IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

ATMAE Accreditation
Self-Study Appendix Spring 2015

Agricultural Systems Technology
- Agriculture and Biosystems Management Option Program
- Machine Systems Option Program

Industrial Technology
- Manufacturing Option Program
- Occupational Safety Option Program

March 1, 2015

Agricultural and Biosystems Engineering Department
1340 Elings Hall
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APPENDIX 7.1

CHAPTER 91.

AGRICULTURAL COLLEGE.

AN ACT to provide for the establishment of a State Agricultural College and farm with a Board of Trustees which shall be connected with the entire Agricultural Interests of the State of Iowa.

College established.

SECTION 1. *Be it enacted by the General Assembly of the State of Iowa*, That there is hereby established a State Agricultural College and Model Farm, to be connected with the entire Agricultural Interests of the State.

Board of trustees.

SEC. 2. Said College and Farm shall be under the management of a board of eleven trustees, and the Governor, the President of the State Agricultural Society, who shall be ex-officio members of said board.

Terms of office.

SEC. 3. The board of Trustees shall at their first meeting under this act determine by lot their several periods of service, five of whom serving for two years, and six serving for four years, and until their successors are elected and qualified. At the annual meetings in the fall before vacancies occur in this board, each county agricultural society in the State may nominate one person for trustee, from whom the General Assembly shall choose trustees to fill vacancies every two years as they occur, discriminating so as to give, if possible, one trustee to each judicial district in the State. Any vacancy in the board of trustees, caused by death, resignation or removal from the State, may be filled by a vote of the majority of the members of said board. Each trustee is required to give a satisfactory bond to the State in such sum as may be required by the Governor, for the faithful discharge of the duties imposed upon them.

Vacancies filled.

Official bond.

President of the board.

SEC. 4. The President of the college shall be president of the board of trustees. It shall be his duty to preside at all meetings of the board. He shall control, manage and direct the affairs of the college and farm herein established, subject to such rules as may be prescribed by the trustees.

Powers of the board.

SEC. 5. Said board shall have power:

Establish rules.

1st. To elect a President for the State Agricultural College and farm, and in the absence of the President,

a President pro tempore, a Secretary and such other officers as may be required in the transactions of the business of the board.

Establish rules.

2d. To make all necessary rules and regulations for the government of the college and farm.

Purchase lands.

3d. To purchase lands and erect buildings thereon, in accordance with the further provisions of this act.

Keep a record.

4th. To keep a full and complete record of all their proceedings, and do such other things as may be found necessary to carry out the intent and meaning of this act.

Compensation of Trustees.

SEC. 6. The trustees shall receive no compensation except for mileage in traveling to and from the meetings of the board, which shall be at the same rate and computed in the same manner as the mileage allowed to members of the General Assemoly; and the Auditor of State is hereby authorized to audit and allow the claims for such attendance, upon not more than three meetings annually.

First session.

SEC. 7. The first session of the board of trustees shall be held at the Capitol of the State, on the second Monday in January, 1859.

Quorum.

SEC. 8. A majority of the board of trustees shall be a quorum for the transaction of business.

Purchase suitable land.

SEC. 9. Said board of trustees are hereby authorized to select and purchase suitable lands, not less than six hundred and forty acres, for the use and purposes of the college herein established.

Proposals of sale and advantages of location.

SEC. 10. Said board shall receive proposals for sale of lands for the use of said college before purchasing the same, and in the purchase, the price, location, quality and variety of soil, advantages of water, timber, stone, et cetera, shall be considered.

Land appropriated for building.

SEC. 11. There is hereby appropriated the proceeds of the sale of five sections of land heretofore granted to the State of Iowa by Congress for the erection of Capitol buildings, for the use and benefit of the college herein established: Provided Congress diverts the same for this purpose; and also the proceed of the sale of all other lands granted or which may be granted by Con-

gress to the State of Iowa for the purposes contemplated by this act.

$10,000 appropriated.

SEC. 12. There is hereby appropriated out of any monies in the treasury of the State, not otherwise appropriated, the sum of ten thousand dollars for the purchase of lands as provided in section nine of this act and the improvement of the same.

Deed of conveyance.

SEC. 13. Upon the execution and delivery to the Secretary of State of the proper convevance or conveyances of the land purchased as hereinbefore provided, with a certificate of the Attorney General of the State, that he has examined the title to the same and finds it unencumbered and perfect and in accordance with this act, and that the location has been approved by the trustees, the Auditor of State shall draw his warrant or warrants on the State Treasurer for the amount of such purchase in favor of the party or parties to whom such sum or sums may be due: said purchase or purchases to be made in the year eighteen hundred and fifty-nine previous to the first day of July of that year.

Auditor's warrants.

Purchase, completed.

Buildings erect'd.

SEC. 14. If any monies remain unexpended after the purchase of said farm or lands, the trustees are hereby authorized to appropriate the same, or so much thereof as is needed for the erection of the necessary buildings for the college on the farm, and otherwise improving the same.

Studies pursued.

SEC. 15. The course of instruction in said college shall include the following branches, to wit: Natural Philosophy, Chemistry, Botany, Horticulture, Fruit Growing, Forestry, Animal and Vegetable Anatomy, Geology, Mineralogy, Meteorology, Entymology, Zoology, the Veterinary Art, plain Mensuration, Levelling, Surveying, Book Keeping, and such mechanic arts as are directly connected with Agriculture. Also, such other studies as the trustees may from time to time prescribe, not inconsistent with the purposes of this act.

Professorships.

SEC. 16. The board of trustees shall establish such Professorships as they may deem best to carry into effect the provisions of this act.

SEC. 17. Tuition in the college herein established

Tuition free.

Qualification of admission.

shall be forever free to pupils from this State over fourteen years of age and who have been resident of the State six months previous to their admission. Applicants for admission must be of good moral character, able to read and write the English language with ease and correctness, and also to pass a satisfactory examination in the fundamental rules of arithmetic.

Hours of labor.

SEC. 18. The trustees upon consultation with the professors and teachers shall, from time to time, establish rules regulating the number of hours, to be not less than two in winter and three in summer, which shall be devoted to manual labor and the compensation therefor; and no student shall be exempt from such labor except in case of sickness or other infirmity.

Book keep'r elected.

SEC. 19. The board shall elect annually from the teachers or more advanced pupils, a competent book keeper, who shall keep an accurate account of the receipts and disbursements of said college and farm from all sources; he shall also keep a minute and accurate account with each field and of each crop, which shall embrace the time and manner of cultivation, the amount of seed and the product, condition of the field before planting and sowing, and after harvesting, and kind and amount of fertilizers used; also, a list of animals and the value thereof, kept on the farm and the treatment of the same; also, a daily register of the weather; of all of which he shall make an annual statement or synopsis of the same, to the Secretary of the board of trustees.

Record of crops, &c.,

Account with farm.

SEC. 20. Said college and farm shall be charged with the amount of crops, the proceeds of sales, and the increase of animals raised on the farm.

Secretary elected.

SEC. 21. The trustees shall elect at their first annual meeting in January, 1859, and every two years thereafter, a Secretary from their own number, who shall hold his office two years, and until his successor is elected and qualified. He shall reside at the Capital of the State and have an office in the legislative building. It shall be his duty to keep a record of the transactions of the board of trustees and college and farm, which shall

He keeps minutes.

be open at all times to the inspection of any citizen of this State. He shall also have the custody of all books, papers, documents and other property which may be deposited in his office, including specimens of the vegetable and animal kingdom of the State or country; also, keep and file all reports which may be made from time to time by county and State agricultural and horticultural societies, and all correspondence of the office from other persons and societies appertaining to the general business of husbandry; address circulars to societies and the best practical farmers in the State and elsewhere, with the view of eliciting information upon the newest and best mode of culture of those products, vegetables, trees, etc., adapted to the soil and climate of this State; also, on all subjects connected with field culture, horticulture, stock raising, and the dairy. He shall encourage the formation of agricultural societies throughout the State, and purchase, receive and distribute such rare and valuable seeds, plants, shrubbery and trees, as may be in his power to procure from the general government and other sources, as may be adapted to our climate and soils. He shall also encourage the importation of improved breeds of horses, asses, cattle, sheep, hogs and other live stock, the invention and improvement of labor saving implements of husbandry and diffuse information in relation to the same; and the manufacture of woolen and cotton yarns and cloths, and domestic industry in weaving, spinning, knitting, sewing, and such other household arts as are calculated to promote the general thrift, wealth and resources of the State. He shall make a report in writing to the General Assembly at every session thereof, and to the Governor in each year when the Legislature is not in session, on the first day of February, of all the transactions of his office of a public character, including a full statement of the receipts and expenditures of the college and farm and of his own office, and at such other times as the Governor or Legislature may require. He shall give a bond in the sum of thirty thousand dollars, with good security, for the faithful discharge of the duties of his office.

Preserves documents.

Attend to correspondence.

Encourage agricultural societies.

Import breeds.

Domestic manufactures.

Annual report.

Seeds &c., distributed.

SEC. 22. The seeds, plants, trees and shrubbery received by the Secretary, shall be, as far as possible, distributed equally throughout the State, and placed only in the hands of those farmers and others who will cultivate them properly and return to the Secretary's office, a reasonable proportion of the products thereof with a full statement of the mode of cultivation and such other information as may be necessary to ascertain their value for general cultivation in the State. All information in regard to agriculture, obtained by the Secretary, of an important character, may be published by him from time to time in the newspapers of the State, provided it does not involve any expense to the State.

Information published.

Agricultural statistics.

SEC. 23. The Secretary shall collect and file in his office the agricultural statistics of each organized county in the State.

Gov. appoints Secretary.

SEC. 24. That the farming interest of the State may derive immediate benefit from the duties imposed upon the Secretary, the Governor is hereby authorized and empowered to appoint a Secretary on the passage of this act, from among the board of trustees named in this act, who shall hold his office for one year, and until his successor is elected and qualified, as provided in section twenty-one of this act.

His salary.

SEC. 25. The Secretary shall receive as a compensation for his services, a salary of one thousand dollars per annum, to be paid quarterly from the State treasury in the same manner as is provided by law for the payment of the salaries of other State officers, and the sum of one thousand dollars is hereby annually appropriated for that purpose; and the additional sum of one thousand dollars, or so much thereof as may be esteemed necessary by the Governor, is also hereby annually appropriated to meet the expenses which may be incurred in the purchase and transportation of seeds, postage, stationery, and the other contingent expenses of the office of the Secretary, to be paid out of the State Treasury on the requisition of the Governor through the Auditor of State.

Contingent fund.

SEC. 26. The board of trustees shall elect a Treas-

urer from their own number annually, at their meeting in Jan., who shall receive and keep all moneys arising from the sale of the products of the farm or other source, and give bonds in such sum as the board of trustees may require. He shall pay over all moneys upon the warrant of the President, countersigned by the Secretary. He shall render annually in the month of January, to the board of trustees, and as often as may be required by said board, a full and true account of all moneys received and disbursed by him. Treas'r chosen. His duties.

SEC. 27. That M. W. Robinson, of Desmoine county, Timothy Day, of Van Buren county, John D. Wright, of Union county, G. W. F. Sherwin, of Woodbury county, Wm. Duane Wilson, of Polk county, Richard Gaines, of Jefferson county, Suel Foster, of Muscatine county, J. W. Henderson, of Linn county, Clerment Coffin, of Delaware county, E. H. Williams, of Clayton county, and E. G. Day, of Story county, are hereby appointed and constituted the first board of trustees of the agricultural college and farm, who shall hold their office as may be determined under the provisions of the third section of this act. First Board of Trustees.

SEC. 28. This act shall be in force from and after its publication in the Iowa Farmer, Tri-Weekly Iowa State Journal and Tri-Weekly Citizen. Take effect.

Approved March 22, 1858.

I hereby certify that the foregoing Act was published in the Iowa Farmer on the 25th day of March, 1858, in the Iowa Weekly Citizen on the 31st of March, 1858, and the Iowa State Journal on the 27th of March, 1858.

ELIJAH SELLS,
Secretary of State.

CHAPTER 92.

UNCLAIMED GOODS.

AN ACT to regulate the sale of unclaimed goods, in the possession of Forwarding and Commission Merchants, Express Companies, and other common carriers.

SECTION 1. *Be it enacted by the General Assembly of*

ENROLLED ACT, NO. 91 HOUSE OF REPS.

An act to provide for the establishment of a State Agricultural College and Farm, with a Board of Trustees which shall be connected with the entire agricultural interest of the State of Iowa,

Sec. 1. Be it enacted by the General assembly of the State of Iowa, that there is hereby established a State Agricultural College and Model Farm, to be connected with the entire agricultural interests of the State

Sec. 2. Said College and Farm shall be under the management of a Board of Eleven Trustees, and the Governor, the President of the State Agricultural Society and the President of the State Agricultural College, who shall be ex-officio members of said Board,

Sec. 3. The Board of Trustees shall, at their first meeting under this act determine by lot, their several periods of service, five of whom, serving for two years and six serving for four years, and until their successors are elected and qualified, At the annual meeting in the fall, before vacancies occur in this board, each county agricultural society in the State may nominate one person for Trustee, from whom the General Assembly shall choose Trustees to fill vacancies every two years as they occur, discriminating so as to give, if possible one Trustee to each Judicial District in the State, Any vacancy in the Board of Trustees, caused by death, resignation or removal from the State, may be filled by a vote of the majority of the members of said Board. Each Trustee is required to give a satisfactory bond to the State in such sum as may be required by the Governor, for the faithful discharge of th

I hereby certify that this bill originated in the House of Representatives, W. Hepburn Chief Clerk

[illegible] this State in the years 1855, 1856, and 1857

give bonds in such sum as the Board of Trustees may require. He shall pay over all moneys, upon the warrant of the President countersigned by the Secretary, he shall annually in the month of January, to the Board of Trustees, and as often as may be required by said Board a full and true account of all moneys received and disbursed by him.

Sec. 27. That M. W. Robinson of Des Moines County, Timothy Day of Van Buren County, John D. Wright of Union County, G. W. F. Sherwin of Woodbury County, Wm. Duane Wilson of Polk County, Richard Gains of Jefferson County, Lucel Foster of Muscatine County, J. H. Henderson of Linn County, Clermont Coffin of Delaware County, E. H. Williams of Clayton County, E. G. Day of Story County, are hereby appointed and constituted the first Board of Trustees of the Agricultural College and Farm, who shall hold their office as may be determined under the provisions of the third section of this act.

Sec. 28. This act shall take effect from and after its publication in the Iowa Farmer, the Tri-weekly Iowa State Journal and Tri-weekly Iowa Citizen.

Stephen B. Sheeley
Speaker of the House
of Representatives

Oran Faville
President of the Senate

Approved March 22nd 1858
Ralph Pelton

APPENDIX 7.2

IJEE 1854

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Competency-based Outcomes Assessment for Agricultural Engineering Programs*

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The ABET 2000 criteria have provided the impetus for the Agricultural and Biosystems Engineering Department at Iowa State University to re-structure the assessment of its undergraduate agricultural engineering program. We linked ABET student outcomes to validated work-place competencies with key actions that are measurable in academic and experiential education environments. Two tools are being used to assess competencies: an on-line assessment system and electronic portfolios developed by each student as a requirement for graduation. This paper discusses the overall philosophy of our assessment program, how the assessment tools are being implemented, and the implications for change in the curriculum.

Keywords: Outcomes, assessment, competencies, electronic portfolios, on-line assessment, experiential education, internships, ABET.

BACKGROUND

ABET Outcomes and Competencies

ENGINEERING EDUCATION programs in the United States are moving from an 'input' to an 'outcomes' paradigm. Success is now focused on how well students achieve desired learning outcomes, not simply whether they've completed required coursework. The ABET 2000 Engineering Criteria 3 Program Outcomes and Assessment [1] have provided engineering programs with the impetus and opportunity to re-craft how they educate students.

Although institutions may use different terminology, for purposes of Criterion 3, program outcomes are intended to be statements that describe what students are expected to know or be able to do by the time of graduation from the program.

Engineering programs, based on ABET Engineering Criteria 3 Program Outcomes and Assessment for 2003–2004 [1], must demonstrate that their graduates have:

a. an ability to apply knowledge of mathematics, science, and engineering
b. an ability to design and conduct experiments, as well as to analyze and interpret data
c. an ability to design a system, component, or process to meet desired needs (d) an ability to function on multi-disciplinary teams
d. an ability to identify, formulate, and solve engineering problems
e. an understanding of professional and ethical responsibility
f. an ability to communicate effectively
g. the broad education necessary to understand the impact of engineering solutions in a global and societal context
h. a recognition of the need for, and an ability to engage in life-long learning
i. a knowledge of contemporary issues
j. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Each program must have an assessment process with documented results. Evidence must be given that the results are applied to the further development and improvement of the program. The assessment process must demonstrate that the outcomes of the program, including those listed above, are being measured.

There are a variety of ways in which engineering departments can respond to the new ABET Criteria. Felder and Brent [2] give an excellent overview of ways to redesign courses and curricula for meeting ABET engineering criteria.

ISU approach to meeting ABET Outcomes

The College of Engineering (COE) at Iowa State University (ISU) has taken the unique approach of addressing the ABET Outcomes criteria as workplace competencies [3, 4]. In the technologically and structurally expanding workplace, employers need different measures to use when recruiting and retraining employees [5]. Competencies fulfill this need by focusing on what people can do with what they learn, not solely on the acquisition of skill or knowledge [6]. Employers of the graduates of our agricultural engineering (AE) program are increasingly focusing on workplace competencies in their

* Accepted 11 August 2006.

hiring practices (e.g., USDA National Resource and Conservation Service, John Deere, ConAgra Foods, Caterpillar), and student development of competencies are, therefore, critical to career success after graduation.

Competencies are the application of behavior and motivation to knowledge, understanding, and skill. They are 'the result of integrative learning experiences in which skills, abilities and knowledge interact' to impact the task at hand [7]. As such, competencies are directly measurable through key actions or through demonstrations of the existence of those competencies in the individual.

In the Fall of 1999, a constituency of over 200 ISU faculty, partnering international faculty, co-op and intern students, employers, and alumni were asked to assist the ISU College of Engineering Cooperative Education and Internship Program in developing a next generation of performance assessment tools, ones that would be aligned with the new ABET Engineering Criteria 2000. Specifically, we set out to create a set of assessment metrics for the co-op and intern workplace that would be sufficient to document our students' development and demonstration of the ABET (a-k) Outcomes. Our hypotheses were that each the Outcomes are too complex to measure directly and that each Outcome represented some collection of workplace competencies necessary for the practice of engineering at the professional level. To support our efforts, the College collaborated with Development Dimensions International, Inc. (DDI), a global provider of competency-based performance management tools and services [8].

Constituents participated in DDI-facilitated focus sessions, using a 'Critical Incident' data gathering technique, following a DACUM strategy [9]. In these sessions, they provided hundreds of examples of successful and unsuccessful demonstrations of the eleven ABET (a–k) Outcomes by engineering students and graduates. DDI professionals analyzed these 'Critical Incident' stories and extracted fourteen dimensions or ISU Competencies:

- engineering knowledge
- continuous learning
- initiative
- cultural adaptability
- planning
- teamwork
- professional impact
- general knowledge
- quality orientation
- innovation
- analysis and judgment
- communication
- integrity
- customer focus.

The definition of each ISU competency was written clearly, concisely, and independently. Specific to each definition is a set of observable and measurable key actions. For example, the definition of the Communication competency and its key actions are given below.

- Communication involves clearly conveying information and ideas through a variety of media to individuals or groups in a manner that engages the audience and helps them understand and retain the message. Key actions involve:
- Organizes the communication—Clarifies purpose and importance; stresses major points; follows a logical sequence.
- Maintains audience attention—Keeps the audience engaged through use of techniques such as analogies, illustrations, body language, and voice inflection.
- Adjusts to the audience—Frames message in line with audience experience, background, and expectations; uses terms, examples, and analogies that are meaningful to the audience.
- Ensures understanding—Seeks input from audience; checks understanding; presents message in different ways to enhance understanding.
- Adheres to accepted conventions—Uses syntax, pace, volume, diction, and mechanics appropriate to the media being used.
- Comprehends communication from others—Attends to messages from others; correctly interprets messages and responds appropriately.

A complete set of competency definitions and key actions can be found at: http://learn.ae.iastate.edu/assessment/CompetencyDefinitions.pdf.

COE faculty involved in the constituency dialogue then mapped the competencies to the ABET (a–k) Outcomes. Further constituent dialogue using a survey tool validated these competencies as necessary and sufficient to demonstrate the Outcomes. Figure 1 shows this mapping in the form of a matrix.

COMPETENCY-BASED LEARNING

A conceptual model of learning based on competencies does not work solely at the level of skill, abilities, and knowledge (the conventional approach to engineering education), but seeks to formulate curriculum and assessment at the competency level which embodies integration of skills, abilities, and knowledge needed to become part of the disciplinary community of practice [10]. Such a model is illustrated in Fig. 2.

Competency-based learning (CBL) involves redefining program, classroom, and experiential education objectives as competencies or skills, and focusing coursework on competency development. The advantage to CBL is that competencies are transparent; that is, all participants in the learning process understand the learning goals and outcomes. Competencies provide students with a clear map and the navigational tools needed to move expeditiously toward their goals [7]. Competencies have a stronger impact on

Engineering 2003-2004 Criterion 3 Program Outcomes and Assessment		ISU Competency													
		Engineering Knowledge	General Knowledge	Continuous Learning	Quality Orientation	Initiative	Innovation	Cultural Adaptability	Analysis and Judgment	Planning	Communication	Teamwork	Integrity	Professional Impact	Customer Focus
(a)	an ability to apply knowledge of mathematics, science and engineering	X		X		X			X						
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	X		X	X	X	X		X	X		X			X
(c)	an ability to design a system, component, or process to meet desired needs	X		X	X	X	X	X	X	X	X	X			X
(d)	an ability to function on interdisciplinary teams					X		X	X	X	X	X	X	X	X
(e)	an ability to identify, formulate and solve engineering problems	X		X	X	X	X		X		X	X			X
(f)	an understanding of professional and ethical responsibility		X	X	X			X	X				X		
(g)	an ability to communicate effectively		X			X					X			X	X
(h)	the broad education necessary to understand the impact of engineering solutions is a global and societal context	X	X	X				X	X						
(i)	a recognition of the need for, and the ability to engage in, life-long learning			X			X								
(j)	a knowledge of contemporary issues		X	X				X	X						
(k)	an ability to use the techniques, skills and modern engineering tools necessary for engineering practice	X		X	X	X		X	X						

Fig. 1. ABET Outcomes—ISU competencies matrix.

student learning when they are linked to and embedded within specific courses and across the curriculum [9]. CBL models rely on both the judgment of those external to the learning process and on measurable assessment [7].

Other institutions have linked competencies to the learning process with some success [9]. King's College in London, UK, Alverno College, Wisconsin, USA, and Northwest Missouri State University, USA, have all used competency-based learning as an integral part of student development and learning assessment. However, few engineering programs have embraced CBL across the entire curriculum.

ePortfolios

Portfolios provide a broad assessment tool for student intellectual development and for technical expertise. They are powerful vehicles for both pedagogy and assessment, demonstrating a student's learning as an organic process involving three key factors: collection, reflection, and selection [11].

Portfolios can be a powerful learning experience. Using portfolios allows students to revisit their accomplishments over a given period of time, select various artifacts for the collection, and reflect on their growth and development through the creation of those artifacts: 'Revisiting past work, students often improve the earlier work but also comment in a way that demonstrates their thinking around that work. In such a reflective text, students make their thinking visible' [12]. Through students' reflections and choice of artifacts, assessors and instructors have the opportunity to see explicitly how instruction is being interpreted and evaluated long after the class has ended [11].

Although there are many types of portfolios (e.g. professional, classroom, and learning portfolios), generally they can be broken down into two categories: summative and formative [13]. Summative portfolios center themselves on learning outcomes and seek to demonstrate the student's knowledge through the presentation of artifacts. In contrast, formative portfolios emphasize the process of learning and seek to show how students arrive at various artifacts. Moreover, formative portfolios provide feedback to students throughout the learning process.

In the last five years, portfolios have been moving increasingly online. Online electronic portfolios (ePortfolios) are useful pedagogical tools for providing both efficiency and effectiveness for assessment [13]. Because ePortfolios are online, the portfolio process can be streamlined through intelligent database control, electronic guides, and web design templates. All of these procedures can increase the effectiveness of the assessment process for students, faculty, and programs. ePortfolio

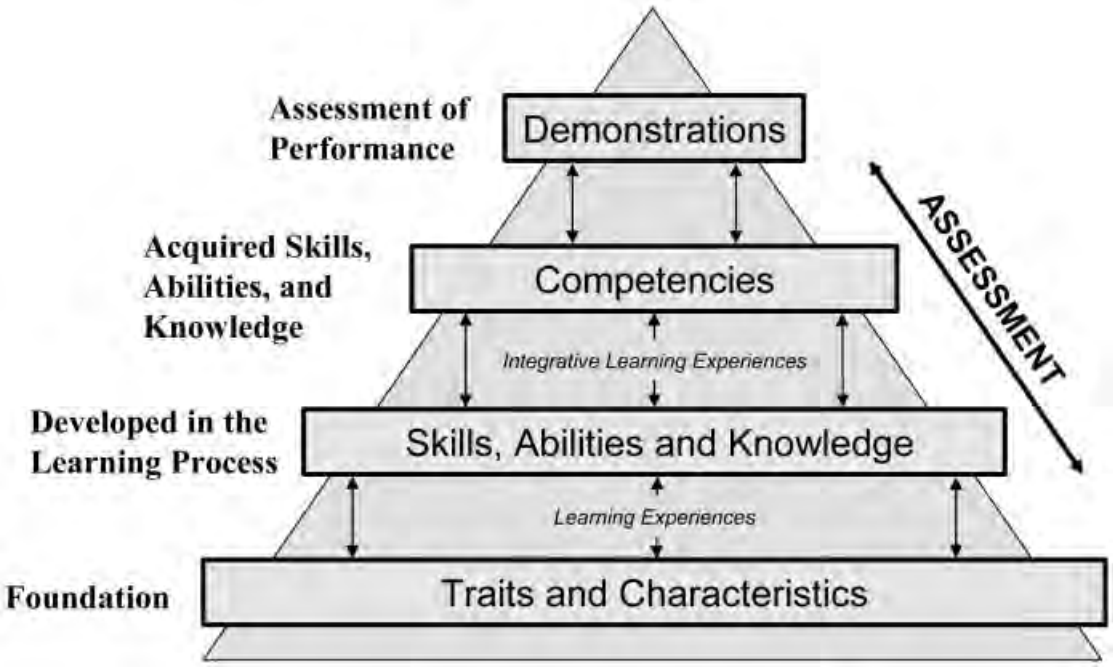

Fig. 2. A conceptual learning model based on competencies [10].

systems range from the generic tool/template approach (GT) to the customized systems/free design approach (CS) of development [14]. GT systems rely on databases and templates, which give students little individual expression in their portfolio while CS systems rely on free design which gives students flexibility and personal creativity. CS systems, however, do not lend themselves to competency-based portfolios.

Competency driven portfolios hosted within writing programs have been successfully used at a variety of institutions [15, 16]. For example, Rose-Hulman Institute of Technology, Indiana USA, has developed an ePortfolio system that allows students to archive multimedia artifacts. Their faculty can rate the artifacts based on learning outcome goals and performance criteria [17]. A slightly different model is the Learning Record Online at the University of Texas at Austin, USA, which includes both formative and summative assessment in its reading and writing portfolio system [18]. Similarly, the University of Wisconsin-Superior, U.S., piloted a portfolio system for assessment in their general education program [19]. More recently, Alverno College, Wisconsin, U.S., has developed the Diagnostic Digital Portfolio system where students display key performances in a GT environment, linked to abilities and educational standards across the entire college [20].

OUR ASSESSMENT PLAN

Through the integration of ABET Outcomes and ISU Competencies, the Agricultural and Biosystems Engineering (ABE) department developed the outcomes assessment plan for the Agricultural Engineering (AE) undergraduate degree program, as illustrated in Fig. 3.

The mission, goals, and objectives of the program are reviewed (and changed as necessary) every three years in consultation with stakeholders and our industrial advisory board, concurrent with the ABET accreditation cycle. From this process, the desired student learning outcomes are developed, taking into account ABET accreditation and ASAE recognition criteria.

Each class in the curriculum is examined to determine which of the outcomes it addresses. Then curriculum as a whole is examined to ensure adequate coverage of the outcomes. Should there be gaps in coverage, the curriculum is re-examined to determine if different classes are needed, or if courses within the department need to be changed or added to ensure all the outcomes are adequately addressed.

Once the outcomes are mapped to the individual classes, we determine from the outcomes-competency matrix which competencies are addressed in each of the classes taught in our department. We thus know which competencies should be focused on in each class. Finally, the faculty designate key assignments in each class that students can use to demonstrate these competencies.

The primary evidence of students achieving the outcomes (or in our case, achieving the fourteen ISU competencies) is direct evidence of performance: student portfolios, workplace evaluations of students on internships and alumni five years post-graduation, and the results of the Fundamentals of Engineering (FE) exam. Indirect measures

(e.g., senior exit surveys, student evaluation of instruction, post graduate surveys, program reviews, advisor evaluations and placement statistics) are reviewed as background information but are not the basis of judgment for the attainment of outcomes.

The direct and indirect measures are reviewed annually by the AE Curriculum Committee to identify strengths and weaknesses of the program, and in consultation with the ABE External Advisory Committee, makes recommendations for change. The faculty as a whole (e.g., curriculum changes) or individual faculty (specific classes) implement the recommendations.

This outcomes assessment plan is identical for the other undergraduate degree offered by our department, agricultural systems technology. The outcomes for this program were modeled after the ABET technology criteria [21], with a similar set of competencies mapped to the outcomes, although the program is not accredited by ABET. Thus all undergraduate students in our department, both engineers and technologists, will be creating electronic portfolios, and will be evaluated in internship experiences and in the workplace post-graduation.

Direct and indirect measures

Before implementing this new assessment plan, we relied on 'indirect' measures of student performance, i.e., student exit surveys, placement rates, and alumni surveys. While these instruments, especially surveys, can provide some useful information, they are ultimately just opinions and not direct evidence of student performance. With the new ABET accreditation guidelines, credence is given to direct measures, i.e., evaluations of student work and performance [22].

Our assessment plan uses these direct measures to evaluate student performance: electronic portfolios created and owned by students, online competency assessments (evaluations by supervisors of students on internships and alumni practicing in the field of engineering), and the results of the Fundamentals of Engineering examination, the first step towards professional licensure.

CONNECTING COMPETENCIES TO OUTCOMES

The direct measures result in numerical evaluations of student performances. Workplace and ePortfolios competency assessments are charted on a Likert Scale, allowing us to rank the weakest and strongest competencies. The aggregate results of the FE exam provide evidence for the attainment of the 'engineering knowledge' competency by our students.

We apply a numerical rating to each of the outcomes, given that all the competencies are mapped to outcomes, and we can then rank how well each outcome is achieved. A system which weighs each competency within an outcome could also be developed to determine how each outcome is being met. However, since we are only now working to complete our first cycle of assessment,

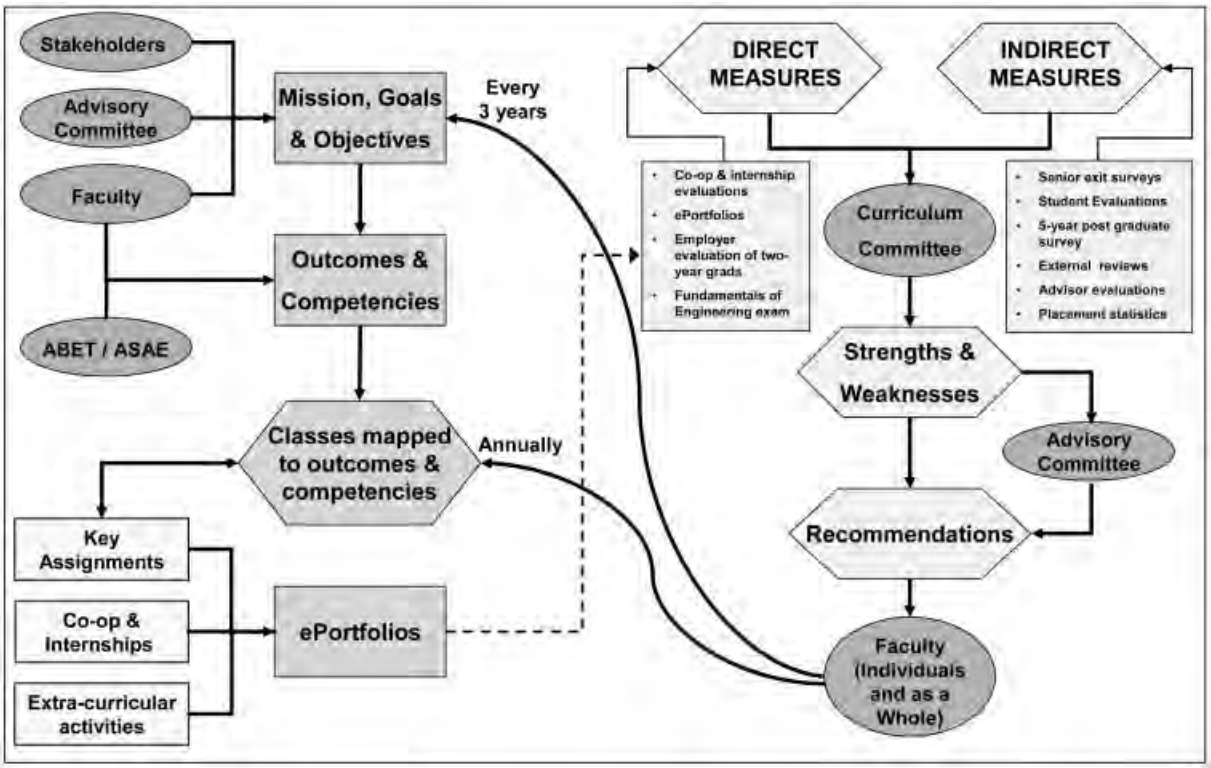

Fig. 3. The ABE outcomes assessment plan.

we don't have the experience with our plan to implement such a system.

ePortfolios

Incorporating a portfolio program into our curriculum allows us to continually renegotiate what our program is teaching and what our students are learning, and also provides us with a strong qualitative methodology for continual program assessment.

Our electronic portfolio system is a compromise between the generic template and the customized system approaches. The foundation of the system is a proprietary database system that we developed to hold the artifacts. This system is based on Macromedia's Rich Internet Application (RIA) model using Dreamweaver, Flash, and Cold Fusion [23]. The system (Fig. 4) can be accessed at *http://learn.ae.iastate.edu/portfolio/* (username = guest, password = guest). Built into the database system is an assessment component.

Students upload artifacts that demonstrate achievement of one or more competencies. These artifacts can be papers they have written, examinations, laboratory reports, videos of presentations, design projects, or any form of evidence the student chooses that can be stored electronically. Artifacts, however, are not restricted to formal class settings. They can include internship experiences, student club activities, service learning projects, volunteer work, or any extra-curricular experiences that help demonstrate the competencies. Students must attach a reflection to the artifact by explaining its significance and impact. They must also self-assess the artifact, rating it on a Likert Scale for each of the key actions associated with the competency.

Using Dreamweaver and Flash, students then

Fig. 4. The ABE ePortfolio System introduction screen.

develop an interface which accesses the database to display the artifacts in whatever fashion they deem appropriate. For assessment purposes, artifacts are presented around a competency theme. They can also develop electronic resumes and portfolios for prospective employers in the same interface.

Students own the artifacts they place in the database. They decide to make the artifacts public (available for viewing by faculty and assessors) or private. They also control, outside of the classroom and assessment settings, who has access to their portfolios.

Faculty and assessors, in the context of class assignments and assessment, can access the 'public' student artifacts and their ePortfolios. Just as the students self-assess the artifacts based on competencies, faculty and assessors assess the artifacts, resulting in a numerical evaluation of the students' achievement of the competencies.

On-line competency assessment

OPAL™ is DDI's online competency development and performance management software that provides assessment, development, coaching, and learning tools [24]. Following customization of OPAL™ to present the ISU Competencies, key actions, and assessment surveys, the system is now used by all Iowa State engineering cooperative education and internship (semester long only) students and their supervisors. To receive academic credit for the work term, each student is required to complete the standard self-assessment and to ensure that the supervisor completes the same assessment of the student.

The standard assessment survey consists of sixty-one key actions associated with the fourteen ISU Competencies. Using a Likert Scale, each student and each supervisor provides an assessment of the student's demonstration of each key action. The average value of each key action is computed from the student's self assessment and from the supervisor's assessment. A value for student development and demonstration of each ISU Competency is computed as the average of the averages of the associated Key Actions (Fig. 2). These assessments are anonymous to the ABE faculty, in that we can see aggregate results, but cannot identify individual evaluations. Mickelson *et al.* [25] summarize the results of such assessments for students in the AE program.

The same standard assessment survey is given to alumni (two years post-graduation) and their supervisors. While their participation is voluntary, we are finding that we have approximately the same response rate as the alumni surveys we previously administered.

While not part of our assessment plan, we are using OPAL™ in the classroom and having students evaluate themselves and others in team projects and capstone design experiences. The evaluations of an individual competency within the OPAL™ assessment surveys are identical to the assessments they make on artifacts within the ABE portfolio system.

IMPLEMENTING THE PLAN IN OUR CURRICULUM

Changes in the curriculum

Upon entering the program, agricultural engineering (AE) students are exposed to workplace competencies. All freshmen are placed in a learning community for the first two semesters of their academic program [26]. In these learning communities, the students take three linked courses each semester as a cohort group. The first semester link includes Engineering Orientation (Engr 101, R credit), First-Year Composition I (English 104, 3 credits), and Engineering Graphics and Design (Engr 170, 3 credits). The second semester includes a link between Engineering Problems Solving (AE 160, 3 credits), First-Year Composition II (Engl 105, 3 credits), and a hands-on laboratory course, Experiencing Agricultural and Biosystems Engineering (AE 110, 1 credit).

AE students are introduced to the 14 ISU competencies in these course linkages through several assignments. For example, in Engr 101 and AE 110, students prepare behavior-based answers to workplace related questions for each of the 14 competencies. Upper-class mentors conduct behavior-based interviews in our college interview rooms to help prepare the students for coop/internship interviews. Assignments in the First-Year Composition courses tie in with the competency theme, where the students write papers related to competencies in engineering, technology, agriculture, and biological systems. From these classes, and the freshman engineering courses, students also start collecting artifacts that demonstrate their proficiency for each ISU competency. An example that demonstrates the teamwork competency would be an open-ended team design report in Engr 170 describing the design of a robot to collect contaminated materials. Another example would be documenting the solution to an engineering economics problem in AE 160, thus demonstrating 'engineering knowledge.' OPAL™ is used in each of these courses. Education materials that correlate with each competency are available within OPAL™. Faculty and students can access these materials for course or personal development.

Two required one-credit seminar classes for the sophomore and junior years have been created. These seminars focus on three areas: competency development, ePortfolio creation, and service learning. The seminars help ensure that work on competency development and on ePortfolios is a continuous process rather that something that students can delay until the semester in which the portfolio is required.

Portfolios are summatively evaluated as part of the senior seminar. While there is some discussion of competencies and ePortfolios in the class, much of the student work will already have been completed. If the student doesn't submit a satisfactory ePortfolio, she/he will not pass the seminar class, which is required for graduation. Using the assessment tools imbedded in the database system, a team of three engineering professionals, two faculty members and one external reviewer, evaluate portfolios and their artifacts. External reviewers come from the Iowa Section of the American Society of Agricultural Engineers. The local section of our professional society has over 400 members and has been actively involved in student professional development in our department for many years. We anticipate evaluating 35 to 40 portfolios each year. With approximately 17 teaching faculty, each faculty will review four portfolios, which is a reasonable workload.

Changes for faculty

Implementing an assessment plan based on competencies requires faculty to engage in competency-based learning. Faculty must think, teach and assess in terms of competencies. In short, we must formulate our learning objectives in terms of competencies. This requires us to change how we approach the educational process in our department.

We are at the beginning stages of this process. Faculty know which outcomes their classes address, and the Outcomes-Competency matrix (Fig. 2) lets them know the competencies they need to address in their classes. We are providing faculty with workshops and graduate student assistance to help them to include competencies as part of course foundations. Our faculty, through the unanimous adoption of the assessment plan, are committed to the process of implementing competency based learning in our curriculum.

As a first step, faculty designate key assignments for inclusion into student ePortfolios. These designations spring from a recognition of the competencies that the assignment addresses. Sharing these designations with students provides opportunities outside the seminars to discuss competencies.

We recognize that faculty time is always at a premium. As such, we worked hard to create a system that does not place undue burdens on the faculty. The only additional workload involved for individual faculty is evaluating four ePortfolios each year. Incorporating competencies into classes, with guidance and access to resources, can be part of the normal class development and evolution process.

CURRENT STATUS

To date, we have accomplished these aspects of our outcomes assessment plan:

- The ABE portfolio system has been constructed and tested. Students are uploading artifacts. A cohort of students has created ePortfolios which will be assessed in the fall of 2004.
- Competency-based learning has been incorporated into the ABE Learning Communities (coursework) at the freshman and sophomore level.
- The curriculum has been revised to include sophomore and junior seminars. The first offerings will be in the spring of 2005.
- Outcomes have been mapped to individual classes.
- Faculty are currently (summer of 2004) identifying competencies addressed in individual classes and key assignments to be included in student portfolios.

There are some important things we have yet to accomplish:

- The whole ABE undergraduate student body needs to be engaged in ePortfolio creation, not just a small cohort. While we have tested the ABE portfolio system, we need experience managing the system with approximately 300 students from the two undergraduate degree programs in the department.
- We need to train the faculty and external evaluators on assessing ePortfolios.
- Faculty need to fully integrate competency-based learning into their courses.
- We must complete an entire assessment cycle, with students completing their ePortfolios in the senior seminar class. The data needs to be analyzed, with recommendations for change developed and implemented.

The first complete assessment cycle is scheduled for the 2005–2006 academic year, in preparation for the ABET accreditation visit in the fall of 2006. We will learn a great deal in the process—we understand that we cannot fully anticipate all the ramifications of our plan. However, we are willing to adjust and modify are plan as needed to obtain a thorough and on-going outcomes assessment of the students in our degree program.

SUMMARY AND CONCLUSIONS

The Agricultural and Biosystems Engineering Department at Iowa State University has embarked on a process of outcomes assessment that requires us to radically change how we think about the education process. By interpreting the ABET (a–k) Criterion 3 Program Outcomes in terms of competencies, we are committing ourselves to transforming our curriculum into one built on competency-based learning.

While change is often difficult, the ABE faculty view this change as an opportunity to re-craft our curriculum to more effectively prepare students for

the professional practice of engineering. Students will benefit by developing competencies that are necessary for success in the engineering workplace. Competencies and ePortfolios will allow them to make connections across the entire curriculum and see their academic experience as an integrated whole rather than just a series of classroom requirements. Faculty will design their classes in ways that address competencies and long-term student success.

Admittedly, we are in the early stages of this process. Even so, we have constructed the pieces of an assessment system radically different from anything we've done before. As we gain experience, we will make the necessary adjustments, refinements, and changes to the process. We believe, however, that our assessment plan is based on sound learning and assessment theory, resulting in a stronger and more successful academic program.

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Assessing and Developing Program Outcomes through Workplace Competencies*

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The College of Engineering at Iowa State University (ISU) partnered with constituents and assessment professionals to identify and validate 14 observable and measurable competencies necessary and sufficient to measure program outcomes. Constituents identified the engineering and experiential workplaces as settings most likely to develop and demonstrate the competencies, and the traditional classroom as least likely. Engineering students in the experiential workplace are assessed on the competencies by their supervisors, providing feedback for curricular change. These results confirm that we must re-examine how we use the classroom to educate engineers and our belief that experiential education is critical to students' success.

Keywords: assessment; ABET; competencies; workplace assessment; internships

INTRODUCTION

MANY ENGINEERING PROGRAMS are well on their way to adopting the outcomes-based ABET Criteria 3, now well know as the 'ABET (a–k) Outcomes' [1]. Eight of the eleven Outcomes address 'an ability to . . .'; two address 'understanding'; and only one addresses 'knowledge.' The direct measurement of 'an ability to . . .' presents challenges very different from those of measuring knowledge and understanding. George Peterson, ABET Executive Director, stated, '. . . evaluating their outcomes are sophisticated activities with which most engineering educators have had little or no experience' [2].

There is no universal approach to implementing and assessing the ABET outcomes-based criteria. Each program must interpret the criteria as they fit for them. A cursory examination of the literature reveals numerous different approaches to implementing ABET criteria [3–5].

Mentkowski *et al.* [6] state:

- Abilities are complex combinations of motivations, dispositions, attitudes, values, strategies, behaviors, self-perceptions and knowledge of concepts and of procedures.
- A complex ability cannot be observed directly, it must be inferred from performance.

At Iowa State University (ISU), we realized that we did not know how to directly assess 'an ability'. We hypothesized that each of the Outcomes are multi-dimensional and represent some collection of workplace competencies necessary for the practice of engineering at the professional level.

We define workplace competencies as the application of knowledge, skills, attitudes and values, and behaviors, as identified by Ewell [7], in the engineering workplace. They are 'the result of integrative learning experiences in which skills, abilities and knowledge interact' to impact the task at hand [8]. As such, competencies are directly measurable through actions or demonstrations of the existence of those competencies in the individual.

The 2005–2006 ABET Engineering Criteria [1] confirm our hypothesis by stating that the program outcomes 'relate to the skills, knowledge, and behaviors that student acquire in their matriculation through the program.'

A list of such competencies could be endless. Which are the most important for students to become successful engineers? Rogers [9] stated that '. . . faculty must determine what competencies that the student must demonstrate in order to know that they have achieved the outcome.' She also stated that 'key stakeholders need to be involved in determining which competencies should be the focus from all the possible competencies for any given outcome.' We could not agree more.

Employers of Iowa State University graduating engineers are relying on behavioral-based interviewing in the recruitment, screening and selection processes of new hires. They seek to assess whether a student has demonstrated a specific set of competencies, the definition of which is based on the analysis of the successful practice of engineering in specific engineering positions. These screening criteria often contain a minimum set of competencies, such as communication, teamwork and continuous learning.

In Spring 1999, the Iowa State University College of Engineering and Development Dimensions International, Inc. (DDI), a global provider of competency-based performance management

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tools and services [10], collaborated to identify workplace competencies that were linked to Criterion 3 Outcomes and Assessment.

IDENTIFYING WORKPLACE COMPETENCIES

Our initial objective was to create a set of repeatable and reproducible measurements for the ABET (a–k) Outcomes that could be applied across the broad spectrum of the engineering experiential education workplace. This process was previously reported by Hanneman *et al.*, [11] and is summarized here.

Experiential education can be broadly defined as a philosophy and methodology in which educators purposefully engage with learners in direct experience and focused reflection in order to increase knowledge, develop skills, and clarify values [12]. In the College of Engineering at Iowa State University, we use a much narrower definition for engineering experiential education. For us, it is work experience in an engineering setting, outside of the academic classroom, and before graduation. Iowa State engineering students work in either a cooperative education program (alternating periods of full-time academic college training and full-time work experience of approximately equal length) or an internship (a single work period of institutional supervised full-time employment of a summer or at least one semester) [13]. Thus, the experiential workplace for us is where students are working when on an internship or participating in a cooperative education program. Typically, over 80% of graduates of our accredited engineering programs have participated in engineering experiential education before they graduate. An internship or cooperative education experience is not required at ISU in our engineering programs, but is strongly encourage by faculty and advisors.

It was desired that measurements of the ABET (a–k) Outcomes should be applicable across all ten of our accredited programs and across the two forms of experiential education offered by the college. Additionally, we wanted the measurements to be clearly and independently defined, readily observable, immediately measurable, consistent with the visions and missions of our college and university, and aligned with existing employer assessment, development and performance management practices. The competencies were to be uniquely ISU's.

Over two hundred constituents (stakeholders) were invited in 1999 to participate in a process to create and validate metrics for the experiential education workplace. These constituents included representation from these groups:

- employers (supervisors, managers, practicing engineers, recruiters, and human resource, education, training and development representatives);
- faculty, staff, and administrators; alumnae/i;
- students who participated in experiential education; parents;
- international faculty from partnering institutions.

Significant effort was made to ensure that each accredited program in the college received appropriate representation from each of the stakeholder groups and to ensure a broad, diverse representation from the employer community. The group ultimately consisted of 212 stakeholders.

The constituents participated in DDI-facilitated focus sessions, using a 'Critical Incident' data gathering technique, following the DACUM strategy [14]. In these sessions, constituents provided hundreds of examples of successful and unsuccessful demonstrations of the eleven ABET (a–k) Outcomes by engineering students and graduates. DDI professionals analyzed these 'critical incident' stories and extracted fourteen dimensions or workplace competencies necessary and sufficient for the successful demonstration of the eleven Outcomes:

Engineering Knowledge	General Knowledge	Continuous Learning
Quality Orientation	Initiative	Innovation
Cultural Adaptability	Analysis & Judgment	Planning
Communication	Teamwork	Integrity
Professional Impact	Customer Focus	

Note that these are 'ISU Competencies' that resulted from dialogue with *our* constituents. Other programs or institutions might develop a different set of competencies.

Based on their experience, DDI provided definitions for each competency. Each definition is clear, concise and independent of all others. Specific to each definition is a set of observable and measurable Key Actions that a student may take that demonstrates their development of that ISU Competency. A complete listing of the ISU Competencies and Key Actions can be found at http://learn.ae.iastate.edu/assessment/competency-definitions.pdf. An example of one ISU competency, Continuous Learning, is given in Table 1.

This process resulted in a mapping of the fourteen ISU Competencies to the ABET (a–k) Outcomes. The matrix of this mapping is given in Table 2. In each cell with a number, a competency is mapped to a specific Outcome. The numbers refer to constituent ranking of each competency–outcome combination (see the following section on Validation). There is no mapping of a competency to an Outcome where there were no supportive 'critical incident' stories, despite the temptation to assign such a relationship.

This matrix confirms our hypothesis that the outcomes are multi-dimensional and complex. For example, 'Initiative' is linked to each Outcome with 'an ability'. Outcome (c), 'an ability to design a system . . .', requires the greatest

Table 1. The Continuous Learning workplace competency

Definition	Actively identifying new areas for learning; regularly creating and taking advantage of learning opportunities; using newly gained knowledge and skill on the job, and learning through application.
Key Actions	1. Targets learning needs — Seeks and uses feedback and other sources of information to identify appropriate areas for learning. 2. Seeks learning activities — Identifies and participates in appropriate learning activities (e.g., courses, reading, self-study, coaching, experiential learning) that help fulfill learning needs. 3. Maximizes learning — Actively participates in learning activities in a way that makes the most of the learning experience (e.g., takes notes, asks questions, critically analyzes information, keeps on-the-job application in mind, completes required tasks). 4. Applies knowledge or skill — Puts new knowledge, understanding, or skill to practical use on the job; furthers learning through trial and error. 5. Takes risks in learning — Puts oneself in unfamiliar or uncomfortable situation in order to learn; asks questions at the risk of appearing foolish; takes on challenging or unfamiliar assignments.
Representative Career Activities	• Participating in applied projects that require new knowledge • Designing and/or performing experiments that require new knowledge • Designing products that require engineers to learn new subject areas • Questioning ethical professional responsibility when undertaking sensitive tasks • Engaging in discussions on professional responsibility • Taking courses outside of the 'hard sciences' while in the workplace • Using feedback from 'customers' to learn new material that will improve a product • Reading non-assigned books to learn new topics • Attending conferences and seminars • Learning local, state, and federal laws to understand impact on engineering practices • Learning new software programs to design a product or solve a problem • Participating in experiential education opportunities
Off-Key Actions	• Lets others determine learning goals and needs • Allows barriers and obstacles to interfere with learning • Only targets low-priority or current needs • Ignores own preferences, strengths, or developmental needs • Doesn't practice, reinforce, or apply learning
Over Actions	• Sets unrealistic goals or overextends • Over-emphasizes future needs and excludes current needs • Is overly confident or independent

Table 2. Matrix of ABET (a–k) Outcomes vs. ISU Competencies*

	ISU Competency													
ABET Criterion 3 Outcomes	Engineering Knowledge	General Knowledge	Continuous Learning	Quality Orientation	Initiative	Innovation	Cultural Adaptability	Analysis & Judgment	Planning	Communication	Team-work	Integrity	Professional Impact	Customer Focus
(a) An ability to apply knowledge of mathematics, science, and engineering	4.8		3.8		3.5			4.3						
(b) An ability to design and conduct experiments, as well as to analyze and interpret data	4.4		3.6	4.3	3.7	4.0		4.5	4.1		3.4			3.4
(c) An ability to design a system, component, or process to meet desired needs	4.4		3.8	4.1	3.9	4.3	3.0	4.5	4.2	4.0	3.8			4.2
(d) An ability to function on multidisciplinary teams					4.0		4.3	3.6	3.8	4.7	4.9	4.3	3.9	3.7
(e) An ability to identify, formulate, and solve engineering problems	4.7		3.8	3.9	4.1	4.2		4.4		3.7	3.6			3.6
(f) An understanding of professional and ethical responsibility		3.8	3.6	3.3			3.7	3.5				4.7		
(g) An ability to communicate effectively		3.8			3.7					4.9			4.2	4.0
(h) The broad education necessary to understand the impact of engineering solutions in a global & societal context	3.4	3.9	3.9				4.1	3.5						
(i) A recognition of the need for, and ability to engage in, life-long learning			4.6		4.1									
(j) A knowledge of contemporary issues		3.7	3.8				3.8	3.1						
(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	4.3		4.2	3.6	3.7		2.6	4.0						

* Numbers refer to the average rating by constituents of the importance of the competency to demonstrating the outcome (5 = essential; 4 = very important; 3 = important; 2 = useful, but not essential; and 1 = unnecessary.) No rating was made for any competency-outcome combination where there was no 'Critical Incident' story.

Table 3. Constituents' view of the probability (%) that students/graduates will have the opportunity to develop and demonstrate competencies in various settings.

	ISU Competency														
Setting	Engineering Knowledge	General Knowledge	Continuous Learning	Quality Orientation	Initiative	Innovation	Cultural Adaptability	Analysis & Judgment	Planning	Communication	Teamwork	Integrity	Professional Impact	Customer Focus	Average
Engineering Workplace	88	71	87	87	92	78	73	89	87	90	90	90	92	88	86
Co-op/Internship Workplace	73	62	76	76	82	63	63	76	69	80	76	80	83	66	73
Classroom Capstone Design	76	47	69	72	73	63	55	73	75	71	75	72	60	53	67
Extracurricular Activities (Engineering Profession Related)	47	54	67	45	70	52	59	59	55	69	68	68	66	50	59
Classroom (Laboratory)	71	32	60	67	57	43	46	59	63	55	61	65	41	30	54
Extracurricular Activities (Non-engineering profession related)	25	69	56	35	63	44	59	49	51	65	64	66	60	47	54
Classroom (Traditional)	64	40	62	51	51	35	43	51	56	50	42	59	41	27	48

number of ISU Competencies. The 'Continuous Learning' and 'Analysis and Judgment' competencies are the most highly leveraged (associated with the greatest number of Outcomes) to the successful demonstration of the Outcomes.

VALIDATING THE RELATIONSHIP BETWEEN WORKPLACE COMPETENCIES AND ABET OUTCOMES

To validate the ISU Competency Matrix, a survey was sent to each of the original constituents. In this survey, we first asked them to carefully read the competency definitions and Key Actions and then to rate how important each competency is to a student's or a graduate's successful demonstration of each of the ABET Outcomes to which that competency is linked. The rating was on a Likert scale (5 = essential; 4 = very important; 3 = important; 2 = useful, but not essential; and 1 = unnecessary.)

Of the 212 constituents mailed a survey, 67 responded, a 32% return rate. The respondents represented industry and faculty from each of the engineering disciplines in the college. Each accredited program within the college had a minimum of six respondents that identified with the degree. Thirty-six percent represented faculty, fifty-eight percent of whom are Iowa State alumni. Sixty-four percent of respondents represented industry; sixty-nine percent of whom are Iowa State alumni. The results of their ratings are given in Table 2.

All competencies received an average rating of 3 (important) or better, confirming that the associations between the competencies and the Outcomes were valid. The only exception was the rating of Cultural Adaptability in its relationship to Outcome (k): 'an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.' That relationship received an average rating of 2.6. After review by the Employer Advisory Board for the ISU Engineering Cooperative Education, Internship and Summer Programs, the decision was made to keep this association at least through the initial pilot applications and analysis.

Finally, we asked of the constituents the degree to which the 14 ISU Competencies collectively cover ABET Criterion 3 Program Outcomes (a–k) and the degree (from 0 to 100%) to which all of the ISU Competencies cover the practice of engineering at the professional level. Coincidentally, the response average to both questions was 89%, from which we conclude that the ISU Competencies are sufficient for measuring our program outcomes.

This process resulted in a set of constituent-created and -validated, competency-based, ABET-aligned assessment tools for the engineering experiential education workplace. These tools will serve as the foundation for assessing our program outcomes.

CONFIRMING THE IMPORTANCE OF EXPERIENTIAL EDUCATION

As part of the validation survey, we asked that, after considering the Key Actions, constituents offer their assessment of the probability that a student and/or graduate would have the opportunity to take those actions to develop and demonstrate that competency in various settings. The settings were: the full-time engineering workplace, the cooperative education/internship workplace (experiential education); the traditional classroom, the classroom laboratory, the classroom capstone design, extracurricular activities (engineering profession related), and extracurricular activities (non-engineering profession related). The results are given in Table 3. The result for the Communication Competency is illustrated in Fig. 1.

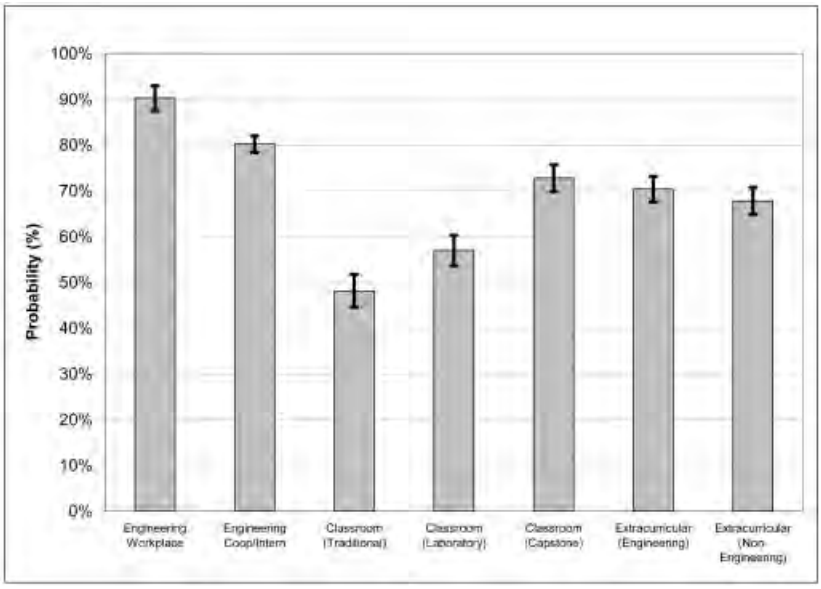

Fig. 1. Constituents' view of the probability (%) that students/graduates will have the opportunity to develop and demonstrate the Communication Competency in various settings.

For most of the competencies essential to the professional practice of engineering, the engineering workplace ranked the highest as the place best to develop and demonstrate the competencies, followed by internships. The classroom consistently ranked last. Engineering students spend a large portion of their academic experiences in the classroom, the least likely place for them to develop the skills, attitudes, values and behaviors necessary to be successful engineers, according to the constituents.

Competency assessment in experiential education

Engineering experiential education programs, such as cooperative education and internships, present the best place to directly observe and measure students developing and demonstrating competencies while engaged in the practice of engineering at the professional level. Measurements made by employers of student competencies present the best opportunity for feedback and curricular change with a cycle time that can address rapidly changing employer needs and expectations. Thus, engineering experiential education can and should be integral to the curricular continuous improvement process.

The ISU College of Engineering, through the office of Engineering Career Services, has implemented competency-based assessment tools for the engineering experiential education workplace, using Online Performance and Learning (OPAL^{TM}) [15]. OPAL^{TM} is DDI's web-based competency development and performance management software that provides assessment, development, coaching and learning tools. OPAL^{TM} was customized to present the ISU Competencies, corresponding Key Actions, and assessment surveys. To receive academic credit for their work experience, each student is required to complete the standard self-assessment and to ensure that their supervisor completes the same assessment of the student. This system has been in place since the fall of 2001. Over 90% of the ISU engineering students in the experiential workplace are evaluated by their supervisors.

A standard assessment survey consists of rating the student on the following question: 'When given the opportunity, how often does this individual perform the action?' The rating for each Key Action is on a Likert scale (1 = never or almost never; 2 = seldom; 3 = sometimes; 4 = often; 5 = always or almost always). A total of 61 Key Actions must be rated in the survey, which takes about 10 minutes to complete.

For each accredited engineering program in the College, the average value of each Key Action is computed from the student's self-assessment and separately from the supervisor's assessment. A ranking of the fourteen competencies (1 = highest mean score value, 14 = lowest mean score value) are made for students in each program. DDI recommends that individual departments look more carefully at patterns than a mean value. The overall results for the college [16] and one program [17] have been reported elsewhere.

The implementation of such an assessment system in a large practice-oriented engineering college presents an outstanding opportunity to collect very large volumes of competency-based assessment data and to study the correlation of these data to curricular processes and to the success of our graduates.

IMPLICATIONS FOR ENGINEERING EDUCATION PROGRAMS

There are number of important implications for engineering educators at Iowa State. Constituents

believe that the classroom is the least likely place to develop competencies necessary for the successful practice of engineering at the professional level. We must re-examine how we use the classroom in educating future engineers, broadening our focus to include competency development. Additionally, these results confirm our belief that experiential education is critical to students becoming successful in the engineering workplace. Finally, the engineering cooperative education and internship workplace provides a superb venue in which to assess student development and demonstration of the ISU Competencies and Criterion 3 Outcomes.

If competencies are the lens through which we view student learning outcomes, competencies must be integral to our engineering education programs. Competency-based learning involves redefining program, classroom, and experiential education objectives as competencies or skills, and focusing coursework on competency development. 'Competencies can have a stronger impact on student learning when they are linked and embedded within specific courses and across both general education and academic majors' [18]. Competencies are transparent; that is, all participants in the learning process can readily understand the learning goals. Competencies provide students with a clear map and the navigational tools needed to move expeditiously toward their goals [19].

At Iowa State University, some engineering programs are implementing competency-based learning and assessment. For example, the Department of Agricultural and Biosystems Engineering is implementing a competency-based education and assessment strategy [20], focused on student attainment of the Competencies, as demonstrated through portfolios and experiential education. They have identified the degree to which all engineering courses they offer address the 14 ISU competencies. The results of these assessments are being used to make curricular changes as part of their continuous improvement process.

CONCLUSIONS

Iowa State University's College of Engineering constituents helped us create and validate the use of workplace competencies to assess ABET Criterion 3 (a–k) Outcomes. Eight of the eleven Outcomes are directly stated as ability-based outcomes. Abilities are highly complex, multidimensional variables that cannot be measured directly and must be inferred from performance by direct observation. We re-defined the Outcomes as a collection of independent workplace competencies with measurable Key Actions.

Measuring the Outcomes as single variables can only provide information confirming that the demonstration of an Outcome is at a specified level, or whether the demonstration has improved or declined from a specified level. Measuring the Criterion 3 Outcomes with competencies provides specific information on what needs to be improved to enhance demonstration of specific Outcomes. This provides programs with specific, focused information on where and how to apply resources and, therefore, significantly enhances efficiency and efficacy of the curriculum continuous improvement process.

The experiential workplace (cooperative education and internships) provides a unique setting where the actions that define performance and competencies can be assessed while the student is actually engaged in the practice of engineering at the professional level.

The constituent-created ISU competencies provide the basis for an on-line measurement system that is well aligned with performance management and professional development systems in common practice in the engineering workplace. This system presents minimal burden to supervisors and mentors of engineering students and requires little education and training of the users.

The use of an on-line competency-based assessment system, such as OPAL^{TM}, provides large volumes of data to each program and to the college each semester, with little or no demand on faculty resources. A broad and representative sampling of student competency development is assured because of the high degree of student participation in experiential education and resulting supervisor assessment. Faculty can focus on data analysis, design and implementation of curricular changes, and analysis of the results of those changes.

Understanding the importance of developing workplace competencies in students provides an opportunity to re-invigorate and re-invent the engineering education process. Competencies provide students with a clear map and the navigational tools needed to become successful engineers and have a strong impact on student learning.

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Iowa State University
Engineering & Technology Workplace Competencies*

Definition: A competency is a grouping of similar knowledge, skills, behaviors and motivations. A "core" competency is one that is regularly mentioned by many of our employers.

Competency	Core?	Definition
Analysis and Judgment	✓	Identifying and understanding issues, problems and opportunities; developing the relevant criteria and comparing data from different sources to draw conclusions; using effective approaches for choosing a course of action or developing appropriate solutions; taking action that is consistent with available facts, constraints, and probable consequences.
Communication	✓	Clearly conveying information and ideas through a variety of media to individuals or groups in a manner that engages the audience and helps them understand and retain the message.
Continuous Learning	✓	Actively identifying new areas for learning; regularly creating and taking advantage of learning opportunities; using newly gained knowledge and skill on the job, and learning through application.
Cultural Adaptability		Being open to and making changes to accommodate the differences found in other cultures in order to interact effectively with individuals and groups from a different cultural background.
Customer Focus		Making customers and their needs a primary focus of one's actions; developing and sustaining productive customer relationships.
Engineering/Technical Knowledge	✓	Having achieved a satisfactory level of knowledge in the relevant specialty areas of engineering/technology, science and mathematics.
General Knowledge	✓	Having achieved a satisfactory level of knowledge outside the areas of engineering, technology, science and mathematics
Initiative	✓	Taking prompt action to accomplish objectives; taking action to achieve goals beyond what is required; being proactive
Innovation		Generating creative, non-traditional technical solutions in work situations; trying different and novel ways to deal with work problems and opportunities.
Integrity		Maintaining social, ethical, and organization norms; firmly adhering to codes of conduct and professional ethical principles.
Planning		Effectively managing one's time and resources to ensure that work is completed efficiently.
Professional Impact		Creating a good first impression, commanding attention and respect, showing an air of confidence.
Quality Orientation		Accomplishing tasks by considering all areas involved, no matter how small; showing concern for all aspects of the job; accurately checking processes and tasks; being watchful over a period of time.
Safety Awareness		Identifying and correcting conditions that affect employee safety; upholding safety standards.
Teamwork	✓	Effectively participating as a member of a team to move the team toward the completion of goals.

* Adapted from "ISU Competencies", an on-going effort of the ISU Engineering Career Services, the ISU College of Engineering Committee on Experiential Education (Co-ops and Internships), the ISU Department of Agricultural and Biosystems Engineering, and Developmental Dimensions Int'l, Inc. (More information can be found in: Brumm, T.J., L.F. Hanneman and S.K. Mickelson, (2006). Assessing and developing program outcomes through workplace competencies. International Journal of Engineering Education 22(1): 123-129.)

1. Analysis and judgment

- **Definition:** Identifying and understanding issues, problems, and opportunities; comparing data from different sources to draw conclusions; using effective approaches for choosing a course of action or developing appropriate solutions; taking action that is consistent with available facts, constraints, and probable consequences.
- **Key Actions**
  - **Identifies issues, problems and opportunities.** Recognizes issues, problems, or opportunities and determines whether action is needed.
  - **Gathers information.** Identifies the need for and collects information to better understand issues, problems, and opportunities.
  - **Interprets information.** Integrates information from a variety of sources; detects trends, associations, and cause-effect relationships.
  - **Generates alternatives.** Creates relevant options for addressing problems/opportunities and achieving desired outcomes
  - **Commits to action.** Implements decisions or initiates action within a reasonable time.
  - **Chooses appropriate actions.** Formulates clear decision criteria; evaluates options by considering implications and consequences; chooses an effective option.
  - **Involves others.** Includes others in the decision-making process as warranted to obtain good information, make the most appropriate decisions, and ensure buy-in and understanding of the resulting decisions.
  - **Values diversity.** Embraces and values diverse collection of inputs, values, perspectives, and thought paradigms in approaching the application of engineering and technology to products and processes.

2. Communication

- **Definition:** Clearly conveying information and ideas through a variety of media to individuals or groups in a manner that engages the audience and helps them understand and retain the message.
- **Key Actions**
  - **Organizes the communication.** Clarifies purpose and importance; stresses major points; follows a logical sequence.
  - **Maintains audience attention.** Keeps the audience engaged through use of techniques such as analogies, illustrations, body language, and voice inflection.
  - **Adjusts to the audience.** Frames message in line with audience experience, background, and expectations; uses terms, examples, and analogies that are meaningful to the audience.
  - **Ensures understanding.** Seeks input from audience; checks understanding; presents message in different ways to enhance understanding.
  - **Adheres to accepted conventions.** Uses syntax, pace, volume, diction, and mechanics appropriate to the media being used.
  - **Comprehends communication from others.** Attends to messages from others; correctly interprets messages and responds appropriately.

3. Continuous learning

- **Definition:** Actively identifying new areas for learning; regularly creating and taking advantage of learning opportunities; using newly gained knowledge and skill on the job and learning through their application.
- **Key Actions**
  - **Targets learning needs.** Seeks and uses feedback and other sources of information to identify appropriate areas for learning.
  - **Seeks learning activities.** Identifies and participates in appropriate learning activities (e.g., courses, reading, self-study, coaching, and experiential learning) that help fulfill learning needs.
  - **Maximizes learning.** Actively participates in learning activities in a way that makes the most of the learning experience (e.g., takes notes, asks questions, critically analyzes information, keeps on-the-job application in mind, does required tasks).
  - **Applies knowledge or skill.** Puts new knowledge, understanding, or skill to practical use on the job; furthers learning through trial and error.
  - **Takes risks in learning.** Puts self in unfamiliar or uncomfortable situation in order to learn; asks questions at the risk of appearing foolish; takes on challenging or unfamiliar assignments.

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4. Cultural Adaptability

- **Definition:** Being open to and making changes to accommodate the differences found in other cultures in order to interact effectively with individuals and groups from a different cultural background.
- **Key Actions**
  - **Demonstrates inclusive behavior.** Establishes effective relationships with people of other cultures and backgrounds; shows genuine acceptance of people from backgrounds different from one's own.
  - **Exhibits sensitivity.** Exhibits sensitivity to and respect for the perspectives and interests of people of a different culture; attends to and tries to understand different perspectives and approaches.
  - **Adapts behavior to other cultures.** Adjusts own approach to interactions, communications, and decision making to be appropriate and effective within another culture without sacrificing own values.
  - **Adapts products and processes to cultural concerns.** Identifies, understands and incorporates cultural factors into the design of products and processes

5. Customer Focus

- **Definition:** Making customers and their needs a primary focus of one's actions; developing and sustaining productive customer relationships.
- **Key Actions**
  - **Seeks to understand customers.** Actively seeks information to understand customers' circumstances, problems, expectations, and needs.
  - **Educates customers.** Shares information with customers to build their understanding of issues and capabilities.
  - **Builds collaborative relationships.** Builds rapport and cooperative relationships with customers.
  - **Takes action to meet customer needs and concerns.** Considers how actions or plans will affect customers; responds quickly to meet customer needs and resolve problems; avoids over-commitments.
  - **Sets up customer feedback systems.** Implements effective ways to monitor and evaluate customer concerns, issues, and satisfaction and to anticipate customer needs.

6. Engineering/Technical Knowledge

- **Definition:** Having achieved a satisfactory level of knowledge in the relevant specialty areas of mathematics, science and engineering/technology.
- **Key Actions**
  - **Knowledge of Mathematics.** Demonstrates a knowledge of the mathematical principles required to practice engineering or apply and manage technology in one's specialty area.
  - **Knowledge of Science.** Demonstrates a knowledge of the scientific principles required to practice engineering or apply and manage technology in one's specialty area.
  - **Knowledge of experimental analysis.** Demonstrates a knowledge of the principles of experimental data analysis in one's specialty area.
  - **Knowledge of current engineering/technology tools.** Demonstrates a knowledge of the use of contemporary tools needed to practice engineering or apply and manage technology in an effective manner.
  - **Knowledge of technology.** Demonstrates a knowledge of engineering/technology principles required to practice in one's specialty area.

7. General Knowledge

- **Definition:** Having achieved a satisfactory level of knowledge outside the areas of mathematics, science, engineering and technology.
- **Key Actions**
  - **General Knowledge.** Demonstrates a knowledge of important current issues and events outside the areas of mathematics, science, engineering and technology
  - **Relates general knowledge to engineering/technology.** Demonstrates a knowledge of the interrelationships between important issues and events outside of engineering/technology and one's engineering/technology specialty area.

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8. Initiative

- **Definition:** Taking prompt action to accomplish objectives; taking action to achieve goals beyond what is required; being proactive.
- **Key Actions**
  - **Responds quickly.** Takes immediate action when confronted with a problem or when made aware of a situation.
  - **Takes independent action.** Implements new ideas or potential solutions without prompting; does not wait for others to take action or to request action.
  - **Goes above and beyond.** Takes action that goes beyond job requirements in order to achieve objectives.

9. Innovation

- **Definition:** Generating innovative solutions in work situations; trying different and novel ways to deal with work problems and opportunities.
- **Key Actions**
  - **Challenges paradigms.** Identifies implicit assumptions in the way problems or situations are defined or presented; sees alternative ways to view or define problems; is not constrained by the thoughts or approaches of others.
  - **Leverages diverse resources.** Draws upon multiple and diverse sources (individuals, disciplines, bodies of knowledge) for ideas and inspiration
  - **Thinks expansively.** Combines ideas in unique ways or makes connections between disparate ideas; explores different lines of thought; views situations from multiple perspectives; brainstorms multiple approaches/solutions.
  - **Evaluates multiple solutions.** Examines numerous potential solutions and evaluates each before accepting any.
  - **Ensures relevance.** Targets important areas for innovation and develops solutions that address meaningful work issues.

10. Integrity

- **Definition:** Maintaining social, ethical, and organizational norms; firmly adhering to codes of conduct and professional ethical principles.
- **Key Actions**
  - **Demonstrates honesty.** Deals with people in an honest and forthright manner; represents information and data accurately and completely.
  - **Keeps commitments.** Performs actions as promised; does not share confidential information.
  - **Behaves consistently.** Ensures that words and actions are consistent; behaves consistently across situations.

11. Planning

- **Definition:** Effectively managing one's time and resources to ensure that work is completed efficiently.
- **Key Actions**
  - **Prioritizes.** Identifies more critical and less critical activities and tasks; adjusts priorities when appropriate
  - **Makes preparations.** Ensures that required equipment and/or materials are in appropriate locations so that own and others' work can be done effectively.
  - **Schedules.** Effectively allocates own time to complete work; coordinates own and others' schedules to avoid conflicts.
  - **Leverages resources.** Takes advantage of available resources (individuals, processes, departments, and tools) to complete work efficiently.
  - **Stays focused.** Uses time effectively and prevents irrelevant issues or distractions from interfering with work completion.

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12. Professional Impact

- **Definition:** Creating a good first impression; commanding attention and respect; showing an air of confidence.
- **Key Actions**
  - **Dresses appropriately.** Maintains professional, businesslike image.
  - **Displays professional demeanor.** Exhibits a calm appearance; does not appear nervous or overly anxious; responds openly and warmly when appropriate.
  - **Speaks confidently.** Speaks with a self-assured tone of voice.

13. Quality Orientation

- **Definition:** Accomplishing tasks by considering all areas involved, no matter how small; showing concern for all aspects of the job; accurately checking processes and tasks; being watchful over a period of time.
- **Key Actions**
  - **Follows procedures.** Accurately and carefully follows established procedures for completing work tasks.
  - **Ensures high-quality output.** Vigilantly watches over job processes, tasks, and work products to ensure freedom from errors, omissions, or defects
  - **Takes action.** Initiates action to correct quality problems or notifies others of quality issues as appropriate.

14. Safety Awareness

- **Definition:** Identifying and correcting conditions that affect employee safety; upholding safety standards.
- **Key Actions**
  - **Identifies safety issues and problems.** Detects hazardous working conditions and safety problems; checks equipment and/or work area regularly.
  - **Takes corrective action.** Reports or corrects unsafe working conditions; makes recommendations and/or improves safety and security procedures; enforces safety regulations and procedures.
  - **Monitors the corrective action.** Monitors safety or security issues after taking corrective action and ensures continued compliance.

15. Teamwork

- **Definition:** Actively participating as a member of a team to move the team toward the completion of goals.
- **Key Actions**
  - **Facilitates goal accomplishment.** Makes procedural or process suggestions for achieving team goals or performing team functions; provides necessary resources or helps to remove obstacles to help the team accomplish its goals.
  - **Involves others.** Listens to and fully involves others in team decisions and actions; values and uses individual differences and talents.
  - **Informs others on the team.** Shares important or relevant information with the team.
  - **Models commitment.** Adheres to the team's expectations and guidelines; fulfills team responsibilities; demonstrates personal commitment to the team.

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APPENDIX 7.4

General Instructions:

The purpose of this evaluation is to collect your honest, frank and constructive feedback on how the teaching in this course enhanced or detracted from your learning. Your instructor, and the ABE department, will use aggregated results from this evaluation to assess (and, if needed, to help improve) your instructor's teaching, and to strengthen future course offerings.

Please review and reflect upon the intended learning outcomes, objectives, and/or goals for the course. Then please answer the questions below:

Instructor and Course Ratings:

On questions 1-18, please indicate the extent to which you agree or disagree with each statement, using this five-point scale: (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, (5) strongly agree:

In this class...

1 The Instructor

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.1	The expected student learning outcomes, and the expectations for meeting those outcomes, were clear.	○	○	○	○	○
1.2	The instructor consistently explained concepts and clarified areas of confusion.	○	○	○	○	○
1.3	The instructor used teaching methods and classroom activities that enhanced my achievement of the expected student learning outcomes.	○	○	○	○	○
1.4	The instructor regularly illustrated the relevance of course content to practical engineering or technology situations, through any one of a combination of the following: case studies, news stories, humor, personal experiences, or other appropriate methods.	○	○	○	○	○
1.5	The instructor encouraged class participation by asking questions and/or holding students accountable for meeting the learning outcomes.	○	○	○	○	○
1.6	Assignments were related to the expected student learning outcomes.	○	○	○	○	○
1.7	Assignment depth and complexity were appropriate, and helped students achieve the expected learning outcomes.	○	○	○	○	○
1.8	Assignments were returned quickly enough to benefit my performance on future assignments.	○	○	○	○	○
1.9	The instructor's (and/or grader's) feedback (oral, written, electronic) was helpful in enhancing my learning.	○	○	○	○	○
1.10	My grades to date are an accurate reflection of my achievement of the expected student learning outcomes.	○	○	○	○	○
1.11	The text, lecture notes, videos, and/or other supplementary resources used in this course were effective in helping me to meet the expected student learning outcomes.	○	○	○	○	○
1.12	If I needed to communicate with the instructor outside of class, s/he was available in a reasonable timeframe - either electronically or in person.	○	○	○	○	○
1.13	The instructor was effective in helping me meet the expected student learning outcomes.	○	○	○	○	○
1.14	I gave an appropriate amount of effort to achieve the expected student learning outcomes.	○	○	○	○	○
1.15	I achieved all of the expected student learning outcomes.	○	○	○	○	○
1.16	The content of this course had value.	○	○	○	○	○
1.17	The instructor had appropriate mechanisms to prevent academic dishonesty.	○	○	○	○	○
1.18	The instructor treated students with respect.	○	○	○	○	○
		Not challenging	Mildly challenging	Appropriately challenging	A bit too challenging	Excessively challenging
1.19	Indicate how intellectually challenging this course was using the following scale:	○	○	○	○	○

2 Open-Ended Comments

2.1	What, if anything, most helped your learning in this class?	
2.2	What, if anything, most hindered your learning in this class?	
2.3	What might have improved your learning in this class?	
2.4	Other comments:	

3 THANK YOU FOR YOUR FEEDBACK!

Close Window

APPENDIX 7.5

TSM 110: Introduction to Technology

Friday 10 or 11am, 4220 Sukup Hall

TSM 110 Section A Instructor:
Jenny Macken
1330D Elings Hall
515-294-5196
jennym@iastate.edu
Office hours: Call or e-mail for appointment

TSM 110 Section B Instructor:
Tamara Kerns
1330A Elings Hall
515-294-0462
tkerns@iastate.edu
Office hours: Call or e-mail for appointment

Textbooks: None

Class Website – Blackboard: http://bb.its.iastate.edu

Purpose

The purpose of this class is to: (1) aid in your transition to Iowa State; (2) help you integrate into the ABE department as students in either Agricultural Systems Technology or Industrial Technology; and (3) assist you in developing a career management plan.

An earlier version of this verbiage was approved by the ABE TCC and ECC in March 2014. In preparation for upcoming university-wide accreditations, the Associate Chair for Teaching modified this and is providing it to instructors of all ABE courses with a recommendation that it be included in course syllabi.

The material is provided in a formatted version on pages 2 & 3, and in a minimally formatted version on pages 4 & 5.

Much of the misconduct, disability accommodation, and religious accommodation content is either verbatim or strongly based upon the content in the Faculty Senate Recommendations for Syllabus Inclusion at this link: http://www.celt.iastate.edu/teaching/syllabus_inclusion.html

Catalog Description (2012-2013)

TSM 110. Introduction to Technology.
(1-0) Cr. 1. F. *Prereq: AST and I Tec majors only or permission of instructor*
Team-oriented introduction to agricultural systems technology and industrial technology. Internships, careers, competencies, academic success strategies, industry visits, transition to academic life.

Student Learning Objectives

Upon the completion of this course, you will be able to:

- Develop a personal definition of Industrial Technology or Ag Systems Technology as a discipline.
- Develop a professional, personal, and social support group from within your peers.
- Recognize and utilize the support of ABE faculty and staff members and industrial mentors.
- Identify professional roles and career opportunities available to ITec and AST graduates.
- Perform self-evaluation processes to aid in the development of personal, academic and career goals.
- Develop a professional resume.
- Understand the importance of competencies in your career development.

ITEC and AST Program Outcomes Addressed in this Class (bold)

a) an ability to apply knowledge of mathematics, science, engineering and technology;
b) an ability to design and conduct experiments, as well as to analyze and interpret data;
c) an ability to formulate or design a system, process or program to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
d) an ability to function on multi-disciplinary teams;
e) an ability to identify and solve technology problems;
f) an understanding of professional and ethical responsibility;
g) an ability to communicate effectively;
h) the broad education necessary to understand the impact of solutions in a global, economic, environmental, and societal context;
i) a recognition of the need for, and an ability to engage in life-long learning;
j) a knowledge of contemporary issues; and
k) an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.

Key Assignments for your electronic portfolio

1. Resume
2. STARs

Course Policies

- Your attendance is expected for the duration of every class period and team meetings. You are allowed one excused absence each from class and team meetings. Each absence after that will **drop a half letter grade**.
- Late work will **NOT** be accepted unless prior permission has been granted. Due date/time for each assignment will be clearly specified.
- You are responsible for all class information communicated in person, via email and Blackboard whether you are present or not.
- There will be no reading of newspapers or other extraneous materials or use of laptops/cellphones during class. Please silence cell phones.
- Syllabus is subject to change.

Disability Statement

If you have a disability and anticipate needing accommodations in this course, we strongly encourage you to contact {course instructor} to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need.The SDR is located in the Student Services Building, Room 1076. Their phone number is 515-294-7220, TDD 515-294-6335.

Course Grading

10 Assignments	100 pts
Class attendance- *see above paragraph*	

Grading Scale (tentative)

A	93-100%	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	<59

Academic Dishonesty

Academic dishonesty occurs when a student uses or attempts to use unauthorized information in the taking of an exam; or submits as his or her own work themes, reports, drawings, laboratory notes, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism. Such behavior is abhorrent to the university, and students found responsible for academic dishonesty face expulsion, suspension, conduct probation, or reprimand. Instances of academic dishonesty ultimately affect all students and the entire university community by degrading the value of diplomas when some are obtained dishonestly, and by lowering the grades of students working honestly.

Academic dishonesty is considered to be a violation of the behavior expected of a student in an academic setting as well as a student conduct violation. A student found responsible for academic dishonesty or academic misconduct is therefore subject to appropriate academic penalty; to be determined by the instructor of the course, as well as sanctions under the university Student Disciplinary Regulations. The instructor of this course follows the university policies about academic dishonesty. More complete information on these policies can be found at http://www.public.iastate.edu/~catalog/2009-2011/geninfo/dishonesty.html

Course Schedule (tentative; subject to change)

Week	*Date*	*Topics*	*Activity Assigned (due following week)*
1	Aug. 29	Introduction	*Time Management Worksheet*
2	Sept. 5	Amazing Race	*Results of Race/Reflection*
3	Sept. 12	**Resume Building: Writing and Media Center**	*Resume*
4	Sept. 19	**Interviewing: Mike Gaul; CALS Career Services**	1 minute speech prep (not graded)
5	Sept. 26	**Departmental Clubs & Ambassadors**	TBA
6	Oct. 3	Internship Panel: Mentors	*Internship Reflection*
7	Oct. 10	**Academic Success Center: Dr. Rhoades**	*Learning Style Reflection*
8	Oct. 17	**Department Chair: Dr. Mickelson**	*Career Fair/Club Reflection*
9	Oct. 24	**Diversity: Denise Williams**	*Diversity Reflection*
10	Oct. 31	Registration Planning (break out)	*Four year plan-excel spreadsheet*
11	Nov. 7	**International Opportunities: Ag Study Abroad**	TBA
12	Nov. 14	**Workplace Competencies & BBI: Dr. Kalieta**	*STAR assignment*
13	Nov. 21	Faculty Interviews Due	*Faculty Interview: PPT Due*
	Nov. 25-29	*FALL BREAK*	No classes
14	Dec. 7	Semester Wrap-Up	TBA
15	Dec. 14	Dead week	No class
16	*Dec. 15-19*	*FINALS WEEK*	No class

Important Dates:

College of Engineering Career Fair: Sept .23 @ Hilton Coliseum & Scheman Building from noon-6pm

Business, Industry, & Technology Career Fair: Sept. 24 @ Hilton Coliseum from noon-6pm

College of Agricultural and Life Sciences Career Fair: Oct. 14 @ Lied Rec Center from 9a-3p

College of Engineering Study Abroad: Sept. 9 @ Howe Hall Atrium from 5:30-7p

University Study Abroad Fair: Sept. 18 @ Great Hall, MU from 10a-1:30p

TSM 111: Experiencing Technology

Monday 12:10-2:00pm
or
Friday 10:00-11:50am
2306 Elings Hall

Instructors

Tamara Kerns (*tkerns@iastate.edu*)
1320 Elings Hall
294-0462
Office Hours: By Appointment

Jenny Macken (*jennym@iastate.edu*)
1320 Elings Hall
294-5196
Office Hours: By Appointment

Textbooks

None; all necessary materials will be provided.

Class Website – Blackboard

Purpose

The purpose of this class is to: (1) aid in your transition to the ABE department; (2) introduce you to various agricultural systems and industrial technology lab-based experiences; (3) further your knowledge of the discipline and options within agricultural systems and industrial technology; (4) strengthen your team skills; (5) develop your communication skills through report writing

Catalog Description (2009-2011)

(0-2) Cr. 1. S. *Prereq: AST or I Tec majors only or permission of instructor.* Laboratory-based, team oriented experiences in a spectrum of topics common to the practice of technology. Report writing, internships, competencies, portfolios, industry visits.

Student Learning Objectives

Upon the completion of this course, you should have begun to develop the following:

- an understanding and appreciation of the breadth of topics covered by the discipline through discussions and hands-on experiences.
- an ability to communicate effectively through team based activities and report writing

ITEC and AST Program Outcomes Addressed in this Class (bold)

a) an ability to apply knowledge of mathematics, science, engineering and technology;
b) an ability to design and conduct experiments, as well as to analyze and interpret data;
c) an ability to formulate or design a system, process or program to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
d) an ability to function on multi-disciplinary teams;
e) an ability to identify and solve technology problems;
f) an understanding of professional and ethical responsibility;
g) an ability to communicate effectively;
h) the broad education necessary to understand the impact of solutions in a global, economic, environmental, and societal context;
i) a recognition of the need for, and an ability to engage in life-long learning;
j) a knowledge of contemporary issues; and
k) an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.

Key Assignments for your electronic portfolio

1. Lab Synopses
2. Reflections

Course Policies

- Your attendance is expected for the duration of **every class period** and **team meetings** (tardiness will not be tolerated and will negatively impact your grade).
- You are allowed one excused absence from class (acceptable reasons determined by the instructor; prior notice required). Each absence after that is **1/2 of a drop in a letter grade**.
- Assignments are due in the format outlined by the instructor. Late homework will be accepted with a **10% reduction per class period late**, up to a maximum of 50%.
- You are responsible for all class information missed by absences.
- There will be no reading of newspapers or other extraneous materials, including use of electronic devices during class, unless prior permission is granted. Please silence cell phones.
- Course syllabus is subject to change as needed to accommodate industry visits, labs, or assignments as needed.

Disability Accommodation Policy: Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Course Grading

Your grade will be based on these components:

- Assignments
- Attendance
- Participation

Assignments will include all class exercises, labs**,** and industry trips. **Attendance will include your TSM 111 classroom attendance and Mentor meetings.** Your participation level will be determined by your peer mentor through your learning team activities and class labs/reports.

Grading Scale (tentative)

A	93-100%	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	<59

Academic Dishonesty

Academic dishonesty occurs when a student uses or attempts to use unauthorized information in the taking of an exam; or submits as his or her own work themes, reports, drawings, laboratory notes, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism. Plagiarism is the unacknowledged use of the information, ideas, or phrasing of other writers and is an offense comparable with theft and fraud, and it is so recognized by the copyright and patent laws. One is responsible for plagiarism when: the exact words of another writer are used without using quotation marks and indicating the source of the words; the words of another are summarized or paraphrased without giving the credit that is due; the ideas from another writer are borrowed without properly documenting their source.

Academic dishonesty is considered to be a violation of the behavior expected of a student in an academic setting as well as a student conduct violation. A student found responsible for academic dishonesty or academic misconduct is therefore subject to appropriate academic penalty; to be determined by the instructor of the course, as well as sanctions under the university. The instructor of this course follows the university policies about academic dishonesty. More complete information on these policies can be found in the ISU Student Information Handbook: *http://www.dso.iastate.edu/handbook.html*.

The department strongly recommend s that you read the following Iowa State University web pages:

http://www.lib.iastate.edu/commons/resources/facultyguides/plagiarism/dishonest.html and

http://www.lib.iastate.edu/commons/resources/facultyguides/plagiarism/isu.html

Course Schedule (Subject to Change)

Week	*Date*	*Topics-Proposed*	*Assignment (Due Next Class)*
1	Jan. 12 & 16	Welcome: Dr. Raj Raman, Professor and Associate Chair for Teaching Introduction/Teams	Marbleworks Activity (in class activity) Questions for Panels due by January 19/23 Safety Training Modules due by February 2/6
2	Jan. 19 & 23	No Class-MLK Holiday	
3	Jan. 26 & 30	Instructor FAQ Panel/Student Internship Panel	Reflection due by February 2/6
4	Feb. 2 & 6	Lab: Safety – Mr. Steve Simpson Lab: Precision – Mr. Chris Murphy	Lab Synopses due by February 9/13 Questions for Panels due by February 9/13
5	Feb. 9 & 13	Lab: Biodiesel – Dr. Tom Brumm Lab: Plastics/Metals – Mr. Russ Hoffman	Lab Synopsis due by February 16/20
6	Feb. 16 & 20	Recent Graduate Panel/Capstone Panel	Reflection due by February 23/27
7	Feb. 23 & 27	Trip: Amcor	Reflection due by March 2/6
8	Mar. 2 & 6	Trip: Ag Leader	Reflection due by March 9

Club Fest: January 21 from 11a-4pm in the Great Hall, Memorial Union

Study Abroad Fair: January 22 from 10:30a-1pm in the Great Hall, Memorial Union

Ag Career Fair: February 4 from 10a-2p in the Memorial Union

Engr. Career Fair: February 10 from 12-6 in Hilton/Scheman Bldg

IOWA STATE UNIVERSITY

OF SCIENCE AND TECHNOLOGY

Department of Agriculture and Biosystems Engineering

ACCREDITED BY ATMAE
The Association of Technology, Management, and Applied Engineering

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TSM 115 Solving Technology Problems
Department of Agriculture and Biosystems Engineering

Instructor
John Haughery
3330A Elings Hall
717.587.6506 (Mobile)
haughery@iastate.edu

[Please only use mobile between 8 AM and 8 PM]

Office Hours:
M W 10:30am - 2:00pm | R 1:00pm - 3:30pm

Purpose:
This course is intended to help students develop necessary skills, abilities, and knowledge required to assess problems, analyze data, and interpret results using quantitative problem solving methods. The use of a problem-based class structure will allow students to gain experience in applying technical tools throughout the problem-solving process.

Catalog Description (2014-2015)
TSM 115. Solving Technology Problems. (2-2) Cr. 3. F.S. *Prereq: Math 140 or higher (can be taken concurrently).* Solving technology problems and presenting solutions through technical reports. Unit conversions, unit factor method, SI units, significant digits, graphing and curve fitting. Use of spreadsheet programs to solve and present technology problems. Solution of technology problems using computer programming languages.

Student Learning Outcomes
Upon the completion of this course, you should be able to:

1. Systematically solve physical, agricultural, or industrial technology problems.
    - **Assessment Measures: Assignments 1, 2, 3; Homework 1; Exam 1**
2. Use appropriate mathematical, statistical, and computer programming methods to support data-driven problem solving.
    - **Assessment Measures: Term Project; Homework 2, 3, 4**
3. Use technical tools (i.e. Excel, VBA, Word, PowerPoint, etc.) to accomplish the objectives above.
    - **Assessment Measure(s): Assignments 4, 5, 6, 7, 8, 9, 10; Exam 2; Final Exam**

Course Website:
We are using a BBL (Blackboard Learn) website for *TSM 115 (Spring 2015)*. Go to the ISU homepage, click Blackboard at the top (or go to https://bb.its.iastate.edu) and login. This BBL site will be used throughout the semester.

Program Outcomes

(a) an appropriate mastery of the knowledge, techniques, skills, and modern tools of technology, physical and agricultural sciences,
(e) an ability to identify, analyze, and solve technical problems,
(g) an ability to communicate effectively, and
(k) an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.

Textbook: None required. Instructor will provide the necessary handouts, materials, and references.

Course Policies

- To be graded, assignments must be submitted on time and in the required format.
- Late assignments will only be considered in extreme cases (personal or family medical emergency). Contact instructor ASAP by e-mail to request an extension.
- Work teams are expected to function productively and professionally.
- Cell phones must be turned off during class.
- Attendance is expected for the duration of every class period. If you expect to miss a class then prior permission should be requested. Special consideration will be made for emergencies after the fact.

NO FOOD, DRINKS, OR CHEWING TOBACCO IS ALLOWED AT ANY TIME IN CLASS.

Required Supplies:

- Scientific Calculator (any kind, as long as you can use it competently!)
- Paper and pencil/pen for taking notes and working problems
- USB memory stick
- Scanner or smartphone app for scanning and uploading hand-written work to BBL
- MS Office (available in computer labs, but having personal copy will be very helpful, $13 at bookstore)

Final Project Expectations

The Final project is your opportunity to demonstrate your newfound skills in integrating problem solving and technical writing using Microsoft Office©. You (and your team) will develop both a technical written report and oral presentation on a topic of your choice in your discipline with approval of your instructor. You will analyze and summarize data in Excel, prepare a technical report in Word, and present a summary of your project in PowerPoint. The presentations will be given in class with equal participation of each team member. The project work should adequately demonstrate your understanding of the overall course material. The documents you present should be well organized, concise and professional in appearance. There will be four Term Project Milestones throughout the semester. Submission of reports, information and /or data is required at each of these Milestones.

Grading: The grading scale below will be used to translate your numerical grade into a letter grade.

A	>93%	A-	90-93	B+	87-90	B	83-87
B-	80-83	C+	77-80	C	73-77	C-	70-73
D+	67-70	D	63-67	D-	60-63	F	<60

Item	Qty.	Pts. Ea.	Total Pts.	% of Final Grade
Exams (in class)	2	100	200	20%
Assignments (in class)	10	15	150	15%
Home Work (out of class)	4	50	200	20%
Term Project (in/out of class)	1	150	150	15%
Participation (in/out of class)	1	150	150	15%
Final Exam (in class)	1	150	150	15%
Total			1000	100%

Late Work Policy: If you have extenuating circumstances (illness, death in family) we will work with you to take late work. If not, zero on the assignment. Late work is considered anything submitted after 11:59pm of due date. Do not wait till the last minute to submit. It may take longer than you think.

Neatness Policy: The grader is not a cryptographer. If it isn't clearly legible, they don't have to grade it and will score the offending section as a zero.

Assignment and Homework Submission Requirements: Please see *TSM 115 Assignment and HW Template* file on BBL.

Class Conduct: Please see *TSM 115 Class Expectations* file on BBL.

Tentative Course Schedule

Week	Activity	Assignment*
1	Introductions, Course overview, Class Survey Problem Solving: Methods & Tools	
2	University Holiday – No Class Problem Solving: Identify Problems, Criteria, & Constraints	 Assignment 1
3	Unit Systems, Unit Factor Method, Significant Figures Precision/Accuracy/Error	Assignment 2 Proj. Milestone 1
4	Flow Charts, Algorithmic Thinking *** Exam 1 ***	Assignment 3 Exam 1
5	Formatting, Project Discussion Introduction to MS Excel©	 HW 1
6	Functions in MS Excel© Collecting and cleaning data in MS Excel©	Assignment 4 Assignment 5, Proj. Milestone 2
7	Charting in MS Excel© part I & II Basic data analysis in MS Excel© part I	Assignment 6 Plus-Delta
8	Basic data analysis in MS Excel © part II Advanced Functions in MS Excel ©	Assignment 7 HW 2
9	Advanced data analysis in MS Excel © *** Exam 2 ***	Assignment 8
10	Spring Break Spring Break	
11	Printing and Inserting charts into MS Word © Programming: Macros & VBA part I	Proj. Milestone 3 HW 3
12	Programming: Macros & VBA part II Programming: Macros & VBA part III	 Assignment 9
13	Programming: Macros & VBA part IV Technical Comm.: Report Construction & Presentation	 HW 4
14	Technical Comm.: Integration of Excel© into Word© and PowerPoint© Term project development (work in-class with your team)	Assignment 10
15	Term project development (work in-class with your team) Term project presentations	
16	Term project presentations Course Review	Proj. Milestone 4, Peer Evaluations
17	*** Final Exam (specific day and time TBD) ***	

*Assignments, HW, and Project Milestones due by 11:59pm on the day they appear on the schedule

Safety Emphasis: Students in ABE classes work with systems that, if misused, can be extremely hazardous. Therefore developing an attitude of safety is crucial to all engineering and technology professionals. Instructors may take an array of actions when students fail to complete required safety training (for example, by coming late to class and missing a safety briefing) or to adhere to procedures. These include but are not limited to (1) only allowing the student to observe the lab; (2) only allowing the student to observe the lab, and deducting points from the associated lab report; (3) suspending the student from all lab activities until the student has successfully completed the required safety portion of the lab (this may mean attending another lab section where the student can arrive on time); (4) dismissing students – and particularly repeat violators of safety policy – from the course.

Academic Misconduct: The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.

Note that ISU identifies several forms of academic dishonesty including: A student uses or attempts to use unauthorized information in the taking of an exam; submits as his or her own work, themes, reports, drawings, laboratory notes, computer programs, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism. Students found guilty of academic dishonesty in this class face suspension, conduct probation, or reprimand.

Computer Ethics: Please check the link at http://policy.iastate.edu/policy/it/ethics/ for information on the university's computer ethics policy. You are expected to use the university computers responsibly and to communicate courteously with others in your class.

Disability Accommodation Policy: Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Jenny Macken, 1330D Elings Hall (515.294.5196; jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with Jenny and your instructor to address any special needs or special accommodations at the beginning of the semester.

Dead Week: For each Fall and Spring semester, the last full week of classes before final examinations is designated as Dead Week. The intent of Dead Week is to establish a one-week period of substantial and predictable study time for undergraduate students. During the Dead Week period, regular lectures are expected to continue, including the introduction of new content, as deemed appropriate by the instructor. The restrictions established by this Dead Week policy are:

- Due dates for mandatory graded submissions of any kind that fall within Dead Week must be listed on the syllabus provided at the start of the course.
- Mandatory final examinations may not be given during the Dead Week period except for laboratory courses or courses that meet weekly and for which there is no contact during the normal final examination week.

Harassment and Discrimination: Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact Student Assistance at 515.294.1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515.294.7612.

Religious Accommodation: If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information: If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.

Agricultural & Biosystems Engineering
Iowa State University

Instructor: Russ Hoffman
4342 Elings Hall
russh@iastate.edu; 515.294.8800

INTRODUCTION TO DESIGN IN TECHNOLOGY

TSM 116 Section B: Tuesday & Thursday 2:10 – 4:00 P.M. 2217 Sukup, Spring 2015

Wk#	Date	Topics	Text	Ch.	Activity	Due	Reading	Quiz
Introduction to Design in Technology – Part A (Basic Graphics and Modeling Techniques)								
1 T	1/13	Introductions, course overview			Choose In-Class partner/Pretest		GRB Ch. 1, 2	
		Getting Started with Autodesk Inventor 2015	RHS	1	**Review of Inventor Tools**	In-Class		
Th	1/15	Sketching – Techniques	GRB[1]	2	GRB: 2.21 (Fig. 2.53)	1/20	**HWK#1**	
		Fundamentals of Parametric Modeling	RHS[2]	1,2	**Adjuster Design**	In-Class	GRB 3	**Quiz #1**
2 T	1/20	Constructing Geometric Objects			GRB: Fig. 3.91 & Fig. 3.92	1/22	**HWK#2**	**Quiz #2**
		Constructive Solid Geometry	RHS	3	**Locator Design**	In-Class		
Th	1/22	3D Solid Modeling	RHS	4	**Saddle Bracket Design**	In-Class	GRB: 5 (p.55-80)	
		Model History Tree			GRB: Fig. 4.58 & Fig. 4.60	1/27	**HWK#3**	
3 T	1/27	Multiview Drawings	GRB	5	GRB: Fig. 5.139 & Fig. 5.150	1/29	**HWK#4**	**Quiz #3**
		Parametric Constraints and Relations	RHS	5	**Triangular Plate Design**	In-Class	GRB 6 (p.339-354)	
Th	1/29	Auxiliary Views	GRB	6	GRB: Fig. 6.19 & Fig. 6.23	2/03	**HWK#5**	**Quiz #4**
		3-D Solid Modeling Fundamentals	RHS	6	**Gasket Design**	In-Class	GRB 8 (p.425-454)	
4 T	2/03	Section Views	GRB	8	GRB : Fig. 8.59 & Fig. 8.70	2/10	**HWK#6**	**Quiz #5**
		Parent-Child Relationship/BORN Technique	RHS	7	**U-Bracket Design**	In-Class		
Th	2/05	Orthographic Views					GRB 9 (p.483-506)	
		Part Drawing and 3D Annotations	RHS	8	**U-Bracket Drawing**	In-Class		
5 T	2/10	Dimensioning	GRB	9				**Quiz #6**
		Datum Features and Auxiliary Views	RHS	9	**Rod Guide Design**	In-Class		
Th	2/12	Tolerancing Practices	GRB	9	GRB: Fig 9.85 & Fig. 9.89	2/18	**HWK#7**	
		Inventor Model /Drawing/Section views	RHS	9	RHS 9#1-(**Rod Slide**)	In-Class		
6 T	2/17	**Mock Exam #1**				In-Class		
Th	2/19	**Exam #1**						
Introduction to Design in Technology – Part B (Advanced Modeling Techniques)								
7 T	2/24	Symmetrical Features in Graphics Design			RHS 10#1 & 10.2	02/26	**HWK#8**	
		Advanced 3D Construction Tools	RHS	10	**Pulley Design**	In-Class		
Th	2/26	Applying 3D Construction Tools						
		Advanced 3D Construction Tools	RHS	11	**Dryer Housing Design**	In-Class		
8 T	3/03	Sheet Metal Drawings			Sheet Metal Dwg: RHS 12#1	03/05	**HWK#9**	
		Sheet Metal Processes and Designs	RHS	12	**Actuator Bracket Design**	In-Class		
Th	3/05	**Rapid Prototyping & 3D Printing**						
		Introduction to Stress Analysis	RHS	16	**Plate Stress Analysis**	In-Class		
9 T	3/10	**Mock Exam #2**				In-Class	GRB 11	
Th	3/12	**Exam #2**						
10	3/16-20	**Spring Break**						
Introduction to Design in Technology – Part C (Part and Feature Reuse/Assembly Design Workflows)								
11 T	3/24	Working Drawings	GRB	11	GRB: Figure 11.72/V-Block	3/26	**HWK#10**	**Quiz #7**
		Assembly Modeling	RHS	13	**Shaft Support Assembly**	In-Class		
Th	3/26	Content Center and Basic Motion	RHS	14	**Crank-Slider Assembly**	In-Class		
		More Working Drawings						
12 T	3/31	Assembly Modeling						
		2D Design Reuse, Collision and Contact	RHS	15	**Geneva Wheel Assembly**	In-Class		
Th	4/02	Working Drawings and Assembly Modeling	GRB	11	SHOCK/YORK Assembly	4/07	**HWK#11**	
		Assembly Modeling – GRB 11.70			**Butterfly Valve Assembly**	In-Class		
13 T	4/07	**Mock Exam #3**				In-Class		
Th	4/09	**Exam #3**						
Introduction to Design in Technology – Part D (The Design Process)								
14 T	4/14	Introduction to the Design Process			Class discussions			
Th	4/16	Group Design Project Meeting			Team meeting*			
15 T	4/21	Work on Design Project			Team meeting			
Th	4/23	Work on Design Project			Team meeting			
16 T	4/28	Work on Design Project			Team meeting			
Th	4/30	**Presentation of Group Design Project**			**Oral Presentation**		**Guest Evaluator**	
17 T	5/04	**Finals week**						
Th	5/07	**Finals week**						

[1]Gary R. Bertoline, Erik Wiebe, Nathan Hartman, and William Ross (GRB), 6th Edition, (Required Text); [2]Randy H. Shih (Required Text)

Extra Credit Exercises: RHS 2#3, 3#2, 4#1, 5#4, 6#3, 7#2, 8#1, and 9#1.

* Team of 4-5 students with an elected Team Leader

Instructor	***Text (Required)***
Instructor: Russ Hoffman 4342 Elings Hall russh@iastate.edu; 515.294.8800 Office Hours: Monday 9:00-11:30, during open lab time, and by appointment.	**GRB:** Fundamentals of Graphics Communication, 6th edition by Gary R. Bertoline, et al. Publisher: McGraw Hill **RHS:** Parametric Modeling with Autodesk Inventor 2015 by Randy H. Shih. Publisher: Schroff Development Corporation Class Website: Blackboard

Catalog Description	***Expected Student Learning Outcomes***
TSM 116. Introduction to Design in Technology. (2-2) Cr. 3. F.S. 2D projections and 3D representations of objects, national and international standards for documentation, manufacturing processes, design projects, and teamwork. Free-hand sketching techniques and parametric solid modeling will be covered. **General Considerations** 1. Time: 4-6 hours per week, on the average 2. Computers / Software / Operating System: ➔ Be patient / Be professional / Stay on Task	Upon successfully completing this course, the students will be able to: • graphically communicate a design idea • use CAD to visualize and design parts • use CAD to visualize and design assemblies • demonstrate basic skills and understanding to produce and interpret technical drawings used in industry • demonstrate a basic understanding of the role of CAD and technical graphics in manufacturing processes

Course Grading

- Exams ……..……..... (45%)
- In-Class Activities…….…….. (25%)
- Homework …….…..... (10%)
- Quizzes……....…….....(10%)
- Design Project……(10%)

Grading System

A	93-100	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	<59

Course Policies

1) Assigned Activities:
   a) All assignments are due by the end of the class period on the day specified.
   b) All in-class activities are to be completed and uploaded to Blackboard at end of class period.
   c) Other problems are individual assignments. Do not share computer files.
   d) Quizzes are to be completed before class. Quizzes will be opened at 7 AM the day before class.
   e) Completed drawing files should be uploaded to Blackboard in pdf format.
2) Project requirements will be distributed in class.
3) Consideration for making up missed work will be based on your attendance and previously submitted assignments.

Purpose

TSM 116 is going to provide basic knowledge and skill in technical graphics communication. Technical graphics plays a major role in design, design documentation, and production. TSM 116 focuses on important technical graphics topics: 2D projections and 3D representations of parts, 3D models, working drawings and assemblies, using computer-aided-design (Autodesk Inventor 2015) and free-hand sketching, standards for documentation, and rapid prototyping and manufacturing processes.

Student Evaluation of Instruction

Course evaluation results are extremely important and are used to help the instructor improve the course and the learning experience of future students. Results from the 19 or so multiple choice questions are tabulated anonymously and go directly to instructors and department chairs. Student comments on the open-ended questions are compiled and confidentially forwarded to the instructor, in accordance with ISU procedures. The online instructions on how and when to complete the evaluation will be sent to students toward the end of the semester. The results on the form are anonymous and are not tabulated until after grades are posted.

Use of Electronic Device

Please turn off cell phones, pagers, notepads, and other electronic gadgets before you enter class; take your ear buds out, don't text people, don't check your Facebook page or Twitter account. They all CAN wait until after class. Make sure that you complete all assigned activities for the day, upload any and all required materials to Blackboard and log-off your computer.

UNIVERSITY POLICIES AND GUIDELINES

Disability Accommodations

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Academic Dishonesty

This class follows Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office. http://www.dso.iastate.edu/ja/academic/misconduct.html

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact me, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation

If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be submitted to me in writing. You may also seek assistance from the Dean of Students Office.

Dead Week

This class follows the Iowa State University Dead Week guidelines. For academic programs, the last week of classes is considered to be a normal week in the semester except that in developing their syllabi faculty shall consider the following guidelines:

- Mandatory final examinations in any course may not be given during Dead Week except for laboratory courses and for those classes meeting once a week only and for which there is no contact during the normal final exam week. Take home final exams and small quizzes are generally acceptable. (For example, quizzes worth no more than 10 percent of the final grade and/or that cover no more than one-fourth of assigned reading material in the course could be given).
- Major course assignments should be assigned prior to Dead Week (major assignments include major research papers, projects, etc.). Any modifications to assignments should be made in a timely fashion to give students adequate time to complete the assignments.
- Major course assignments should be due no later than the Friday prior to Dead Week. Exceptions include class presentations by students, semester-long projects such as a design project in lieu of a final, and extensions of the deadline requested by students.

The details of this guideline can be found at http://catalog.iastate.edu/academiclife/#deadweek.

Contact Information

If you are experiencing, or have experienced, a problem with any of the policy or guideline issues described above, email academicissues@iastate.edu.

ABE/TSM 201: Preparing for the Workplace
Mondays and Wednesdays 4:10-5:00 PM, Sukup Hall, Room 0022
January 12 – March 4

Instructor

Dr. Steven Mickelson
1340B Elings Hall
515-294-1434
estaben@iastate.edu
Office hours: by appointment

Catalog Description

AE/BSE/TSM 201. Preparing for Workplace Seminar. (1-0) Cr. 1. F.S. Prereq: Sophomore classification in AE, AST, BSE, or I Tec. 8 week course. Professionalism in the context of the engineering/technical workplace. Development and demonstration of key workplace competencies: teamwork, initiative, communication, and engineering/technical knowledge. Resumes, interviewing, preparation for internship experiences, professional portfolios.

Textbooks

There is no textbook for this class. Handouts and/or electronic material will be provided as needed.

Class Website

Blackboard

ABE Key Assignments: resumes, cover letters, STARs, competency executive summaries

Key Competencies Addressed in the Course: Communication, Initiative, Communication, Engineering/Technical Knowledge

Student Learning Objectives

At the completion of this course, you should have improved your:

- knowledge of the career services available as ISU
- integration and development of human capital factors leading to success in professional internships and careers
- ability to reflect on meaningful experiences that have led to competency development
- ability to communicate effectively through the documentation of workplace competencies
- ability to manage your careers
- understanding of financial planning

AE and BSE Program Outcomes Addressed in this Class (in bold)

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

AST and ITec Program Outcomes Addressed in this Class (in bold)

a) an ability to apply knowledge of mathematics, science, engineering and technology;
b) an ability to design and conduct experiments, as well as to analyze and interpret data;
c) an ability to formulate or design a system, process or program to meet desired needs within realistic constraints such as economic, environ-mental, social, political, ethical, health and safety, manufacturability, and sustainability;
d) an ability to function on multi-disciplinary teams;
e) an ability to identify and solve technology problems;
f) an understanding of professional and ethical responsibility;
g) an ability to communicate effectively;
h) the broad education necessary to understand the impact of solutions in a global, economic, environmental, and societal context;
i) a recognition of the need for, and an ability to engage in life-long learning;
j) a knowledge of contemporary issues; and
k) an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.

Course Expectations:

To succeed in this course, expect to spend at least 2-3 hours per week outside of class mastering concepts through the creation of high quality written artifacts related to each assignment. A grading rubric is available for each assignment and can be found in BlackBoard with the assignment.

Course Schedule

Week	***Dates***	***Topic***	***Assignment***
1	Jan. 12	Course Overview; Workplace Competency Review; CyHire	CyHire (Due Jan. 21)
	Jan. 14	Engineering Career Services – Roger Bentley	
2	Jan. 19	NO CLASS University Holiday	
	Jan. 21	Developing a Successful Resume; References; Letters of Recommendation	Resume (Due Jan. 28)
3	Jan. 26	Developing a Cover Letter	Cover Letter (Due Feb. 4)
	Jan. 28	Agriculture Career Services – Mike Gaul	
4	Feb. 2	Preparing for Behavioral Based Interviewing (BBI) – STAR development	STAR –Communication Competency (Due Feb. 11)
	Feb. 4	Speakers –Jake Venner (Cargill); Morgan Core (Hormel)	
5	Feb. 9	Communication Competence (Key Artifacts, Executive Summary);	Key Artifact, Executive Summary – Communication Competency (Due Feb. 18)
	Feb. 11	Speakers – Trey Purvis (Pella Corp.); Keith Heiar (CAT)	
6	Feb. 16	Initiative Competence (STARS, Key Artifacts, Executive Summary)	Initiative Competency (Due Feb. 25)
	Feb. 18	Speakers – Jeff Fleenor (Fleenor Mfg)	
7	Feb. 23	Teamwork Competence (STARS, Key Artifacts, Executive Summary)	Teamwork Competency (Due Mar. 4)
	Feb. 25	Speakers -	
8	Mar. 2	Leadership Development	
	Mar. 4	Speaker – Don Frey (ADM)	

Other important dates

- Tuesday, February 4 - **2015 Ag Career Day** – Spring; 10 AM – 2 PM, Great Hall, Memorial Union http://www.career.cals.iastate.edu/ag-career-day
- Tuesday, February 10 - **2015 Spring Engineering Career Fair**, Noon – 6 PM, Hilton Coliseum & Scheman Bldg. http://www.engineering.iastate.edu/ecs/career-fair/

Course Grading

Attendance: 50%; Assignments: 50%

Grading Scale (%)

A > 93.0	C 73.0-76.9
A- 90.0-92.9	C- 70.0-72.9
B+ 87.0-89.9	D+ 67.0-69.9
B 83.0-86.9	D 63.0-66.9
B- 80.0-82.9	D- 60.0-62.9
C+ 77.0-79.9	F < 60.0

Course Policies

- Your attendance is expected for the duration of every class period. Consideration for making up missed work will be given if discussed with the instructor beforehand.
- No late homework will be accepted.
- You are responsible for getting all class information missed by absences.

Academic Misconduct: The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office. Note that there ISU identifies several forms of academic dishonesty including: A student uses or attempts to use unauthorized information in the taking of an exam; submits as his or her own work, themes, reports, drawings, laboratory notes, computer programs, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism. **Students found guilty of academic dishonesty in this class face suspension, conduct probation, or reprimand.**

Disability Accommodation Policy: Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Dead Week: For each Fall and Spring semester, the last full week of classes before final examinations is designated as Dead Week. The intent of Dead Week is to establish a one-week period of substantial and predictable study time for undergraduate students. During the Dead Week period, regular lectures are expected to continue, including the introduction of new content, as deemed appropriate by the instructor. The restrictions established by this Dead Week policy are:

- Due dates for mandatory graded submissions of any kind that fall within Dead Week must be listed on the syllabus provided at the start of the course.
- Mandatory final examinations may not be given during the Dead Week period except for laboratory courses or courses that meet weekly and for which there is no contact during the normal final examination week.

Harassment and Discrimination: Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact Dr. Mickelson. Student Assistance at 515.294.1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515.294.7612.

Religious Accommodation: If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information: If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.

TSM 210: Fundamentals of Technology
TR 3:40-5:00, 0022 Sukup Hall

Instructor

Chenxu Yu (*chenxuyu@iastate.edu*)
3344 Elings Hall
294 -4554
Office hours: M 3:30-6:00 pm or by appointment

Teaching assistant

Chao Wang (chaow@iastate.edu)
3332 Elings Hall
Office hours: W 3:00-5:00 pm, or by appointment

Textbook

Course Packet for TSM210, available at Copyworks

Class Website – Blackboard:
https://bb.its.iastate.edu
Online instructions are available at the course webpage.

Why take this course? There are fundamentals principles and tools in technology that you'll come across again and again. This course introduces those principles/tools in a variety of systems that often interact: mechanical, thermal and economic, and basic mathematical tools that is often needed for problem solving. TSM 210 also introduces you to some of the diverse subject matter found in upper level TSM classes, i.e., GPS and internet.

Catalog Description

TSM 210. Fundamentals of Technology. (3-0) Cr. 3. F. Prereq: 115, Math 140 or higher. Introduction to problem solving related to fundamental agricultural and/or industrial technology systems. Basic laws of energy, force, and mass applied to technology systems, mathematical tools needed for data analysis; Using the time value of money to make economic decisions.

Student Learning Objectives

Upon the completion of this course, you should have:

- gained a basic knowledge and appreciation of the fundamental principles of technology systems
- increased your ability to apply current knowledge, mathematics, science, engineering, and technology
- improved your ability to identify, analyze, and solve technical problems

AST and ITec Program Outcomes Addressed in TSM 210

a) an ability to apply knowledge of mathematics, science, engineering and technology;
b) an ability to design and conduct experiments, as well as to analyze and interpret data;
c) an ability to function on multi-disciplinary teams;
d) an ability to identify and solve technology problems;
e) an ability to communicate effectively;
f) an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.

Course Grading

Online Practice	15%
In-class problems	20%
Homework	25%
Exams	40%
	======
Total:	100%

In class problems, quiz, and homework totals may be adjusted to maintain the above percentage distribution.

Grading Scale (tentative)

A	>90%	C	70-75
A-	87-90	C-	67-70
B+	85-87	D+	65-67
B	80-85	D	60-65
B-	77-80	F	<60
C+	75-77		

I may, at my option, adjust the grading scale downward. I will not adjust it upward.

Course Policies

- This course will be taught as a "flipped" course. Contact hours of the class are mainly used for practicing problem solving. We will meet twice every week for one hour. Contents of the course are provided online via pre-recorded video episodes, which you are requested to watch off-class.
- Your attendance is expected for the duration of every class period. Consideration for making up missed in-class problems will be given ONLY if valid emergencies are involved.
- All homework must be turned in on engineering problems paper, available at the bookstore, at the designated time. No late homework will be graded. Homework will be due on each Tuesday throughout the semester, the last homework is due on the Tuesday of the dead week. On-line practice is due on each Thursday.
- There are 3 in-class midterms and 1 final. You are responsible for all class information missed by absences.
- Cell phones must be turned off or to "silent" during class. If a phone rings, I may ask the person to step outside.

Disability Statement

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Academic Dishonesty. Academic dishonesty occurs when a student uses or attempts to use unauthorized information in the taking of an exam; or submits as his or her own work themes, reports, drawings, laboratory notes, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism. Plagiarism is the unacknowledged use of the information, ideas, or phrasing of other writers and is an offense comparable with theft and fraud, and it is so recognized by the copyright and patent laws. One is responsible for plagiarism when: the exact words of another writer are used without using quotation marks and indicating the source of the words; the words of another are summarized or paraphrased without giving the credit that is due; the ideas from another writer are borrowed without properly documenting their source.

Academic dishonesty is considered to be a violation of the behavior expected of a student in an academic setting as well as a student conduct violation. A student found responsible for academic dishonesty or academic misconduct is therefore subject to appropriate academic penalty; to be determined by the instructor of the course, as well as sanctions under the university. The instructor of this course follows the university policies about academic dishonesty. More complete information on these policies can be found in the ISU Student Information Handbook: *http://www.dso.iastate.edu/handbook.html*.

The department strongly recommend that you read the following Iowa State University web pages: http://www.lib.iastate.edu/commons/resources/facultyguides/plagiarism/dishonest.html and http://www.lib.iastate.edu/commons/resources/facultyguides/plagiarism/isu.html

Tentative Course Schedule

Week	*Topics*
1-5	Mechanical Systems: simple machines, power, torque, power trains Midterm Exam #1, Feb. 17th, 2015
6-8	Electrical Systems: circuits, conductors, energy use Midterm Exam #2, March 12th, 2015
9-13	Thermal Systems, Psychometrics, Ventilation Midterm Exam #3, April 16th, 2015
14-16	Economic Systems: time value of money, loan amortization choosing between economic alternatives Take-home Final Exam

TSM 216: Advanced Technical Graphics Interpretation, and CAD

Section A: T / Th 12:40-2:30 (Sukup 0214)
Section B: T / Th 8:00-9:50 (Sukup 2217)

Instructor:
Jim Shahan (*jcshahan@iastate.edu)*
4352 Elings Hall (294-1398)
Office hours: Friday 9-12 (other arranged)

Text (Required):
"Print Reading for Industry", 9th edition by Walter C. Brown and Ryan K Brown. The Goodheart-Wilcox Company, Inc.
Class Website: Blackboard

Pd	Date	**Introduction / Fundamentals (AutoCAD)**	**In-class**	**Homework**
1	1/13	Introduction, Prints, Lines (Geometric Construction)	Acad I	Hw 1
2	1/15	Geometric Construction (Layers, Blocks, Arrays)	Acad II	
3	1/20	Multi-View, Section Views (Projected Views)	Acad III	Hw 2
4	1/22	Auxiliary Views, Threaded Fasteners (Auxiliary Views)	Acad IV	
5	1/27	Dimensioning (Styles , Standards)	Acad V	Hw 3
6	1/29	Tolerancing I –Basic Tolerances (Layouts)	Acad VI	
		Size Description / Industrial Drawings (Autodesk Inventor)	**In-class**	**Homework**
7	2/3	Tolerancing I- Standard Fits (Projects, Part Models)	Inv I	Hw 4
8	2/5	Tolerancing II - Standard Fits, Machining Specs (Part Drawings)	Inv II	
9	2/10	Tolerancing III – Practices (Assembly Models)	Inv III	Hw 5
10	2/12	Surface Texture Symbols (Presentation Models)	Inv IV	
11	2/17	Tolerancing IV – Tolerance Stack-up (Assembly Drawings)	Inv V	
12	2/19	**Portfolio I Due / In-Class Problem**		
		Specialized Parts / Prints (Autodesk Inventor)	**In-class**	**Homework**
13	2/24	Fasteners, Gears, Cams, Springs (Design Accelerators)	Inv VI	Hw 6
14	2/26	Plastic Parts (Plastic Parts and Standard Features)	Inv VII	
15	3/3	Precision Sheet Metal Parts (Sheet Metal Features)	Inv VIII	Hw 7
16	3/5	…continued (Sheet Metal Parts)	Inv IX	
17	3/10	Welding Prints (Weldments)	Inv X	Hw 8
18	3/12	…continued (Drive Constraints)	Inv XI	
		Spring Break		
		Geometric Dims / Tolerances	**In-class**	**Homework**
19	3/24	Introductions, Datums	GDT I	Hw 9
20	3/26	Form and Orientation	GDT II	
21	3/31	Profile and Runout	GDT III	Hw 10
22	4/2	Location	GDT IV	
23	4/7	Review	GDT V	
24	4/9	**Portfolio II Due / In-Class problem**		
		Working Drawings (Advanced CAD)	**In-class**	**Assigned**
25	4/14	Working Drawings Project (WDP)		WDP
26	4/16	WDP - Models (Frame Generator)	Inv XII	
27	4/21	WDP – Detail Drawings		
28	4/23	WDP – Assembly Drawings (Rendering, Animation)		
29	4/28	WDP – Drawing Revision Systems		
30	4/30	Review		
Final Week		**Working Drawings Project Due**		

Purpose: In the manufacturing setting, managers must be able to interpret, create or modify designs and engineering drawings. The graphic language used in industry today has developed into a detailed, highly complex language, which is "written" or "drawn" on the computer. With the advent of concurrent engineering, managers, designers, production specialists, and engineers alike are involved in all stages of the manufacturing process, including design and documentation. The purpose of the *Advanced Technical Graphics, Interpretation, and CAD* course is to provide more depth in areas of design and documentation which were introduced in TSM 116, as well as introduce new concepts, new computer programs, and new CAD techniques and commands.

2014-2015 Catalog Description

TSM 216. Advanced Technical Graphics, Interpretation, and CAD. (2-2) Cr. 3. F.S. *Prereq: TSM 116* Advanced design systems incorporating 2D and 3D design and productivity tools for use in manufacturing settings. Topics include: Geometric dimensioning and Tolerancing, 3D models, welding symbols, advanced visualization, design modeling of parts and assemblies, feature based design. Use of AutoCAD and parametric modeling software.

Learning Outcomes & Course Expectations

Expected Student Learning Outcomes:

Upon successfully completing this course, you should have:

- Built on material learned in TSM 116 and applied those concepts to depict more complicated products/systems
- Developed an awareness of the vital role technical graphics plays in modern manufacturing
- Developed the ability to select, apply, and evaluate appropriate technical graphic systems
- Developed the understanding necessary to produce and interpret 2D and 3D technical drawings used in industry
- Applied conventional industrial practices in creating and storing drawings as a common data base for documentation and manufacturing

Course Expectations:

1) To succeed in this course expect to spend 6-9 hours per week outside of class. (average)
2) Computers / Software / Operating Systems used: Be patient / Be professional
3) Stay On Schedule.

Course Grading (Average)	Grading System	
• In-class Assignments…… 20%	A 93-100	C 73-76
• Homework…….. 20%	A- 90-92	C- 70-72
• Portfolio I……. 20%	B+ 87-89	D+ 67-69
• Portfolio II…… 20%	B 83-86	D 63-66
• Working Drawings Project…… 20%	B- 80-82	D- 60-62
	C+ 77-79	F < 60

Course Policies

1) Assignments.
   a. In-class assignments are typically worked during class.
      - Due at the beginning of the next class period
      - ½ credit if submitted within 24 hours
      - Two problems count as extra credit
   b. Homework,
      - Due dates specified when assigned.
      - ½ credit if submitted within 24 hours
      - One problem counts as extra credit
   c. Submitted as follows.
      - All files are saved in the appropriate folder on the class drive.
      - Appropriate .pdf is printed and submitted in blackboard.
2) Project instructions will be handed out.
3) Consideration for making up missed work, will be based on you attendance and previously submitted assignments.

Classroom Environment

Safety Emphasis: Students in ABE classes work with systems that, if misused, can be extremely hazardous. Therefore developing an attitude of safety is crucial to all engineering and technology professionals. Instructors may take an array of actions when students fail to complete required safety training (for example, by coming late to class and missing a safety briefing) or to adhere to procedures. These include but are not limited to (1) only allowing the student to observe the lab; (2) only allowing the student to observe the lab, and deducting points from the associated lab report; (3) suspending the student from all lab activities until the student has successfully completed the required safety portion of the lab (this may mean attending another lab section where the student can arrive on time); (4) dismissing students – and particularly repeat violators of safety policy – from the course.

Academic Misconduct: The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office. Note that there ISU identifies several forms of academic dishonesty including: A student uses or attempts to use unauthorized information in the taking of an exam; submits as his or her own work, themes, reports, drawings, laboratory notes, computer programs, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism. **Students found guilty of academic dishonesty in this class face suspension, conduct probation, or reprimand.**

Disability Accommodation Policy: Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources **(SDR) to establish eligibility.** A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructo**r.** Students are encouraged to deliver completed SAAR forms as earl**y in the semester as possible.** SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Dead Week: For each Fall and Spring semester, the last full week of classes before final examinations is designated as Dead Week. The intent of Dead Week is to establish a one-week period of substantial and predictable study time for undergraduate students. During the Dead Week period, regular lectures are expected to continue, including the introduction of new content, as deemed appropriate by the instructor. The restrictions established by this Dead Week policy are:

- Due dates for mandatory graded submissions of any kind that fall within Dead Week must be listed on the syllabus provided at the start of the course.
- Mandatory final examinations may not be given during the Dead Week period except for laboratory courses or courses that meet weekly and for which there is no contact during the normal final examination week.

Harassment and Discrimination: Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact the course instructor, Student Assistance at 515.294.1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515.294.7612.

Religious Accommodation: If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information: If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.

IOWA STATE UNIVERSITY

Department of Ag & Biosystems Engineering

TSM 240: Introduction to Manufacturing Processes

SPRING 2015 SYLLABUS

Catalog Description: (1-4) Cr. 3. A study of selected materials and related processes used in manufacturing. Lecture and laboratory activities focus on materials, properties, and processes. This includes plastics and metals.

Class Meeting Times & Locations:

Lecture:	Monday	2:10pm-3:00pm	Elings	0308
Lab:	Wednesday/Friday	9:00am-10:50am (Section A)	Sukup	0221
	Wednesday/Friday	1:10pm-3:00pm (Section B)	Sukup	0221
	Tuesday/Thursday	12:10pm-2:00pm (Section D)	Sukup	0221
	Tuesday/Thursday	9:00am-10:50am (Section E)	Sukup	0221

Instructors:

Dr. David Grewell
4356 Elings
515-294-2036
dgrewell@iastate.edu

Mr. Russ Hoffman
4342 Elings
515-294-8800
russh@iastate.edu

TA: Jake Behrens (jbehrens@iastate.edu)
UTA: Aaron Jordan (ajjordan@iastate.edu)

Office Hours: Dr. Grewell: as arranged. Russ: Monday 9:00-11:30, during lab sessions, or as arranged.

Course Text: Fundamentals of Modern Manufacturing 5th, M. Groover (978-0470-467002). Class notes, handout materials, exams, quizzes, homework assignments, and support documents are posted on Blackboard.

Lab Fee: There is a $125.00 lab fee for this course. The fee is billed through the university's business office. This fee covers one pair of safety glasses, all lab supplies, maintenance, and materials.

Purpose of the Course: The purpose of this course is to provide students with an introduction to materials and processes used in the manufacturing environment.

Course Objectives: Upon completing this course, the student will:

1. Demonstrate the ability to work both as an individual and as a team member.
2. Correctly utilize a variety of technical terminology needed to communicate in a manufacturing environment.
3. Safely utilize industrial manufacturing equipment, materials, and processes.
4. Understand some basic principles of materials properties and testing.
5. Become comfortable in a manufacturing setting, as well with department laboratories and equipment.
6. Develop an appreciation for the skills, expertise, and responsibilities of skilled workers and their impact on the manufacturing environment.
7. Understand the standard and metric systems and how they are used in manufacturing.
8. Develop or enhance a background in metallic materials and processes, which can be carried to other courses, later research, and employment in manufacturing.

Course Outcomes: Upon completing this course, the student will have an ability to:

1. Apply knowledge of mathematics, science, technology and applied sciences.
2. Formulate or design a system, process, or program to meet desired needs within realistic constraints.
3. Identify and solve practical and applied science problems.
4. Communicate effectively.
5. Apply the techniques, skills, and modern scientific and technical tools necessary for professional practice.

Grading:

Requirements	Weight
Exams (75% written + 25% practical)	50%
Homework Assignments	20%
Attendance & Participation & Quizzes	20%
Final Presentation	10%
TOTAL	**100%**

Percentage Scale for Letter Grades

A	95-above	A-	90-94		
B+	87-89	B	84-86	B-	80-83
C+	77-79	C	74-76	C-	70-73
D+	67-69	D	64-66	D-	60-63
F	59-below				

Assignments: Students are expected to complete multiple homework assignments, quizzes, and exams during the course of the semester (primarily available on Blackboard). Each assignment will be available for at least one week and many can be taken multiple times until the student is satisfied with his/her score. The **two lowest homework** assignment scores will be dropped from final score calculations. In addition, student group-based "How It's Made" research projects will be presented in the laboratory during the last week of classes (i.e., Dead Week) – details available on Blackboard.

Extra Credit: Extra credit points will be calculated into to the final score for attending three manufacturing society meetings. Seven points are added for being an officer in a manufacturing related society. These societies include but are not limited to SPE, SME, and ASSE, etc. Signature forms (available on Blackboard) must be returned by Week 14. Additional participation and extra credit points may be given throughout the semester at the discretion of the instructor for attendance, participation, or outstanding performance.

Course Policies:

Attendance: Attendance will be recorded during labs and is crucial for completing the work in this course. Students are responsible for initialing the sign-in sheet during every lab meeting – falsifying sign-up sheets will result in automatic failure of the course. Excusable absences will be reviewed and accepted at the instructor's discretion. Unless extenuating circumstances exist, students must notify the instructor prior to an absence, or at minimum send/leave an email or phone message time stamped by the beginning of the class period, for the absence to be considered excusable.

Absence from Labs: Provided the student makes arrangements beforehand, an alternate time for lab work may be permitted, provided it fits into the instructor or lab assistant's schedule.

Tardiness: Unexpected tardiness is unprofessional; habitual tardiness is unacceptable in TSM240 as safety topics and related instructions are frequently discussed during the first few minutes of each lab. Students arriving late by five minutes may be asked to leave the lab at the instruction's discretion and, attendance records will be adjusted accordingly.

Exams, Quizzes, Assignments: Exams, quizzes, and homework assignments are posted on Blackboard and are available for several days at a time. Exams may be rescheduled if necessary provided the absence is excusable. Students are encouraged to work together on homework assignments and laboratory projects but cheating on exams will result in automatic failure of the course. Anyone suspected of, or caught cheating will be reported to the Dean of Students Office as per the University's academic policy.

Late Work: Unless previously discussed and agreed upon, or an excusable delay exists, late homework, laboratory projects, quizzes, or exams will not be accepted.

Cell Phone Usage: The use of cell phones is a distraction to the user, fellow students, and the instructor, not to mention that student cell phone usage during lecture or group discussion is the epitome of rudeness and inconsideration. Because everyone's safety in the labs is paramount, leave your phones in your bag or in your pocket – no phone call or text message is worth an injury. If you're unable to abide by this simple rule you may be asked to leave the lab and your grade will be adjusted accordingly.

Viral Illnesses: If you suffer from a viral infection and experience flu-like symptoms, you are strongly encouraged to stay home, and away from others to decrease the likelihood of spreading the virus. This type of absence is excusable provided you send a notification prior to your class/lab time for each incident as outlined above.

SAFETY IS THE MOST IMPORTANT PART OF THIS CLASS – ***Anyone behaving in an unsafe manner can be asked to leave the lab. Anyone noticing unsafe behavior or equipment is responsible to report this to the instructor. Safety is everyone's responsibility.***

Basic Safety Rules & Concepts: The statements below apply to safe, orderly use of laboratory facilities; in all cases the instructor or lab assistant has the right to take action as they deem necessary in cases where a student's attitude and/or actions regarding safety is below standard.

1. All students are required to participate in and satisfactorily complete the laboratory safety program before performing any activities in the metals and/or polymers laboratories. All safety rules and practices shall be observed at all times.
2. Industrial quality eye protection must be worn in the metals laboratory even if you are not using a piece of machinery yourself; particles can fly across room without warning from unguarded machines or various processes.
3. Closed-toe shoes must be worn in the laboratories. Sandals or open-toe shoes are not allowed!
4. Long pants are to be worn in the laboratories.
5. Long sleeves, loose clothing, loose fitting jewelry, and long hair shall be removed or secured to prevent them from being caught in the machinery. No loose tie strings or neckties are permitted – remove or tuck inside!
6. Additional personal protective equipment – i.e., welding jackets, gloves, face shields, helmets, etc. – shall be worn as prescribed by the instructor or project manuals.
7. Students not properly prepared as per rules 1 through 6 shall be asked to correct the situation immediately. This may include being asked to leave the class to obtain proper clothing or safety gear.

Laboratory Safety Program: In order to ensure all students are familiar with safe practices, everyone must participate in and successfully complete a laboratory safety program. The program consists of lecture, demonstrations, discussion, reading materials, multi-media, hands-on experiences, a written examination, and an acknowledgment that the student understands and accepts the inherent risks associated with operating dangerous equipment and potentially hazardous items found throughout the laboratory environment.

Safety Exam: All students must achieve a minimum score of 90% on the laboratory safety exam available on Blackboard. Failure to satisfactorily complete this exam will result in being denied the opportunity to participate in laboratory assignments and grades will be adjusted accordingly.

Safety Training Statement: Upon successful completion of laboratory safety exam, students must complete a safety training statement, available on Blackboard, acknowledging their participation in the safety program and agreement to abide by all safety rules. **The safety training statement must be completed before your first laboratory meeting the second week of classes.**

Industrial Eye Protection: The department requires ALL persons working in or visiting the laboratories to wear industrial quality eye protection – even if you're just walking through. Safety glasses will be distributed at the beginning of the course; you may purchase replacement safety glasses through the main office if necessary. Safety glasses must be worn whenever you are in any laboratory even if you are not operating a machine. It is the student's responsibility to bring and wear safety glasses in the labs.

Lab Cleanup: Cleanup will be the responsibility of each student before leaving the laboratory for the day. During the grading of individual and group projects, an assessment will be made of your assigned area, to ensure that all materials, tools, and literature are put away; floors, equipment, and tables are swept clean, and trash is thrown away. This requirement will carry equal weight as other requirements for grading the projects.

During the final lab period of the semester, everyone will be expected to help thoroughly clean the laboratories and equipment.

Requirements (Summary):

- Safety glasses must be worn in the laboratories at all times
- Successful completion of safety training materials
- Textbook
- Dressed appropriately for the lab, long legged pants, closed-toed shoes, no loose jewelry, sleeves, ties, etc.
- Appropriate attitude

University Polices and Guidelines:

Disability Accommodations: Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

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- Due dates for mandatory graded submissions of any kind that fall within Dead Week must be listed on the syllabus provided at the start of the course. **Please note: student group-based "How It's Made" research projects will be presented in the laboratory during Dead Week.**
- Mandatory final examinations may not be given during the Dead Week period except for laboratory courses or courses that meet weekly and for which there is no contact during the normal final examination week.
- Registered ISU Student Organizations may not hold any meetings, functions, or sponsored events during the Dead Week period. Any exception to these restrictions must be authorized in advance by Office of the Dean of Students.

Contact Information: If you are experiencing, or have experienced, a problem with any of the policy or guideline issues described above, email academicissues@iastate.edu.

TSM240 Spring 2015 Class Schedule and Assignments:

Week	Date	Lecture	Assignments	Polymers Lab	Metals Lab
1	1/12	Course introduction, review syllabus & manufacturing overview	Read: Chapter 1 BB: Safety Exam BB: Homework Assignment	Day 1: Course introduction, plastics safety (SPE Video), discussion of safety exam & lab overview Day 2: Review of math fundamentals and Mathcad use *(computer lab)*	Day 1: Course introduction, plastics safety (SPE Video), discussion of safety exam & lab overview Day 2: Review of math fundamentals and Mathcad use *(computer lab)*
2	1/19	**No class -** University holiday	Read: Chapter 2 & 3.1/2/3 BB: Safety Training Statement BB: Homework Assignment	Day 1 – 1st hour: Introduction to mechanical properties of stress, shear, strain, & tensile Day 2 – 1st hour: Introduction to lab equipment *(metals/plastics labs)*	Day 1 – 2nd hour: Introduction to lab equipment *(metals/plastics labs)* Day 2 – 2nd hour: tensile test demonstration *(grain lab)* & Mathcad Exercise 3.1 *(computer lab)*
3	1/26	Review mechanical properties of stress, shear, & strain Introduction to composites	Read: Chapter 8 & 9 BB: Homework Assignment Research Team Membership Assignments	Composites, fiberglass layup, & clipboards	Machine operations & production: Aluminum Tops
4	2/2	Physical properties of materials Introduction to polymers & blends	Read: Chapter 3.4/5 & 4 BB: Homework Assignment	Water jet clipboards and assemble Melt-flow index & viscosity	Manual lathe operations: Setting offsets & machining wax
5	2/9	Net shape molding processes	Read: Chapter 13 BB: Homework Assignment	Injection molding	Machining operations: Tensile Test Specimens
6	2/16	Machining operations, tools, speed & feed calculations	Read: Chapter 21 BB: Homework Assignment	Sequencing, basic machining and CNC concepts	Manufacturing operations: Torsion Test Specimens CNC programming
7	2/23	CNC programming, G-Code, Conversational, CAM	Read: Chapter 37 BB: Homework Assignment	CAD/CAM/G code *(computer lab)*	Manufacturing operations: Torsion Test Specimens CNC programming
8	3/2	**Exam 1 – due Thursday 5:00 PM** Engineering materials – metals, alloys & blends	Read: Chapter 6 BB: Homework Assignment	Foaming, rotational, & compression molding Test torsion specimens	Machining operations: Threaded Adapters CNC programming

9	3/9	Rapid Prototyping & Additive Manufacturing	Read: Chapter 32 BB: Homework Assignment DUE: Research Status Update	3-D Printing	Magic Bolt– mass confusion
	3/16	**SPRING BREAK**			
10	3/23	Metal machining – theory	Read: Chapter 20 BB: Homework Assignment	Blown film simulator, extrusion, and packaging	Magic Bolt – chaos & clarity
11	3/30	Non-traditional machining processes	Read: Chapter 25 BB: Homework Assignment	Vacuum forming, hot gas & ultrasonic welding	Magic Bolt – mass production
12	4/6	Joining processes – welding	Read: Chapters 28 & 29 BB: Homework Assignment	Silkscreen printing	Introduction to Welding
13	4/13	Brazing, soldering, & adhesive bonding	Read: Chapter 30 & 31 BB: Homework Assignment	Electronics & soldering printed circuit boards	Welding assignment & project work
14	4/20	Tool life and tool selection Guest speaker: Eric Jenkins Sandvik Coromant	Read: Chapters 22 & 23 BB: Homework Assignment	Practical exam	Practical exam
15	4/27	Applied university research	Read: Chapter 40 BB: Homework Assignment	Research presentations	Research presentations
16	5/4	**Exam 2 – due Thursday 2:00 PM** *Course grades available in Blackboard under "My Grades" after exam closes* Finals week – no lecture		Finals week – no lab	Finals week – no lab

Notes: Due dates for assignments, quizzes, and exams are available in Blackboard.
Instructor reserves the right to make changes to the course schedule as necessary.
March 27 is the drop date for full-semester courses or withdraw without extenuating circumstances.

TSM 270 – Principles of Injury Prevention
Fall 2014

Class Meeting: Asynchronous Web delivery

Instructor: Dr. Steven A. Freeman email: sfreeman@iastate.edu
Office: 3333 Elings Hall Phone: 294-9541

Teaching Assistant: Mr. Matthew E. Harvey email: meharvey@iastate.edu
Office: 3332 Elings Hall

REQUIRED MATERIALS

Textbook: Safety: A Personal Focus (4th Ed.) by David L. Bever

CATALOG DESCRIPTION

TSM 270. Principles of Injury Prevention. (3-0) Cr. 3. Basic foundations of injury causation and prevention in home, motor vehicle, public, and work environments.

To do well in this class expect to spend 6-9 hours per week on class readings and assignments.

COURSE DESCRIPTION/PURPOSE/OBJECTIVES

This is an overview course that will cover a variety of safety and health topics focussing on injury prevention in the home, motor vehicle, public, and work environments. The enduring understanding that forms the basis for every discussion and activity in this course is **all of us make decisions every day that impact our safety as well as the safety of those around us**. The overarching questions that this class will answer include:

1. What are the critical safety issues that impact every day life?
2. What can we personally do to create a safer environment for ourselves and others?

At the conclusion of this course, you should be able to:

- Define terminology commonly associated with the safety and health discipline.
- Select a philosophical position regarding safety and be able to justify that position.
- Practice the principles of smart risk behavior.
- Identify methods to reduce stress and its effects on safety and health.
- Identify the hazards of sleep deprivation
- Identify the hazards of alcohol consumption.
- Identify appropriate emergency response procedures.
- Analyze the safety conditions of homes.
- Evaluate the causes of fires and appropriate prevention procedures.
- Appraise your preparedness for dealing with crime and violence.
- Recognize the causes of motor vehicle injuries and prevention techniques.
- Evaluate the causes of occupational injuries and their prevention.
- Appraise your preparedness for dealing with adverse weather and other disasters.
- Identify steps to develop an ergonomically sound environment and prevent back injuries.
- Identify methods to prevent temperature related illnesses.
- Reflect on your safety knowledge and clearly articulate your role in the prevention of injuries and illnesses.

COURSE REQUIREMENTS

1. Read assigned materials and watch course lectures.
2. Complete individual reflections on the content and your learning of the content.
3. Pass assessments
4. Complete safety presentation

COURSE SCHEDULE

Topic	Readings
Introduction	Syllabus; Blackboard Learn
Definitions & Safety Philosophy	Chapter 1; Blackboard Learn
Safety Analysis	Chapter 2; Blackboard Learn
Stress Management	Blackboard Learn
Sleep Deprivation	Blackboard Learn
Alcohol Safety	Blackboard Learn
Sexual Health	Blackboard Learn
Emergency Response	Chapter 3; Blackboard Learn
Home Safety	Chapter 4; Blackboard Learn
Fire Safety	Chapter 5; Blackboard Learn
Personal Safety	Chapter 6; Blackboard Learn
Motor Vehicle Safety	Chapter 7; Blackboard Learn
Occupational Safety	Chapter 8; Blackboard Learn
Disaster Response	Chapter 9; Blackboard Learn
Human Factors	Blackboard Learn
Back Safety	Blackboard Learn
School Safety	Chapter 11; Blackboard Learn
Recreational Safety	Chapter 10; Blackboard Learn
Winter Safety	Blackboard Learn
Sun Safety	Blackboard Learn
Safety Responsibility	Chapter 12

GRADING

There is a total of 450 points possible.

Reflections on Learning (20 @ 10 points each) .....200 pts
Topic Assessments (21 @ 10 points each) .....210 pts
Final Reflection on Learning .....20 pts
Safety Presentation .....20 pts

COURSE GRADE

Your final grade will be computed based on the following scale:

A	405 - 450 points
B+	392 - 404 points
B	360 - 391 points
C+	347 - 359 points
C	315 - 346 points
D+	302 - 314 points
D	270 - 301 points
F	- 269 points

COURSE STRUCTURE

This course is an online course that allows you to work at your own pace as follows:

1. **Read the outline notes** available in the topic folder in Blackboard, **read the chapter in the text book** if appropriate, **watch the lectures** posted in the topic folder, and **review any supplemental materials** (files or videos) posted in the topic folder.
2. **Prepare and post your reflection on learning** via the link to the assignment located in the topic folder. As soon as you post your reflection, a link to the topic assessment will appear in the topic folder.
3. **Complete the topic assessment.** If you pass the assessment (a score of 70% or better) the next topic folder will appear. If you did not pass the assessment, you will need to repeat the assessment until your average score is 70% or better (e.g., if you receive a score of 60% on the first attempt, you would need a score of 80% on the second attempt to obtain an average of 70%).
4. **Move on to the next topic and repeat steps 1**-3.

You can work ahead at your own pace and complete the entire course before the end of the semester if you wish. However, you cannot fall behind and put course activities off until the end of the semester. To ensure that minimum progress is being made throughout the semester the following cutoff dates have been established:

1. **The first four topics (*Introduction* through *Stress Management*) must be completed by September 15th.** Any of the reflections and assessments associated with these topics not completed by this time will receive a grade of 0 on September 16th. This pattern will then follow through the end of the semester according to the dates below.
2. **Topics through *Sexual Health* must be completed by September 30th.**
3. **Topics through *Personal Safety* must be completed by October 15th.**
4. **Topics through *Disaster Response* must be completed by October 31st.**
5. **Topics through *Recreational Safety* must be completed by November 15th.**
6. **All course activities must be completed by December 8th, 2014 (the start of dead week).** Any reflections, assessments and the safety presentation not completed by this time will receive a grade of 0 on December 9th.

REFLECTIONS ON LEARNING

For each course topic, you will reflect on your learning associated with that topic. These will be guided reflections – with specific questions to be answered for each topic. **Each reflection must include headings that match the questions and be 200-400 words in length**. Reflections should be prepared and spell checked before submitting them via the assignment toolbox for that reflection (**the link for each assignment is in the topic folders**). Include the word count at the end of the reflection. Put your reflection in the submission box of the assignment. Do not attach a separate file. Grading will be based on the rubric that is included in Blackboard with the assignment. The final reflection is a longer, more involved reflection and is worth more points.

TOPIC ASSESSMENTS

These assessments will be available in Blackboard for each topic once you have submitted your reflection on learning for that topic. **(The link for each assessment will appear in the topic folders once the reflection has been submitted.)** These are timed activities. Once you start the assessment, you will have 15 minutes to complete it and submit your answers. These assessments are repeatable. You must have an average score of 70% on an assessment before the next topic will be available.

FINAL REFLECTION ON LEARNING

The final reflection covers an overview of a safety topic of your choice and then reflection questions concerning your learning throughout the semester. This reflection is 1000-2000 words in length. Complete this reflection in the same process as all other reflections on learning. **(The link for this assignment is in the last topic folder on Safety Responsibility.)**

SAFETY PRESENTATION

This is a PowerPoint presentation visual explanation of the safety topic you chose to write about in your final reflection. This presentation should include 15-20 slides (not including your title slide and reference slide). You will attach your PowerPoint file via the assignment toolbox. **(The link for this assignment is in the last topic folder on Safety Responsibility.)**

UNIVERSITY POLICIES

Disability Accommodations

If you have a documented disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act and requires accommodations, you will need to go to the Disability Resource (DR) Office for coordination of your academic accommodations. The DR Office is located in room 1076, Student Services Building. Their telephone number is 515-294-7220. Their email is disabilityresources@iastate.edu.

Jenny Macken, 1330D Elings Hall (phone 515-294-5196; email jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with Jenny and myself to address any special needs or special accommodations at the beginning of the semester.

Academic Dishonesty

This class follows Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office. http://www.dso.iastate.edu/ja/academic/misconduct.html

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact me, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation

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Dead Week

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- Due dates for mandatory graded submissions of any kind that fall within Dead Week must be listed on the syllabus provided at the start of the course.
- Mandatory final examinations may not be given during the Dead Week period except for laboratory courses or courses that meet weekly and for which there is no contact during the normal final examination week.
- Registered ISU Student Organizations may not hold any meetings, functions, or sponsored events during the Dead Week period. Any exception to these restrictions must be authorized in advance by Office of the Dean of Students. .

Contact Information

If you are experiencing, or have experienced, a problem with any of the policy issues described above, email academicissues@iastate.edu.

COURSE INFORMATION:

TSM 310: Total Quality Improvement
Prerequisites: (Stat 101 or 104; junior classification)

Introduction to the fundamental concepts of TQM – Deming style of management, statistical studies to understand the behavior of products, processes, or services and how to define and document processes and customer focus. Introduction to continuous improvement tools and methods – DMAIC, SPC, Lean and Six Sigma and JIT; emphasis on team work and problem solving skills.

Class meeting: Monday and Wednesday, 4:10pm until 5:30pm, 0005 Physics Hall

Instructor:
Gretchen A. Mosher, PhD
Assistant Profesor
3331 Elings Hall
Office hours: M 3-4pm or by appointment

Email: gamosher@iastate.edu
Office phone: 515 294-6416

REQUIRED MATERIALS

The required text for this course is a helpful resource, not only in class, but in internship and professional positions.

The Quality Toolbox, by Nancy Tague, Published by ASQ Press.

COURSE DESCRIPTION/PURPOSE/OBJECTIVES

TSM 310 will introduce you to concepts in the field of quality management and provide you the tools needed to use measured data to make strategic decisions. Overarching principles that connect all course content and activities are:

1. The goal of quality management is continuous improvement to meet and exceed customer expectations.
2. Appropriate collection and analysis of data should support strategic decision-making.
3. Comprehensive knowledge of interacting process components within a larger system is required for sustainable continuous improvement.

COURSE OBJECTIVES: By the end of TSM 310, students will be able to:

1. Define the origins and current role of Total Quality Control in manufacturing and process-based environments.
2. Interpret quality management principles developed and advocated by leaders in the field of quality management.

3. Identify and explain basic data collection and analysis tools as they relate to addressing quality problems, reducing variation, decision-making and other process improvement strategies.
4. Apply statistical thinking to business process performance and improvements.
5. Practice tenets of effective teamwork.
6. Demonstrate skills in experimental design to answer quality-oriented questions.
7. Outline strategies for implementation and evaluation of quality management programs.
8. Identify best practices in personnel development components related to quality management education and training.

ABE STUDENT OUTCOMES ADDRESSED IN THIS COURSE:

- The ability to apply knowledge of mathematics, science, technology, and applied sciences
- The ability to function on multi-disciplinary teams
- The demonstration of an understanding of professional and ethical responsibility
- The ability to communicate effectively
- Demonstrate the broad education necessary to understand the impact of solutions in a global, economic, environmental, and societal context
- The ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice

STUDENT ASSESSMENT:

Individual:

Readiness Assessment Tests (RATs)	10 @ 10 points each	100 points
Content Exams	4 @ 50 points each	200 points
Big Quizzes (25 point quiz)	2 @ 25 points each	50 points
Decision simulation activities	2 @ 25 points each	50 points
Final Exam (cumulative)	1 @150 points	100 points

Team:

Readiness Assessment Tests (RATs)	10 @ 10 points each	100 points
Group Problems	4 @ 25 points each	100 points
Peer Evaluations	5 @ 20 points each	100 points

Other:

In-Class Participation and Activities	Continuously	200 points

Total Points:

Individual	500 points
Team	300 points
Other	200 points
Total Points	**1000 points**

No extra credit will be offered in this course. In-class activities generally cannot be made up. Your regular attendance is expected and necessary to do well in this course.

COURSE GRADE:

Your final grade will be computed based on the following scale:

A	93% and above
A-	90% - 92.9%
B+	87% - 89.9%
B	83% - 86.9%
B-	80% - 82.9%
C+	77% - 79.9%
C	73% - 76.9%
C-	70% - 72.9%
D+	67% - 69.9%
D	63% - 66.9%
D-	60% - 62.9%
F	59% or below

COURSE SCHEDULE (tentative – subject to change as needed):

DATE	TOPIC(s)	ASSIGNMENT(S)
Jan 12 (Mon)	Syllabus review; course expectations and ground rules; formation of course teams; Basics of quality management	Review the syllabus on Blackboard
Jan 14 (Wed)	Statistical concepts important to quality; statistical thinking – why is this important?	
Jan 19 (Mon)	No class – Martin Luther King, Jr. Day	
Jan 21 (Wed)	Data collection; Classifying data; measurement systems	**RAT 1** Individual due by class time Group completed in class
Jan 26 (Mon)	Variation; how variation impacts quality; quality processes	**Group problem 1 –** in class
Jan 28 (Wed)	Idea creation and expanding tools; Systems thinking	**RAT 2** Individual due by class time Group completed in class
Feb 2 (Mon)	**Decision simulation 1**	**Decision simulation 1**
Feb 4 (Wed)	**Exam 1**	**Exam 1**
Feb 9 (Mon)	Cause analysis tools	
Feb 11 (Wed)	Cause analysis tools	**RAT 3** Individual due by class time Group completed in class
Feb 16 (Mon)	Cause analysis tools	
Feb 18 (Wed)	Planning tools	**RAT 4** Individual due by class time

		Group completed in class
Feb 23 (Mon)	Planning tools	
Feb 25 (Wed)	**Exam 2**	**Exam 2**
Mar 2 (Mon)	Data collection and analysis tools	**Group problem 2 –** in class
Mar 4 (Wed)	Data collection and analysis tools	**RAT 5** Individual due by class time Group completed in class
Mar 9 (Mon)	Evaluation tools; selection of tools	
Mar 11 (Wed)	**Big Quiz 1**	**Big Quiz 1**
Mar 16 and 18	Spring break – no class	
Mar 24 (Mon)	Statistical process control	
Mar 26 (Wed)	Statistical process control	**RAT 6** Individual due by class time Group completed in class
March 30 (Mon)	Statistical process control	**Group problem 3 –** in class
Apr 1 (Wed)	**Decision simulation 2**	**RAT 7** Individual due by class time Group completed in class
Apr 6 (Mon)	Process capability; capability index	
Apr 8 (Wed)	**Exam 3**	**Exam 3**
Apr 13 (Mon)	Implementation of quality management programs; management support	
Apr 15 (Wed)	Evaluating effectiveness; data management	**RAT 8** Individual due by class time Group completed in class **Group Problem 4** – in class
Apr 20 (Mon)	**Decision simulation 3**	**Decision simulation 3**
Apr 22 (Wed)	Benchmarking; Six Sigma; JIT management approaches	**RAT 9** Individual due by class time Group completed in class
Apr 27 (Mon)	Six Sigma	**Big Quiz 2**
April 29 (Wed)	Integration of quality with other business goals; quality climate and employee engagement;	**RAT 10** Individual due by class time Group completed in class
May 4 (Mon)	Comprehensive final exam – Tentatively scheduled for Monday, May 4 from 2:15 until 4:15pm	**Final exam**

UNIVERSITY POLICIES AND GUIDELINES

Disability Accommodations

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting

accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Jenny Macken, 1330 Elings Hall, (phone 515-294-5196; email jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with Jenny or me to address any special needs or special accommodations at the beginning of the semester.

Academic Dishonesty

To falsify the results of one's research, to steal the words or ideas of another, to cheat or misrepresent your efforts on an assignment or to allow or assist another to commit these acts corrupts the educational process, and ultimately, cheapens the value of your education. Any work that you submit in any stage of the assignment process must be your own words, ideas, statistics, or data. Use of others work must be properly cited (within the text) and referenced (at the end of the text).

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Religious Accommodation

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Dead Week

This class follows the Iowa State University Dead Week guidelines. For academic programs, the last week of classes is considered to be a normal week in the semester except that in developing their syllabi faculty shall consider the following guidelines:

Mandatory final examinations in any course may not be given during Dead Week except for laboratory courses and for those classes meeting once a week only and for which there is no contact during the normal final exam week. Take home final exams and small quizzes are generally acceptable. (For example, quizzes worth no more than 10 percent of the final grade and/or that cover no more than one-fourth of assigned reading material in the course could be given).

TSM 322– Preservation of Grain Quality

Lecture TR 11:00 a.m. – 11:50 a.m. Room 13 Curtiss

Instructor

Justin McGill
jmmcgill@iastate.edu
2327 Elings Hall
515-294-0783
Office Hours: By appointment only – *this does not mean I am hard to reach* – Just need some advance notice! ☺

Textbooks, Laboratory Manuals

"Managing Grain After Harvest", C.J. Bern, T.J. Brumm and C.R. Hurburgh, Jr. (Bookstore)

"Grain Drying, Handling and Storage Handbook", MWPS-13 (Bookstore, or MWPS, 122 Davidson Hall)

Class Website

Blackboard Learning System – this will be used extensively

Catalog Description

TSM 322. Preservation of Grain Quality. (2-3) Cr. 3. S. Prereq: Math 140. Principles and management for grain quality preservation. Grain drying and grain storage. Psychometrics. Fans and airflow. Grain handling methods and system planning. Grain quality measurement, and end use value analysis.

Student Learning Objectives

Upon successfully completing this course, you should have gained and/or improved your:

1. mastery of the knowledge, techniques, skills, and tools related to grain quality, handling and drying;
2. ability to conduct, analyze, and interpret experiments;
3. ability to apply creativity in the design and management of a grain handling system;
4. ability to function effectively on teams;
5. ability to identify, analyze and solve grain quality, drying, and handling problems, and
6. knowledge of some of the contemporary professional, society, and global issues related to grain and grain quality

Tips on being successful in TSM 322 / Course Expectations

1. **Come to class.** I expect you to be in class each class period. There will be unannounced graded activities during class that you will miss if you aren't there. If you can't make it (unforeseen emergencies excepted), I expect notification (phone or email) ahead of time. You can make up activities if you've given prior notification. You are responsible for getting all class information missed by absences.
2. **Spend regular time on this class each week.** You should be regularly spending time on the class each week – at least 1 to 2 hours out of class for every hour in class. I will provide assignments for you to help you with this.
3. **Ask questions**. If you don't understand what's been presented or discussed, ask! I want to hear your questions. My job is to make sure that you understand. And if what we talk about sparks a question in your mind in another direction, ask. I always take time to answer questions in class. I am available outside of class to answer questions that may not come up during class. BTW, your knowledge is valuable too – I don't know everything and your contributions to the discussions are welcome.

4. **Do the assignments on time**. Class activities will expect that you've come to class prepared. Read the assigned material before coming to class. (Short on-line quizzes will reward you for doing so.) Hand in assignments on time. The due date and time for each assignment will be clearly specified. Note, however, that is always worth something to hand in an assignment if you've missed a deadline, even though there is a deduction for being late.
5. **Take notes and review them**. Class notes are invaluable to learning the material in this class. I will post the lecture notes after class to assist you.
6. **Review your notes, posted solutions and practice problems.** Going back to review and reflecting on what you've heard, seen and done is how learning really occurs.
7. **Don't Wait if you have a problem.** Waiting until the last week of the semester to sort out grading issues is not an entirely successful way to sort out problems. Please document and keep dates of any communique so that we can make sure you get all the points you deserve.

Tentative Course Outline

Week	Unit	Lecture
1-2	1	Moisture and Grain Deterioration
3-4	1	Grading and Sampling
5-6	2	Grain Handling
7-9	3	Psychometrics & Grain Drying
10-11	3	Grain Drying Systems
12-13	3	Fan/Grain Systems
14-15	4	Grain Quality

Course Grading

Homework Assignments (1/week – 16 given)	33.3%
Closed Book Exams (4 Given)	33.3%
Team Problems (every couple weeks – 8 given)	33.3%
Total	100%

Tenative Grading Scale

A	> 90%
B+	87-89.9
B	80-86.9
C+	77-79.9
C	70-76.9
D+	67-69.9
D	60-66.9
F	<60%

NOTE: Late assignments are accepted at a flat penalty of 41%!!
NOTE: There is no extra credit in this class!!

Contacting the Instructor

1. If you need something from the instructor right away, please feel free to call my cell phone. 812-216-4119. Like most of you -- I am not far from it at all times.

2. If you email me, please know that I value my family time greatly and WILL NOT make it a priority to answer emails after hours. I will get to emailed questions as soon as I am able – but know if you want an immediate detailed answer, email may not be the best way to get me. Please expect the following response times:
   a. Monday through Thursday (12-24 hours)
   b. Friday – Sunday (72 Hours)

Classroom Environment

Safety Emphasis: *Students in ABE classes work with systems that, if misused, can be extremely hazardous. Therefore developing an attitude of safety is crucial to all engineering and technology professionals. Instructors may take an array of actions when students fail to complete required safety training (for example, by coming late to class and missing a safety briefing) or to adhere to procedures. These include but are not limited to (1) only allowing the student to observe the lab; (2) only allowing the student to observe the lab, and deducting points from the associated lab report; (3) suspending the student from all lab activities until the student has successfully completed the required safety portion of the lab (this may mean attending another lab section where the student can arrive on time); (4) dismissing students – and particularly repeat violators of safety policy – from the course.*

Academic Misconduct: The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.

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Disability Accommodation Policy: Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

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Contact Information: If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.

TSM 322L– Preservation of Grain Quality Laboratory
Sukup Hall 4223 - M9-12; W 9-12; F9-12; F12-3

Instructor

Justin McGill
jmmcgill@iastate.edu
2327 Elings Hall
515-294-0783
Office Hours: By appointment only – *this does not mean I am hard to reach* – Just need some advance notice! ☺

Textbooks, Laboratory Manuals

"Managing Grain After Harvest", C.J. Bern, T.J. Brumm and C.R. Hurburgh, Jr. (Bookstore)

"Grain Drying, Handling and Storage Handbook", MWPS-13 (Bookstore, or MWPS, 122 Davidson Hall)

All Other Materials Provided by Instructor

Class Website

Blackboard Learning System – this will be used extensively

Catalog Description

TSM 322L. Preservation of Grain Quality. (0-3) Cr. 1. S. Prereq: Credit or enrollment for credit in TSM 322. Hands-on experiences in the principles and management for grain quality preservation. Quality measurement. Drying and storage. Fans and airflow through grain. Handling methods. System planning. Industry tour.

Student Learning Objectives

Upon successfully completing this course, you should have gained and/or improved your:

1. mastery of the knowledge, techniques, skills, and tools related to grain quality, handling and drying;
2. ability to conduct, analyze, and interpret experiments;
3. ability to apply creativity in the design and management of a grain handling system;
4. ability to function effectively on teams;
5. ability to identify, analyze and solve grain quality, drying, and handling problems, and
6. knowledge of some of the contemporary professional, society, and global issues related to grain and grain quality

Tentative Course Outline -- Note: this outline is tentative and ***WILL*** change. Please watch the website for those changes. I will communicate them in class as well.

Week	Lab Exercises
1	NO LAB
2	Moisture Determination
3	Iowa Power Farming Show
4	Determination of a U.S. Grade
5	System Plan Introduction
6	Mechanical Conveying
7	System Plan Milestones
8	Psychrometrics
9	Psychrometrics of Drying
10	Industry Tour
11	Dryer Controls Lab
12	Deadly Dust and System Plan Upload
13	?
14	?
15	Peer Evaluations

Course Grading

Laboratory Exercises (10 – 20 pts)	80%
System Plan	20%
Total	100%

Tenative Grading Scale

A	> 90%
B+	87-89.9
B	80-86.9
C+	77-79.9
C	70-76.9
D+	67-69.9
D	60-66.9
F	<60%

NOTE: Late assignments are not accepted in this class without prior written arrangement!!
NOTE: There is no extra credit in this class!!

Tips on being successful in TSM 322L

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TSM 324. Soil & Water Conservation Management
Spring 2015 Syllabus

Meetings: Monday & Wednesday 8:00 am – 8:50 am, 0308 Elings
Tuesday 12:10 pm – 1:30 pm, 2306 Elings

Prerequisites: Math 140

Instructor: Dr. Bailey Sullivan
3354 Elings Hall
baileys1@iastate.edu

Office Hours: I have an open door policy however to ensure I have time to address your issues an appointment is recommended. You can also reach me by email if you have questions.

By the end of this course, you will be able to:

- Understand and describe soil and water resource systems qualitatively and quantitatively;
  - *Competencies highlighted: technical knowledge, general knowledge.*
  - *Assessment will be primarily through exams and weekly quiz questions.*
- Critically evaluate multi-dimensional issues related to the management of soil and water systems (consider both technical/scientific and non-technical constraints);
  - *Competencies highlighted: planning, customer focus, cultural adaptability, continuous learning, and communication.*
  - *Assessment will be primarily through lab assignments.*
- Identify and evaluate alternative solutions to problems associated with the utilization and management of soil and water resources.
  - *Competencies highlighted: analysis and judgment, continuous learning.*
  - *Assessment will be primarily through lab assignments.*

Grading:

Grades will be determined based on your performance as follows:

2 midterm exams:	30%	(15% each)
Labs & Quizzes:	50%	
Final exam:	20%	

The grade assignment will be based on the following scale - please note I round strictly to the tenths place:

92.5 - 100 %	A	72.5 - 77.4 %	C
90.0 - 92.4 %	A-	70.0 - 72.4 %	C-
87.5 - 89.9 %	B+	67.5 - 69.9 %	D+
82.5 - 87.4 %	B	62.5 - 67.4 %	D
80.0 - 82.4 %	B-	60.0 - 62.4 %	D-
77.5 - 79.9 %	C+	0 - 59.9 %	F

Attendance:

I believe that attendance should only help you; therefore good attendance will be rewarded with extra credit. Attendance will be taken each class you will pick up your attendance sheet at the beginning of each class and will write down one thing you learned or didn't

understand and turn it back in at the end of class. You will not be punished for missing class but you are responsible for learning all the material covered in class.

0 absences – 5 pts
1-2 absences – 3 pts
3-4 absences – 1 pts
5 or more absences – 0 pts

Lab assignments:

Weekly lab assignments will be in the form of mini-projects. Project results must be turned in before or at the beginning of class on the due date. **I DO NOT ACCEPT LATE WORK.** Please note that with labs contributing to 50% of your grade, handing things in is critical to passing the class.

At the beginning of each lab period, students will be selected at random to present their work on the lab that is being turned in.

Quizzes:

Each week there will be a short multiple-choice quiz posted in BbL. These are an opportunity for you to be familiar with the kinds of questions I ask on exams, and an opportunity for me to check overall understanding of the material before we move on to the next topic.

Exams:

Exams 1 and 2 will be 50 minutes. The final exam will be 1 hour and 50 minutes and will be cumulative and mandatory. Each exam will be closed reference. An exam equation sheet will be provided for each exam when applicable.

Dead Week:

The last full week of classes before final examinations is designated as Dead Week. The intent of this policy is to establish a one-week period of substantial and predictable study time for undergraduate students. During the Dead Week period, regular lectures are expected to continue, including the introduction of new content, as deemed appropriate by the instructor. Relevant restrictions established by ISU Dead Week policy are:

- Due dates for mandatory graded submissions of any kind that fall within Dead Week must be listed on the syllabus provided at the start of the course.
- Mandatory final examinations may not be given during the Dead Week period except for laboratory courses or courses that meet weekly and for which there is no contact during the normal final examination week.

If you have a documented disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act and requires accommodations, you will need to go to the Disability Resource (DR) Office for coordination of your academic accommodations. The DR Office is located in room 1076, Student Services Building. Their telephone number is 515-294-7220. Their email is disabilityresources@iastate.edu. Jenny Macken, 1330D Elings Hall (phone 515-294-5196; email jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with Jenny and myself to address any special needs or special accommodations at the beginning of the semester.

TSM 324 Class Schedule (Subject to Minor Change)

Date	*Content No.*	*Material/Content*
Mon. 1/12/15	1.	Introduction
Tues. 1/13/15	2.	Intro to lab expectations
Wed. 1/14/15	3.	Landscapes and mapping
Mon. 1/19/15		MLK Jr. DAY - NO CLASS
Tues. 1/20/15	4.	Lab 1: Mapping
Wed. 1/21/15	5.	Hydrology
Mon. 1/26/15	6.	Precipitation
Tues. 1/27/15	7.	Lab 2: Precipitation mapping
Wed. 1/28/15	8.	Runoff
Mon. 2/2/15	9.	Runoff estimation
Tues. 2/3/15	10.	Lab 3: Runoff
Wed. 2/4/15	11.	Erosion mechanics
Mon. 2/9/15	12.	Erosion estimation
Tues. 2/10/15	13.	Lab 4: Basic erosion estimation
Wed. 2/11/15	14.	Upland erosion control, part 1: residue, tillage, compaction
Mon. 2/16/15	15.	Upland erosion control, part 2: pictures and supplemental info
Tues. 2/17/15	16.	***EXAM 1***
Wed. 2/18/15	17.	Upland erosion control, part 3: contouring, strip cropping, VFS
Mon. 2/23/15	18.	Upland erosion control, part 4: Terraces
Tues. 2/24/15	19.	Lab 5: Erosion control and conservation planning
Wed. 2/25/15	20.	Surface water storage
Mon. 3/2/15	21.	Pond & embankment planning
Tues. 3/3/15	22.	Lab 6: Ponds
Wed. 3/4/15	23.	Subsurface water and wells
Mon. 3/9/15	24.	Pumps
Tues. 3/10/15	25.	Lab 7: Pumps
Wed. 3/11/15	26.	Water quality
		SPRING BREAK
Mon. 3/23/15	27.	Water quality
Tues. 3/24/15	28.	Lab 8: Water quality
Wed. 3/25/15	29.	Natural wetlands
Mon. 3/30/15	30.	Constructed wetlands
Tues. 3/31/15	31.	Lab 9: Wetlands
Wed. 4/1/15	32.	Soil-water-plant relations
Mon. 4/6/15	33.	Flex day
Tues. 4/7/15	34.	***EXAM 2***
Wed. 4/8/15	35.	Subsurface drainage
Mon. 4/13/15	36.	Subsurface drainage
Tues. 4/14/15	37.	Lab 10: Subsurface drainage
Wed. 4/15/15	38.	Irrigation systems
Mon. 4/20/15	39.	Irrigation demand
Tues. 4/21/15	40.	Lab 11: Irrigation scheduling
Wed. 4/22/15	41.	Low impact development, part 1
Mon. 4/27/15	42.	Low impact development, part 2
Tues. 4/28/15	43.	NO CLASS
Wed. 4/29/15	44.	Course review
Thur. 5/7/15, 7:30-9:30AM		***FINAL EXAM*** - *see* http://www.registrar.iastate.edu/exams/

Ag & Biosystems Engineering
Iowa State University

Fall 2014
tjb 9/5/2014

TSM 325 – Biorenewable Systems
(Cross-listed with ABE/Agron/AnS/BusAd/Econ)
TR 3.40-5.00p, 13 Curtiss (Sections A & B, a.k.a. F2F)
Online via Blackboard Learn (Sections XH & XW, a.k.a. Online)

Instructor Dr. Tom Brumm
tbrumm@iastate.edu
4335 Elings Hall
515-294-5145
Office hours: M 9, TR 11
Virtual office hours: TBD

Teaching Assistants

Camille Nelson
cknelson@iastate.edu
3122 NSRIC
515-294-6358
Office hrs: M 10

Megan Scott
mes@iastate.edu
3122 NSRIC
515-294-6358
Office hrs: W 1.30-2.30

Course Website and Textbook
This course will be using ISU's Blackboard Learn (Bb). Link: https://bb.its.iastate.edu/

There is no textbook. Resource materials will be made available to you through Bb.

Catalog Description
TSM 325. Biorenewable Systems. (Cross-listed with A E, Agron, An S, BSE, BusAd, Econ). (3-0) Cr. 3. F. *Prereq: Econ 101, Chem 155 or higher, Math 140 or higher.* Converting biorenewable resources into bioenergy and biobased products. Biorenewable concepts as they relate to drivers of change, feedstock production, processes, products, co-products, economics, transportation/logistics, and marketing.

Prerequisites
Course prerequisites are Econ 101, Chemistry 155 or higher, and Math 140 or higher. From these courses you are expected to understand the basics of economics and chemistry, and to be able to make extensive algebraic calculations and unit conversions. If you do not have these prerequisites, you must get permission from the instructor to remain in the course.

Student Learning Outcomes
By the end of this course, you should be able to:
1. Identify and discuss bioeconomy drivers of change.
2. Describe, discuss, and analyze major components of biorefining products, processes, feedstock production, and co-products.
3. Understand and apply firm- and market-level economics of biorenewable products to analyze profitability, technological change, and public policy.
4. List different types of transportation modes, explain cost/service tradeoffs and use this knowledge to describe critical biorenewable issues.

AE/BSE/AST/ITec Student Outcomes addressed in this course
a) an ability to apply knowledge of mathematics, science, and engineering/technology
d) an ability to function on multidisciplinary teams
e) an ability to identify, formulate, and solve engineering/technology problems
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of engineering/technology solutions in a global, economic, environmental, and societal context
i) a recognition of the need for, and an ability to engage in life-long learning
j) a knowledge of contemporary issues

Key Assignments for ABE Portfolios: Semester project and exams.

Lecture Videos and Notes
Lectures are recorded for every class, Tuesdays and Thursdays, 3:40p-5:00p, and are posted on Bb Learn within 24 h of recording, usually much sooner. They will be also posted to iTunes University. Lecture videos will be available to all students, whether they are taking the class exclusively online or not. Students in the online sections XH and XW (online) should view them within a day or two of their posting. A copy of the lecture notes and materials are also posted within 24 hours of the class.

Podcasts (audio supplement)
Dr. Brumm will be podcasting each week as a supplement to the class. The intent is that each new podcast will be available by 6.00p each Sunday. Podcasts can be accessed via Bb, iTunes (search for "Biorenewable Systems" in the iTunes Store, or you may subscribe directly with another player http://feeds.feedburner.com/BiorenewableSystems, or use an RSS feed (http://tbrumm.libsyn.com/rss).

Course Grading

The number of points in each area may vary but each area will be weighted so that it is worth 25% of the course grade.

	Points	Percent
Exams (5 @ 60)	300	25%
Weekly Assignments	300	25%
Team Problems	300	25%
Semester Project	300	25%
	====	====
Total	1,200	100%

Late assignments and team problems are assessed a 40% penalty but they are accepted up until the end of Dead Week.

Grading Scale (tentative)

A	> 90%	C	70-76.9
B+	87-89.9	D+	67-69.9
B	80-86.9	D	60-66.9
C+	77-79.9	F	< 60%

Exams

There are five exams, roughly one every three weeks. Exams 1 through 4 are closed-book. Exam 5 is a take-home exam due by the final examination period. There is no comprehensive final exam in this course.

- F2F Students (Sections A and B) will take four closed-book exams in class: Sep 16, Oct 7, Oct 28, and Nov 18.
- Online students (Sections XH and XW) will take exams under the supervision of an approved proctor in the three days following the F2F dates of the exams: Sep 17-19, Oct 8-10, Oct 29-31, Nov 19-21.
- Online students (Section XH):
  - You are a student at a university in the AG*IDEA Consortium. A proctor will be arranged by the coordinating professor at your university (Dr. John Slocombe at K-State, Dr. Leon Schumacher at Missouri, and Dr. Deepak Keshwani at UNL). If you need to arrange for a different proctor, contact Dr. Brumm.
- Online students (Section XW):
  - Students in the Ames area should go to room 2352 Gilman Hall before their first exam and ask to register the Online Testing Center as their proctor for exams. Exams may be taken during the designated time period of three days. Exams will be administered in the ELO Online Testing Center in 2552 Gilman Hall, Mon-Thu 8am to 7pm (doors locked 7:30pm) and Fri 8am to 6pm (doors locked 5:30pm). All exams must be completed by closing time. (http://www.eol.iastate.edu/online-testing-center/)
  - If you are unable to take the exams in the ELO Online Testing Center (you are not in the Ames area), arrange for a proctor here: http://www.elo.iastate.edu/proctored-testing/.

Weekly Assignments

Each week there will be assignments that are a mixture of readings, numerical problems and reflections. They will be completed and/or submitted through Bb Learn. All students (F2F and online) will occasionally need to submit hand-written assignments electronically (pdf format) via Blackboard Learn and will need access to a scanner to do so. Students are expected to work independently on these assignments. The due date for all assignments will be on Tuesdays at 3:40 p.m.

Team Problems

F2F students will do collaborative work in-class, a.k.a., "team problems." Online students are expected to do the same assignments with the added bonus of no restriction relative to collaboration with others or outside resources.

Semester Project

The semester project will be either a poster or paper examining an issue relative to biorenewables. More details on the semester project will be made available after Week 4 of the class.

- F2F students: The semester project is a poster. You will work in assigned teams. A public poster session will be held during the final examination period at which time you will present your poster as a team.
- Online students: You have a choice of a poster (completed individually or in a team of other online students of your choosing) or a paper (completed individually). With a poster, you may participate in the poster session if you wish.

Bonus points for Online Discussions

Given that (1) "biorenewables" is a relatively new field of study for undergraduates, (2) this course covers many different disciplines; and (3) there is no textbook for the class, I expect (and hope) that you will have numerous questions. In the discussion space on Blackboard Learn, there will be an opportunity to post questions and have them answered by fellow students. The instructor and/or the teaching assistants will monitor the discussion board and respond within 24 h, and usually much sooner to answer your question. As a reward for posting and answering questions, you can earn bonus points through postings. Your degree of participation will determine the total number of bonus points to be added to your assignments score, not exceed 10% of the assignments score.

Course Outline (tentative)

Week	Topic	Topic
1-2	1: Drivers of Change	Global energy use; climate change; public policy; economic development
3	2: Biorenewable fundamentals	Mathematical conversions and the unit factor method; basic chemistry; mass and energy balances; characterizing biomass.
4-7	3: Biofuels	Biodiesel, ethanol from corn, ethanol from cellulose, algal biofuels
8-9	4: Thermochemical processing	Pyrolysis, gasification, thermal depolymerization, combustion
10-12	5: Financial fundamentals	Basic financial terms, biorefinery financial statements, break-even pricing points, financial modeling
13	6: Feedstock production	Production fundamentals, "ideal" biomass crops, alternative biomass crops
14-15	7: Transportation and logistics	Corn stover transportation and logistics, transportation alternatives, relative costs of transportation/logistics decisions

Course Glossary

A glossary of terms for the course will be posted in the Bb Learn course website. It is ASABE Standard S593.1 - Terminology and Definitions for Biomass Production, Harvesting and Collection, Storage, Processing, Conversion and Utilization. It is also available through the ISU library's website – search for "ASABE Standards." (ASABE = American Society of Agricultural and Biological Engineers)

Course Policies

- F2F Students (sections A & B): Your attendance is expected for the duration of every class period. Consideration for making up missed work, including scheduled exams and unscheduled team problems, will be given if discussed with the instructor beforehand or if valid emergencies are involved. Cell phones must be turned off or silenced during class.
- Late assignments and team problems will be penalized 40%, unless prior permission has been granted. Due date/time for each assignment will be clearly specified. Arrangements must be made to submit late assignments beforehand.
- You are responsible for all class information missed because of your absence.
- Cell phones are not allowed as calculators for exams.
- Collaboration is allowed and encouraged for team problems and other assignments where specified. Otherwise, you are expected to work independently on assignments. Collaboration is defined as two or more students working together on a phase of an assignment. Working together does not mean that one student does the work and the other student just copies it.

Campus Resources

The following resources may be of assistance to you:

- Student Support, College of Agriculture and Life Sciences Distance Education: http://agonline.iastate.edu/resources.
- Academic Success Center: http://www.dso.iastate.edu/asc/. The Academic Success Center (ASC) is a collection of services and programs designed to help you reach your academic goals. ASC offers individualized and group experiences, course-specific and general academic assistance, and even credit and non-credit programs.
- Student Disability Resources: http://www.dso.iastate.edu/dr/.
- Writing and Media Help Center: http://www.dso.iastate.edu/wmc. Trained consultants assist with written, oral, visual and electronic communication.

Technical Requirements and Support

- Computer requirements: http://agonline.iastate.edu/resources/computer-requirements. Students will also need to scan some assignments to submit them electronically (as a pdf file) via Blackboard Learn.
- Additional resources can be found at: http://agonline.iastate.edu/resources.
- Technical support: Brenton Center for Agricultural Instruction and Technology transfer, 800-747-4478 or agonlinehelp@iastate.edu; and Solution Center, ISU Information Technology, 195 Durham Center, 515-294-4000, solution@iastate.edu.

Communicating with Instructor and Teaching Assistant(s)

Often times, questions arise or you wish to communicate with the instructor or teaching assistants. Follow the steps below, in order, to communicate. You are expected to use appropriate online etiquette or "netiquette" in your correspondence.

1. Use the "Discussion Board" in Bb Learn to ask your question. Often, you are not the only one with the same question and/or other students can easily answer your question. The instructor and/or teaching assistants will monitor the discussion board and respond within 24 h, and usually much sooner to answer your question.
2. Use the "eMail" function in Bb Learn for items that are of a more personal nature (grades, time conflicts, late assignments, etc.). This will send an email to my ISU email address. You will get a response within 24 h, and usually much sooner.
3. Office hours (F2F and Online): I endeavor to be strict about keeping office hours, whether F2F or online. Virtual office hours for all students will be conducted through video conferencing – a link will be provided on the BB Learn class website – where you can chat via text or voice with Dr. Brumm on your computer. You'll need a microphone on your computer for voice chat. If for some reason I am unable to hold my office hours, I will post an announcement in Bb.
4. Phone calls. You can phone Dr. Brumm or the teaching assistant(s), but you'll likely to get voice mail. We will respond within 24 h to voice mails, but often an ongoing game of voice mail tag ensues.

Tips on being successful in this course

1. **Keep up on the lectures.**
   a. F2F students (sections A & B): Your attendance is expected for the duration of every class period. I will provide incentives for you to do so. This will ensure that you keep up on at least the lectures.
   b. Online students (sections XH & XW): I expect you to view each lecture within a day or two of it being posted on the web. The on-line version operates like the F2F class, except that you're not actually sitting in the classroom.
2. **Spend regular time on this class each week.** You should be regularly spending time on the class each week – at least 1 to 2 hours out of class for each hour of lecture. (That's three to six hours per week minimum outside of class or lecture viewing.) I will provide assignments for you to help you meet this expectation. Note that there is no final in this class – you can't blow off the class throughout the semester and pull out a passing grade at the end.
3. **Ask questions**. If you don't understand what's been presented or discussed, ask! I want to hear your questions. My job is to make sure that you understand. And if what we talk about sparks a question in your mind in another direction, ask. I will always respond to your questions. BTW, your knowledge is valuable too – I don't know everything (believe or not) and your contributions to the discussions are welcome. Use the discussion space in Bb Learn where you can ask/answer questions and receive bonus points.
4. **Do the assignments on time, or perhaps a little ahead**. There are deadlines for the assignments, clearly specified (usually Tuesdays at 3:40 p.m.). If you miss a deadline, however, it is always worth something to hand in a late assignment. BTW, I've noticed that student computers amazingly seem to go haywire just before deadlines (see #8 below). Submitting assignments a bit before the deadlines gives you some breathing room for technology problems.
5. **Take notes during the lecture and review them**. Class notes are invaluable to learning the material in this class, even if you are viewing this class at a distance. I realize that many students today don't take notes, but from studies on human learning, note taking can be an important tool to help your learning. I will post the lecture notes after class to assist you. I don't post them before class as I try not to do "death by Powerpoint" and thus my notes are not in a student-friendly format beforehand.
6. **Review notes, lectures, posted solutions and practice problems.** Going back to review and reflecting on what you've heard, seen and done is how learning really occurs. This type of review is good preparation for exams.
7. **When you can't meet deadlines.** You are expected to meet the deadlines for assignments, team problems and exams. There is a late penalty that applies when you don't. However, I understand that many students have other activities that sometimes interfere with meeting the deadlines in this class – interviews, family responsibilities, field trips, etc. If you can't meet a deadline for a reasonable reason, I expect notification (phone or email) ahead of time. You can make up activities if you've given prior notification. If you come to me after a deadline has passed, you'll find me less cooperative. Of course, I understand that emergencies do occur and I try to make reasonable allowances for them.
8. **Don't expect perfection.** Let's be honest. While technology enables us to do wonderful things, sometimes it just doesn't work like it's supposed to. I try to think ahead and I'm a bit of a geek, but something will probably not work correctly (Blackboard, video, submitting assignments electronically, etc.) Please be patient. If something is wrong, confusing or isn't working, let me know – we can work it out. I try not to penalize you for things out of your control. Note, however, that the majority of things are within your control.

UNIVERSITY POLICIES AND GUIDELINES

Disability Accommodations

Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact {course instructor} to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need. Before meeting with {course instructor}, you will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 on the main floor of the Student Services Building (515.294.7220; disabilityresources@iastate.edu). Retroactive requests for accommodations will not be honored. Jenny Macken, 1330D Elings Hall (515.294.5196; jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with Jenny and your instructor to address any special needs or special accommodations at the beginning of the semester.

Academic Dishonesty

Academic Misconduct: The class will follow Iowa State University's policy on academic dishonesty. http://www.dso.iastate.edu/ja/academic/misconduct.html Anyone suspected of academic dishonesty will be reported to the Dean of Students Office. Note that there ISU identifies several forms of academic dishonesty including: A student uses or attempts to use unauthorized information in the taking of an exam; submits as his or her own work, themes, reports, drawings, laboratory notes, computer programs, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism. Students found guilty of academic dishonesty in this class face suspension, conduct probation, or reprimand.

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact me, Student Assistance http://www.dso.iastate.edu/sa/ at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance http://www.eoc.iastate.edu/ at 515-294-7612.

Religious Accommodation

If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be submitted to me in writing. You may also seek assistance from the Dean of Students Office http://www.dso.iastate.edu/

Dead Week

For each Fall and Spring semester, the last full week of classes before final examinations is designated as Dead Week. The intent of this policy is to establish a one-week period of substantial and predictable study time **for undergraduate students**. During the Dead Week period, regular lectures are expected to continue, including the introduction of new content, as deemed appropriate by the instructor. The restrictions established by this Dead Week policy are:

- Due dates for mandatory graded submissions of any kind that fall within Dead Week must be listed on the syllabus provided at the start of the course.
- Mandatory final examinations may not be given during the Dead Week period except for laboratory courses or courses that meet weekly and for which there is no contact during the normal final examination week.
- Registered ISU Student Organizations may not hold any meetings, functions, or sponsored events during the Dead Week period. Any exception to these restrictions must be authorized in advance by Office of the Dean of Students.

Contact Information

If you are experiencing, or have experienced, a problem with any of the policy or guideline issues described above, email academicissues@iastate.edu.

TSM 330 – Agricultural Machinery and Power Systems

Lecture: MW 10:00 am – 10:50 am
Location: Pearson 2115

Lab Sections:
A: W 1:10 pm – 3:00 pm
C: W 6:10 pm – 8:00 pm
Location: Sukup 4220

B: W 3:10 pm – 5:00 pm
Location: Sukup 4219

Instructor: Justin D Maughan
Email: jmaughan@iastate.edu
Phone: 406-781-5679 + txt
Office: Elings 2324C

Office Hours: MW 11:00 am – 12:00 pm, Other times by appointment only
Location: Elings 1330H

Contact me:
Email is the preferred method of communication, and you may expect responses from me at any time. When emailing me, please use the words "TSM 330" in the subject line. This will help me keep my inbox organized and be able to respond to you more efficiently. You may call or text, but please do so only during the work week (M-F) unless there is an emergency.

Required Text

Hunt, D. R. *Farm Power and Machinery Management.* 10th ed. Ames, IA: Iowa State University Press, 2001.

See the course website for any other required reading materials or sources. Occasionally a reading assignment will be given that will require you to use a resource on reserve at the Library or available on a website that will be given to you.

Recommended Texts

Srivastava, A.K., Goering, C.E., Rohrbach, R.P., and Buckmaster, D.R. *Engineering Principles of Agricultural Machines*. 2nd ed. St. Joseph, MI: ASABE, 2006.
Available online at http://elibrary.asabe.org/textbook.asp?confid=epam2006

ASABE Standards. Available online at http://elibrary.asabe.org/standards.asp

Course Website

Blackboard

Catalog Description

TSM 330. Agricultural Machinery and Power Systems
(2-3) Cr. 3. S. Prereq: TSM 210, MATH 142, MATH 145X, or MATH 151
Selection, sizing, and operational principles of tractors and machinery systems. Cost analysis and computer techniques applied to planning and management of agricultural machine systems. Principles, operation, and application of agricultural machinery.

Course Objectives

This course is designed to help students understand the principles of agricultural machinery and power systems management. This includes being able to explain and analyze the function and performance of key off-road machine systems used in agricultural production, being able to analyze the costs of machinery systems, and being able to select an optimal set of machinery for a given application. The following goals outline other specific objectives of this course:

- Improve student's communication/teamwork skills. Provide exposure to problems that require judgment decisions and justification of those decisions, even in the case of incomplete information.
- Students going into industry will learn terminology and principles of operation that will help in a sales and/or service position.
- Students going into production agriculture will gain knowledge that will act as a tool for decision making when purchasing equipment and how to get the most out of it.

It is expected that the each lecture and lab for this course will assist students in gaining the following understandings:

- Identification, assessment, and analysis and communication of the performance and costs of off-road equipment are necessary to properly, effectively and safely select, operate, manage, and maintain agricultural machinery and power systems.

The questions that are essential to obtaining the above enduring understandings include:

- How do you define agricultural power systems?
- What are operational principles of agricultural machinery and power systems?

- How do theories and principles of operation influence the performance and construction of agricultural machinery and power systems?
- How do you assess and analyze the performance of agricultural machinery and power systems?
- How do you determine and implement the best operation and management solutions for a given set of agricultural machinery?
- How can the performance of agricultural machinery be managed through identification, assessment and analysis of agricultural power systems?
- How does knowledge of agricultural machinery influence the selection, management and operation of the machinery?
- What role does cost analysis have in the selection, management, and operation of agricultural machinery?
- What role does communication have in analyzing, assessing, and reporting/explaining the performance of agricultural machinery?
- What role does safety play in the identification, assessment and analysis of agricultural machinery and power systems?

Upon successful completion of this course, students should be able to:

- Identify agricultural machinery and power systems and their functions.
- Use theories and principles of operation to properly analyze the performance of agricultural machinery and power systems.
- Interpret the relationship between operational principles and the performance and capabilities of agricultural machinery and power systems.
- Determine the capabilities of a tractor and implement set based on the performance limitations of the individual machinery and power systems.
- Properly select or make recommendations on the selection of agricultural machinery for a given set of applications.
- Properly make adjustments in the operation of agricultural machinery and power systems to achieve the best possible performance.
- Effectively communicate the results of an analysis of the performance of agricultural machinery systems.
- Demonstrate knowledge of safety with regards to agricultural machinery and power systems in a laboratory setting and typical field operations.

Proposed Course Schedule:

Week	Topic	Reading	Assignment
1	1-12: Introduction		
	Introduction to Agricultural Machinery Systems		
	1-14: Off-Road Equipment Safety, intro to Unit Factor System	FPMM pp. 297-8	HW 1
	Lab: Machine Performance I	FPMM Ch. 1	HW 2
2	1-19: Martin Luther King Jr. Day – No Class		
	1-21: Machine Performance II	FPMM Ch. 1	HW 3
	Lab: Functions of Excel, Intro to Crystal Ball	FPMM Ch. 2	Lab 1
3	1-26: Machine Performance III		HW 4
	1-28: Machinery Systems Costing I	FPMM Ch. 4	HW 5
	Lab: Crystal Ball - Machine Performance		Lab 2
4	2-2: Machinery Systems Costing II		
	2-4: Agricultural Machinery Systems Unit Exam		
	Lab: Crystal Ball – Tractor/Implement Matching		Lab 3
5	**Crop Production Systems**		
	2-9: Soil Compaction, Tillage I	FPMM Ch. 5-7	HW 6
	2-11: Tillage II	See Blackboard	
	Lab: Crystal Ball – System Optimization		Lab 4
6	2-16: Planters I	FPMM Ch. 8	HW 7
	2-18: Planters II		
	Lab: Planter Evaluation		Lab 5 Report
7	2-23: Chemical Applications I	FPMM Ch. 9	HW 8
	2-25: Chemical Applications II		
	Lab: Chemical Applications		Lab 6 Report
8	3-2: Precision Agriculture	See Blackboard	
	3-4: Crop Production Unit Exam		
	Lab: TBD		
9	**Crop Harvesting Systems**		
	3-9: Hay and Forage Harvesting I	FPMM Ch. 11	HW 9

	3-11: Hay and Forage Harvesting II	See Blackboard	
	Lab: Hay and Forage Equipment		Lab 7 Report
Spring Break: March 16-20			
10	3-23: Grain Harvesting I	FPMM Ch. 10	HW 10
	3-25: Grain Harvesting II		
	Lab: Combine Evaluation		Lab 8 Report
11	3-30: Cotton Harvesting	See Blackboard	HW 11
	4-1: Potato Harvesting	See Blackboard	HW 12
	Lab: Cotton Harvesting		Lab 9 Report
12	4-6: Orchard Crop Harvesting I	See Blackboard	HW 13
	4-8: Orchard Crop Harvesting II		
	Lab: Project Work Day		
13	4-13: Crop Harvesting Systems Unit Exam		
	Course Wrap-up		
	4-15: Materials Handling	FPMM Ch. 13	HW 14
	Lab: Project Work Day		
14	4-20: Belts, Chains, and PTO	See Blackboard	HW 15
	4-22: Project Presentations		
	Lab: Project Work Day		
15	4-27: Project Presentations		
	4-29: Project Presentations		
	Lab: Project Presentations (if needed)		
Finals Week: May 4-8			
Final Exam: May 5, 9:45-11:45 am			

Special note on the course pace

This course will be paced according to student comprehension, rather than according to the course syllabus. You as a student bear a special responsibility in the pacing of the course. You must indicate to the instructor about any topic you do not understand. The instructor will do all within his ability to allow and help you to achieve understanding.

Course Policies and Expectations

Homework assignments: Homework assignments will be given at the beginning of the class period. The problems will consist of critical thinking and calculation problems. Assignments for the week are due by Friday of that week by 5:00, unless otherwise specified when assigned. After the original due date, a penalty of 5% per day will be assessed. Late work will only be accepted for one week after the original due date. Neatness is important, so typed homework assignments are encouraged. Assignments can be handed in to my office at Elings 2324C or my mailbox in 1201 Sukup Hall.

Course readings: Any assigned readings will be given before lectures and labs. It is expected that you read the assigned sections before coming to class, because the concepts covered will provide background and help you better understand the topics covered, as well as to help complete the homework and lab assignments.

Laboratory exercises and reports: The laboratory exercises that are held each week will consist of practical applications of the course material as well as type written lab reports and WebCT submissions. Most lab exercises will be performed in groups, however, individual lab reports will be expected. Lab reports are due at the beginning of the lab two weeks later. All lab reports should follow an industry report format as shown in the template provided on Blackboard.

Quizzes: Quizzes will be administered frequently to review the reading assignments and topics of the current lectures and labs. You may not receive prior notice of the quizzes, so it is expected that you will always be prepared for a quiz at the start of each class period. Quizzes will consist of short answer, multiple choice, and true-false questions.

Exams: After each main course topic there will be a unit exam. Unit exams will consist of short answer and multiple choice questions, calculation problems, and, if applicable, a group component. There will also be a comprehensive final exam, following the same format.

Semester projects: Throughout the semester you will have the opportunity to learn key concepts and principles that are important for making decisions about the selection process for agricultural machinery. You will be divided into groups and given a scenario that will help guide you in selecting a set of machinery for expanding a particular operation. Each group will write a report detailing their selection and the criteria they followed in the selection process. They will then present their work to the class for evaluation.

Extra credit: Extra credit worth equivalent to two lab exercises may be given for writing a technical report on a topic of my choice. The expected outcome of this is that you gain the experience of preparing a paper similar to what would happen at an industry conference, as well

as give you the opportunity to learn about a topic related to agricultural machinery management outside of what is presented in class.

Attendance and Participation: Attendance to all lectures and labs are mandatory, and attendance will be taken. Excused absences must be cleared with the instructor in advance, except in the case of critical health/family emergencies. A class participation grade will be assessed for each lecture and lab period of the semester. If you are not present, a zero will be assessed unless you have an excused absence.

Grading:

Activity	Percentage of final grade
Homework and quizzes	20
Lab exercises and reports	20
Unit exams	20
Semester project	20
Attendance	10
Final exam	10

Final grades will be calculated based on the weight of each activity as shown here.

Score	Minimum grade
≥ 90	A-
≥ 80	B-
≥ 70	C-
≥ 60	D-
< 60	F

Academic Dishonesty
This class follows ISU's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Student's Office.

Disability Accommodations
Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Jenny Macken (1330D Elings, 515-294-5196, jennym@iastate.edu) is the Disability Resource Liason for the Department of Agricultural and Biosystems Engineering. Please work with Jenny and myself to address any special needs or accommodations within the first two weeks of the semester.

Harassment and Discrimination
Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact me, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodations
If an academic requirement of this class conflicts with your religious practices and/or observances you may request reasonable accommodations. Your request must be submitted in writing, and I will review the request. You may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information
If you are experiencing, or have experienced, a problem with any of the above policy or guideline issues, email academicissues@iastate.edu.

TSM 333
PRECISION FARMING SYSTEMS
FALL 2014

LECTURE: W, 2:10 – 4:00 0022 Sukup Hall
LAB: Various Sections, 2207 Sukup Hall, Ag Leader Precision Ag Lab

INSTRUCTORS:

Dr. Matt Darr
2356 Elings Hall
Office Hours: By Appointment
Email: darr@iastate.edu

Mr. Christopher Murphy
2350 Elings Hall
Office Hours: By Appointment
Email: cjmurphy@iastate.edu

COURSE DESCRIPTION:
TSM 333. Precision Farming Systems. (2-2) Cr. 3. F. *Prereq: Math 140 or 160, junior or senior classification.* Geographic information systems (GIS) and global positioning systems (GPS). Hardware systems for precision farming emphasized. Auto steering and automatic implement control systems. Collection and management of yield data. Sampling strategies for precision farming. Introduction to building fertilizer prescriptions and recommendations. Economic benefits of precision farming systems. Non-major graduate credit.

Precision agriculture couples advanced technologies with precise field operations. It allows farmers to measure the spatial variability of factors involved in crop production and make management decisions on very small areas within fields based on this information. It has been shown that precision agriculture has the potential to increase yield or reduce the crop production expense and decrease the environmental associated with agricultural operations.

This course will provide an overview of the principles of precision agriculture and discuss its various components. It will introduce the technologies involved in precision agriculture such as Global Positioning System (GPS), Geographic Information System (GIS), machine guidance systems, sensors for qualitative and quantitative measurement of soil and plant variables, and Variable Rate Technology (VRT). Machinery systems and their components will be the main focus of this course.

REQUIRED TEXTS:
1. Course Notes: Provided from Blackboard Learn.

GRADING:

Midterm Exam 1	25%
Midterm Exam 2	25%
Final Exam	20%
Homework / Lab Reports	15%
GIS Practicum Exam	15%

GRADING SCALE:

A	> 90%	B+	87-89.9
B	83-86.9	B-	80-82.9
C+	77-79.9	C	73-76.9
C-	70-72.9	D+	67-69.9
D	60-66.9	E	<60%

STUDENT LEARNING OUTCOMES:
Upon completion of this course you should be able to:

- Communicate the technical specifications of GPS receivers and differential correction sources.
- Manage and analyze multi-year GIS data within a commercial software package.
- Develop written and oral technical reports for precision agriculture systems.
- Calculate the performance specifications for the precision agriculture equipment and machinery controls.
- Successfully setup and configure various precision agriculture systems.
- Document the economic benefits of variable rate and automated precision agriculture systems.
- Troubleshoot precision agriculture equipment functionality within a group environment.

ASSIGNMENTS:
Homework and or prelab/postlab assignments will be given on approximately a weekly basis. These assignments should be done on an individually basis and prelabs must be completed before the associated laboratory session if assigned. Late work will not be accepted without prior consent from the instructor.

The majority of assignments will be uploaded via Blackboard Learn.

Requests for assignment re-grading must be made to the instructor in writing no later than 24 hours after the assignment was initially returned. The written request must contain an explanation of the re-grade question.

PARTICIPATION POLICY:
All students are expected to actively participate in lecture and in labs activities. In general labs are not able to be made up. Each laboratory that is missed will result in a direct deduction to the participation points and no lab report will be accepted.

TIPS ON BEING SUCCESSFUL IN TSM 333

1. **Come to class.** I expect you to be in class each class period. There will be unannounced graded activities during class that you will miss if you aren't there. If you can't make it (unforeseen emergencies), I expect notification (email preferred) ahead of time. You are responsible for getting all class information missed by absences.
2. **Spend regular time on this class each week.** You should be regularly spending time on the class each week – at least 1 to 2 hours out of class for every hour in class. Working on class homework is a good example of the out of class effort required.
3. **Ask questions**. If you don't understand what's been presented or discussed, ask! I want to hear your questions. My job is to make sure that you understand. And if what we talk about sparks a question in your mind in another direction, ask. I always take time to answer questions in class. I am available outside of class to answer questions that may not come up during class.
4. **Start assignments in advance of the due date**. Give yourself an opportunity to ask questions by starting assignments well in advance of the due date. As questions arise, schedule a time to meet with me and discuss. The due date and time for each assignment will be clearly stated.
5. **Be prepared to work hard and achieve professional and academic growth.** The material covered in this course is unlike any other course you have had or will have at Iowa State. It will deal with cutting edge issues in the precision agriculture and advanced machinery automation fields. The assignments in this course will require significant out of class work and will stretch your skills in mathematics, computer numerical methods, and technical communication. Bring a positive attitude to working hard in this course every day and look forward to achieving significant professional growth.

University Policies and Guidelines

Classroom Environment

Safety Emphasis: Students in ABE classes work with systems that, if misused, can be extremely hazardous. Therefore developing an attitude of safety is crucial to all engineering and technology professionals. Instructors may take an array of actions when students fail to complete required safety training (for example, by coming late to class and missing a safety briefing) or to adhere to procedures. These include but are not limited to (1) only allowing the student to observe the lab; (2) only allowing the student to observe the lab, and deducting points from the associated lab report; (3) suspending the student from all lab activities until the student has successfully completed the required safety portion of the lab (this may mean attending another lab section where the student can arrive on time); (4) dismissing students – and particularly repeat violators of safety policy – from the course.

Academic Misconduct: The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.
Note that there ISU identifies several forms of academic dishonesty including: A student uses or attempts to use unauthorized information in the taking of an exam; submits as his or her own work, themes, reports, drawings, laboratory notes, computer programs, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism. **Students found guilty of academic dishonesty in this class face suspension, conduct probation, or reprimand.**

Disability Accommodation Policy: Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact Matt Darr (darr@iastate.edu). We strongly encourage you to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need. Before meeting with Matt Darr you will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 on the main floor of the Student Services Building (515.294.7220; disabilityresources@iastate.edu). Retroactive requests for accommodations will not be honored.

Jenny Macken, 1330D Elings Hall (515.294.5196; jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with Jenny and your instructor to address any special needs or special accommodations at the beginning of the semester.

Dead Week: For each Fall and Spring semester, the last full week of classes before final examinations is designated as Dead Week. The intent of Dead Week is to establish a one-week period of substantial and predictable study time for undergraduate students. During the Dead Week period, regular lectures are expected to continue, including the introduction of new content, as deemed appropriate by the instructor. The restrictions established by this Dead Week policy are:

- Due dates for mandatory graded submissions of any kind that fall within Dead Week must be listed on the syllabus provided at the start of the course.
- Mandatory final examinations may not be given during the Dead Week period except for laboratory courses or courses that meet weekly and for which there is no contact during the normal final examination week.

Harassment and Discrimination: Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact Matt Darr, Student Assistance at 515.294.1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515.294.7612.

Religious Accommodation: If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information: If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.

TSM 335: Lectures on MWF 10-10:50 AM, Room 0308 Eilings Hall
Lab Sections: M 12-3:00pm, 3:10-6:00 PM, W 3-6:00pm Room 1219 Sukup Hall
Tractor Power.

Instructor	**Text**
Dr. Stuart Birrell, 2323 Eilings Hall Phone: 294-2874, *sbirrell@iastate.edu* Office hours: 11:00-11:30am M, Walk in, except 8-11 M,W,F; 12-6M , 12-2 W Other times by appointment	Required Text: **Engine and Tractor Power, 4rd Edition,** *Goering, C.E., and A.C. Hansen*. St. Joseph, Mich.: ASABE. Ordering Info: **http://www.asabe.org/publications/publications/book-catalog/textbooks.aspx** Electronic Version available from ASABE electronic Library: Library QuickSearch: **http://elibrary.asabe.org/** **Enter: "Goering"** as Author **Class Website** : BlackBoard

Purpose:

1. To help students understand the principles of internal combustion engines, engine testing and their application in agricultural tractors.
2. To provide students with a fundamental understanding of the concepts of traction and chassis mechanics.
3. Improve student's communication/teamwork skills. Provide exposure to problems that require judgment decisions and justification of those decisions, even in the case of incomplete information.

2014 Catalog Description

TSM 335. Tractor Power. (3-3) Cr. 4. F. Prereq: 210, Math 142. Theory and construction of tractor engines, mechanical power trains and hydraulic systems. Introduction to traction, chassis mechanics, and hydraulic power.

Expected Student Learning Objectives

Upon successfully completing this course, you should:

- Understand the terminology and basic design principles governing the performance of an engine
- Exhibit a fundamental understanding of the concepts of traction and chassis mechanics including the interaction between weight transfer, slip and traction, based on the Zoz Charts, Wismer-Luth and Brixius equations.
- Understand planar chassis mechanics and limitations of tractor performance based on traction, stability and/or engine torque.
- Understand the power flows through a tractor from the engine, through the power train and development of drawbar power.

Course Outline (tentative)

Date		**Topic**	**Reading**	**Laboratory Exercise**
Aug	25	Introduction		No, Lab
	27	Internal Combustion Engines		
	29	Internal Combustion Engines	Chap 5	
Sept	1	Labor Day		No Lab, Labor Day
	3	Work / Energy / Power		
	5	Engine Principles	Chap 2	
Sept	8	Engine Principles		**Section 1. Lab 1 Engine Construction**. Section 2&3: No Lab
	10	Engine Principles		
	12	Engine Components & Characteristics	Chap 3	
Sept	15	Engine Components & Characteristics		**Section 1&2. Lab 1 Engine Construction**. Section 3: No Lab
	17	Engine Components & Characteristics	Chap 4	
	19	Fuels and Combustion		
Sept	22	Fuels and Combustion, Teir 4		Section 1: No Lab **Section 2&3. Lab 1 Engine Construction.**
	24	Fuel Injection and Spark ignition		
	26	Fuel Injection and Spark ignition, ECU's		
Sept	29	Diesel Systems	Chap 6	Section 1&2: No Lab **Section 3. Lab 1 Engine Construction**
	1	Diesel Systems		
	3	Diesel Systems	Chaps 8,9	
Oct	6	Turbocharging /Exhaust Systems		Section 1&2: No Lab **Section 3. Lab 1 Engine Construction**
	8	Turbocharging /Exhaust Systems	Chap 10	
	10	Turbocharging /Exhaust Systems		
Oct	13	Lubricants	Chap 11	Lab2: Governed Engine Tests
	15	Lubricants & Lubrication Systems		
	17	Lubricants & Lubrication Systems	Chap 13	

Oct	20	Mechanical Power Trains		Lab 3: Mechanical Efficiency
	22	Mechanical Power Trains		
	24	Exam 1		
Oct	27	Hydraulic Power Trains	Chap 15	Lab 4. Mechanical Power Trains
	29	Hydraulic Power Trains		
	31	Traction & Weight Transfer		
Nov	3	Traction & Weight Transfer		Lab 7. Traction, Weight Transfer
	5	Traction & Weight Transfer	Chap 16	
	7	Tractor Stability		
Nov	10	Tractor Stability		Lab 8. Center Gravity, Stability
	12	Hydraulic Fundamentals		
	14	Hydraulic Pumps/Motors		
Nov	17	Hydraulic Motors/Cylinders	Chap 14	Lab 9. John Deere Visit
	19	Basic Hydraulic Circuits		
	21	Tractor Hydraulics, Draft Control		
Nov	24-28	THANKSGIVING		
Dec	1	Tractor Hydraulics, Draft Control		No Lab
	3	Tractor Hydraulics, Draft Control		
	5	Exam 2		
Dec	8	Review		No Lab
	10	Additional Topics/Review		
	12	Additional Topics/Review		
Dec	15-19	Finals		

Course Grading:

Course Component	Percent of Final Grade
Lab Reports	20%
Homework (WebCT)	20%
Exam1, Exam 2,	40% (each worth 20%)
Final	20%

Grading System:

Score	*Min. grade of:*
≥ 90	A-
≥ 80	B-
≥ 70	C-
≥ 60	D-

I may shift these scores downward depending on the distribution of the scores.

Course Policies:

Homework and Lab Assignments: You will be required to turn in a lab report, or engineering letter for each set of labs as instructed. Most reports will be due the week following the actual lab.

- The reports will be formal reports (unless otherwise instructed). The reports must be well organized, neat and orderly. The reports, tables and figures (possible exception of sample calculations and equations) should be computer generated. The original data sheets may be included in appendices without change.
- Tabulated data: Record both observed and calculated results along with associated units. Manipulate the columns, spacing, etc. so it is easy to read and in an organized format.
- Sample Calculations: Show one sample of each different calculation and or equation development.

Exams: You are expected to take exams with the class. Any exceptions need to be cleared with me before the scheduled time that the exam is given.

Classroom Environment

Attendance: Attendance to all labs are mandatory for the duration of the lab. Excused absences must be cleared with instructor in advance, except in the case of critical family/health emergencies. If you are not there, you will receive a zero unless you have an excused absence.

Safety Emphasis: Students in ABE classes work with systems that, if misused, can be extremely hazardous. Therefore developing an attitude of safety is crucial to all engineering and technology professionals. Instructors may take an array of actions when students fail to complete required safety training (for example, by coming late to class and missing a safety briefing) or to adhere to procedures. These include but are not limited to (1) only allowing the student to observe the lab; (2) only allowing the student to observe the lab, and deducting points from the associated lab report; (3) suspending the student from all lab activities until the student has successfully completed the required safety portion of the lab (this may mean attending another lab section where the student can arrive on time); (4) dismissing students – and particularly repeat violators of safety policy – from the course.

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Disability Accommodation Policy: Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact Dr. Birrell to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need. Before meeting with Dr. Birrell, you will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 on the main floor of the Student Services Building (515.294.7220; **disabilityresources@iastate.edu)**. Retroactive requests for accommodations will not be honored.

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TSM 337 Fluid Power Systems Technology

Agricultural and Biosystems Engineering Department
Iowa State University

Spring 2015 Syllabus

Contact Info

Meeting Time and Place:

- Class meets on M, W at 11:00 to 11:50 AM. 102 Science
- Lab meets on:
  - Section A: Tuesday at 2:40 to 4:30 PM Room 2209 Sukup Hall
  - Section B: Tuesday at 12:40 to 2:30 PM Room 2209 Sukup Hall
  - Section J: Tuesday at 9:00 to 11:00 AM Room 2209 Sukup Hall
  - Section K: Friday at 12:10 to 2:00 PM Room 2209 Sukup Hall
  - Section L: Thursday at 12:10 to 2:00 PM Room 2209 Sukup Hall

- Final Exam, Thursday, May 7 9:45-11:45 AM Room 102 Science

Instructor: Brian Steward, Ph.D., P.E.

- Office Hours: 2-4 M
- Office: 2325 Elings Hall
- Phone: 294-1452
- Email: bsteward@iastate.edu

TA: Kathryn Hinkle

- Office Hours: Th 9-11
- Office: 2326 Elings Hall
- Email: khinkle@iastate.edu

TA: Safal Kshetri

- Office Hours: Th 2-4
- Office: 2326 Elings Hall
- Email: skshetri@iastate.edu

TA: Dillon Wirth

- Office Hours: T 11-1
- Office: 2326 Elings Hall
- Email:djwirth@iastate.edu

Required Texts:

- Esposito, A. 2009. Fluid Power with Applications. 7th Edition. Pearson/Prentice Hall
- Lighting Reference Handbook, 8th Edition, Berendsen Fluid Power.
- Steward, B. L. 2015. TSM 337 Slide pack. Available online and at Alpha Copies
- Steward, B. L., K. Hinkle, and J. W. Hall. 2014. TSM 337 Lab Manual. Available at Alpha Copies

Prerequisite Course:

TSM 210, Fundamentals of Technology. This class trains students to solve problems and to do units conversions. Both of these skills are necessary for success in this class. If you have not yet take TSM 210, you should not be enrolled in TSM 337.

Major Course Assignments:

In-class questions: Periodic and unannounced, in-class questions will be given in-class. The intention of this in-class work is to encourage active-learning in class as well as to encourage class attendance.

Blackboard Assignment: Each week, you will be required to complete a homework assignment that will be completed through using Blackboard. In these assignments, you will be required to solve some problems and answer some questions. They will be called a quiz, but you will have a time period to work on each assignment **(from Wednesday 9:00 am to Tuesday at 11:59 pm)** and can use your textbook. This quiz will help you review the material discussed the previous week and preview the material to be discussed during the next lecture.

Laboratory Assignments: Most every week, we will have a laboratory exercise for which you will need to complete a lab assignment. Also planning to have Laboratory quizzes to be completed before the labs.

Exams: There will be a mid-term exam that will be taken during a lab period and a final exam.

Technical Summary: Communicating about hydraulics is an important of learning about hydraulics. A technical summary can be written for extra credit about an article describing a hydraulic system, component, or application.

Opportunity for extra credit: The Iowa Power Farming Show will be held on Feb. 3 to 5 at the Iowa Events Center, Des Moines. For more information see: iowapowershow.com. I will have some tickets, if you are interested in attending. For extra credit, you must attend the show, pick out a piece of equipment and learn about the details (such as pressures, flow rates, circuit diagram, size and number of pumps, motors and cylinders) about the hydraulic system for that piece of equipment. You may want to take pictures or video of the equipment and pick up manufacturer literature and contact information. Then write a short report describing the details of the hydraulic system.

Student Learning Objectives:
When you finish this course, you should be able to:
1. Communicate fluid power concepts and apply fluid power systems to agricultural and industrial systems.
2. Understand what fluid power symbols mean and relate symbols to physical components
3. Interpret and draw hydraulic schematic diagrams.
4. Use the Lightning Reference Handbook to find fluid power system information
5. Describe the operation and function of hydraulic components including pumps, motors, cylinders, and valves
6. Calculate power and efficiency for a hydraulic component or system.
7. Relate hydraulic flow and pressure to force or torque and actuator speed in hydraulic systems.
8. Analyze and troubleshoot hydraulic systems.
9. Communicate using common hydraulic terminology.
10. Work with teams in laboratory environment and collaboratively report findings from experiments.

Course Expectations:
To succeed in this course, expect to spend at least 6 to 9 h per week outside of class studying the text book and notes in preparation for class, completing the online quizzes, preparing for examinations, analyzing and reporting the results from lab experiments. If you have questions, it is your responsibility to seek out help from instructor, TAs, or other classmates.

Tentative Course Schedule:

Week # & Date	Topic/Chapter	Assignment	Lab
1 - Jan. 12	Introduction to TSM 337/Fluid Power / Chap. 1	Read Chap.1; Learning Style, Info Sheet ,Sample Quiz	1: Fluid Power Symbols Lab
2 - Jan. 19	Basic Concepts/ Chap. 3	Quiz 1; Read Chapter 3	2: FP Circuits and LRH Lab
3 - Jan. 26	Hydraulic Fluids / Chap. 2	Quiz 2; Read Chapter 2	3: Sauer-Danfoss Field Trip
4 - Feb. 2	Pumps / Chap. 5	Quiz 3; Read Chapter 5	4: Fluid Power Safety and Intro to Trainers Lab
5 - Feb. 9	Motors /Chap. 7	Quiz 4; Read Chapter 7	5: Pumps Lab
6 - Feb. 16	HST /Chap. 7	Quiz 5;	6: HST Lab
7 - Feb. 23	Connections/ Chap. 4 and 10	Quiz 6; Read Chapter 4 and 10	7: Valves and Motors Lab
8 - Mar. 2	Review		**Mid-Term Exam**
9 - Mar. 9	Cylinders / Chap. 6	Read Chapter 6	8: Filtration and Contamination Lab
Mar 16-20	**Spring Break Week**		
10-Mar. 23	Directional Control Valves / Chap. 8	Quiz 7; Read Chapter 8	9: Hydraulic Circuits Trainer Lab
11- Mar. 30	Pressure Control Valves/ Ch. 8	Quiz 8	9b: Hydraulic Circuits Trainer Lab Part 2
12- Apr. 6	Flow Control Valves/Ch. 8	Quiz 9;	10a: Sequence Circuit Lab
13- Apr. 13	Hydraulic Systems / Chap. 9	Quiz 10; Read Chapter 9	10b: Sequence Circuit Lab, Part 2
14- Apr. 20	Electrohydraulics / Chap. 8	Quiz 11; Read Chapter 8	11: Flow Control Lab
15- Apr. 27	Review	Make up Quiz	12: Char. E/H valves and CL Speed Control Lab
16- May 4	**Final Exam Week**	Final Exam, Thurs., May 7 9:45 – 11:45 AM	

Final Grade Components:

Course Component	Percent of Final Grade
In-Class Questions and Course Reflections	4%
Lab Reports	18%
Quizzes	18%
Mid-Term Exam	28%
Final	32%

Final Grade Scale:

On a 0 to 100 point final grade scale, you can expect:

Score	*At least a letter grade of:*
≥ 90	A-
≥ 80	B-
≥ 70	C-
≥ 60	D-

I may shift these scores downward depending on the distribution of the scores.

Course Communications:
As the course progresses, updates and information about the course will be provided at the beginning of class and through Blackboard announcements. You are responsible for receiving these communications and acting accordingly.

You are welcome to communicate with the instructor or TAs via the email addresses on the first page. When sending an email, please include **"TSM 337"** in the subject line so that I can find your email. Emails without this phrase in the line may be lost.

Course Policies:
Exams: You are expected to take exams with the class. Any exceptions need to be approved by me before the scheduled time that the exam is given.

Grading disagreements: If you have a disagreement with the grading of an exam and homework, you are welcome to write up a short description of your disagreement and hand into the instructor or TA. Disagreements will only be considered up to the next class period after the graded material is returned.

Blackboard Assignments: Quizzes taken on-line through Blackboard have exact cut-off times. If you do not complete Blackboard assignments within the given time period, Blackboard will deny you access to the quiz after the cut-off time. One make-up quiz is provided near the end of the semester which replaces your lowest quiz grade.

Lab Assignments: Lab assignments will be due on the Friday after the next lab. Late lab reports may receive a 10% reduction for each day that they are late.

Homework Assignments: Homework will be due based on the due date indicated on the assignment. Late homework may receive a 10 % reduction for each day that it is late.

Lab Preparation: Students are expected to be prepared for labs by reading and studying the lab manual before coming to lab. Lack of preparation will result in the lab taking longer to complete and lower lab grades.

Attendance: Students are expected to attend class. Occasional, unannounced in-class exercises or quizzes will be administered to encourage regular attendance.

Classroom Environment:
Students are expected to come to class ready to learn. Professional behavior is expected in the classroom out of respect for everyone in the class. Electronic devices should be only used for learning such as viewing and taking course notes.

Safety Emphasis: Students in ABE classes work with systems that, if misused, can be extremely hazardous. Therefore developing an attitude of safety is crucial to all engineering and technology professionals. Instructors may take an array of actions when students fail to complete required safety training (for example, by coming late to class and missing a safety briefing) or to adhere to procedures. These include but are not limited to (1) only

allowing the student to observe the lab; (2) only allowing the student to observe the lab, and deducting points from the associated lab report; (3) suspending the student from all lab activities until the student has successfully completed the required safety portion of the lab (this may mean attending another lab section where the student can arrive on time); (4) dismissing students – and particularly repeat violators of safety policy – from the course.

University Policies:

Academic Misconduct: The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.

Note that there ISU identifies several forms of academic dishonesty including: A student uses or attempts to use unauthorized information in the taking of an exam; submits as his or her own work, themes, reports, drawings, laboratory notes, computer programs, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism. **Students found guilty of academic dishonesty in this class face suspension, conduct probation, or reprimand.**

Disability Accommodation Policy: Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

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Syllabus

TSM 340. Advanced Automated Manufacturing Processes. (2-2) Cr. 3. F. Prereq: TSM216, TSM240. NC programming operations for CNC mills and lathes. Transfer of parts descriptions into detailed process plans, tool selection, and NC codes. Computer assisted CAD/CAM NC programming for 3-axis machining. Applying advanced CAE technology to check process feasibility, determine optimal process conditions, and evaluation of part.

Prerequisites:

Required: TSM 216, TSM 240
Recommended: MATH 142, STAT 101 or 104

Class Schedule

Lectures (Elings 2306): 8 – 8:50 am Mon. & Wed.
Labs (Sukup 1223): Thur. 1-3 pm, 3-5 pm; Fri. 1-3 pm, and 3-5 pm.
Office hours: Anytime Monday & Tuesday 8-5 pm

Instructor

Lloyd D. Snell

Office Location: 2321 Elings Hall
Phone Number: 515-294-9216
paecific@iastate.edu

Contacting:

- For course general questions and help, the Discussion Board is the primary source of support.
- Email is for personal issues such as grade, attendance, and issues not related to labs, homework, and assignments. Emails must include
    - Subject line – TSM340:
    - Signature must include a phone number

Textbooks - Required

Machinery's Handbook, 29th Edition, Erik Oberg; ISBN: 083112900X
MasterCam X^7 Training Guide
Lab Notebook, 4x4 quad rule

Course Objectives

STUDENTS ARE SRONGLY EXPECTED TO LEARN TO PROBLEM SOLVE, I.E., LEARN THROUGH INDEPENDENT LEARNING EXPERIENCES, I.E., WITHOUT CONSTANT INSTRUCTOR SUPERVISION.

IN ADDITION, students at the completion of the course must be able to successfully and/or have:

1) Demonstrate a commitment to Safety First Policy.
2) Read and write manual CNC program and demonstrate skill for 3-axis mill:
   i) In homework;
   ii) In labs; and
   iii) On exams.
3) Program a CNC vertical machining center demonstrating:
   i) Manual coding;
   ii) CAM programming;
   iii) Tool offsets setup; and
   iv) Work offsets setting.
4) Demonstrate self-learning of manufacturing CAM Software
   i) Submit self-paced assignments
   ii) Demonstrate in two part programming lab
   iii) Demonstration in machining 3D course final project.
5) Define a part's manufacturing strategy by:
   i) Initial estimate;
   ii) Based on volume;
   iii) Based on available equipment;
   iv) Based on new technology options;
   v) Select appropriate tooling; and
   vi) Understand process risks.
   vii) Participate on a team project to machine a part and demonstrate learned skill during a part prove-out process.
6) Demonstrate mathematical calculations associated with metal removal process in homework, labs, and exams.
7) Identify manufacturing error using statistical methods and technology.

General Course Policies

1) Lectures are encouraged to be open discussion of course materials.
   a) Daily lecture note submission are required.
2) Homework and problems:
   a) Will be posted and collected on Blackboard;
   b) Blackboard assignments will not be reopened after closing; and
   c) All late submissions will receive a zero.
   d) Submissions requiring an attachment shall without exception shall include:
      i) Your name.
      ii) The assignment or task name.
      iii) The date.
      iv) Team name if submission is related to a team project.
      v) Neatly presented work
      vi) Be submitted in the format listed on the assignment.
      vii) Correctly labeled tables.
      viii) Correctly labeled figures.
      ix) Page numbers if longer than two pages.
3) Labs policies (additional rules will be present on the safety document prior to first lab)
   a) Review and signed lab safety requirements form.
   b) Cell phones will be turned off and stored in backpacks during lab and project hours in lab.
   c) Attendance to all labs is mandatory for the duration of the lab.

   i) A missed labs will result in a full letter lab grade reduction.
   ii) Missing two labs will result in failure of the course
   d) Lab badge is required at all times when in the lab.
   e) Safety glasses will be worn in the lab at all times.
   f) Closed toed shoes are required.
   g) Lab reports are due at the beginning of your next schedule lab.
   h) Two or more student in the lab at all times when working on projects.
   i) Report machine issues immediately
4) Miscellaneous
   a) Excused absence must be cleared with instructor in advance and by email, except in the case of critical family/heath emergencies (requires proof of event no matter how painful).

Team performance & operating policies

1. Team members must provide a meaningful pre-lab support of a team project.
2. Teams are expected to function productively, proactively and professionally.
3. Work done by the project team should reflect an equal distribution of tasks and responsibilities among team members.
4. Team member final project performance will evaluated and team member(s) participation in programming, prove out, production, and overall participation. Student's final grade may be adjusted (potentially significantly) based on other team members' feedback. The following matrix (included in assignment) essentially evaluates member performance in:
   a. Productivity/quantity of work (Below Expectation, Meets Expectation, Exceeds Expectation)
   b. Meeting attendance (Below Expectation, Meets Expectation, Exceeds Expectation)
   c. Deadlines (Below Expectation, Meets Expectation, Exceeds Expectation)
   d. Collaboration (Below Expectation, Meets Expectation, Exceeds Expectation)
   e. Effort (Below Expectation, Meets Expectation, Exceeds Expectation)
   f. Instructors may modify or add additional evaluation measures if needed.

Disability Accommodations

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Academic Dishonesty

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www.dso.iastate.edu/ja/academic/misconduct.html

Harassment and Discrimination

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identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact me, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

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- Mandatory final examinations may not be given during the Dead Week period except for laboratory courses or courses that meet weekly and for which there is no contact during the normal final examination week.
- Registered ISU Student Organizations may not hold any meetings, functions, or sponsored events during the Dead Week period. Any exception to these restrictions must be authorized in advance by Office of the Dean of Students.

Contact Information

If you are experiencing, or have experienced, a problem with any of the policy or guideline issues described above, email academicissues@iastate.edu.

Final Grade

Academic Measures Weighting

Assignments, InClass Tasks, Quizzes	25.0%
Closed Loop Documents (CLD)	2.5%
Labs	15.0%
Exam 1	7.5%
Exam 2	7.5%
Exam 3	7.5%
Exam: Lab	5.0%
Exam: Final	15.0%
Project	15.0%
Total	100%

Final Grade Scale

≥93	A	≥80	B
≥90	A-	≥77	B-
≥85	B+	≥73	C+

≥70	C	≥60	D
≥67	C-	<60	F

Tentative (Beta) Course Schedule

This is the course tentative schedule. Instructor may accelerate, decelerate, or change topic to provide appropriate course material for the student learning objectives.

Date		Wk #	Lecture	Lecture Topic	Lab	
1/12/2015	M	1	1	Introduction, Safety		
1/14/2015	W		2	Coordinate System Setup, Clearance Plane		
1/15/2015	TH				Lab 1	Safety, Machine Control, Set Work Coord.
1/16/2015	F				Lab 1	Safety, Machine Control, Set Work Coord.
1/19/2015	M	2		No Class, Holiday		
1/21/2015	W		3	Calculations: RPM, Feedrate, MRR, Torque, Power		
1/22/2015	TH				Lab 2	Set Work Offsets, Validate Speeds and Feeds
1/23/2015	F				Lab 2	Set Work Offsets, Validate Speeds and Feeds
1/26/2015	M	3		No Class - IMTS Chicago		
1/28/2015	W		4	Tooling: Holders, Setup, Offsets		
1/29/2015	TH				Lab 3	Set Work Offsets, Tool Offsets, Machine Part
1/30/2015	F				Lab 3	Set Work Offsets, Tool Offsets, Machine Part
2/2/2015	M	4	5	Part Programming, Name Block		
2/4/2015	W		6	M&G Code, Linear, Chamfering		
2/5/2015	TH				Lab 4	Program Load, Prove Out, Trouble Shoot
2/6/2015	F				Lab 4	Program Load, Prove Out, Trouble Shoot
2/9/2015	M	5	7	M&G Code, Linear, Chamfering		
2/11/2015	W		8	Tool Functions, Offsets, Modular Tooling		
2/12/2015	TH				Lab 5	Name Block (Personal Submission)
2/13/2015	F				Lab 5	Name Block (Personal Submission)
2/16/2015	M	6	9	Exam 1		
2/18/2015	W		10	Arc Programming		
2/19/2015	TH				Lab 6	Name Block (Personal Submission)
2/20/2015	F				Lab 6	Name Block (Personal Submission)
2/23/2015	M	7	11	Arc Programming		
2/25/2015	W		12	Drilling, Tapping, Reaming, Fixed Cycles		
2/26/2015	TH				Lab 7	Lab Proficiency Exam
2/27/2015	F				Lab 7	Lab Proficiency Exam
3/2/2015	M	8	13	Drill and Tap Point Management		

3/4/2015	W		14	Sub Programming, Incremental Prog.		
3/5/2015	TH				Lab 8	Machine Block, Single Tool MasterCAM Program
3/6/2015	F				Lab 8	Machine Block, Single Tool MasterCAM Program
3/9/2015	M		15	Tool Compensation Programming		
3/11/2015	W		16	Exam 2		
3/12/2015	TH	9			Lab 9	Machine Block, Single Tool MasterCAM Program
3/13/2015	F				Lab 9	Machine Block, Single Tool MasterCAM Program
3/16/2015	M	Spring Break				
3/18/2015	W					
3/19/2015	TH					
3/20/2015	F					
3/23/2015	M		17	Project/Team Selection		
3/25/2015	W		18	Cost Estimating		
3/26/2015	TH	10			Lab 10	Canned Drill & Tapped Lab
3/27/2015	F				Lab 10	Canned Drill & Tapped Lab
3/30/2015	M		19	Cost Estimating		
4/1/2015	W		20	Quality: Manufacturing Process Map, PFMEA		
4/2/2015	TH	11			Lab 11	Canned Drill & Tapped Lab
4/3/2015	F				Lab 11	Canned Drill & Tapped Lab
4/6/2015	M		21	Quality: Gage R&R		
4/8/2015	W		22	Quality: Gage R&R		
4/9/2015	TH	12			Lab 12	Project
4/10/2015	F				Lab 12	Project
4/13/2015	M		23	Quality: Capibility Analysis, Cp & Cpk		
4/15/2015	W		24	Quality: Capibility Analysis, Cp & Cpk		
4/16/2015	TH	13			Lab 13	Project / Gage R&R/Cp & Cpk
4/17/2015	F				Lab 13	Project / Gage R&R/Cp & Cpk
4/20/2015	M		24	Measurement Systems, Tooling, CMM		
4/22/2015	W		25	Exam 3		
4/23/2015	TH	14			Lab 14	Project / Cp & Cpk
4/24/2015	F				Lab 14	Project / Cp & Cpk
4/27/2015	M	15	26	Dead Week/Special Topic/Proj. Lab Time		
4/29/2015	W		27	Dead Week/Special Topic/Proj. Lab Time		

4/30/2015	TH			Lab 15	Project (Bowl)
5/1/2015	F			Lab 15	Project (Bowl)
5/7/2015	Th	16	**Final Exam: 7:30-9:30 am**		

TSM 363: Electric Power and Electronics for Agriculture and Industry

Lecture: TR 8-9:20 [Sukup 0022]
Lab: Tuesday 12-3, Wednesday 12-3, [Sukup 3220]

Instructor – (Lecture and Lab)
Justin M. McGill
Lecturer, Agricultural and Biosystems Engineering
2327 Elings Hall
(O) 515-294-0783 (C) 812-216-4119
Office Hours: By appointment only – *this does not mean I am hard to reach* – Just need some advance notice. (jmmcgill@iastate.edu) – Open Door Policy

Required Textbooks
- Bern, C. J., Olson, D. O. 2002 Electricity for Agricultural Applications. Ames, IA: Iowa State Press.
- Bern, C. J. 2006 TSM 363 Lab Manual 12/27/06 edition Course Works, ISU Bookstore.

Suggested Additional References
- Hiatt, R. S. (ed) 2006 Agricultural Wiring Handbook, 14th edition. Columbia, MO: National Food and Energy Council. Inc.
- MWPS 2006 Wiring Handbook for Rural Facilities, Ames, IA: Midwest Plan Service.

Purpose: To thoroughly understand electrical safety. To master fundamental principles of electric power use, and to practice these principles through realistic problem solving and lab experiences.

Catalog course description: TSM 363. Electric Power and Electronics for Agriculture and Industry. (3-3) Cr. 4. F. *Prereq:210, Physics 112.* Basic Electricity. Electrical safety, wiring, 3-phase service, controls, and motors for agricultural and industrial applications. Planning building electrical systems. Electronics to sense, monitor, and control mechanical processes: Semiconductors, digital logic circuits; speed, pressure, position, temperature, and moisture sensors. Non-major graduate credit.

Student Learning Objectives: Upon completion of this course, you should be able to:
- Have a general understanding of Electrical Safety
- Have a general understanding of the History of Electricity
- Understand how the current electrical delivery system got to be where it is today
- Define current, voltage, and resistance, and know how to safely measure any of these on AC (single and three-phase) and DC circuits.
- Understand how power is dissipated in electrical circuits
- Know how to specify wire sizes to meet code and be economically reasonable
- Understand the criteria used to specify wire sizes
- Understand how electrical motors work.
- Read motor torque curves.
- Specify electric motors to drive defined loads.
- Measure the electrical and mechanical operating characteristics of an electric motor.
- Specify lighting systems for workspaces, and understand the advantages and disadvantages of different light sources
- Understand some of the psychology of how light effects people
- Understand how switches and relays work, and how they can be used to control electrical loads
- Be prepared to go to the workplace and begin working with electrical contractors

Late Work Policy for TSM 363:

1. ALL LATE WORK WILL BE ACCEPTED from lecture. – with a flat 41% taken off of the top.
2. Late lab reports will not be accepted past the due date. The lowest lab score will be dropped to accommodate student absences.
    a. IF you need to miss more than one lab, you need prior written permission from the instructor.

Tips on being successful in TSM 363

1. **Come to class.** Class is there for you. There are graded activities for you to be a part of in class and its meant to increase your learning.
2. **Spend regular time on this class each week.** You should be regularly spending time on the class each week – at least 1 to 2 hours out of class for every hour in class. I will provide assignments for you to help you with this.
3. **Ask questions**. If you don't understand what's been presented or discussed, ask! I want to hear your questions. My job is to make sure that you understand. And if what we talk about sparks a question in your mind in another direction, ask. I always take time to answer questions in class. I am available outside of class (office hours at a minimum) to answer questions that may not come up during class. BTW, your knowledge if valuable too – I don't know everything and your contributions to the discussions are welcome.
4. **Do the assignments on time**. Class activities will expect that you've come to class prepared. Read the assigned material before coming to class. Hand in assignments on time. The due date and time for each assignment will be clearly specified.
5. **Take notes and review them**. Class notes are invaluable to learning the material in this class. I will post the lecture notes after class to assist you.
6. **Review your notes, posted solutions and practice problems.** Going back to review and reflecting on what you've heard, seen and done is how learning really occurs.
7. **Make sure and work out Technical Details Early!!** Late work will be accepted -- at great penalty -- and you are responsible for making sure you work out any technical details before the due date!

Communications Guidelines for TSM 363

1. *If you need something from the instructor right away – i.e. an emergency – please feel free to call my cell phone. 812-216-4119. Like most of you I am not far from it at all times.*

2. If you email me, please know that I value my family time greatly and WILL NOT make it a priority to answer emails after hours. *I will get to emailed questions as soon as I am able – but know* if you want an immediate detailed answer, email may not be the best way to get me. Please expect the following response times:
    a. Monday through Thursday (12-24 hours)
    b. Friday – Sunday (72 Hours)

Course Grading

3 1-hour exams (of approx. equal value)	25%
Labs	25%
Team Problems	25%
Homework, in class assignments, quizzes	25%
	100%

Grading Scale – Minimum Values for Each Grade

A	>90%
B+	87-90
B	80-87
C+	77-80
C	70-77
D+	67-70
D	60-67
F	**<60**

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Harassment and Discrimination: Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact Justin McGill, Student Assistance at 515.294.1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515.294.7612.

Religious Accommodation: If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information: If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.

TSM 370 – Occupational Safety
Spring 2015

Class Meeting: On-Line
Instructors: Nir Keren email: nir@iastate.edu Office: 2624 Howe Hall P: 515-294-2580

Office Hours: Tuesday, 10:30-11:30am.

TEXTBOOK (required)
Textbook: Occupational Safety and Health for Technologists, Engineers and Managers (7th edition, 2010) David L. Goetsch. ISBN: 013700916X

CATALOG DESCRIPTION
TSM 370. Occupational Safety. (3-0) Cr. 3. *Prereq: 270, junior standing*. Identifies safety and health risks in industrial work environments. Focus on how managers and supervisors meet their responsibilities for providing a safe workplace for their employees. Includes the identification and remediation of workplace hazards. Non-major graduate credit.

COURSE DESCRIPTION/PURPOSE/OBJECTIVES
TSM 370, Occupational Safety is a survey course that identifies safety and health risks in industrial work environments. The enduring understanding that forms the basis for every discussion and activity in this course is **as a manager or supervisor, you are responsible for the safety of all employees under you**.

The overarching questions that this class will answer include:
1. Why do workers continue to get injured on the job?
2. How can we protect workers from workplace injuries and illnesses?
3. What is the manager's role in the implementation of workplace safety programs?

At the conclusion of this course, you should be able to:
1. Define terminology commonly associated with the field of occupational safety and health.
2. Define and explain specific safety and health standards that impact general industries.
3. Explain the primary causes of work-related injuries and fatalities.
4. Develop safe procedures for the use of industrial equipment.
5. Select the proper personal protective equipment to reduce the potential for occupational injuries and illnesses for common industrial tasks.
6. Apply the principles of human factors and ergonomics to the prevention of work-related injuries and illnesses.
7. Design, prepare, and evaluate safety interventions in an industrial work setting.
8. Communicate safety concerns and recommendations in a manner that peers and management can understand and appreciate.
9. Reflect on your safety knowledge and clearly articulate your role in the prevention of workplace injuries and illnesses.
10. Understand general ethical concerns and ethical concerns associated with safety issues at the workplace and strategies for developing remedies for these concerns.

COURSE SCHEDULE

Week#/Date	Topic	Readings	Assignment
W1: Jan 12	Introductions, Safety & Health Movement	1, Blackboard	Group Quiz, Q1, Assg.1
W2: Jan 19	Accidents and their Effect; Theories of Accident Causation	2, 3, Blackboard	Q2, Assg.2
W3: Jan 26	Safety, Health, and Competition in the Global Marketplace; OSHA Act, Standards, and Liability	5, 6, Blackboard	Q3, Assg.3
W4: Feb 2	Ergonomic Hazards; Stress and Safety	10, 11, Blackboard	Q4, Assg.4
W5: Feb 9	Safety and Health Training	12, Blackboard	Q5, Assg.5
W6: Feb 16	Violence in the Workplace	13, Blackboard	Q6, Assg.6
W7: Feb 23	Hand and Portable Power Tools; Welding/Cutting/Brazing	Blackboard	Q7
W8: March 2	Mechanical Hazards and Machine Safeguarding Control of Hazardous Energy	14, Blackboard	Q8
Midterm Exam: March 4th 12:01 am – March 5th 11:59 pm			
W9: Mar 9	Falling, Impact, Acceleration, Lifting, and Vision Hazards	15, Blackboard	Q9
W10: Mar 16	Spring Break		
W11: Mar 23	Ethics	26, Blackboard	Q10, Assg. Ethics (will be released on March 25th. A 5-page paper is requested. Thus, due date is April 15 (3-weeks).
W12: March 30	Electrical Safety	18, Blackboard	Q11
W13: Apr 6	Fire Safety; Flammable/Combustible Liquids; Compressed Gases	19, Blackboard	Q12
W14: Apr 13	Hazard Communication; Confined Spaces; Noise	20, 22, Blackboard	Q13 Assg. 8
W15: Apr 20	Blood Borne Pathogens; Emergency Preparation	24, 25, Blackboard	Q14, Assg. 9
W16: Apr 27	Total Safety Management; Safety Culture	30, 31, Blackboard	Q15
W17: May 4	**Final Exam: May 4th @ 12:01 am – May 6nd @ 6:00 pm**		

Readings: The numbers refer to the chapter numbers in the book
Blackboard" refers to material available in learning modules on Blackboard
Assignments: "Q" – Quiz; "Assg." - Assignment.

Important!!
This course is recognized for fulfilling the requirement for Ethics in your program of study. Therefore, Failure to submit a discussion for the Ethics assignment, or being granted a grade that is lower than 70 on this discussion will results with a "F" grade on the course.

COURSE REQUIREMENTS

- Read assigned materials.
- Participate in a base group activities and work to ensure that all group members make satisfactory academic progress in achieving the goals of the course.
- Pass the exams and quizzes.
- Participate in the development and documentation of all group activities.

GRADING

Grading is given on a 100 scale. Course elements' weights are as follows:

Exams (2)	40 %
Weekly Quizzes (15)	30%
Assignments (9)	30%
Total:	100 %

COURSE GRADE

Your final grade will be computed based on the following scale:

A	93 - 100 points
A-	90 - 92 points
B+	87 - 89 points
B	83 - 86 points
B-	80 - 82 points
C+	77 - 79 points
C	73 – 76 points
C-	70 - 72 points
D+	67 - 69 points
D	63 - 66 points
D-	60 – 62 points
F	less than 60 points.

CLASSROOM EXPECTATIONS

This is an on-line course with multiple small group activities. As such you must be self-directed and take responsibility for completing your assignments by the time they are due. You must also remain in communication with your teammates so that you may complete the required assignments. Remaining self-directed is the toughest challenge when taking on-line courses.

EXAMS

Your grade on the exams will be based on your individual performance. You will be taking the exams on-line on Blackboard. You work is to be independent and reflect your own knowledge.

WEEKLY QUIZZES

Your grade for the quizzes will be based on your individual score. The quizzes will be available on Blackboard during the week of the relevant learning module ONLY!

ASSIGNMENTS

Assignments in the course are case studies. You are expected to discuss the case study within your base group. Preferably, the group should meet and discuss the topic. However, you can facilitate an online discussion on the base group's discussion board**.** The discussions should reflect on your collective learning associated with the week's topic with respect to the case study. You should decide among the group members on a Recorder. The member that is assigned as a Recorder will record the discussion items and will prepare a summary statement that represents the group's collective reflection on the case. When the summary statement is completed, the Recorder will verify that there exists a consensus among the members with regard to the appropriateness of the summary statement and then submit the summary in the assignment box. For the majority of the discussion cases the summary statements are limited to 300 – 500 words.

The discussion cases include instructions that will assist the group if the members failed to come to a consensus on the topic.

The summary statements should be prepared in Word and spell checked before posting them in the assignment boxes. Include the word count at the end of the summary statement of each assignment. Use your group number and the topic as the title for the summary statement (for example, "International Safety Programs - Group 6"). These statements will be assessed as a group activity. Grading will be based on your ability to communicate reflective thinking, address the major ideas in the text, and demonstrate thoughtfulness.

If all group members participated in the discussion, the Recorder will add the statement "**All members participated**". Alternatively, if not all of the members participated, list the names of the members that **DID NOT** participate at the end of the summary.

Assignments are due at the end of the week for the topic. For example, assignment 2 will address material covered on the week beginning on Monday, January 21. The assignment is due on Sunday, January 27, at 11:59 pm.

The instructor will provide feedback for at least 50% of the summary statements published each week. Statements that scored less than "80" (on a scale of "100") will always be provided with a feedback.

Special Assignment for the Ethics learning module:

The Occupational Safety course addresses ethics throughout the learning modules. However, as noted earlier, this course is recognized for fulfilling the requirement for Ethics in your program of study, and therefore, a specific learning module enhances the discussion on Ethics. This module includes a significant assignment for Ethic. For this assignment you are required as a base group to write a 5-page (~ 1,500 words) paper. To accommodate the magnitude of efforts associated with this assignment, the

schedule allows three weeks for this assignment. See the course schedule above for further details on due dates.

ACCEPTANCE OF LATE WORK

Assignments are due as indicated in this syllabus and on the assignment instructions. Late assignments will not be accepted.

EXTRA CREDIT ASSIGNMENTS

I will add extra credit assignment several times throughout the semester. The extra credit assignments will address current issues that are relevant to the material covered. These assignments will vary in form (e.g., summaries of discussions in groups, blogs, etc.). Extra Credits are counted differently. For every 20 extra credit accumulated you will get 1% extra credit on top of your final grade on the course. Total extra credits may allow for 5-10% extra credits. Again, these are extra credits. Thus, your grade will not be negatively affected if you did not submit responses to these assignments. I would strongly encourage you to take advantage on these assignments, as they are great learning opportunities.

BASE GROUP

Base-groups are established through a self-enrollment process. To enroll to a group go to the Group tab on the course menu. Click the 'View Sign-up Sheet to Join a Group' button.
Now a list of groups and the members of each group will be visible. Review the list and identify the group you would like to join (or randomly select a group if you have no preference). Click "Sign Up" button to be added to the group you want to join (be aware that group size is limited to 6 members) and follow the instructions further to complete the process.

Base groups are cooperative learning groups whose primary responsibility is to provide each student the support, encouragement, and assistance they need to make academic progress. Base groups personalize the work required and the course learning experiences. The members of your base group should exchange phone numbers, email addresses or other communication means and information about schedules since you will likely wish to correspond outside of class. The base group functions as a support group for members that:

1. Gives assistance, support, and encouragement for mastering the course content and provides feedback on how well the content is being learned.
2. Provides a set of interpersonal relationships to personalize the course and an arena for working on interpersonal and group communication and interaction.

Responsibilities:

1. Master the course content to meet the objectives and requirements of the course.
2. Ensure that all members of your base group master the course content to meet the objectives and requirements of the course.
3. Share experience and knowledge with group members and class.

Weekly, communicate with your base group members to check if all of them understood the material presented at the last session and are prepared for upcoming quizzes, exams, discussions, and other upcoming assignments.

Base groups are available to support individual members. Additionally, group members should assist one another in studying and preparing for quizzes and exams. If the group cannot come to consensus on an issue it should be brought to my attention.

Red Zone

ACADEMIC DISHONESTY - PLEASE READ CARFULLY!!!
Due to several misfortunate events we need to reinforce the issue of academic dishonesty.

The instructors reserve the rights to assign a Fail ("F") grade to students due to academic dishonesty. Additionally, the instructor will act upon the guidelines available in the university's policies about academic dishonesty.

Copying or reproducing material prepared by others (with or without their approval) is considered a severe case of academic dishonesty, whether this action was taken during an exam or with respect to homework assignments.

Academic dishonesty occurs when a student uses or attempts to use unauthorized information in the taking of an exam; or submits as his or her own work themes, reports, drawings, laboratory notes, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism.

Plagiarism is the unacknowledged use of the information, ideas, or phrasing of other writers and is an offense comparable with theft and fraud, and it is so recognized by the copyright and patent laws. One is responsible for plagiarism when: the exact words of another writer are used without using quotation marks and indicating the source of the words; the words of another are summarized or paraphrased without giving the credit that is due; the ideas from another writer are borrowed without properly documenting their source.

Academic dishonesty is considered to be a violation of the behavior expected of a student in an academic setting as well as a student conduct violation. A student found responsible for academic dishonesty or academic misconduct is therefore subject to appropriate academic penalty; to be determined by the instructor of the course, as well as sanctions under the university.

The instructor of this course follows the university policies about academic dishonesty. More complete information on these policies can be found in the ISU Student Information Handbook: *http://www.dso.iastate.edu/handbook.html*

FIRING GROUP MEMBERS
Groups may choose to fire group members who are not sharing in the group workload and contributing to the success of the group. Firing a group member is an extreme response and can only be done after attempts in getting the group member involved have failed. The steps for firing a group member are as follows:

1. After being unsuccessful in getting a group member to participate, the group member needs to be informed in writing that he or she is in jeopardy of being fired from the group. This memo needs to include specific documentation of the problem, the attempts that have been made to try to

resolve the problem, and group expectations to maintain group membership. This memo needs to be signed by all other group members and a copy needs to be given to the instructor.

2. The group member receiving the memo needs to respond, in writing, to the group acknowledging that the memo has been received and understood. A copy of this response also needs to be given to the instructor.
3. After receiving the written warning, if a group member is still not participating and contributing to the group in a satisfactory manner, he or she can then be fired from the group. This notification needs to be done in writing explaining how the group member failed to meet the expectations established in the warning memo. This memo also needs to be signed by all other group members and a copy needs to be given to the instructor.
4. Upon receipt of notification that a group member has been fired, the instructor will remove that member from the group roster and he or she will be considered an individual group for the rest of the semester. Group members who are fired will be responsible for completing the remaining assignments on their own. A penalty of 20 points (100 will drop to 80, 90 will drop to 70, and so on) will be introduced to each assignments the student completed following being fired by her/his group members.

OTHER UNIVERSITY POLICIES AND GUIDELINES

DISABILITY ACCOMMODATIONS

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

HARASSMENT AND DISCRIMINATION

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact me, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

RELIGIOUS ACCOMMODATION

If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be submitted to me in writing. You may also seek assistance from the Dean of Students Office.

DEAD WEEK

This class follows the Iowa State University Dead Week guidelines. For academic programs, the last week of classes is considered to be a normal week in the semester except that in developing their syllabi faculty shall consider the following guidelines:

- Mandatory final examinations in any course may not be given during Dead Week except for laboratory courses and for those classes meeting once a week only and for which there is no contact during the normal final exam week. Take home final exams and small quizzes are generally acceptable. (For example, quizzes worth no more than 10 percent of the final grade and/or that cover no more than one-fourth of assigned reading material in the course could be given).
- Major course assignments should be assigned prior to Dead Week (major assignments include major research papers, projects, etc.). Any modifications to assignments should be made in a timely fashion to give students adequate time to complete the assignments.
- Major course assignments should be due no later than the Friday prior to Dead Week. Exceptions include class presentations by students, semester-long projects such as a design project in lieu of a final, and extensions of the deadline requested by students.

The details of this guideline can be found at http://catalog.iastate.edu/academiclife/#deadweek.

Contact Information

If you are experiencing, or have experienced, a problem with any of the policy or guideline issues described above, email academicissues@iastate.edu

End of Red Zone

I wish you a great spring 2015 semester,

Nir Keren

TSM 371 – Occupational Safety Management
Spring 2015

Class Meeting:	T 11:00 - 11:50 Arranged via Web	Location:	3219 Sukup Hall
Instructor:	Dr. Steven A. Freeman	email:	sfreeman@iastate.edu
Office Hours:	3333 Elings Hall – by appointment	Phone:	294-9541
Teaching Assistant:	Mr. Matthew E. Harvey	email:	meharvey@iastate.edu
Office Hours:	3332 Elings Hall – by appointment		

REQUIRED MATERIALS

Textbook: Occupational Health and Safety Management: A Practical Approach, 2nd Ed.
Charles D. Reese

CATALOG DESCRIPTION

(2-0) Cr. 2. Introduction to occupational safety and health administration and management. Focus on development and management of safety programs and obtaining employee involvement in occupational safety programs.

COURSE DESCRIPTION/PURPOSE/OBJECTIVES

This is a course focussing on the management and administration of occupational safety and health programs. The enduring understanding that forms the basis for every discussion and activity in this course is **workplace safety is a management function that requires commitment and involvement from all employees to be successful**. The overarching principles that connect all course content and activities are:

1. All occupational injuries and incidents are preventable.
2. All levels of management are responsible for safety and health.
3. All employees have the responsibility to themselves, their coworkers, and their families to work in a safe and healthy manner.
4. To eliminate injuries and incidents, management must ensure that all employees are properly trained on how to perform every job task efficiently and safely, and are properly equipped to carry out their duties.
5. All employees must be involved in every area of the safety, health, and production process.

At the conclusion of this course, you should be able to:

1. Synthesize the functions and responsibilities of a safety professional.
2. Outline the components of an occupational safety and health program.
3. Define the safety roles and responsibilities of both management and employees.
4. Understand the principles of behavior-based safety management.
5. Conduct a safety audit and identify workplace hazards.
6. Conduct a job safety analysis.
7. Conduct an incident investigation.
8. Write a workplace safety policy/program and develop related training materials.

COURSE SCHEDULE

Topic	Readings	Assignments Due
UNIT 1		
Introduction	Chapter 1	
Roles & Responsibilities	Chapter 2	Reflection 1 (1/17)
Getting Employees Involved	Chapter 3	Program & Training Topic (1/22)
Written Programs	Chapter 4	Reflection 2 (1/24)
Motivating Employees	Chapter 5	
Behavior-Based Safety	Chapter 6	Reflection 3 (1/31)
Hazard Identification	Chapter 7	
Incident Investigation	Chapter 7	Reflection 4 (2/7)
Hazard Analysis	Chapter 8	**Safety Audit (2/10)**
Employee Assistance Programs		Reflection 5 (2/14)
EXAM 1 (2/17)		Program Progress Report (2/20)
UNIT 2		
Occupational Injuries & Illnesses	Chapters 9 & 10	
Ergonomics & Industrial Hygiene	Chapters 11 & 12	Reflection 6 (2/28)
Intervention, Mitigation, & Control	Chapter 13	**Incident Investigation (3/3)**
Prevention Techniques	Chapter 14	Reflection 7 (3/7)
Safety & Health Training	Chapter 15	Presentation Progress Report (3/13)
Training Techniques	Chapter 15	Reflection 8 (3/14)
OSHA Compliance	Chapter 16	
OSHA Regulations	Chapter 17	Reflection 9 (3/28)
JSA Presentations		**Job Safety Analysis and Presentation(3/31)**
Safety Awareness	Chapter 21	
Safety Management	Chapter 23	Reflection 10 (4/11)
EXAM 2 (4/14)		**Written Program (4/17)**
UNIT 3		
Training Presentations		**Training Presentations and Assessment (4/21)**
FINAL EXAM (5/6/15 9:45-11:45)		

TIME EXPECTATIONS

Expect to spend an average of 6 hours per week on this class to ensure success.

ON CAMPUS COURSE REQUIREMENTS

1. Actively participate in class and online.
2. Read assigned materials.
3. Participate in a base group and work to ensure that all group members make satisfactory academic progress in achieving the goals of the course.
4. Pass the exams and quizzes.
5. Participate in the development and documentation of all group activities.
6. Complete individual reflections on the content and your learning of the content.

ONLINE COURSE REQUIREMENTS

1. Actively participate online.
2. Read assigned materials.
3. Pass the exams and quizzes.
4. Complete all individual assignments.
5. Complete individual reflections on the content and your learning of the content.

GRADING

There is a total of 1000 points possible.

Exams (2 @ 100 points each)	200 pts
Final Exam	150 pts
Quizzes	100 pts
Reflections on Learning (10 @ 10 points each)	100 pts
Safety Audit	40 pts
Incident Investigation	40 pts
Job Safety Analysis	60 pts
Job Safety Analysis Presentation	30 pts
Written Safety Program	100 pts
Safety Training Presentation	100 pts
Safety Training Presentation Assessment	30 pts
Class Participation	50 pts

COURSE GRADE

Your final grade will be computed based on the following scale:

A	900 - 1000 points	C+	770 - 799 points	D	670 - 699 points
B+	870 - 899 points	C	700 - 769 points	F	- 599 points
B	800 - 869 points	D+	670 - 699 points		

EXAMS

Your grade on the exams will be based on your individual performance. The Final Exam is comprehensive.

QUIZZES

Quizzes will be unannounced. The number of quizzes vary from semester to semester. As the number of quizzes increase, the value of each individual quiz decreases.

For the on campus section, quizzes are group activities that will occur during the Tuesday class meetings. Every group member who participates will receive the same grade. Group members who do not participate will receive a zero and a missed quiz cannot be made up.

For the online sections, quizzes are individual activities and will be posted online via blackboard with a specific due date.

REFLECTIONS ON LEARNING

Approximately every week you will reflect on your learning associated with the topics presented during that week or since the last reflection. Each reflection must include these headings: 1) *Summary* and 2) *Professional Implications*. Start with a summary of the major points associated with that week's topics (*Summary*) and then reflect on their importance to your future activities as a safety professional or manager with safety responsibilities (*Professional Implications*). These reflections (300-500 words) need to be **posted to Blackboard by Saturday at 2 pm** as indicated in the schedule (of course you may post them earlier in the week). Reflections should be prepared in Word and spell checked before posting them to the Bulletin Board associated with the reflection (post as a Word file or a pdf file). Include the word count at the end of the reflection. Use your name as the title of the reflection. These are individual assignments and will be graded on your individual performance. However, you may certainly discuss them with group members. Grading will be based on your ability to communicate reflective thinking.

I expect you to read all the reflections posted by the class. Each week, as part of class participation, you must select at least two posted reflection and respond publicly to the student with a critical analysis of his reflection. Your critique will address her thoughts in each category as well as her ability to communicate her thoughts. The goal is to provide feedback to your peers so they can improve their next reflection. You may post as many critiques (approximately 50 words) as you want each week. The more meaningful postings you make to online discussions, the higher your class participation grade will be (see the class participation rubric for details).

SAFETY AUDIT, INCIDENT INVESTIGATION, & JOB SAFETY ANALYSIS

These are activities to help you gain experience in conducting some of the functions of a safety professional. It is required that these assignments be conducted in a general industry work environment (if you have questions concerning if a particular work environment that you have in mind is acceptable, please talk to me in advance). These assignments must be typed and include a cover page. The cover page must include the assignment title, the due date, the title of the class, the instructor's name, and name(s) of all students involved. All assignments must be submitted

electronically via Blackboard. The Job Safety Analysis assignment also includes a class presentation component. The presentation (developed in PowerPoint) will be a short summary of the task, the significant hazards involved, and recommendations to reduce injuries while performing the task. The presentations should be not more than 20 slides and should be prepared as a 15-minute presentation [Note: you will not actually present, just prepare the presentation].

For the on campus section, these assignments will be group activities. The group process provides learning support during the activities. It is important for everyone to participate fully. A base score will be assigned for each activity. Individual scores will be calculated using the base score and peer evaluations.

For the online sections, these assignments may be individual or group activities. You may choose to work independently or you may choose to participate in a group with other online students [Note: if you choose to participate in a group, all of your group members must be able to physically be present at the worksite while completing the assigned activities]. If you choose to participate in a group, this group will become your base group and will remain in effect for all assignments and projects. Group size must be at least two students and not more than four students. For the online sections, groups will be self-selected, but must be approved and in place by the second week of the semester. If work is done as a group, peer evaluations will be used as part of the grading process.

WRITTEN SAFETY PROGRAM

You (or your group) will need to select a safety program topic from the list provided below and then develop a generic written program for that topic. Topics cannot be repeated and will be assigned on a first come, first served basis. The written program must follow the provided outline and be submitted electronically using Blackboard. The final *Written Safety Program* is worth 100 points. The *Written Program Progress Report* is a midpoint check to keep me appraised of progress being made. While the progress report is not graded, it does provide the opportunity for critical feedback and its submission is part of your class participation grade.

Written Safety Program Topics

Personal Protective Equipment (PPE)	Workers Compensation	Office Safety
Process Safety Management	Bloodborne Pathogens	First Aid
Permit-Required Confined Spaces	Industrial Hygiene	Fleet Safety
Workplace Violence Protection	Emergency Response	Back Safety
Contractors and Subcontractors	Electrical Safety	Inspections and Audits
Employee Wellness Program	Machine Guarding	Ergonomics
General Housekeeping	Laboratory Safety	Fall Protection
Safety Incentive Program	Record Keeping	Fire Protection
Hazardous Communication	Workplace Security	Industrial Trucks
Control of Hazardous Energy	Respiratory Protection	Indoor Air Quality

For the on campus section, this project is a group activity. A base score will be assigned for each program. Individual scores will be calculated using the base score and peer evaluations.

For the online sections, this project is an individual activity except for those students who established an online base group. If done as a group, the same group process applies.

SAFETY TRAINING PRESENTATION AND ASSESSMENT

This is associated with your written safety program. The intended audience for your presentation is a group of wage employees in an industrial setting as part of their safety training. The presentation should be planned for one hour. The requirements include the goals of the training presentation (i.e., what are the learning outcomes), a training plan (i.e., how the training will be conducted), a powerpoint presentation covering the content of the training, and at least one handout designed for the employees to take with them. The *Presentation* grade (100 points) will include all of the curriculum components developed to share your training topic with a group of employees. The *Presentation Progress Report* is a midpoint check to keep me appraised of progress being made and an opportunity to get feedback on your plan, powerpoint, handouts, and assessment component. While the progress report is not graded, it does provide the opportunity for critical feedback and its submission is part of your class participation grade.

This presentation assessment (30 points) must include both the assessment tool designed to evaluate the effectiveness of your training and an answer key. The assessment will consist of at least 10 meaningful multiple choice questions covering the main points of the material presented.

For the on campus section, these projects are group activities. A base score will be assigned for each program. Individual scores will be calculated using the base score and peer evaluations.

For the online sections, these projects are individual activities except for those students who established an online base group. If done as a group, the same group process applies.

CLASS PARTICIPATION

This score will be based on participation in class discussions and class reflections, and preparing the two progress reports for your training program and presentation. The rubric details are on the assessment sheet which can be found in course resources folder. If you were involved in a base group during the semester, a final peer evaluation will also impact your class participation score.

ACCEPTANCE OF LATE WORK

Assignments are due as indicated in this syllabus and on the assignment instructions. Late projects and assignments will be penalized 25%.

CLASSROOM EXPECTATIONS

This is primarily an online course. I expect all of you to be willing to share your experiences, insights, and thoughts openly with the class as part of the online discussions. All postings (including the reflection critiques) will be professional. Each base group will be assigned a private bulletin board (upon request) to encourage additional group interaction and discussion.

BASE GROUP

Base groups are cooperative learning groups whose primary responsibility is to provide each student the support, encouragement, and assistance they need to make academic progress. Base groups personalize the work required and the course learning experiences. The members of your base group should exchange phone numbers and information about schedules since you will need to meet to discuss topics and complete course assignments and projects. The base group functions as a support group for members that:

1. Gives assistance, support, and encouragement for mastering the course content and provides feedback on how well the content is being learned.
2. Provides a set of interpersonal relationships to personalize the course and an arena for working on interpersonal and group communication and interaction.

Responsibilities:

1. Master the course content to meet the objectives and requirements of the course. (You are accountable to both me, as the instructor, and the members of your base group for your participation in class and your performance on quizzes and group activities.)
2. Ensure that all members of your base group master the course content to meet the objectives and requirements of the course.
3. Share experience and knowledge with group members and class.

Ultimately you are each responsible for ensuring that your group works well together. I hope that your group members become your friends, but that is not necessary. In fact, you can work well together even if you do not like your group members at all. I have put some structures in place to help facilitate your group activities by holding each group member individually responsible for their share of the work. You will complete a peer evaluation for each group activity. If a group member does not participate, then as a group, you do not have to give him or her credit for the work done by the rest of the group. If non-participation becomes a habit, the group may also consider firing the group member.

Peer Evaluations

Peer evaluations will be turned in for each group activity (3 assignments, written program, safety training presentation, and presentation assessment) to assess group participation. These 6 peer evaluations are due the same day as the activity. To maintain confidentiality, you will email me via Blackboard the ratings for all your group members (including yourself). There will also be an additional peer evaluation at the end of the semester due at the time of the final exam.

Firing group members:

Groups may chose to fire group members who are not sharing in the group workload and contributing to the success of the group. Firing a group member is an extreme response and can only be done after attempts in getting the group member involved have failed. The steps for firing a group member are:

1. After being unsuccessful in getting a group member to participate, the group member needs to be informed in writing that he or she is in jeopardy of being fired from the group. This memo needs to include specific documentation of the problem, the attempts that have been made to try to resolve the problem, and group expectations to maintain group membership. This memo needs to be signed by all other group members and a copy needs to be given to the instructor.
2. The group member receiving the memo needs to respond, in writing, to the group acknowledging that the memo has been received and understood. A copy of this response also needs to be given to the instructor.
3. After receiving the written warning, if a group member is still not participating and contributing to the group in a satisfactory manner, he or she can then be fired from the group. This notification needs to be done in writing explaining how the group member failed to meet the expectations established in the warning memo. This memo also needs to be signed by all other group members and a copy needs to be given to the instructor.
4. Upon receipt of notification that a group member has been fired, the instructor will remove that member from the group roster and he or she will be considered an individual group for the rest of the semester. Group members who are fired will be responsible for completing the remaining assignments on their own. This will include completing a new written program and safety training presentation on their own.

UNIVERSITY POLICIES

Disability Accommodations

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Jenny Macken, 1340D Elings Hall (phone 515-294-5196; email jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with Jenny and myself to address any special needs or special accommodations at the beginning of the semester.

Academic Dishonesty

This class follows Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.
http://www.dso.iastate.edu/ja/academic/misconduct.html

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact me, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation

If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be submitted to me in writing. You may also seek assistance from the Dean of Students Office.

Dead Week

For each Fall and Spring semester, the last full week of classes before final examinations is designated as Dead Week. The intent of this policy is to establish a one-week period of substantial and predictable study time for undergraduate students. During the Dead Week period, regular lectures are expected to continue, including the introduction of new content, as deemed appropriate by the instructor. The restrictions established by this Dead Week policy are:

- Due dates for mandatory graded submissions of any kind that fall within Dead Week must be listed on the syllabus provided at the start of the course.
- Mandatory final examinations may not be given during the Dead Week period except for laboratory courses or courses that meet weekly and for which there is no contact during the normal final examination week.
- Registered ISU Student Organizations may not hold any meetings, functions, or sponsored events during the Dead Week period. Any exception to these restrictions must be authorized in advance by Office of the Dean of Students. .

Contact Information

If you are experiencing, or have experienced, a problem with any of the policy issues described above, email academicissues@iastate.edu.

TSM 372
Legal Aspects of Occupational Safety and Health
Fall 2013

INSTRUCTOR:
Jason Schaufenbuel, MPH, CSP
Phone: (515) 229-1844
Office: By appointment.
E-mail: jschaufe@iastate.edu or jason@safetyus.com

REQUIRED MATERIALS:
OSHA Regulations - accessible via: http://www.osha.go

Additional materials will be posted on Blackboard for students to read/review

CATALOG DESCRIPTION:
Legal implications of legislation as it applies to health and safety in the workplace.

DESCRIPTION:
This course focuses on the development and application of legislation which safety practitioners typically encounter in the performance of their duties.

At the conclusion of the course students should be able to:

1. Describe the evolution of workplace safety regulations
2. Apply 29 CFR 1904, 1910 and 1926 standards to the workplace
3. Compare the difference between voluntary and mandatory standards
4. Summarize the OSHA enforcement process
5. Demonstrate an ability to prepare for an informal OSHA hearing
6. Define the difference between civil and criminal litigation
7. Summarize the role, objectives, and authority of each of the following agencies:
    - Department of Transportation
        - Federal Motor Carrier Safety Administration (FMCSA)
        - National Highway Traffic Safety Administration (NHTSA)
        - National Transportation Safety Board (NTSB)
        - Federal Aviation Administration (FAA)
        - Pipeline and Hazardous Materials Safety Administration (PHMSA)
    - Environmental Protection Agency (EPA)
    - Consumer Product Safety Commission (CPSC)
    - Mine Safety and Health Administration (MSHA)
    - Nuclear Regulatory Commission (NRC)
    - National Institute for Occupational Safety and Health (NIOSH)
    - Occupational Safety and Health Review Commission (OSHRC)
8. Identify a professional code of ethics as a safety practitioner

TENTATIVE COURSE SCHEDULE

Week	TOPIC	READINGS	ASSIGNMENTS
Aug. 26	• Orientation • Introduction • History of workplace safety	• Read History of Workplace Safety • View Hist. of Workplace Safety Video	Weekly Quiz
Sep. 2	• History of OSHA • Rulemaking • General duty clause • NIOSH • OSHRC	• Read All About OSHA • Read OSH ACT of 1970 • Read Setting Standards • Review OSHRC Website • Review NIOSH Website	Weekly Quiz Select Voluntary standard paper topic by 6:00 pm Sep. 6
Sep. 9	• CFR 1910 and 1926	• Review 29 CFR 1910 and 1926 • Review OSHA Training Requirements Publication • Read the regulation you wish to do your presentation on	Weekly Quiz Select Group and Regulation presentation topic by 6:00 pm Sep. 13
Sep. 16	• Inspections • Violations	• Read OSHA Posters (Iowa and Fed.) • Read OSHA Inspection Fact Sheet • Read OSHA Inspection Publication (OSHA 2098) • Read What to Expect During an OSHA Inspection • Read Should You Request a Warrant	Weekly Quiz Standards activity due by 6:00 pm Sep. 20
Sep. 23	View on-line • Citations • Contesting violations • Criminal prosecution	• Read Sample IOSHA Citation • Read Employer Rights and Responsibilities Following an Inspection • Read Should You Contest an OSHA Citation	Weekly Quiz
Sep. 30	• Recordkeeping	• Read 29 CFR 1904 • Read OSHA Recordkeeping Package • Review OSHA Recordkeeping Handbook	Weekly Quiz
Oct. 7	• Voluntary standards • OSHM Systems • Ergonomics	• Read VPP Application packet • Read ILO guidelines • Read article on ANSI Z10 • Read Legal Perspective of Z10 • Read OSHA's final ergonomics standard – which was repealed •	Weekly Quiz Recordkeeping activity due by 6:00 pm Oct. 11

Date	TOPIC	READINGS	ASSIGNMENTS
Oct. 14	• Exposure Limits • Arc flash protection	• Review OSHA PELs • Read Position Statement on TLVs • Read TLV Development Process • Read Protection from Electrical Shock	Weekly Quiz
Oct. 21	• Insurance - risk xfer • Workers Comp • Claims management	• Read pages 1 – 7 of Iowa Work Comp Manual • Read Work Comp Q&A • Read Iowa 1st Report of Injury • Read Sample Experience Mod Worksheet	Weekly Quiz
Oct. 28	• ADA • Building codes • Electrical codes	• Review 28 CFR 36 • Review ADA Standards for Accessible Design	Weekly Quiz WC activity due by 6:00pm Nov. 1
Nov. 4	• DOT • Fleet Safety	• Review 49 CFR 383, 391 and 395 • Read 49 CFR 391.11 • Read Sample Fleet Safety Program	Weekly Quiz
Nov. 11	• EPA • PHMSA	• Review 49 CFR 171 and 172 • Read 49 CFR 171.2 • Read Managing Hazardous Waste in the Small Business	Weekly Quiz Voluntary Standard Paper by 6:00pm Nov. 15
Nov. 18	• CPSC • MSHA • NRC • Public Health	• Review CPSC regulated products list • Read MSHA History • Read MSHA Function • Read NRC Fact Sheet	Weekly Quiz DOT/EPA activity due by 6:00 pm Nov. 22
Nov. 25	Thanksgiving Break		
Dec. 2	• Code of ethics • Professional liability	• Read ASSE Code of ethics • Read AIHA Member Ethical Principles • Read BCSP Codes of ethics • Read Examples of employer liability	Weekly Quiz Group Regulations Presentations Due
Dec. 9	Semester Review	• Review Group Regulation Presentations	
Dec. 16	Final Exam - On-Line		

COURSE REQUIREMENTS

1. Review weekly presentations
2. Read assigned materials
3. Pass exam and quizzes
4. Complete and submit muddiest points, activities and paper as assigned
5. Participate in all group activities.

GRADING

There is a total of 400 points possible

Weekly quizzes (10 points each)	140 pts
Four out of class activities (10 points each)	40 pts
Standards Activity, Recordkeeping Activity, WC Activity, DOT/EPA Activity	
Muddiest Point Postings (3 points each)	21 pts
Muddiest Point Responses (13 points each)	39 pts
Voluntary standard paper	40 pts
Regulation presentation	45 pts
Final Exam	75 pts

Course Grade

Your final grade will be computed based on the following scale:

A	360 – 400 points
B+	348 – 359 points
B	320 – 347 points
C+	308 – 319 points
C	280 – 307 points
D+	268 – 279 points
D	240 – 267 points
F	0 – 239 points

COURSE EXPECTATIONS

1. QUIZZES

Your grade on each quiz will be based on your individual performance. Quizzes may cover material already presented or reading materials for that week. Quizzes will be posted to Blackboard by Monday of the week assigned and will remain posted for until the 2nd Friday (11 days). For example the Week 1 quiz will be available August 26th and will remain available until Sep 6th. Missed quizzes cannot be made-up.

2. OUT OF CLASS ACTIVITIES

Out of class activities are to be completed by you, independently, using OSHA regulations or other suitable references. The activities are to be completed via Blackboard. Activities will be available electronically via Blackboard generally one and one-half weeks prior to the assignment being due. Missed assignments cannot be made-up.

3. MUDDIEST POINT POSTING

Seven times during the semester you will post on Blackboard your muddiest (least understood) point from that week's reading assignment, lecture, discussion, presentation, quiz, etc. If everything was clear, then you may turn in an explanation of the most significant thing learned from the week's material and how it relates to your future as a manager in an industrial setting. Grading will be based on your ability to communicate reflective thinking or clearly communicate the muddiest point. You may not post more than one point per week. Muddiest Point submissions must be made by **6:00 pm, of the Friday following the**

week concerning that topic. For example, a Muddiest Point for a topic covered during the week of Aug. 26th is due by 6:00 pm, September 6th.

4. MUDDIEST POINT RESPONSES

Three times during the semester you will select a muddiest point from another student and provide a response via Blackboard. Responses should be directed towards answering muddiest points and not towards explanations of significant learning. The responses should be approximately 200 - 250 words (or longer if needed) and provide a suitable resolution to the issue presented. You may only respond to another individual's muddiest point response if you can contribute significantly to the response they provided such as by showing an alternative solution, or if you feel that the response provided wasn't accurate. Grading will be based upon the clarity and appropriateness of the response. This will be a first come, first serve process and individuals are responsible for completing all muddiest point responses by 6:00pm, December 8th. However at least one response is due before Oct. 4, for calculation of mid-term grades. When you decide to respond to a muddiest point, if you cannot post your response at that time, you should post a short response in Blackboard indicating that you will be responding to the issue. This in effect holds the muddiest point for you to respond to and keeps others from working on the same issue. From the time you hold a muddiest point for your response, you have **one week** to post your actual response.

5. VOLUNTARY STANDARD PAPER

You will select a consensus standard, available at the ISU Library or a few are available for free on the web, from a list provided by the instructor. You will review the standard and provide a written paper which:

1. Briefly summarizes the standard (the focus of the summary should be primarily focused on the impact upon employers and not necessarily manufacturer responsibilities)
2. Explains the differences in employer responsibilities between the consensus standard requirements and the comparable OSHA standard requirements <u>and the importance of these differences in terms of employee safety</u>

And one of the following:

3. Your opinion on whether the OSHA standard should be updated to reflect the consensus standard reviewed <u>and</u> a detailed explanation as to why/or why not

Or

3. How you would apply the differences in the consensus standards in the workplace to enhance employee safety

You must clearly identify the ANSI standard you reviewed and the OSHA standard which you compared it against. **Part 3 of the paper should be given more emphasis than the first two parts of the assignment. IE provide significant detail to substantiate your thoughts.**

The paper should be in a font no greater than 12, with 1 inch margins on all sides, double spaced. Papers should not exceed five pages in length. Papers are to be submitted electronically (via Blackboard or email to the instructor). Do not procrastinate on this topic. Occasionally the library will not have the standard you selected.

5. REGULATION PRESENATATION

The intent of this presentation is to educate your fellow students on the employer's obligations under a particular OSHA standard. The presentation must not be a re-hash of the regulation, but a presentation on what the employer needs to do to ensure compliance with the law. For example, if you were presenting on 1910.135 you'd comment on the employer's need to provide appropriate ANSI approved head protection, you wouldn't need go into the detailed requirements of the ANSI standard.

Students will be put into groups of three (you may choose your own partners). Each group will select an OSHA regulation from a list provided by the instructor on which to develop a class presentation. The

intended audience for your presentation is your fellow classmates to enhance their understanding of employer responsibilities under the law. You are not training **employees** on the regulation – **you are training other safety practitioners on what they need to do to ensure their organization is in compliance with the standard**. Regulations cannot be repeated and will be assigned to groups on a first come, first request basis. While you will not be delivering the presentation in class, the presentation you develop should be designed to last at least 15 minutes. You may create the presentation in PowerPoint, Prezie or any other delivery media as long as it can be posted to the course website by the instructor or a link may be shared with your classmates so they may view the material. Videos (which you did not create) may be used but cannot be the major component of the presentation.

This activity is worth 45 pts.

- 35 pts - The presentation
- 5 pts- Each group must also provide the instructor with 5 meaningful multiple choice questions covering the main points of the material presented which may be used in the final examination. These questions may also be shared with the students in the course through your presentation.
- 5 pts - You performance on this activity will be judged by your teammates.

6. FINAL EXAM

Your grade on the final exam will be based on your individual performance. The Final Exam is comprehensive.

ACCEPTANCE OF LATE WORK

Assignments are due by their respective due dates. All assignments will be submitted electronically to the instructor via Email or Blackboard. Late projects and assignments will be penalized 10% of the total possible points each day they are late.

ACADEMIC HONESTY

Academic honesty is fundamental to the activities and principles of any university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Academic dishonesty is not only a basis for disciplinary action but is also relevant to the evaluation of the student's level of performance. Academic honesty requires that students do not cheat, or knowingly assist another to do so. Other unacceptable behavior includes plagiarism, which is the submitting of someone else's work as your own, and unauthorized access to or changing of grades or examinations.

DISABILITY ACCOMMODATIONS

If you have a documented disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act and requires accommodations, you will need to go to the Disability Resource (DR) Office for coordination of your academic accommodations. The DR Office is located in room 1076, Student Services Building. Their telephone number is 515-294-7220. Their email is disabilityresources@iastate.edu.

Jenny Macken, 116 I ED II building (phone 515-294-5196; email jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with Jenny and myself to address any special needs or special accommodations at the beginning of the semester.

TSM 372 – Legal Aspects of Occupational Safety and Health

GENERIC ASSIGNMENT RUBRIC

Grade (%)	Description
A (90-100)	• Assignment is complete • Assignment demonstrates a thorough understanding of the safety issues involved • Evidence that the individual or group extended the assignment beyond the basic expectations
B (80-89)	• Assignment is complete • Assignment demonstrates a thorough understanding of the safety issues involved
C (70-79)	• Assignment is complete • Some areas may indicate weaknesses, lack of understanding, or minimal effort
D (60-69)	• Assignment is incomplete or not completed according to instructions • Major weaknesses in understanding of the safety issues involved is evident

COURSE OUTLINE:

1. History of workplace safety
2. OSHAct
3. OSHA
    a. Rulemaking
    b. General duty clause
4. National Institute for Occupational Safety and Health (NIOSH)
    a. Purpose and responsibility
    b. Types of authority
    c. Research efforts
5. OSHRC
6. OSHA regulations
    a. 1910 Standards
        1. Subpart A - General
        2. Subpart B - Adoption and extension of Established Federal Stds.
        3. Subpart C - Reserved
        4. Subpart D - Walking - Working Surface
        5. Subpart E - Exit Routes, Emergency Action Plans and Fire Prevention Plans
        6. Subpart F - Powered Platforms, Manlifts and Vehicle-Mounted Work Platforms
        7. Subpart G - Occupational Health and Environment Control
        8. Subpart H - Hazardous Materials
        9. Subpart I - Personal Protective Equipment
        10. Subpart J - General Environmental Controls
        11. Subpart K - Medical and First Aid
        12. Subpart L - Fire Protection
        13. Subpart M - Compressed Gas and Compressed Air Equipment
        14. Subpart N - Materials Handling and Storage
        15. Subpart O - Machinery and Machine Guarding
        16. Subpart P - Hand and Portable Powered Tools and Other Hand-Held Equipment
        17. Subpart Q - Welding, Cutting, and Brazing
        18. Subpart R - Special Industries
        19. Subpart S - Electrical
        20. Subpart T - Commercial Diving Operations
        21. Subpart Z - Toxic and Hazardous Substances
    b. 1926 Standards
        1. Subpart A - General
        2. Subpart B - General Interpretations
        3. Subpart C - General Safety and Health Provisions
        4. Subpart D - Occupational Health and Environmental Controls
        5. Subpart E - Personal Protective and Life Saving Equipment
        6. Subpart F - Fire Protection and Prevention
        7. Subpart G - Signs, Signals, and Barricades
        8. Subpart H - Materials Handling, Storage, Use, and Disposal
        9. Subpart I - Tools - Hand and Power
        10. Subpart J - Welding and Cutting
        11. Subpart K - Electrical
        12. Subpart L - Scaffolds
        13. Subpart M - Fall Protection
        14. Subpart N - Cranes, Derricks, Hoists, Elevators, and Conveyors
        15. Subpart O - Motor Vehicles, Mechanized Equipment, and Marine Operations
        16. Subpart P - Excavations
        17. Subpart Q - Concrete and Masonry Construction
        18. Subpart R - Steel Erection

19. Subpart S - Underground Construction, Caissons, Cofferdams, and Compressed Air
20. Subpart T - Demolition
21. Subpart U - Blasting and the Use of Explosives
22. Subpart V - Power Transmission and Distribution
23. Subpart W - Rollover Protective Structures: Overhead Protection
24. Subpart X - Ladders
25. Subpart Y – Commercial Diving Operations
26. Subpart Z – Toxic and Hazardous Substances

c. Should/Shall

7. OSHA enforcement, citations
8. Contesting violations, criminal, civil suits
9. Voluntary safety standards
   a. VPP
   b. NFPA
   c. ANSI
   d. Safety and health management standards
10. Recordkeeping (29 CFR 1904)
11. Other pertinent topics
    a. Ergonomics
    b. Exposure limits (AIHA)
    c. Arc flash protection
    d. Fleet safety
12. Workers Compensation, insurance, claims management
    a. Risk Financing
    b. Insurance
       1. Errors and Omission
       2. Business income/loss
       3. Equipment breakdown
       4. Loss of use
       5. Property
    c. Workers Compensation
       1. History
       2. Iowa Code
       3. Relationship Safety Profession
       4. Case History
       5. Relationship to OSHA recordkeeping
13. DOT
    a. Federal Motor Carrier Safety Act (FMCSA)
       1. Purpose
       2. Regulations: drivers, vehicles, company
       3. Enforcement
    b. National Highway Traffic Safety Administration (NHTSA)
       1. Purpose
       2. Nature of standards
       3. Research and investigation roles
       4. Uniform National Highway Standards
       5. Enforcement powers
    c. National Transportation Safety Board (NTSB)
       1. Purpose
       2. Types of accident investigation
       3. Procedures following an accident
       4. Enforcement
    d. Federal Aviation Administration (FAA)

        1. Purpose
        2. Responsibilities
        3. Standards
        4. Enforcement activities
        5. Other activities

14. EPA
    a. Purpose
    b. Functions
        1. Clean Water Act
        2. Resource Conservation and Recovery Act
        3. Federal Insecticide, Fungicide, and Rodenticide Act
        4. Food, Drug, and Cosmetic Act
        5. Toxic Substance Control Act
        6. Clean Air Act
        7. Noise Control Act
    c. Enforcement powers
15. CPSC, FAA, MSHA, NRC
    a. Consumer Product Safety Commission (CPSC)
        1. Purpose
        2. Standard setting
        3. Recall of products
        4. Test products
        5. Safety acts
            a. Federal Hazardous Substance Act
            b. Flammable Fabrics Act
            c. Poison Prevention Packaging Act
            d. Refrigerator Act
        6. Enforcement tools
        7. Record systems
    b. Mine Safety and Health Administration (MSHA)
        1. Purpose
        2. Types of standards
        3. Inspection schedules
        4. Enforcement and penalties
    c. Nuclear Regulatory Commission (NRC)
        1. Purpose
        2. Authority
        3. Approval authority
        4. Inspection
        5. Enforcement
16. Building and electrical codes
17. Code of Ethics, professional liability

Iowa State University

TSM 376 Fire Protection and Prevention

Fall 2014 Syllabus

Course Number and Title
TSM 376: *Fire Protection and Prevention*

Catalogue Description
TSM 376. Fire Protection and Prevention. (3-0) Cr.3. F. An overview of the current problems and technology in the fields of fire protection and fire prevention, with emphasis on industrial needs, focusing on the individual with industrial safety responsibilities.

Class Meeting Times/Locations
Asynchronous – Online – no classroom meetings scheduled.

Prerequisites
None

Catalog Description
This course provides the student with an overview of the current problems and technology in the fields of fire protection and fire prevention, with emphasis on industrial need, focusing on the individual with industrial safety responsibility.

Purpose of Course
The purpose of this course is to introduce the mechanisms of fire events and the fundamentals of protection and prevention of fires. This course will help prepare safety industrialists to effectively integrate into the fire protection and prevention fields.

Instructor
Dr. Nir Keren
Phone: (515) 294-2580
E-mail: nir@iastate.edu

Office: 2624H Howe Hall. Office hours: Tuesday, 11:00-noon. However, my office is located in a secured area. When you get to 2624 in Howe, use the intercom on the West door (dial 5). I will then let you in.

Learning Outcome/Objectives
After completing this course the student will be able to:

- Understand the fire problem in the US
- Be familiar with behavior of fires
- Identify fire hazards and risk associated with these hazards, understand the principles of preventing loss due to fires

- Become familiar with basics of fire protection systems
- Understand the process of investigation of fire events, and be familiar with the principles of planning for emergencies.

Required Textbooks

- Schroll, R. C. (2002). Industrial Fire Protection Handbook, 2nd ed., Boca Raton, FL: CRC Press LLC.

Supplemental Readings (not required, but could help provide additional information)

- Cote, A.E. (2004). Fundamentals of Fire Protection, Quincy, MA: National Fire Protection Association, Inc.
- Ferguson, L. H. & Janicak, C. A. (2005). Fundamentals of Fire Protection for the Safety Professional, Lanham MD: Government Institutes.

Students will be responsible for reading supplemental class materials as assigned in the current course outline. Supplemental readings will be provided by the instructor and not required to be purchased by the student.

Instructional Methodology and Delivery

This course is delivered via distance education format using the ISU Blackboard Learn system. This format will use the ISU Blackboard Learn system for course presentations, on-line discussion, and other web-based resources. Students will interact with the instructor and other students using the communication functions provided by Blackboard Learn. Students will submit assignments in accordance with the course outline using Blackboard Learn.

Evaluation and Grading

Midterm and final course grades will be determined by the completion of course assignments, quizzes, exams, and class participation based on the following scales.

Grading System

Quizzes (14)	28%
Assignments (5)	30%
Discussions (6)	12%
Mid-term exam	15%
Final Exam	15%
Total:	**100%**

- 93% - 100%: "A"
- 90% -92.9%: "A-"
- 87% -89.9%: "B+"
- 83% – 86.9%: "B"
- 80% – 82.9%: "B-"
- 77% – 79.9%: "C+"
- 73%-76.9%: "C"
- 70%-72.9%: "C-"
- 67% – 69.9%: "D+"
- 64%-66.9%: "D"
- 60%-63.9%: "D-"
- Less than 59.9%: "F"

Online Participation in Discussions
Online participation is an important part of this course and is worth 12% of the total course grade. Online participation in threaded discussions using the Blackboard Learn Bulletin Board function is a significant learning mechanism. Students must post original responses to discussion questions posed by the instructor, *and* respond to other students to receive *full* class participation credit. Discussions will be open throughout the week they are posted and will be closed on the Sunday of the specified week at 11 pm.
Discussions are facilitated by the students. If you have a specific concern please contact the instructor via email.

Assignments
Out of the five assignments, the first four are group-based. You will be divided to groups of 3-4 members. Work with your base group on the topic at hand and consolidate a document that represents collective response.

To be effective, select a recorder for the group for each assignment. The member that is assigned as a Recorder will record the discussions on the assignments and will prepare a draft for the assignment. The draft should represents the group's collective reflection on the case. When the draft is completed, the Recorder will verify that there exists a consensus among the members with regard to the appropriateness of document and then submit the assignment in the assignment box. The four assignments will be assessed as a group activity. Grading will be based on your ability to communicate reflective thinking, address the major ideas in the text, and demonstrate thoughtfulness.

If all group members participated in discussing and preparing the assignment, the Recorder will add the statement "**All members participated**". Alternatively, if not all of the members participated, list the names of the members that **DID NOT** participate at the end of the summary. Assignments that will not include information on group participations will not be accepted. In extreme cases, groups can fire a group member. Please refer to the red zone at the end of the syllabus for the appropriate procedure for firing a group member.

Online quizzes
Weekly learning modules consist of reflection quizzes. The quizzes are available for you to take throughout the week they are posted; quizzes will not be available after Sunday of the specified week at 11 pm.

Extra Credit Assignments
Several extra credit assignments (EC's) will be posted throughout the semester. The purpose of these assignments is to discuss current, relevant, issues where you can demonstrate your critical thinking and out of the box thinking skills, while utilizing the knowledge you gained.

Participation in these assignments is voluntarily. Thus, your grades will not be affected negatively if you decide to not participate in any of the EC's. I encourage you though to take advantage on these assignments, as they are great learning opportunities. Furthermore, these are opportunities to boost your grade from great to excellent.

Exams
The mid-term and final exam may include any combination of fill-in-the-blank, true/false, short answer, essay, and/or multiple-choice type questions.

Late Assignments
Late assignments will not be accepted.

Course schedule
Below is the schedule for the semester with an outline for the course modules. Content will be released in timing appropriate for the schedule.

Course Outline

Lesson	Subject	Readings	Assignment
Section 1 -Introduction to Fire Protection			
1 8/25-8/31	Fire in America (1.1)	Schroll: Chap.1 Ferguson:Chap.1 Cote: Chap. 1	*Blackboard Learn Bio(not graded)* *Reflection Quiz #1*
2 9/1-9/7	America's Fire Problem (1.2)	Fire in the US pp.23-44 Cote: Chap. 2	*Reflection Quiz #2* *Discussion Post #1*
Section 2 - Fire Prevention			
3 9/8-9/14	Fire Prevention (2.1)	Solutions 2000 pp. 1-6 & 19-28 Cote: Chap. 7	*Assignment #1* *Reflection Quiz #3*
4 9/15-9/21	Loss Control Programs (2.2)	Scholl: Chap.3	*Reflection Quiz #4* *Discussion Post #2*
Section 3 - Special Hazards			
5 9/22-9/28	Chemistry and Physics of Fire Behavior (3.1)	Schroll: Chap.2 Ferguson:Chap.2 Cote: Chap. 3	*Assignment #2* *Reflection Quiz #5*
6 9/29-10/5	Hazard Control (3.2)	Scholl: Chap.5	*Reflection Quiz #6*
Section 4 - Fire Protection Structures and Systems			
October 2nd - 3rd MID-TERM EXAM (Lessons 1 – 6) Duration allowed: 2.5 hours			
7 10/6-10/12	Life Safety (4.1)	Schroll: Chap.4 Ferguson:Chap.6	*Reflection Quiz #7* *Discussion Post #3*
8 10/13-10/19	Building Design and Construction (4.2)	USFA: Interstate Bank Building Fire Cote: Chap. 4	*Assignment #3* *Reflection Quiz #8*

9 10/20-10/26	Installed Fire Protection (4.3)	Schroll: Chap.6 Ferguson:Chap.8 Cote: Chap. 8	*Reflection Quiz #9* *Discussion Post #4*
Section 5 - Fire Response and Extinguishment			
10 10/27-11/2	Emergency Teams and Fire Brigades (5.1)	Schroll: Chap.9	*Assignment #4* *Reflection Quiz #10*
11 11/3-11/9	Manual Fire Extinguishment (5.2)	Schroll: Chap.7 Cote: Chap. 8	*Reflection Quiz #11* *Discussion Post #5*
Section 6 - Emergency Program Management			
12 11/10-11/16	Emergency Planning (6.1)	Schroll: Chap.8 Ferguson:Chap10 Cote: Chap. 10	*Reflection Quiz #12*
13 11/17-11/23	Incident Command System (6.2)	On-line FEMA course/exam	*Assignment #5* *Reflection Quiz #13* *Discussion Post #6*
11/24-11/30	**Holiday Week – No School – Happy Thanksgiving!**		
Section 7 – Fire and You!			
14 12/1-12/7	Fire-Related Human Behavior (7.1)	Study of Human Behavior During World Trade Center Evacuation	*Reflection Quiz #14*
15 12/8-12/14	Campus Fires (7.2)	USFA Dorm Fires &Fraternity/Sorority Fires	*Complete on-line Post-Test* *Study for final exam*
16 12/15	Final Exam	None	***FINAL EXAM*** ***Will cover Lessons 7 – 15***
December 15th – 17th Final EXAM (Lessons 7 – 15) Duration allowed: 2.5 hours			

Red Zone

ACADEMIC DISHONESTY - PLEASE READ CARFULLY!!!

Due to several misfortunate events we need to reinforce the issue of academic dishonesty.

The instructors reserve the rights to assign a Fail ("F") grade to students due to academic dishonesty. Additionally, the instructor will act upon the guidelines available in the university's policies about academic dishonesty.

Copying or reproducing material prepared by others (with or without their approval) is considered a severe case of academic dishonesty, whether this action was taken during an exam or with respect to homework assignments.

Academic dishonesty occurs when a student uses or attempts to use unauthorized information in the taking of an exam; or submits as his or her own work themes, reports,

drawings, laboratory notes, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism.

Plagiarism is the unacknowledged use of the information, ideas, or phrasing of other writers and is an offense comparable with theft and fraud, and it is so recognized by the copyright and patent laws. One is responsible for plagiarism when: the exact words of another writer are used without using quotation marks and indicating the source of the words; the words of another are summarized or paraphrased without giving the credit that is due; the ideas from another writer are borrowed without properly documenting their source.

Academic dishonesty is considered to be a violation of the behavior expected of a student in an academic setting as well as a student conduct violation. A student found responsible for academic dishonesty or academic misconduct is therefore subject to appropriate academic penalty; to be determined by the instructor of the course, as well as sanctions under the university.

The instructor of this course follows the university policies about academic dishonesty. More complete information on these policies can be found in the ISU Student Information Handbook: *http://www.dso.iastate.edu/handbook.html*

Firing group members:

Groups may choose to fire group members who are not sharing in the group workload and contributing to the success of the group. Firing a group member is an extreme response and can only be done after attempts in getting the group member involved have failed. The steps for firing a group member are as follows:

1. After being unsuccessful in getting a group member to participate, the group member needs to be informed in writing that he or she is in jeopardy of being fired from the group. This memo needs to include specific documentation of the problem, the attempts that have been made to try to resolve the problem, and group expectations to maintain group membership. This memo needs to be signed by all other group members and a copy needs to be given to the instructor.
2. The group member receiving the memo needs to respond, in writing, to the group acknowledging that the memo has been received and understood. A copy of this response also needs to be given to the instructor.
3. After receiving the written warning, if a group member is still not participating and contributing to the group in a satisfactory manner, he or she can then be fired from the group. This notification needs to be done in writing explaining how the group member failed to meet the expectations established in the warning memo. This memo also needs to be signed by all other group members and a copy needs to be given to the instructor.
4. Upon receipt of notification that a group member has been fired, the instructor will remove that member from the group roster and he or she will be considered an individual group for the rest of the semester. Group members who are fired will be responsible for completing the remaining assignments on their own. This will include completing all remaining assignments on their own, including providing responses to the discussion topics directly to the instructor. A penalty of 20 points (100 will drop to 80, 90 will drop to 70, and so on) will be introduced to

each assignments the student completed following being fired by her/his group members.

UNIVERSITY POLICIES AND GUIDELINES

Disability Accommodations

If you have a documented disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act and requires accommodations, you will need to go to the Disability Resource (DR) Office for coordination of your academic accommodations. The DR Office is located in room 1076, Student Services Building. Their telephone number is 515-294-7220. Their email is disabilityresources@iastate.edu.

Jenny Metzger, 116 I ED II building (phone 515-294-5196; email jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with Jenny and myself to address any special needs or special accommodations at the beginning of the semester.

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact me, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation

If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be submitted to me in writing. You may also seek assistance from the Dean of Students Office.

Dead Week

This class follows the Iowa State University Dead Week guidelines. For academic programs, the last week of classes is considered to be a normal week in the semester except that in developing their syllabi faculty shall consider the following guidelines:

- Mandatory final examinations in any course may not be given during Dead Week except for laboratory courses and for those classes meeting once a week only and for which there is no contact during the normal final exam week. Take home final exams and small quizzes are generally acceptable. (For example, quizzes worth no more than 10 percent of the final grade and/or that cover no more than one-fourth of assigned reading material in the course could be given).
- Major course assignments should be assigned prior to Dead Week (major assignments include major research papers, projects, etc.). Any modifications to assignments should be made in a timely fashion to give students adequate time to complete the assignments.

- Major course assignments should be due no later than the Friday prior to Dead Week. Exceptions include class presentations by students, semester-long projects such as a design project in lieu of a final, and extensions of the deadline requested by students.

The details of this guideline can be found at http://catalog.iastate.edu/academiclife/#deadweek.

Contact Information

If you are experiencing, or have experienced, a problem with any of the policy or guideline issues described above, email academicissues@iastate.edu

TSM 397: Internship in Technology
Spring 2015 Syllabus

Instructor
Ben McCarty
1330C Elings Hall
bmccarty@iastate.edu
515-294-4087

TSM 397: Internship in Technology. A supervised work experience in an approved learning setting with application to technology practices and principles. Reporting during work experience and self and employer evaluation required.

Student Learning Outcomes
Upon successfully completing your internship (400 hour minimum) or co-op, you should have:

1. Gained an understanding of the engineering workplace.
2. Developed and demonstrated workplace competencies necessary for professional and academic success.
3. Enhanced your career exploration and better clarified your professional goals.
4. Increased your competitiveness for full-time engineering employment.

To enroll in an Internship, Co-op or Summer Program, you must complete these forms:

1. Internship Application
2. Internship Information Sheet
3. Internship Work Agreement

<u>ASSIGNMENTS:</u>

Employment Information Sheet – Due Friday, January 30 by 5 pm:

1. Log into your ISU CyHire account (https://cyhire.iastate.edu/students/).
    a. Click on **Profile** in the Main Header.
    b. Click on **Placements** – View All. Then Click on '**Add New**'.
    c. Complete requested information. NOTE: **Course Number** --start with College of Agriculture and scroll to the right to eventually select TSM 397. **At Graduation Plans** – select Experiential Ed Program (toward end of list).
    d. WHEN FINISHED click the **Submit** button. A list of your placement records will be shown.

2. Click on **Edit Evaluation** for the current record to complete the additional information requested.
    a. Student Learning Objectives and Employment Information.
    b. Supervisor Contact Information – this should be the person that will complete the OPAL Survey.
    c. Mentor Contact Information – *OPTIONAL*

Mid Term Assignment – Due Monday, March 9 11:59 PM:
Send a brief email letting me know how your internship is going. Complete and submit an electronic internship profile to send to your instructor: Ben McCarty at bmccarty@iastate.edu (see attached instructions)

OPAL Self-Assessment – Due Monday, April 27 11:59 PM:
You and your supervisor will fill out an assessment regarding your demonstration of 15 workplace competencies during your internship. The link for this assessment is: (opal.eng.iastate.edu). Complete this assessment near the end of your internship. Lois Benning will e-mail the instructions for completing the OPAL survey about one month before the end of your internship to both you and your supervisor. **Note:** Consider saving the rankings of your competencies completed by yourself and supervisor to have on file for TSM 399.

YOU MUST COMPLETE ALL ASSIGNMENTS LISTED ABOVE ON TIME IF YOU WISH TO SUCCESSFULLY PASS AND COMPLETE THIS COURSE. NO LATE ASSIGNMENTS WILL BE ACCEPTED UNLESS THERE ARE EXTENUATING CIRCUMSTANCES APPROVED BY THE INSTRUCTOR.

TSM 397: Internship in Technology
Spring 2015 Syllabus

Internship Profile

Follow this format:

- A one page profile of your internship experience.
- Company name and logo
- Your name and a picture
- Your major and option
- Your current year in school and graduation date
- Duration of your internship
- How you identified your internship
- How the internship will prepare you for a career in industry
- Duties that are related to the major that you are doing while on your internship
- Projects you have worked on
- Anything else you think would be interesting for future interns
- Show this to your supervisor and ask for permission to allow the department to share this on our website for future interns to view
- Send this to bmccarty@iastate.edu as a word doc or PDF saved in the following manner:
  Company Name_Major_Option_Your Name_Semester
  For example: Ag Leader_I Tec_Occupational Safety_Tamara Kerns_Fall 2014

University Policies and Guidelines

Academic Dishonesty

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Disability Statement

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact me, Student Assistance at 515-294-1020 or email dsosas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

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Dead Week

For each Fall and Spring semester, the last full week of classes before final examinations is designated as Dead Week. The intent of this policy is to establish a one-week period of substantial and predictable study time for undergraduate students. During the Dead Week period, regular lectures are expected to continue, including the introduction of new content, as deemed appropriate by the instructor. The restrictions established by this Dead Week policy are:

- Due dates for mandatory graded submissions of any kind that fall within Dead Week must be listed on the syllabus provided at the start of the course.
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- Registered ISU Student Organizations may not hold any meetings, functions, or sponsored events during the Dead Week period. Any exception to these restrictions must be authorized in advance by Office of the Dean of Students.

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BM 1/14/15

TSM 399: Work Experience in Technology
Spring 2015 Syllabus

Instructor: Ben McCarty **Office:** 1330C Elings Hall **Email:** bmccarty@iastate.edu **Phone:** 515-294-4087

TSM 399: Work Experience in Technology. Cr. 2. *Prereq: Satisfactory grade in TSM 397 the preceding semester.* Written reports and reflection on work experience. A maximum of 4 credits of TSM 399 maybe be used toward the total credits required for graduation.

What is TSM 399?

Student internships are an important part of your journey towards becoming a professional. While the ABE department can provide great classroom and laboratory experiences, nothing can replace being out in the workplace, doing things that are directly connected to your career objectives. It helps put your on-campus learning into better perspective, helps you understand your competency weaknesses and strengths, and often starts you networking in companies you might be working for after graduation.

The ABE department, the Colleges of Agriculture and Engineering, and Iowa State University believe strongly that internships add to the value of your education – thus you are receiving college credits for your experience. There is a catch, however, in that you actually have to do something beyond the internship to earn those credits.

True learning does not happen without reflection. TSM 399 provides you the opportunity to reflect on your experience in the form of written papers. Please note that this is not a course in which you report on what you did on your internship, although you will be doing some of that. This is really about reflecting on what you learned and what changes you will make because of that learning.

Assignments

This course has two major assignments, including the Internship Self-Reflection and Competency Self-Assessment.

Internship Self-Reflection

The Internship Self-Reflection provides reflection on the responsibilities, duties, activities, and projects within the completed internship. This paper allows one to reflect on what was learned during the internship, how academic coursework prepared you for your internship, and how the internship has prepared you to be a practicing professional.

Rough Draft due in BlackBoard on Friday, February 13, 2015 by 5:00 PM
Final Draft due in BlackBoard on Monday, April 20, 2015 by 11:59 PM

Competency Self-Assessment

The Competency Self-Assessment provides reflection on your top five and bottom five competencies as determined by the OPAL survey you and your internship supervisor completed. This paper allows one to reflect on strengths and weaknesses within the competencies, how the competencies were demonstrated in the internship, and plans for improvement of competencies for future careers.

Rough Draft due in BlackBoard on Friday, February 20, 2015 by 5:00 PM
Final Draft due in BlackBoard on Monday, April 20, 2015 by 11:59 PM

Note: To log into OPAL, use the following information below. Please log in to retrieve your OPAL results at your earliest convenience.

User name: netid@iastate.edu Password: last 6 digits of your University ID

IMPORTANT: You must submit both of your rough drafts and final papers (word document-no PDFs) on Blackboard to receive full credit for them.

Grading

Letter grades will be assigned according to point values of the above requirements. I will start the grading scale at a 90% for an A, 80% for a B, etc., and adjust according to student performance

Drafts	10%
Internship Self-Reflection	45%
Competency Self-Assessment	45%

TSM 399: Work Experience in Technology
Spring 2015 Syllabus

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TSM 415 – Technology Capstone I Spring 2015

COURSE INFORMATION:

Class Meeting: Fridays, 9:00am until 10:50am, 4220 Sukup Hall

Instructor: Dr. Gretchen A. Mosher, Assistant Professor
Office: 3331 Elings Hall
Office Hours: Fridays 8-9am or by appointment
Phone: 515 294-6416
Email: gamosher@iastate.edu

REQUIRED MATERIALS:

There are no required materials for this class. You are expected to use previous course textbooks and materials as your primary resource.

CATALOG DESCRIPTION:

TSM 415. Technology Capstone I. *senior classification with less than 32 credits remaining* (1) Cr. 1. Identification and proposal development of a current technological problem in agricultural or industrial systems. Formation of project teams and selection of faculty project mentor in preparation to complete project.

COURSE OBJECTIVES:

DURING TSM 415 STUDENTS WILL GAIN EXPERIENCE IN:

1. Forming and working effectively on a technology-based team

2. Developing an effective working relationship with faculty mentor and industry client(s)

3. Defining multiple components of technology projects, including:

- Formulating and evaluating potential answers/solutions to critical project questions/problems
- Outlining and justifying key project decisions to instructors, mentors and client(s)
- Effectively presenting project goals using various communication tools to project managers, mentors, and client(s)

ABE STUDENT OUTCOMES ADDRESSED IN THIS COURSE:

1. Apply knowledge of mathematics, science, technology, and applied sciences
2. Design and conduct experiments, as well as to analyze and interpret data
3. Function on multi-disciplinary teams
4. Demonstration of an understanding of professional and ethical responsibility
5. Communicate effectively

6. Demonstrate the broad education necessary to understand the impact of solutions in a global, economic, environmental, and societal context
7. Use the techniques, skills, and modern scientific and technical tools necessary for professional practice

COURSE EXPECTATIONS:

Students will strengthen their professional workplace competencies by working in a team environment to:

- Complete course activities and projects as assigned
- Develop all relevant aspects of experimental design to complete the assigned project
- Investigate, develop, and justify decisions made concerning the team project
- Communicate findings effectively using oral and written methods

Once teams are formed, meetings with the instructor will be scheduled approximately every two weeks. All team members must attend all meetings. If you must miss are you are expected to:

- In a single email to your teammates and instructor, explain the reason for your absence, and how you plan to deliver the information you were scheduled to present during the meeting
- It is expected that you will let your team, mentor, and instructor know you will be gone in advance of the meeting – at least 24 hour notice is preferred, if possible.
- If you do not provide advance notification, your individual participation score for the meeting may be recorded as a zero

All project-related or individual submitted material for grading will be submitted using Blackboard. All assignments should be submitted on or before the due date specified in the syllabus or in class. Late materials <u>may be accepted, but will be graded at a minimum</u> <u>of 20% discount</u> in points awarded. This means that instead of grading out of 100%, the assignment will be graded out of 80%.

Course assignments must be submitted in the format specified. If I cannot read your assignment in Blackboard, it is your responsibility to get it to me in a format that can be read.

<u>TSM415 is a team-based course</u>. Therefore, all team members are expected to participate and engage fully in all team assignments and activities. Team projects will address a significant technology-related problem of current concern to the client. Project goals must demonstrate application of problem analysis and project management tools discussed in class, and the application of up-to-date industrial and/or agricultural technologies and practices.

TSM 415 – Technology Capstone I Spring 2015

TSM 415 COURSE ASSIGNMENTS AND ACTIVITIES:

1. Student must submit a written request for the top three projects he or she wishes to work on.
2. Once teams are formed, hold team office hours of at least 1 hour per week in the teaming rooms located in the basement of Sukup Hall.
3. Team meetings every other week with the instructor (during the 1 hour office time or during class time)
4. A one-page meeting synopsis must be submitted within 48 hours after each team/instructor meeting by each team member
5. Within 48 hours after each team/instructor meeting, each team member must also complete and submit a peer-review form for each of their teammates
6. Upkeep of an individual lab notebook, outlining key steps in the project development process, including but not limited to:
    a. Contact with instructors, mentor and client
    b. Conceptual ideas for projects
    c. Support and justification of project proposal from literature, expert opinion, or industry personnel
    d. Changes and modifications made to project proposal as a result of meetings with instructors, mentor, and client
    e. Key project tasks/subtasks and associated deliverables
    f. Task owner/sub-owner
    g. Task deadlines
7. Participation in Senior Capstone Day, tentatively scheduled for April 24, 2015. Participation involves the following activities:
    a. Creation of a poster to summarize your activity on your project
    b. Attendance at the TSM 415 poster session to answer questions about your project
    c. Attendance of at least two TSM 416 presentations is highly recommended
8. Submission of a final summary of your TSM 415 project accomplishments
9. In-class and Blackboard activities, as assigned

DUE DATES:

Assignment	Due Date
Completion of skill, background, and learning styles inventory	January 23, 2015
Critical thinking assessment exam	April 10, 2015
Team/instructor meeting synopsis – completed individually	Within 48 hours after meeting
Peer review of team members – completed individually	Within 48 hours after meeting
Project application assignment	January 30, 2015
Poster for Capstone Day – draft	Draft: April 17, 2014 Final: April 24, 2014
Attendance at group/instructor meetings	Continuous, beginning 3rd week in February
Final summary of project accomplishments	May 1, 2014
Classroom activities, assignments, and group participation	Continuous

TSM 415 – Technology Capstone I **Spring 2015**

COURSE REQUIREMENTS:

1. Attend lecture sessions, Fridays from 9am until 10:50am in room 4220 Sukup Hall
2. Submit written application assignment by January 30th
3. Beginning the first week in February (2nd through 6th) , schedule and attend office hours for at least 1 hour per week in the ABE Teaming Rooms or another small group room
4. Complete individual synopses and peer evaluations
5. Prepare poster for Capstone Day, scheduled for April 24th
6. Communicate regularly with your instructors, client and mentor in project proposal decisions
7. Keep consistent and credible records of your work using your lab notebook
8. Submit a summary of TSM 415 project accomplishments by May 1st
9. Complete other tasks as assigned

COURSE GRADE: There are 770 points available in TSM 415

Assignment	Point Value
Completion of skill, background, and learning styles inventory	40 points
Critical thinking assessment exam	100 points
Team/instructor meeting synopsis – completed individually	4 @ 25 pts. each = 100 pts.
Peer review of team members	4 @ 20 pts. each = 80 pts.
Project application assignment	100 points
Poster for Capstone Day – draft	25 points
Poster for Capstone Day – final	75 points
Attendance at group/instructor meetings	100 points
Final summary of project accomplishments	100 points
Classroom activities, assignments, and group participation	50 points

GRADING SCALE:

Your final grade will be computed on the following scale:

100% – 93%	A	76.99% - 73%	C
92.99% - 90%	A-	72.99% - 70%	C-
89.99% - 87%	B+	69.99% - 67%	D+
86.99% - 83%	B	66.99% - 63%	D
82.99% - 80%	B-	62.99% - 60%	D-
79.99% - 77%	C+	59.99% or below	F

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Jenny Macken, 1330D Elings Hall (phone 515-294-5196; email jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with Jenny or me to address any special needs or special accommodations at the beginning of the semester.

Academic Dishonesty. To falsify the results of one's research, to steal the words or ideas of another, to cheat on an assignment or to allow or assist another to commit these acts corrupts the educational process, and ultimately, cheapens the value of your education. Any work that you submit in any stage of the assignment process must be your own words, ideas, statistics, or data. Use of others work must be properly cited (within the text) and referenced (at the end of the text).

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IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Department of Agricultural and
Biosystems Engineering
Elings Hall
Ames, Iowa 50011
515 294-2874 FAX 515 294-2255

TSM416: Technology Capstone II

Instructors

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Catalog Description (2011-2012)

TSM416. Technology Capstone II. (1-2) Cr. 3. F.S. Prereq: 415. Selection of promising potential solutions to technology problems identified in 415 for development and analysis by student teams. Presentation of project through oral presentations, written reports, and working prototypes.

Textbook & Reference Material

Root Cause Analysis: Simplified Tools & Techniques, 2nd ed. by Bjørn Andersen and Tom Fagerhaug.

Student Learning Outcomes Addressed in Course

During the course students will continue to gain experience in:

1. Functioning effectively on a technology systems problem-solving team;
2. Managing a technology project - including breaking the project into a logical sequence of subprojects, developing and following a timeline for on-time completion of the final project;
3. Develop the best or alternative solution defined in TSM 415 to meet your client's deliverable objectives and criteria;
4. Assessing the performance of a new technical product, service, or system, and using analysis or verifying that it meets project objectives and criteria; and
5. Effective presentation of project outcomes to project managers or clients (written and oral communication).

ABE Program Outcomes Addressed in this Class

- Fully develop the identified and analyzed technical problem defined in TSM415.
- Mastery of learned knowledge, techniques, skills, and modern tools of technology, physical and agricultural sciences.
- Conduct, analyze, and interpret experiments and apply results to improve processes.
- Creativity in the design and management of agricultural systems, components, or processes to create improvement.
- Ability to function effectively on teams.
- Ability to understand professional, ethical, and social responsibilities.
- Ability to communicate effectively through oral and written mediums.
- Commitment to quality, timeliness and continuous improvement.
- Recognition of the need for, and the ability to engage in, life-long learning, and

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- Ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology to agricultural systems and natural resource management.

General Course Policies

1. Your email address of record for course communications by the instructor(s) will be your ISU Blackboard account.
2. Email Subject line shall be *TSM416: agenda for instructor/team meeting on Sept. 15th*
3. If your email concerns a project/team-related issue, please CC all team members.
4. Teams are required to have business office hours.

Projects

Project completion

TSM416 is first and foremost about completing a solution to solve the TSM415 defined project root cause. Construction of working prototypes (by the end of TSM416) may not be required unless specified by the client or the team chooses to create a working model or prototype to substantiate "proof of concept".

Neither ABE nor ISU will provide project funding. Materials, equipment, travel expenses, and other project-related costs are the responsibility of the project team and are typically funded through industry sponsorship, grants, or from private resources.

Professional role as a team member

TSM416 is about working in teams to manage and carry out an industrial or agricultural technology project previously defined in TSM415. Team members are expected to participate actively in all team activities. Being an active team member is extremely important to your success in TSM416.

Team Performance & Operating Policies

1. **Team expectations** – include functioning productively and professionally, establishing and following team-developed operating policies. Work done by the project team should reflect an equal distribution of tasks and responsibilities among team members.

2. **Professional expectations** -- Project work must meet expectations for professional work in business and industry. You are solely responsible to review, apply, and deliver all effort at the highest professional standards and reflect senior level proficiency.

3. **Effort expectations**—ISU catalog guidelines state that "*undergraduate students typically are expected to spend two hours in preparation outside of class for each lecture or recitation hour (or credit) and; additional outside work may be required for laboratory or studio classes.*"

   5 credits = 5 hours
   2 hours preparation expectation x 5 credits = 10 hours
   Individual effort expectation per week 15 hours

   Previous high-performing and successful teams have typically significantly exceed this expectation at critical times in the project's development.

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4. **Team conflicts** – Most teams have occasional internal disagreements on the best way to proceed. Team members should strive to recognize, discuss, and resolve potential conflicts early before they become harmful to good teamwork and successful team outcomes. If team attempts at conflict resolution have failed, project mentors or course instructors may be requested to assist with arbitration.

Course Grading

1. **Individual Effort Assessment** — Since conflicts do occur and being a quality team member is a primary course requirement, the following accountability is required. You are **solely** responsible for completing a weekly team member evaluations during the entirety of the project.
   a. Evaluations are open on Blackboard every Friday from 8:00 AM to Saturday 11:59 PM. You are solely responsible to submit your team members' evaluation. Failure to do so will result in you receiving the minimum score (30 pts).
   b. Evaluation factors will include:
      i. Quantity and quality work
      ii. Meeting attendance
      iii. Meeting team deadlines
      iv. Collaboration
      v. Overall effort contributed to the project
   c. Each of the five evaluation factor measures your perception of team members' contribution to the project. Did they Meet, Exceeded, or are Below your expectations. **Teams are responsible for updating their 'meets expectation team document' and submitting on Blackboard (Assignment: Expectations) by the end of the first week.**
   d. The points awarded are 10 for exceeds, 8 for meets, and 6 for below expectations. A maximum and minimum score per evaluation is 50 and 30 points respectively. It is expected that most of the time team members will meet expectations, except in extra ordinary instances will students be below or above expectation.
   e. Scores are normalized to remove team bias.
   f. The outcome of the **Individual Effort Assessment**.
      i. A THREE WEEK MOVING SCORE OF LESS THAN 108.2 WILL RESULT IN REMOVAL FROM THE COURSE, PENDING INSTRUCTOR REVIEW.
      ii. The average of your Three Week Moving Score at the end of the semester will be used to adjust your final team score per the following table.

Table 1. Team member grade adjustment of team grade based on team member evaluations.

Percentile	Average Three Week Moving Score	Project Letter Grade Adjustment
0.86	>123.9	+++
0.71	>121.6	++
0.57	>121.3	+
	120.5	0
0.43	<119.7	-
0.29	<118.1	--

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0.14	<117.5	---

2. **Graded TSM416 assignments**

Individual (25%)

5%	Critical Thinking Assessment (CAT), (Friday, Feb. 3, 2015, during class).
5%	Bi-weekly instructor-team meetings during your team business hours.
10%	InClass activities
5%	Final exam
25%	

Team scores (25%)

20%	Required team task submissions (generally communications and management activities)
3%	Deliverable & Acceptance Criteria (Due 2/3/2015 @ 5 PM)
10%	Final written project progress submission (Due 2/13/2015 @ 5 PM)
12%	Oral Presentation, 'Senior Capstone Day' (Due 4/22/2015 @ 5 PM)
30%	Final written project report evaluated by client, mentor, and instructors. (Due 5/1/2015 @ 5 PM)
75%	

3. **Team Submission and General Grading Rules**
   a. The responsibility for meeting expectations is that of the individual or team to deliver a profession submission. This may require students to review or learn best practices, in addition, to any provided assignment general guidelines. Rubrics may not always be provided.
   b. **All** late submissions will receive a zero.
   c. **Project ownership is expected … All** submissions shall include (minimum requirement) or receive a zero.
      i. The team members name.
      ii. The assignment or task name.
      iii. The date.
      iv. Team name.
      v. Computer generated work unless stated otherwise (no had written work).
      vi. Be submitted in the format listed on the assignment (no exception).
      vii. Correctly labeled tables and figures.
      viii. Page numbers if longer than two pages.
   d. For more subjective assignments grades will be based on ...
      i. Exceeds expectation (A = 95%)
      ii. Meets expectations (B = 85%)
      iii. Needs improvement (C = 75%)
      iv. Minimal effort (D = 65%)
      v. No/Failed effort (F = 0%)

4. **Client's evaluation** – will be asked at the end of the semester to evaluated team performance based on communication, pro*fessionalism, project completeness, project final recommendations,*

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completeness of deliverables, implementation and general overall evaluation of team's performance and professional expertise. This evaluation will be weighted equally with the faculty mentor and instructors evaluation.

5. **Faculty mentor evaluation** – will be asked at the end of the semester to provide evaluation of team performance in communication & responsiveness, application of TSM *curriculum, strength of solution development, written report quality, and overall evaluation of the team's performance and professional expertise*

6. **Team Score and Grade** —final project reports (oral and written) submitted by the project team will receive a team score calculated as the sum of project report ratings submitted by the project client, project faculty mentor, faculty (oral presentation) and course instructors. Since each project evaluator will receive equal weighting towards the student's final grade the student should pay attention to meeting the expectations of the stakeholders.
    a. In the event the faculty mentor and client are represented by a single person (not desirable), the student team's final score will be calculated using equal weighting of the instructors and a client score.
7. **Final grade –** Is calculated by your weighted Individual Effort Assessment Score (25%) + weighted Team assignments and after team member evaluation adjustment (75%).

Final Letter Grade Schema

A ≥ 93%	B- ≥ 80%	D+ ≥ 67%
A- ≥ 90%	C+ ≥ 77%	D ≥ 63%
B+ ≥ 87%	C ≥ 73%	F < 63%
B ≥ 83%	C- ≥ 70%	

Academic Dishonesty

Academic dishonesty occurs when a student: uses or attempts to use unauthorized information during the taking of an exam; submits as his or her own work products prepared by another person; or knowingly assists another student in such acts.

Plagiarism, a form of academic dishonesty, is unacknowledged use of information, ideas, or phrasing of others, and is an offense comparable with theft and fraud and is so recognized by copyright and patent laws. One is responsible for plagiarism when: the exact words of another writer are used without using quotation marks and indicating the source of the words; the words of another are summarized or paraphrased without giving the credit that is due; or the ideas from another writer are borrowed without properly documenting their source.

Academic dishonesty is a violation of behavior expected of a student in an academic setting, and is a student conduct violation. A student found responsible for academic dishonesty or academic misconduct will be subject to appropriate academic penalty determined by the course instructors and/or sanctions imposed by the university.

Disability Accommodation:

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course

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will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Harassment/Discrimination Policy:

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact the course instructors, Student Assistance at 515-294-1020, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Iowa State University
Agricultural and Biosystems Engineering Department

Course	TSM 440- Cellular Lean Manufacturing Systems
Course Meetings	Mon. & Wed[¥]. @ 12:10- 2:00 pm in Elings 0308
Prerequisites	TSM 310
Instructor	Shweta Chopra
Office	Elings 4344
E-mail	schopra@iastate.edu
E-mail protocol	Please begin all emails with **'TSM 440'** in the subject line
Office Hours	Monday/Wednesday 2:00 PM – 4:00 PM and by appointment on only on Friday 9:00 AM – 12:00 PM
BB Website	https://bb.its.iastate.edu/

[¥] Wednesday schedule will vary depending on the activity.

In-class assignment	Group A Last Name A-L Group B Last Name M-Z	Group A will come 12:10 PM- 1:00 PM Group B will come 1:10 PM – 2:00 PM
Guest Speaker/ Plant tour		Group A and Group B 12:10 – 2:00 PM
Project work		Group A and Group B 12:10 – 2:00 PM meets with respective group on the project site or computer lab

Course description:
Reviews principles and concepts required for cellular manufacturing system design to meet customer demand in production, quality, on-time delivery, and continuously reducing manufacturing cost. Emphasis is on applying lean manufacturing principles, simulation techniques, and Kaizen methodologies with hands-on projects. Lean manufacturing is a systematic approach to eliminating non-value added activities throughout a production system. Five basic principles characterize a lean production system: value definition, value stream mapping, flow optimization, pull production, and continuous improvement.

Student Learning Objectives:
Upon completion of this course, you should be able to:

- Communicate lean tools/techniques to various stakeholder audiences (*communication, general knowledge, technical knowledge, professional impact, cultural adaptability)*
- Apply lean tools/techniques in the classroom and an industrial setting(*general knowledge, technical knowledge, analysis and judgment, continuous learning)*
- Analyze an industrial situation and identify problem /customer need(s) utilizing lean tools/techniques(*customer focus, analysis and judgment, teamwork, continuous learning, initiative, cultural adaptability*)
- Evaluate team developed lean industry recommendation(s) to determine impact on industry client's business performance (*professional impact, customer focus, analysis and judgment, planning, teamwork, initiative*)
- Create a professional presentation that communicates your lean team recommendation(s) to industry client(*initiative, professional impact, customer focus, planning, team work*)

- Participate as an effective member of team working on a manufacturing /industry lean project(*teamwork, initiative, communication, analysis and judgment, continuous learning, planning*)
- Communicate lean team progress and recommendations to industry mentor and diverse audiences (*communication, teamwork, professional impact, initiative, planning,, customer focus*)
- Develop workplace competencies and experience 360-degree feedback (*continuous learning, initiative, analysis and judgment, communication, teamwork, professional impact)*

Intended Student Outcomes Addressed in this Course:

- An ability to apply knowledge of mathematics, science, technology and applied sciences;
- An ability to design and conduct experiments, as well as to analyze and interpret data;
- an ability to formulate or design a system, process or program to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- An ability to function on multi-disciplinary teams;
- An ability to identify and solve applied science problems;
- An understanding of professional and ethical responsibility;
- An ability to communicate effectively;
- The broad education necessary to understand the impact of solutions in a global, economic, environmental, and societal context;
- A recognition of the need for, and an ability to engage in life-long learning;
- A knowledge of contemporary issues; and
- An ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.

Required Texts:

1) Suzaki, K. (1987). The new manufacturing challenge: Techniques from continuous improvement. Free Press: ISBN-13: 9780029320402.

2) Mann, D. (2005). Creating a lean culture: tools to sustain lean conversions. Taylor and Francis: ISBN-13: 9781563273223. (also available online on ISU library)

Optional Text:

1) Rother, M & Shook, J (1999). Learning to See: Value Stream Mapping to Add Value and Eliminate MUDA. Lean Enterprise Institute: ISBN-13: 978-0966784305.

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Instructional Approach:
This course was created through a backward curriculum design model. This method promotes student ownership of learning, collaboration, problem solving, and thinking critically. To promote these concepts, the objectives are delivered as groups by priority: enduring concepts, important concepts, and concepts worth being familiar with. These objectives ensure students have the competencies in knowledge and skills to prepare them for a global marketplace. In addition, the sequence of learning is scheduled to build upon concepts previously studied:

Enduring Understandings: The instructional goals for this course are presented as enduring understandings of the 'big ideas' that are essential to the field of lean manufacturing:
Students will understand basic lean principles of waste, continuous improvement, and modern manufacturing system
Students will be able to complete a basic continuous improvement project utilizing lean thinking ideas and tools.
Students will understand principles to lead or support an organizational effort to implement lean enterprise strategies.
Important to know and do: Additional key topics and ideas considered important, but not essential, that contribute to one's knowledge and skills in lean manufacturing in the next weeks:
Students will be able to identify the 7 basic principles of waste or muda in an evaluation of systems or process(s).
Students will be able to describe modern quality management systems in organization
Students will be able to describe the basics of Lean Six Sigma
Students will be able to apply techniques of process evaluation
Students will be able to apply lean techniques of production flow
Students will be able to apply techniques of quality control and assurance.
Worth being familiar with: The following weeks encompass topics that should round out what a person familiar with lean manufacturing should understand:
Students will understand the history of lean manufacturing from a US and global perspective.
Students will understand implications of globalization and current industry trends.
Students will understand applications of lean manufacturing in other industries.

Evaluation criteria (approx):
A diverse approach is utilized in grading, and many assessment tools are included as you gain and apply knowledge over the semester. Course grading may include, but not limited to: Attendance, Class Activities/Simulations Participation, Lean Team Project, Lean Assessments(Pre/Post), Self/Peer Competency Assessments (Pre & Post), Article Reviews/Critiques, Team Presentations, Final Written Report, Industry Client Assessment, Case Studies, and Team Member Work Contribution Evaluations, and other Assignments, etc. It is the student's responsibility to check the syllabus for assignment due dates and locations on Bb Learn. Adjustments may be made at the discretion of the instructor, and will be communicated to the students via email and Bb Learn announcements. It's the student's responsibility to check the university email and Bb Learn on a frequent basis.

Assignment		**Points**	**Percentage**
Class Attendance/ participation		100	10%
Quizzes (10 quizzes)	10x20	200	20%
Exam 1 & Exam 2	2x100	200	20%
Assignment (6 Assignment)	6x40	240	24%
Guest Speaker /field trip	1x60	60	6%
Final Project (Group Assignment)	1x200	200	20%
Total		1000	100.00%

Course Grade: Your final grade will be computed based on the following scale:

Letter grade	**Percentage**
A	93% and above
A-	90% - 92.9%
B+	87% - 89.9%
B	83% - 86.9%
B-	80% - 82.9%
C+	77% - 79.9%
C	73% - 76.9%
C-	70% - 72.9%
D+	67% - 69.9%
D	63% - 66.9%
D-	60% - 62.9%
F	59% or below

Course Expectations:

To succeed in the course, expect to spend typically 2 – 3x the credit hours. Since this is a senior-level course, students are expected to have a reasonable background in manufacturing processes, basic numerical control concepts, quality tools and techniques. Students will work both independently and in teams. When class is NOT held in the classroom your team is expected to either make an industry visit or hold team meetings to work on project tasks, as appropriate and requested, or be working on project tasks as needed. All assignments are to be of professional quality and incorporate proper grammar, spelling, word usage, clarity, sentence structure, sentence variety, use of proper writing principles, and creativity.

Surprise Quizzes

Ten quizzes will be given in class over the course of the semester. This is another opportunity to understand and practice important lean principles. Quizzes may be short answer, problems, multiple- choice or true false. NOTE: When there is an exam during that week on M or W, no quiz will be given.

Assignment

Guidelines will be provided with each assignment. Assignment will be given on Wednesday and will be due following Wednesday. Instruction for assignment will be posted online. All assignment will be submitted online (or advised). No late assignment will be graded.

Team project:

Students will complete a complete a team project. Completion of the project is up to the instructor and industry sponsor. Milestones to be completed are in the project description (discussed in more detail later).
You will identify a problem of their choice in lean manufacturing and apply the tools learned in this course to analyze and solve lean management issues. The students have to present their findings in a team presentation and paper (5 pages max). The project will be graded per a rubric and based upon peer evaluation. No late projects will be accepted.

Attendance and Due Dates

You are also expected to come to class regularly and turn in assignments, project report, or any other material on the specified due date. **No late submission will be accepted**. Attendance will count and be assessed in different ways: quiz, paper, reflections, discussion, or simply signing in.

Iowa State University
Agricultural and Biosystems Engineering Department

UNIVERSITY POLICIES AND GUIDELINES

Safety Emphasis

Students in ABE classes work with systems that, if misused, can be extremely hazardous. Therefore developing an attitude of safety is crucial to all engineering and technology professionals. Instructors may take an array of actions when students fail to complete required safety training (for example, by coming late to class and missing a safety briefing) or to adhere to procedures. These include but are not limited to (1) only allowing the student to observe the lab; (2) only allowing the student to observe the lab, and deducting points from the associated lab report; (3) suspending the student from all lab activities until the student has successfully completed the required safety portion of the lab (this may mean attending another lab section where the student can arrive on time); (4) dismissing students – and particularly repeat violators of safety policy – from the course.

Academic Misconduct

The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.

Disability Accommodations

If you have a documented disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act and requires accommodations, you will need to go to the Disability Resource (DR) Office for coordination of your academic accommodations. The DR Office is located in room 1076, Student Services Building. Their telephone number is 515-294-7220. Their email is disabilityresources@iastate.edu.

Jenny Metzger,116 IED II building (phone 515-294-5196; email jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. If you have a disability and anticipate needing accommodations in this course, we strongly encourage you to contact Jenny and me to address any special needs or special accommodations within the first two weeks of the semester or as soon as you become aware of your need.

Academic Dishonesty

This class follows Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.
http://www.dso.iastate.edu/ja/academic/misconduct.html

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact me, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation

If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be submitted to me in writing. You may also seek assistance from the Dean of Students Office.

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Dead Week

This class follows the Iowa State University Dead Week guidelines. For academic programs, the last week of classes is considered to be a normal week in the semester except that in developing their syllabi faculty shall consider the following guidelines:

- Mandatory final examinations in any course may not be given during Dead Week except for laboratory courses and for those classes meeting once a week only and for which there is no contact during the normal final exam week. Take home final exams and small quizzes are generally acceptable. (For example, quizzes worth no more than 10 percent of the final grade and/or that cover no more than one-fourth of assigned reading material in the course could be given).
- Major course assignments should be assigned prior to Dead Week (major assignments include major research papers, projects, etc.). Any modifications to assignments should be made in a timely fashion to give students adequate time to complete the assignments.
- Major course assignments should be due no later than the Friday prior to Dead Week. Exceptions include class presentations by students, semester-long projects such as a design project in lieu of a final, and extensions of the deadline requested by students.

The details of this guideline can be found at http://catalog.iastate.edu/academiclife/#deadweek.

Contact Information

If you are experiencing, or have experienced, a problem with any of the policy or guideline issues described above, email academicissues@iastate.edu.

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TSM 440 Course Schedule

Week	Date	Monday	Reading	Date	Wednesday	Task Due
#1	25-Aug	Introduction to the class. Overview of course material and course requirements. History of Lean / Simplify, combine, and eliminate waste/ Housekeeping improvements and workplace organization	New Mfg. Challenge: Chap. 1 & Chap. 2	27-Aug	Simplify, combine, and eliminate waste/ Housekeeping improvements and workplace organization	
#2	1-Sep	No Class University Holiday		3-Sep	Class Activity 1: Process flow chart	
#3	8-Sep	Setup time reduction: techniques for quick setup	New Mfg. Challenge: Chap. 3	10-Sep	Class Activity 2: 5S Audit	**Assignment 1 10-Sep**
#4	15-Sep	Developing flow on the production floor	New Mfg. Challenge: Chap. 4	17-Sep	Class Activity 3: Push Pull exercise	**Assignment 2 17-Sep**
#5	22-Sep	**(EXAM 1) TOPICS 1-4 (12:10 pm-1:00 pm)** Expanding skills for increase flexibility (1:10 pm- 2:00 pm)	New Mfg. Challenge: Chap. 5	24-Sep	Class Activity 4: Standard work (airplane simulation)	**Assignment 3 24-Sep**

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#6	29-Sep	Improving processes for productivity gains	New Mfg. Challenge: Chap. 6	1-Oct	Class Activity 5: Health care Case study and Introduction of Project	**Assignment 4 1-Oct**
#7	6-Oct	Strengthening our nerves and muscles	New Mfg. Challenge: Chap. 7	8-Oct	Guest Speaker Ron Smith	**Assignment 5 8-Oct**
#8	13-Oct	Improving work with standards	New Mfg. Challenge: Chap. 10	15-Oct	Project Work	**Project Part I 17- Oct**
#9	20-Oct	Value Stream Mapping	Material posted on BB	22-Oct	Class Activity 6: Value Stream Mapping	
#10	27-Oct	Standard work for leaders + Visual controls	Creating Lean Culture: Chap. 3,4	29-Oct	Guest speaker (TBA)	**Assignment 6 29-Oct**
#11	3-Nov	**(EXAM 2) TOPICS from week 5-10 (12:10 pm-1:00 pm)** Daily accountability process (1:10 pm- 2:00 pm)	Creating Lean Culture: Chap. 5	5-Nov	Project work/Plant tour	**Guest Speaker write-up 5-Nov**
#12	10-Nov	Learning lean management: the Sensi and Gemba walks+ Solving problems and improving processes-rapidly	Creating Lean Culture: Chap. 6, 8	12-Nov	Project work	**Project part II 14-Nov**

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#13	17-Nov	Lean Six Sigma	Material posted on BB	19-Nov	Project work	**Project part III 21-Nov**
#14	24-Nov	Thanksgiving Vacation		26-Nov	Thanksgiving Vacation	
#15	1-Dec	Project Presentation	What is Lean Six Sigma?	3-Dec	Project Presentation	**Final Project report 5-Dec**
#16	8-Dec	Project Presentation	As assigned	10-Dec	Project Presentation	

Note:

- All the tasks are due on Wednesday by 11:50 pm
- Project part I, II, III and final project report has extended deadline till Friday of the same week till 11:50 pm

¥ Wednesday schedule will vary depending on the activity.

In-class assignment	Group A Last Name A-L Group B Last Name M-Z	Group A will come 12:10 PM- 1:00 PM Group B will come 1:10 PM – 2:00 PM
Guest Speaker/ Plant tour		Group A and Group B 12:10 – 2:00 PM
Project work		Group A and Group B 12:10 – 2:00 PM meets with respective group on the project site or computer lab

IOWA STATE UNIVERSITY

Department of Ag & Biosystems Engineering

TSM 443: Statics and Strength of Materials for Industrial Technology

Spring 2015 SYLLABUS

Catalog Description: (2-2) Cr. 3. Statics and Strength of Materials. Application of the standard analytic techniques of solving problems related to force and moments. The properties of materials and how to select appropriate materials for a particular design. This includes plastics and metals.

Class Meeting Times & Locations:

Lecture:	M, W	1:10-2:00	Sukup 0022
Lab (Section A):	T	12:40-2:30	Sukup 4220
Lab (Section B):	R	8:00-9:50	Sukup 4220

Instructor: Prof. David Grewell
Office: 4356 Elings Hall
Office Phone: 294-2036
Email: dgrewell@iastate.edu
Office Hours: Appointment

Lecturer: Dr. Melissa Montalbo-Lomboy (melissam@iastate.edu)
Lab: Kendra Allen (kendraa@iastate.edu)
Cindu Annandarajah (cindu@iastate.edu)

Course Text: Statics and Strengths of Materials, 2nd edition, Fa-Hwa Cheng, McGraw-Hill (978-0-02-803067-8)

Lab Fee: $35.00

Learning Objectives and Course Expectations:

Student Learning Objectives: Upon completing this course, the student will be able to:

1. Recall and practice standard analytical techniques in solving problems related to force and moments.
2. Identify various stresses and angular deformation.
3. Identify various stresses in a beam subjected to various loads and be able to demonstrate structures based on these determinations.
4. Recognize common methods of structural analyses.
5. Recall various material properties and testing.
6. Recall Finite Element Analysis (FEA) fundamentals and methods.
7. Distinguish some basic principles of materials properties and testing.
8. Develop a background in materials and processes, which can be carried to other courses, later research, and employment in manufacturing and design.

Course Expectations: To succeed in this course, expect to spend at least 6 hours per week outside of class learning the fundamental concepts of statics and strength of materials through online lectures, developing skills in problem solving through weekly online quizzes, and demonstrating deeper understanding of mathematical computing and modeling using engineering software such as Mathcad and Ansys.

Grading:

Assessment	Points	Weight (with Finals)	Weight (without Finals)
Exam 1	200	13.33%	16.67%
Exam 2	200	13.33%	16.67%
Comprehensive Final Exam (optional)	300	20%	-
In-class Exercises (28 @ 10 points)	280	18.67%	23.33%
Class Participation	20	1.33%	1.67%
Short Quiz (15 @ 10 points)	150	10%	12.5%
Lab Assignments	200	13.33%	16.67%
Lab Participation	50	3.33%	4.17%
West Point Bridge Design @ bar	50	3.33%	4.17%
Bar FEA and testing	50	3.33%	4.17%
TOTAL	**1500**	**100%**	**100%**

Class Participation and In-class Exercises:

Every class lecture, the students will be divided into groups and will be assigned one problem to solve during class. In the later portion of the class, one or two of the student groups will be randomly selected to explain and show their solution on the board (or similar, such as Elmo). For every correct problem solved, the student's group will get 6 points. For incorrect solutions, the student's group will receive 3 points. One additional point will go towards the student who presented their solution. The points obtained will be counted towards class participation. At the end of the class, each student group will submit their solution to the instructor. Students present during the in-class exercise should write their names in the solution sheet. There will only be one submission per group and the points obtained will be counted towards in-class exercises.

Percentage Scale for Letter Grades

A	95-above	A-	90-94		
B+	87-89	B	84-86	B-	80-83
C+	77-79	C	74-76	C-	70-73
D+	67-69	D	64-66	D-	60-63
F	59-below				

Extra Credit. No extra credit.

Short Quiz:

Students are required to take the weekly quizzes in blackboard, which will be based on the lectures. The students will be given three attempts to take the quiz and the final score will be based on the highest score obtained from the three attempts. The short quiz will only be available for one week.

Exams:

Students are required to take exam 1 and exam 2. However, the comprehensive final exams will be optional.

Online Lectures:

All lectures will be posted in blackboard. During in-class lectures, the instructor will review one example related to the lectures posted. The class will then be divided into groups and will be assigned one problem per group.

Below are the planned lectures (note that class speed will affect the actual schedule)

Week	Activity	Topic/Comments
1 (1/12)	Lecture (chapter 1)	Introduction/ Principle of statics
1 (1/14)	Lecture, Quiz #1	Force/Newton's Laws
1	Lab	MathCad-units
2 (1/19)	**No class**	
2 (1/21)	Lecture, Quiz #2	Numerical calculations
2	Lab	MathCAD –units/equations
3 (1/26)	Lecture (chapter 2)	Resultants of coplanar force systems
3 (1/28)	Lecture, Quiz #3	Moments of a force
3	Lab	MathCAD-linear algebra
4 (2/2)	Lecture (page 73)	Distributed loads
4 (2/4)	Lecture (Chapter 3), Quiz #4	Nonconcurrent force
4	Lab	SolidWorks
5 (2/9)	Lecture (Chapter 4)	Structures
5 (2/11)	Lecture, Quiz #5	Machines
5	Lab	SolidWorks
6 (2/16)	Lecture	Friction
6 (2/18)	Lecture, Quiz #6	Friction
6	Lab	**Mid-Term 1**
7 (2/23)	Lecture	Spatial force
7 (2/25)	Lecture, Quiz #7	Center of gravity
7	Lab	Friction
8 (3/2)	Lecture	Center of gravity
8 (3/4)	Lecture, Quiz #8	Moments of inertia
8	Lab	Ansys
9 (3/9)	Lecture	Stress and strain
9 (3/11)	Lecture, Quiz #9	Shear and bending moment in beams (3)
9	Lab	West Point Bridge
	Spring break	**No class**
10 (3/23)	Lecture	Stress/strain
10 (3/25)	Lecture, Quiz #10	Materials
10	Lab	Stress/strain
11 (3/30)	Lecture	Torsion
11 (4/1)	Lecture, Quiz #11	Shear force in beams
11	Lab	**Mid-term 2**
12 (4/6)	Lecture	Stress in beam
12 (4/8)	Lecture, Quiz #12	Designing of beams
12	Lab	Ansys
13 (4/13)	Lecture	Deflection of beams
13 (4/15)	Lecture, Quiz #13	Deflection of beams
13	Lab	Ansys
14 (4/20)	Lecture	Strain gauges
14 (4/22)	Lecture, Quiz #14	Strain gauges
14	Lab	Strain gauges
15 (4/27)	Lecture	Columns
15 (4/29)	Lecture, Quiz #15	Columns
15	Lab	Ansys
16		**FINAL**

Course Policies:

Attendance: Every student is required to watch the lectures as it become available in blackboard. Every student is required to attend the lecture classes as in-class exercises will be provided.

Absence from Exams: Make up exams will be provided and administered during off-hours by Prof. Grewell or a TA, provided that the absence is excusable.

Late Work Without permission, late lab homework will not be considered.

Absence from Labs: Every 5 unexcused absences will result in a deduction of 5% from your final grade percentage. For example, if you have 5 to 9 absences, you will lose 5% off your final grade percentage; if you have 10 to 14 absences, you will lose 10%. Prof. Grewell will contact you personally to discuss any excessive absences. Make-up work or special circumstances will be considered at Prof. Grewell's discretion, and excused absences will be dismissed.

Student Requirements (Summary)

- Calculator (for quizzes and exams)

Classroom Environment:

Safety Emphasis: Students in ABE classes work with systems that, if misused, can be extremely hazardous. Therefore developing an attitude of safety is crucial to all engineering and technology professionals. Instructors may take an array of actions when students fail to complete required safety training (for example, by coming late to class and missing a safety briefing) or to adhere to procedures. These include but are not limited to (1) only allowing the student to observe the lab; (2) only allowing the student to observe the lab, and deducting points from the associated lab report; (3) suspending the student from all lab activities until the student has successfully completed the required safety portion of the lab (this may mean attending another lab section where the student can arrive on time); (4) dismissing students – and particularly repeat violators of safety policy – from the course.

Academic Misconduct: The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.

Note that there ISU identifies several forms of academic dishonesty including: A student uses or attempts to use unauthorized information in the taking of an exam; submits as his or her own work, themes, reports, drawings, laboratory notes, computer programs, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism. **Students found guilty of academic dishonesty in this class face suspension, conduct probation, or reprimand.**

Disability Accommodation Policy: Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Dead Week: For each Fall and Spring semester, the last full week of classes before final examinations is designated as Dead Week. The intent of Dead Week is to establish a one-week period of substantial and

predictable study time for undergraduate students. During the Dead Week period, regular lectures are expected to continue, including the introduction of new content, as deemed appropriate by the instructor. The restrictions established by this Dead Week policy are:

- Due dates for mandatory graded submissions of any kind that fall within Dead Week must be listed on the syllabus provided at the start of the course.
- Mandatory final examinations may not be given during the Dead Week period except for laboratory courses or courses that meet weekly and for which there is no contact during the normal final examination week.

Harassment and Discrimination: Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact Prof. David Grewell at 515-294-2036, Student Assistance at 515.294.1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515.294.7612.

Religious Accommodation: If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information: If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.

Iowa State University
Agricultural and Biosystems Engineering Department

Course Title: TSM 444 - Facility Planning

Course Meetings: Tuesday & Thursday, 2:10-3:25 PM, 0308 Elings Hall

Prerequisites: TSM 216, TSM 240, STAT 101 or STAT 104

Instructor: Russ Hoffman

Office Location: 4342 Elings Hall

Office Hours: Monday 9:30 – 11:00 or by arrangement

Required Texts: ***Manufacturing Facilities Design & Material Handling***
Matthew P. Stephens & Fred E. Meyers
5th Edition, Purdue University Press

Project Management Memory Jogger
Paula Martin & Karen Tate
2nd Edition, GOAL/QPC (Code Number: 1085E)

Catalog Description:

Principles and practices in designing, evaluating, and organizing existing facilities or creating new facilities. Emphasis on AutoCAD-based new facility design project - product design, production flow analysis, activity relationship analysis, layout deployment, materials handling, office and other service requirement design, and the necessary cost analysis for the new facility.

Course Expectations:

- As a senior-level course, all enrolled students should expect to be respected and treated as adults. While attendance and participation contribute to the final grade, decisions about whether to attend class or participate are left up to each individual student.
- On average, college students should expect to spend 2-3 hours per week studying for each credit hour they are taking. This class should fall well within that norm.
- All students are expected to have a reasonable background in manufacturing processes and basic numerical control concepts, have a basic familiarity with analytical, quality, and statistical tools, and have hands-on experience with a CAD application.
- Students are expected to work on assignments and activities independently and/or in teams (depending on the task instructions), and to apply project management tools and techniques to successfully complete the industry-based facilities planning projects.
- During the semester there will be days when class is NOT held. On those days students are expected to work to complete assignments or activities.

Course Purpose:

The purpose of this course is to develop basic knowledge of the principles and practices of modern industrial facility design, as well as the accompanying skills required to apply those principles and practices to real-world situations. These include:

- Reducing production costs
- Improving product quality
- Providing a safe environment for employees
- Developing facility designs that promote efficient use of people, equipment, and material resources, and
- Incorporating flexibility into new or existing facility designs

Course Objectives:

Upon completion of this course, students should be able to translate their understanding of best-practice facilities management and design to the practical tasks of analysis, good judgment, customer focus, professional impact, technical knowledge, planning, communication, initiative, and teamwork. Students should be able to:

- Analyze current facility/plant layouts/designs and develop recommended improvements.
- Apply facility planning tools/techniques to design and improve layouts for new or existing facilities, including employee and auxiliary services/areas.
- Apply analysis tools/techniques to develop optimized material handling systems.
- Apply project management tools to develop, plan, and implement industry team projects.
- Develop/improve workplace competencies and complete self & peer competency assessments.
- Utilize plant layout and analysis software (such as Proplanner, VISIO, CAD, etc.) to provide industry clients with layout/re-layout recommendations.
- Develop layout recommendation with LEED and sustainability needs as inputs.
- Collaboratively research, organize, and participate in a minimum of two field trips to industrial or commercial facilities, then prepare and deliver oral and/or written reports during Dead Week, integrating academic materials discussed in lecture to onsite observations. Facility locations, team member composition, report types and length/duration of the presentations are subject to the discretion of the instructor.

Grading:

Requirements	**Weight**
Exams	25%
Homework Assignments	20%
Attendance & Participation & Quizzes	30%
Final Presentation	25%
TOTAL	**100%**

Percentage Scale for Letter Grades

		A	95 – above	A-	90 – 94
B+	87 – 89	B	84 – 86	B-	80 – 83
C+	77 – 79	C	74 – 76	C-	70 – 73
D+	67 – 69	D	64 – 66	D-	60 – 63
F	Less than 60%				

Grade Status:

Grades are maintained and posted in Blackboard. Students with questions or concerns regarding the scoring system, or their posted grade, should contact the instructor for clarification. Be aware, not all assignments will be critically evaluated and given assigned grades.

Course Policies:

Attendance: Attendance will be recorded periodically to assess student participation. Excusable absences will be reviewed and accepted at the instructor's discretion. Unless extenuating circumstances exist, students must notify the instructor prior to an absence if they wish the absence to be considered excusable.

Tardiness: As adults, students are expected to be in attendance on time. Tardiness is a genuine distraction and irritation to the instructor and other students. Habitual tardiness is not acceptable. Students exhibiting the latter behavior should seriously consider visiting with their adviser to make arrangements that better meets their personal needs.

Exams, Quizzes, Assignments: Exams, quizzes, and homework assignments may be posted on Blackboard and may be available for several days at a time. Exams may be rescheduled in advance if necessary, provided the request to do so is justified and is deemed reasonable by the instructor. Quizzes and homework assignments are likely to be assigned or collected during class, however, not all assignments will be graded. Students are encouraged to collaborate on homework assignments and projects but cheating on exams and quizzes will result in automatic failure of the course. Anyone suspected of academic dishonesty or caught cheating will be reported to the Dean of Students Office as per the University's academic policy.

Cell Phone Usage: The use of cell phones is a distraction to the user, fellow students, and the instructor, not to mention that student cell phone usage during lecture or group discussion is the epitome of rudeness and inconsideration. For the convenience of everyone, please leave your phone in your bag or in your pocket – or at least have the courtesy to excuse yourself from the classroom! If you're unable to abide by this simple rule you may be asked to leave and your grade will be adjusted accordingly.

Late Work: Unless previously arranged, or an excusable delay exists, late homework, projects, quizzes, presentations, assignments, and exams will not be accepted past their due date.

Disability Statement: Iowa State University complies with the American with Disabilities Act and Section 504 of the Rehabilitation Act. Any student who requires an accommodation under such provisions should contact the instructor as soon as possible, with the proper documentation from the Disability Resources office, room 1076 Student Services Building. No retroactive accommodations will be provided in this class. See your academic advisor for help with obtaining documentation.

Course Fees:

An associated course fee is used for purchasing materials for class/team projects and field/industry trips.

Industry/Facility Field Trips:

Students will visit at minimum two industrial/commercial facilities as partial fulfillment of the requirements of this course. Business-casual attire is strongly recommended but not required. As cliché as this is, you only get one opportunity to create a first impression to look like the professional you are. While visiting a facility you should consider it an opportunity to network with industry personnel. Last, a bit of unsolicited old guy advice here, a casual comment regarding your experience at the facility, or recalling someone's name at an opportune time often opens doors later – learn, and master this skill, it'll serve you well Grasshopper.

University Polices and Guidelines:

Disability Accommodations: If you have a documented disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act and requires accommodations, you will need to go to the Disability Resource (DR) Office for coordination of your academic accommodations. The DR Office is located in room 1076, Student Services Building. Their telephone number is 515-294-7220. Their email address is disabilityresources@iastate.edu.

Jenny Macken, 1330D Elings Hall (phone 515-294-5196; email jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with Jenny and me to address any special needs or special accommodations at the beginning of the semester.

Academic Dishonesty: This class follows Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office: www.dso.iastate.edu/ja/academic/misconduct.html

Harassment and Discrimination: Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact the instructor, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or contact the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation: If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be submitted to the instructor in writing. You may also seek assistance from the Dean of Students Office.

Dead Week: For each Fall and Spring semester, the last full week of classes before final examinations is designated as Dead Week. The intent of this policy is to establish a one-week period of substantial and predictable study time for undergraduate students. During the Dead Week period, regular lectures are expected to continue, including the introduction of new content, as deemed appropriate by the instructor. The restrictions established by this Dead Week policy are:

- Due dates for mandatory graded submissions of any kind that fall within Dead Week must be listed on the syllabus provided at the start of the course. **Please note: Student team-based research projects will be presented in the classroom during Dead Week**.
- Mandatory final examinations may not be given during the Dead Week period except for laboratory courses or courses that meet weekly and for which there is no contact during the normal final examination week.
- Registered ISU Student Organizations may not hold any meetings, functions, or sponsored events during the Dead Week period. Any exception to these restrictions must be authorized in advance by Office of the Dean of Students.

Contact Information: If you are experiencing, or have experienced, a problem with any of the policy or guideline issues described above, email academicissues@iastate.edu.

TSM 465 – Automation Systems

Meeting Times:
Lectures: T, R – 11:00-11:50 am, 0022 Sukup
Labs: A (T – 3:10-5:00 pm), B (W – 9:00-11:00 am), C (W – 2:10 – 4:00 pm), D (R – 2:10 – 4:00 pm), E (R - 4:10 – 6:00 pm), 4215 Sukup

Instructor:
Dr. Lie Tang
Office: 2346 Elings Hall
Office Hours: Open office policy but better by appointment via email.
Office Phone: 294-9778, Cell phone for emergency issues: 515-509-6857
Email: lietang@iastate.edu

Teaching Assistants:
Reshma Kotamsetty, Office hour: W 5:30 – 6:30 pm, 4215 Sukup, Email: reshmak@iastate.edu
Dylan Shah, Office hour: M 5:30 – 6:30 pm, 4215 Sukup, Email: dsshah@iastate.edu

Lab Coordinator:
Tim Shepherd, Email: tshep@iastate.edu

I. Course Purpose:

TSM 465 is intended to serve as your invitation into the field of automated industrial process control. You will acquire the fundamental skills and knowledge necessary to work with, manage, or advance your studies in PLCs, robotics, and related topics.

II. Catalog Description:

Theory and applications of automation systems technology. Emphasizes features, capabilities, programming and integration of sensors, programmable logic controllers, and robots.

III. Prerequisite: TSM 363 or equivalent

IV. Required Materials:

Textbook– Frank D. Petruzella (2010). Programmable Logic Controllers (4th Edition). McGraw Hill: New York, NY. ISBN-13: 978-0-07-351088-0

V. Reference material:

- Lecture slides handout and lab assignments.
- LogixPro – RSLogix Simulator, installed in departmental computer labs
- PLC User Manuals – Allen-Bradley, posted on Blackboard.

VI. General Course Objectives:

By the end of the course, you will understand:

1) the Relay Ladder Logic (RLL) programming language and PLC programming software from Allen-Bradley
2) the hardware configurations of Allen-Bradley Micrologix 1100 PLCs
3) the Mitsubishi anthropomorphic robot hardware and software
4) the parameters and components of automation systems
5) the inputs and outputs (I/O) for automation systems

By the end of the course, you will be able to:

1) develop and execute RLL programs using one of the most popular products – the Allen-Bradley MicroLogix and RSLogix software

2) develop and execute a program for the Mitsubishi robot arms and alike
3) manage automation systems and processes
4) create automated solutions to industrial problems

VII. Course Assignments:

You will complete supporting assignments in the form of hands-on laboratory experiments, homeworks, quizzes, and exams.

VIII. Course Evaluation Guidelines:

You are expected to conduct yourself in a professional manner throughout the duration of this course.

A. Attendance and active classroom participation: Attendance in this course is required. If you know you cannot attend a class due to a legitimate time conflict, you should inform the instructor of your intended absence ahead. I reserve rights to give any type of graded in-class exercises at any time. Active classroom participation is encouraged and bonus points will be given to those who voluntarily answer and ask questions in a proper and constructive ways.

B. Submissions: Most assignment solutions will be submitted via Blackboard. I will try to make sure that every assignment will be graded in a timely manner. If you have any questions regarding your grade of homeworks, quizzes, and labs, you should not hesitate to contact the instructor and the TAs.

C. Policies of Assignments

Homeworks: In principle homeworks are on individual basis. I do encourage discussions with your peers as discussions usually lead to a deeper understanding of the learning material. But discussion on homeworks *doesn't mean working as a group and sharing solutions with others*. Every student should try his/her own way to solve homework problems, which means discussions with others should be limited to exchanging ideas and helping each other to set off on a right path rather than taking a homework assignment as a group assignment. Every one day overdue of homework will receive 20% grade deduction. Homeworks that are more than 2 days overdue will not be accepted.

Labs: Hands-on labs will be conducted mostly as teams of two. Lab solutions will be checked and signed by the instructor or TA during lab times. Lab report is required on a team basis. You will be asked to demonstrate and explain your solutions. Note that 10% of your lab grade consists of proper lab cleanup; therefore, make certain that your work bench looks as good (or better) than when you first started your lab session. No food and soft drinks are allowed in the lab. If you need to drink, you may do it outside of the lab room.

D. Plagiarism penalty: When working on labs and homeworks, discussions with your peers are encouraged (without disturbing others), but copying or sharing others' work is strictly forbidden and will be considered as plagiarism, and you will get zero grade once the case is confirmed. When you are asked to work on your assignment individually, for example, term exam, you are not allowed to discuss with your peers.

E. Make-up Work: There will be no make-up exams or labs unless prearranged.

F. Communication: The instructor may need to contact you with course-related information such as assignments and announcement, which will take place via email. Supplementary materials such as lab assignment, solutions and notes will be posted on Blackboard in a timely manner.

IX. Course Grades and Assignments:

Laboratory Experiments	35%
Homeworks + Quizzes	25%
Midterm Exam (lab exam + theory)	5% + 10%
Final Exam	25%
TOTAL	**100%**

A^--A (90 - 100), B^- - B^+ (80 - 89), C^- - C^+ (70 – 79), D^- – D^+ (60 – 69), F (<60)
I may shift these scores upward or downward depending on the distribution of the scores.

X. Safety:

Safety must always be your first priority, whether on the job or in the laboratory. Strict safety standards will be adhered to in the lab at all times:

- Horseplay of any kind will be grounds for dismissal from the class
- Always ensure that the robot's work envelope is free and clear of people or other obstacles before running a program
- Always assume that a robot is ready to move without notice
- Be neat! Clean up after yourself
- No food and soft drink is allowed in the laboratory

XI. Special Help:

1. I am here to facilitate your learning. If you find that you are struggling with a particular concept, please see me in my office or make an appointment.
2. If you have a disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehab Act and require accommodations, please contact the Disability Resources (DR) office for information on appropriate policies and procedures. DR is located on the main floor of the Dean of Students Building, room 1076; their phone number is (515) 294-6624.

XII. Tentative Schedule (some adjustments may occur as we are always trying to improve students' learning by incorporating new lab activities and new topics.)

Week	Lecture topics	Labs
1	Over View and Basics of PLC Programming	
2	Basics of PLC Programming and Basics of Logic	Lab 1. Intro to lab and basic relay ladder logic
3	Basics of Logic and Boolean Algebra	Lab 2. Digital control using logic gate IC
4	Number Systems, Advanced RLL	Lab 3. Silo control
5	Advance RLL, Programming Timers	Lab 4. Dual compressor control
6	Programming Timers	Lab 5. Traffic lights control
7	Programming Counters	Lab 6. Batch mixing control
8	Midterm Exam	
9	Program Control Instructions	Lab 7. Elevator control
10	Sequencer and Shift Registers	Lab 7. Elevator control - Continued
11	Process Control	1ab 8. Linear robot control
12	Process Control	Lab 9. Bottleline simulation
13	Closed Loop Control - PID	Lab 10. PID control on fan speed regulation
14	Industrial Robots	Lab 11. Program industrial robots
15	Industrial Robots	Lab 12. Workcell design and implementation

FUNDAMENTALS OF INDUSTRIAL HYGIENE
TSM 470
SPRING 2014 SYLLABUS
INSTRUCTOR: DR. NIR KEREN

OBJECTIVES AND OUTCOMES

The objectives of this course are to introduce the fundamentals of health effects of chemical, biological, and physical hazards in workplace environment. Upon completion of the course, students will be able to conduct basic anticipation, recognition, and evaluation, of health effects of chemical, biological, and physical hazards in workplace environment. Furthermore, students will become familiar with principles of control and avoidance tactics.

CATALOG DESCRIPTION

TSM 470. Industrial Hygiene: Physical, Chemical, and Biological Hazards. (3-0) Cr. 3.
Prereq: 272; Math 160 or higher. A qualitative and quantitative introduction to health effects of chemical, biological, and physical hazards in a workplace.

TEXTBOOK

REQUIRED: BASIC CONCEPTS OF INDUSTRIAL HYGIENE, by Ronald Scott (ISBN 1566702925) – Lewis Publishers.

TENTATIVE COURSE SCHEDULE

Week	Learning module	Reading	Assignments	Due @ 11:59 pm on Sunday
1: Jan 13-19	Introduction to Industrial Hygiene	1, 2, BB	Q1, LA's	Jan 19
2: Jan 20-26	Governmental agencies & Professional Organizations	1, 2, BB	Q2, LA's	Jan 26
3: Jan 27-Feb 2	Toxic effect	3, BB	Q3, LA's	Feb 2
4 & 5: Feb 3-16	Measuring relative toxicity and assessing risk	4, BB	Q4, LA's	Feb 16
6: Feb 17-23	Toxicokinetics	5, BB	Q5, LA's	Feb 23
7: Feb 24-Mar 2	Midterm exam – February 27, Time & Location be announced later.			
8: Mar 3-Mar 9	Occupational dermatosis & eye hazards	6, BB	Q6, LA's	Mar 9
9: Mar 10-16	Inhalation toxicity	7, BB	Q7, LA's	Mar 16
10: Mar17-23	**S P R I N G B R E A K**			
11: Mar 24-30	Monitoring the plant's atmosphere	8, BB	Q8, LA's	Mar 30
12: Mar 31-Apr 6	Providing clean air	9, BB	Q9, LA's	Apr 6
13: Apr 7-13	Occupational hearing loss	12, BB	Q10, LA's	Apr 13
14: Apr 14-20	Radiation	13, BB	Q11, LA's	Apr 20

TENTATIVE COURSE SCHEDULE (continued)

Week	Learning module	Reading	Assignments	Due @ 11:59 pm on Sunday
15: Apr 21-27	Working in extreme temperatures	14, BB	Q12, LA's	Apr 27
16: Apr 28-May 4	Cumulative trauma	16, BB	Q13, LA's	May 4
17: May 5	Final Exam – Time and location will be determined			

Readings: The numbers refer to the chapter numbers in the book.
BB: Refers to material available in learning modules on Blackboard.
Assignments: "Q" – Quiz; "LA's" – Learning Activities. Learning Activities may be traditional homework assignments, group discussions, blogs, other type of assignments, or combination of assignments. "EC's" – See below.

COURSE REQUIREMENTS

- Read assigned materials.
- Participate in a base-group works to ensure that all group members make satisfactory academic progress in achieving the goals of the course. When assignments are individual, participate, complete, and submit your assignment as specified.
- Pass the exams and quizzes.

Extra Credit Assignments (EC's)

The instructor will post several extra credit assignment throughout the semester. The purpose of these assignments is to allow for recovering from a low graded assignment, missing a deadline, or simply to boost up your grade. Participation in these assignments is voluntarily. Thus, your grades will not be affected negatively if you decide to not participate in any of the EC's. I would strongly encourage you though to take advantage on these assignments, as they are great learning opportunities.

EC's will be presented randomly, to address current issues, issues in the news, or similar items. The overall grade on your AC's work will be added on top of your final grade in the semester. You will be able to earn at least 5% on top of your final grade if you have completed successfully all EC's.

EC's are graded with a different grading scheme. Every 20 extra credit points are equal to 1% of the final grade. You will have opportunity to earn at least 100 extra credits throughout the semester.

MEETINGS

This is an online course. However, I will be available to answer questions, address concerns, and provide further assistance as you feel you need. If you feel that you need more than 15 minutes with me, please contact me and schedule an appointment. Otherwise, come and visit with me during my office hours on Tuesday, Thursday 10:30-11:30am.

My office is located in 102, I Ed II. Otherwise, my phone number is (515) 294-2580 and my e-mail address is nir@iastate.edu.

GRADING

Grading is given on a 100 scale. Course elements' weights are as follows:

Midterm Exam	20%
Final Exam	20%
Weekly Quizzes	20%
Assignments	20%
Participation	20%
Total:	100%

Course Grade

Final grade will be determined based on the following scheme:

A	93 - 100 points
A-	90 - 92 points
B+	87 - 89 points
B	83 - 86 points
B-	80 - 82 points
C+	77 - 79 points
C	73 – 76 points
C-	70 - 72 points
D+	67 - 69 points
D	63 - 66 points
D-	60 – 62 points
F	less than 60 points.

CLASSROOM EXPECTATIONS

This is an on-line course with multiple small group activities. As such you must be self-directed and take responsibility for completing your assignments by the time they are due. You must also remain in communication with your teammates so that you may complete the required assignments. Remaining self-directed is the toughest challenge when taking on-line courses.

The online learning modules will direct you to supplemental material outside of the learning module. The assignments, quizzes and exams will cover the supplemental material, and often heavily relay on these resources, so make sure that you reviewed the material diligently.

EXAMS

Your grade on the exams will be based on your individual performance. The exams will be either take home or online tests. If take home exams will be the mode of delivery, you will have to use Microsoft Word or equivalent word processor that includes equation editor. Your will be required to type your answers and use equation editor to present your solution. You will then submit your work file in Blackboard.

WEEKLY QUIZZES

Your grade for the quizzes will be based on your individual score. The quizzes will be available on Blackboard only during the week when the content being covered

scheduled for. For example, the learning module Toxic Effects is scheduled for week 3, January 27th – February 3rd. The quiz for the Toxic Effects module will be available only between Monday January 27th at 12:01 AM and Sunday February 3rd at 11:59 PM.

ASSIGNMENTS

Assignments are presented to most of the learning modules. For group assignments: Group members will work together to complete these assignments, and the assignment should be submitted as group efforts. The assignments are available in the assignments box in BlackBoard (BB), and completed assignments should be submitted to the Assignment box – a single submission for the group. The assignments should be prepared with MS Word file and this file will be submitted (as an attachment) as a completed assignment. Assignments that are typed directly to the assignment box will not be accepted. Graphs should be generated with Microsoft Excel and embedded in the Word file. For equations, use the Equation Editor in Word.

You should decide among the group members on a Recorder. The member that is assigned as a Recorder will record the results of the items and will prepare the Word file that represents the group's collective work on the assignment. Use your group number and the assignment number as the title for the work (for example, "Discussion 3 - Group 6")

If all group members should participate in solving all problems in the assignment. The Recorder will add the statement "**All members participated**" at the end of the assignment. Alternatively, if not all of the members participated, list the names of the members that **DID NOT** participate and contribute at the work. Failure to address participation in the summary will draw 5 points (out of potential 100 points) from the grade for the work.

Please note that some of the assignments are end of chapter problems. The textbook provide brief solutions for the problems at the end of the text. Use these solutions to benchmark the results of your analysis. **Typing the results word-by-word as provided at the end of the text will be consider plagiarism and will result in a disciplinary action at the university level**. Furthermore, some of the solutions at the end of the text are wrong. The instructor expects enhanced discussions in your assignments that are rarely available at the end of the text. Members of each group are responsible for verifying that assignments are written clearly and are easy to read.
Similarly to quizzes, assignments are due at the end of the week for the topic. Ex

The instructor will provide keys for assignments that are quantitative in nature. The keys will be posted immediately after the assignments are due. Therefore, late works will not be accepted. Members of each group are responsible for verifying that assignments are written clearly and are easy to read.

PARTICIPATION

Participation is most critical for learning. Thus, participation facilitate 20% of your final grade. Grade for participation will be based on your (1) contribution for group assignments as indicated by your group members, (2) individual efforts I individual assignments, and (3) your general level of responsiveness. Thus, some component of this grade is intuitive, so make sure I know you are there…. ☺

BASE GROUP

Base groups are cooperative learning groups whose primary responsibility is to provide each student the support, encouragement, and assistance they need to make

academic progress. Base groups personalize the work required and the course learning experiences. The members of your base group should exchange phone numbers, email addresses or other communication means and information about schedules since you will likely wish to correspond outside of class. The base group functions as a support group for members that:

1. Gives assistance, support, and encouragement for mastering the course content and provides feedback on how well the content is being learned.
2. Provides a set of interpersonal relationships to personalize the course and an arena for working on interpersonal and group communication and interaction.

Responsibilities:

1. Master the course content to meet the objectives and requirements of the course. (You are accountable to both me, as the instructor, and the members of your base group for your participation in class and your performance on quizzes and group activities.)
2. Ensure that all members of your base group master the course content to meet the objectives and requirements of the course.
3. Share experience and knowledge with group members and class.

Weekly, communicate with your base group members to check if all of them understood the material presented at the last session and are prepared for upcoming quizzes, exams, discussions, and other up-coming assignments.

Base groups are available to support individual members. Additionally, group members should assist one another in studying and preparing for quizzes and exams. If the group cannot come to consensus on an issue it should be brought to my attention.

DISABILITIES

If you have a documented disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act and requires accommodations, you will need to go to the Disability Resource (DR) Office for coordination of your academic accommodations. The DR Office is located in room 1076, Student Services Building. Their telephone number is 515-294-7220. Their email is disabilityresources@iastate.edu. Jenny Metzger, 116 I ED II building (phone 515-294-5196; email jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with Jenny and myself to address any special needs or special accommodations at the beginning of the semester.

Red Zone

ACADEMIC DISHONESTY - PLEASE READ CARFULLY!!!

Due to several misfortunate events we need to reinforce the issue of academic dishonesty.

The instructors reserve the rights to assign a Fail ("F") grade to students due to academic dishonesty. Additionally, the instructor will act upon the guidelines available in the university's policies about academic dishonesty.

Copying or reproducing material prepared by others (with or without their approval) is considered a severe case of academic dishonesty, whether this action was taken during an exam or with respect to homework assignments.

Academic dishonesty occurs when a student uses or attempts to use unauthorized information in the taking of an exam; or submits as his or her own work themes, reports, drawings, laboratory notes, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism.

Plagiarism is the unacknowledged use of the information, ideas, or phrasing of other writers and is an offense comparable with theft and fraud, and it is so recognized by the copyright and patent laws. One is responsible for plagiarism when: the exact words of another writer are used without using quotation marks and indicating the source of the words; the words of another are summarized or paraphrased without giving the credit that is due; the ideas from another writer are borrowed without properly documenting their source.

Academic dishonesty is considered to be a violation of the behavior expected of a student in an academic setting as well as a student conduct violation. A student found responsible for academic dishonesty or academic misconduct is therefore subject to appropriate academic penalty; to be determined by the instructor of the course, as well as sanctions under the university.

The instructor of this course follows the university policies about academic dishonesty. More complete information on these policies can be found here http://www.public.iastate.edu/~catalog/2009-2011/geninfo/dishonesty.html.

Firing group members:

Groups may choose to fire group members who are not sharing in the group workload and contributing to the success of the group. Firing a group member is an extreme response and can only be done after attempts in getting the group member involved have failed. The steps for firing a group member are as follows:

1. After being unsuccessful in getting a group member to participate, the group member needs to be informed in writing that he or she is in jeopardy of being fired from the group. This memo needs to include specific documentation of the problem, the attempts that have been made to try to resolve the problem, and group expectations to maintain group membership. This memo needs to be signed by all other group members and a copy needs to be given to the instructor.
2. The group member receiving the memo needs to respond, in writing, to the group acknowledging that the memo has been received and understood. A copy of this response also needs to be given to the instructor.
3. After receiving the written warning, if a group member is still not participating and contributing to the group in a satisfactory manner, he or she can then be fired from the group. This notification needs to be done in writing explaining how the group member failed to meet the expectations established in the warning memo. This memo also needs to be signed by all other group members and a copy needs to be given to the instructor.
4. Upon receipt of notification that a group member has been fired, the instructor will remove that member from the group roster and he or she will be considered an individual group for the rest of the semester. Group members who are fired will be responsible for completing the remaining assignments on their own. This will include completing all remaining assignments on their own, including the Semester's Service Learning Project. A penalty of 20 points (100 will drop to 80,

90 will drop to 70, and so on) will be introduced to each assignments the student completed following being fired by her/his group members.

HARASSMENT AND DISCRIMINATION

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact me, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

RELIGIOUS ACCOMMODATION

If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be submitted to me in writing. You may also seek assistance from the Dean of Students Office.

DEAD WEEK

This class follows the Iowa State University Dead Week guidelines. For academic programs, the last week of classes is considered to be a normal week in the semester except that in developing their syllabi faculty shall consider the following guidelines:

- Mandatory final examinations in any course may not be given during Dead Week except for laboratory courses and for those classes meeting once a week only and for which there is no contact during the normal final exam week. Take home final exams and small quizzes are generally acceptable. (For example, quizzes worth no more than 10 percent of the final grade and/or that cover no more than one-fourth of assigned reading material in the course could be given).
- Major course assignments should be assigned prior to Dead Week (major assignments include major research papers, projects, etc.). Any modifications to assignments should be made in a timely fashion to give students adequate time to complete the assignments.
- Major course assignments should be due no later than the Friday prior to Dead Week. Exceptions include class presentations by students, semester-long projects such as a design project in lieu of a final, and extensions of the deadline requested by students.

The details of this guideline can be found at http://catalog.iastate.edu/academiclife/#deadweek.

Contact Information:
If you are experiencing, or have experienced, a problem with any of the policy or guideline issues described above, email academicissues@iastate.edu

End of Red Zone

I wish you a great spring 2014 semester,

Dr. Nir Keren

TSM 471 - Safety Laboratory
Department of Agricultural and Biosystems Engineering
Iowa State University
Spring 2012
Syllabus

Catalogue Description

TSM 471. Safety Laboratory. (0-2) Cr. 1. S.
Introduction to equipment, methods, and strategies to measure, evaluate, control, and research hazards and risk in the workplaces.

Prerequisite: TSM 470 Industrial Hygiene: Physical, Chemical, and Biological Hazards. TSM 471 can be taken concurrently with TSM 470.

OBJECTIVES AND OUTCOMES

The objectives of this course are to introduce students with strategies to measure, and evaluate safety and health effects of physical and chemical hazards in workplace environments. Upon completion of the course, students will be familiar with concepts of operation of assessment tools and equipment, and methods to infer on the extant identified hazards pose threats to employee health and safety. Students will be able to utilize industrial hygiene equipment for quantitatively measuring hazards level in workplace environment.

TEXTBOOK/MATERIAL

REQUIRED: BASIC CONCEPTS OF INDUSTRIAL HYGIENE, by Ronald Scott (ISBN 1566702925) – Lewis Publishers. This is the same textbook for TSM 470 (IH).
Other material will be available to be printed from webCT or will be distributed in class during the semester. Students are required to check webCT between 24-48 hours before meetings for materials. Materials need to be printed and read. Students must come prepared for meetings; pre-meeting works are required for several of the experiments.

Other materials such as papers, DVD/videos, and guest lectures might be introduced during the semester. All of the material that is introduced is part of the syllabus, i.e. quizzes may contain questions from this material.

SCHEDULE, INSTRUCTORS, AND OFFICE INFORMATION

Day	Start Time	Stop Time	Location
Thursday	9:10 A	011:00 A	See schedule below for locations.

INSTRUCTORS

Dr. Nir Keren is the instructor of records. However, Mr. Paul Richmond, the Director of the department of Environmental Health and Safety (EH&S) will facilitate a significant number of these meetings.

Office hours:
Dr. Keren's details are as follows:
Phone: (515) 294-2580; e-mail: nir@iastate.edu .
Office Location: Room 102, Industrial Education II.
Office Hours: Open door policy--you are always welcomed. However, the official office hours are Friday 10-11am; Office hours may change during the semester.

Mr. Paul Richmond's details are as follows:
Phone: (515) 294-9698; e-mail: perichm@iastate.edu
Office Location: 1104 EHSSB (Environmental Health and Safety Services Building)
Office Hours: Tuesdays 9:00-10:00 a.m. or by appointment.

COMMUNICATION

The instructor will communicate with the class through Blackboard.

EVALUATION

Evaluations are on a scale of 0 - 100. Points are awarded as follows:

Pre-class works: 10%
Lab reports: 40%
Power plant project report: 25%
Power plant project presentation: 20%. A student cannot be granted a non- "F" grade in the course if s/he have earned a failing grade in the presentation and/or in the final report.
Participation: 5%.

Where,

93 and higher:	"A"
90-92:	"A- "
87-89:	"B+"
83 – 86:	"B"
80 – 82:	"B-"
77 – 79:	"C+"
73-76:	"C"
70-72:	"C-"
67 – 69:	"D+"
64-66:	"D"
60-63:	"D-"
Less than 60:	"F"

LAB REPROTS, ASSIGNMENTS, AND PROJECTS

Students will be assigned to groups. Groups will work together during class exercises, preparing lab reports, and term projects. The instructor will determine group configurations. Members of each group are responsible for verifying that assignments are written clearly and are easy to read.

PROJECTS AND TERM PRESENTATIONS

As mentioned earlier, students will participate in air and noise monitoring projects at the ISU Power plant. These projects will provide opportunities for students to use sampling equipment, collect and analyze data, and write sampling reports. Students will interact with plant personnel as well as industrial hygiene personnel from the department of Environmental Health and Safety. Additional "field" or in-plant time will be required for the collection of data and will be coordinated by students. Each group will submit two sampling reports: 1) air sampling; and, 2) noise monitoring.

The reports will be used by the Power Plant for exposure monitoring documentation and therefore must follow proper industrial hygiene sampling protocol and be accurately written.

Term Presentation

The sampling reports and term presentation account for 45% of the final grade. **A student will not receive a passing grade in the course if an "F" is earned in this part of the course**. Final presentations will include a discussion on the methodology used to collect data, regulatory basis for workplace sampling, and recommendations based upon the sampling results. The presentations are expected to be formal (professional), and must include visual, written and oral elements. Demonstrable knowledge of the project will be expected by all group members. **Minimum passing grade for sampling reports and term presentation is 80 on a 0-100 scale.**

You should prepare to present like you will do in court in front of a judge and jury. Failure to deliver that you are knowledgeable and the appropriate impression that you are professional will results either in your client lose his case, or you go to jail.

PARTICIPATION

Please read the appropriate chapter(s) before class. Discussion is the preferred method of communication during class sessions. Compared to instructor-led lecture format, discussion offers a good deal of added value to the class.

ATTENDANCE

Class attendance will be recorded. It is very important that students will attend all meetings due to the need to become familiar with equipment and tools and their operations. Although, we realize that students may miss meetings due to unexpected circumstances. Thus, the attendance policy is as follows:

With appropriate excuses, students may miss two meetings; however, these students MUST complete all assignments and reading for the specific labs they have missed. Failure to do so will result with an "Incomplete" grade. An excused absence must be cleared through the instructor prior to class; alternatively, an appropriate document from Dean of Students office (in a case of illness, a note from a Dr. will be sufficient) can serve as an excuse. Failure to attend three meetings or more (excused) will result with an "Incomplete" grade for the semester. **Students will be needed to complete the material missed during another semester in which the course is offered**. Only then s/he can gain credit for the lab.

An unexcused absence will result with a Fail ("F") grade for the course.

CALENDAR

A tentative calendar is available at the end of this document. The calendar may be modified significantly as the semester progresses.

DISABILITIES

If a student has a disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act and requires accommodations, s/he should contact the Disability Resources (DR) office for information on appropriate policies and procedures. DR is located on the main floor of the Student Services Building, Room 1076-- phone 515-294-7220.

Melody Carroll, 114 I ED II building-- phone 294-6239, is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with your instructor and Melody to address any special needs or special accommodations at the beginning of the semester.

ACADEMIC DISHONESTY

Due to several misfortunate events in the last three semesters we need to reinforce the issue of academic dishonesty.

The instructors reserve the rights to assign a Fail ("F") grade to students due to academic dishonesty. Additionally, the instructors will act upon the guidelines available in the university's policies about academic dishonesty.

Copying or reproducing material prepared by others (with or without their approval) is considered a sever case of academic dishonesty, whether this action was taken during an exam or with respect to homework assignments.

Academic dishonesty occurs when a student uses or attempts to use unauthorized information in the taking of an exam; or submits as his or her own work themes, reports, drawings, laboratory notes, or other products prepared by another person; or knowingly assists another student in such acts or plagiarism.

Plagiarism is the unacknowledged use of the information, ideas, or phrasing of other writers and is an offense comparable with theft and fraud, and it is so recognized by the copyright and patent laws. One is responsible for plagiarism when: the exact words of another writer are used without using quotation marks and indicating the source of the words; the words of another are summarized or paraphrased without giving the credit that is due; the ideas from another writer are borrowed without properly documenting their source.

Academic dishonesty is considered to be a violation of the behavior expected of a student in an academic setting as well as a student conduct violation. A student found responsible

for academic dishonesty or academic misconduct is therefore subject to appropriate academic penalty; to be determined by the instructor of the course, as well as sanctions under the university.

The instructor of this course follows the university policies about academic dishonesty. More complete information on these policies can be found in the ISU Student Information Handbook: *http://www.dso.iastate.edu/handbook.html*

We are pleased to have each and every one of you in this course, and wish you a great semester. We believe that we provide the most supportive environment. Take advantage of it and we have no doubts that you will be successful.

Best wishes!
Nir Keren and Paul Richmond

Calendar

	Topic	Conducted by	Date	Location
	Introduction	Nir	1/12/12	0042 – I Ed II
1	Slips and Trips	Nir	1/19/12	0042 – I Ed II
2	MSDS	Nir	1/26/12	0042 – I Ed II
3	Overview of Sampling Report	Paul/Nir	2/02/12	EH&S (EHSSB)
4	Air pump/Noise Meter Calibration	Paul/Nir	2/09/12	EH&S (EHSSB)
5	Air Sampling Strategies - Power plant	Paul/ Nir	2/16/12	EH&S (EHSSB)
6	SKC – Rep Visit	Nir	2/23/12	0042 – I Ed II
7	Power plant – Sampling Session	Student independent	3/01/12	Power plant
8	Respiratory Testing Lab	Paul/Nir	3/08/12	EH&S (EHSSB)
Spring Break			3/15/12	
9	Asbestos Handling	Paul/Nir	3/22/12	EH&S (EHSSB)
10	Audiograms at Occupational Medicine	Student independent	3/29/12	Occupational Medicine (G11 TASF)
11	Radiation Detection Exercise	Paul/Steve Simpson	4/05/12	EH&S (EHSSB)
12	Power Plant – Sampling	Student independent	4/12/12	Power plant
13	Heat Stress Monitor Lab	Paul	4/19/12	EH&S (EHSSB)
14	Project Presentations	Nir/Paul	4/26/12	EH&S (EHSSB)

TSM 471
Group Members

Name	Group
Lien, Christian Ridpath, Robert Steffes, Mitchel Westendorf, Bradley	**1**
Bligh, Robert Hayford, Benjamin Schaufenbuel, Alec Troiano, Giovanni	**2**
Akol, Makuac Broshar, Zachary Green, Deirdre Wyman, Haylee	**3**
Hall, Stuart Jordan, Elroy Oldenburg, Danial Zarn, Anthony	**4**

TSM 477
Risk Analysis & Management – Fall 2014
Syllabus

DESCRIPTION

TSM 477 – Risk Analysis and Management (3-0) Cr. 3. *Prereq:* 470, Math 160, Stat 101. Risk Analysis and Management focuses on developing a safety oriented pattern of thinking that is appropriate for today's complex systems. The tools that will be gained in this course will be helpful in recognizing, understanding, and analyzing hazards and risks in modern complex systems.

Following are the major sections in this course:

- Definitions and Concepts
- Hazard Identification and Evaluation
- Quantitative Risk Analysis Techniques
- Human Reliability
- Decision Making
- Establishing Risk Analysis and Management Program

OBJECTIVES AND LEARNING OUTCOMES

The objectives and learning outcomes of this course are as follows: 1) to introduce variety of hazard identification and risk assessment methodologies in the systems level; 2) to gain experience in using data in system safety analysis; 3) to understand Human Machine Interface factors associated with system safety; 4) to introduce human reliability assessment tools; and if time allows 5) to introduce Decision Making theory and applications.

When completed the course you will be able to: (1) perform fundamental risk calculations (2) utilize a variety of risk analyses, (3) perform human reliability analyses, and (4) employ decision making models to solve safety concerns.

REFERENCES/TEXT BOOKS

1. NIOSH Instructional Module "**SYSTEM SAFETY ENGINEERING AND RISK MANAGEMENT**". Available on-line on the course's website on Blackboard.
2. Other material will be used as well. The material will be either distributed in class or will be available on the web, or in other locations.

SCHEDULE AND OFFICE INFORMATION

Time: Tuesday, Thursday 9:30 – 10:50 am.
Class location: 4220 Sukup Hall

My office: 2624H, Howe Hall. Use the intercom on the West door in 2624. Dial "5" and I will let you in.

Office hours are Tuesday, 11:00 – noon.
Phone: (515) 294-2580
E-mail: nir@iastate.edu

Evaluation
Evaluations are on a scale of 0 - 100. Points are awarded as follows:

Exams (2):	60%
Quizzes:	5%
Participation	10%
Term presentation	5%
Homework/Class works	20%
Total:	100%

Failing to contribute to term projects and/or failing to participate in final presentations will result in a "Fail" grade in the course. Similarly, failing to submit or contribute to 30% or more of homework assignment/class activities will results in a "Fail" grade in the course.

Final grades are based on the following scale:

93 and higher:	"A"
90-93:	"A- "
87-89:	"B+"
83 – 86:	"B"
80 – 82:	"B-"
77 – 79:	"C+"
73-76:	"C"
70-72:	"C-"
67 – 69:	"D+"
64-66:	"D"
60-63:	"D-"
Less than 60:	"F"

HOMEWORK ASSIGNMENTS/CLASS ACTIVITIES
For homework assignments, students will be assigned to groups. Groups will work together during class exercises and also on term presentations. The instructor will determine group configuration. Members of each group are responsible for verifying that assignments are written clearly and are easy to read. Homework assignments and

class activities will include preparation and presentation of material in front of the class, papers, preparation of class activities, etc.

EXAMS

Exams are conducted with open material. You may bring any PRINTED material to the exam. Usage of laptop will not be allowed during exams/quizzes. The exams may consist of a combination of multiple choice, short answer, fill in the blank, matching or essay questions. Calculators are allowed. Bring your OWN calculator to the exam. Transfer of calculators is prohibited.

QUIZZES

Quizzes may be conducted on material introduced in class, DVD/VCR's viewed, guest lectures, or additional reading material assigned. Usually, time allowed for quizzes is 15-30 minutes. Students might be asked to prepare and present presentations on variety of topics during the semester.

PARTICIPATION

Please read the appropriate chapter(s) before class. Discussion is the preferred method of communication during class sessions. Compared to instructor-led lecture format, discussion offers a good deal of added value to the class.
Participation grade is intuitive. Make me remember your name soon (!).

Attendance

Class attendance will be recorded. While it is understood that students may miss classes due to other constraints, it is very important that students will attend classes. Thus, unexcused absences of three or more classes will result in a letter grade dropping (A will go to a B, etc.). An excused absence must be cleared through the instructor prior to class. Student who accumulated six or more absences (excused and unexcused) will not be allowed to take exams, and his grade will be dropped to F (fail). Alternatively, in cases where all six (or more) absences are excused (e.g., illness related), an Incomplete grade will be assigned.

CALENDAR

- Aug. 25, Tue. – First class meeting
- Midterm Exam is tentatively scheduled to Thursday Sept. 25th
- Nov. 24-30, Mon.-Fri. - Thanksgiving break, classes recessed.
- Final exam, Dec. 18th 9:45-11:45
- Project presentation dates: to be announced.

Please review below ISU policies and guidelines on disabilities, academic dishonesty, harassment and discrimination, religious accommodation, and dead week. I will operate

the class according to the policies and guidelines, so do not hesitate to address concerns you may have.

Best wishes to you all and …

Have a great semester!!

Nir

ISU Policies and Guidelines

Disability Accommodations

If you have a documented disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act and requires accommodations, you will need to go to the Disability Resource (DR) Office for coordination of your academic accommodations. The DR Office is located in room 1076, Student Services Building. Their telephone number is 515-294-7220. Their email is disabilityresources@iastate.edu.

Jenny Metzger, 116 I ED II building (phone 515-294-5196; email jennym@iastate.edu), is the Disability Resource Liaison for the department of Agricultural and Biosystems Engineering. Please work with Jenny and myself to address any special needs or special accommodations at the beginning of the semester.

Academic Dishonesty

This class follows Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.

http://www.dso.iastate.edu/ja/academic/misconduct.html

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability,

age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact me, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation

If an academic requirement of this class conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be submitted to me in writing. You may also seek assistance from the Dean of Students Office.

Dead Week

This class follows the Iowa State University Dead Week guidelines. For academic programs, the last week of classes is considered to be a normal week in the semester except that in developing their syllabi faculty shall consider the following guidelines:

- Mandatory final examinations in any course may not be given during Dead Week except for laboratory courses and for those classes meeting once a week only and for which there is no contact during the normal final exam week. Take home final exams and small quizzes are generally acceptable. (For example, quizzes worth no more than 10 percent of the final grade and/or that cover no more than one-fourth of assigned reading material in the course could be given).
- Major course assignments should be assigned prior to Dead Week (major assignments include major research papers, projects, etc.). Any modifications to assignments should be made in a timely fashion to give students adequate time to complete the assignments.
- Major course assignments should be due no later than the Friday prior to Dead Week. Exceptions include class presentations by students, semester-long projects such as a design project in lieu of a final, and extensions of the deadline requested by students.

The details of this guideline can be found at http://catalog.iastate.edu/academiclife/#deadweek.

Contact Information

If you are experiencing, or have experienced, a problem with any of the policy or

guideline issues described above, email academicissues@iastate.edu.

APPENDIX 7.8

<u>Daniel Andersen, Assistant Professor & Extension Specialist</u>

Education

- Ph.D. Agricultural Engineering, Iowa State University, 2012
- M.S. Agricultural Engineering, Iowa State University, 2008
- B.S. Mechanical Engineering & Mathematics, University of Wisconsin-Platteville, 2006

Academic experience

- Iowa State University, Ames, Iowa (8/2012 - present)
    - Assistant Professor, Agricultural and Biosystems Engineering (8/12 - Present)
- Iowa State University, Ames, Iowa (1/2007 – 7/2012)
    - Graduate Research Assistant Agricultural Enginering

Non-academic experience

- Curwood – A Bemis Company (5/05 – 1/06
    - Mechanical Engineering Co-op

Certifications or professional registrations

- Engineer in Training Certificate

Current membership in professional organizations

- American Society of Agricultural Engineers (2007 – present)
- Soil Science Society of America (2012 – present)

Honors and awards

- Outstanding Review for 2013 Publication Year from ASABE (2014)
- Iowa Section Newcomer Engineer of the Year (2014)
- Iowa Section ASABE Outstanding Ph.D. Student in Agricultural Engineering (2010)
- ISU Teaching Excellence Award for Graduate Assistants (2009)
- Alpha Epsilon (2009)
- Tau Beta Pi (2004)

Service activities (within and outside of the institution)

- ASABE Blue Ribbon Education Aids Judging Coordinator for Websites (2013- Present)
- Iowa Section ASABE Treasurer/Secretary (2013 – Present)
- ASABE Agricultural Waste Management Committee Member (2008 – Present)
- Iowa ASABE Student Club Advisor (2012 – Present)

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Regan, K.B. & D.S. Andersen. 2014. What is it worth? The economic value of manure testing. *Trans. of the ASABE* 57(6): 1845-1852.
- Andersen, D.S., R.T. Burns, M.J. Helmers, and L.B. Moody. 2014. Vegetative treatment system impacts on groundwater quality. *Trans. of the ASABE*. 57(2): 417-430.

- Andersen, D.S., R.T. Burns, L.B. Moody, M.J. Helmers, B. Bond, I. Khanijo, and C. Pederson. 2013. Impact of System Management on Vegetative Treatment System Effluent Concentrations. *Journal of Environmental Management* 125: 55-67.
- J.F. Baker, D.S. Andersen, R.T. Burns, and L.B. Moody. 2013. The use of phosphorus sorption isotherms to project vegetative treatment area life. *Trans of the ASABE* 56(3): 935-945.
- Andersen, D.S., R.T. Burns, L.B. Moody, M.J. Helmers. 2011. Using total solids concentration to estimate nutrient content of feedlot runoff effluent from solids settling basins, vegetative infiltration basins, and vegetative treatment areas.
- Pepple, L.M., D.S. Andersen, R.T. Burns, and L.B. Moody. 2011. Physical and chemical properties of runoff effluent from open beef feedlot in Iowa. *Transactions of the ASABE* 54(3): 1079-1084.
- Andersen, D.S, R.T. Burns, L.B. Moody, M.J. Helmers, R. Horton, and C. Pederson. 2010. The use of the Soil-Plant-Air-Water Model to predict the hydraulic performance of vegetative treatment areas for controlling open lot runoff. *Transactions of the ASABE* 53(1): 207-217.
- Andersen, D.S, R.T. Burns, L.B. Moody, M.J. Helmers, and R. Horton. 2010. Comparison of the Iowa State University-Effluent Limitation Guidelines Model with the Soil-Plant-Air-Water Model to evaluate Holding Basin Performance. *Transactions of the ASABE* 53(2): 537-543.

CARL J. BERN

University Professor of Agricultural and Biosystems Engineering

Education

Ph.D.	Iowa State University	AgriculturalEngineering minor Mechanical Engineering	May, 1973
M.S.	University of Nebraska	Agricultural Engineering	June, 1964
B.S.	University of Nebraska	Agricultural Engineering	December, 1963

Professional Experience

2002 present	University Professor, Iowa State University
1982-2002	Professor, Iowa State University
1976-1982	Associate Professor, Iowa State University
1973-1976	Assistant Professor, Iowa State University
1968-1973	Instructor, Iowa State University
1967-1968	Graduate Teaching Assistant, Iowa State University
1964-1967	Instructor, Lynam Agricultural College, Stann Creek, Belize
1963-1964	Graduate Research Assistant, University of Nebraska

Activities in Developing countries

- Kenya 2014
- Cameroon 2013
- Honduras 2010
- Tanzania 2007

Areas of Expertise

- Reducing postharvest grain storage losses on subsistence farms
- Hermetic grain storage
- Corn and soybean drying, handling, storage, processing
- Electrical power and electronics, energy use in agriculture

Professional Engineering Registration

Iowa Professional Engineering Registration 08679 (Agricultural)

Professional Society Membership

American Society of Agricultural and Biological Engineers
-Member since 1965, Elected Fellow Member 1993

Honors and Awards

2011, 1996,94,88,79	Elected ASABE Student Branch Faculty Member of the Year
2005	National Food and Energy Council Electric Technology Award, ASABE
2005	ISU Foundation Award for Outstanding Achievement in Teaching
2004	Massey-Ferguson Gold Medal Educational Award, ASABE
2002	Named University Professor

Refereed Journal Articles

---Nyendu, G. C., S. Pflum, P. Schumacher, **C. J. Bern,** T. J. Brumm. 2014. Friction coefficients for dried distillers grains on eight structural surfaces. *Applied Engineering in Agriculture* 30(4):673-678.
---Suleiman, R., D. Williams, A. Nissen, **C. J. Bern,** K. A. Rosentrater. 2014. Is flint corn naturally resistant to *Sitophilus zeamais*? *Journal of Stored Products Research* 60:19-24.
---Schuler, N. J., **C. J. Bern,** D. D. Loy, T. J. Brumm, D. R. Strohbehn. 2014. Mixing beef rations containing distillers grains. *Applied Engineering in Agriculture* 30(2): 199-204.
---Del Campo, B. G., T. J. Brumm, **C. J. Bern**, C. G. Nyendu. 2014. Corncob dry matter loss in storage as affected by temperature and moisture content. *Transactions of the ASABE* 57(2):573-578.
---White, S. D., P. T. Murphy, L. F. Leandro, **C. J. Bern,** S. E. Beattie, J. (Hans) van Leeuwen. 2013. Microflora of high-moisture maize treated with ozone. *Journal of Stored Products Research* 55:84-89.
---Rezaei, K., T. Beta, **C. J. Bern**, P. J. White. 2012. Characterization of free and bound lipids among four corn genotypes as affected by drying and storage temperatures. *Journal of the American Oil Chemists Society* 89:1201-1210.
---**Bern, C. J.,** Pate, M. B., Shivvers, S. 2011. Operating characteristics of a high-efficiency pilot scale corn distillers grain dryer. *Applied Engineering in Agriculture* 27(6):993-996.
---Keren, Nir, S. A. Freeman, J D. Harmon, **C. J. Bern**. 2011. Testing the effectiveness of an on-line safety module for engineering students. *Int. Journal of Engineering Education*. 27(2); 284-291.
---Yakubu, A. S**., C. J. Bern**, J.R. Coats, T. B. Bailey**.** 2011**.** Hermetic on-farm storage for maize weevil control in East Africa**.** *African Journal of Agricultural Research* 6(14):3311-3319
.---White, S. D., P. T. Murphy, **C. J. Bern**, J. (Hans) van Leeuwen. 2010. Controlling deterioration of high-moisture maize with ozone treatment. *Journal of Stored Product Research.* 46(1):7-12.
---Murphy, P. T., K. J. Moore, T. L. Richard, **C. J. Bern**, T. J. Brumm. 2007. Use of swine manure to improve solid-state fermentation in an integrated storage and conversion system for corn stover. *Trans of the ASABE* 50(5): 1901-1906. -
--Bennet, A. S., **C. J. Bern**, T. L. Richard, R. P. Anex. 2007. Corn grain drying using corn stover combustion and CHP systems. *Trans of the ASABE* 50(6): 1-10. -
-- Krueger, N. A., **C. J. Bern**, M. K. Misra, K. M. Adam. 2007. Gravity table sorting of commodity corn. *Appl. Engr.in Ag.* 23(3): 319-325. -
--Murphy, P. T., K. J. Moore, T. L. Richard, and **C. J. Bern**. 2007. Enzyme enhanced solid-state fermentation of kenaf core fiber for storage and pretreatment. *Bioresource Technology* 98:3106-3111

Non-Refereed Articles

Conference papers
---Bern, C.J., A Yakubu, T. Brumm. 2011. Hermetic maize storage systems for subsistence farmers. Proceedings of XXXIV CIOSTA CIGR V Conference 2011**,** University of Natural Resources and Applied Life Sciences, Vienna, Austria, June 29-July 1.

Books
---Bern, C.J., D. I. Olsen. 2002. Electricity for agricultural applications. 305 p. Iowa State University Press, Ames, IA.
---Bern, C.J., C.R. Hurburgh, T. J. Brumm. 2014. Managing grain after harvest. Photoduplicated text, 502 pages. Agricultural and Biosystems Engineering Department, Iowa State University, Ames, IA.

Stuart Birrell, Associate Professor

Education

- Ph.D. Agricultural Engineering, University of Illinois, 1995
- M.S Agricultural Engineering, University of Illinois, 1987
- B.S. Agricultural Engineering, University of Natal, South Africa, 1984

Academic experience

- 2004-Present: Associate Professor, Agricultural & Biosystems Engineering (50% teaching; 50% research)
- 1998-2004: Assistant Professor, Agricultural & Biosystems Engineering (50% teaching; 50% research)
- 1996-1997 Visiting Assistant Professor, University of Illinois, Urbana-Champaign, IL
- 1992-1996: Research Assistant Professor. (Formerly Senior Research Specialist), University of Missouri, Columbia, MO

Non-academic experience – company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time

Certifications or professional registrations

Current membership in professional organizations

- American Society of Agricultural and Biological Engineers (ASABE)

Honors and awards

- Frank Wilcoxon Prize for paper "Composite Response Surface Designs for Factors with Jointly Symmetric Effects" , 2010
- Editorial Board Member, Biosystems Engineering, 2009
- Kinze Manufacturing Professor, 2007

Service activities (within and outside of the institution)

- Chairman, College Engineering Curriculum Committee, 2006-2009
- Chairman of ASAE PM 54 Precision Agriculture Committee, 2001-2003
- Secretary of the Iowa Section of the ASAE, 2001-2002
- Iowa Section of the ASAE Newcomer of the Year, 2001
- PM-54 Precision Agriculture Committee for ASABE, 1996-present
- Invited Speaker, Evaluation of Corn Cob and Stover Removal levels on Crop Production, Soil Quality and Nutrient Levels for Different Single Pass Harvest Systems. Agricultural Equipment Technology Conference, Jan 5-7, 2011, Atlanta, GA
- Invited Speaker, POET Liberty Project Biomass Kickoff Meeting.

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Karkee, M., R.P. McNaull, S.J. Birrell and B.L. Steward. 2011. Estimation for Optimizal Biomass Removal Rate Based on Tolerable Soil Erosion for Single Pass Crop Grain and Biomass Harvesting System. Transactions of the ASAE. *Transactions of the ASABE*. 55(1): 107-115.

- Karlen, D.L., S.J. Birrell and J.R. Hess. 2011. Corn Stover Harvest Strategies: A Five-Year Assessment in Central Iowa, USA. Soil and Tillage 115-116:47-55.
- Karlen, D.L., G. Varvel, J, Johnson, J. Baker, S. Osborne, J. Novak, G. Roth, and S.J. Birrell. 2011. Monitoring Soil Quality to Assess the Sustainability of Harvesting Corn Stover. Agronomy Journal, 103(1):288.
- Chighladze, G., A. Kaleita and S. Birrell, 2010. Sensitivity of Capacitance Soil Moisture Sensors to Nitrate Ions in Soil Solutions, *Soil Sci. Soc. Am. J.* 74:1987-1996.
- Morris, M.D., B. Dilts, S.J. Birrell and P.M. Dixon. 2009. Composite response surface designs for factors with jointly symmetric effects. *Technometrics*: 206-214.
- Kim, H.J., J.W. Hummel, K.A. Sudduth, and S.J. Birrell. 2007. *Evaluation of phosphate ion-selective membranes and cobalt-based electrodes for soil nutrient sensing. Transactions of the ASABE*. 50(2): 415-425.
- Hoskinson, R.L., D.L. Karlen, S.J. Birrell, C.W. Radtke and W. W. Wilhelm. 2007. Engineering, soil fertility, and feedstock conversion evaluations of four corn stover harvest scenarios *Biomass and Bioenergy*, 1:126-136.

Briefly list the most recent professional development activities

- Agricultural Equipment Technology Conference (AETC), January 2011
- Bioenergy Engineering, October 2009
- ASABE Annual International Meeting, July 2009
- National Ethanol Conference, February 2009

Thomas Brumm, Associate Professor

Education

- Ph.D. Agricultural Engineering, minor in Chemical Engineering, Iowa State University (with distinction),1990
- M.S. Agricultural Engineering, Purdue University, 1980
- B.S. Agricultural Engineering, Iowa State University (with distinction), 1979

Academic Experience

- Iowa State University, Ames, Iowa
  - Professor-in-Charge, Engineering-LAS Online Learning, Colleges of Engineering and Liberal Arts & Sciences (2011 - present)
  - Professor-in-Charge, Engineering Online Learning College of Engineering (2010-2011)
  - Associate Professor, Agricultural and Biosystems Engineering (80% administration, 10% teaching, 5% research, 5% service; 2010-present)
  - Director of Assessment, College of Engineering (2008-present)
  - Associate Professor, Agricultural and Biosystems Engineering (50% administration, 25% teaching, 20% research, 5% service; 2006-2010)
  - Assistant Professor, Agricultural and Biosystems Engineering, (75% teaching, 25% research; 2000-2006)
  - Post-doctoral Research Associate, Departments of Agronomy and Agricultural Engineering; Temporary Instructor, Agricultural Engineering (1990-1991)
  - Instructor and Pre-doctoral Research Associate, Agricultural Engineering (1983-1990)
- University of Illinois at Urbana-Champaign
  - Pre-doctoral Research Associate, Agricultural Engineering (1981-1983)

Non-academic Experience

- Technical Director, MBS Genetics, L.L.C., Story County, IA (1996-2000)
- Technical Manager, MBS, Inc., Ames, IA (1991-1996)

Current membership in professional organizations

- American Society of Agricultural and Biological Engineers (ASABE) (1987-present)
- American Society for Engineering Education (ASEE) (2000-present)
- Epsilon Pi Tau, Technology Honorary, Iowa Alpha Chapter Co-Trustee (2004-present)

Selected Honors and Awards

- Best Session Award, 2014 Conference on Industry and Education Collaboration, American Society for Engineering Education, Continuing Professional Development Division (2015)
- Thomas B. Thielen Award for Outstanding Service to the Student Body, Division of Student Affairs, Iowa State University (2012)
- Distinguished Service Award, Iowa FFA Association (2011)
- Iowa State University Coleman Faculty Entrepreneurship Fellow, The Coleman Foundation, Chicago, IL (2010-2011)

- College of Agriculture and Life Sciences Learning Community Coordination Award (2010)
- Outstanding Learning Community Scholarship Award, Center for Excellence in Learning and Teaching, Iowa State University (2007)
- Outstanding Advisor Award, College of Agriculture, Iowa State University (2006)
- Distinguished Alumnus, Sacred Heart School, Osage, Iowa (2005)
- Outstanding Innovations Award, Center for Excellence in Learning and Teaching, Iowa State University (2004)

Service Activities (within and outside of the institution)

- Dean's Global Advisory Committee member, College of Agriculture and Life Sciences (2014-present)
- Learning Ecosystem Assessment and Review of Needs (LEARN) Steering Committee, Office of the Provost (2014)
- Assessment Committee, Global Resource Systems major, College of Agriculture and Life Sciences (2014-present)
- Faculty mentor for McNair Scholar Christian Miller (2013-present)
- University Outcomes Assessment Committee, ISU Faculty Senate (2012-present)
- University Academic Advising Committee, Co-chair (2007-2009)
- American Society of Agricultural and Biological Engineers (ASABE) – Membership Development Council, Nominating Committee, various Committee leadership roles, Founding Secretary of the Education Division (2001-present)
- American Society of Engineering Education (ASEE), Chair and other offices of the Biological and Agricultural Engineering Division (2002-present)

Selected Publications from the past five years

- Baughman, J.A., T.J. Brumm and S.K. Mickelson, 2014. Holistic student professional development and assessment: a back design approach. Journal of Technology, Management and Applied Engineering 31(1): 2-13.
- del Campo, B.G., T.J. Brumm, C.J. Bern and G.C. Nyendu, 2014. Corn cob dry matter loss in storage as affected by temperature and moisture content. Transactions of the ASABE. 57(2): 573-578.
- Schuler, N., C.J. Bern, T.J. Brumm, D. D. Loy, and D.R. Strohbehn, 2014. Mixing beef feed rations containing wet distillers grains. Applied Engineering in Agriculture 30(2):199-204.
- Nyendu, G.C., S. Pflum, P Schumacher, C.J. Bern and T.J. Brumm, 2014. Friction coefficients for dried distillers grains on eight structural surfaces. Applied Engineering in Agriculture Vol. 30(4): 673-678.
- Baughman, J.A., S.K. Mickelson and T.J. Brumm, 2012. Student professional development: competency-based learning and assessment. Journal of Technology Studies 38(2): Fall 2012.
- Saunders, K., T.J. Brumm, C. Brook, S.K. Mickelson, and S. Freeman. 2009. Assessing student work to support curriculum development: An engineering case study. *Journal of Learning Communities Research* 3(3):47-62.

<u>Shweta Chopra, Assistant Professor</u>

Education

- Ph.D. Technology Leadership and Innovation, Purdue University, 2014
- M.S. Material Science and Engineering, Rochester Institute of Technology, 2009
- B.S. Polymer Engineering, Pune University, 2005

Academic experience

- Iowa State University, Ames, Iowa (8/14 – present)
    - Assistant Professor, Agricultural and Biosystems Engineering (8/14 – present)
    - Member, Global Food Security Consortium (8/14 – present)
- Purdue University, West Lafayette, Indiana (8/10 – 7/14)
    - Instructor of Record, Technology Leadership and Innovation (8/10 - 5/13)
    - Graduate Research Fellow/Assistant, Technology Leadership and Innovation (6/13 – 7/15)
- Rochester Institute of Technology, Rochester, New York (9/06 – 11/09)
    - Graduate Research Fellow/Assistant, Material Science and Engineering (9/06 – 11/09)
    - Teaching Assistant, Department of Chemistry (3/07 – 6/08)
- Pune University, Pune, India (7/01 – 5/05)
    - Research Assistant, National Chemical Lab (5/04 – 5/05)

Non-academic experience

- Blichmann Engineering, Lean Consultant, (6/12 – 5/13), part-time.
- Genentech Inc., Research Associate, (1/10 – 7/10), full-time.
- Eastman Kodak Company, Graduate Intern, (9/07 – 3/08), full-time.

Current membership in professional organizations

- Association of Technology, Management, and Applied Engineering (ATMAE) *(2010 – present)*
- American Society for Quality (ASQ) *(2010 – present)*
- American Society for Engineering Education (ASEE) *(2011 – present)*
- Academy of Management (AOM) *(2014 – present)*
- International Food and Agribusiness Management Association, (IFAMA) *(2013 –present)*
- The Institute for Operations Research and the Management Sciences (INFORMS) *(2013 – present)*

Honors and awards

- Graduate Research Award, ATAME (2013)
- Purdue Research Foundation Fellow, Purdue University (2013)
- Summer College of Technology Fellow, Purdue University (2013)
- Semi-finalist in West Monroe Partners Case Challenge (2012)
- Bilsland Strategic Initiative Fellow, Purdue University (2011)
- Dr.Clois Kicklighter Doctoral Student Scholarship, ATMAE (2011)

- College of Education Outstanding Graduate Student Teaching Award (CETA) award for teaching at Purdue University (2011)

Service activities (within and outside of the institution)

- ABE, ISU Diversity Committee Member *(2014 – present)*
- ABE, ISU Web Committee Member *(2014 – present)*

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- **S. Chopra,** and C. Laux. 2014. Designing curriculum involving industry participation: Positive outcome on students learning and development. Presented in ATMAE conference, St. Louis, MO.
- P. Rajan, **S. Chopra**, A. Somasekhar, and C. Laux. 2014. Designing for food security: the expansion of capabilities through the COREPDS in Chhattisgarh, India, Academy of management Conference Proceeding.
- **S. Chopra.** 2013. Attaining food security in Chhattisgarh, India through the use of COREPDS. Presented at the ATMAE conference, New Orleans, LA.
- **S. Chopra**, and C. Laux. 2013. Quality in healthcare Processes and mitigating the "July Effect". Presented at Production and Operations Management Society Denver, CO.
- C. Laux, and **S. Chopra.** 2013. Challenges and Outcomes of Industrial Based Projects of Students Learning Lean Manufacturing. Presented at the ASEE Conference for Industry and Education Collaboration; Phoenix, AZ.
- **S. Chopra**, H. Caballero, C. Laux, E. Schmidt, and H. Yang 2012. Reverse Logistics in the Heavy Machinery Industry. Proceeding of Biennial Supply Chain Management Conference, Indian Institute of Management; Bangalore, India.
- C. Laux, and **S. Chopra.** 2012. Enhancing student learning experience in lean manufacturing with industry engagement. Proceeding of the ASEE Conference for Industry and Education Collaboration; Orlando, FL.
- **S. Chopra**, and C. Laux. 2012. Finding what women want: Developing strategies to increase recruitment and retention in along with attracting external and internal sources of funding. Proceeding of the ASEE; Austin, TX.
- H. Caballero, **S. Chopra,** and E. Schmidt. 2012. Project selection and portfolio optimization using mathematical programming. Proceeding of Project Management Institute Global Congress North America; Vancouver, Canada.

<u>Matt Darr, Associate Professor</u>

Education

- Ph.D. Food, Agricultural, and Biological Engineering, The Ohio State University, 2007
- M.S. Biosystems and Agricultural Engineering, University of Kentucky, 2004
- B.S. Food, Agricultural, and Biological Engineering, The Ohio State University, 2002

Academic experience

- Iowa State University, Ames, Iowa (2008 - present)
    - Associate Professor, Agricultural and Biosystems Engineering (2013 - present)
    - Assistant Professor, Agricultural and Biosystems Engineering (2008 - 2013)
- The Ohio State University, Columbus, Ohio (2004 - 2007)
    - Research Associate II (2004 – 2007)
- University of Kentucky, Lexington, Kentucky (2002 - 2004)
  Graduate Research Assistant, Biosystems and Agricultural Engineering

Current membership in professional organizations

- American Society of Agricultural and Biological Engineers (ASABE) *(1998 - present)*

Honors and awards

- PrecisionAg Excellence Award in Education and Research. PrecisionAg Institute. 2014
- Teaching Award of Merit, North American College Teachers of Agriculture (NACTA) and Iowa State University College of Agriculture and Life Sciences. 2013
- A. W. Farrall Young Educator Award, American Society of Agricultural and Biological Engineers. 2013
- Sustainable Biofuels Award for Feedstock Innovation. World Biofuels Markets. 2012
- Newcomer of the Year. Iowa ASABE Section. 2012
- Early Achievement in Teaching Award. Iowa State University College of Agriculture and Life Sciences. 2012
- Early Achievement in Research Award. Iowa State University College of Agriculture and Life Sciences. 2011
- Gale A. Holloway Professional Development Award presented by ASABE. Recognized for outstanding leadership and active involvement in ASABE for early career members. 2009
- Top paper award for Information and Electronic Technologies division of ASABE. 2008
- Price Chair Award for Outstanding Teaching by a Staff Member. Annually awarded to a single staff instructor in the College of Food, Agricultural, and Environmental Sciences at The Ohio State University. 2006

Service activities (within and outside of the institution)

- John Deere Corporate AMS University License Program (chair 2009 – present)
- Farm Progress Show Precision Ag Exhibits (chair 2010 - present)
- Inventory Advisory Committee, ISU Research Foundation (member 2012 – present)
- Ag Leader Scholarship Liaison (2009 – present)
- Agricultural Systems Technology Club (advisor 2008 – present)
- Technology Curriculum Committee (member 2008 – present)

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Thoreson, C., K. Webster, **M. J. Darr**, and E. Kapler. 2014. Investigation of Process Variables in the Densification of Corn Stover Briquettes. *Energies*. 7(6), 4019-4032; doi:10.3390/en7064019.
- Wang S., L. Y. Zhao, X. Wang, R. Manuzon, **M. Darr**, H. Li, and H. M. Keener. 2014. Estimation of Ammonia Emission from Manure Belt Poultry Layer Houses Using an Alternative Mass-Balance Method. Transactions of the ASABE. 57(3):937-947.
- Pires, A, J. Funk, R. Manuzon, **M. Darr**, and L. Zhao. 2013. Longitudinal study to evaluate the association between thermal environment and Salmonella shedding in a Midwestern US swine farm. Preventive Veterinary Medicine. 112(1): 128-137.
- Shah, A., **M. J. Darr**, D. Dalluge, D. Medic, K. Webster, and R. Brown. 2012. Physicochemical Properties of Bio-oil and Biochar Produced by Fast pyrolysis of Stored Single-pass Corn Stover and Cobs. *Bioresource Technology*. 125:348-352; doi: 10.1016/j.biortech.2012.09.061
- Kruckeberg, J.P., H. M. Hanna, B.L. Steward, and **M.J. Darr**. 2012. The relative accuracy of DRIFTSIM when used as a real-time spray drift predictor. Transactions of the ASABE. 55(4):1159-1165.
- Medic, D., and **M. J. Darr**, A. Shah, and S. Rahn. 2012. Effects of Torrefaction on Water Vapor Adsorption Properties and Resistance to Microbial Degradation of Corn Stover. *Energy & Fuels*. 26(4): 2386-2393; doi: 10.1021/ef3000449.
- Roth, J., and **M. J. Darr**. 2012. Measurement of Normal Stresses at the Soil-Tire Interface. *Transactions of the ASABE*. 55(2): 325-331.
- **Darr, M. J.**, and A. Shah. 2012. Biomass Storage: An Update on Industrial Solutions for Baled Biomass Feedstock. *Biofuels.* 3(3): 321-332; doi: 10.4155/bfs.12.23.
- Medic, D., **M. J. Darr**, A. Shah, and S. Rahn. 2012. The Effects of Particle Size, Different Corn Stover Components, and Gas Residence Time on Torrefaction of Corn Stover. *Energies*. 5(4): 1199-1214; doi: 10.3390/en5041199.
- Shah, A., **M. J. Darr**, D. Medic, R. Anex, S. Khanal, and D. Maski. 2012. Techno-economic Analysis of a Production-Scale Torrefaction System for Cellulosic Biomass Upgrading. *Biofuels, Bioproducts & Biorefining*. 6(1): 45-57; doi: 10.1002/bbb.336.
- Medic, D., **M. J. Darr**, A. Shah, B. Potter, and J. Zimmerman. 2012. Effects of Torrefaction Process Parameters on Biomass Feedstock Upgrading. *Fuel*. 91(1): 147-154; doi: 10.1016/j.fuel.2011.07.019.
- Thoreson, C. P., K. E. Webster, and **M. J. Darr**. 2011. Durability Analysis of Large Corn Stover Briquettes. *Applied Engineering in Agriculture.* 28(1): 9-14.
- Shah, A., **M. J. Darr**, K. Webster, and C. Hoffman. 2011. Outdoor Storage Characteristics of Single-Pass Large Square Corn Stover Bales in Iowa. *Energies*. 4(10): 1687-1695; doi: 10.3390/en4101687.

<u>Steven A. Freeman, University Professor</u>

Education

- Ph.D. Agricultural Engineering, Purdue University, 1993
- M.S. Agricultural Engineering, Texas A&M University, 1990
- B.S. Agricultural Engineering, Colorado State University, 1988

Academic experience

- Iowa State University, Ames, Iowa (8/97 - present)
    - Faculty Advisor to the President, (7/13 - present)
    - University Professor, Agricultural and Biosystems Engineering (8/14 - present)
    - Professor, Agricultural and Biosystems Engineering (8/09 – 8/14)
    - Associate Director, Center for Excellence in Learning and Teaching (8/09 - 6/13)
    - Assistant Director, Center for Excellence in Learning and Teaching (1/04 - 8/09)
    - Associate Professor, Agricultural and Biosystems Engineering (7/04 - 8/09)
    - Associate Professor, Industrial Education and Technology (8/03 - 6/04)
    - Assistant Professor, Industrial Education and Technology (8/97 - 8/03)
- Purdue University, West Lafayette, Indiana (8/90 - 8/97)
    - Agricultural Safety Specialist, Agricultural and Biological Engineering (1/94 - 8/97)
    - Visiting Instructor, Agricultural Engineering (7/93 - 5/94)
    - Graduate Research Fellow/Assistant, Agricultural Engineering (8/90 - 6/93)
- Texas A&M University, College Station, Texas (9/88 - 8/90)
  Graduate Research Fellow/Assistant, Agricultural Engineering

Non-academic experience

- Blue Spruce Safety Services, Owner/Operator, safety and health consulting and training (9/98 – present), part-time.

Certifications or professional registrations

- Certified Safety Professional (CSP). 2001. Board of Certified Safety Professional. Certificate No.: 16984.
- Certified Senior Technology Manager (CSTM). 2005. The Association of Technology, Management, and Applied Engineering. Certificate No.: 2015.

Current membership in professional organizations

- Association of Technology, Management, and Applied Engineering (ATMAE) *(1998 - present)*
- American Society of Safety Engineers (ASSE) *(1995 - present)*
- International Society for the Scholarship of Teaching and Learning (ISSOTL) *(2005 - present)*
- American Society for Engineering Education (ASEE) *(1992 - present)*
- American Society of Agricultural and Biological Engineers (ASABE) *(1986 - present)*
- International Society for Agricultural Safety and Health (ISASH) *(1993 - present)*
- Iowa Farm Safety Council *(1997 - present)*

Honors and awards

- Laureate Citation, Epsilon Pi Tau (2012)
- Fulbright Specialist, Institute of International Education, U.S. Dept. of State (2011 - 2012)
- SENCER Leadership Fellow, National Center for Science and Civic Engagement (2008 - 2010)
- Learning Community Champion Award, Iowa State University (2008)
- Outstanding Industrial Technology Professor Award, National Association of Industrial Technology (2007)

Service activities (within and outside of the institution)

- President of the ISU Faculty Senate *(2011 - 2012)*
- ISU President Search Committee (2011)
- Iowa Farm Safety Council Board of Directors *(1998 – present)*
- Chair, Journal of Technology, Management, and Applied Engineering Board (*2009 – 2012*)
- Executive Board, National Association of Industrial Technology (now ATMAE) (*2002 – 2006*)

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Mosher, G.A., N. Keren, S.A. Freeman, and C. R. Hurburgh, Jr. 2014. Development of safety decision-making scenario to measure worker safety in agriculture. *Journal of Agricultural Safety and Health* 20(2):91-97.
- Withers, J.H. and S.A. Freeman. 2013. Case study: The importance of the assessment technique in chemical safety training on a college campus. *Journal of SH&E Research* 9(2): 89-93.
- Mosher, G.A., N. Keren, S.A. Freeman, and C. R. Hurburgh, Jr. 2013. Measurement of worker perceptions of trust and safety climate in managers and supervisors at commercial grain elevators. *Journal of Agricultural Safety and Health* 19(2): 125-134.
- Withers, J.H., S.A. Freeman, and E. Kim. 2012. Learning & retention of chemical safety training information: A comparison of classroom versus computer-based formats on a college campus. *Journal of Chemical Health and Safety* 19(5): 47-55.
- Ibrahim, N., S.A. Freeman, and M.C. Shelley. 2012. Exploring the impact of work experience on part-time students' academic success in Malaysian polytechnics. *Career and Technical Education Research* 37(1): 57-74.
- Mosher, G.A., N. Keren, S.A. Freeman, and C. R. Hurburgh, Jr. 2012. Management of safety and quality and the relationship with employee decisions in country grain elevators. *Journal of Agricultural Safety and Health* 18(3): 195-215.
- Ibrahim, N., S.A. Freeman, and M.C. Shelley. 2011. Identifying predictors of academic success for part-time students at polytechnic institutes in Malaysia. *International Journal of Adult Vocational Education and Technology* 2(4): 1-16.

<u>David Grewell, Professor</u>

Education

- Ph.D. Welding Engineering, The Ohio State University, 2005
- M.S. Welding Engineering, The Ohio State University, 2002
- B.S. Welding Engineering, The Ohio State University, 1989

Academic experience

- Iowa State University, Ames, Iowa (8/05 - present)
    - Professor, Agricultural and Biosystems Engineering (8/14 - present)
    - Courtesy Professor, Food Science and Human Nutrition (8/12 – present)
    - Courtesy Professor, Civil, Construction and Environmental Engineering (8/06 – present)
    - Associate Professor, Agricultural and Biosystems Engineering (8/10 - 7/14)
    - Assistant Professor, Agricultural and Biosystems Engineering (8/05-7/10)
- University of Erlangen-Nuremberg, Germany (8/07 - present)
    - Courtesy Professor, Department of Polymer Processing (8/07 - present)

Non-academic experience

- Grewell Engineering Consultants, President, technical consulting and experimental research on plastic joining for industrial clients (2001-2012)
- Branson Ultrasonic Corporation, Research Project Manager Infrared Welding, project management for the development of novel laser welding product line (1997-2001)
- Branson Ultrasonic Corporation, Plastic Joining Specialist (Senior Research Engineer), project management for developing high power ultrasonic equipment for tong-term industrial needs (1992-1997)
- EWI/Materials Joining Technology, Research Engineer, project management and engineering research (1989-1992)
- Edison Welding Institute, Junior Technician, technical work on short and long term projects related to thermoplastics and composites processing and welding (1987-1989)

Current membership in professional organizations

- Acoustical Society of America *(2013-present)*
- Sigma Xi *(2011-present)*
- Ultrasonics Industrial Association *(2009-present)*
- International Polymer Processing Society (*2005-present)*
- American Society of Agricultural and Biological Engineers *(2007-present)*
- Society of Plastic Engineers *(2001-present)*

Honors and awards

- Student Recruitment Award, College of Agriculture and Life Sciences, Iowa State University *(2014)*
- Elected President to Osborn Club, The Scientific Research Society *(2012)*
- International Award, College of Agriculture and Life Sciences, Iowa State University *(2011)*

- Early Achievement in Research Award, College of Agriculture and Life Sciences, Iowa State University *(2010)*
- Grand Prize for University Research, American Academy of Environmental Engineers *(2009)*
- Newcomer Research Award, American Society of Agricultural and Biological Engineers *(2007)*
- Research Award, Proctor and Gamble *(2001)*
- Significant Contribution Award, Branson Ultrasonic Corporation *(1996)*

Service activities (within and outside of the institution)

- Member of Board of Directors, Society of Plastic Engineers – Bioplastics SIG *(2014-present)*
- Member of Board of Directors, Ultrasonics Industrial Associatio *(2009-present)*
- Editorial Board Member, Journal of Plastics Technology *(2008-present)*
- Program Director for Study Abroad Program, International and Academic Leadership Experience, ISU and Chung Yuan Christian University *(2010-2013)*

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- McCabe, K.G., Schrader, J.A., Madbouly, S., Grewell, D., Graves, W.R. 2014. Evaluation of biopolymer-coated fiber containers for container-grown plants, *Hort Technology*, 24(4):439-448.
- Madbouly, S.A., Schrader, J.A., Grewell, D., Kessler, M.R., Graves, W.R. 2014. Novel Bio-based composites of Polyhydroxyalkanoate (PHA)/ Distillers Dried Grains with Solubles (DDGS), Royal Society of Chemistry, 4: 39802-39808.
- Juretic, H., Montalbo-Lomboy, M., van Leeuwen, J. (Hans), Cooper, W., Grewell, D. 2014. Hydroxyl radical formation in batch and continuous ultrasonic systems, *Ultrasonics Sonochemistry*, 22: 600-606.
- Montalbo-Lomboy, M. and Grewell, D. 2014. Rapid dissolution of switchgrass in 1-Butyl – 3- Methylimidazolium Chloride by ultrasonication, *Ultrasonics Sonochemistry*, 22: 588–599.
- Riedl, J., Grewell, D., Kessler, M., Raman, R. 2014. Peel and shear strength and tear resistance of ultrasonically sealed coextruded polyolefin films for packaging applications. *Weld World* 58: 619-636.
- Thunga, M., Chen, K., Grewell, D., Kessler, M.R. 2014. Bio-renewable precursor fibers from lignin/polylactide blends for conversion to carbon fibers, *Carbon* 68:159-166.
- Gerde, J., Montalbo-Lomboy, M., Yao, L., Grewell, D., Wang, T. 2012. Evaluation of microalgae cell disruption by ultrasonic treatment, *Bioresource Technology*, 125:175-181.
- Schrader, J.A., Srinivasan, G., Grewell, D., McCabe, K.G., Graves, W.R. 2013. Fertilizer effects of soy-plastic containers during crop production and transplant establishment, *HortScience*, 48(6):724-731.

Curriculum Vitae
H. MARK HANNA
Extension Ag Engineer
Department of Agricultural and Biosystems Engineering
Iowa State University

RANK

Extension Agricultural Engineer (P & S)/Scientist II

EDUCATION

Degree	Institution	Major Field of Study	Year
Ph.D.	Iowa State University	Agricultural Engineering	1991
M.S.	Iowa State University	Agricultural Engineering	1975
B.S.	Iowa State University	Agricultural Engineering	1973

PROFESSIONAL EXPERIENCE

5/87 -	Extension Agricultural Engineer, Ames
9/75 – 4/87	Extension Soil, Water, and Waste Management Specialist, Atlantic and Council Bluffs
11/73 – 8/75	Teaching and research assistant, Ames
5/73 – 8/73	Summer Design Trainee, Caterpillar Tractor Co, Peoria, IL

PROFESSIONAL HONORS AND AFFILIATIONS

Iowa Center for Agricultural Safety and Health Hall of Fame Award
Intellectual Property Achievement Award, Iowa State University
Excellence in Applied Research, College of Agriculture and Life Sciences
Fellow, American Society of Agricultural and Biological Engineers
Editor's Choice Award, Journal of Soil and Water Conservation
Outstanding Achievement in Extension, College of Agriculture and Life Sciences
Top 10 Agricultural Engineering Products in Last 20 years (Impellicone)
American Soc. of Agr. and Biol. Engineers Mid-Central Region Engineer of the Year Award
Professional and Scientific Excellence Award
American Soc. of Agricultural and Biol. Engrs. Rainbird Engineering Concept of the Year Award
American Society of Agricultural and Biol. Engineers Iowa Section Engineer of the Year Award
American Society of Agricultural Engineers AE 50 Design Award
Superior Engineering Extension Award
Mission Award for Extension (Gamma Sigma Delta)
American Society of Agricultural Engineers Honorable Mention Paper Award
Achievement Award (Iowa State University Extension) (3)

Achievement Award (Iowa State University Extension Association) (2)
American Society of Agricultural Engineers Educational Aids Blue Ribbon Award (6)
American Society of Agronomy Educational Materials Award (6)
American Society of Agricultural and Biological Engineers
American Association for the Advancement of Science
American Society of Heating, Refrigerating and Air Conditioning Engineers
International Society for Agricultural Safety and Health
Registered Professional Engineer in Iowa and Nebraska

PUBLICATIONS

Refereed:

Hanna, Mark, and Scott Sanford. 2014. Energy management during field production practices. In Bioenergy - Biomass to Biofuels, Anju Dahiya ed. Elsevier Inc., Academic Press. pp 179-188.

Woli, K. P., F. G. Fernandez, J. E. Sawyer, D. B. Mengel, D. W. Barker, and H. M. Hanna. 2014. Agronomic comparison of anhydrous ammonia applied with a high speed-low draft opener and conventional knife injection in corn. Agronomy Journal 106(3):881-892.

Al-Kaisi, M. M., R. W. Elmore, J. G. Guzman, H. M. Hanna, C. E. Hart, M. J. Helmers, E. W. Hodgson, A. W. Lenssen, A. P. Mallarino, A. E. Robertson, and J. E. Sawyer. 2013. Drought impact on crop production and the soil environment: 2012 experiences from Iowa. Journal of Soil and Water Conservation 68(1):19A-24A.

Kruckeberg, J. P., H. M. Hanna, B. L. Steward, and M. J. Darr. 2012. The relative accuracy of DRIFTSIM when used as a real-time spray drift predictor. Transactions of the ASABE 55(4):1159-1165.

Hanna, H. M., and G. R. Quick. 2012. Grain harvesting machinery (revised). In Food machinery handbook, Myer Kutz ed. William Andrew Publishing, Norwich, NY. pp 93 - 111.

Hanna, H. M., and D. H. Jarboe. 2011. Effects of full, abbreviated, and no clean-outs on commingled grain during combine harvest. Applied Engineering in Agriculture 27(5):687-695.

Hanna, H. M., B. L. Steward, and L. Aldinger. 2010. Soil loading effects of planter depth-gauge wheels on early corn growth. Applied Engineering in Agriculture 26(4):551-556.

Hanna, H. M., D. H. Jarboe, and G.R. Quick. 2009. Grain residuals and time requirements for combine cleaning. Applied Engineering in Agriculture 25(6):851-861.

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Jay D. Harmon, Professor

Education

- Ph.D. Agricultural Engineering, Virginia Tech, 1989
- M.S. Agricultural Engineering, University of Minnesota, 1986
- B.S. Agricultural Engineering, Purdue University, 1984

Academic experience

- 2005-Present: Professor, Iowa State University (full-time)
- 1998-2005: Associate Professor, Iowa State University (full-time)
- 1993-1998: Assistant Professor, Iowa State University (full-time)
- 1989-1993: Assistant Professor, Clemson University (full-time)

Non-academic experience –

- 2008 – present: consultant for Murphy-Brown, LLC
- Other consulting with Hormel Foods, Premium Standard Farms, Murphy Family Ventures and the US Grain Counsel

Certifications or professional registrations

- Professional Engineer

Current membership in professional organizations

- American Society of Agricultural and Biological Engineers
- National Frame Builders Association
- American Society of Heating, Refrigerating and Air Conditioning Engineers

Honors and awards

- American Society of Agricultural and Biological Engineers (ASABE) Fellow (2011)
- ASABE Henry Giese Structures and Environment Award (2011)
- ASABE Presidential Distinguished Service Award (2010)
- ISU College of Agriculture and Life Sciences Dean's Citation for Extraordinary Contributions to the College (2009)

Service activities (within and outside of the institution)

- Midwest Plan Service - MWPS is comprised of extension and research agricultural engineers from 12 Midwestern universities with headquarters at Iowa State University. MWPS produces educational publications for the agricultural audience. Professor-in-charge (2005-present)
- North Central Region Committees
    - NCR-89, Swine Management Research Committee (1995-present)
    - NCR-9 MWPS (1994-present)
- Iowa State University
    - Art in State Building Committee, 2011-present, chair
    - COE Promotion and Tenure Committee, 2011-2012
    - Biorenewables Complex Steering Committee, 2007-present
- Midwest Rural Energy Counsel Board of Directors, 2003-present
- ASABE
    - Board of Trustees, 2012-2015

- Representative to the NCEES Examinations for Professional Engineers Committee, 2009-2012
- Ag Engineering PE Exam Development Committee, 2004-present

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Glanville, T.D., H.K. Ahn, T.L. Richard, J.D. Harmon, D.L. Reynolds and S. Akinc. 2013. Effect of envelope material on bio-security during emergency bovine mortality composting. Bioresource Technology 130:543-551.
- Tyndall, J.C., N. Grudens-Schuck, J.D. Harmon and S.J. Hoff. 2012. Social Approval of the Use of the Community Assessment Model for Odor Dispersal: Results from a Citizen Survey. Environmental Management 50(2): 315-328.
- Harmon, J.D., M.C. Brumm, L.D. Jacobson, S.H. Pohl, D.R. Stender, and R.R. Stowell. 2012. Field Performance Evaluation of a Ventilation System: A Swine Case Study. *Applied Engineering in Agriculture.* In press.
- Li, H., H. Xin, R.T. Burns, L.D. Jacobson, S. Noll, S.J. Hoff, J.D. Harmon, J.A. Koziel and B.P. Heckler. 2011. Air Emissions from Tom and Hen Turkey Houses in the US Midwest. Transactions of the ASABE 54(1): 305-314.
- Davis, J.D., M.J. Darr, H. Xin, J.D. Harmon and J.R. Russell. 2011. Development and use of a GPS herd activity and well-being kit (GPS HAWK) to monitor cattle behavior and the effect of sample interval on travel distance. Appl. Engr. In Ag. 27(1): 143-150.
- Energy Conservation in Swine Barns. Iowa Energy Summit. October 18, 2011. Ames, IA. *Invited.*
- ISU Research, Programs and Assistance. IPPA. September 7, 2010. *Invited.*
- Air Quality and Livestock: An Iowa Perspective. Wisconsin DNR. May 11, 2010. *Invited.*
- Lammers, P.J., M.S. Honeyman, J.D. Harmon, and M.J. Helmers. 2010. Energy and carbon inventory of Iowa swine production facilities. Agricultural Systems 103:551–561.
- Honeyman, M.S., W.D. Busby, S.M.Lonergan, A.K. Johnson, D.L. Maxwell, J.D. Harmon, and S.C. Shouse. 2010. Performance and carcass characteristics of finishing beef cattle managed in a bedded hoop-barn system. Journal of Animal Science 88:2797–2801.
- Lammers, P.J., M.D. Kenealy, J.B. Kliebenstein, J.D. Harmon, M.J. Helmers, and M.S Honeyman. 2010. Non-solar energy use and 100-year global warming potential of Iowa swine feedstuffs and feeding strategies. Journal of Animal Science 88:1204–1212.
- Hoff, S.J., J.D. Harmon, L. Chen, K.A. Janni, D.R. Schmidt, R.E. Nicolai, L.D. Jacobson. 2009. Partial Biofiltration of a Hybrid Ventilated Deep-Pit Swine Finisher. Applied Engineering in Agriculture 25(2): 269-280.

Briefly list the most recent professional development activities

- Attendance of ASABE conference, Montreal, Quebec, July 2014
- Development of AgE PE Exam, Seneca, SC, February 2014
- Attendance of ASABE conference, Kansas City, MO, July 2013
- Development of AgE PE Exam, Seneca, SC, February 2013
- Attendance of ASABE conference, Dallas, TX, July 2012

<u>Matthew J. Helmers, Professor</u>

Education

- Ph.D. Agricultural and Biological Systems Engineering, University of Nebraska-Lincoln, 2003
- M.S. Civil Engineering, Virginia Polytechnic Institute and State University, 1997
- B.S. Civil Engineering, Iowa State University, 1995

Academic experience

- Iowa State University, Ames, Iowa (8/03-present)
    - Professor, Agricultural and Biosystems Engineering (8/14-present)
    - Associate Chair for Research and Extension, ABE Dept. (8/13-present)
    - Dean's Professor in College of Ag and Life Sciences (7/13-present)
    - Associate Professor, Agricultural and Biosystems Engineering (7/09-7/14)
    - Assistant Professor, Agricultural and Biosystems Engineering (8/03-6/09)
- University of Nebraska-Lincoln (7/99-7/03)
    - USDA National Needs Graduate Fellow, Ag and Biological Systems Engineering
- Virginia Polytechnic Institute and State University (8/95-6/97)
    - Eisenhower Graduate Research Fellow, Civil Engineering Department

Non-academic experience

- URS Greiner Woodward-Clyde (8/97-6/99)
    - Staff engineer, Santa Ana, CA and Denver CO

Certifications or professional registrations

- Engineer in Training Certification (1995)

Current membership in professional organizations

- American Society of Agricultural and Biological Engineers (ASABE)
- Soil and Water Conservation Society
- Soil Science Society of America

Honors and awards

- ASABE G.B. Gunlogson Countryside Engineering Award, 2014
- Member of Team that received 2013 College of Agriculture and Life Sciences Dean's Citation for Extraordinary Contributions
- ASABE Blue Ribbon Award (2013) in the Educational Aids Competition for Electronic Delivery "Rock Your Watershed! A Game of Choice and Chance"
- Member of Team that received Iowa State University Extension Team Award – Organizational, 2009
- ASABE Nolan Mitchell Young Extension Worker Award, 2009
- Iowa State University Early Achievement in Extension, 2007
- College of Agriculture Early Achievement in Extension, 2007
- ASABE Blue Ribbon Award (2007) in the Educational Aids Competition for publication "Drainage Water Management for the Midwest"
- ASA Educational Materials Award (2007) for publication "Agricultural Nitrogen for Water Protection in the Midwest"
- ASABE Iowa Section – Newcomer Engineer of the Year, 2006
- ASAE Mid-Central Region Graduate Student of the Year, 2002
- Tau Beta Pi, Engineering Honorary
- Chi Epsilon, Civil Engineering Honorary

Service activities (within and outside of the institution)

- ASABE Program Committee Chair (2015-present)
- ASABE Steering secretary (2013-present)
- ASABE Program (2011-present)
- ASABE Hydrology (2009-present)
- ASABE Nomenclature (2007-present)
- ASABE ED-01Extension, secretary, vice-chair, chair (2003-present)
- ASABE SW-23 Drainage, vice-chair 2009-2011, chair 2011-present
- Departmental, College, and University
    - ABE Awards Committee (2008-present), (chair 2010-present)
    - Agricultural Systems Technology Club Faculty Advisor (2005-present)
    - ABE Research Farms Committee (2004-present)
    - ABE Faculty Search Committee (2010-2011)
    - ABE DEO search committee (2010-2011)
    - Member of College of Engineering Awards Committee (2011-present)
- State Government, Commodity groups, Industries or other stakeholders
    - Member of State of Iowa Nutrient Reduction Strategy Team-Lead on Nitrogen Team (2010-present)
    - Member of the Fertilizer Institute 4R Research Fund Technical Advisory Group (2013-present)

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Chen, B., W.F. Krajewski, X. Zhou, and **M.J. Helmers**. In press. Organized variability of surface runoff processes across neighboring hillslopes in Iowa. Accepted January 2015 to *Journal of Hydrology*.
- Wang, Z., Z. Qi, L. Xue, M. Bukovsky, and **M. Helmers**. In press. Modeling the impacts of climate change on nitrogen losses and crop yield in a subsurface drained field. Accepted January 2015 to *Climatic Change*.
- Iqbal, J., M. Castellano, **M.J. Helmers**, T. Parkin, and X. Zhou. In press. Denitrifcation and N2O emissions in annual croplands, perennial grass buffers and restored perennial grasslands. Accepted October 2014 to *Soil Science Society of America Journal*.
- Smith, T.W., R.K. Kolka, X. Zhou, **M.J. Helmers**, R.M. Cruse, and M.D. Tomer. 2014. Effects of native perennial vegetation buffer strips on dissolved organic carbon in surface runoff from an agricultural landscape. *Biogeochemistry* 120(1-3):121-132.
- Gutierrez-Lopez, J., H. Asbjornsen, **M.J. Helmers**, and T. Isenhart. 2014. Regulation of soil moisture dynamics in agricultural fields using strips of native prairie vegetation. *Geoderma* 226:238-249.
- Daigh, A.L., X. Zhou, **M.J. Helmers**, C.H. Pederson, R. Horton, and R. Ewing. 2014. Subsurface drainage flow and soil water dynamics of reconstructed prairies and corn rotations for biofuel production. *Vadose Zone Journal* doi:10.2136/vzj2013.10.0177.
- Zhou, X., **M.J. Helmers**, H. Asbjornsen, R. Kolka, M. Tomer, and R. Cruse. 2014. Nutrient removal by prairie filter strips in agricultural landscape. *Journal of Soil and Water Conservation* 69(1): 54-64.

Steven J. Hoff,Ph.D., P.E., Professor and ASABE Fellow
Department of Agricultural and Biosystems Engineering
4331 Elings Hall, Iowa State University
515/294-6180 (voice) 515/291-2726 (cell); hoffer@iastate.edu

ISU APPOINTMENT (A-BASE)……

30% research; 60% teaching; 5% Institutional Service; 5% administration (04/12 to present)
30% research; 50% teaching; 15% Institutional Service; 5% administration (04/11 to 03/12)

EDUCATION……

Degree	Major	Institution	Date
Ph.D.	Agricultural Engineering	University of Minnesota	10/90
M.S.	Agricultural Engineering	University of Minnesota	05/87
B.Ag.Eng.	Agricultural Engineering	University of Minnesota	06/85
B.S.	Ag Eng Technology	UW-River Falls	06/83

PROFESSIONAL EXPERIENCE……..……

Professor, Iowa State University, July 2005 to Present

Responsible for the development of an internationally recognized research and teaching program in the areas of livestock ventilation, environmental control, gas and odor emission measurement, gas and odor emission mitigation, and odor dispersion modeling for practical use in the siting of new livestock systems.

AWARDS, HONORS, AND RECOGNITION (2008-PRESENT)……..…

2014 *Henry Giese Structures and Environment Award*, ASABE
2011 *Dean Lee R. Kolmer Award for Excellence in Applied Research*, ISU CALS
2010 *Fellow*, American Society of Agricultural and Biological Engineers
2010 *Faculty Member of the Year*, Department of Agricultural and Biosystems Engineering
2009 *Team Award Recipient, College of Agriculture and Life Sciences, Extension* ISU
2009 *Dean's Citation for Extraordinary Contributions to the College of Ag and Life Sciences*, ISU
2008 *Louis Thompson Distinguished Undergraduate Teacher*, ISU

PATENT ACTIVITY (patents received, patents pending, disclosures made)……...

5. **US PATENT NO. 6,360,955.** *Method and Means for Automated Variable Heater Control for Agricultural Unit Heaters (**Hoff**, S.J, J.D. Harmon, and D. VanUtrecht)*
4. **US PATENT NO. 5,813,599.** *Automated Controller for Naturally Ventilated Livestock and Poultry Facilities (**Hoff**, S.J.)*
3. **US PATENT NO. 5,767,385.** *Automated Forced-Choice Dynamic-Dilution Olfactometer and Method of Operating the Same (D.S. Bundy, W. Huang, S.J. **Hoff**, Q. Liu, and X. Li)*
2. **US PATENT NO. 5,707,283.** *Dual Baffle System in Automatic Air Inlets for Livestock Facilities (Oberreuter, M.E., S.J. **Hoff**, and F. perez-Munoz)*
1. **US PATENT NO. 5,579,719.** *Method and Means for Quasi Ad-Libitum Feeding for Gestation Sows in Loose Housing (**Hoff**, S.J., M.S. Honeyman, J.D. McKean, E.J. Stevermer, D.S. Bundy, F. Perez-Munoz, S.E. Bryce, and W.E. Backhaus)*

DISCLOSURES ……

5. ISURF #03757; *Impact Based Odor Control Mechanism (S.J. **Hoff** and L. Tong)*
4. ISURF #03684; *Force Plate System–Measurement and Recording Devices for Evaluating Lameness in Swine (K. Stalder, R. Fitxgerald, G. Sun, and S.J. **Hoff**)*

3. **ISURF #03377;** *Method and Means for Passive Oral Delivery of Vaccines (Zimmerman, J.J. and **S.J. Hoff**)*
2. **ISURF #02714;** *Automated Variable Cycling Algorithm for Animal Cooling (S.J. **Hoff**)*
1. **ISURF #02478;** *A Community Assessment Model for Site Selection and Odor Management for Swine Operations (**Hoff**, S.J. and D.S. Bundy)*

REFEREED PUBLICATIONS (SELECTED 2012-PRESENT, PUBLISHED AND ACCEPTED)……...

Shicheng, Z., L. Cai, J.A. Koziel, L. Chen, S.J. **Hoff**, K.Y. Heathcote, L.D. Jacobson, N. Akdeniz, B.P. Hetchler, D.B. Parker, E.A. Caraway, A.J. Heber and S.D. Bereznicki. 2015. Odor and odorous chemical emissions from animal buildings: Part 5-correlations between odor intensities and chemical concentrations (GC-MS-O). *Transactions of the ASABE* (accepted).

Cai, L., J.A. Koziel, Z. Shicheng, E.L. Cortus, D.B. Parker, S.J. **Hoff**, G. Sun, K.Y. Heathcote, E.A. Caraway, L.D. Jacobson, N. Akdeniz, B.P. Hetchler, A.J. Heber, S.D. Bereznicki and T.T. Lim. 2015. Odor and odorous chemical emissions from dairy and swine facilities: Part 3-chemical emissions. *Transactions of the ASABE* (accepted).

Luck, B.D., J.D. Davis, J.L. Purswell, S.S. Kiess, S.J. Hoff, and J.W.W. Olsen. 2014. Effect of measurement density on characterizing air velocity distribution in commercial broiler houses. *Transactions of the ASABE* 57(5): 1443-1454.

Abell, C.E., A.K. Johnson, L.A. Karriker, M.F. Rothschild, S.J. **Hoff**, G. Sun, R.F. Fitzgerald, and K.J. Stalder. 2014. Using classification trees to detect induced lameness with a transient model. *Animal* 8(6):1000-9.

Cutler T.D., C. Wang, S.J. **Hoff** and J.J. Zimmerman. 2013. A method to quantify infectious airborne pathogens at concentrations below the threshold of quantification by culture. *Can J Vet Res* 77(2): 95-99.

Karriker, L., C. Abell, M. Pairis, W. Holt, G. Sun, J. Coatzee, A. Johnson, S. **Hoff**, K. Stalder. 2013. Validation of a lameness model in sows using physiological and mechanical measurements. *Journal of Animal Science* 91: 130-136.

Chen, L.D. and S.J. **Hoff**. 2012. A two-stage wood chip-based biofilter system to mitigate odors from a deep-pit swine building. *Applied Engineering in Agriculture* 28(6): 893-901.

Cutler T.D., C. Wang, S.J. **Hoff** and J.J. Zimmerman. 2012. Effect of temperature and relative humidity on ultraviolet (UV254) inactivation of airborne porcine respiratory and reproductive syndrome virus. *Veterinary Microbiology* 159: 47-52.

Tyndall, J.C., N. Grudens-Shruck, J.D. Harmon and S.J. **Hoff**. 2012. Social approval of the use of the community assessment model for odor dispersal: Results from a citizen survey. *Environmental Management* 50(2):315-328.

ACTIVE RESEARCH GRANTS……...

Development of New Barn Commissioning and Building Component Integrity Protocols for Swine Housing Systems (PI, IPPA, $116,000).

Assessing Air-infiltration Rates of Swine Housing Systems (PI, IPPA, $68,000).

Evaluating Strength, Sharpness, and Detectability of Veterinary-use Hypodermic Needles (PI, NPB, $75,600).

Evaluation of Transportation Conditions on Performance of Weaned and Feeder Pigs (Co-PI, NPB, $58,204).

Investigating the Cause and Mitigation of Pit Foaming in Swine Facilities (PI, IPPA, $1,000,000).

Russell W. Hoffman
Iowa State University
Agricultural and Biosystems Engineering, Lecturer
4342 Elings Hall
Ames, IA 50011
515.294.8800
russh@iastate.edu

Education

- M.S. Agricultural and Biosystems Engineering/Industrial Technology – Iowa State University, 2006
- B.S. Industrial Education and Technology – Iowa State University, 1992, Honors Student
- A.A.S. Machine Technology – Indian Hills Community College, 1981, Graduated with Honors

Academic Experience

- Iowa State University, Ames, Iowa (8/2014 – present
    - Lecturer, Ag & Biosystems Engineering (08/14-present)
    - Senior Teaching Laboratory Coordinator, Ag & Biosystems Engineering (03/13 – 08/14)
    - Teaching Laboratory Coordinator, Ag & Biosystems Engineering (01/10 – 03/13)

Non-academic Experience

- Iowa State University, Center for Statistics and Methodology, Systems Support Specialist (12/94 – 01/10)
- IntelliStat, Inc., President, (06/93 – 12/00)
- Iowa State University, Systems Analyst, Administrative Data Processing Center (01/93-12/94)
- Composite Technology Corporation, Machinist (02/88 – 08/90)
- Union Carbide Corporation, Industrial Area Mechanic/Machinist (01/81 – 06/87)

Honors and Awards

- Miller Faculty Fellow, 2012
- Member of the Ames High School Industrial Technology Advisory Committee, 2015
- Iowa State University Professional & Scientific Council Team Award for the Resource Hub, 2014
- Iowa Sports Club Adviser of the Year, 2010

Service Activities

- Faculty Advisor, Iowa State University's Industrial Technology (ITEC) Club

Adina Howe, Assistant Professor

Education

- Ph.D. Environmental Engineering, University of Iowa, 2009
- M.S. Environmental Engineering, Purdue University, 2005
- B.S. Mechanical Engineering, Purdue University, 2003

Academic Experience

- Iowa State University, 2014 – present
  - Assistant Professor, Agricultural and Biosystems Engineering
- Michigan State University, 2012 – 2013
  - Adjunct Professor, Microbiology and Microbial Genetics
- Michigan State University, 2009 – 2012
  - Postdoctoral Researcher, Microbiology and Microbial Genetics
- University of Iowa
  - Graduate Research Fellow, 2005 – 2009

Non-academic Experience

- Argonne National Laboratory, 2012-2013
  - Computational Scientist, Mathematics, Computation, and Life Sciences Division
- Exxon Mobil Production Company, 2002
  - Intern Fellow, US/East Operations Technology
- Cummins Engine Company, 2000, 2001
  - Intern Fellow, High Horsepower Engineering

Certifications

- Engineer In-Training License

Professional Organizations

- American Society of Microbiology (2005-present)
- International Society of Microbial Ecology (2009-present)

Service Activities

- Software Carpentry, 2009 – present
  - Instructor and volunteer
- Scipy 2014, Program committee member
- Scientific Reviewer *BMC Bioinformatics*; *G3: Genes, Genomes, Genetics*, *International Society for Microbial Ecology*; *Molecular Ecology Resources; PLOS ONE*; *Biotechnology Journal*; Bacteriophage; and French Genomique Infrastructure Program
- Graduate Women in Science, Reviewer

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Aw, T.G., **Howe, A.**, and Rose, J. Metagenomic approaches for direct and cell culture evaluation of the virological quality of wastewater. 2014. Journal of virological methods 210(15):15-21. doi:10.1016/j.viromet.2014.09.017 http://www.sciencedirect.com/science/article/pii/S0166093414003723

- Williams, R.J., **Howe, A.**, and Hofmockel, K. 2014. Demonstrating microbial co-occurrence patter analyses within and between ecosystems. Frontiers in Microbiology 5(358). doi: 10.3389/fmicb.2014.00358 http://journal.frontiersin.org/Journal/10.3389/fmicb.2014.00358

- **Howe, A.C.**, Jansson, J., Malfattie, S., Tringe, S., Tiedje, J., and Brown, C.T. 2014. Tackling soil diversity with the assembly of large, complex metagenomes. PNAS. Accepted February 11, 2014. doi:10.1073/pnas.1402565111. http://www.pnas.org/content/early/2014/03/13/1402564111.short

- Vital, M, **Howe, A.C.**, and Tiedje, J. 2014. Revealing the bacterial butyrate-synthesis pathways from (meta)genomic data. mBio 5(2):e00889-14. doi: 10.1128/mBio. 00889-14. *Featured in Faculty of 1000 Prime.* http://mbio.asm.org/content/5/2/e00889-14

- Pell, J., Hintze, A., Canino-Koning, R., **Howe, A.C.,** Tiedje, J.M., and Brown, C.T. 2012. Scaling metagenome sequence assembly with probabilistic de Bruijn graphs. PNAS 109(33):13272-13277. doi:10.1073/pnas.1121464109. http://www.pnas.org/content/109/33/13272.full

- **Chuang, A.S.**, Jin, Y.O., Schmidt, L.S., Li, Y., and Mattes, T.E. 2010. Proteomic analysis of ethene-enriched groundwater microcosms from a vinyl chloride-contaminated site. Environ. Sci. Technol. 44(5):1594-1601. doi: 10.1021/es903033r. http://pubs.acs.org/doi/abs/10.1021/es903033r

- **Chuang, A.S.** and Mattes, T.E. 2007. Identification of polypeptides expressed in response to vinyl chloride, ethene, and epoxyethane in *Nocardioides* sp. strain JS614 by using peptide mass fingerprinting. Appl. Env. Microbiol. 73(13):4368-4372. doi: 10.1128/AEM.00086-07. http://aem.asm.org/content/73/13/4368.full

- Mattes, T.E., Coleman, N.V., **Chuang, A.S.**, Rogers, A., Spain, J.C., and Gossett, J.M. 2006. Mechanism controlling the extended lag period associated with vinyl chloride starvation in *Nocardioides* sp. strain JS614. Arch. of Microbiol. 187(3):217-226. http://link.springer.com/article/10.1007%2Fs00203-006-0189-2

Charles Hurburgh, Professor

Education

- Ph.D. Agricultural Engineering, Iowa State University, 1981
- M.S. Agricultural Engineering, Iowa State University, 1980
- B.S Agricultural Engineering, Iowa State University, 1973

Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 1990-1995), full time or part time

Iowa State University

- 1995-Present: Professor (30% extension; 70% research)
- 1991-1994: Professor (30% teaching; 70% research)
- 1985-1991: Associate Professor (30% teaching; 70% research)
- 1982-1985: Assistant Professor (25% teaching; 75% research)
- 1978-1982: Instructor (25% teaching; 75% research)
- 1976-1978: Instructor (full-time teaching)
- 1976: Graduate Research Assistant

Non-academic experience – company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time

- 1972-1976: Operated family cash grain farm (1000 acres corn, soybeans) (full-time)

Current membership in professional organizations

- American Society of Agricultural Engineers (ASAE)
- American Society of Cereal Chemists (AACC)
- Iowa Academy of Science (IAS)
- Grain Elevator and Processing Society (GEAPS)
- American Oil Chemists Society (AOCS)
- Society for Applied Spectroscopy (SAS)
- International Diffuse Reflectance Council (IRDC)
- Council on Near-Infrared Spectroscopy (CNIRS)

Honors and awards

- Extension Service Award, College of Engineering (2010)

Service activities (within and outside of the institution)

- NC-213 USDA regional research committee, Marketing and Delivery of Quality Cereals and Oilseeds (1978-) Iowa State University representative (1978-2014). Chair 1990-91. Iowa Contribution Station project 3261/5373, Principal investigator
- AACC NIR methods (1989-). Chair 2000-2013
- Calibration guideline method developed, included in Methods of AACC and AOCS AACC Biotechnology Methods (2000-)
- U.S. Technical Advisory Group, ISO Technical Committee TC34, working group 7 (biotechnology testing) and working group 12 (traceability) (2001-)
- ISO22000, Food Safety and Quality Management Systems, TC34, WG17. US advisory Group (2009 –)
- AACC Food Safety Audit Task Force. (2009-)
- Agribusiness Association of Iowa grain committee and feed committee (2010 –)
- International Center for Grain Operations and Processing, Board President (2012 -)
- FDA Food Safety Preventive Controls Alliance, animal feed section. (2013 -)

Pilcher, C.M., A. Greco, C.R. Hurburgh, G.P. Munkvold, C.K. Jones and J.F. Patience. 2012. Amino acid composition and digestibility of mold damaged corn selected for low mycotoxin content fed to finishing pigs. J. Anim. Sci. 90 (E-Suppl. 2):49.

Esteve Agelet, Lidia, David D. Ellis, Susan Duvick, A. Susana Goggi, Charles R Hurburgh, and Candice A. Gardner. 2012. Feasibility of Near Infrared Spectroscopy for Analyzing Corn Kernel Damage and Viability of Soybean and Corn Kernels. Journal of Cereal Science, 55(2) March 2012: 160–165

Mosher, G.A., N. Keren, S. A. Freeman, C. R. Hurburgh Jr. 2013. Measurement of Worker Perceptions of Trust and Safety Climate in Managers and Supervisors at Commercial Grain Elevators. Journal of Agricultural Safety and Health 19(2): 125-134.

Lidia Esteve Agelet, Paul R. Armstrong, Jasper G. Tallada, and Charles R. Hurburgh Jr. 2013. Differences between conventional and glyphosate tolerant soybeans and moisture effect in their discrimination by near infrared spectroscopy. Food Chemistry 141(2013): 1895 – 1901.

G. A. Mosher, N. Keren, C.R. Hurburgh. 2013. Employee Trust and Its Influence on Quality Climate at Two Administration Levels. The Journal of Technology, Management, and Applied Engineering (JTMAE), Volume 29, Number 1 (January through March 2013).

Esteve Agelet, Lidia , Paul R. Armstrong, Jasper G. Tallada, Charles R. Hurburgh. 2013. Discrimination of Conventional and Roundup Ready Soybean Seeds. Differences between conventional and glyphosate tolerant soybeans and moisture effect in their discrimination by near infrared spectroscopy. Food Chemistry 141 (2013) 1895–190.

Mosher, G.A., N. Keren and C.R. Hurburgh. 2013. Development of a quality decision-making scenario to measure how employees handle out-of-condition grain. Applied Engineering in Agric., 29(5), 807-814.

Mosher, G.A., N. Keren, S.A. Freeman, and C.R. Hurburgh. 2013. Two-level measurement of trust and safety climate in the commercial grain elevator. Journal of Agricultural Safety and Health, 19(2), 125-134

Agelet, L. and C. R. Hurburgh. 2014. Limitations and current applications of Near Infrared Spectroscopy for single seed analysis. Talanta. 121(2014): 288 - 299.

Medic, J., C. Atkinson, and C. R. Hurburgh. 2014. Current Knowledge in Soybean Composition. J Am Oil Chem Soc (2014) 91:363–384

Mosher, G.A., N. Keren, S. A. Freeman, and C. R. Hurburgh Jr. 2014. Development of a Safety Decision-Making Scenario to Measure Worker Safety in Agriculture. Journal of Agricultural Safety and Health. 20(2): 91-107

Biller, Clemence, Charles Hurburgh, Nanning Cao and Glen Rippke. 2014. Calibration of the JDSU MicroNir 1700 for agricultural product analysis. NIR News 25:16-29.

Briefly list the most recent professional development activities

- American Society of Cereal Chemists (AACC) annual meetings 2010,2011,2012,2013, 2014
- Grain Elevator and Processing Society (GEAPS) annual meetings 2010, 2011, 2012, 2013, 2014
- American Oil Chemists Society (AOCS) annual meetings 2010, 2011, 2012, 2013
- Council on Near-Infrared Spectroscopy (CNIRS) annual meeting 2010, 2012
- International Conference on Diffuse Reflectance (France). 2013.

<u>Amy Kaleita, Associate Professor</u>

Education

- Ph.D. Agricultural Engineering, University of Illinois at Urbana-Champaign, 2003
- M.S. Civil & Environmental Engineering, University of Illinois at Urbana-Champaign, 1999
- B.S. Agricultural Engineering, Pennsylvania State University, 1997

Academic experience

- Iowa State University, Ames, Iowa (8/03 - present)
    - Associate Professor, Agricultural and Biosystems Engineering (8/09 - present)
    - Assistant Professor, Agricultural and Biosystems Engineering (8/03 - 8/09)
- University of Illinois at Urbana-Champaign (8/97 - 8/03)
    - Graduate Research Fellow, Agricultural and Biological Engineering (5/00-8/03)
    - Graduate Research Fellow, Civil Engineering, Environmental Hydrology and Hydraulic Engineering Laboratory (8/97 - 5/00)

Non-academic experience

- Summer Graduate Fellow, NASA Goddard Space Flight Center, Greenbelt, MD (6/99-8/99)
- Student research assistant, USDA ARS Pasture Systems and Watershed Management Research Laboratory, University Park, PA (5/96-8/97)

Certifications or professional registrations

- PE in Agricultural Engineering, State of Iowa (2014), Certificate Number 22002.

Current membership in professional organizations

- Tau Beta Pi Engineering Honor Society *(1996 - present)*
- American Society of Agricultural and Biological Engineers (ASABE) *(2000 - present)*
- Soil and Water Conservation Society *(2013-present)*

Honors and awards

- Gilbreth Lectureship for Young Engineers, National Academy of Engineering (2013)
- Young Engineer of the Year, American Society of Agricultural and Biological Engineers, Iowa Section (2011)
- Superior Engineering Teacher Award, Iowa State University College of Engineering (2010)
- A.W. Farrall Young Educator Award, American Society of Agricultural and Biological Engineers (2008)
- New Teacher Award, USDA and the National Association of State Universities and Land-Grant Colleges (2007)
- Teaching Award of Merit, North American College Teachers of Agriculture (2006)

Service activities (within and outside of the institution)

- Chair, College of Engineering Honors Program Committee, Iowa State University (2009-Present)

- Vice Chair and Public Member (gubernatorial appointee), Iowa Flood Mitigation Board (2013-present)
- Member, Environmental Sciences Graduate Program Supervisory Committee, Iowa State University (2010-present)
- Iowa State University Campus Coordinator for the Iowa Space Grant Consortium (2011-present)
- Associate Editor, *Transactions of the ASABE* (2006-present), *Journal of Social and Water Conservation* (2013-present)

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Van Arkel, Z., and A.L. Kaleita. 2014. Identifying sampling locations for field-scale soil moisture estimation using self-organizing maps and K-Means clustering; *Water Resources Research* 50(8): 7050-7057.
- Newman, J.K., A. Kaleita, and L.W. Morton. 2013. Stakeholder perspectives of two different sediment TMDL calculation methods. *Journal of Soil and Water Conservation* 68(1):73-81.
- A. Kaleita and D.R. Raman. 2012. A rose by any other name: An analysis of agricultural and biological engineering undergraduate curricula. *Transactions of the ASABE.* 55(6): 2371-2378.
- Abd-Aziz, S., B. Steward, A. Kaleita, and M. Karkee. 2012. Assessing the effects of DEM uncertainty on erosion rate estimation in an agricultural field. *Transactions of the ASABE*. 55(3): 785-798.
- Chighladze, G., A. Kaleita, S. Logsdon, and S. Birrell. 2012. Estimating soil solution nitrate concentration from dielectric spectra using partial least squares analysis. *Soil Science Society of America Journal*. 76(5): 1536-1547.
- Qi, Z., M. Helmers, and A. Kaleita. 2011. Soil water dynamics under various agricultural land covers on a subsurface drained field in north-central Iowa, USA. *Agricultural Water Management*. 98(4): 665-674.
- Chighladze, G., A. Kaleita, and S. Birrell. 2010. Sensitivity of capacitance soil moisture sensors to nitrate ions in soil solution. *Soil Science Society of America Journal.* 74: 1987-1995.
- S.D. Logsdon, T.J. Sauer, G. Hernandez-Ramirez, J.L. Hatfield, A. Kaleita, J.H. Prueger. 2010. Effect of corn or soybean row position on soil water. *Soil Science* 175(11): 530-534.
- Newman, J.K., A. L. Kaleita, and J. Laflen. 2010. Soil erosion hazard maps for corn stover management using NRI data and WEPP. *Journal of Soil and Water Conservation.* 65(4): 211-222.

Ramesh Kanwar, C.F. Curtiss Distinguished Professor

4358 Elings Hall, Iowa State University, Ames, Iowa 50011, USA
E-mail: rskanwar@iastate.edu; Phone: 515-294-0417

Education

- Ph.D. Agricultural Engineering (Water Resources Engr), Iowa State Univ., Ames, Iowa, USA.
- M.S. Irrigation & Drainage Engineering, G.B. Pant Univ. Ag & Tech, India.
- B.S. Agricultural Engineering, Punjab Agricultural University., India.

Academic experience

- 2009-Present: C.F. Curtiss Distinguished Professor of Water Resources Engineering, Iowa State
- 2011-2013: Vice Chancellor, Lovely Professional University, India
- 2001- 2011: Professor and Chair, Department of Agricultural and Biosystems Engineering, ISU
- 1999-2002: Director, Iowa State Water Resources Research Institute (ISWRRI).
- 1997-2001: Assistant Director, Iowa Experiment Station at Iowa State University.
- 1991-1997: Director of Graduate Education, Dept. of Agric. and Biosy. Engineering, Iowa State
- 2001-Present: Faculty Member, Environmental Sciences & Sustainable Agriculture, Iowa State
- 1991-2009: Professor of Agricultural and Biosystems Engineering, Iowa State University
- 1993-1996: International Professor, College of Agric. & Life Sciences, Iowa State University
- 1986-1991: Associate Professor of Water Resource Engineering at Iowa State University
- 1983-1986: Assistant Professor of Water Resource Engineering at Iowa State University
- 1981-1982: Instructor of Water Resource Engineering, Iowa State University
- 1976-1981: Graduate Assistant, Department of Agricultural Engineering, Iowa State University
- 1974-1976: Assistant Professor, Soil & Water Engineering, Punjab Agricultural University, India
- 1973-1974: Research Fellow, (ICAR), G.B. Pant Univ. of Agric. & Technology, Pantnagar, India
- 1969-1973: Lecturer/Assistant Professor, Punjab Agricultural University, Ludhiana, India

Non-academic experience – company or entity, title, brief description of position

- 1969: Junior Engineer with H.P. Government, India

Certifications or professional registrations

- American Institute of Hydrology – Professional Hydrologist-Water Quality, December 12, 1995

Current membership in professional organizations

- Life Member, American Society of Agricultural and Biological Engineers
- Life Member, Indian Society of Agricultural Engineers
- Life Member, International Association of Hydrological Sciences
- Life Members, Asian Association for Agricultural Engineering, foundation member
- Life Member, International Commission on Irrigation and Drainage, life member
- Life Member, Indian Science Congress Association

Honors and awards

- Distinguished Alumni Award, Punjab Agricultural University, India (2012)
- Punjab Ratan Award, All India Conference of Intellectuals, India (2012)
- International Agriculture Leadership Award, Agriculture India Today, India (2012)
- Fellow, Indian Society of Agricultural Engineers, India (2012)
- Sakai Science and Technology Award, Asian Association of Agricultural Engineering (2012)

- John Deere Gold Medal Award from ASABE (2009)
- Superior Research Paper Award from ASABE (2009)
- International Award of Merit from Gamma Sigma Delta (2009)
- Significant Contributor Award Administrative Advisor of NCERA 101 Committee (2009)
- Fellow, American Society of Agricultural & Biological Engineers (2007)
- Honorary Doctorate Degree, Trakia University, Bulgaria (2007)
- Honorary Doctorate Degree, Georgia State University, Tbilisi, Georgia (2003)

Service activities (within and outside of the institution)

- Promotion and Tenure Committee, College of Engineering (2014-2015)
- External Assessor, Putra University Malaysia (2014-2017)
- President's Advisory Board for India' $40 M Project, Cornell University (2011-2015)
- Panel member to review USAID Grants for Philippines, Indonesia, Georgia (2009-2013)
- Administrative advisor of ERA committees (NCERA 101, NCERA 217), 2007- present
- ISU Provost's Distinguished Professor Awards Committee (2010-2011)
- Task Force on Higher Education, Planning Commission of Government of India (2011-13)

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Ruttanaprasert, R., P. Banterng, S. Jogloy, N. Vorasoot, T. Kesmala, **R.S. Kanwar**, C.C. Holbrook, and A. Patanothai. 2014. Genotypic variability for tuber yield, biomass and drought tolerance in Jerusalem artichoke germplasm. Turkish J.oAgriculture and Forestry 38 (4):570-580.
- Malone, R.W., B.T. Nolan, L. Ma, **R.S. Kanwar**, C. Peterson and P. Heilman. 2014. Effects of tillage and application rate on atrazine transport to subsurface drainage: evaluation of RZWQM using a six year field study. Agricultural Water Management 132:10-22.
- Ahmed, S., S. Mickelson, C. Pederson, J. Baker, **R.S. Kanwar**, J. Lorimor, and D. Webber. 2013. Swine manure rate, timing, and application method effects on post-harvest soil nutrients, crop yield, and potential water quality implications in a corn-soybean rotation. TRANSACTIONS of the ASABE 56 (2): 395-408.
- Huy, N.Q.,N.L. Hoover, **R.S. Kanwar**, P. Dixon, J. Hobbs, C. Pederson, and M.L. Soupir. 2013. Long-term application of poultry manure effects on crop yield, N-Uptake, and residual soil nitrate-nitrogen under corn-soybean rotation system. Journal of Research Vol.49 (3):193-199.
- Ruttanaprasert, R., S. Jogloy, N. Vorasoot, T. Kesmala, **R.S. Kanwar**, C.C. Holbrook, and A. Patanothai. 2013. Photoperiod and growing degree days effect on dry matter partitioning in Jerusalem artichoke. International Journal of Plant Production 7 (3): 393- 415.
- Huy, N.Q., **R.S. Kanwar**, N.L. Hoover, P. Dixon, J. Hobbs, C. Pederson, and M.L. Soupir. 2013. Long-Term Effects of Poultry Manure Application on Nitrate Leaching in Tile Drain Water. Transactions of the American Society of Agricultural and Biological Engineers 56(1): 91-101.
- Ruttanaprasert, R., S. Jogloy, N. Vorasoot, T. Kesmala, **R.S. Kanwar**, C.C. Holbrook, and A. Patanothai. 2012. Relationship between chlorophyll density and spad chlorophyll meter reading for Jerusalem artichoke (*Helianthus tuberosus* L.). SABRAO J. Breed. Genet. 44 (1): 149-162
- Heilman, P., **R.S. anwar**, R.W. Malone, L. Ma, J. L Hatfield, and K. P Boyle, 2012. Nashua agronomic, water quality and economic data set. J. Soil and Water Conservation, 67(6): 502-512.
- Heilman, P., R.W. Malone, L. Ma, J. L Hatfield, L. R Ahuja, K. P Boyle, and **R. S. Kanwar**. 2012. Extending results from agricultural fields with intensively monitored data to surrounding areas for water quality management. Agricultural Systems 106 (1): 59 – 71.

Nir Keren, Associate Professor

Education

Ph.D. Interdisciplinary Engineering (Chemical Engineering Department), Texas A&M University, December 2003

M.S. Management and Safety Engineering, Ben Gurion University, Israel, July 1998

B.S. Mechanical Engineering, Ben Gurion University, Israel, July 1990

Academic Experience

Iowa State University, Ames, Iowa

Associate Professor, Ag. & Biosystems Engineering (8/11 – Present)

Assistant Professor, Ag. & Biosystems Engineering (8/05 – 7/11)

Graduate Faculty, Human Computer Interaction (11/05 - Present)

Konan University, Kobe, Japan

Special Guest Researcher (4/07 – 04/08)

Texas A&M University, College Station, Texas

Assistant Research Scientist, Chemical Engineering (1/04 – 7/05)

Graduate Research Assistant, Chemical Engineering (1/00 – 12/03)

Non-academic Experience

Keren Consult, L.L.C. (2014-present),

Owner, manager, organizational climate assessments and training services

Rotem Amfert Group, Negev, Israel

Maintenance Manager, Sulfuric Acid Plant (5/99 – 12/00)

Dead Sea Bromine Compounds Group, Ramat Hovav, Israel

Maintenance Manager, Fine Chemical Divisio (8/98 – 5/99)

Nuclear Research Center in the Negev, Israel.

Project Manager and Division Safety Engineer (1995 – 8/98)

Maintenance Manager (1992 - 1995)

Maintenance Engineer (1990 - 1992)

Israeli Navy, Israel (1982 - 1985)

Honors and Awards

Iowa Labor Commissioner Recognition of Service on the Iowa Occupational Safety and Health Advisory council 2011

Miller Faculty Fellow, ISU 2008-2009

Miller Faculty Fellow, ISU 2007-2008

MS with Magna Cum Laude, Ben Gurion University, Israel 1998

Professional Affiliations

1. American Institute of Chemical Engineers 2002-2011
2. American Society of Safety Engineers 2004-Present
3. Association of Technology Management and Applied Engineering 2005-Present
4. Society for Judgment and Decision Making 2008-Present
5. Human Factors and Ergonomics Society 2012 - Present

Selected service activities (within and outside of the institution)

- Editor-in-chief, Journal of Technology, Management, and Applied Engineering (2012-present)
- Member of the Iowa Governor Occupational Safety and Health Advisory Council (2008-present)
- Iowa State University Faculty Senate (2008-2014)
- American Institute of Chemical Engineers Loss Prevention committee (2008 – 2012)
- Center for Chemical Process Safety, Safety and Chemical Engineering Education Committee (2008-2012)

Selected list of publications and presentations

Mosher, G. A., Keren, N., Freeman, S. A., & Hurburgh, C. R. (2014). Development of Safety Decision-Making Scenario to Measure Worker Safety in Agriculture, Journal of Agricultural Safety and Health.

Mosher, G. A., Keren, N., & Hurburgh, C. R. (2013). Development of quality decision-making scenario to measure how employees handle out-of-condition grain, Applied Engineering in Agriculture, 29(5): 807-814.

Bayouth, S. T., Keren, N., Franke, W. D., & Godby, K. (2013). Examining firefighter decision-making: How experience influences speed in process and choice, International Fire Service Journal of Leadership and Management, 7.

Mosher, G. A., Keren, N., & Freeman, A. S. (2013). Measurement of Worker Perceptions of Trust and Safety Climate in Managers and Supervisors at a Commercial Grain Elevator, Journal of Agricultural Safety and Health, 19(2). 125-134.

Mosher, G. A., Keren, N., & Hurburgh C. R. (2013). Employee trust and its influence on quality climate at two administration levels, Journal of Technology Management and Applied Engineering, 29(2).

Mosher, G. A., Keren, N., Freeman, S. A., Hurburgh C. R. (2012). Management of safety and quality and the relationship with employee decisions in the country grain elevator, Journal of Agricultural Safety and Health, 18(3): 195-215.

Cena, L., Keren, N., Li, W., Carriquiry, A. L., Pawlovich, M. D., & Freeman S. A., (2011). A Bayesian assessment of the effect of highway bypasses in Iowa on crashes and crash rates, Journal of Safety Research, 42(4): 241-252.

Keren, N., Freeman, S. A., Harmon, J. D., & Bern, C. J. (2011) Testing the effectiveness of an online safety module for engineering students, International Journal of Engineering Education, 27(2): 284-291.

Keren, N. (2010). Incident database-based framework for establishing industrial safety performance assessments. Journal of Industrial Technology, 26(2):2-12.

Samuel, C., Keren, N., Shelley, M. C., & Freeman, S. A. (2009). Frequency analysis of hazardous material transportation incidents as a function of distance from origin to incident location. Journal of Loss Prevention in the Process Industries. 22(6): 783-790.

Jacek Koziel, Associate Professor

Education

- Ph.D. Civil Engineering, University of Texas at Austin, 1998
- M.S. Environmental Quality Engineering, University of Alaska Anchorage, 1993
- M.S. Mechanical Engineering, Warsaw University of Technology, Poland, 1989

Academic experience

- 2007-Present: Associate Professor, Department of Agricultural and Biosystems Engineering, Iowa State University (50% research, 50% teaching)
- 2004-2007: Assistant Professor, Department of Agricultural and Biosystems Engineering, Iowa State University (50% research, 50% teaching)
- 2000-2004: Assistant Professor, Texas Agricultural Experiment Station and Texas Agricultural Extension Service, Texas A&M University (75% research, 25% extension)
- 2001-2003: Adjunct Professor, West Texas A&M University (WTAMU) in Canyon, TX
- 1998-2000: Research Associate/Postdoctoral Fellow, New Analytical Methods and Technologies, Department of Chemistry, University of Waterloo, Canada

Current membership in professional organizations

- American Society of Agricultural and Biological Engineers
- Alpha Epsilon Agricultural Engineers Society
- Air & Waste Management Association
- American Chemical Society
- International Society for Olfaction and Chemical Sensing

Honors and awards

- 2015 - Distinguished Fellow, Collegium of Eminent Scientists, Kosciuszko Foundation, NY, USA.
- Featured on the "Stink" episode of *History Channel – Modern Marvels* production, air time – Jan 23, 2012.
- Outstanding Toxicology Faculty Mentor Award, Iowa State University (2011)
- Nomination for the 2011 Grand Prize Katerva Award ('Nobel Prize' for sustainability) for the "Hydrothermal liquefaction for sustainable oil spill remediation and partial recovery of oil product streams" white paper in response to the Gulf of Mexico 2010 oil spill (Rapp, Zhang, Wang, Sun, Minarick, Woolcock and Koziel) (2011)
  - Multistate Research Award for Project S-1032. Improving the sustainability of livestock and poultry production in the United States (2011)
- The Best Paper Award – 1st World Conference PETrA (Pollution and Environment
  - Treatment of Air) 2011, for "Simultaneous Chemical and Sensory Analysis of Odor" by Koziel, Cai, Zhang, Hoff, Prague, Czech Republic (2011)
- Alpha Epsilon Agricultural Engineering Society, Honorary Member (2011)
- ISU Coll. of Agricult. and Life Sci. Mid-Career Achievement in Research Award (2010)

Service activities (within and outside of the institution)

- ABE Scholarships Committee, chair

- ABE Awards and Honors Committee, vice-chair
- ABE International programs, member
- College of Engineering, at-large senator and Caucus member

Briefly list the most important publications and presentations from the past five years –

- Woolcock, P.J., J.A. Koziel, P.A. Johnston, R.C. Brown, K.M. Broer. 2015. Analysis of trace contaminants in hot gas streams using time-weighted average solid-phase microextraction: pilot-scale validation. *FUEL*, in press.
- Baimatova, N., J.A. Koziel, B. Kenessov. 2015. Quantification of benzene, toluene, ethylbenzene and o-xylene in internal combustion engine exhaust with time-weighted average solid phase microextraction and gas chromatography mass spectrometry. *Analytica Chimica Acta*, in press.
- Zhu, W., J.A. Koziel, L. Cai, H.D. Ozsoy, J.H. van Leeuwen. 2015. Quantification of carbonyl compounds generated from ozone-based food colorants decomposition using on-fiber derivatization-SPME-GC-MS. *Chromatography*, 2015, 2, 1-18.
- Akdeniz, N., L.D. Jacobson, B.P. Hetchler, S.D. Bereznicki, A.J. Heber, J.A. Koziel, L. Cai, S. Zhang, D.B. Parker. 2012. Odor and odorous chemical emissions from animal buildings: Part 2 - odor emissions. *Transactions of ASABE*, 55(6), 2335-2345.
- Parker, D.B., L. Cai, J.A. Koziel, L. Jacobson, N. Akdeniz, S. Bereznicki, E. Caraway, S. Zhang, S.J. Hoff, A.J. Heber, T.T. Lim K. Heathcote, B. Hetchler. 2012. Odor and odorous chemical emissions from animal buildings: Part 6 - odor activity value. *Transactions of ASABE*, 55(6), 2357-2368.
- Rockafellow, E.M, J.A. Koziel, W.S. Jenks (2012). UV treatment of ammonia for livestock and poultry barn exhaust applications. *Journal of Environmental Quality*, 41, 281-288.
- Akdeniz, N., J.A. Koziel, T.D. Glanville, H-K Ahn, B.P. Crawford. 2011. Air sampling methods for VOCs related to field-scale biosecure swine mortality composting. *Bioresource Technology*, 102: 3599-3602.

Briefly list the most recent professional development activities (Invited presentations)

- Koziel, J.A., Maurer, D., J. Harmon, S. Hoff, A. Rieck-Hinz. Air Management Practices Assessment Tool (AMPAT) Literature Database. Environmental Protection Commission, Department of Natural Resources, State of Iowa, February, 2015.
- Koziel, J.A. 2014. Research on mechanisms of livestock odor generation Symposium of efforts to reduce odor emissions from livestock farming practices, National Institute of Animal Science, Suwon, Republic of Korea, June, 2014.
- Koziel, J.A. 2013. Iowa State University and Agricultural and Biosystems Engineering. Invited lecture at the University of Warmia and Mazury, Poland, November 2013.
- Koziel, J.A. 2012. Simultaneous chemical and sensory analyses with multidimensional GC-MS-Olfactometry. Invited lecture for the *International Conference on Analytical Chemistry and Ecology*, Al-Farabi National Kazakh University, Almaty, Kazakhstan, October, 2013.
- Koziel, J.A., S. Rice, D. Maurer. 2012. Simultaneous chemical and sensory analysis of odors and aromas with multidimensional GC. 29th *International Symposium on Chromatography* (the 29th ISC), Torun, Poland. September, 2012.

<u>Justin M. McGill, Lecturer</u>

Education

- M.S. Agricultural Systems Management, Purdue University, 2004
- B.S. Agricultural Systems Technology, Iowa State University, 2002

Academic Experience

Iowa State University

- 2011-Present: Lecturer, Agricultural and Biosystems Engineering

Purdue University

- 2002-2004: Graduate Research Assistant, Agricultural & Biosystems Engineering

Non-academic Experience

- March 2010 – January 2011, Territory Manger, Sioux Steel Corporation
- October 2009 – March 2010, Agent, American Family Insurance
- March 2008 – October 2009, Regional Agronomy Operations Manager, FC Cooperative Company
- September 2005 – March 2008, Operations Manager, The Andersons, Inc., Maumee, Ohio
- August 2002 – May 2004, Laborer, Purdue University Dairy Farm, West Lafayette, Indiana
- Summer 2002 – Intern, NRCS, Algona, Iowa
- Winter 2002 – Cashier, Lowes Outdoor Lawn and Garden Center, Ames, Iowa
- Summer 2001 – Crop/Field Scout, Prism Technologies, Baxter, Iowa
- Summer 2000 – Crop/Field Scout, County Line Cooperative, Sigourney, Iowa
- Summer 1999 – Intern, Linn County Conservation Board, Linn County, Iowa

Certifications or Professional Registrations

- Green Belt Certification in Lean Manufacturing, Bowling Green State University

Current Membership in Professional Organizations

- Epsilon Pi Tau - Member

Service Activities (within and outside of the institution)

- Member, ABE Safety Committee
- Member, ABE curriculum Committee

Dr. Steven K. Mickelson, Professor and Chair

Education

Name of Institution	Degree	Field of Study	Date of Degree
Iowa State University	B.S.	Agricultural Engineering	5/1982
Iowa State University	M.S.	Agricultural Engineering	5/1984
Iowa State University	Ph.D.	Agricultural Engineering	12/1991

Academic experience

Chair, Department of Agricultural and Biosystems Engineering, ISU	8/2011-present
Full Professor, Agricultural and Biosystems Engineering, ISU	7/2009-present
Director, Center for Excellence in Learning and Teaching, ISU	6/2008-present
Co-Director, Learning Communities, ISU	6/2008-present
Associate Chair, Agricultural and Biosystems Engineering, ISU	7/2005-present
Director of Assessment, College of Engineering, ISU	7/2005-6/2008
Associate Professor, Agricultural and Biosystems Engineering, ISU	7/1998-6/2009
Assistant Professor, Agricultural and Biosystems Engineering, ISU	7/1993-7/1998
Assistant Professor, Freshman Engineering, ISU	8/1984-6/1993
Adjunct Professor, Freshman Engineering, ISU	8/1982-8/1984
Graduate Assistant, Agricultural Engineering, ISU	1982-84, 87-91

Non-academic experience

Systems Engineer, Sundstrand (fluid power company), Ames, IA	5/1984-12/1984
Engineering Intern for the Buena Vista County, Storm Lake, IA	5/1979-8/1979

Current membership in professional organizations

American Society of Agricultural and Biological Engineers	1989-Present
American Society of Engineering Educators	1986-Present
Association of Technology, Management, and Applied Engineering	2011-Present
Tau Beta Pi	2012
Gamma Sigma Delta	1984
Alpha Epsilon Honors Society	1981

Honors and awards

- ISU Corly Brooke Learning Community Advocate Award 2014
- ISU Agricultural and Biosystems Engineering Chair's Faculty Citation Award 2009
- ISU Learning Community Scholarship Award 2008
- Sesquicentennial Hubbard Award Finalist for Teaching Excellence 2007
- ISU Membership to the 25 Year Club 2007
- ISU Scholarship Award for Exemplary Contributions to ISU Learning Communities 2007
- College of Agriculture Learning Community Coordinator Recognition 2007
- ISU Miller Faculty Fellowship (2x) 2007
- Award Chair, BAE Division of ASEE 2006
- ISU Miller Faculty Fellowship 2006

Service activities (within and outside of the institution)

- Provost's Quality Initiative Committee, member (2013-Present)
- Provost's Chair Cabinet, CoE member (2012-Present)
- Chair Cabinet, Subcommittee for Undergraduate Education, member (2012-2013)
- Leopold Center Advisory Board, member (2012-Present)
- Faculty Review Board, Student Harassment case (2013)
- Provost's Learning, Research, and Collaboration in the Future – Implications for Facilities Task Force (2011-2012)
- Faculty Senate C&I and ELPS Merger Monitoring Committee (2010-2011)
- CoE Chair of Animal Science Chair Search Committee (2013-2014)

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

1. Baughman, J.A. T.J. Brumm and **S.K. Mickelson**. 2014. Holistic Student Professional Development and Assessment: A Backward Design Approach. Journal of Technology, Management, and Applied Engineering. Accepted 3-20-14.
2. Laugerman, M., M. Shelley, **S.K. Mickelson**, and D. Rover. 2013. The Engineering Admissions Partnership Program: A Navigation Strategy for Community College Students Seeking a Pathway into Engineering. IJEE 29(5):1260-1269.
3. Ahmed, S.I., **S.K. Mickelson**, C.H. Pederson, J.L. Baker, R.S. Kanwar, J.C. Lorimor, and D. Webber. 2013. Swine manure rate, timing, and application method effects on post-harvest soil nutrients, crop yield, and potential water quality implications in a corn-soybean rotation. Transactions of the ASABE 56(2):395-408.
4. Webber, D.F., **S.K. Mickelson,** B.D. Whitman, T.L. Richard, and H.K. Ahn. 2011 Livestock manure windrow composting runoff and infiltration characteristics from laboratory rainfall simulations. *Compost Science and Utilization* (Accepted for publication on 3-8-2010)
5. Eide, A, R. Jenison, S. Mickelson, and L. Northup. Engineering Fundamentals and Problem Solving. 6th Edition. 2011.
6. Webber, D.F., **S.K. Mickelson**, L.W. Wulf, T.L. Richard, and H.K. Ahn. 2010. Hydrologic modeling of runoff from a livestock windrow composting site and vegetative filter strip buffers. *Journal of Soil and Water Conservation* 65(4):252-260.
7. Arora, K., **S.K. Mickelson**, M. Helmers, and J.L. Baker. 2010. Review of Pesticide Retention Processes Occurring in Buffer Strips Receiving Agricultural Runoff. *Journal of the American Water Resources Association* 46(3):618-647.
8. Webber, D.F., **S.K. Mickelson**, S.I. Ahmed, J.R. Russell, W.J. Powers, R.C. Schultz, and J.L. Kovar. 2010. Livestock grazing and vegetative filter strip buffer effects on runoff sediment, nitrate, and phosphorus losses. *Journal SWC* 65(1):34-41.
9. Saunders, K., T. Brumm, C. Brook, **S. Mickelson**, and S. Freeman. 2009. Assessing student work to support curriculum development: An engineering case study. *Journal of Learning Communities Research* 3(3): 47-62.
10. Webber, D.F., **S.K. Mickelson**, T.L. Richard, and H.K. Ahn. 2009. Effects of a livestock manure windrow composting site with a fly ash pad surface and vegetative filter strip buffers on sediment, nitrate, and phosphorus losses with runoff. *Journal of Soil and Water Conservation* 64(2):163-171.

Manjit Misra, Professor

Education

- Ph.D. Agricultural Engineering, University of Missouri, Columbia, 1978
- M.S. Agricultural Engineering, University of Missouri, Columbia, 1973
- B.S. Agricultural Engineering, Orissa University of Agricultural Technology, Orissa, India, 1971

Academic experience

Iowa State University

- 2008-Present: Dean's Chair for Distinction, College of Agriculture and Life Sciences
- 2005-2008: Director, Institute for Food Safety and Security
- 2002-Present: Founding Director, Biosafety Institute for Genetically Modified Agricultural Products (BIGMAP)
- 1991-Present: Director, Seed Science Center (full-time)
- 1991-present: Professor, Agricultural and Biosystems Engineering
- 1984-1991: Associate Professor, Agricultural and Biosystems Engineering
- 1979-1984: Assistant Professor, Agricultural and Biosystems Engineering

University of Missouri

- 1978-1979: Research Associate (full-time)
- 1971-1978: Graduate Research Assistant (part-time)

Non-academic experience – company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time: none

Certifications or professional registrations: none

Current membership in professional organizations

- American Society of Agricultural Engineers
- American Seed Trade Association
- African Seed Trade Association
- Iowa Seed Association
- Alliance to End World Hunger

Honors and awards

- Chair, National Genetic Resources Advisory Council, USDA, (2012-14)
- Appreciation Plaque from the American Seed Trade Association for chairing the planning committee of Corn and Sorghum seed research conference, 2011
- Order of the Knoll Distinguished Faculty and Staff Award, Iowa State University 2008
- Honorary Member, Iowa Seed Association, 2007
- Global Round Table Discussion for Farmers on "Networking on Biotechnology", The World Food Prize International Symposium, moderator, 2007

Service activities (within and outside of the institution)

- Founding Board member, First the Seed Foundation
- Member, Steering Committee, Food and Agriculture Organization (FAO) International Biotechnology Conference, 2009-10
- Editorial Board, Seed World (2002-present)

- Proposal reviewer for Plant Science Institute Grants Program (2000-present)
- Board of Directors, Iowa Seed Association (1991-present)
- Board of Directors, Iowa Crop Improvement Association (1993-present)
- Chair, Education committee, First the Seed Foundation, American Seed Trade Association, 2011-12

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Okeno, J.A., E. Mutegi, S. de Villiers, J. D. Wolt, and M. K. Misra. 2012. Morphological Variation in the Wild-Weedy Complex of Sorghum Bicolor in Situ in Western Kenya: Preliminary Evidence of Crop-to-Wild Gene Flow. *Int. J. Plant Sci*. 173(5):1-10.
- Iakovoglou, V., M. K. Misra, R. B. Hall, and A. D. Knapp. 2010. Alterations of Seed Variables Under Storage in Nitrous Oxide (N2O) Atmospheres for Two Recalcitrant Quercus Species. *Scandinavian Journal of Forest Research*, 25(1): 24-30.
- Iakovoglou, V., M. K. Misra, R. B. Hall, and A. D. Knapp. 2009. How Seed Size and Desiccation Time Affect Seed Deterioration of Quercus macrocarpa L. *Seed Technology*. 31(1) 21-39.
- Krueger, N. A., C. J. Bern, M. K. Misra, K. M. Adam. 2007. Gravity Table Sorting of Commodity Corn. *Applied Engineering in Agriculture*, 23(3), 319-325.
- Iakovoglou, V., M. K. Misra, R. B. Hall, and A. D. Knapp. 2007. The Effect of Seed Size and Parent Tree on Seed Variables and Seedling Growth of Quercus spp. *Seed Science and Technology*, Vol. 35:771-777.
- Wolt, J.D., Y-Y. Shyy, P. Christensen, K.S. Dormin, and M. Misra. 2005. Quantitative Exposure Assessment for Confinement of Maize Biogenic Systems. *Environmental Biosafety Research*, 3:183-196. Also at http://www.edpsciences.org/10.1051/ebr:2005004.
- Adam K, M. Misra, and D. Thoreson. 2004. Removal of Ergot from Barley by Density Separation. *Applied Engineering in Agriculture*, 20(1):39-43.
- "Quality Seeds to Feed the World", invited presentation to the USAID (2011), to Department of State (2011), to the International Food Policy Research Institute (2010) and to the Alliance for Green revolution in Africa, 2009.
- "Service, the Legacy of Dr. George Washington Carver", invited presentation at the Iowa Seed Association Convention 2009, (Service: the Legacy of Dr. George Washington Carver, Iowa Seed Association Convention, Ames, Iowa, 2009, to the , National Black Caucus of State Legislators Conference, Little Rock, Arkansas, 2007.

Briefly list the most recent professional development activities

- Corn and Sorghum Seed Research Conference, American Seed Trade Association, 2011, 2010, 2009, 2008, 2007
- Soybean seed Research conference, American Seed Trade Association, 2011, 2010, 2009, 2008, 2007
- USAID-USDA Food security Conference, 2011
- USDA Outlook Conference, 2011
- Food and Agriculture Organization (FAO) International Biotechnology Conference, Mexico, 2009-10

Gretchen A. Mosher, Assistant Professor

Education

- Ph.D. Industrial & Agricultural Technology, Iowa State University, 2011
- M.S. Family & Consumer Sciences Education, Iowa State University, 2002
- B.S. Food Science, Iowa State University, 1996

Academic Experience

- Iowa State University, Ames, Iowa (10/96 – present)
    - Assistant Professor, Agricultural & Biosystems Engineering, (8/12 – present)
    - Post-Doctoral Associate and Lecturer, Agricultural & Biosystems Engineering, (5/11 – 8/12)
    - Graduate Research Assistant, Agricultural & Biosystems Engineering, (8/2006 – 5/2011)
    - Lecturer, Apparel, Educational Studies, & Hospitality Management, (8/2003-8/2006)
    - Research Associate, Animal Science, (10/1996-3/2004)

Non-academic Experience

- No recent experience

Current Membership in Professional Organizations

- Association of Technology, Management, and Applied Engineering, (2006- present)
- American Society of Engineering Education, (2006 – present)
- American Society of Agricultural & Biological Engineers, (2012-present)
- International Society for Agricultural Safety & Health, (2010-present)
- Grain Elevator and Processing Society, (1/2011-present)
- Epsilon Pi Tau, Alpha Xi Chapter, (1/2009-present)

Honors & Awards

- Miller Faculty Fellow (2013-2014), Iowa State University
- 2011 Warner Graduate Student Research Award (Region 4), Epsilon Pi Tau (March 2011)
- 2010 Graduate Research Award. Association of Technology, Management and Applied Engineering (October 2010)
- 2008 Best Conference Paper Award for "Food traceability using quality management systems to meet the Food and Drug Administration Bioterrorism Act of 2002" by C.M. Laux, **G.A. Mosher** and C.R. Hurburgh. National Association of Industrial Technologists (November 2008)

Service Activities (within and outside of the institution)

- Associate Editor, Journal of Technology, Management, & Applied Engineering, (11/2014-present)
- Safety Division President, Association for Technology, Management, & Applied Engineering, (11/2014-present)
- Co-chair, Professional Improvement Committee, International Society for Agricultural Safety & Health, (6/2014-present)
- Institutional representative and executive committee secretary, USDA Multi-state Research Project NC 213, (2/2014-present)

Important publications from past five years

- Ramaswamy, S.K. and G.A.Mosher. 2015. Perceptions of agricultural college students on the relationship between quality and safety in agricultural work environments. *Journal of Agricultural Safety and Health*, in press.

- Mosher, G.A., N. Keren, S.A. Freeman, and C.R. Hurburgh. 2014. Development of a safety decision-making scenario to measure worker safety in agriculture. *Journal of Agricultural Safety and Health*, 20(3), 91-107.

- Mosher, G.A., N. Keren, S.A. Freeman, and C.R. Hurburgh. 2013. Measurement of Worker Perceptions of Trust and Safety Climate in Managers and Supervisors at Commercial Grain Elevators. *Journal of Agricultural Safety and Health*, 19(2), 125-134.

- Mosher, G.A**.**, N. Keren and C.R. Hurburgh. 2013. Development of a quality decision-making scenario to measure how employees handle out-of-condition grain. *Applied Engineering in Agriculture*, 29(5), 807-814.

- Mosher, G.A**.**, N. Keren, and C.R. Hurburgh. 2013. Employee trust and its influence on quality climate at two administration levels. *Journal of Technology, Management, and Applied Engineering*, 29(2).

- Mosher, G.A. 2013.Trust, safety, and employee decision-making: A review of research and discussion of future directions. *Journal of Technology, Management, and Applied Engineering*, 29(1).

- Mosher, G.A., S.A. Freeman and C.R. Hurburgh. 2011. Design of an online course in quality management systems for adult learners. *Journal of Industrial Technology*, 27(4).

- Mosher, G.A**.** 2013. *Development and formation of effective student teams to facilitate team-based learning.* American Society of Engineering Education, North Midwest Regional Conference Paper NMWSC2013-0026.

- Mosher, G.A. and N. Keren. 2011. Analysis of safety decision-making data using event tree analysis. *Association of Technology, Management, and Applied Engineering (ATMAE) 2011 Conference Proceedings Paper.*

CV Norman E. Muzzy, Lecturer

Education

B.S. Mechanical Engineering, Iowa State University, 1979

Academic Experience

Iowa State University
2013-Present: Lecturer, Agricultural & Biosystems Engineering

Non-academic Experience

1979- 2013: Engineer, Senior Engineer, John Deere Product Engineering Center, Waterloo, IA

Certifications or Professional Registrations

Professional Engineer, Iowa License No. 10366, Active

Current Membership in Professional Organizations

American Society of Mechanical Engineers, 1978-
Society of Automotive Engineers, 1978-
American Society of Agricultural and Biological Engineers, 2011-

Patents

United States Patent 5,231,965	Throttle Signal Modifying Circuit, 3 August 1993
United States Patent 5,558,404	Adjustable Armrest, 24 September 1996
United States Patent 7,798,241	Mechanical Hitch Control Unit, 21 September 2010
European Patent EP1975385B1	Exhaust Pipe Assembly, 13 November 2013

AWARDS (John Deere Internal)

Ag Division Engineering Managers Collaboration and Innovation Award-
5603 and 5625 Tractors, 2008
Factory recognition for focus on customer satisfaction- PTO switch on 5D tractors, 2007
Award for Product Simplicity in Design- 9000 series fuel tank system, 1997

PRESENTATIONS

Battlebots: This is going to make a Mess!

LETS Conference, John Deere, Moline, IL	September 2002
Society of Automotive Engineers, Davenport, IA	October 2002
Waterloo Technical Society, Waterloo, IA	February 2003
Northern Minnesota Manufacturer's Association,	March 2003
Kansas City Area School Systems, Olathe, KS	April 2003

D. RAJ RAMAN, PHD, PE
Professor and Associate Chair for Teaching, Agricultural and Biosystems Engineering
Iowa State University
3356 Elings Hall, Ames, IA 50011
515.294.0465 / rajraman@iastate.edu

(a) Professional Preparation

Rochester Institute of Technology	Electrical Engineering	B.S., 1986
Cornell University	Ag. & Biological Engineering	Ph.D., 1994

(b) Appointments

2011 - present	Associate Head for Teaching, ISU[1] ABE[2]
2010 - present	Pyrone Testbed Champion, CBiRC[3]
2008 – present	University Education Program Director, CBiRC
2006 – present	Assoc. Prof./Professor Agricultural & Biosystems Engineering, ISU
2006 – 2010	Assoc. Director of Educational Programs, ISU Bioeconomy Institute
2004 – 2005	Interim Head, Biosystems Engineering and Soil Science, UTK[4]
1999 – 2005	Asst./Assoc. Professor, Biosystems Engineering, UTK

(c) Publications

1) Claypool, J. T., D. R. Raman, L. R. Jarboe, and D. R. Nielsen. 2014. Technoeconomic evaluation of bio-based styrene production by engineered *Escherichia coli*. *Journal of Industrial Microbiology & Biotechnology* 41(8): 1211 – 1216
2) Claypool, J.T. and D.R. Raman. 2013. Development and validation of a technoeconomic analysis tool for early-stage evaluation of bio-based chemical production processes. *Bioresource Technology* 150: 486 – 495
3) Christiansen, K. L., D. R. Raman, and R. P. Anex. 2012/13. Predicting cost growth and performance of first-generation algal production systems. *Energy Policy* 51: 382 - 391
4) Faulhaber, C. R., D. R. Raman, and R. T. Burns. 2012. An engineering-economic model for analyzing dairy plug-flow anaerobic digesters: cost structures and policy implications. *Transactions of the American Society of Agricultural and Biological Engineers* 55(1): 201 – 209
5) Raman, D. R. and R. P. Anex. 2012. Conceptual and mathematical models of batch simultaneous saccharification and fermentation: dimensionless groups for predicting process dynamics. *Journal of Biological Systems* 20(2): 195 – 211
6) Riedl, J., D. Grewell, M. Kessler, and D. R. Raman. 2014. Peel and shear strength and tear resistance of ultrasonically sealed coextruded polyolefin films for packaging applications. *Welding In The World* 58(5): 619 – 636
7) Geisinger, B. N., and D. R. Raman 2013. Why they leave: Understanding student attrition from engineering majors. *International Journal of Engineering Education* 29(4): 914 – 925
8) Kaleita, A. L., and D. R. Raman. 2012. A rose by any other name: an analysis of agricultural and biological engineering undergraduate curricula. *Transactions of the ASABE* 55(6): 2371-2378
9) Rawat, V., D. R. Raman, and R. P. Anex. 2011. Technical Note: Detecting and Subcategorizing Hard-Coding Errors in Bioenergy-Relevant Spreadsheets using Visual Basic for Applications (VBA). *Applied Engineering in Agriculture* 27(3): 469-474
10) Haen, K. M., D. R. Raman, E. Polush, and M. R. Kemis. 2012. Training the Next Generation of Creative, Innovative and Adaptive Scientists and Engineers: The NSF Engineering Research Center

[1] Iowa State University
[2] Agricultural and Biosystems Engineering
[3] NSF Engineering Research Center for Biorenewable Chemicals
[4] The University of Tennessee, Knoxville

for Biorenewable Chemicals (CBiRC) Research Experience for Undergraduates. *Education for Chemical Engineers* (*Accepted*, available online @ http://dx.doi.org/10.1016/j.ece.2012.09.001)

(d) Synergistic Activities

1. Associate Chair for teaching, 720-student, four-accredited degree program department (ABE).
2. Testbed Champion (providing technoeconomic and lifecycle assessments for *pyrone testbed*) – NSF ERC for Biorenewable Chemicals (CBiRC)
3. University Education Program Director – CBiRC
4. Objective 8 (Education) Co-Director, CenUSA Sustainable Production and Distribution of Bioenergy for the Central USA (USDA AFRI- CAP Program)
5. Engineering Curriculum Committee Chair, Agricultural and Biosystems Engineering Department (overseeing curricula and ABET accreditation of the Agricultural Engineering and the Biological Systems Engineering degree programs)

(e) Collaborators & Other Affiliations

i. Collaborators (past 48 months)

Robert Anex (UWM), Krishna Athreya (ISU), Stuart Birrell (ISU), Robert Brown (ISU), Thomas Brumm (ISU), Michael Casler (UWM), Nancy DaSilva (UCI), Abhaya Datye (UNM), Robert Davis (UVA), Jim Dumesic (UWM), Jill Euken (ISU), Mark Hanna (ISU), Dermot Hayes (ISU), Jason Hill (UMN), Keri Jacobs (ISU), Amy Kaleita (ISU), Cathy Kling (ISU), David Laird (ISU), Adah Leshem (ISU), Robert Mitchell (UNL), Ken Moore (ISU), Basil Nikolau (ISU), Joe Noel (Salk), Charles Schwab (ISU), Brent Shanks (ISU), Kevin Shinners (UWM), Michelle Soupir (ISU), Jeffrey Volenec (Purdue).

ii. Graduate Advisor: Larry P. Walker (Cornell University)

iii. Thesis Advisor and Postgraduate-Scholar Sponsor (past 5 years)

Past Students (past 5 years, all at Iowa State University): Katrina Christiansen (PhD), Joshua Claypool (MS), Carol Faulhaber (MS), John Haughery (PhD expected August 2017), Jenni Himmelsbach (MS), Darren Jarboe (PhD; no relation to Laura Jarboe), Jasjeet Kaur (MS), Patrick Murphy (PhD), Vertika Rawat (MS), Mothi Viswanathan (MS expected August 2015).

Kurt A. Rosentrater, Assistant Professor

Education

- Ph.D. Agricultural Engineering, Iowa State University, 2001
- M.S. Agricultural Engineering, Iowa State University, 1996
- B.S. Agricultural Engineering, Iowa State University, 1994

Academic experience

- Iowa State University, Ames, Iowa (8/2011 – present).
    - Assistant Professor, Agricultural and Biosystems Engineering (8/2011 – present).
- Northern Illinois University, DeKalb, IL (01/2002 – 05/2004).
    - Assistant Professor, Industrial and Engineering Technology (01/2002 – 05/2004).
- Iowa State University, Ames, Iowa (05/1994 – 11/1997).
    - Graduate Research Assistant, Agricultural and Biosystems Engineering (05/1994 – 11/1997).

Non-academic experience

- Distillers Grains Technology Council, CEO & Executive Director (09/2013 – present).
- United States Department of Agriculture, Agricultural Research Service, Lead Scientist (05/2004 – 08/2011).
- Todd & Sargent, Inc., Process Development Engineer (11/1997 – 01/2002).

Current membership in professional organizations

- American Society for Engineering Education (ASEE) (1996 – present).
- American Society of Agricultural and Biological Engineers (ASABE) (1994 – present).

Honors and awards

- Phi Tau Sigma, The Honor Society of Food Science and Technology, 2014
- Corporation for National and Community Service, The President's Volunteer Service Award, 2012
- USDA, ARS, Award of Excellence, Northern Plains Area Diversity Taskforce, 2011
- USDA, ARS, Award of Excellence, Research Leader, 2011
- USDA, ARS Certificate of Merit/Superior Performance, 2010
- Institute of Food Technologists Outstanding Section Volunteer, 2009

Service activities (within and outside of the institution)

- Biorenewable Resources and Technology. Graduate Curriculum Committee. ISU. 2013-2014.
- Department of Agricultural and Biosystems Engineering. Biological Systems Engineering (BSE) Club Advisor. ISU. 2012-Present.
- Department of Agricultural and Biosystems Engineering. Departmental Graduate Student Admissions Committee. ISU. 2012-Present.
- Department of Agricultural and Biosystems Engineering. Grain Handling Faculty Search Committee. ISU. 2012-Present.

- Department of Agricultural and Biosystems Engineering. Departmental Engineering Curriculum Committee. ISU. 2011-Present.
- Department of Agricultural and Biosystems Engineering. Iowa Art in State Buildings Project for the Biorenewables Complex Committee. ISU. 2011-Present.
- Department of Agricultural and Biosystems Engineering. Departmental Promotion Tenure Review Committee. ISU. 2012-2013.

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

1. Balassiano, K., **K. A. Rosentrater**, and S. B. Marcketti. 2014. Student perceptions of dual-listed courses. *Journal of Effective Teaching* 14(1): 20 - 32. [Concept 33%; Statistics & Analysis 75%; Writing 20%; Editing 30%]

2. *Bhadra, R.*, **K. A. Rosentrater**, and K. Muthukumarappan. 2014. Measurement and comparison of glass transition and sticky point temperatures of distillers dried grains with solubles (DDGS) with varying condensed distillers solubles (CDS) and drying temperature levels. *Cereal Chemistry* 91(4): 406-413. [Concept 85%; Statistics & Analysis 50%; Writing 50%; Editing 85%]

3. *Fallahi, P.*, **K. A. Rosentrater**, K. Muthukumarappan, and M. L. Brown. 2014. Characteristics of vegetable-based twin-screw extruded yellow perch (*Perca flavenscens*) diets containing fermented high protein soybean meal and graded levels of distillers dried grains with solubles. *Cereal Chemistry* 91(1): 79-87. [Concept 85%; Statistics & Analysis 50%; Writing 50%; Editing 85%]

4. Holbrook, G. P., Z. Davidson, R. A. Tatara, N. L. Ziemer, **K. A. Rosentrater**, and W. S. Grayburn. 2014. Use of microalga *Monoraphidium* sp. Grown in wastewater as a feedstock for biodiesel: Cultivation and fuel characteristics. *Applied Energy* 131: 386-393. [Concept 15%; Statistics & Analysis 15%; Writing 15%; Editing 15%]

5. *Pourafshar, S.*, **K. A. Rosentrater**, and P. Krishnan. Submitted 2014. Production of Latin American wheat tortillas using different levels of distillers dried grains with solubles (DDGS). *Journal of Food Science and Technology* 23 September, DOI: 10.1007/s13197-014-1566-5. [Concept 85%; Statistics & Analysis 50%; Writing 50%; Editing 85%]
6. *Pourafshar, S.*, **K. A. Rosentrater**, and P. Krishnan. Submitted 2014. Using alternative flours as partial replacement of Barbari bread formulation. *Journal of Food Science and Technology* 14 Nov, DOI: 10.1007/s13197-014-1640-z . [Concept 85%; Statistics & Analysis 50%; Writing 50%; Editing 85%]
7. *Saunders, J. A.*, **K. A. Rosentrater,** and P. Krishnan. 2014. Analysis of corn distillers dried grains with solubles (DDGS) / flour mixtures, and subsequent bread baking trials. *Journal of Food Research* 3(3): 78-104. [Concept 85%; Statistics & Analysis 50%; Writing 50%; Editing 85%]

8. *Suleiman, R., D. Williams, A. Nissen*, C. J. Bern, and **K. A. Rosentrater.** 2015. Is flint corn naturally resistant to *Sitophilus zeamais* infestation? *Journal of Stored Products Research* 60: 19-24. [Concept30%; Statistics & Analysis 50%; Writing 40%; Editing 50%]

9. *Wood, C.*, **K. A. Rosentrater,** and K. Muthukumarappan. 2014. Techno-economic modeling of a corn-based ethanol plant in 2011/2012. *Industrial Crops and Products* 56: 145-155. [Concept 85%; Statistics & Analysis 50%; Writing 50%; Editing 85%]

10. *Wood, C., K. A. Rosentrater, and K. Muthukumarappan. 2014. Pyrolysis of ethanol coproducts. Industrial Crops and Products 56: 118-127. [Concept 85%; Statistics & Analysis 50%; Writing 50%; Editing 85%]*

Charles V. Schwab

Education

- Ph.D. Agricultural Engineering, University of Kentucky, August, 1989
- M.S. Agricultural Engineering, University of Kentucky, December, 1982
- B.S. Agricultural Engineering, University of Kentucky, May, 1979

Academic experience

- Iowa State University, Ames, Iowa (8/90 - present)
    - Professor, Extension Safety specialist(7/05 – present)
    - Associate Professor, Extension Safety specialist, (7/95 – 1/05)
    - Assistant Professor, Extension Safety specialist, (8/90 - 7/95)
- University of Kentucky, Lexington, Kentucky (5/79 – 8/90)
    - Post Doctoral Scholar, Instructor, and co-investigator, (7/89 - 7/90)
    - Research Specialist, Investigator and lecturer (12/82 - 12/88)
    - Research Associate, Investigator and lecturer (5/79 - 12/82)

Current membership in professional organizations

- American Society of Agricultural and Biological Engineers, member engineer since 1979
- Sigma Xi, Scientific Research Society of North America, full member since 1988
- Iowa Farm Safety Council, life member since 1990
- American Society for Engineering Education, member since 1991
- International Society of Agricultural Safety and Health, member since, 1992
- American Society of Safety Engineers, member since 1997
- Association of Technology, Management, and Applied Engineering, member since, 2004
- International Technology and Engineering Educators Association, member since 2010
- Agricultural Safety & Health Council of America voting member since 2014

Honors and awards

- Outstanding Reviewer, ASABE Ergonomics, Safety and Health Division, 2013
- Academic Excellence in Universities, Association of Technology, Management, and Applied Engineering, 2010
- Iowa State University Award for Outstanding Achievement, 2010
- Blue Ribbon for ASABE Educational Aids Competition, 2010
- NAMIC Engineering Safety Award, 2009
- Chair Faculty Citation Award, Agricultural and Biosystems Engineering, 2008
- Blue Ribbon for ASABE Educational Aids Competition, 2005
- I-CASH Agricultural Safety Hall of Fame, 2004
- Bronze Award for Electronic Media-Audio category V, Agricultural Communicators in Education, 2003
- Superior Engineering Extension Award, College of Engineering, 2002
- Meritorious Service Award, ISU Extension, 2002
- Blue Ribbon for ASAE Educational Aids Competition, 2002
- Professional Skills Award for Writing, Agricultural Communicators in Education, 2002
- Gold Award for Writing category XI, Agricultural Communicators in Education, 2002
- Blue Ribbons (three separate projects awards) for ASAE Educational Aids Competition, 2001
- Bronze Award for category III class 11 Agricultural Communicators in Education, 2001
- Silver Award for Website category XI, Agricultural Communicators in Education, 1999
- Young Engineer of the Year, IA Section of ASAE 1996-97
- Blue Ribbon for ASAE Educational Aids Competition, 1996
- Blue Ribbon for ASAE Educational Aids Competition, 1995

- Blue Ribbons (two separate projects awards) for ASAE Educational Aids Competition, 1994
- Iowa State University Extension Achievement Award for the Safe Farm Program, 1993
- Blue Ribbons (two separate projects awards) for ASAE Educational Aids Competition, 1993
- Blue Ribbon for ASAE Educational Aids Competition, 1992
- Blue Ribbon for ASAE Educational Aids Competition, 1991

Service activities (within and outside of the institution)

- Editorial Board member for Journal of Agricultural Safety and Health (1999–present)
- Editor for Journal of Technology Studies (2014-present)
- ASABE ESH 03/1 External Standard Development (2004–present)
- ATMAE Awards Committee - Faculty Excellence Award (2011, 2012, 2013, and 2014)
- ISASH Endowment Fund Trustee (2012 – present)
- Epsilon Pi Tau Board of Directors (2012 – 2015, 2009 – 2012)
- ABE Technology Curriculum Committee (2004 – present, Chair 2004 – 2013)
- Agriculture and Life Sciences College Curriculum Committee (2004 – present)
- University Faculty Recognition and Development Committee (2010 – present, Chair)
- University Faculty Development & Administrative Relations Council (2013-2015)
- University representative NCERA197 Agricultural Safety and Health Research (2005 – present)
- University Extension representative EDEN (1995 – present, charter member)
- Iowa State University's Ingestion Pathway Plan for nuclear power plant radiological emergency response program (principal representative 1990 – present)
- Athletics Council (2009–2011, 2012-2015)
- Athletics Council – Academic Integrity Committee (2009 – 2013, Chair)
- Progressive Agriculture Foundation, President (2013-2014)
- Progressive Agriculture Foundation, Board of Directors (2012-2014, 2011–2012, 2007–2009, 2003–2006)

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

1. A.M. Yoder, C. V. Schwab, P. Gunderson, and D. Murphy. 2014. Safety and health in biomass production, transportation and storage: a commentary based on the biomass and biofuels session at the 2013 North American Agricultural Safety Summit. Journal of Agromedicine.19:83-86.
2. J. C. Gillette, C. A. Stevermer, R. H. Miller, W. B. Edwards, and C. V. Schwab. 2012. Lower extremity joint moments during carrying tasks in Children. Journal of Applied Biomechanics. (Accepted/in press)
3. Burgus, S., C.V. Schwab, M. Shelly. 2012. Assessing Rural Coalitions That Address Safety and Health Issues. Journal of Extension 50(2).
4. Schwab, C. V., and S. A. Freeman. 2011. Pilot Evaluation of an Internet Educational Module for Agricultural Safety. Journal of Extension 49(3).
5. Gillette, J. C., Stevermer, C. A., Miller, R. H., Meardon, S. A. and Schwab, C. V. 2010 The effects of age and type of carrying task on lower extremity kinematics. Ergonomics 53: 3, 355 — 364.
6. Schwab, C. V., and H. M. Hanna. 2012. Master Gardeners' safety precautions for handling, applying, and storing biochar. Iowa State University Extension publication. ISU University Extension, Ames, IA 50011
7. Wall, R., R. Litchfield, and C. V. Schwab. 2011. Les Club des Mystéres: Préparation pour la course. Iowa State University Extension publication Pm-2069b(f). ISU University Extension, Ames, IA 50011.
8. Wall, R., R. Litchfield, and C. V. Schwab. 2011. El Club Misterio: Nos Preparamos para el Dia de la Carrera. Iowa State University Extension publication Pm-2069b(s). ISU University Extension, Ames, IA 50011.

<u>James Shahan, Adjunct Assistant Professor</u>

Education

- M.S. Agricultural Engineering, Iowa State University, 1985
- B.S. Agricultural Engineering, Iowa State University, 1979

Academic experience

- Iowa State University, Ames, Iowa (1980 - present)
    - Adjunct Assistant Professor, Agricultural & Biosystems Engineering, 1990 – Present
    - Assistant Professor, Freshmen Engineering – Engineering Fundamentals and Multi-disciplinary Design, Iowa State University, Ames, United States Of America, 1984 – 1990
    - Temporary Instructor, Freshmen Engineering, Iowa State University, Ames, United States Of America, 1984 (Spring)
    - Graduate Research Assistant, Agriculture and Biosystems Engineering, Iowa State University, Ames, United States Of America, 1983 – 1984
    - Temporary Instructor, Agriculture and Biosystems Engineering, Iowa State University, Ames, United States Of America, 1982 – 1983
    - Graduate Research Assistant, Agriculture and Biosystems Engineering, Iowa State University, Ames, United States Of America, 1980 – 1982
- Project Lead the Way, Affiliate Professor (2006-2014)
    - Attended Introduction to Engineering Design (IED) Summer Training Institure (STI) at Pennsylvania State University – Berks, July 2006
    - Attended IED STI Prep session, 2007- 2012
    - Taught IED STI at Iowa State University, 2007 – 2014

Non-academic experience

- Computer Programmer (Part time), Agricultural Engineering Extension, Iowa State University, Ames, United States Of America, 1981 - 1982
- Farm Automation Sales/Manager, Mahaska Farm Services, Oskaloosa, United States Of America, 1979
- Product Engineer, Mahaska Industries, Oskaloosa, United States Of America, 1979 - 1980
- Contractor, J.P. Gannon Construction, Ames, United States Of America, 1978 - 1979
- Draftsman (Part Time), Agricultural Experiment Station/Engineering Services, , 1975 - 1976
- Farm Labor (Full and part time), Farm, United States Of America, 1970 - 1978

Certifications or professional registrations

- EIT Certification, United States of America, 1979
- Professional Engineer – Agricultural Engineering, Iowa, 1986 –Current
- Autodesk Certification
    - Autodesk Inventor Certified Professional 2010 -2013
    - AutoCAD Certified Professional 2011 -2013
    - Autodesk Certified Instructor – Inventor 2011-2013

Current membership in professional organizations

- American Society of Engineering Education, Member (1984-Current)
    - Engineering Design Graphics Division (EDGD), Member (1984-)

Honors and awards

- 25 year club, ISU, 2010

Service activities (within and outside of the institution)

- Computer and Educational Aids, Member, 1998; Chair, 1999 – 2006; Co-Chair, 2007-2010; Member 2011-
- Review Board for ASEE / Engineering Design Graphics Journal, 2004 –
- Autodesk Manufacturing Education Focus Group, San Francisco, CA, 3/2011

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- James Shahan, Various Screencast videos related to teaching AutoCAD and Autodesk Inventor. https://screencast.autodesk.com/ViewAll/#?sort=Rating&author=jshahan

LLOYD SNELL

VITAE

LECTURER, AGRICULTURAL AND BIOSYSTEMS ENGINEERING

PROFESSIONAL ADDRESS

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EDUCATION

Name of Institution	Degree	Field of Study	Date of Degree
Iowa State University	Ph.D.	Agricultural Engineering	ABD
Iowa State University	M.S.	Agricultural Engineering	8/2008
Iowa State University	B.S.	Mechanical Engineering	12/2000
McPherson College	B.A.	Theology	5/1983

PROFESSIONAL EXPERIENCE – ACADEMIC

Position Held and Location

1. Lecturer, Agricultural and Biosystems Engineering, Iowa State University — 8/2008-present

Courses - Instructor of record

1. Total Quality Improvement (TSM310) — 2008-2011
2. Agricultural Machinery and Power Management (TSM330) — 2008-2010, 2012-2014
3. Functional Analysis and Design of Agricultural Field Machinery (AE340) — 2009-2010, 2012-14
4. Advanced Automated Manufacturing Processes (TSM340) — 2008-present
5. Technology Capstone I (TSM415) — 2012-present
6. Technology Capstone II (TSM416) — 2011-present
7. Facility Planning (TSM444) — 2011

Courses - co-instructor

1. Technology Capstone I (TSM415) — 2010-2011
2. Technology Capstone II (TSM416) — 2011-2012
3. Travel Abroad - Brazil (TSM496) — 2012, 2014

Committees

1. Ag Systems and Industrial Technology Manufacturing Curriculum Committee — 2010-2014

PROFESSIONAL EXPERIENCE

Position Held and Location

1. Founder, CEO, Trading-In, LLC (internet/software), Ames, IA — 2010-2012
2. Manufacturing Engineer, Sauer-Danfoss Inc., Ames, IA — 2002-2008

3. Design Engineer, Wandling Snell, Inc., Ames, IA 2001-2002
4. Engineering Intern, Wandling Engineering, Ames, IA 2000-2001
5. Principle/Machine Shop and Manufacturing, Paecific Applied Multiple Applications, Inc., Hughson, CA 1988-1996
6. Principle/Mechanic, FGL, Inc., McFarland, CA 1985-1988
7. Mechanic, 81 Farm Supply, McPherson, KS 1983-1985

Professional and Scientific Organizations

1. Fundamental of Engineering (FE), #14692, 1-11-2001
2. Epsilon Pi Tau

Peer-Reviewed Research and Education Publications

1. **Lloyd Dale Snell**, Stuart J. Birrell. Tree's Natural Frequency and System Identification using Magnetostrictive Actuator, pre-submission (2015).
2. **Lloyd Dale Snell**, Stuart J. Birrell. Moment Analysis of Stacked Counter Rotating Eccentric Mass Tree Shaker Energy-Wheel System, Biosystem Engineering (Accepted for publication, final edits).
3. **Lloyd Dale Snell**. Force and Moment Analysis of Stacked Counter Rotating Eccentric Mass Tree Shaker Energy-Wheel System, Iowa State University, MAI 47/01, Feb 2009, Publication Number 1454712.
4. **Lloyd D. Snell**, Avery Nelson, and Pal Molian. A Novel Laser Technique for Oxidation-resistant Coating of Carbon-Carbon Composite, Carbon 2001.

Conference Presentations

1. **Lloyd Dale Snell**, Jacek Koziel. Strengthening Senior Technology Capstone experience for Agricultural and Industrial Technology students, Abstract submitted (2014).

U.S. Patent and Intellectual Activity

1. **Lloyd D. Snell.** US Patent (8,650,847) – Nut and Fruit Harvesting Apparatus, System and Method
2. **Lloyd D. Snell.** US Patent (6,152,435) – CNC Vise Jaws for Clamping Multiple Diameters Cylindrical Parts in Standard Linear CNC Vises.
3. **Lloyd D. Snell.** US Patent (6,015,218) – Outdoors Christmas Light Display.
4. **Lloyd D. Snell.** US Patent (5,347,787) –Tractor/power Unit Design.

Awards

ASABE Faculty of the Year Award 2008-2009

Student Club Advisor

ASABE ¼ Scale Tractor Team Advisor, Iowa State University 2014-Present

ASABE Student Chapter, Iowa State University 2008-2011

SME Student Chapter, Iowa State University 2010-present

Michelle Soupir, Associate Professor

Education

- Ph.D. Biological Systems Engineering, Virginia Tech, 2008
- M.S. Biological Systems Engineering, Virginia Tech, 2003
- B.S. Biological and Agricultural Engineering, Kansas State University, 1999

Academic experience

- 2014- present: Associate Professor, Agricultural and Biosystems Engineering, Iowa State University.
- 2008-2014: Assistant Professor, Agricultural and Biosystems Engineering, Iowa State University.
- 2001-2008: Graduate Research Assistant, Biological Systems Engineering, Virginia Tech.

Non-academic experience – company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time

- 2000-2001: Environmental Engineer, Camp Dresser and McKee, IN

Certifications or professional registrations

- EIT Certification, April 1999
- OSHA 40-hour HAZWOPPER Certification

Current membership in professional organizations

- Alpha Epsilon
- American Water Resources Association, member
- American Society for Engineering Education, member
- Society of Women Engineers, member
- Soil and Water Conservation Society, member
- American Society of Agricultural and Biological Engineers, member

Honors and awards

- New Holland Young Researcher Award, 2014, ASABE
- ASABE Young Engineer of the Year, 2014, Iowa Section
- Early Career Engineering Faculty Research Award, 2014, Iowa State University
- CALS Early Achievement in Research Award, 2013, Iowa State University
- Outstanding Recent Alumna, Biological Systems Engineering Dept., 2012-2013, Virginia Tech
- Black and Veatch "Building a World of Difference" Faculty Fellow (2011)
- EPA Science to Achieve Results (STAR) Graduate Fellowship (2006)
- USDA National Need Doctoral Fellowship (2003)
- ASABE Student Engineer of the Year (1999)

Service activities (within and outside of the institution)

- Associate Editor, *Journal of Environmental Quality* (2012-2017)
- Nonpoint Source Management Planning Committee, ISU representative, an effort led by the Iowa DNR to develop a state-wide plan with input from a wide range of groups.
- ABE Diversity Committee (2012 – present, chair, 2014-present)

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Liang, X., M.L. Soupir, S. Rigby, L.R. Jarboe, W. Zhang. 2014. Flow cytometry as a method to partition between freely suspended *E. coli* and *E. coli* attached to clay particles. *Journal of Applied Microbiology.*
- Pandey, P.K., Soupir, M.L. 2014. Assessing relationships between in –stream *Escherichia coli*, total suspended sediment, and water nutrients during storm flow in an Agricultural Watershed in Iowa. *Transactions of the ASABE*. 57(6)
- Pandey, P.K., S. Biswas, V.K. Vaddella, M.L. Soupir. 2014 *Escherichia coli* persistence kinetics in dairy manure at moderate, mesophilic, and thermophilic temperatures under aerobic and anaerobic environments. *Bioprocess and Biosystems Engineering.*
- Ikenberry, C.D, M.L. Soupir, K.E. Schilling, C.S. Jones, A. Seeman. 2014. Nitrate-nitrogen export: Magnitude and patterns from drainage districts to downstream river basins. *Journal of Environmental Quality.* 43(6): 2024-2033.
- Garder, J.L., T.B. Moorman, and M.L. Soupir. 2014. Occurrence and movement of total and tylosin resistant enterococci, *erm* genes, and tylosin in tile-drained agricultural fields receiving swine manure application. *Journal of Environmental Quality.* 43:1484-1493.
- Brown, S.B., C.D. Ikenberry, M.L. Soupir, J. Bisinger, J.R. Russell. 2014. Predicting time cattle spend in streams to quantify direct deposition of manure for TMDL development. *Applied Engineering in Agriculture.* 30(2): 187-195.
- Hoang, T.T.T., M.L. Soupir, A. Bhandari, and P. Liu. 2013. Occurrence of tylosin-resistant enterococci in swine manure and tile drainage systems under no-till management. *Water Air and Soil Pollution*. 224:1754.
- Pandey, P.K. and M.L. Soupir. 2013. Assessing the impacts of streambed sediment on total *E. coli* load over a range of flows. *Journal of the American Water Resources Association*. 49(6) 1261-1269.
- McDaniel, R.L., M.L. Soupir, Tuttle, R.*, and A. Cervantes*. 2013. Release, dispersion, and resuspension of *E. coli* from direct fecal deposits under controlled flows. *Journal of the American Water Resources Association*. 49(2): 319-327.
- Huy, N.Q., R.S. Kanwar, N. Hoover*, P. Dixon, J. Hobbs, C. Pederson, M.L. Soupir. 2013. Long-term effects of poultry manure application on nitrate leaching in tile drainage water. *Transactions of the ASABE*. 56(1): 91-101.
- Pandey, P.K., M.L. Soupir, and C.R. Rehmann. 2012. A model to predict resuspension of E. coli from streambed sediments. *Water Research*. 46: 115-126.
- Liu, P., M.L. Soupir, M.R. Zwonitzer, B. Huss, L.R. Jarobe. 2011. Antibiotic resistance in agricultural E. coli isolates correlates with attachment to quartz. *Applied and Environmental Microbiology*. 77(19): 6945-6953.

Briefly list the most recent professional development activities

- Writing Your Next Chapter: workshop targeting mid-career development, Iowa State University, Ames, IA, September 12, 2014.
- Annual International Meeting of the American Society of Agricultural Engineers, Montreal, Canada, July 13 -16, 2014
- Iowa Nutrient Research Center Retreat, Grinell, IA, May 15, 2014
- Iowa Water Conference, Ames, IA, March 3-4, 2014
- Annual International Meeting of the American Society of Agricultural Engineers, Kansas City, MO, July 21-24, 2013
- Essentials of ArcGIS 10.1, Ames, Iowa, 1/10/13 – 1/11/13.

Brian Steward, Professor

Education

- Ph.D. Agricultural Engineering, University of Illinois, Urbana, 1999
- M.S. Electrical Engineering, South Dakota State University, 1994
- B.S. Electrical Engineering, South Dakota State University, 1989

Academic experience

- Iowa State University, Ames, Iowa (8/99 – present)
    - Professor, Agricultural and Biosystems Engineering (2012-present)
    - Associate Professor, Agricultural and Biosystems Engineering (2005-2012)
    - Assistant Professor, Agricultural and Biosystems Engineering (1999-2005)
    - Human Computer Interaction Graduate Program Faculty (2003-present)
    - Graduate Program in Sustainable Agriculture Faculty (2000-2013)
- Universidade Federal de Viçosa, Minas Gerias, Brasil (2009-2010)
    - Fulbright Visiting Professor, Departamento de Engenharia Agricola,
- University of Illinois at Urbana-Champaign, Urbana, Illinois (8/95 – 7/99)
    - Graduate Research Assistant, Agricultural Engineering (7/98 – 7/99)
    - USDA Graduate Fellow, Agricultural Engineering (8/95 – 6/98)
- Changsha Electric Power University, Changsha, People's Republic of China
    - Foreign Expert (English) (9/94 – 7/95)
- South Dakota State University, Brookings, SD (9/91 – 8-93)
    - NASA Fellow, South Dakota State University, Brookings, SD
    - Graduate Teaching Assistant, South Dakota State University, Brookings, SD

Non-academic experience – company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time

- 10/89 – 7/94: Design Engineer, Raven Industries, Sioux Falls, SD
- 5/89 – 8/89: Intern, Missouri Basin Municipal Power Agency, Sioux Falls, SD

Certifications or professional registrations

- Licensed as Professional Engineer in Iowa (2008; Lic. #18674)
- Certified Fluid Power Hydraulic Specialist (2014)

Current membership in professional organizations

- American Society of Agricultural and Biological Engineers, member (1996 to present)
- International Fluid Power Society, member (2013 – present)
- Alpha Epsilon, Honor Society of Agricultural, Food, and Biological Engineering, member
- Eta Kappa Nu, National Electrical and Computer Engineering Honor Society, member
- Phi Kappa Phi Honor Society, member
- Tau Beta Pi, Engineering Honor Society, member

Honors and awards

- ISU College of Agriculture and Life Sciences Mid-Career Achievement in Research Award (2013).
- ASABE Honorable Mention Paper Award for Transactions of the ASABE journal article (2011).
- ISU College of Agricultural and Life Sciences Outstanding Achievement in International Agriculture Award, Presented at the CALS Spring University Convocation (2011)
- ISU Louis Thompson Distinguished Undergraduate Teacher Award, Presented at the ISU Fall University Convocation (2010)
- Fulbright Scholarship Grant for Research and Lecturing at the Universidade Federal de Viçosa, Viçosa, Minas Gerais, Brasil (2009)
- ISU College of Engineering Superior Engineering Teacher Award, Presented at the ISU College of Engr. Fall Convocation (2008)

Service activities (within and outside of the institution)

- American Society of Agricultural and Biological Engineers: IET-04 – Information and Electrical Technologies Division Publication Review and Paper Award Committee
- ASABE Resource Editorial Board (2008 – present)
- ASABE Textbooks and Monographs Committee (P-515; 2012-present)
- Coordinator of ISU-UFV (Brazil) Exchange Program (2008-present)
- ABE International Programs Committee, Chair (2010-present)
- College of Engineering International Programs Advisory Committee (2010-present)
- ISU College of Agriculture and Life Sciences Awards Committee (2012-present)
- Associate Editor, Transactions of ASABE, Applied Engineering in Agriculture (2005-present)

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Ahmad, M. T., L. Tang, and B. L. Steward. 2014. Automated Mechanical Weeding. In Automation: The Future of Weed Control in Cropping Systems.
- Karkee, M., B. L. Steward, and J. P. Kruckeberg. 2013. Automation of Chemical Application Systems. In Agricultural Automation: Fundamentals and Practices. CRC Press: Boca Raton, Florida, USA.
- Kruckeberg, J.P., H. M. Hanna, B.L. Steward, and M.J. Darr. 2012. The relative accuracy of DRIFTSIM when used as a real-time spray drift predictor. Transactions of the ASABE 55(4):1159-1165.
- Aziz, S. A., B. L. Steward. A. L. Kaleita, and M. Karkee. 2012. Assessing the effects of DEM error uncertainty on soil loss estimation in agricultural fields. Transactions of the ASABE 55(3): 785-798.
- Karkee, M., R. P. McNaull, S. J. Birrell, and B.L. Steward. 2012. Agricultural Biomass Removal Rate Estimation for Real-time Optimization of Single Pass Crop Grain and Biomass Harvesting System. Transactions of the ASABE 55(1): 107-115.

Lie Tang, Ph.D.
Associate Professor
Agricultural and Biosystems Engineering
2346 Elings Hall, Iowa State University, Ames, IA 50014
Email: lietang@iastate.edu Tel: +1 515-294-9778

Education

- Ph.D. University of Illinois at Urbana-Champaign, Agricultural Engineering, 2002
- M.S. Zhejiang University (China), Agricultural Engineering, 1994
- B.S. Jiangsu University of Science and Technology (China), Electrical Engineering, 1989

Academic Experience

- 8/10 – present Associate Professor, 50% Research / 40% Teaching / 10% Professional and Institutional Service, Department of Agricultural & Biosystems Engineering, Iowa State University
- 10/04 – 7/10 Assistant Professor, Department of Agricultural & Biosystems Engineering, Iowa State University
- 8/08 – present Human Computer Interaction Graduate Program Faculty, Iowa State University, Ames, IA
- 7/03 – 9/04 Assistant Professor, Department of Agrotechnology and Food Sciences, Wageningen University, The Netherlands
- 3/02 – 7/03 Assistant Professor, AgroTechnology, Department of Agricultural Sciences, the Royal Veterinary and Agricultural University (KVL), Denmark
- 11/95 – 8/97 Visiting Scholar, Agricultural Engineering Department, Katholieke Universiteit Leuven, Belgium

Honors and Awards

Personal Honors & Awards

- ISU Plant Science Institute Scholar 2/2015
- Member of Epsilon Pi Tau 12/2011
- Adjunct Scientist, National Engineering Research Center for Information Technology in Agriculture 6/2011
- Newcomer Engineer of the Year, Iowa Section of the ASABE. 4/2009
- First Place Cutting Edge Award for research presentation, College of Engineering, University of Illinois. 3/1999

Peer-Reviewed Journal Articles in Past 5 Years

*MS, Ph.D., Post Doc, or Research Scientist supervised by Tang

1. Supawadee Chaivivatrakul, L. Tang, M. Dailey, A. D. Nakarmi. 2014. Automatic corn plant trait characterization via 3D holographic reconstruction. Computers and Electronics in Agriculture, PP. 109-123. DOI information: 10.1016/j.compag.2014.09.005

2. Nakarmi, A. D.* and L. Tang. 2014. Within-Row spacing sensing of maize plants using 3D computer vision. Biosystems Enngineering, PP. 54-64 DOI Information: 10.1016/j.biosystemseng.2014.07.001

3. Nakarmi, A. D.*, L. Tang, H. Xin. 2014. Automated tracking and behavior quantification of laying hens using 3D computer vision and radio frequency identification technologies. Transactions of the ASABE.

4. Nakarmi, A. D.* and **L. Tang**. 2012. Automatic Inter-plant spacing sensing at early growth stages using a 3D vision sensor. Computers and Electronics in Agriculture 82(3): 23-31.

5. Jin, J.*, **L. Tang**. 2011. Coverage path planning on three-dimensional terrain for arable farming. *Journal of Field Robotics 28(3):424-440*.

6. Tu, X.*, S. Du, **L. Tang**, H. Xin, B. Wood. 2011. A real-time automated system for monitoring individual feed intake and body weight of group housed turkeys. *Computers and Electronics in Agriculture* 75(2): 313-320.

7. Jin, J.* and **L. Tang**. 2010. Optimal coverage path planning for arable farming on 2D surfaces. *Transactions of the ASABE* 53(1): 283-295.

8. Jin, J.* and **L. Tang**, Z. Hruska, H. Yao. 2009. Classification of toxigenic and atoxigenic strains of *Aspergillus Flavus* with hyperspectral imaging. *Computers and Electronics in Agriculture* 69: 158-164.

9. Jin, J.* and **L. Tang**. 2009. Corn plant sensing using real-time stereo vision. *Journal of Field Robotics* 26 (6-7): 591-608.

10. Aziz, S. A., B. L. Steward, **L. Tang**, M. Karkee. 2009. Utilizing repeated GPS measurement form field -operations for development of agricultural field DEM. *Transactions of the ASABE* 52(4): 1057-1067.

11. Karkee, M., B. L. Steward, **L. Tang** and S. A. Aziz. 2009. Quantifying sub-pixel signature of paddy rice field using an artificial neural network. *Computers and Electronics in Agriculture* 65(1): 65-76.

Professional Affiliations

- American Society of Agricultural Engineers (1998 – present)
- National Association of Industrial Technology (2007– 2008)
- Alpha Epsilon, Honor Society of Agricultural, Food, and Biological Engineering, 1999

Professional Committees and Service

- President-elect, Association of Overseas Chinese Agricultural, Food and Biological Engineers, 2014
- Associate Editor, IET Division, *Transactions of the ASABE* (2008 –2012)
- Associate Editor, Power and Machinery Division, *International Journal of Agricultural & Biological Engineering (IJABE)* (2008 – present)
- ASABE – Information and Electrical Technologies Division Steering Committee (secretary, 2010; vice chair, 2011; Chair, 2012)
- IEEE Robotics and Automation's Technical Committee on Agricultural Robotics (2007 – present)
- Program co-chair of the Agricultural Machinery Conference (2006)
- ASABE IET-312 – Machine Vision Committee (secretary, 2008; vice chair, 2009, Chair, 2010)
- ASABE IET-318 – Mechatronics and Biorobotics Committee (secretary, 2007; vice chair, 2008; chair, 2009, 2010)
- ASABE P127 – ASABE Student Robot Design Competition Committee (secretary, 2007; vice chair, 2008; chair, 2009, 2010)
- Judge, ASABE Student Robot Design Competition
- ASABE PM-54 – Precision Agriculture Committee (2006 – present)
- Technical session moderator at ASABE Annual International Meetings (2005, 2008, 2009)
- Technical session organizer at ASABE Annual International Meetings (2006, 2007, 2009)
- Technical session chair at the 4th IFAC international conference on bio-robotics, Urbana, IL (2009)

U. Sunday Tim, Associate Professor

Education

- Ph.D. Civil and Environmental Engineering, Concordia University, Montreal, Canada, 1987
- B.Eng. (with distinction) Civil Engineering, Concordia University, Montreal, Canada, 1982

Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 1990-1995), full time or part time

- 1995-Present: Associate Professor, Agricultural & Biosystems Engineering (full-time)
- 1990-1995: Assistant Professor, Agricultural & Biosystems Engineering (full-time)
- 1987-1990: Research Associate, Agricultural Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA

Current membership in professional organizations

- American Association for the Advancement of Science (AAAS)
- American Chemical Society
- American Water Resources Association
- Sigma Xi
- International Association for Hydrological Research

Honors and awards

- Brenton Center for Agricultural and Technology Transfer Award (2008)
- Wakonse Faculty Fellow (2004)
- USDA Award for Excellence – Geospatial Information Partnership (2001)

Service activities (within and outside of the institution)

- College of Agriculture and Life Sciences Global Agriculture Programs Committee
- ISU Library Advisory Committee
- ISU Administrative Support Programs Advisory Committee
- ISU Faculty Policy Review Board
- ISU Traffic Appeals Board
- Affiliate, AAAS

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Sharma, S. U.S. Tim, S. Gardia, and P. Smith. 2011. Geospatial pattern determination for SNAP eligibility in Iowa using GIS. *Advances in Computing and Communications*, Part I, 190: 191-200

Briefly list the most recent professional development activities

<u>Research Grant Review Panels:</u>
NSF CREST/ HBCU-RISE
NSF Earth Sciences Directorate
USDA National Needs Fellowship Grant Program
NOAA Educational Partnership Programs
US EPA STAR Fellowships Program
US EPA Greater Research Opportunities Program
US EPA SBIR Grant Program
Lytmos Group

Journals
Journal of Environmental Science and Technology
Journal of Hydrology
Journal of Hydrological Sciences

Hongwei Xin, Distinguished Professor and Director

Education

- Ph.D. Engineering (Bio-environmental Engineering Field) University of Nebraska, 1989
- M.S. Agricultural Engineering, University of Nebraska-Lincoln, 1985
- B.S. Agricultural Engineering, Shenyang Agricultural University, China, 1982

Academic experience

- 2014.05-present: Charles F. Curtiss Distinguished Professor
- 2013.10-present: Iowa Egg Council Endowed Professor
- 2011-2013: Associate Chair for Research, Department of Agricultural and Biosystems Engineering (ABE), Iowa State University (ISU)
- 2008-present: Director, Egg Industry Center (located at ISU)
- 2002-present: Professor, ABE, ISU
- 1998-2002: Associate Professor, ABE, ISU
- 1993-1998: Assistant Professor, ABE, ISU
- 1990-1993: Post-doc Research Associate, Department of Biological and Agricultural Engineering, University of Arkansas
- 1990: Post-doctoral Research Associate, Department of Biological Systems Engineering, University of Nebraska

Current membership in professional organizations

- American Society of Agricultural and Biological Engineers (ASABE)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- Association of Overseas Chinese Agricultural, Biological and Food Engineers (AOC)
- Poultry Science Association (PSA)

Selected honors and awards

- C.F. Curtiss Distinguished Professor (2014–)
- USPOULTRY's 2014 Workhorse of the Year Award (2014)
- Iowa Egg Council Endowed Professor (2013–)
- Appointed by the U.S. Secretary of Agriculture to the USDA Agricultural Air Quality Task Force (AAQTF) (2008–2010, 2011–2013, 2013–2015)
- Overseas Chair of the International Research Center for Animal Environment and Welfare headquartered at Chongqing Academy of Animal Sciences, China (2012–2016)
- Midwest Poultry Consortium Outstanding Service Award (2011)
- Iowa State University Award for Outstanding Achievement in Research (2010)
- ISU CALS Outstanding Achievement in International Agriculture Award (2010)
- Appeared in "The Modern Marvels: Eggs" Show (1st aired Jan 20, 2010 History Channel)
- ISU CALS Outstanding Research Award (2009)
- ISU College of Engineering David R. Boylan Eminent Faculty Research Award (2008)
- Fellow of the ASABE (2008)
- Project Director of the Midwest Poultry Research Program (2008–2013)
- Iowa Poultry Association Hall of Fame Award (2007)
- Chair of United Egg Producers Environmental Scientific Panel on Air Emissions (2004–)
- Guest or Honorary Professor at three Chinese academic institutions (CAU, CAAS, ZU)

Selected service activities (within and outside of the institution)

- CALS Distinguished Professor Screening Committee (2015–2017); COE Research Committee; COE P&T Committee
- ABE Committees: *Promotion and Tenure Review Committee, International Programs Committee, Space Advisory Committee, Graduate Programs Committee*
- Iowa Egg Council Board Member
- Invited Member of Scientific Advisory Committees for:
  - ✓ The Key Laboratory on Agricultural Structures and Environment, China Agricultural University, Beijing China (2008-2011, 2011-2015)
  - ✓ Key Laboratory of Energy Conservation and Waste Management of Agricultural Structures, Ministry of Agriculture, China (2012–2017)
  - ✓ The State Key Laboratory in Animal Nutrition (SKLAN), the Chinese Academy of Agricultural Sciences, Beijing, China (2011–2016)
  - ✓ The Science and Information Centre for Sustainable Poultry Industry (WING), Raum, Germany (2012–)

Partial list of recent refereed publications (163 total; * student or post-doc mentored by Xin**)**

- Akarmi*, A., L. Tang, and **H. Xin**. 2014. Automated tracking and behavior quantification of laying hens using 3D computer vision and radio frequency identification technologies. *Transactions of the ASABE* 57(5): 1455-1472.
- Brown-Brandl, T.M, M.D. Hayes, **H. Xin**, J.A. Nienaber, H. Li, R.A. Eigenberg, J.P. Stinn, and T.A. Shepherd. 2014. Heat and moisture production of modern swine. *Transactions of the ASHRAE* 120(1): 469-489.
- Hayes*, M.D. **H. Xin**, H. Li, T. A. Shepherd, and J. P. Stinn. 2014. Electricity and fuel usage of aviary layer houses in the Midwestern USA. *Applied Engineering in Agriculture* 30(2): 259-266.
- Kang, J., T. Wang, **H. Xin**, and Z. Wen. 2014. A laboratory study of mitigating ammonia gas emission from animal production operations using microalgae. *J. Air and Waste Management Association* 64(3): 330-339.
- Mendes*, L.B., **H. Xin**, J.W. Nascimento, and H. Li. 2014. Evaluation of a soil moisture sensor for real-time measurement of poultry manure or litter moisture content. *Applied Engineering in Agriculture* 30(2): 277-284.
- Pelletier, N., M. Ibarburu, and **H. Xin**. 2014. Comparative assessment of the environmental footprint of the U.S. egg industry in 1960 and 2010. *Poultry Science* 93:241-255.
- Shepherd*, T.A., Y. Zhao, H. Li, J.P. Stinn, M.D. Hayes, and **H. Xin**. 2014. Environmental assessment of three laying-hen housing systems– Part II: ammonia, greenhouse gas, and particulate matter emissions. *Poultry Science* (in press)
- Stinn*, J.P. and **H. Xin**. 2014. Heat and moisture production rates of a modern U.S. swine breeding-gestation-farrowing facility. *Transactions of the ASABE* 57(5): 1517-1528.
- Stinn*, J.P. **H. Xin**, T.A. Shepherd, H. Li, and R.T. Burns. 2014. Ammonia and greenhouse gas emissions of a modern U.S. swine breeding-gestation-farrowing system. *Atmospheric Environment* 98(2014):620-628
- Zhao*, Y, **H. Xin**, D. Zhao, W. Zheng, W. Tian, H. Ma, K. Liu, H. Hu, T. Wang, M.L. Soupir. 2014. Free chlorine loss during spray of membrane-less acidic electrolyzed water and its antimicrobial effect on airborne bacteria from poultry house. *Annals of Agricultural and Environmental Medicine* 21(2):249-255.
- Zhao*, Y., T.A. Shepherd, T.A., H. Li, J.P. Stinn, M.D. Hayes, and **H. Xin**. 2014. Environmental assessment of three laying-hen housing systems–Part I: ammonia, greenhouse gas, and particulate matter emissions. *Poultry Science* (in press)

Chenxu Yu, Ph.D.

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Iowa State University
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Education

- Ph.D. 2003 Biological Systems Engineering, University of Wisconsin, Madison, WI
- M.S. 1998 Biochemical Engineering, Dalian Polytechnic University, Dalian, PRC
- B.S. 1993 Physics and Astronomy, Nanjing University, Nanjing, PRC

Professional Experience

- 08/14-present Associate Professor, Environmental Sciences Graduate Program, Iowa State University
- 08/14-present Associate Professor, 50% Teaching/50% Research, Department of Agricultural and Biosystems Engineering, Iowa State University
- 8/10-04/14 Assistant Professor, Environmental Sciences Graduate Program, Iowa State University
- 11/07-07/14 Assistant Professor, 50% Teaching/50% Research, Department of Agricultural and Biosystems Engineering, Iowa State University
- 01/06-11/07 Postdoctoral Research Associate, Department of Agricultural and Biological Engineering, Purdue University
- 08/03-12/05 Postdoctoral Research Associate, Department of Agricultural and Biological Engineering, the Pennsylvania State University
- 08/98-08/03 Graduate Research Assistant, Department of Biosystems Engineering, University of Wisconsin-Madison
- 08/95-05/98 Graduate Research Assistant, Non-aqueous Enzymology Lab, Dalian Polytechnic University
- 08/93-07/95 Computer Engineer, China Construction Bank, Dalian Branch

Areas of Specialization

- Teaching program in the areas of fundamentals of technology, food and bioprocess engineering, and biological engineering.
- Research program in the areas of spectroscopic biosensing and bio-related nanotechnology, and their applications in food quality and safety monitoring, biomedical diagnosis, environmental risk factor/contamination evaluations and disease prevention and vaccine development
- Member of graduate faculty in Agricultural and Biosystems Engineering and Environmental Sciences Programs

Awards and Honors

- Engineering Student Council Outstanding Club Advisor Award, 2012, College of Engineering, Iowa State University

Professional Affiliations

- American Society of Agricultural and Biological Engineers (2005-present)
- Institute for Food Technologists (1999-2003, 2007-present)
- American Chemical Society (2007-present)
- Biophysical Society (2007-present)
- Institute of Biological Engineering (2011-present)

Most Recent Publications (2013 and beyond)

1. Peng, H., C. Wang, X. Xu, **C. Yu** and Q. Wang, An Intestinal Trojan Horse for Gene Delivery. Nanoscale, in press
2. Wang, C. and **C. Yu,** Analytical characterization using surface-enhanced Raman scattering (SERS) and microfluidic sampling. Nanotechnology, in press
3. Kadam, D. M., C. Wang, S. Wang, D. Grewell, B. Lamsal, **C. Yu**, Microstructure and antimicrobial functionality of nano-enhanced protein-based biopolymers, Transactions of the ASABE, 57(4): 1141-1150, 2014.
4. Yao, L., W. Zhou, M. Liu, **C. Yu** and T. Wang, Quantification of egg yolk contamination in egg white using UV/Vis spectroscopy: prediction model development and analysis, Food Control, 43, 88-97, 2014.
5. Wang, C., C. G. Yoo, **C. Yu**, T. Kim, Raman Spectroscopic characterization of photonanocatalyst aided alkaline pretreated corn stover biomass, Advanced Materials Research, 877, 1576-1580, 2014
6. Liu, M., L. Yao, T. Wang, J. Li and **C. Yu**, Rapid determination of egg yolk contamination in egg white by VIS spectroscopy, Journal of Food Engineering, 124C, 117-121, 2014.
7. Wang, C., N. Xiao, **C. Yu,** A self-referencing detection of microorganisms using surface enhanced Raman scattering nanoprobes in a test-in-a-tube platform, Biosensors, 3(3), 312-326, 2013
8. Wang, Q., S. Grozdanic, M. H. Harper, K. Hamouche,* N. Hamouche, H. Kecova, T. Lazic and **C. Yu**, Detection and characterization of glaucoma-like canine retinal tissues using Raman spectroscopy, Journal of Biomedical Optics, 18(6), 067008, 2013
9. Wu, H. T., D. M. Li, B. W. Zhu, J. H. Cheng, J. J. Sun, F. L. Wang, Y. Yang, Y. K. Song, and **C. Yu,** Purification and characterization of alkaline phosphatase from the gut of sea cucumber *Stichopus japonicas*, Fisheries Science, 79(3), 477-485, 2013.
10. Kadam, D. M., M. Thunga, S. Wang, M. R. Kessler, D. Grewell, B. Lamsal, **C. Yu**, Preparation and characterization of whey protein isolate films reinforced with porous silica coated titania nanoparticles, Journal of Food Engineering, 117, 133-140, 2013.
11. Yang, J., B. Zhu, J. Zhang, L. Sun, D. Zhou, X. Ding, and **C. Yu,** Stimulation of lymphocyte proliferation by oyster glycogen sulfated at C-6 position. Carbohydrate Polymers, 94, 301-308, 2013.
12. Yoo, C. G., C. Wang, **C. Yu**, T. H. Kim, Enhancement of enzymatic hydrolysis and lignin removal of corn stover using photocatalyst-assisted ammonia pretreatment, Applied Biochemistry and Biotechnology, 169, 1648-1658, 2013.
13. Wang, C., **C. Yu**, Detection of chemical pollutant in water using gold nanoparticles as sensors: a review, Reviews in Analytical Chemistry, 32(1), 1-14, 2013.

Governance Document

Department of Agricultural and Biosystems Engineering

Table of Contents

Article I: Purpose and Goals

This Governance Document defines the role of and procedures for faculty participation in governance of the Agricultural and Biosystems Engineering Department.

The goals of this document are to promote effective operation of the department and to assist the department in fulfilling its mission.

Other documents that affect department governance are:

1. Iowa State University Faculty Handbook
2. College of Agriculture and Life Sciences Governance Document
3. College of Engineering Governance Document

This Governance Document is subservient to those listed above, and properly adopted changes in those documents that are in conflict with provisions in this Governance document shall supersede said provisions of this document.

Faculty evaluation and review procedures and processes are embedded in this document as well as the documents listed above.

In this document, a faculty member's "College" refers to that college where the faculty member has their primary appointment.

Article II: Department Mission

The mission of the Agricultural and Biosystems Engineering Department is to serve, through education, research, extension and service, the agricultural and allied industries. The department develops and transfers engineering and related technological knowledge for efficient production of food and fiber to citizens in Iowa and beyond while wisely using our natural resources. Department programs integrate basic biological and physical sciences through application of engineering fundamentals and allied technologies to develop and deliver new knowledge and understanding of agricultural and biological systems. Included in the department's mission are the efficient and effective production, processing, storage, handling, distribution, and use of food and other biological products, and the management of related natural resources.

The department remains committed to the Land Grant philosophy of serving the people of Iowa through education, research, extension, and international programs, particularly as

human needs become more global in nature, and population growth requires increased food supplies.

Mission I – Education

To provide educational programs of unsurpassed quality in selected areas of agricultural and biosystems engineering and allied technologies.

Mission II – Research

To generate new knowledge through internationally recognized research programs in selected areas of engineering and allied technologies as related to agriculture and biosystems.

Mission III – Extension

To transfer technology to the people of Iowa in selected areas of agricultural and biosystems engineering and allied technologies.

Mission IV – International

To develop and support instruction, research, and extension opportunities and needs in international agricultural development.

Article III: Department Personnel

Department personnel are classified into several categories:

- Faculty
- Non-Tenure-Eligible Research (NTER) Faculty
- Professional and Scientific Staff
- Merit System Staff
- Graduate Assistants
- Hourly Employees

All individuals in these categories have critical responsibilities in achieving the department mission. However, governance of the department is specifically assigned to the Faculty and Department Chair acting within established College and University procedures.

Article IV: Faculty and Chair Responsibilities

The faculty and Chair share responsibility for department operation. The faculty has an important voice in setting policy and the Chair is responsible for department administration. It is

expected that faculty and Chair will approach department governance in a cooperative and positive spirit.

Responsibilities of the Chair include:

- Directing the work of the department
- Preparing and administering the department's Teaching, Experiment Station and Extension budgets
- Recommending personnel actions
- Assigning work loads
- Appraising performance of faculty members
- Assigning faculty member salaries
- Providing department leadership

The faculty is responsible for academic matters, including:

- Curricula. Note that the two ABE curriculum committees are charged with general oversight of, including assessment and continuous improvement of, the degree programs under their purview (TCC for technology programs, ECC for engineering programs). Voting members on the curriculum committees must be voting members of the faculty; other members such as advisers and students, are in an ex-officio role. Once per semester, either at a full faculty meeting, or at a full faculty retreat, the chairs of the TCC and ECC shall provide a summary of any curricular changes made since the last report. If possible, this report should also include an update on the current status of continuous improvement processes for each degree program within the purview of the committee. Any major changes in programs or policies – e.g.: addition or deletion of an option, certificate, or degree program; change in credit hours required for graduation; changes in admission requirements to any program; changes in the assessment tool for student evaluation of instruction – must be brought to the full faculty for a vote after the relevant curriculum committee(s) has voted on the change.
- Admission of, monitoring progress of, and setting retention standards for undergraduate and graduate students

The faculty advises and makes recommendations to the Chair and College and University administrators regarding:

- Hiring of new faculty members
- Faculty member promotion, tenure, and post-tenure issues
- Research programs
- Extension programs
- Teaching programs
- Physical facility needs
- Other items as requested by administrators or as deemed appropriate by the faculty

The faculty conducts an annual performance review of the Chair through the Promotion, Tenure, and Review Committee (PTRC) (see Article IX for other responsibilities of this committee). The purpose of this review is to assist the Chair in providing effective leadership to the department (see Article XVI). The PTRC will conduct a concise, confidential, electronic survey of the tenured and tenure-eligible faculty regarding the performance of the Chair. The survey will be administered each June, with responses compiled and a summary report provided by the end of September. The report will be shared with the Chair, and made available to the Deans.

Article V: Voting Faculty

The voting faculty consists of the regular voting faculty and the provisional voting faculty. The regular voting faculty shall consist of all tenured and tenure-track faculty members with a budgeted appointment in Agricultural and Biosystems Engineering, as well as faculty members holding budgeted joint appointments in Agricultural and Biosystems Engineering. The provisional voting faculty members fill positions and have responsibilities similar to those of the regular faculty, but have courtesy appointments or non-tenure track positions. They may have adjunct or other types of faculty appointments, or may be appointed in a non-faculty position.

At the first faculty meeting of each semester, the Chair will nominate those persons, if any, who he/she believes should be members of the provisional voting faculty. The regular voting faculty will vote to accept or reject each of the nominees. Tenure on the provisional voting faculty is for one year, but members may be reelected an indefinite number of times.

The provisional voting faculty may vote on all items of faculty business, except for promotion and tenure matters (see Article VI).

Article VI: Conduct of Faculty Business

The Chair or his/her designee chairs in the faculty meetings. Meetings shall be conducted according to parliamentary procedure. Robert's Rules of Order shall be the governing parliamentary document.

The Chair shall designate a Secretary of the Faculty. The Secretary may be a faculty member or a P&S or Merit System employee. The Secretary shall:

- Maintain current rosters of the regular voting faculty and the provisional voting faculty.
- Maintain minutes of faculty meetings, which shall be available in the department office.
- Maintain a current copy of this Governance Document, as amended, and current copies of the nine related documents listed in Article I.

Faculty meetings shall be scheduled by the Chair at whatever frequency deemed appropriate, but at least once during the Fall and once during the Spring semesters. Meetings shall be announced in writing at least one week in advance of the scheduled time.

The Chair must call a faculty meeting within two weeks if so requested in writing by at least two members of the voting faculty, or when presented with a proposed amendment to this Governance Document (see Article XXII).

Individuals with an interest in matters under discussion, e.g. persons with Adjunct, Visiting, or Courtesy appointments, Professional and Scientific Staff, Merit Staff, or others, may be invited to participate in discussions at faculty meetings, unless ruled out of order by the presiding officer. Only members of the voting faculty may vote on questions brought to a vote. Provisional voting faculty members may not vote on promotion, tenure, and post-tenure review matters. A quorum shall consist of 50% of the voting faculty. Unless otherwise stated, approval by a majority (more than one-half) of voting faculty members present and voting is required to pass questions brought to a vote.

Article VII: Department Committees

Except for the PTRC, establishing committees, assigning their responsibilities, naming committee members, and terminating committees is a responsibility of the Chair. The purpose of committees is to provide an organizational framework for department personnel to collectively conduct activities vital to department functioning. Committee membership may include any persons budgeted in the department and may include students or others from within or outside the department or university.

By September 1 of each year, the Chair shall publish a list of departmental standing committees their responsibilities, except for the PTRC that is to be formed by May 1 (described in Article IX*)* and a listing of the chair and members of each committee. The Chair may, at any time, appoint an ad hoc committee to address specific issues that may arise.

Article VIII: Promotion, Tenure, and Review Committee

Promotion and tenure procedures are specified in the Department Promotion and Tenure document and by Promotion and Tenure Documents of the College of Agriculture and Life Sciences and the College of Engineering. Post-tenure review procedures are specified in the Department Post-Tenure Review document and by Post-Tenure Review Documents of the College of Agriculture and Life Sciences and the College of Engineering.

The PTRC shall have seven members elected from the regular voting faculty. The PTRC shall include five full professors, one associate professor, and one assistant professor. The PTRC shall be elected from a nomination list that includes all members of the regular voting faculty, except for those who are being considered for promotion, tenure, mid-term probationary or post-tenure review, and regular voting faculty members who ask the Chair to remove their names from the nomination list. Additionally, the department chair has the right to limit assistant professor nominees to ensure that all assistant professors have the opportunity to serve on the PTRC prior to their tenure review.

The election must be conducted by May 1st of each year. A ballot will be prepared by the Department Chair and distributed to the regular voting faculty. The five professors, one associate professor, and one assistant professor receiving the most votes will be elected to the committee. If a tie vote occurs that would elect more members than specified, a second ballot containing the names of the individuals so tied will be distributed and that person (or persons, if breaking a

multiple tie at the professor position) receiving the most votes will be elected. When no candidate is available at one of the specified ranks, an additional member of the next-higher rank shall be elected.

Since the PTRC is elected by the regular voting faculty of the department, the PTRC vote represents the combined vote for the entire regular voting faculty. Therefore no regular voting faculty member in the department is permitted to cast a vote outside the department in promotion and tenure process. (Note: see faculty handbook on double voting). The elected assistant professor will participate in all processes and deliberations of the committee, but shall not cast any votes on final recommendations. The elected associate professor will participate in all processes and deliberations of the committee, but shall not cast any votes on final recommendations regarding candidates applying for promotion to full professor or post-tenure reviews of full professors.

No faculty member seeking promotion or a tenure decision, being evaluated for mid-term probationary or post-tenure review is eligible for the PTRC. An assistant professor who has previously been elected to the PTRC is not eligible to serve on the PTRC again until all other assistant professors have served. If any elected member is subsequently unable to serve, that member will resign from the committee, and a replacement member of the same rank will be appointed by the Department Chair.

The PTRC shall elect as voting chairperson one of its full professor members. The elected chairperson will also serve as the member the position responsibility statement (PRS) mediation panel selected by the department. If the elected chairperson is the faculty member in dispute, an alternate full professor on the PTRC will be elected to serve. The PTRC shall follow the procedures set forth in the Department, College, and University Promotion and Tenure Documents in evaluating candidates and making recommendations regarding promotion and tenure. However, in the event of conflict between College of Agriculture and Life Sciences and College of Engineering requirements, the committee and the Department Chair shall reach agreement with the Deans of both Colleges regarding the specific rules to follow. This information will be communicated in a timely manner to those seeking promotion and/or tenure.

The PTRC shall follow the procedures set forth in the Department, College, and University Post-Tenure Review Documents in evaluating candidates and making recommendations regarding post-tenure review. Because the department budget is primarily in the College of

Agriculture and Life Sciences, College of Agriculture and Life Sciences procedures will normally govern. However, in the event of conflict between College of Agriculture and Life Sciences and College of Engineering requirements, the committee and the Department Chair in consultation with the faculty member shall reach agreement with the Deans of both Colleges regarding the specific rules to follow. This information will be communicated in a timely manner to those subject to post-tenure review.

Article IX: ABE Faculty Expectations

The ABE voting faculty have approved the following guidelines[1] detailing the qualities and/or behaviors associated with faculty performing over a range of superior, strong, successful, substandard, or unacceptable, across five key realms of accomplishment. These expectations are applicable to faculty during the entire span of their careers, though the expected productivity, and weighting of factors will change with individual PRS requirements, which themselves should change as faculty progress through their careers.

[1] This list is heavily based upon one published in Crookston, R.K. 2012. *Working with Problem Faculty: A 6-Step Guide for Department Chairs*. It has been modified in consultation with ABE faculty members to better reflect the range of activities – e.g., extension and applied research – that characterize our department.

ABE Faculty Expectations: Research

5. Superior scholarship by consistently publishing highly-cited impactful works. Preparing publications used in development of public policy/standards/regulations. Documented broad impact of research including patents, technologies adopted by industry, and/or knowledge from research making an impact on an industry or society because of changes in practices. Consistently preparing and timely completing project reports that lead to continued funding. Consistently obtains funding to conduct his/her research. Consistently mentors students (MS and PhD) and postdocs to maintain a research program.

4. Strong scholarship by publishing highly cited impactful works. Preparing publications used in development of public policy/standards/regulations. Documented broad impact of research including patents, technologies adopted by industry, and/or knowledge from research making an impact on an industry or society because of changes in practices. Consistently preparing and timely completing project reports that lead to continued funding. Consistently obtains funding to conduct his/her research. Consistently mentors students (MS and PhD) and postdocs to maintain a research program.

3. Successful scholarship by publishing peer-reviewed journal articles. Consistently preparing and timely completing project reports. Obtains funding to conduct his/her research. Mentors students (MS and PhD) and postdocs to maintain a research program.

2. Substandard scholarship consisting of a trend of not publishing and with no tangible evidence of work in progress. Submits annual report, though with little thought or commitment to improvement.

1. Unacceptable scholarship, with no verifiable work in progress, no recent submissions, and no publications over a multiyear period. Does not willingly develop plans for improvement and shows no enthusiasm for increasing teaching or service contributions to compensate for lack of scholarly work.

ABE Faculty Expectations: Extension

5. Superior extension through continual recognition of needs of clientele and continual development of outreach programs that lead to measurable outcomes. Consistent development of Extension publications and delivery of presentation materials that are widely used by clientele. Obtains evidence of extension program excellence through peer assessment and/or a well-designed client assessment program.

4. Strong extension through recognition of needs of clientele and development of outreach programs that lead to measurable outcomes. Development of Extension publications and delivery of presentation materials that are widely used by clientele.

3. Successful extension through recognition of needs of clientele and development of outreach programs. Development of Extension publications and delivery of presentations.

2. Substandard extension through little development of outreach programs and little development of program improvement plan.

1. Unacceptable extension through no development of outreach programs and no development of program improvement plan.

ABE Faculty Expectations: Teaching

5. Superior teaching, as evidenced by delivering courses that demonstrably meet key learning outcomes, with valid and transparent measures consistent with program and department goals. Continually updating course content and exploring improved pedagogy. Develops new modules or courses in response to program-identified needs. Student ratings significantly above department averages. Highly active in mentoring students outside the class (undergraduate theses, special projects, etc.). Recognized by industry as the go-to expert in the area for training and courses. Continually strives for the development of hands-on laboratory exoeriences as approrpaite to promote high quality student learning.

4. Strong teaching, as evidenced by creative and rigorous course design and delivery, attention to course learning outcomes and measures, attention to students outside of class, and above-average student ratings, including narrative comments. Recognized by industry as an expert in the area for training and courses. Strives for the development of hands-on laboratory exoeriences as approrpaite to promote high quality student learning.

3. Successful teaching, as evidenced by efforts to revise and improve with well-considered goals, solid lesson plans, helpful and prompt feedback, and sincere concern for student learning. Student ratings near the department average. Course learning goals consistent with and supportive of program learning outcomes.

2. Substandard teaching, as evidenced by some combination of subpar student ratings, significant student complaints, frequent absences from class or late arrival to class, failure to provide students with prompt feedback, superficial attention to course and program learning outcomes, and/or resistance to department work on assessment.

1. Unacceptable teaching, as evidenced by very low teaching scores (greater than 1.5 points below department average on seven-point scale), consistent student complaints, failure to provide students with helpful and timely feedback, course content that fails to meet disciplinary standards, and/or refusal to accept proportionate share of teaching load.

ABE Faculty Expectations: Service

5. Superior, diligent service to department, college, university, and/or profession by attending meetings and contributing constructively; includes holding leadership posts. Contributes actively and positively to the morale of the department and campus.

4. Strong, faithful service on major assignments or significant department, college, and/or university committees. Volunteers for assignments. May include national work such as editorial boards, scholarly reviewer, and assignments in national organizations.

3. Successful service with consistent attendance and input at most department, college, and university meetings. Available and accessible. Has well-considered goals for continuing growth as a university citizen. Uses university resources appropriately.

2. Substandard service including frequent absence from meetings, consistently coming late, and/or inconsistent or unreliable performance on committees. Little evidence of commitment to improvement. Questionable loyalty to unit mission evidenced by nonsupportive behavior or public comments.

1. Unacceptable service by failure to participate in meetings and refusal to serve on committees and to fulfill assignments. Frequently away from office and disengaged from formal and informal life of the department. Does not willingly develop plans for improvement and/or shows little or no progress on meeting expectations.

ABE Faculty Expectations: Collegiality

5. Superior collegiality as evidenced by contributing actively and positively to the morale of the department and campus. Promotes courtesy and harmony and politely takes a stand against incivility when it occurs. Openly recognizes and promotes contributions of others in achieving department and university goals. Works for the good of the whole rather than for personal gain or credit. Is supportive of others' careers, lives, and families.

4. Strong collegiality based on positive interaction with others and having and assuming positive intent with all comments. Supports candid dialogue and disagrees agreeably. Open to new ideas, teachable. Optimistic, and complimentary in conversations and correspondence. Listens attentively.

3. Successful collegiality as evidenced by using courtesy and respect when interacting with students, staff, campus offices, administration, visitors, and professional colleagues. Supports unit mission, goals, and behavioral norms. Keeps sensitive or private information confidential. Has a sense of humor and uses it respectfully.

2. Substandard collegiality as shown by minimizing mission, values, behavioral norms, or policy. Arrogant and condescending; treats colleagues, staff, and students as inferiors; ignores or excludes them. Interrupts, tells side jokes, or holds ancillary discussions in meetings. Participates in fabrications and gossip. Uses dirty looks, sarcasm, teasing.

1. Unacceptable collegiality as demonstrated by ignoring or violating behavioral norms or policy. Insubordinate, prejudiced, known for inflammatory statements or e-mails. Humiliates, threatens, attacks, degrades, or insults others. Fails to respect personal space; makes uninvited physical contact; uses vulgarity.

Article X: Faculty Member Performance Appraisal

The performance of each faculty member shall be reviewed annually by the Chair in accordance with procedures specified in the current appropriate College Performance Appraisal Process. The appraisal process includes a review of the PRS to determine that it accurately reflects the faculty member's duties. The faculty member's accomplishments of the preceding year also are reviewed with reference to the expectations delineated in Article IX. The purpose of the faculty member performance appraisal is to provide the department chair with a detailed knowledge of the faculty member's work and activities, to assist the faculty member in setting goals and priorities, and to enhance productivity.

Article XI: Probationary Faculty Members Performance Appraisal

A review will be conducted by the PTRC for all tenure-track faculty members, on a four-year initial appointment, before the end of the third year of employment. The purpose of this review is to provide the faculty member with feedback in accordance with the current promotion and tenure guidelines, and with reference to the expectations delineated in Article IX. A report from the PTRC will be given to the Department Chair and the Chair will communicate the review findings with the faculty member. In cases where the faculty member receives time credit from previously held positions, the PTRC will conduct the review two years before the end of the probationary period (i.e., one year before their mandatory application for tenure).

Materials for reviews conducted prior to the application for tenure and promotion will include the candidate's PRS, complete vita and portfolio (as detailed on the Provost's web site) and proof of institutional and professional citizenship[2]. The departmental faculty may be asked for input concerning institutional and professional citizenship of the candidate.

The timing of probationary faculty member reviews will be distributed annually, but is typically as follows:

[2] Evidence of institutional and professional citizenship includes contribution to the decision making and academic/institutional planning at the departmental level, and perhaps even at the college and university levels as well as professional organizations, by effectively carrying out committee assignments. The record of service should demonstrate that the assistant professors worthy of promotion to associate professor with tenure have begun to develop a habit of service and that their judgments are professionally respected and valued.

- April 15th (previous year) – probationary faculty members in need of review are notified by the Department Chair (so that they can be excluded from the PTRC).
- Mid January – materials for probationary faculty member reviews due to the PTRC
- End of April – feedback from the PTRC will be given to the Department Chair to share with the probationary faculty member.

The materials to be submitted for promotion to associate professor with tenure include the PRS, complete vita and portfolio (as detailed in the faculty handbook and the Provost's web page) or other materials as required by the College. Proof of institutional and professional citizenship will be an additional departmental requirement (see definition in the footnote). The PTRC will vote on the awarding of promotion and tenure and submit the result to the Department Chair.

The timing of tenure and promotion to Associate Professor will be distributed annually, but is typically as follows:

- April 15th – candidate must notify the Department Chair in writing of their intent to seek promotion and tenure if it is not the penultimate year of their contract. In the case of mandatory review, the Department Chair will notify or remind the candidate of the review by this date and the following timelines apply.
- Beginning of May – the new PTRC will be made aware of the candidate's intent and will find appropriate faculty mentors to assist the candidate as they develop their documentation.
- Mid August – the documentation, including PRS, vita, portfolio and other materials required by the College of Agriculture and Life Sciences, College of Engineering, University and Departmental guidelines, must be received by the PTRC. The PTRC will review the candidate's dossier and then vote on the solicitation of external reference letters to further the process. The PTRC will give the candidate feedback on their dossier, allowing time for changes before the College deadlines, which are typically around November 1st.
- Beginning of September – the PTRC will request external reference letters. The external reviewers will receive the PRS and vita along with other P&T guideline materials as defined by the Provost.

Article XII: Promotion to Professor

Reviews of faculty members wishing to be promoted to full professor are conducted much the same as those being promoted to associate professor, and will be done with reference to the expectations delineated in Article IX. In addition to criteria set forth by the College and University, institutional and professional citizenship will be a consideration in the evaluation of candidates[3]. The departmental faculty may be asked for input concerning institutional and professional citizenship of the candidate.

The timing of tenure and promotion to Professor will be distributed annually, but typically is as follows:

- April 15th – candidate must notify the Department Chair in writing of their intent to seek promotion.
- Beginning of May – the new PTRC will be made aware of the candidate's intent and will find appropriate faculty mentors to assist the candidate as they develop their documentation.
- Mid August – the documentation, including PRS, vita, portfolio and other materials required by the College of Agriculture and Life Sciences, College of Engineering, University and Departmental guidelines, must be received by the PTRC. The PTCR will review the candidate's dossier and then vote on the solicitation of external reference letters to further the process. The PTRC will give the candidate feedback on their dossier, allowing time for changes before the College deadlines, which are typically around November 1st.
- Beginning of September – the PTRC will request external reference letters. The external reviewers will receive the PRS and vita along with other promotion guideline materials as defined by the Provost.

[3] Candidates must present reasonable evidence of such service as: effective membership, and in some cases leadership, on standing and/or ad hoc committees at the departmental, college, and/or University levels; sponsorship and advising of student groups or clubs; lectures, consultation, and other contributions to the University and the community consistent with the candidate's professional expertise; honors or awards for professional service to the University, community, and professional groups or organizations; membership, participation, and certain leadership in the activities of regional and national professional organizations as committee members, session chairs, elected officials, and the like; editing of scholarly journals, reviewing of manuscripts and grant applications or other activities that represent high quality professional service at different levels to both the public and private sectors.

Article XIII: Post-Tenure Review

Each tenured and continuously appointed faculty member's accomplishments will be reviewed according to the current Department, College, and University Post-Tenure Review Guidelines, and with reference to the expectations delineated in Article IX, at the frequency specified in those documents. The review will be conducted by the PTRC, with an evaluation and recommendation forwarded to the Chair. Faculty members will be evaluated sequentially based on the length of service since their last promotion or post-tenure review.

Review packets submitted by faculty will include all PRS's in effect during the review period, a complete vita, and a two-page document summarizing his or her major accomplishments and impacts associated with each PRS component since his or her last review.

The timing of post-tenure review will be distributed annually, but typically is as follows:

- April 15th (previous year) – faculty members scheduled for review are notified by the Department Chair (so they can be excluded from the PTRC).
- Mid December – materials for post-tenure faculty review due to the PTRC
- Mid February – a summary of the PTRC's appraisals and recommendations will be given to the Department Chair in order for the Chair to develop a plan for improvement with the faculty member if such a plan is deemed necessary.

Article XIV: Non-Tenure-Track Faculty Members (Adjunct, Lecturers, and Senior Lecturers) Performance Appraisal

All non-tenure track faculty members with renewable Letters of Intent will be reviewed according to the current Department, College, and University guidelines for non-tenure-track faculty members before a reappointment decision. The review will be conducted by the PTRC, with an evaluation and recommendation forwarded to the Chair

Article XV: Non-Tenure-Eligible Research (NTER) Faculty Member Performance Appraisal

The performance of each NTER faculty member shall be reviewed annually by the Chair in accordance with procedures specified in the current appropriate College and University Performance Appraisal Process. The appraisal process includes a review of the PRS to determine that it accurately reflects the NTER faculty member's duties. The NTER faculty member's

accomplishments of the preceding year also are reviewed. The purpose of the NTER faculty member performance appraisal is to provide the department Chair with a detailed knowledge of the NTER faculty member's work and activities, to assist the NTER faculty member in setting goals and priorities, and to enhance productivity.

A NTER faculty member may be proposed for advancement to the next rank. The advancement review process shall be conducted by the PTRC and be the same as the review for tenure and promotion of tenure-eligible and tenured faculty members. The standards for each rank shall be the same as the definitions for scholarship performance at rank for assistant, associate and professor ranks for tenure-eligible and tenured faculty members. The review will be conducted by the PTRC, with an evaluation and recommendation forwarded to the Chair.

Article XVI: Courtesy Appointment

The ABE department offers courtesy, adjunct, visiting, collaborator, and affiliate appointments. Refer to the Faculty Handbook for details on adjunct, visiting, collaborator, and affiliate appointments. For courtesy appointment, ABE follows the Faculty Handbook with the stipulations below:

Courtesy appointments are offered to faculty members from other academic departments at ISU. It is expected that courtesy faculty members will *engage with ABE in substantive ways that would not be possible without courtesy status*, for example, by recruiting and serving as major professor to students in ABE graduate programs, by providing financial support of ABE graduate student research, or by co-teaching ABE course(s) with ABE faculty members. ABE makes no financial commitment to the courtesy faculty member.

Courtesy appointments are term, with appointments ranging in length from 3 to 5 years, with renewal possible. Unless specifically requested, faculty members with courtesy appointments will not have voting rights. If requested, granting of voting rights will be determined by a faculty vote; a two-thirds majority is necessary for passage. If requested and granted, the voting rights of faculty members with courtesy appointments shall be the same as for provisional voting faculty, per this governance document.

To request courtesy status, the applicant should submit a Letter of Interest indicating the nature of the engagement between the faculty and the ABE department. To request continuation of courtesy status, applicants should also include within the Letter of Interest a summary of

relevant activities arising from the last appointment. The ABE faculty, with access to (1) the written statement and (2) a current 2-pg vita, shall vote on applications and any subsequent renewals; a two-thirds majority is necessary for passage. In cases of approval, the faculty will provide clear guidance to the chair regarding the content of the Letter of Intent. Applications will be reviewed on a rolling basis, but renewals will be reviewed annually at the faculty retreat immediately before fall semester (or at the first faculty meeting thereafter). At that time, the Chair will present the prior Letters of Intent and new Letters of Interest from all those who need renewal actions to inform the discussion.

Article XVII: Faculty Member Work Assignments

Teaching, student advising, research, extension, and other duties shall be assigned by the Chair in consultation with the faculty member and in accordance with the current PRS.

Faculty Buyout from Teaching. Faculty may buyout part of their workload responsibilities from an externally funded grant or sponsored project. Buyout will typically be taken from teaching responsibilities. Faculty buyout must be approved in a workload discussion, written in a memorandum of agreement, and signed by the faculty member and the chair. The faculty member buying out of teaching must identify an acceptable and willing replacement instructor for the class. The faculty member is responsible if the replacement instructor is not able to complete the class.

The standard ABE workload is four 3-credit classes per year for a 50 % teaching load. Since departmental teaching obligations must be covered, it may not be possible to approve all buy-out requests; therefore early notification of the intent to buyout is crucial. Providing notice at least three months in advance of the semester start is recommended. No faculty member will be allowed to buy out of instruction if it will negatively impact the instructional quality in our programs or compromise the ability of the department to deliver its instructional programs. The impact on the instructional program will determine the number of buyouts, if any, that can be accommodated each year by the department. The percentage of courses delivered by non-tenure track faculty in the ABE programs will also be a consideration in the decision process. Faculty members are expected to teach at least one course each academic year and may not use external funding to buy out of all teaching in a given year. To buy out of a course, faculty will provide

reimbursements to the department using the following, where the annual faculty salary is based on a nine-month equivalent salary:

1 course buyout = 0.15 * annual faculty salary

2 course buyout = 0.30 * annual faculty salary

3 course buyout = 0.50 * annual faculty salary

Article XVIII: Department Focus Area Leaders

To facilitate department operation, personnel have been grouped into subject matter focus areas. To improve communication and provide liaison, the Chair may name a leader or co-leaders for each of these units. Unit leaders have no specific administrative duties by virtue of that appointment. Some may, however, have administrative duties assigned by the Chair, or specified in their PRS.

Article XIX: Department Chair Performance Appraisal

The PTRC shall develop a procedure for appraising the performance of the Department Chair and shall conduct a performance appraisal at the request of the Dean or the Chair. The performance appraisal shall include a meeting of the PTRC with the Chair. The purpose of the appraisal is to ensure faculty-Chair interaction and to provide a means for collective, thoughtful recommendations from the faculty to the Chair for enhancing leadership of the department.

The PTRC shall provide for faculty input in developing the performance appraisal. The PTRC shall provide both written and oral reports to the Chair regarding the results of the appraisal. The PTRC may, at its discretion, call a meeting of voting faculty to report orally regarding recommendations made to the Chair.

The faculty may, at its discretion, by majority vote, instruct the PTRC to communicate with the Dean of the College of Agriculture and Life Sciences or the College of Engineering regarding strengths of the Chair’s performance and/or areas of concern that the faculty may have.

Article XX: Department Planning Retreat

The department faculty must be aware of the factors external and internal to the department that affect the ability of the department to fulfill its mission. Thoughtful consideration of these factors is critical to maintaining a strong, vibrant, and effective department.

The Chair shall at least every two years schedule a Department Planning Retreat of appropriate duration for the purpose of reviewing and revising the department's mission and vision. Action plans shall be developed for meeting challenges to department effectiveness, to enhance department relevance, and to evaluate program quality and department stature.

Faculty members have a responsibility to participate in these retreats.

Article XXI: Salary Adjustments

Assigning faculty member salaries is a responsibility of the Department Chair. The Chair may consult with the PTRC or ask any selected individuals to provide guidance in allocating available salary adjustment funds for equity and to reflect contributions to department productivity.

When informing individual faculty members of their salaries for the coming year, the Chair should state the average department percent adjustment, and if the individual's adjustment is appreciably different from the department average, the reasons for that difference.

Article XXII: Amendments

The procedure for amending the Governance Document and/or the Promotion, Tenure, and Post-Tenure Review Documents shall be as follows: Proposed amendments shall be submitted to the Chair in writing by a voting faculty member for distribution to the faculty and for inclusion as an agenda item for a faculty meeting to be held within two weeks. Proposed amendments shall be discussed and may be amended at the faculty meeting. Within one week following the faculty meeting at which the proposed amendment is discussed, a ballot shall be prepared and distributed to the voting faculty. Ballots must be returned within 10 days of distribution to be counted.

To be adopted, an amendment must be approved by a majority of the voting faculty (not simply a majority of those voting).

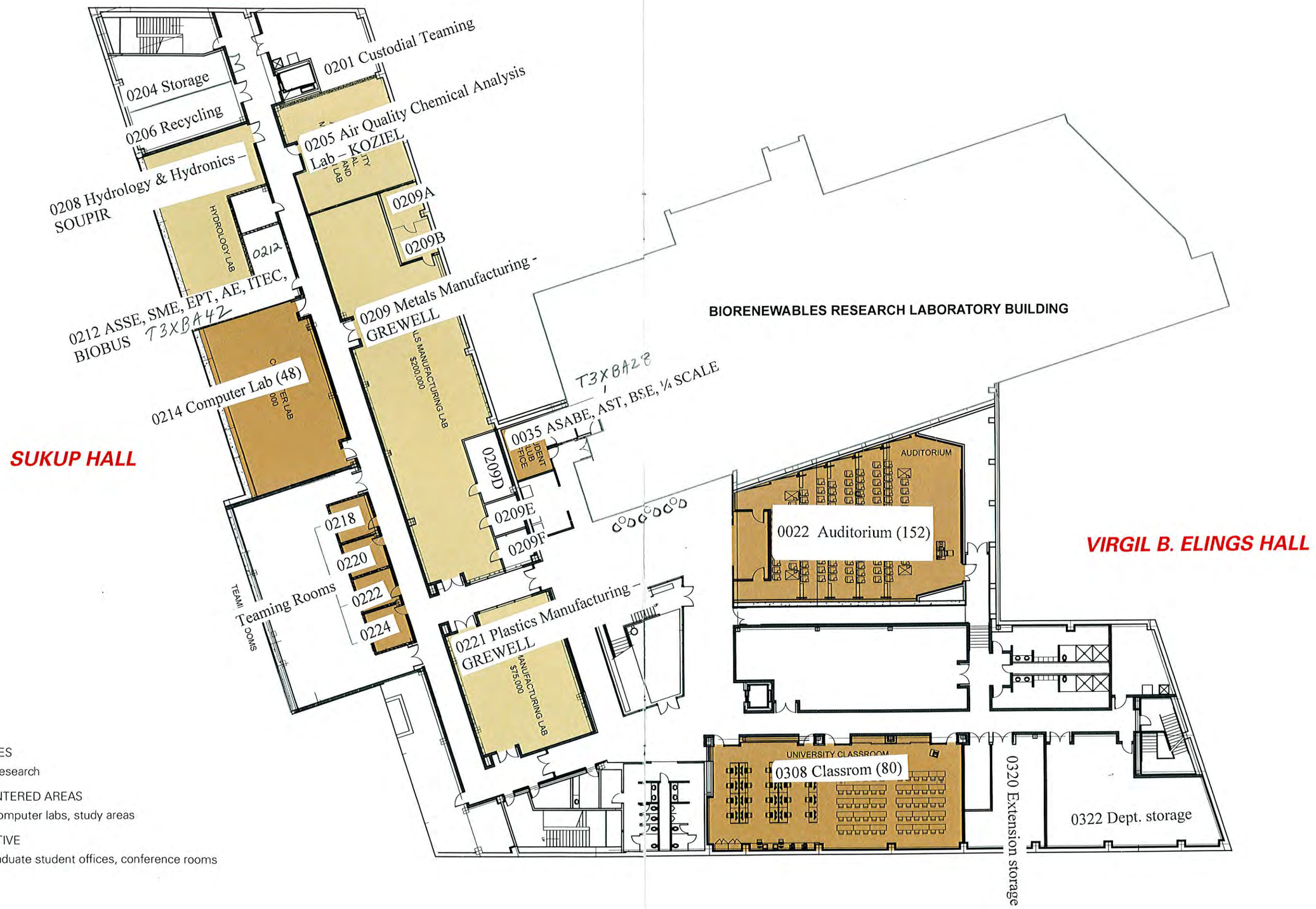
To ensure that this Governance Document remains current, the PTRC shall annually review this document to determine if it is in conflict with University, College of Agriculture and Life

Sciences, or College of Engineering governance document or procedures. If conflicts are found that committee shall propose amendments to this document to reconcile those differences.

Article XXIII: Adoption

This Governance document is proposed as an amendment to and replacement for the "Rules of Governance, Department of Agricultural Engineering", dated September 1, 1975, revised March 1981, amended by replacing that document in its entirety with the Rules of Governance, Department of Agricultural and Biosystems Engineering May 8, 1992, and amended November17, 1999, April 11, 2003, November 18, 2003; December 20, 2005, March 31, 2009, May 3, 2010, February 28, 2011, September 12, 2011, March 1, 2012, April 30, 2012, September 24, 2013, September 18, 2014.

APPENDIX 7.9



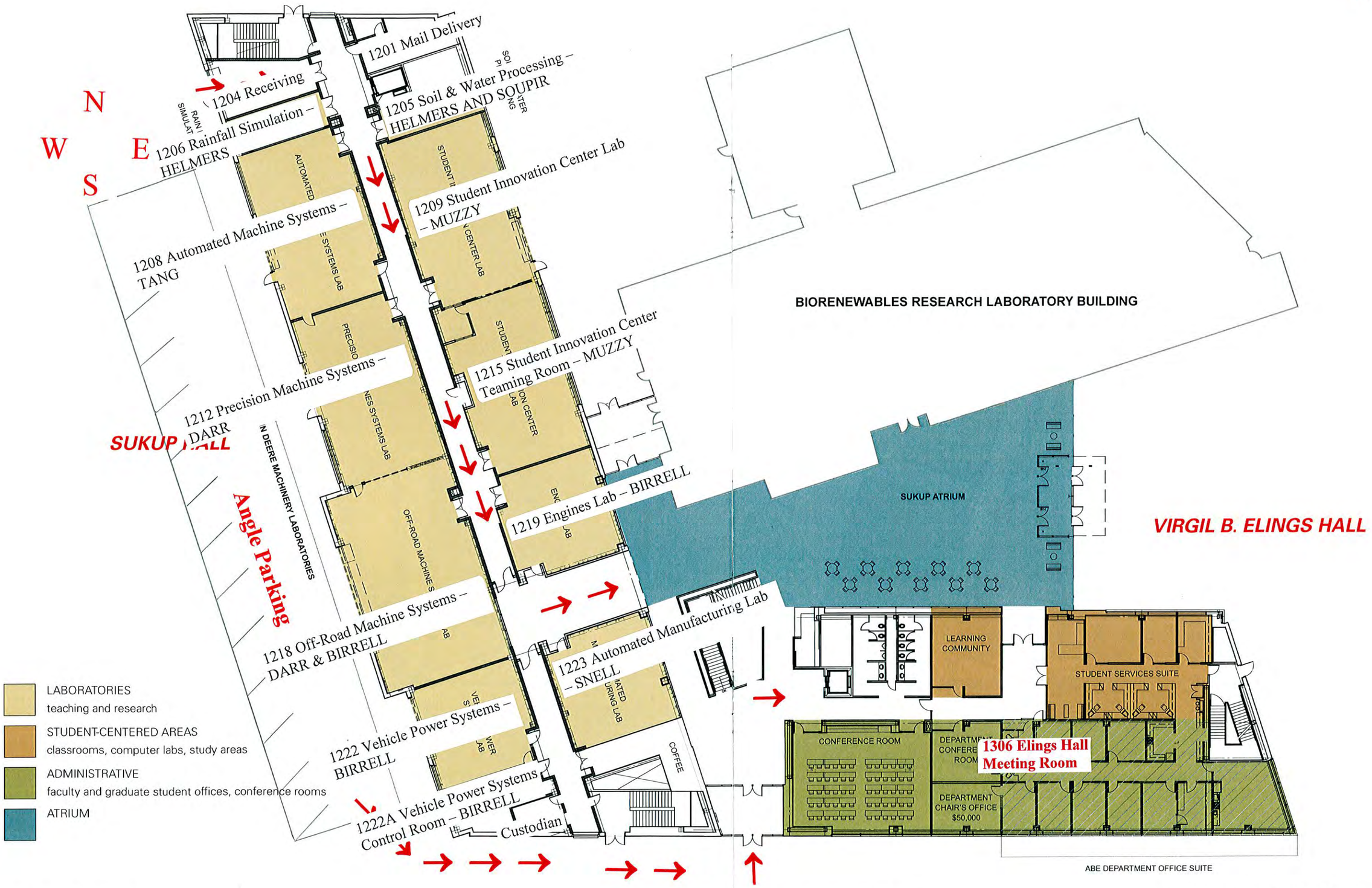
LABORATORIES
teaching and research

STUDENT-CENTERED AREAS
classrooms, computer labs, study areas

ADMINISTRATIVE
faculty and graduate student offices, conference rooms

Updated April 2014

Floor plans subject to change.



Updated April 2014

Floor plans subject to change.

Updated April 2014

Floor plans subject to change.

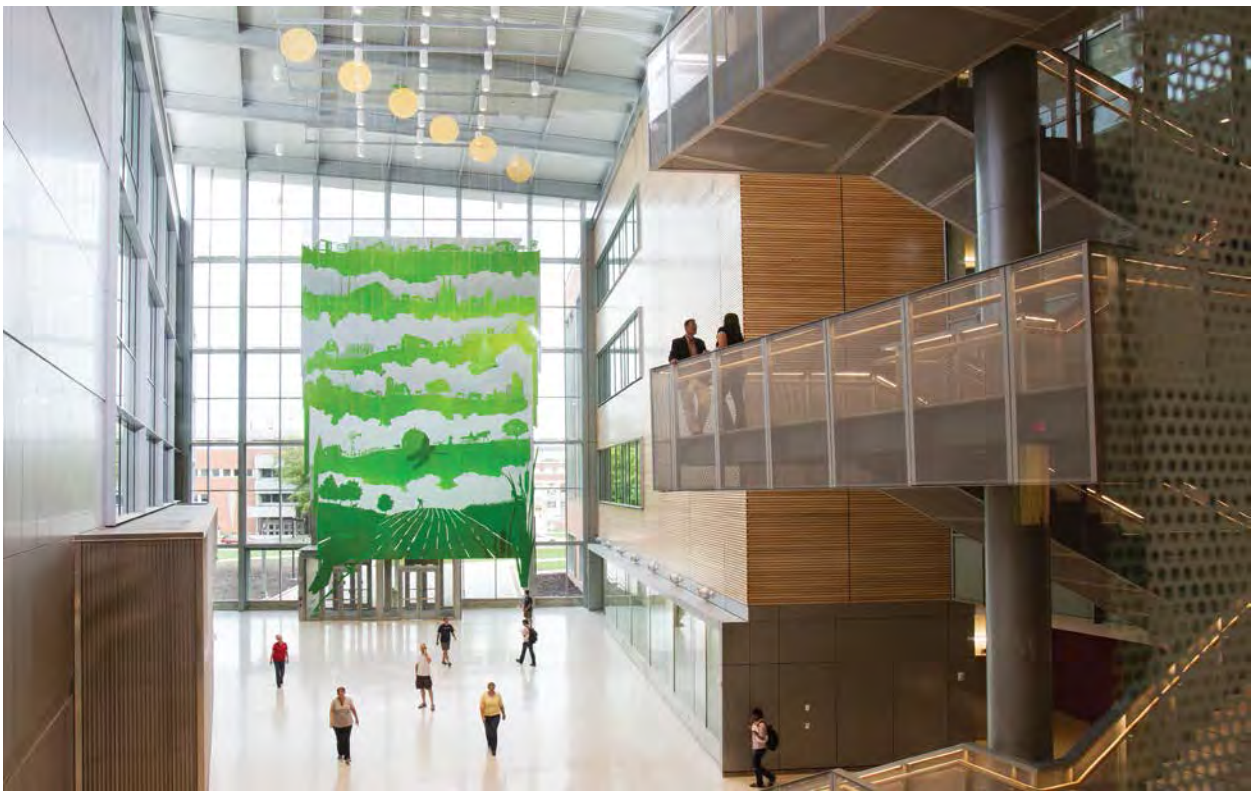
Updated April 2014

Floor plans subject to change.

Updated April 2014

Floor plans subject to change.

ELINGS HALL, SUKUP HALL, SUKUP ATRIUM – exterior and interior photos – July 2014



APPENDIX 7.11

Fall 2014 ABE Senior Exit Survey

What is your major?

- ❍ Agricultural Engineering
- ❍ Agricultural Systems Technology
- ❍ Industrial Technology
- ❍ Biological Systems Engineering

Answer If What is your major? Agricultural Systems Technology Is Selected

Which of the following AST major options did you complete (if any)?

- ❑ AST Machine Systems
- ❑ AST Agricultural and BIosystems Management

Answer If Which of the following AST major options did you complete? AST Machine Systems Is Selected

To what extent did you achieve the following student learning outcomes?

	Poorly	Slightly	Adequately	Above Average	Extremely Well
An ability to specify, manage, and test machine systems in the context of complete agricultural, biological production or processing systems.	❍	❍	❍	❍	❍
An understanding of the technology and application of machine systems including power and information flows, function and interaction with biological materials.	❍	❍	❍	❍	❍
An ability to perform energy and cost analyses of complete machine systems to insure the success and sustainability of an enterprise.	❍	❍	❍	❍	❍

Answer If Which of the following AST major options did you complete (if any)? AST Agricultural and BIosystems Management Is Selected

To what extent did you achieve the following student learning outcomes?

	Poorly	Slightly	Adequately	Above Average	Extremely Well
An ability to develop, implement, and evaluate best management practices for human and natural resource systems for producing, processing and marketing bio-based products worldwide.	❍	❍	❍	❍	❍
An ability to integrate and apply agricultural and biosystems engineering technologies in the bio-based industries.	❍	❍	❍	❍	❍
An understanding of the complex systems that sustain our water, air, soils, and food.	❍	❍	❍	❍	❍

Answer If What is your major? Industrial Technology Is Selected

Which of the following ITEC major options did you complete (if any)?

❍ ITEC Manufacturing

❍ ITEC Occupational Safety

Answer If Which of the following ITEC major options did you complete (if any)? ITEC Manufacturing Is Selected

To what extent did you achieve the following student learning outcomes?

	Poorly	Slightly	Adequately	Above Average	Extremely Well
An ability to develop, implement, and evaluate manufacturing processes and facilities.	❍	❍	❍	❍	❍
An ability to apply computer aided design and manufacturing, control systems, and automation systems to industrial settings.	❍	❍	❍	❍	❍
An ability to implement and analyze the use of manufacturing technologies to enhance production, quality, and profitability of manufacturing systems.	❍	❍	❍	❍	❍

Answer If Which of the following ITEC major options did you complete (if any)? ITEC Occupational Safety Is Selected

To what extent did you achieve the following student learning outcomes?

	Poorly	Slightly	Adequately	Above Average	Extremely Well
An ability to develop, implement, and evaluate occupational safety and health programs for businesses and organizations.	❍	❍	❍	❍	❍
An ability to identify and analyze hazards and loss producing conditions in work environments.	❍	❍	❍	❍	❍
An ability to eliminate or control occupational hazards using appropriate technologies, administrative interventions, and training for behavior modification.	❍	❍	❍	❍	❍

Answer If What is your major? Industrial Technology Is Selected

How satisfied are you with the "Industrial Technology" degree name?

- ❍ Very Satisfied
- ❍ Satisfied
- ❍ Neither Satisfied nor Dissatisfied
- ❍ Dissatisfied
- ❍ Very Dissatisfied

Answer If What is your major? Industrial Technology Is Selected

Please explain your response to the question above.

Answer If What is your major? Industrial Technology Is Selected

If we had the opportunity to change the degree name, what name would you select that best describes your academic program?

Answer If What is your major? Agricultural Engineering Is Selected Or What is your major? Biological Systems Engineering Is Selected

I have taken the FE exam.

- ❍ True
- ❍ False

What is your gender?

- ❍ Male
- ❍ Female
- ❍ Prefer not to disclose

Using the term "semester" to refer to a regular fall or spring semester (i.e., not counting summer), please move the slider to indicate how much time you spent on each of the following on the way to completing your degree:

_____ Semesters enrolled in the degree program from which you graduated
_____ Semesters on internship or co-op
_____ Summer internships (professionally related only)
_____ Semesters doing paid or unpaid undergraduate research an an ABE-faculty lab (please do not count summer REU or other programs)
_____ Summers (at least 6 weeks) doing paid or unpaid undergraduate research in an ABE-faculty lab
_____ Semesters in military service
_____ Semesters in a different major (includes semesters as undeclared)
_____ Semesters as a full-time student at another higher-ed institution (e.g., DMACC, UNL)

The number of total semesters that I actively participated in an ABE-related professional organization (e.g., AST, ASABE, BSE, ATMAE, SME, ASSE) is most nearly:

- ❍ 0
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5 or more

How many weeks, if any, did you participate in study abroad (include short study-tours; count a full semester experience as 15 weeks)?

_____ Weeks participated in study abroad

Whether or not you personally participated in a learning community, to what extent would you support this statement: New students in ABE should participate in a learning community.

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Neutral
- ❍ Agree
- ❍ Strongly Agree

Did you participate in an ABE learning community at ISU?

- ❍ Yes
- ❍ No

If No Is Selected, Then Skip To Please rate your experience in the De...

My learning community participation contributed to my academic success.

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Neutral
- ❍ Agree
- ❍ Strongly Agree

Please share any other comments about your ABE learning community experience.

Please rate your experience in the Department of Agricultural and Biosystems Engineering for each of the following:

	Poor	Fair	Average	Very Good	Excellent	N/A
The degree to which ABE's departmental culture supported my educational goals	❍	❍	❍	❍	❍	❍
The support I received from ABE faculty	❍	❍	❍	❍	❍	❍
ABE department teaching	❍	❍	❍	❍	❍	❍
ABE department advising	❍	❍	❍	❍	❍	❍
Overall experience in ABE	❍	❍	❍	❍	❍	❍

Please select the three ABE faculty members who had the most positive influence on your education.

	Andersen, DS	Bern, CJ	Birrell, SJ	Brumm, TJ	Chopra, S	Darr, MJ	Freeman, SA	Grewell, D	Hanna, M
Faculty Member 1	❍	❍	❍	❍	❍	❍	❍	❍	❍
Faculty Member 2	❍	❍	❍	❍	❍	❍	❍	❍	❍
Faculty Member 3	❍	❍	❍	❍	❍	❍	❍	❍	❍

	Harmon, JD	Helmers, MJ	Hoff, SJ	Hurburgh, CR	Kaleita, AL	Kanwar, RS	Keren, N	Koziel, JA	McGill, J
Faculty Member 1	❍	❍	❍	❍	❍	❍	❍	❍	❍
Faculty Member 2	❍	❍	❍	❍	❍	❍	❍	❍	❍
Faculty Member 3	❍	❍	❍	❍	❍	❍	❍	❍	❍

	Mickelson, SK	Misra, M	Mosher, GA	Muzzy, N	Raman, DR	Rosentrater, KA	Schwab, C	Shahan, J
Faculty Member 1	❍	❍	❍	❍	❍	❍	❍	❍
Faculty Member 2	❍	❍	❍	❍	❍	❍	❍	❍
Faculty Member 3	❍	❍	❍	❍	❍	❍	❍	❍

	Snell, L	Soupir, ML	Steward, BL	Tang, L	Tim, US	Xin, H	Yu, C
Faculty Member 1	❍	❍	❍	❍	❍	❍	❍
Faculty Member 2	❍	❍	❍	❍	❍	❍	❍
Faculty Member 3	❍	❍	❍	❍	❍	❍	❍

How many ABE faculty members (list below) know you well enough to serve as a reference for you?
Tenured or Tenure-Eligible ABE Faculty: Andersen, DS; Bern, CJ; Birrell, SJ; Brumm, TJ; Chopra, S; Darr, MJ; Freeman, SA; Grewell, D; Harmon, JD; Helmers, MJ; Hoff, SJ; Hurburgh, CR; Kaleita, AL;

Kanwar, RS; Keren, N; Koziel, JA; Mickelson, SK; Misra, M; Mosher, GA; Raman, DR; Rosentrater, KA; Schwab, C; Soupir, ML; Steward, BL; Tang, L; Tim, US; Xin, H; Yu, C

- ❍ 0
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5 or more

Please rate the following facilities in ABE buildings:

	Poor	Fair	Average	Very Good	Excellent	N/A
Departmental lecture facilities	❍	❍	❍	❍	❍	❍
Departmental laboratory facilities	❍	❍	❍	❍	❍	❍
Departmental teaching laboratory equipment	❍	❍	❍	❍	❍	❍
Departmental computer laboratories	❍	❍	❍	❍	❍	❍

Please rate the average quality of each of the following:

	Poor	Fair	Average	Very Good	Excellent	N/A
ISU ABE department courses	❍	❍	❍	❍	❍	❍
ISU math department courses	❍	❍	❍	❍	❍	❍
ISU chemistry department courses	❍	❍	❍	❍	❍	❍
ISU physics department courses	❍	❍	❍	❍	❍	❍
ISU English department courses (and other communication courses)	❍	❍	❍	❍	❍	❍
My U.S. Diversity course(s)	❍	❍	❍	❍	❍	❍
My International Perspectives course(s)	❍	❍	❍	❍	❍	❍
Internship/co-op experiences with industry	❍	❍	❍	❍	❍	❍
Placement (career) services in my college (i.e., COE for A E and BSE, CALS for AST and ITEC)	❍	❍	❍	❍	❍	❍

How well do you feel that you have met the following ABE program outcomes (what you should be able to do or have at the time of graduation):

	Not at All	Somewhat	Adequately	Above Average	Extremely Well
An ability to apply knowledge of mathematics, science, and engineering/technology.	❍	❍	❍	❍	❍
An ability to design and conduct experiments, as well as to analyze and interpret data.	❍	❍	❍	❍	❍
An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	❍	❍	❍	❍	❍
An ability to function on multi-disciplinary teams.	❍	❍	❍	❍	❍
An ability to identify, formulate, and solve engineering/technology problems.	❍	❍	❍	❍	❍
An understanding of professional and ethical responsibility.	❍	❍	❍	❍	❍
An ability to communicate effectively.	❍	❍	❍	❍	❍
The broad education necessary to understand the impact of engineering/technology solutions in a global, economic, environmental, and societal context.	❍	❍	❍	❍	❍
Recognition of the need for, and an ability to engage in, life-long learning.	❍	❍	❍	❍	❍
Knowledge of contemporary issues.	❍	❍	❍	❍	❍
An ability to use the techniques, skills, and modern engineering/technology tools necessary for engineering/technology practice.	❍	❍	❍	❍	❍

List the two most valuable ABE (A E, BSE, or TSM) courses you completed at ISU. To assist our data analysis, please indicate course designators (e.g., A E 218, BSE 380, TSM 363).

Course 1

Course 2

List the two least valuable ABE (A E, BSE, or TSM) courses you completed at ISU. To assist our data analysis, please indicate course designators (e.g., A E 218, BSE 380, TSM 363).

Course 1
Course 2

List the two most valuable non-ABE (not A E, BSE, or TSM) courses you completed at ISU. To assist our data analysis, please indicate course designators (e.g., ENGL 250, Chem 177, FSHN 411, AGRON 105).

Course 1
Course 2

List the two least valuable non-ABE (not A E, BSE, or TSM) courses you completed at ISU. To assist our data analysis, please indicate course designators (e.g., ENGL 250, Chem 177, FSHN 411, AGRON 105).

Course 1
Course 2

Please summarize your experiences in ABE, and your feelings toward the department as you finish your undergraduate degree program. Thank you again for choosing to study with us, and for your time in filling out this survey.

Thank you for taking the time to complete the survey. Please click >> to submit your responses.

APPENDIX 7.18

External Advisory Council
Department of Agricultural and Biosystems Engineering
April 18, 2008

Present: Loyd, Mommsen, Hamilton, Riediger, Kajewski, Buss, Wilcox

Guests: Garey Fox, Carl Bern, Keith Fortmann, Robin Habeger

Kanwar welcomed the Council members and guests. Garey Fox, Assistant Professor at Oklahoma State University, was introduced. He is working with Kanwar on a project. Kanwar gave a brief overview of the department and directed the council to the 2007 Annual report for more information. Our major challenge right now is the new building. We are getting close but help is needed in order to make this a reality.

Wilcox went over the progress that has been made since the last meeting. Letters have been sent to the State Legislators. The Regents have not come to the legislature with a request for funding. He feels the senators are not fully aware of the project. Some think they have already given funding because of the BRL. The letter that was sent included signatures from the following companies: General Mills, Pioneer, Clipper Wind, Iowa Biotechnology Association, Vermeer, John Deere, Sukup Manufacturing, Monsanto, and Iowa Engineering Society and the American Council of Engineering Companies.

According to House File 920, a building moratorium is in effect until 2013. The question remains as to whether the Biorenewables "Complex" includes the ABE buildings. It appears that the interpretation of both Kushner and Wintersteen is that it is a complex.

A conference call was held by Kushner, Wintersteen, Sukup, Wilcox, Mack, Degner, and Kanwar regarding the building project. The outcome of the conference call was that there was a need to talk to the Board of Regents in some capacity. All external entities included in the call can have direct contact with the Board of Regents.

A meeting with President Geoffroy is scheduled on Wednesday, April 23 at 8:30 a.m. (conference call) which will include Scott Wilcox and Mike Mack. Council members were urged to contact lobbyists who represent their companies to gather support. If the President does not want the EAC to contact the Board of Regents, what will be the next step? It's not a case of looking for his blessing, just a way to inform him of the plans.

Fortmann indicated that fundraising towards the $12 million goal is going quite well. If the private gift goal is raised, they will continue their efforts to meet that goal. Historically, Engineering has had to raise 50% of building funds. Other areas of the University have typically been at 20%. Pledge gifts would have to be in by six months after the completion of the project. Groundbreaking for the BRL is scheduled for September 2008. It has been the assumption of the Foundation reps that this complex (including ABE) was approved before the moratorium was dictated. Fortmann indicated the ISU Capital Campaign goals are as follows: Engineering: $275 million goal with $215 million raised; Agriculture and Life Sciences: $155 million goal and $83 million raised. They are working with companies to have ½ go into building and ½ to lab

facilities. What about financial endorsements from commodity groups (for the building)? Most of the commodity groups are managed more on the College of Agriculture & Life Sciences (CALS) side. Kajewski noted that this is a key time to approach commodity groups. Fortmann noted that the Foundation is still trying to get all of the big gifts before going ahead with a grassroots effort with alumni. This could possibly happen early next year. The department would be willing to generate a newsletter dedicated to making a request from alumni, as early as this summer. It was noted that John Deere is currently matching employees' gifts to the University up to $1,000 per employee and up to $1 million per year. The idea of hosting alumni events in the Cedar Rapids, Waterloo, and Quad City areas was introduced. Having the deans present at these events would be beneficial. Habeger will check on an inquiry about contacting Mosaic. This could already be in the works with the CALS. A question was raised about naming opportunities and Fortmann provided the following guidelines:

$20,000	Graduate/faculty offices
$50,000	Conference Room
$100,000	Small Classroom
$200,000	Big Classroom/Research Lab
$500,000	Auditorium

Wilcox will send information on the John Deere match to Fortmann.

Facts/Questions:

1. Is the Biorenewables Complex (including the ABE buildings) exempt from the moratorium? (The Regents or President should know or be able to find out)
2. Why are biorenewables important to the State of Iowa?

Case for building/stir up interest

1. Education of Regents on the project (Wilcox)
2. Iowa Department of Economic Development – trying to create jobs in the State of Iowa
    a. Who is their lobbyist?
    b. Loyd to discuss project with the head of the Department
3. National Soybean Growers Association – funding for the building and to use their lobbyist to support soydiesel (Kajewski)
4. Iowa Corn Producers (Buss)
5. Iowa Egg Council (Dean Wintersteen)

Questions that need to be answered:

1. Why is this program necessary?
2. Why is the building needed?

By May 15th, the EAC members would like to receive answers to the above questions and also the following:

1. How important is this business to the State of Iowa?

2. How important is the bioeconomy in the State of Iowa?
3. How does this complex support that development?
4. How many competent engineers are needed?
5. Continue with 70% graduate retention rate in State of Iowa

Recap of the questions;

1. Is the BRL (including ABE) exempt from moratorium? Question for the Regents/President
2. What if the President says "don't talk to the Regents"?
3. Why haven't the Regents asked for State funding based upon approval made at 2-7-08 meeting?
4. When was the moratorium imposed? Need date. (House file 920 was approved May 11, 2007).
5. Note that private givers have given to the ABE building, not the BRL.

A copy of the minutes from the February 6, 2008 BOR meeting was distributed. The schematic design and Elings Hall naming were approved at this meeting. Kanwar is hopeful that the BOR will make the request for funding in early 2009.

Actions:

Kanwar to begin working on a "talking points" handout.

1. Chronological order of events – what and when it happened
2. Iowa Impacts
    a. Who is going to solve Iowa's odor and air quality problems?
    b. Who is going to solve water quality problems?
3. Need to justify why a new building is needed (one point twice as many engineers are needed today)
4. Indicate lack of adequate teaching labs

Strategy:
Pose first question to the President. Get a face-to-face meeting scheduled for discussion.

An EAC conference call will be set up after Wilcox and Mack talk with President Geoffroy.

The Fall meeting of the EAC will be Thursday, September 4 (banquet) and Friday, September 5 (all day meeting). Council members requested some student interaction at this meeting.

Agricultural & Biosystems Engineering
Iowa State University
External Advisory Council
Friday, September 5, 2008

Present: Lisa Blanchet, Larry Buss, Rich Degner, Matt Frandsen, Ravi Godbole, Phil Hamilton, Ron Leonard, bob Loyd, Mark Mommsen, Craig Riediger, Scott Wilcox, Liansuo Xie, Ramesh Kanwar

Chair Scott Wilcox welcomed the group and asked the three new council members to introduce themselves (Rich Degner, Ravi Godbole, and Lisa Blanchet).

New ABE faculty members were introduced and they each gave a brief description of their research programs (Matt Darr, Michelle Soupir, Alok Bhandari and Tae Hyun Kim).

Ramesh Kanwar gave the council a brief update on the department.

Deans Jim Bernard and Wendy Wintersteen joined to welcome EAC and answer questions. It was noted that Labh Hira will chair the COE Dean Search Committee. Wintersteen indicated that a request for $1.25M in planning funds would be made to the state legislature in January 2009. The request for the remainder of building funds (~$54M) would then be made in January 2010. We are well positioned with state legislators and we need to have continued communication. The Biorenewables Research Lab will break ground on Monday, September 8, 2008. The subcommittee which was formed in early summer will stay in contact and strategize on how to approach state legislators. If there are any suggestions for COE Dean candidates, please submit names to Ramesh Kanwar. Degner noted that Iowans should feel free to talk to local legislators on an informal basis.

Craig Schmidt from ISU Foundation joined to provide information and answer questions. The private fundraising goal has been increased to $13.2M because of inflation. We are now just shy of $9M. Sukup Manufacturing has made a large donation and the Atrium will be named for their family. Schmidt indicated that he currently has about $3.5M "in the pipeline" to bridge the gap in private fundraising. He is emphasizing a sense of urgency with donors. Foundation is still waiting for the right time to initiate a grassroots fundraising effort. The last 1 ½ - 2 years have been spent with lead donors. In 2010 the capital request will be the #1 priority – this will be a key message to take to the alumni. Schmidt thanked Kanwar for his work in building and scholarship fundraising. Kanwar's enthusiasm and leadership for these projects has accelerated both. Schmidt indicated that once planning money has been approved, that a timeline for the total project will be assigned. The moratorium was addressed and the feeling is that the Board of Regents does not see the ABE buildings as part of this moratorium. Schmidt noted that he and Keith Fortmann would be willing to accompany EAC members if they had large groups that they would like to present building information to. All are very hopeful and optimistic that this will go forward – key is to get the planning fund request approved ($1.25M is modest amount).

Degner praised Wintersteen for promoting the project with State of Iowa constituents and also on campus. Who should we target to continue the message and move the project forward? One

group that was mentioned was grain farmers. November and December would be an ideal time to contact them. EAC would like to challenge the Foundation staff to capture this opportunity. The Corn and Soybean Associations would be a good place to start.

Chuck Schwab reviewed the NAIT Accreditation visit. We are expecting official accreditation in November. He noted the need for specific program goals. This is the first time an AST program has been accredited by NAIT. ABE at Iowa State University is leading the way. A copy of the self-study report is on the ABE website. Schwab asked for volunteers in the programs areas to engage with the technology curriculum committee. The following volunteered:

- I TEC
    - Manufacturing – Mark Mommsen and Lisa Blanchet
    - Occupational Safety – Bob Loyd and Matt Frandsen
- AST
    - Machine Systems – Craig Riediger and Liansuo Xie
    - Ag & Business Management – Rich Degner and Larry Buss

Brian Steward and David Grewell made a presentation to the EAC on the needs of ABE labs. They requested that EAC members make a request to their companies for help. Steve Mickelson noted that we are developing a plan to upgrade the equipment in all labs. He would like to develop a subcommittee of the EAC to work on equipment needs. Godbole would like to see job profiles of our graduates.

Raj Raman reviewed the newly approved BSE degree.

Mark Hanna presented a brief program on extension/outreach opportunities for partnership with industry. What can the department do to better serve our partners needs?

The EAC members generated some feedback for the department.

Strengths
Student clubs
Family environment
Continuing success in spite of facility handicap
Quality of faculty – new and current
Alignment of faculty to needs of department
Continue US News & World Report ranking
Success of students – getting jobs and high paying ones

Weaknesses
Need more visibility for high schoolers and undeclared students
Tension around fundraising efforts – Foundation seems to have a “one size fits all” approach

Challenges
Retain new faculty
Benchmark other departments that don’t have the family environment but have recognition/success

Improvement/Caution
Need some succession planning
How do you manage your way through a major construction project
More information on strategic planning

Concerns noted by students
Not having construction as part of the safety program – employers need this too
Repeat seminar courses – too much of the same thing – consider integrating industry leaders

Wilcox reviewed with the council the steps that had been taken in the past several months with regards to the building project. Mike Mack and Scott Wilcox had a good conference call with President Geoffroy where he indicated that the ABE project was #2 priority on campus. He noted that the moratorium was not and issued and encouraged contact with the Board of Regents. A face-to-face meeting with David Miles and Craig Lang from the BOR; Betsy Hoffman, Provost, and Mike Mack and Charles Sukup was held. They noted that many of the large donors were under the assumption that this would be happening faster. Hoffman made a verbal commitment that ISU will request $1.25M in planning funding and once this is approved, the difference will be requested in 2010.

Approaches
1. Wilcox will work with Mike Mack and Charles Sukup to discuss with Hoffman and Geoffroy the need for the planning money request to go forward.
2. A list of key legislators to talk with was generated along with names of EAC members who would be willing to approach these legislators. Soliciting involvement from students, their families and student organizations was also mentioned.
   - Mike Gronstal – Senate Majority Leader, Council Bluffs (Larry Buss)
   - Kevin McCarthy – House Majority Leader, Des Moines (Liansuo Xie)
   - Ron Wieck – Senate Minority Leader, Sioux City ( )
   - Kraig Paulson – Minority Whip, Hiawatha/Cedar Rapids (Bob Loyd)
   - Robert Dvorsky – Chair, Senate Appropriations Committee, Coralville (Bob Loyd)
   - Dolores Mertz – Chair, Ag & Natural Resources (Rich Degner)
   - Roger Stewart – Chair, Iowa Economic Growth, Preston (Mark Mommsen)

What is the plan to equip the new building? The ABE Faculty is currently working on a wish list of equipment that they will make available to the EAC. Cost of the building does not include equipping the labs.

Fundraising – would like to have a contingency of people to encourage Schmidt to target grain farmers in 2008 and 2009. EAC members feel it is important to do it now – grain farmers have had a unique year. Target date to solicit farmers would be November 15-December 15. The EAC would also like to proceed with a grassroots effort to alumni. Rich Degner will visit with Ray Klein and Scott Wilcox will talk with Wendy Wintersteen on how we can proceed with this grassroots effort. EAC members are encouraged to continue contact with individual legislators. Scott Wilcox will continue to get lobbyist advice from Mara Sovey (JD lobbyist). Special interest groups will be contacted. Buss has sent an email with attachments to the Iowa

Renewable Fuels Association. Contacting these groups along with the legislators are the right steps.

The EAC members noted the following for future meetings:

- Need more discussion time
- Keep EAC engaged during the year
- Set the agenda via a conference call
- Fall meeting – departmental updates
- Spring meeting – open discussion about the department as a whole
- Appreciated the accreditation involvement and discussion
- Would like more time with students
- Appreciate having Deans at each meeting
- Reduce amount of time given to Foundation
- Presentations could be sent ahead of meeting through distance education (CALS)
- Would like to have two meetings per year (2009 dates: April 17 and September 11)

Mark Mommsen made a motion to nominate Scott Wilcox to continue as chair of the EAC because of where we are at in the building process; second by Ron Leonard; motion carried by unanimous vote.

Meeting adjourned at 3:58 p.m.

EAC Conference Call Summary
January 14, 2009 – 12:00 noon

Caller Participants: Kanwar, Baumert, Wilcox, Riediger, Xie, Igli, Riskowski, Leonard, Hoehn, Godbole, Buss, Kajewski, Blanchet

1. Wilcox welcomed the callers and reviewed the set agenda. He also noted the $200,000 pledge from the Iowa Pork Producers and asked that EAC members acknowledge this gift.

2. Discussion of early ongoing of Iowa Legislature
   Wilcox noted that both McCarthy and Culver highlighted the importance of supporting the infrastructure of Iowa – more than just roads. Andy Baumert updated the group on the status of the current state budget. The budgets for this fiscal year and the next are in sad shape. A 2.5% cut ($7.1 million) for this year and more of the same for next year. The state revenue collection for December was lower than state projections. The next revenue estimate will be in mid to late March before decisions are made for next year's budgets. There is federal and state support $755 million to support infrastructure and stimulate the economy. ABE Building project request has also been submitted to the federal program. Allison Rosenberg is our federal lobbyist and Andy Baumert is our state lobbyist.

3. Andy Baumert has recommended that the EAC draft a one page letter to the Transportation, Infrastructure, and Capitals Appropriation Subcommittee. He would like to see this done by January 31st. Larry Buss has volunteered to start the draft with a letter that he has already started to his state legislators (Seymour and Windschitl). He will forward a copy of this letter to Wilcox and Kanwar and it will be edited for use as the letter from the entire group. Buss was encouraged to send his individual letter after the group letter has been sent to the committee as a whole. Ron Leonard offered his editing services. We will also ask for the help of Brian Meyer, Ag Communications.

4. There are other key legislators to be contacted. EAC members volunteered to contact as follows:

   Dennis Cohoon – Scott Wilcox
   Robert Dvorsky – Bob Loyd (had volunteered earlier)
   Steve Warnstadt – Igli
   Nathan Reichert – Igli
   Jo Oldson – Xie
   Mark Kuhn – Kajewski

   EAC members can utilize the one pager that has been drafted by ABE so that we are sending the same message. These contacts can be made after the group letter has been sent and hopefully completed by the end of February. Igli noted that Tyson is well connected in Iowa. Mention of the impact the department will have on the livestock industry will be helpful. Kajewski also noted the need to play up the biorenewables.

Baumert will assemble a list of lobbyists to contact. Kanwar will check with Roshan Chhabra about a GE contact in Iowa (Phil Meekins is currently at GE in Burlington). Baumert will find a date and time where a few members of the EAC can visit the Capitol for a face-to-face meeting with members of the Transportation, Infrastructure, and Capitals Appropriations Subcommittee. Buss volunteered to attend. Baumert will work with Wilcox on a schedule. It would be added value to have company representatives along with lobbyists sending a message for the importance of this project. Baumert noted company reps should follow company procedures for visiting the Capitol. It would be great to have manufacturing, livestock, biorenewable areas represented.

Commodity Groups to connect with:

Corn – Buss
Soybean – Kajewski
Pork – Degner
Farm Bureau – Baumert

EAC members are welcome to contact Ramesh Kanwar at any time if help or information is needed from the department or individual faculty members.

A follow-up conference call will be schedule for February.

Conference call ended 12.45 p.m.

EAC Teleconference Summary
Wednesday, February 25, 2009
12:00 noon

Participants:
EAC: Wilcox, Buss, Kajewski, Riediger, Loyd, Xie
ABE Faculty: Kanwar, Harmon, Mickelson, Glanville
Foundation: Fortmann

Wilcox reviewed the proposed agenda

1. Update on construction design process (Kanwar)
2. Update on financial support (Fortmann)
3. Update on discussion with Baumert and legislature (Wilcox)

Kanwar noted that there is a possibility that our building project will get assistance from the federal/state stimulus package. The State of Iowa will have $700-$800M that we might get a portion of. President Geoffroy has decided to move forward with "shovel ready" projects and has authorized ISU's FP&M to take our project to the next step and develop construction design plans which will take approximately 3-4 months. An architectural firm has already been chosen and will meet sometime the week of March 23rd. We are asking that EAC members still keep connected with state legislators.

Wilcox noted that the letter that was drafted after the last teleconference went to the Transportation, Infrastructure and Capitals Appropriations Committee and he did receive an acknowledgement of receipt of the letter from McKinley Bailey. Bailey appreciated the information.

It was noted that Culver has zeroed out the two requests from ISU - $1.25M for ABE planning funds and $38M for Vet Med. Do not get discouraged because of this action – stimulus package may be a better avenue to fund these projects.

Shawn Hamerlinck has been in contact with Charles Sukup and Wilcox will continue contact also. Baumert noted that repetition with legislators is a good move. Wilcox plans to send a letter to the full Appropriations committee of both the House and Senate.

Loyd, Buss and Wilcox had assignments to contact specific legislators. All members are encouraged to contact any legislator either by email, phone, or a face-to-face. Loyd noted that he has been in contact with Robert Dvorsky and is trying to schedule a face-to-face meeting. He will let the EAC members know when this has occurred. Buss sent an email to both James Seymour and Matt Windschitl. Wilcox has a call into Dennis Cohoon to request a meeting. Kajewski will talk with Mark Kuhn. Sukup also has a close connection with Kuhn. Kajewski has also been in contact with the National Soybean Growers Association. Wilcox noted that John Deere has a new legislative representative in Nyemaster Law Firm. He has been in contact with Tom Iles and Keith Luchtel who will keep in close contact with Andy Baumert. Wilcox encouraged EAC members to contact Andy Baumert (515-294-4941) to get updates on the legislative progress. Let his office know that you are with ABE External Advisory Council and

that you want an update on the ABE building project. His staff is usually quite responsive on patching the call through.

Keith Fortmann, Executive Director of Development for the College of Engineering was on-line to give an update on the fundraising activities. The goal is $13.2M and right now we have a commitment between $9-10M. There have been no significant gifts in the past few months, however, there are two significant "asks" on the table, along with several smaller "asks". An all-alumni solicitation will go out later this Spring probably starting with a mailing and then a follow-up phone call. He remains optimistic that all is going well. The goal still remains to reach the private fundraising goal of $13.2M before the building is finished. Harmon noted that the ABE retirees group is quite active and that their help could be solicited when contacting alums for support. Kajewski noted that there are several MEs working in the Ag Engineering field that might be willing to contribute to this project. Fortmann will explore the possibility of contacting these people. Kajewski also noted that in the past, the COE Dean held regional get-togethers for alumni and was interested to know if these will be re-initiated. Fortmann indicated that this will be the decision of the new dean. Wilcox and Kajewski volunteered to help with this effort if needed. Kajewski also noted two opportunities to spread the word via a short powerpoint presentation – Iowa Section ASABE meeting in March and the Ag Machinery Conference the first week of May. Fortmann will follow-up with Kajewski on this effort. Kajewski was requested to send the agenda for both meetings to Fortmann. Kanwar noted that a retiree or an alumnus of the department making a presentation at these meetings would be more powerful than say a current faculty member.

Reminders:

- Continue to follow-up with legislators – repetition is good!

- Fall Meeting will be held in Ames on Thursday, September 10th (banquet) and Friday, September 11th (EAC meeting). Please mark your calendars. More details to follow.

Meeting adjourned at 12:37 p.m.

Ag & Biosystems Engineering – Iowa State University
External Advisory Council
Friday, September 11, 2009
Bevis Lab – Room 42 I. Ed. II

Present: Wilcox, Saunders, Degner, Blanchet, Riediger, Leonard, Xie, Frandsen, Kajewski, Buss, Godbole, Kanwar

Guests: President Gregory Geoffroy, Deans Wendy Wintersteen and Jonathan Wickert

Wilcox opened the meeting and requested that all External Advisory Council members introduce themselves.

President Geoffroy thanked the council members for their dedicated service. He continued with an update on ISU. Budgets are trying. Overall good plans have been made and put into place. Our enrollment is the highest ever and we have a large international enrollment. The Board of Regents will meet next week. The University of Iowa Dental facility is the first priority for the BOR. EAC was asked to be an influence on key legislators and influential alumni. We need to:

1. Finish private fundraising; and
2. Secure funding from the state.

Some suggested key legislators are: Mike Gronstal, Pat Murphy and the chairs of the House and Senate Infrastructure Committees. President Geoffroy noted that Andy Baumert is a tremendous resource and gave EAC members a green light to talk with Baumert. David Miles and Craig Lang are the key BOR contacts. It would be helpful to set up another meeting and include Mike Mack from John Deere.

We should highlight how critical the programs in this department are to the State of Iowa and Iowa's economy, and how in order to continue to be a leader, we need new facilities. Any contact with the legislators to educate them before the session begins will be beneficial. We will need to involve Baumert after the session begins to develop timelines and key strategies. It would also be beneficial to get company lobbyists involved to "sing the praises of ABE." Develop an information sheet – possibly one page of text and one of drawings. Geoffroy noted that it is not essential to have private funding ahead of time, but it would help when making the case to the legislators. We should generate a list of major companies in Iowa that manufacture or sell farm equipment. See if we can get Kinze to lobby on our behalf.

After President Geoffroy departed, the EAC discussed the need to develop a plan to contact Mike Gronstal and Pat Murphy. Also need to emphasize ITEC and Occupational Safety along with AgE and AST. Lobbyists that we could call on: John Deere, Iowa Pork Producers, Cattlemen, Corn, Soybean, Poultry, Farm Bureau, Iowa Safety Council (Saunders or Frandsen may be able to contact).

Deans Wintersteen and Wickert joined and discussed several things. One of them was the budget and how this is not a great time with reversions and cuts. The deans would like to be aware of the EAC actions. EAC members were curious to know if it is a strong point to bring up

to the legislators that we funded our own planning money. Baumert can make the call on that issue. EAC members were also interested in a combined list for all COE Advisory Councils.

We would like to get four or five key legislators to visit the department (by special invitation) and engage students in building issues. Our #1 priority with legislature is to request funding for our new building. Later we can remind them about support for the University overall.

Kanwar presented his update on the department (powerpoint presentation).

Alyse Herr gave a presentation on the advantage of studying abroad.

Schwab discussed the accreditation of the programs by ATMAE (formerly NAIT). All four programs were accredited. The homework assignment for EAC members was to review the long term and short term goals for all four programs (Machine Systems, Ag & Biosystems Management, Manufacturing, and Occupational Safety). Schwab noted the changes suggested by the EAC for the long and short term goals.

Schwab also reviewed the differential tuition proposal with the EAC. He noted that we are engaging students in discussion on this topic at student club meetings and seminars. We hope to complete the process before the end of the Fall 2009 semester.

An abbreviated wish list for equipment was distributed to the EAC. A question was posed – "Could ISU be a training center for manufacturing?" It was noted that the wish list should be for equipment needed in the labs in the new building. Will there be a "Virtual Reality Lab" for teaching? At the next meeting a discussion should take place on the future labs for the new building. Kanwar was asked to have faculty complete the list of equipment for each lab and distribute to EAC by the end of October 2009.

A facility tour for key legislators should be organized for this Fall. The two pager that was developed last Spring needs to be revisited. Also need to focus on lobbyist and engage their support.

Wilcox reviewed the surveymonkey results.

We will check with Dean Wickert on his plans for a Spring meeting of the joint Advisory Councils. [Note: Sylvia has checked and they are waiting to decide after their meeting this Fall] It was proposed that the next face-to-face meeting will be in September 2010. Do we have the right mix of EAC members – AE v. ITEC? No – need more ITEC. We should consider someone from Rockwell. We will try to identify two new members who are focused in the manufacturing area (upper management level). Saunders, Kajewski, Wilcox may have some suggestions. [Note: Mark McKee from Honeywell has been invited to join next Fall – he was formerly and I TEC Advisory Council member]

Baumert has proposed trying to bring a group of legislators to the campus on the morning of the opening session. The target group is: Murphy, Gronstal, Cahoon, McCoy, McKinley, Oldson, Wenke, and Dvorsky. Some things to add to the one pager – how ABE produces graduates who

will improve the environment and how many jobs are created. Quality of life issues should be highlighted too. Baumert could bring together a group of lobbyists. DM Waterworks lobbyist? Jobs are important. Other talking points: biofuels/biorenewables, water, air, etc.

We need to identify 2-3 people to prepare the "elevator speech". Degner, Saunders and Blanchet volunteered. Brian Meyer in the CALS communications office would be able to help.

Wilcox will discuss the content of the one pager with Baumert to try and reduce. We need to find a great marketing person that can help get this piece together. A conference call will be set up next week when Baumert returns to campus to discuss the one pager and the events that will involve the legislators. Wilcox will ask Baumert for a list of lobbyists. Will EAC be the inviting party? A NetMeeting or presentation with snips from students and employers would be effective. We will also try to host a breakfast at the Capitol for key legislators. Outside individuals to get support from were mentioned:

- Mike Mack
- Mary Andringa
- Weitz owner
- Jon Kinzenbaw

After a brief discussion, Scott Wilcox was elected to continue his service as Chair of the EAC for one more year. Thanks, Scott!

Steve Mickelson was asked to come up with a list of students who would be good spokespeople for the department and who could communicate with state legislators.

Meeting adjourned at 4:15 p.m.

ABE External Advisory Council
Friday, April 16, 2010
110 Davidson Hall

PRESENT: Blanchett, Buss, Degner, Xie, Wilcox, Hoehn, McKee, Riediger, Mommsen, Kajewski, Loyd, Saunders, Kanwar, Mickelson, Raman, Schwab, Schmidt

Kanwar introduced one new member, Mark McKee, and two returning members, Wendell Saunders and Tony Kajewski.

Raj Raman discussed some of the engineering curriculum issues (see powerpoint presentation). The Agricultural Engineering program is growing. The Biological Systems Engineering program currently has 20 students with 16 new students planning to enroll. Gender diversity in the department is up thanks to the BSE program. At this time, there is no need for industrial support for sophomore projects. We are using single problems that all students can work on. There is a need to collect data from graduates who are 3-5 years into their careers. There is also a need to collect feedback on how to do a better job teaching project management and networking.

Chuck Schwab discussed accreditation by the Association of Technology, Management, and Applied Engineering (ATMAE – formerly NAIT). He noted that the two AST programs were both accredited – 1st time ever that an Ag program has been accredited by ATMAE. A handout outlining the four option Advisory Council Subcommittees was distributed. If there is an outside expert to include in the subcommittees, send name to Chuck Schwab. The second item was a handout with information regarding the continuation of TSM 415 and 416 (Technology Capstone I & II). These are "capstone" experiences, not senior design. What should we do with TSM 415 and 416 sequence? Delete? Replace with electives? It was noted that Manufacturing Technology is hurting because of the number of faculty available to teach. We need to hire and we have one position we are trying to fill right now. Blanchet indicated that graduates ability to think independently (project management) is lacking. Saunders says we need to keep these classes in the curriculum. Technology capstone is more in problem solving vs. design (as in engineering).

Andy Baumert was introduced to Council members to review what went on in the past few months in the Iowa Legislature. Andy has been very helpful in the coordination of all efforts to communicate with key legislators. Wilcox shared what he heard in the van on Monday, January 25th when legislators visited the ISU campus. Andy noted that this is the worst state budget in recent memory. No state university projects were funded. The situation will improve next year but not rapidly. Infrastructure accounts get raided for general fund purposes. There is strong support for the project but funding is just not available. President Geoffroy continues to have this as his number one project. We will continue with the strategies that have been pursued this past year. If you live in an Iowa district, contact your legislator. It's an election year so a summer or fall contact would be a good time. There will be a new Infrastructure committee because of election year (1st week of December) and we will begin immediate communication with the new committee members. Persistence will be the key asset. Where is this project with the Board of Regents. Andy noted that usually the BOR will not approve a project without approving all (ISU, UI, UNI) – at least this has been the trend. He suggests we invite legislators

in late November or early December to get a jumpstart. Would a conversation with President Geoffroy by a small group from the EAC be helpful? Andy does not see any danger in this project falling from #1 on the priority list. He also would not discourage EAC from arranging a meeting with President Geoffroy. Andy suggests that we avoid falling off the radar screen with legislators. He would like to see a monthly update from the department highlighting technology breakthroughs. Sylvia will work with Andy to get these out on a monthly basis.

Craig Schmidt, ISU Foundation, gave an overview of how things have progressed regarding private fundraising. We have currently raised $11.7 million. We need to keep donors involved. Is anyone still working with Virgil Elings? Craig noted that President Geoffroy and Dean Wickert are keeping in touch with him. Will private goal increase? At this time it still remains at $13.7 million. We need to show alumni that this will actually happen. The ABE retirees seem to be most skeptical that this will come to fruition. Craig continues to remind them that we are closer to this project that we have ever been. This project has never been on the President's #1 list as it is today. We need to keep telling what impact a new building would have on faculty and student retention. This point was clearly made when the legislators visited in January.

Ramesh Kanwar gave a budget update and shared a memo from Dean Wintersteen. The College of Agriculture and Life Sciences has withdrawn all graduate assistantships and reduced the amount of graduate tuition scholarships. They have also taken back $163,000 which is the faculty line for Robert Burns. All this has amounted to a 7% reduction in budget. We have made a request for eight TAs, which are especially needed in the technology classes. We will get back four and these positions will be reviewed each year. About 84% of ABEs budget is in CALS with the remaining 16% in COE. We have never had TA support from the COE. About 60% of the COE differential tuition dollars have already been committed to cluster hires. The remaining 40% would be distributed to the departments on the basis of student numbers. Undergraduate education benefits from these funds. The ABE curriculum committee will decide how tuition differential funds are allocated for different teaching functions in ABE. CALS is also proposing differential tuition to the BOR in November 2010.

Enrollment is down in ITEC. There was concern that ITEC would disappear because of the merger with ABE. We need to market this program by getting recruitment materials to high schools and undeclared/undecided students already enrolled at ISU. There are a couple of possible reasons for declined enrollment:

1. Increased standard for math;
2. Mechanical Engineering has started to improve their retention rate;
3. There is no champion in I TEC – we need to develop an aggressive recruitment plan.

It is hard to establish a strong research program in technology so the new hire's appointment will be 75% teaching and 25% administration (including recruitment). Is Industrial Technology the correct name for the curriculum? Wendell Saunders is willing to go to community college career days but needs recruitment materials to distribute. Tony Kajewski questioned if we were recruiting M.S. students who had graduated from private colleges. How can the EAC help with recruitment? Is there a distance learning M.S.? Not currently, but ABE is looking at the possibility of starting one.

Summary:

- Continue to work the same strategies as last year in regards to new building by reaching out to the President (1-2 EAC members) and the Deans. It would be nice to have ONE answer from ISU – too many different messages from President, Deans, Foundation.

- Continue to work with lobbyists – provide any lobbyist names to Scott Wilcox.

- We need to make points on how a new facility would have an impact on urban area air and water quality.

- Wendell Saunders, Bob Loyd and Scott Wilcox will make an appointment with President Geoffroy.

- Craig Schmidt, Scott Wilcox, Andy Baumert, Jim Kurtenbach, and Rich Degner to focus on November/December legislator visit.

- Kanwar will draft a letter for current ABE students that they can share with their legislators.

- We need to get connected with biofuels – Mark McKee has a contact.

- Fall Date?? Sylvia with work with Ramesh and Scott to set the Fall date.

Meeting adjourned at 3:47 p.m.

ABE External Advisory Council
Friday, September 30, 2011
1124 Biorenewables Lab

EAC MEMBERS: Godbole, Leonard, Degner, Kajewski, McKee, Saunders, Mommsen, Schueller, Xie, Buss,

OTHERS: Mickelson, Raman, Wintersteen, Wickert, Laug, Harms, Harmon, Huss

Steve Mickelson opened the meeting by having everyone introduce themselves. Kajewski noted that he would like to have photos from the groundbreaking ceremony to be used in the ASABE magazine.

Jonathan Wickert and Wendy Wintersteen joined the group to talk about the College of Engineering and the College of Agriculture and Life Sciences. Both noted that the colleges have record enrollments this fall.

Ryan Harms and Adam Laug discussed the Foundation's initiative for fundraising (handout). The EAC members would like to see an alumni drive for funding – maybe some localized events for a grassroots effort.

Wendell Saunders acknowledged the efforts of Scott Wilcox and his leadership of the EAC for the past several years. Scott spent a lot of time in getting our message to the legislators and ISU administration. Wendell also noted that it had been an honor to serve as the EAC representative on the ABE DEO search committee. He said that the best candidate, hands-down, Steve Mickelson, was chosen.

Steve Mickelson continued with an update on the department (powerpoint). A question was raised about an agreement with Taiwan. We will check into what has been done formally with Taiwan. The vision for the department is to have 180 students per degree program. New laboratories will be a key to reaching this goal. It is a challenge to keep teachers and researchers.

Raj Raman shared a powerpoint regarding the ABET accreditation that will be done in the Spring of 2012. He asked for EAC feedback on Slide 16. Several comments were made: "statement is broad"; "They are effective collaborators…… seems to be the meat of the statement"; add "environmental"; "How does this differ from other fields? Be more specific to ABE?; add "leaders"; "some of our graduates will not be in agricultural engineering or related fields – maybe add technical instead of related"; "through their application of a wide variety of applications learned in their AE education." Notes were taken and Raman will be modifying the statement and sending it via email to EAC members to ratify.

Mark Huss and Jay Harmon shared the Youtube video of the flythrough of the new facilities. Mark also had prints of the floor plans for review.

The EAC business meeting was conducted by Wendell Saunders. Discussion ensued about filling vacant positions on the Council. We need some more ITEC representation either an ISU grad or another university. Some names/companies that surfaced:

Andy Kilborn – General Mills, Cedar Rapids
Rockwell Collins (we can get a list of ITEC grads working at Rockwell)
Someone from another university
Need to have more areas of ABE represented – heavy on power and machinery
Ron Steenhoek – Pioneer, Johnston
Jerry Wille – Curry Wille & Associates
AST representation

Rich Degner, Ravi Godbole, and Lisa Blanchet terms expire in 2011 and all three are eligible for another three year term in 2011. Degner indicated a willingness to continue service if he is needed (originally he was identified to help with the building); Godbole will continue if he does not find a suitable replacement from the Jackson facility. [Note: Lisa Blanchet was contacted and she will not continue for another term.] Wendell and Steve Mickelson will work on contacting possible new members.

What are industry's priorities?

- Facilities
    - Consider a VRAC lab for teaching (simulation is the future) – best cost return
- Curriculum
    - Hydraulics/engines – John Deere has provided engines. ME is no longer teaching in this area so we might need more facilities/TAs
    - Simulate environmental testing
    - Water & air quality
    - Equipment for labs – sometimes obtained through research projects or start-up packages; (Honeywell might be able to help with trainers)
    - Strong emphasis in water engineering (we will have a new flume and will pursue a joint appointment with CCEE)
    - Examples of things used in industry are needed
    - NC mills
    - Joining technology – welding, brazing, laser applications, EB welding, MIG, TIG
    - Practical application of joining dissimilar materials
    - Vacuum furnace

EAC members encouraged the ABE faculty to put together an equipment wish-list (approximately 1 ½ yr. ahead of the move to the new facilities). We will have to decide what equipment that we currently have that we will take to the new facilities.

What is missing in our curriculum?

- Have we lost the Soil Tilth connection? If so we need to rejuvenate the relationship (good interaction for graduate students and seniors).
- Encouragement of entrepreneurship? Mickelson noted that we have added open-ended problems at the sophomore level. There are several avenues for entrepreneurship. A high percentage of ITECs do the entrepreneurship minor.
- Advanced emissions technology?
- Product liability, product safety
- Lean, Six Sigma – currently an elective for AgE but required for technology students. EAC members think it should be strongly encouraged.
- All courses – demand communication (verbal, computer, speaking in a group, or one-on-one)
- Simulation
- We currently teach AutoCAD, SolidWorks, ProE, ProMechanica, and ProSheetmetal
- Intellectual property – minimal exposure
- Practical experience of all parts of curriculum

Develop departmental feedback:

- Have faculty visit students who are doing internships
- More frequent publications
- Guest speakers
- EAC members to attend Senior Capstone Day – see about linking via video
- EAC members to give presentations to classes
- EAC to meet more frequently – even by teleconference

Keep in mind what we can provide as far as training classes on-line. Also, we will be looking at what it means for a company to have a strategic partnership with the department.

Election of Officers:
The EAC is in need of a Chair and Vice Chair. After some discussion a motion was made by Godbole that Wendell Saunders be nominated as Chair for one year and Gary Schueller as Vice-Chair; second by Leonard; motion carried.

It was noted that the EAC will need to be supportive of the DEO in the course of building the new facilities. Wintersteen also recognizes this and will provide support or relief for some of Harmon's duties.

Meeting adjourned at 2:55 p.m. EAC members were asked to congregate in the hallway for a group picture before the groundbreaking ceremony.

Notes from 4-17-2012 EAC Teleconference

EAC MEMBERS PRESENT: Saunders, Kajewski, Haverly, Xie, Vinchattle, Klocke, Chhabra, Igli, Fisher, Himmelsbach, Loyd, Hoehn, Farrington

ABE FACULTY/STAFF PRESENT: Mickelson, Xin, Harmon, Raman, Anderson

Meeting got underway at 5:02 p.m.

A. Introductions

Chairman Saunders asked that new members introduce themselves.

- Steve Haverly – Vermeer Manufacturing, Pella, IA. 30 year veteran – project engineer – B.S. 1981 in AgE – design and production – opportunity to see a lot of change. Married for 27 years and 2 children.
- Eric Fisher – AGGO, Jackson, MN. Director of Operations – B.S. 1993 Industrial Engineering – 17 years at Jackson plant – 4 boys.
- Kevin Vinchattle – CEO Iowa Poultry Association and Iowa Egg Council, Des Moines, IA. In this position for 15 years – 1978 ISU grad – has legislative experience.
- Craig Klocke – Sauer Danfoss, Ames, IA . B.S.1981 in AgE - Director of the Tech Center – married with 2 children.
- Jennifer Himmelsbach – Merck, Boulder, CO. B.S. in 2007 and M.S. in 2009 – has an upcoming wedding.

Other EAC members on the line also introduced themselves.

- Wendell Saunders – current chair – 1968 IEDT graduate – married for 45 years with 2 children and 2 grandchildren – retired for 6 years from Turbine Fuel Technologies
- Klause Hoehn – from Germany – 20 year career with John Deere
- Roshan Chhabra – 1972 Ph.D. from ISU – GE for 30 years
- Kevin Igli – Tyson – Sr. VP for Environmental Health & Safety on a global basis
- Tony Kajewski – John Deere – ISU graduate – President-elect of ASABE
- Bob Loyd – Clipper Wind Power – B.S. in 1973 from IEDT
- Lian Xie – AgE degree in 1990 – Townsend Engineering/Marvel Meat Processing for 24 years

B. Purpose of the EAC

Saunders read the purpose of the EAC as follows: The ABE External Advisory Council is a group of industrial, business, legislative, and professional leaders who are interested in the vitality of ABE at Iowa State University. The council helps ABE to strengthen its learning, research, and outreach programs,

improve its facilities, expand its base of support, and serve its alumni. Council members actively participate in the continual assessment of ABE progress and the development of ABE/industry/stakeholder partnerships.

C. Old Business

An equipment wish list was sent to EAC members (this list will be resent as new members have not yet received). Saunders reminded EAC to review and pass along to corporate for their consideration of donation. Saunders was not successful with his company but will try again.

D. Departmental Highlights

Mickelson introduced himself as the ABE's department chair. Also sitting in on the conference call and introduced were: Raj Raman, Associate Chair for Teaching; Hongwei Xin, Associate Chair for Research; Jay Harmon; new building liaison; and Sylvia Anderson; ABE support staff. Please see attached PowerPoint for items which were covered.

E. Teaching Highlights

Raman reviewed the PowerPoint slides on teaching.

F. Research Highlights

Xin reviewed the PowerPoint slides on research. The ABE Research KPI's on slide #11 might need to be fine-tuned.

Mickelson noted that ABE scholarships were announced at the Parent/Student banquet on April 15th and that there was a 25% increase in funding - $95,000 was awarded.

G. Ways to engage EAC in more meaningful ways (strategic partnerships)

How can we work with your companies in more strategic ways?
Igli – Tyson looks at which institution(s) they will get involved with – what does the university so and how does it align with the business-research that is important to the company.
Hoehn – Deere has 310 university relationships in the U.S. alone. Mickelson should connect with Deere's director of university relationships for an industry perspective.
Vinchattle – interest in research area
Farrington – Ag Leader is partnering on research projects and senior design
Loyd – hands-on – take design to do value-stream mapping; lean manufacturing; new product to market; I TEC students are uniquely qualified for this. U.S. is at a disadvantage to China's wind turbine manufacturing. Renewables need more support nationally.
Himmelsbach – works in pharmaceuticals – could help coach in this area and do senior design projects. BSE and ITEC student population will have an interest in this area; need for continuous improvement and lean manufacturing.

H. Other

Please send emails to Steve Mickelson (estaben@iastate.edu) or Wendell Saunders (Wendell.saunders@earthlink.net) if you have any comments or questions from today's teleconference. We would like to rework the Strategic Partnership slide from today's PowerPoint (#14).

Our website www.abe.iastate.edu is being updated on an ongoing basis. There is a live webcam for the new building site – check it out.

EAC members were thanked for their time. The Fall meeting will be a face-to-face meeting on campus on Friday, October 26, 2012. The Spring 2013 meeting will be a joint meeting with the College of Engineering Advisory Council and will be held on campus on Friday, April 5, 2013. More details to follow on both meetings.

Meeting adjourned at 6:02 p.m.

Agricultural & Biosystems Engineering
Iowa State University
External Advisory Council
Friday, October 26, 2012
110 Davidson Hall

AGENDA

8:00 a.m. Coffee and pastries with ABE Faculty

8:30 a.m. Welcome, introductions, EAC goals – Wendell Saunders

9:00 a.m. College Updates/Comments on Industry Engagement
a. Dean Wendy Wintersteen, College of Agriculture and Life Sciences (CALS)
b. Associate Dean Ron Cox, College of Engineering (CoE)
c. Questions from EAC

9:30 a.m. ABE Department Updates – Steve Mickelson

9:50 a.m. Break

10:00 a.m. Teaching Programs Update – Raj Raman
a. ABET preparations/status
b. Program growth/recruiting efforts
c. Program needs; Equipment list
d. Capstone changes

10:30 a.m. ISU/ABE Industry Engagement; Career Services Perspective - Brian Larson (CoE) & Mike Gaul (CALS)
a. Placement
b. Internship
c. Industry engagement opportunities
d. Group Discussion

12:00 noon Lunch; New Building Update – Mark Huss & Jay Harmon; walk to building site (weather permitting)

1:00 p.m. Scholarships and Room Naming Opportunities – Shelly Jordan & Ray Klein

1:30 p.m. ABE Research & Extension Updates – Hongwei Xin

2:00 p.m. EAC Business

3:00 p.m. EAC Report to ABE Faculty

3:30 p.m. Adjourn

Next meeting will be a joint meeting with the College of Engineering Advisory Councils on Friday, April 5, 2013.

Agricultural & Biosystems Engineering
Iowa State University
External Advisory Council
Friday, October 26, 2012

MEMBERS PRESENT: Buss, Ehrecke, Farrington, Fisher, Haverly, Himmelsbach, Leonard, Loyd, Mommsen, Saunders, Schueller, Vinchattle, Xie

FACULTY PRESENT: Mickelson, Raman, Brumm, Xin, Harmon

GUESTS PRESENT: Ron Cox, Wendy Wintersteen, Brian Larson, Mike Gaul, Shelly Jordan, Ray Klein, Mark Huss

Chairman Saunders welcomed the group. He noted that six people's terms will expire in 2012 (Chhabra, Hoehn, Igli, Leonard, Mommsen, and Xie). Also two members will be eligible to renew for another three years (Kajewski and Saunders). Council members introduced themselves and gave a little information about themselves and their background.

Associate Dean Ron Cox gave a brief update on the College of Engineering (CoE). There is record enrollment this fall with 7500 students. ISU is leading the way in growth of engineering students. We are the 9th largest college in the U.S. Plans for a student innovation center for use by undergraduate design are underway. Interviews for the new dean of the CoE will be happening in the next couple of months. President Leath wants to make the university "business friendly".

Dean Wendy Wintersteen also noted tremendous growth in the College of Agriculture and Life Sciences (CALS). CALS currently has3900 undergraduates (up from 1800 in the 1980s) and 750 graduate students. CALS has been through a decade of budget cuts making us lean and efficient. There has been great support from alums for the new facilities. A groundbreaking was held for the new Ag Student Learning Center which is south of the Towers. This will be used for human/animal interaction and other student activities. There are six classrooms available for use. Donors funded $7M. There were 208 companies at this Fall's CALS Career Fair. A handout (attached) on Leading the Bioeconomy Initiative was distributed. The EAC members were encouraged to talk with their legislators about this initiative. Wintersteen acknowledged the great leadership that Steve Mickelson has provided since he started his Department Chair position in August of 2011.

Steve Mickelson gave an overview of the department (PowerPoint). The questions posed to the EAC are on slide 14 of the presentation. It was noted that Gary Schueller will take over the

leadership of the Council after today. Saunders was acknowledged for his past leadership of the Council.

Raj Raman gave a teaching program update and reviewed the upcoming ABET visit (PowerPoint). He pointed out that we take continuous improvement of the curriculum very seriously.

Brian Larson from the CoE Placement Office and Mike Gaul from the CALS Placement Offices discussed placement, internships, and industry engagement (PowerPoints). They noted that our students are very humble when it comes to rating themselves. They felt the students might be underselling themselves.

Lunch was served and Mark Huss and Jay Harmon led the group on a visit to the new building site.

Shelly Jordan from the CoE Development Office discussed funding for facilities and scholarships. If you are aware of potential donors, have them contact Steve Mickelson and he will in turn connect with the Foundation. Some support is still needed for graduate students to help make the department competitive with our peers in recruiting the best graduate students.

Hongwei Xin presented information on research and extension efforts in the department (PowerPoint). The question posed was "What can we do to improve compared to our peer institutions?"

There is a lot of industry engagement through our capstone classes. Thirty projects will be shown on our capstone day on November 30th. 75% of the projects are generated by industry. Industries are also involved in our lean manufacturing and quality courses.

External Advisory Council met to discuss some areas for feedback to the ABE faculty. Are there industries not represented on the current EAC?

- Safety
- Ethanol – bio or enzymes
- Food industry
- Legal – attorneys (food safety and animal welfare)
- Logistics, handling

Bob Loyd noted that over 10,000 wind turbines in U.S. will soon need to be serviced – warranty is almost up. His company is starting to focus on the service side. Need employees with common sense, flexibility, and critical thinkers.

What would we do if there was a lower demand for ethanol? Buss noted that it could spur another farm recession. He also said we need to explore climate change issues – what will happen to row crop agriculture in 10-20-30 years? The department could play a role in developing a plan for farmers.

The EAC members provided some input to the questions that were posed by the department:

For ABE's research, extension, and teaching programs, please answer the following:

What are its strength and weakness? (E.g., S & W of research? S & W of extension? S & W of teaching?)

Strengths

- Industry engagement – continue to build
- Practicality of research
- Practical application and hands-on
- Continuous improvement – ability to adapt
- Breadth of the education
- Departmental culture
- In-touch with the customer
- Strength of open-end design projects

Weaknesses

- Breadth of education
- Facilities and equipment
- Need to sell the department across the state and Midwest – sell outside the customer base. Use the Extension function to spread the word.
- Promote what the graduates do after graduation
- Short staffed

How are the programs addressing issues facing your organization? Please give examples.

- Production agriculture – measuring actual performance and what happens in those systems – air, water, welfare
- Lean manufacturing and continuous improvement. Graduates are ready to take on a challenge and lead a team. Extremely focused on cost reduction and efficiency.
- Graduates can be hired with minimal training
- Ag real estate – Farmland prices are very strong due to ethanol, efficient crop production through GPS and other technology, strong livestock industries – ABE has played an important role in these sectors, thereby having a hand in increasing land values.
- Power and machinery – embedded controls and software. Graduates can guide code writers and understand how the machine works.
- Ag Leader (Farrington) – graduates know a little about everything

What specific suggestions do you have for ABE to further improve these programs?

- Require internships for all majors in the department
- Engage EAC more in curriculum review (EAC members requested a quick summary of the curricula – not just the catalog listings)
- Produce engineers that can problem solve
- Cross cultural training
- Produce engineers that can speak another language
- EAC is available to mentor students via technology to allow them to tap into industry knowledge

ABE would like to invest in our people – stellar faculty and students (e.g., endowed professorships, graduate fellowships, UG scholarships), can we count on you to be our champions in securing the resources needed for such purposes?

- It was noted that the larger corporations will probably not donate dollars but may make equipment donations.
- Egg Council had decided to allocate more funding to research and not to faculty salaries
- The change in the Intellectual Property rules will help with the flow of research dollars
- Ron Leonard noted that he and his wife made a decision to endow a scholarship for AgE students in the area of creativity and innovation.

What specific ways can you picture your organization helping with this change?

- Deere will continue to support with equipment donations and Kevin Ehrecke will contact the Foundation to see what else they might do.
- Jenny Himmelsbach from Merck did not feel she could leverage company funds but will continue to mentor BSE students.
- The department knows the EAC members and their company strengths – just need to ask.
- Gary Schueller from Caterpillar will also check with their Foundation on what they might be able to do.

The EAC members expressed the concern that they are being underutilized. ABE faculty asked "how do we sell ourselves?" We need to tell people why we do what we do. Involve EAC members in recruitment. Students could pair up with EAC members to visit high schools. Copies of the "What is…." videos for AST, AgE , and BSE will soon be posted to our website.

Meeting adjourned at 3:30 p.m.

IOWA STATE UNIVERSITY

2013 Legislative Agenda

Leading the Bioeconomy Initiative

Iowa needs to own the brand as *the place* for biofuels and biobased products.

We must promote a vision of Iowa as the place that not only excels in growing crops, producing biofuels and raising livestock and poultry, but that is home to the next generation of biorenewables and biorefineries and the crop and animal agriculture that will define it. Iowa is where that vision becomes reality. The vision foresees companies making Iowa their destination, not only to take advantage of low feedstock costs, but because Iowa has nurtured and developed *a knowledge and innovation center for biorenewables.*

Iowa State University is that center.

Iowa State's research advances in biosciences and engineering have expanded the vision of the bioeconomy, through higher yielding, more resilient crops, reduced inputs for production of crop and livestock products; sustainable manufacture of biorenewable chemicals, materials and finished products; advanced biofuels; and more efficient use of energy.

Iowa State University can help Iowa ensure national leadership in emerging bioeconomy.

Iowa has done well to date in anticipating before others the rapidly changing landscape of this field. More than ever, science is challenged to show more commercial impact to lead economic development by developing fundamental discoveries into practical technologies and products.

Iowa State University is well-positioned to lead this transformational research. ISU's world-class, collective strengths in agriculture and engineering and past investments made in state-of-the-art laboratories; pilot-scale, business-friendly research facilities; and on-farm research and demonstration make it an attractive partner.

Iowa State has a proven track record showing excellent return on investment to society — industry and businesses, communities and farmers — from investments made in agricultural and biosciences and engineering innovation.

> *"ISU's investment and commitment to biorenewables was an important factor in the selection of central Iowa as the location for our first commercial biorefinery based on cellulosic feedstock. The strong relationships we have forged with Iowa State researchers will provide a growing number of applied and advanced research opportunities for partnering with Iowa State faculty focused on biorenewables."*
>
> **— Jim Collins, President, DuPont Industrial Biosciences**

Iowa State's bioeconomy efforts leverage state resources dramatically.

Over the past several years, Iowa State has successfully competed for $150 million in research grants and contracts in the bioeconomy and biosciences. Recently, the National Science Foundation added another $12 million to the Center for Biorenewable Chemicals — making federal investment now $30.5 million over 8 years. The center at ISU leads efforts to transform the industrial chemical industry from petroleum-based to biorenewables-based, partnering with the best scientists and reaching out in educational efforts to pre-college students in the Des Moines schools.

Iowa State has received major federal agency grants in areas of sustainable biofuels production ($25 million, USDA); renewable energy/energy efficiency research ($20 million, NSF EPSCoR); climate adaptation in corn-based cropping systems ($20 million, USDA); disease technology to improve soybean production ($9.2 million, USDA); enhanced biofuel production/bioengineering and double-cropping ($6.4 million, DOE-ARPA-E); adapting kernel metabolism to enhance cereal yield ($5 million, USDA); and improving feed efficiency and production in animal agriculture ($15 million in multiple grants, USDA).

Iowa State University has received over $30 million in industry support for biorenewables research since 2007. ISU's Bioeconomy Institute has an on-going biofuels research program with Phillips 66 worth $20 million to date. More than $11 million in industry support has enhanced research and facilities at ISU's BioCentury Research Farm, from sources that include DuPont/Pioneer, Vermeer, John Deere and Johnson & Johnson. DuPont/Pioneer have contributed $1 million annually on biomass harvesting, storage and transportation research.

Future or upcoming leverage opportunities both federally and privately continue to look very promising. In fall 2012, ISU has several multimillion dollar proposals and applications in varying stages of development for federal agencies of DOE, USDA, NSF and NIH. The proposals target new discoveries in thermochemical biofuels, biomass research and development, animal-based bioeconomy and more. Discussions on expanded efforts with companies like BP, Exxon Mobile and DuPont continue.

"Leading the Bioeconomy" Initiative: Maintaining Iowa's Leadership Position

As other states apply pressure in efforts to position themselves as leaders in the bioeconomy, the success Iowa State has achieved in leveraging base state funding is a strong indicator of its commitment to keeping Iowa number one. Iowa State's request for an additional $7.5 million in base funding will promote the expansion of the state's economy in exciting new directions. This new investment will keep the pressure on other states to try to match the unique environment in Iowa that supports future-focused research, innovation and growth of public-private partnerships. The Leading the Bioeconomy Initiative is about the future — not only in science and engineering, but in the education of Iowa State students who benefit through their active participation with faculty in research and training in biorenewables projects. Iowa's vision should include making the state *the place* for well-prepared graduates to pursue exciting career opportunities in the bioeconomy. Iowa also must be the source for new ideas and discoveries that will move the bioeconomy forward for the benefit of Iowa.

IOWA STATE UNIVERSITY
College of Engineering
College of Agriculture and Life Sciences

Agricultural and Biosystems Engineering

EAC Fall Conference
October 26, 2012

Key ABE Message

- The Department of ABE is crucial to Iowa's success!
- We have outstanding faculty and staff that help the state, nation, and world to address key issues related to the bioeconomy, manufacturing, agriculture, and environmental management.

ABE Department Vision

ISU's Department of Agricultural and Biosystems Engineering: The **premier team** *serving agriculture, industry and society* through engineering and technology for agriculture, industry, and living systems.

ABE Alignment with the 2050 Challenge

- Sustainable agriculture
- Sustainable manufacturing
- Renewable nonpolluting energy
- Abundant clean water
- Human health and safety

ABE Degree Programs

Undergraduate Degree Programs

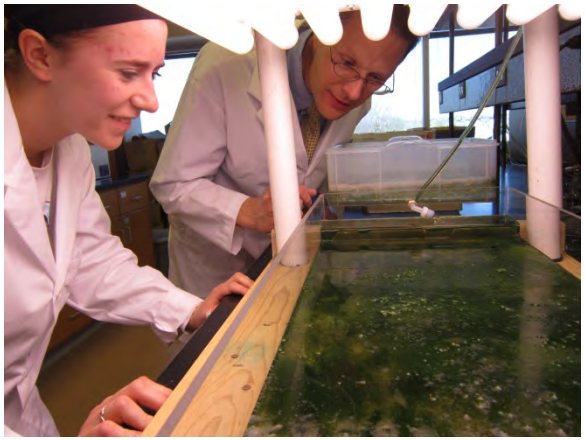
- Agricultural Engineering
- Biological Systems Engineering
- Agricultural System Technology
- Industrial Technology

Graduate Degree Programs

- Agricultural Engineering (MS/PhD)
- Industrial and Agricultural Technology (MS/PhD)
- Interdisciplinary
  - Sustainable Agriculture
  - Environmental Sciences
  - Biorenewable Resources and Technology
  - Human Computer Interaction
  - Professional Agriculture

Themes of Excellence

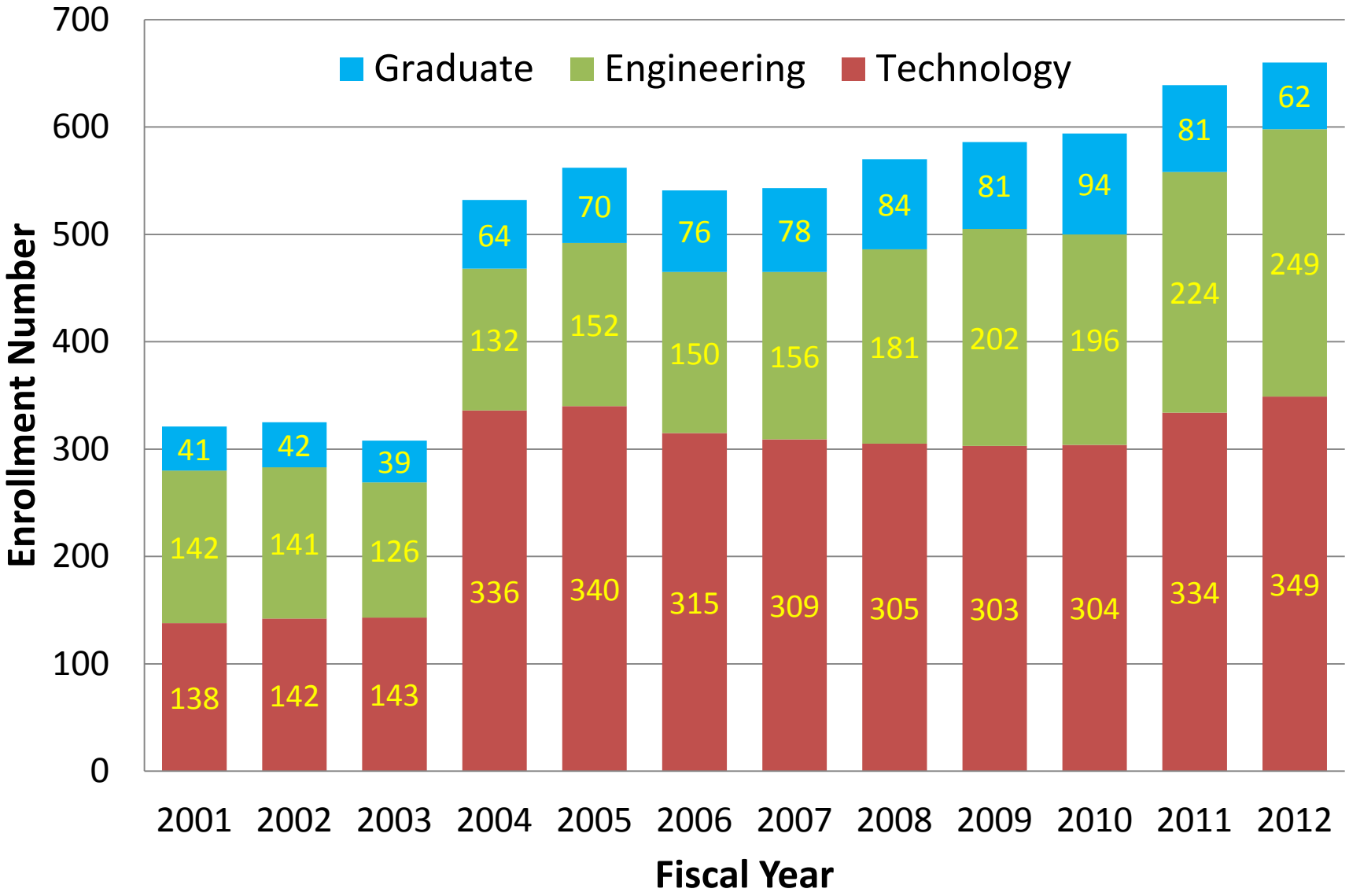
- Advanced Machinery Engineering and Manufacturing Systems
- Animal Production Systems Engineering
- Biological and Process Engineering and Manufacturing
- Occupational Safety Engineering
- Land and Water Resources Engineering



Important Department Data

- 598 Undergraduate students
  - 249 Engineers (>12%) ; 334 Technology (>12%)
- Budget
  - $1.04M CoE; $3.54M CALS;0.39 Extension19%
- 29 Faculty; 2.5 Lecturers
- 12 Support Staff
  - 4 Academic Advisors, 1 IT person, 1 Lab Tech, 6 administrative support staff
- 29 Research Staff
  - all on grants - 5 Post Docs, 24 Staff
- 62 Graduate Students

ABE Student Enrollment



ISU Biorenewable Complex

- Construct new building with world-class facilities by 2014
- Focus on Sustainable Design
  - Goal of LEED Gold
- $76.5 Million Project
  - Private Gifts : $14.5 million
  - State funding over a four year period: $62 million
- Approximately 100,000 Net Square Feet

ABE Top Highlight

- ABE undergraduate engineering programs ranked 3rd and ABE graduate programs ranked 5th in the nation by US News
- Highest ranked department at ISU!
- Goal: to become #1

2012 Faculty/Staff Hires

- Dr. Dan Andersen - water quality/nutrient management (research/extension)
- Dr. Gretchen Mosher - grain quality/food systems safety (teaching/research)
- Dr. Jackie Baughman – BRT DOGE, lecturer, cellular lean manufacturing systems
- Lisa Lajoie – grant coordinator
- Kathy Platts – I Tec academic advisor
- Lindsay Diers – BSE academic advisor
- Jenny Metzger – AST academic advisor
- Joshua Kruse – accountant

2013 Faculty/Staff Hiring

- Faculty – Advanced Manufacturing (CALS)
- Faculty – Grain Systems Management (CALS)
- Faculty – Physical Modeling (CoE)
- AE academic advisor (CoE)

EAC Questions

For ABE's research, extension, and teaching programs, please answer the following:

a) What are its strength and weakness? (E.g., S & W of research? S & W of extension? S & W of teaching?)
b) How are the programs addressing issues facing your organization? Please give examples.
c) What specific suggestions do you have for ABE to further improve these programs?
d) ABE would like to invest in our people – stellar faculty and students (e.g., endowed professorships, graduate fellowships, UG scholarships), can we count on you to be our champions in securing the resources needed for such purposes?

EAC Question

ABE is embarking on a period of significant change – the new building, rapidly growing enrollment, increasing need to be research competitive, changing landscape for extension programming. What should we be doing to best position the department for success as we navigate these changes? In what specific ways can you picture your organization assisting us through this period of change?

Questions?

TEACHING PROGRAM UPDATE

For ABE EAC

D. Raj Raman

10-26-2012

OVERVIEW

- Record Enrollment of 608 (59/41 Tech/Eng):
  - AST – 168 (28%)
  - AE – 175 (29%)
  - ITec – 191 (31%) - Focused recruiting for paying off
  - BSE – 74 (12%) – high gender and cultural diversity
- Resources to key classes
  - GTA support for high-lab instructors (all programs)
- BSE program thriving
  - BSE student club highly active (e.g., industry night)
  - Excellent BSE career fair outcomes
- A E and BSE accreditation visit next week
- Multiple REU/internship programs
- Completely new advising team on-board
- Major shift in Technology Capstone credit distribution

ABET IS HERE

- A culmination of 18+ months of focused preparation
- *"One of the most important events the COE will experience this year"* (Dean Akinc)
- For A E, a chance to uphold a 76 year tradition of accreditation
- For BSE, a final hurdle before **full legitimacy** as an engineering degree program
  - Crucial to the future licensure of our graduates
  - Crucial to the future of the BSE program

TIMELINE

- May 2012
  - Raman and Kaleita completed A E & BSE self studies
    - Excerpted version available to you later today
- July 2012
  - COE submitted all program self-studies to ABET
- Sunday, November 4, 2012
  - EAC (Engineering Accreditation Commission) team begins work
  - Program Evaluators (PEVs) take lab tours and meet with departmental reps
- Monday, November 5, 2012
  - PEVs meet with faculty members
- Tuesday, November 6, 2012
  - Team report findings to department chairs and to upper administration

EAC ROLES?

- Our Program Evaluators (PEVs) are see their discussion with you as one of the most critical aspects of the visit
- Please ask me questions on this as we go through some key points

ENGINEERING DEGREE PROGRAM HISTORY

- Created 1905
- By 1929, had divisions of emphasis including:
  - Farm machinery and power
  - Rural structures
  - Drainage and irrigation
- By 1960, had added Electric Power & Processing
- Food Engineering added in 1970's
- Enrollments <100 during 1980's farm crisis
  - Began to rise again in 1990's

KEY CHANGES SINCE LAST ACCREDITATION

- Added explicit coverage of Engineering Code of Ethics to curriculum
  - Remedy weak performance on FE exam ethics section
- Moved numerical methods from sophomore to junior year
  - Address mathematical preparedness → increase learning
- Created new sophomore level open-ended design course
  - Bridge gap between freshmen and senior open-ended design
- Modified the Program Educational Objectives (PEOs) to reflect the changes in ABET's PEO requirements –EAC involvement
- Increased course selection guidance to AES option students
  - Reduce confusion about how to select courses for a career focused on water and environment issues

TERMINOLOGY

- PEO = program educational objective
  - Broad statements of expected accomplishments of gradates 3 – 5 years after graduation

- Student Outcomes
  - Specific skills/abilities that our graduates will have on day of graduation
  - We follow the standard ABET model in this regard, with 11 items as follow:

a) an ability to apply knowledge of mathematics, science, and engineering
b) an ability to design and conduct experiments, as well as to analyze and interpret data
c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d) an ability to function on multidisciplinary teams
e) an ability to identify, formulate, and solve engineering problems
f) an understanding of professional and ethical responsibility
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i) a recognition of the need for, and an ability to engage in life-long learning
j) a knowledge of contemporary issues
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

PEO

- Program Educational Objective (PEO):

*Using the knowledge, skills, and abilities from their **agricultural (biological systems)** engineering degree, our graduates improve the human condition through successful careers in a wide variety of fields. They are effective leaders, collaborators, and innovators who address environmental, social, technical, and business challenges. They are engaged in life-long learning and professional development through self-study, continuing education, or graduate/professional school.*

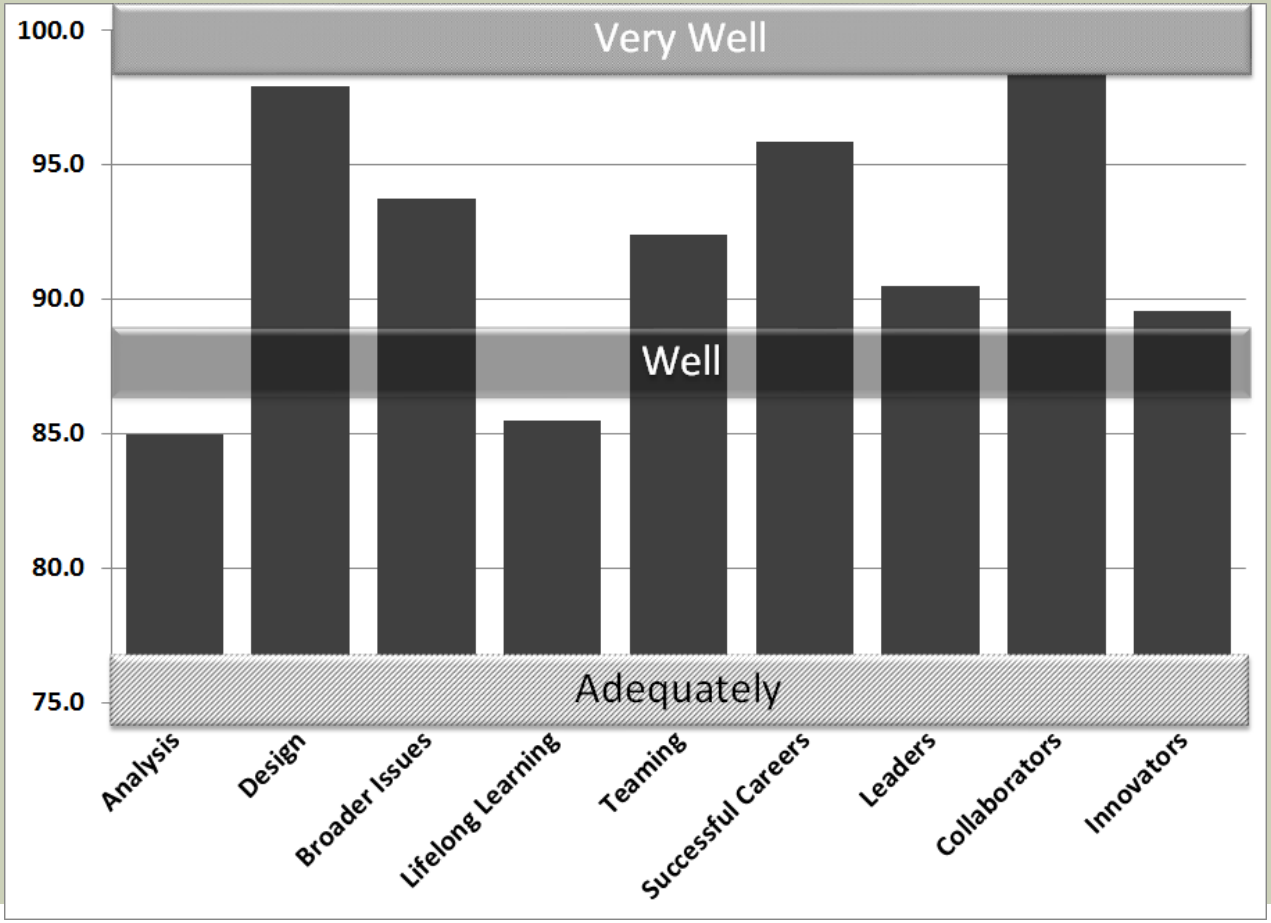
[Revised and approved by EAC Fall 2011]

KEY KNOWLEDGE, SKILLS, AND ABILITIES

1. Possess strong analysis skills
2. Possess strong design skills
3. Understand a range of issues relevant to engineering practice, including topics such as ethics, safety, professionalism, cultural diversity, globalization, and environmental impact
4. Understand the importance of continuous professional and technical growth
5. Capable of functioning in multidisciplinary and team oriented workplaces

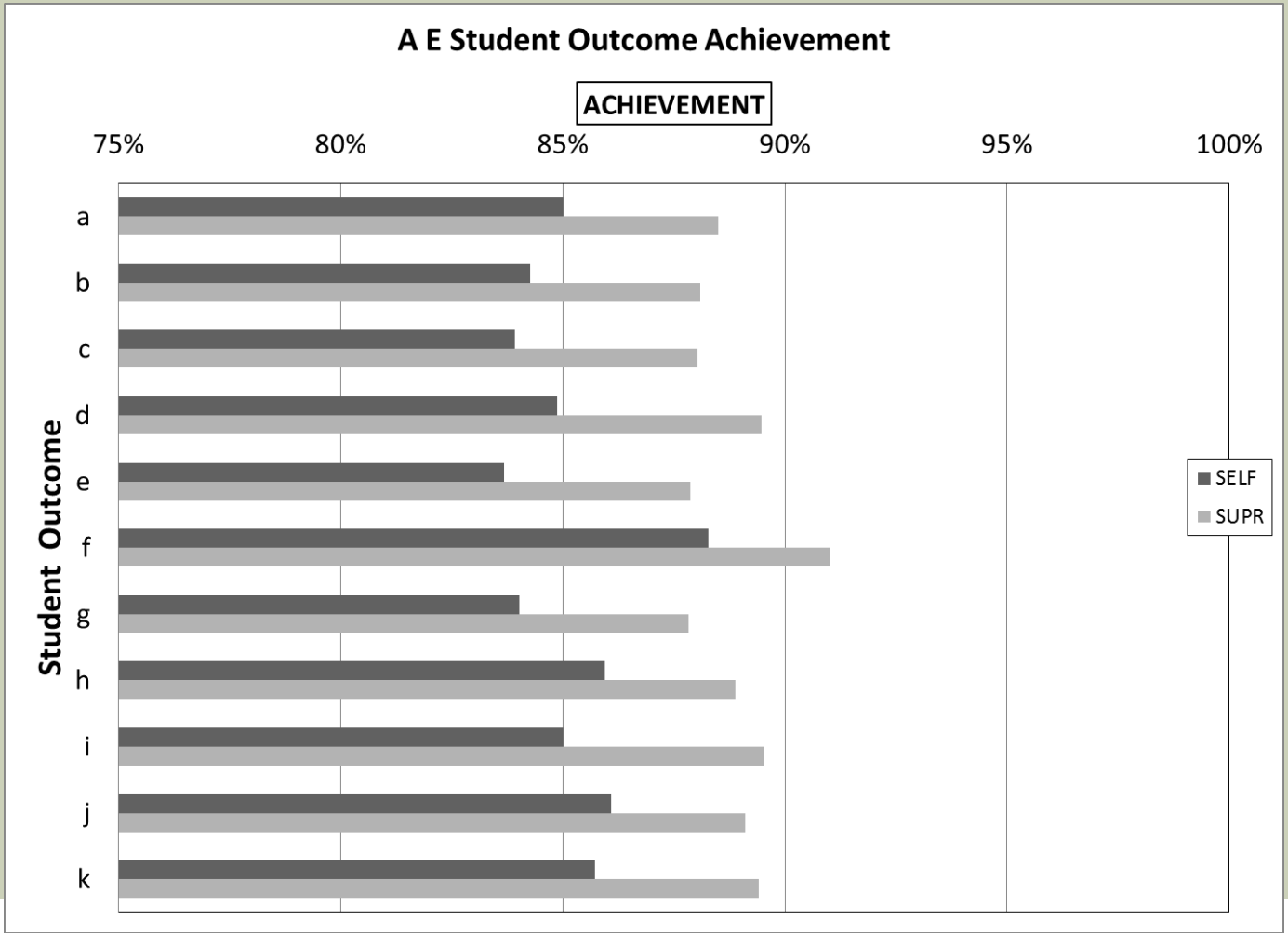
HOW ARE WE MEETING PEOS?

- Based on survey of grads 3 – 5 years out (25% responding, highest in COE, but n = 6!)

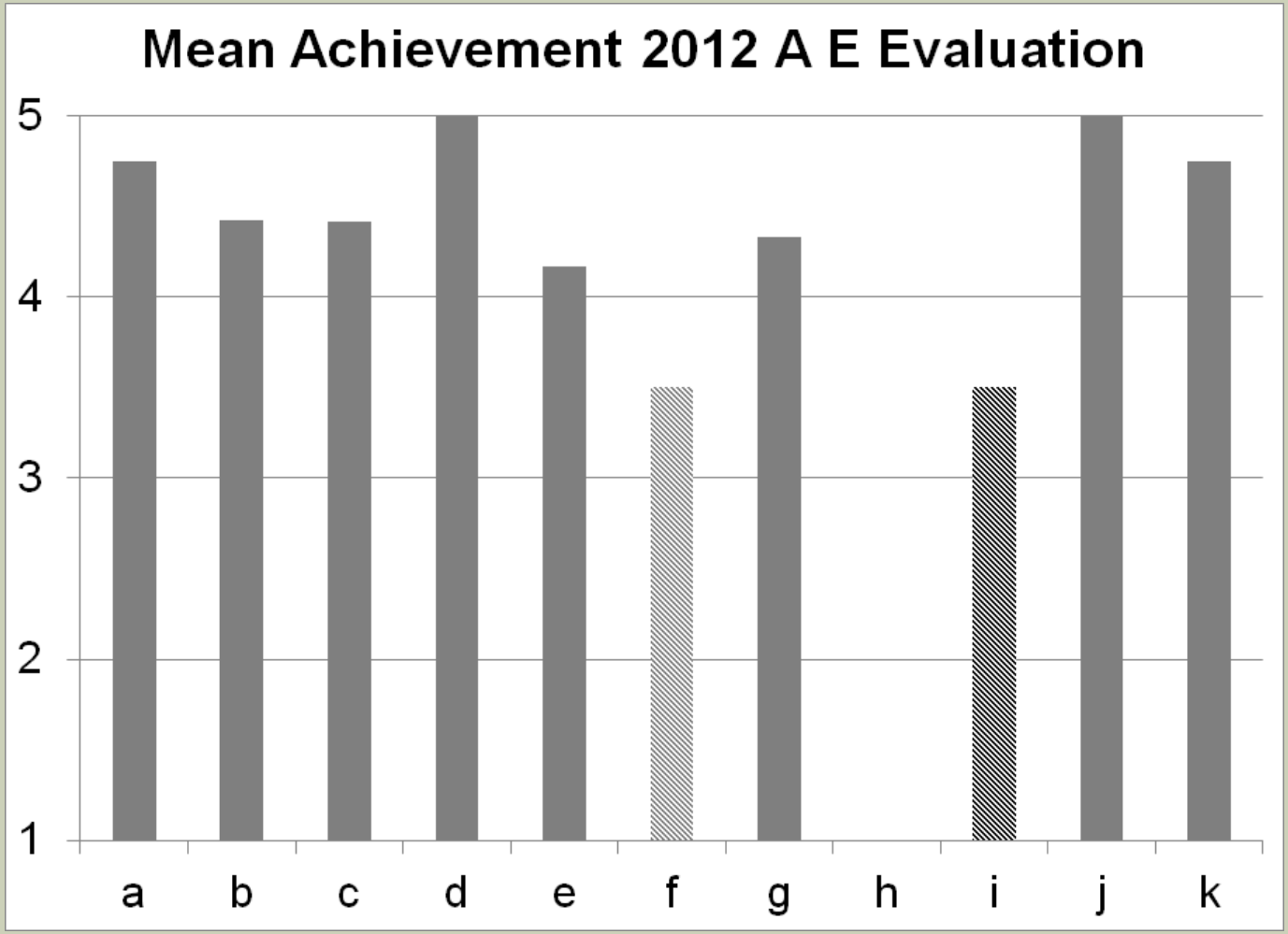


HOW ARE WE MEETING STUDENT OUTCOMES?

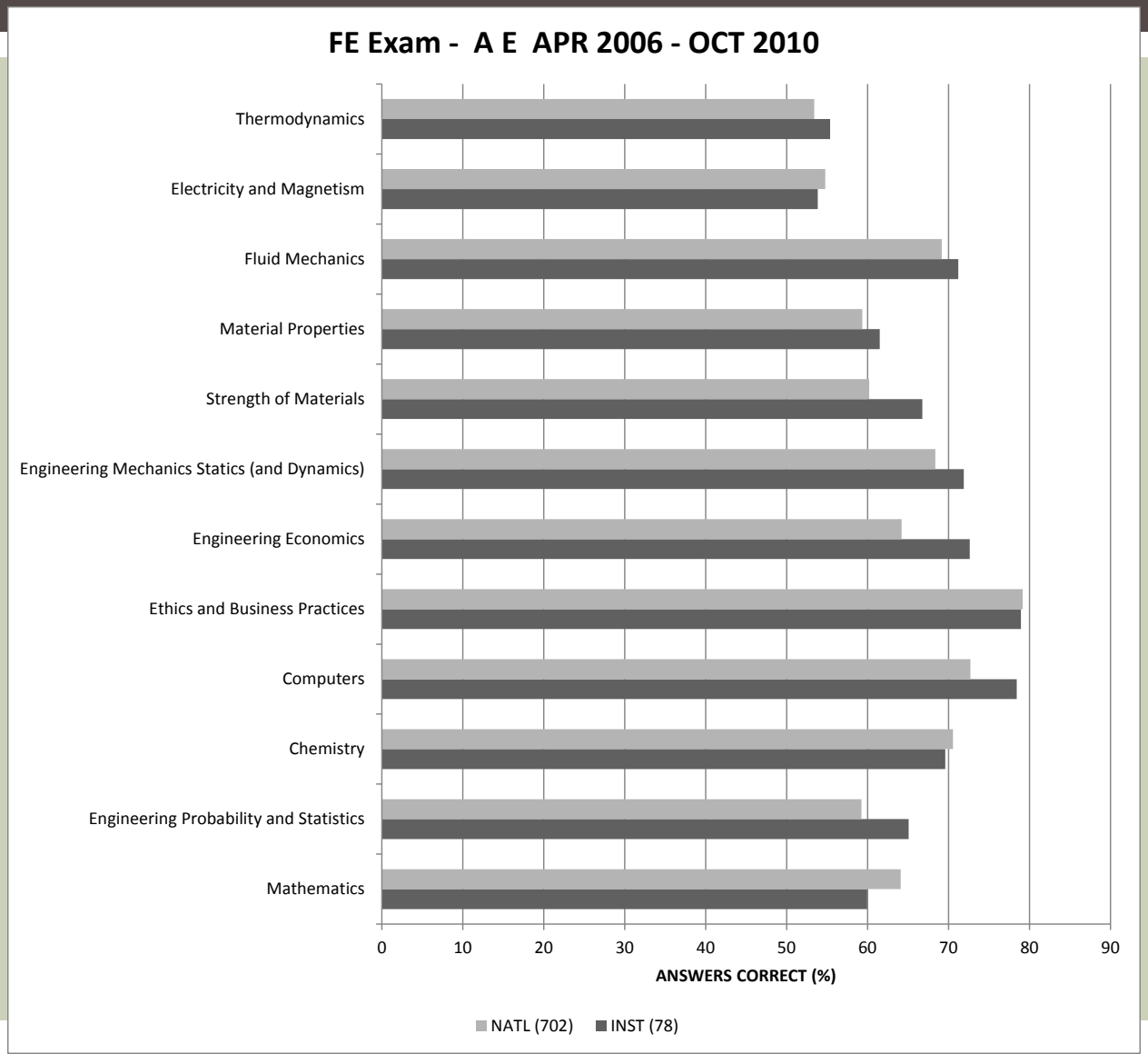
- Based on coop & internship evaluations, very well (n >110)



STUDENT OUTCOMES BASED ON REVIEW OF KEY ASSIGNMENTS IN A E COURSES



HOW ARE WE DOING ON THE FE EXAM?



WE LINK COURSES TO KNOWLEDGE, SKILLS, AND ABILITIES:

Course	KSA				
	1	2	3	4	5
ENGR 101 Engineering Orientation			X		X
A E 170 Engineering Graphics and Introductory Design		X			X
Math 165 Calculus I	X				
Chem 167 + 167 L General Chemistry for Engineering Students + Lab	X				
Engl 150 Critical Thinking and Communication			X	X	
Lib 160 Library Instruction				X	
A E 110 Experiencing Agricultural and Biosystems Engineering				X	X
ENGR 160 Engineering Problems with Computer Applications Lab	X				
Math 166 Calculus II	X				
Phys 221 Introduction to Classical Physics I	X				
SSH Elective			X		

AND WE LINK COURSES TO STUDENT OUTCOMES

No.	Course	Pre/Co Requisites	Student Outcome										
			a	b	C	d	e	f	g	h	i	j	k
1.1	ENGR 101 Engineering Orientation										X		
1.2	A E 170 Engineering Graphics and Introductory Design		X										X
1.3	Math 165 Calculus I		X										
1.4	Chem 167 + 167 L General Chemistry for Engineering Students + Lab		X	X					X				
1.5	Engl 150 Critical Thinking and Communication								X	X			
1.6	Lib 160 Library Instruction										X		
2.1	A E 110 Experiencing Agricultural and Biosystems Engineering					X			X			X	
2.2	ENGR 160 Engineering Problems with Computer Applications Lab		X				X		X				X
2.3	Math 166 Calculus II	1.3	X										
2.4	Phys 221 Introduction to Classical Physics I	2.3	X	X					X				
2.5	SSH Elective									X		X	

FACULTY QUALIFICATIONS & ROLE IN CURRICULUM

- ABE faculty members are leaders on campus, playing key roles in multiple high-impact research, teaching, and extension efforts
  - e.g., CenUSA USDA AFRI CAP Center, Egg Industry Center, Midwest Plan Service, NSF Engineering Research Center for Biorenewable Chemicals
- All substantive curricular decisions including those related to course substitutions are the jurisdiction of the faculty membership of the ABE ECC as a whole, not of the ABE ECC chair, nor of the departmental Chair, nor of the Associate Chair for Teaching

CLOSING COMMENTS

- Many thanks to current and past EAC members for supporting our programs over the past six (exciting) years
- Huge thanks to ALK for co-authoring the document
  - And to TJB and SKM for much critical input
- Writing the document is a lot of work, but a reminder to me of what a great department we really are:
  - We take educational programming seriously, and we meet the spirit of ABET
  - We have excellent students!

THANK YOU!

- Questions?

IOWA STATE UNIVERSITY
College of Engineering

CAREER SERVICES UPDATE

Brian Larson
Director Engineering Career Services
Iowa State University

Agricultural & Biosystems Engineering
Advisory Council
October 26, 2012

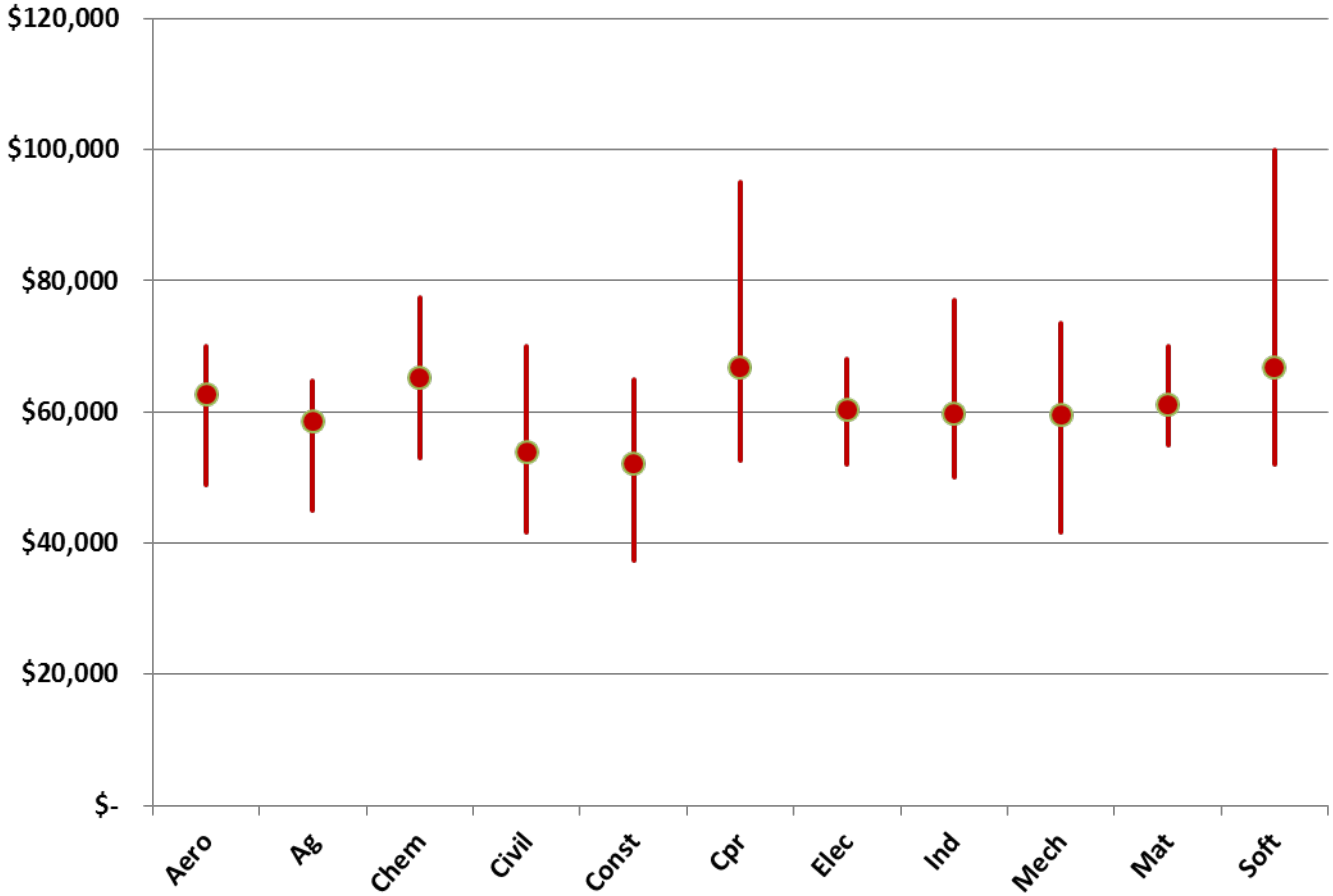
Outline

- Placement and Salary Data
- Experiential Education Data
- Recruitment Indicators (Job Posting, Career Fair Participation, On-Campus Interviews)
- OPAL Assessment
- Connecting with Students

2011-2012 Placement Data

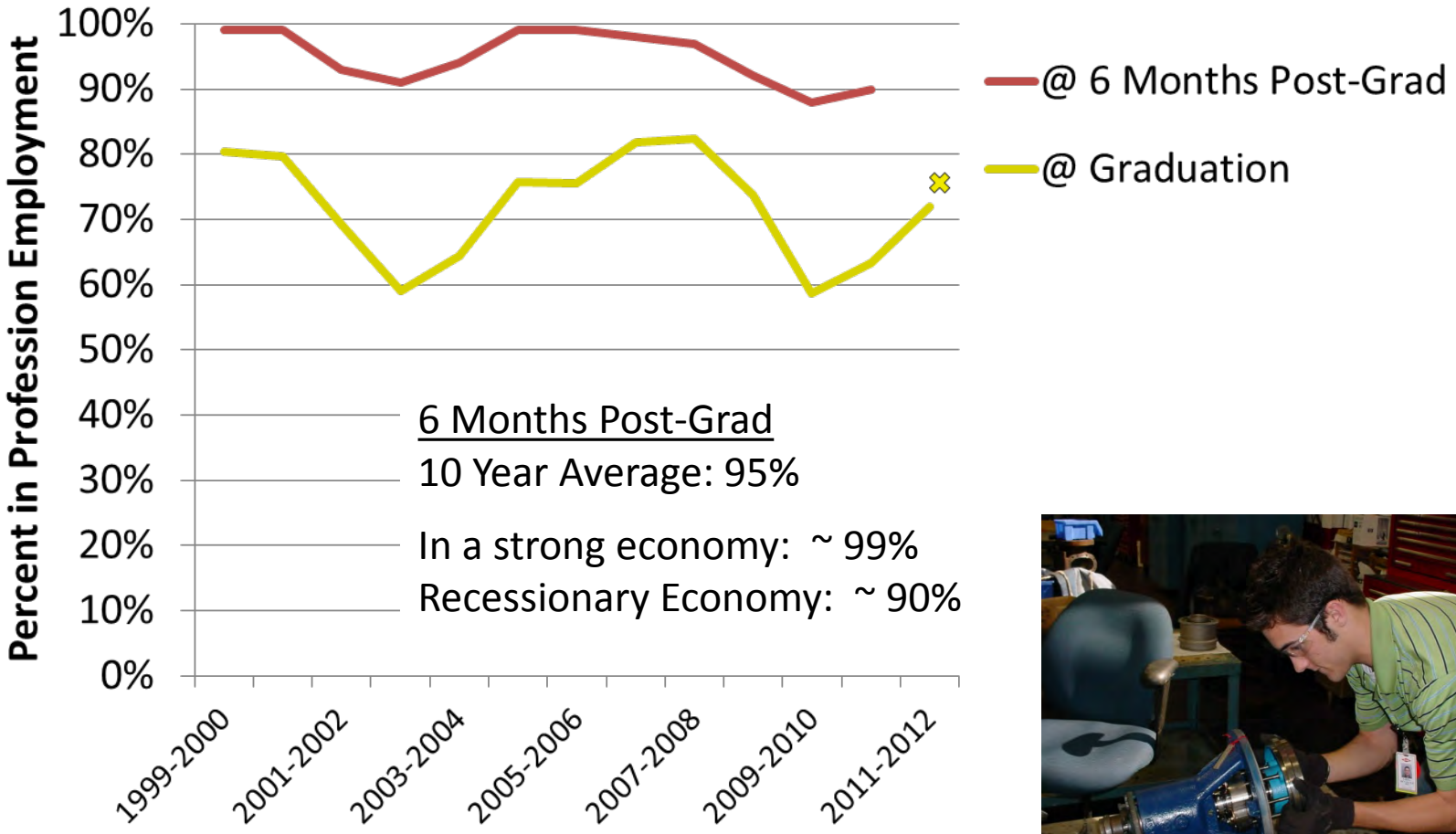
Dept	Grads	Grads Reporting	Resumes Uploaded	Employed in Iowa	Employed Out of Iowa	Employed	Grad/Prof School	Offers	% Placed *	Seeking/No Plans US	Seeking/No Plans Int.	No Plans No Interviews	STARTING SALARY RANGE Low	High	$/yr Average	No.
Aero E	94	92	70	5	30	35	13	4	57%	40	0	23	49000	- 70000	62739	26
Ag E	38	36	34	13	14	27	2	2	86%	5	0	2	45000	- 64800	58573	16
BSE	3	3	3	0	1	1	2	0	100%	0	0	0	-	-	-	0
Chem E	79	69	69	5	27	32	15	1	70%	13	8	11	53000	- 77500	65235	22
CE	124	117	95	12	31	43	29	6	67%	34	5	17	41600	- 70000	53905	28
Con E	71	71	56	20	29	49	2	3	76%	17	0	6	37440	- 65000	52062	30
Cpr E	60	58	51	8	27	35	7	2	76%	14	1	7	52700	- 95000	66771	23
EE	68	62	56	13	12	25	18	2	73%	12	4	4	52000	- 68000	60332	16
IE	47	43	40	8	21	29	2	2	77%	9	1	4	50000	- 77000	59852	21
ME	233	207	188	46	79	125	22	6	74%	45	9	13	41600	- 73500	59610	82
Mat E	42	41	34	0	12	12	13	3	68%	13	0	6	55000	- 70000	61040	10
SE	25	25	32	5	14	19	2	1	88%	3	0	1	52000	- 100000	66827	12
TOTALS	884	824	728	135	297	432	127	32		205	28	94	37440	- 100000	59906	286
%'s		93%	82%	31%	69%	52%	15%	4%	72%	28%						
Last Year (2010-2011)																
Totals	843	776	734	143	207	350	124	17		262	23	136	35000	- 81000	58914	199
%'s		92%	87%	41%	59%	45%	16%	2%	68%	37%						

2011-2012 Average Starting Salaries ISU Engineering Graduates



Source: ISU 2011-2012 At-Graduation Survey

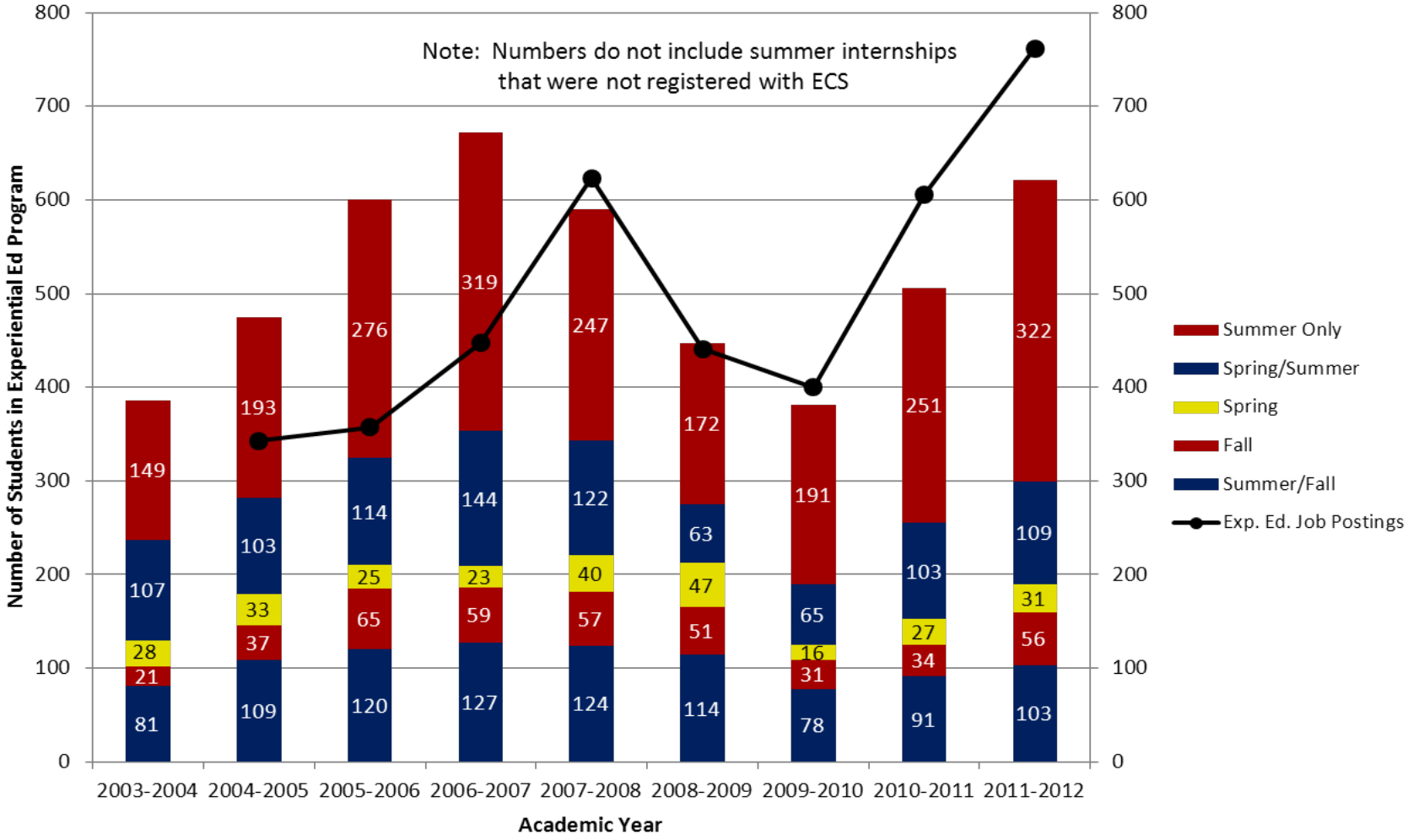
In-Profession Employment



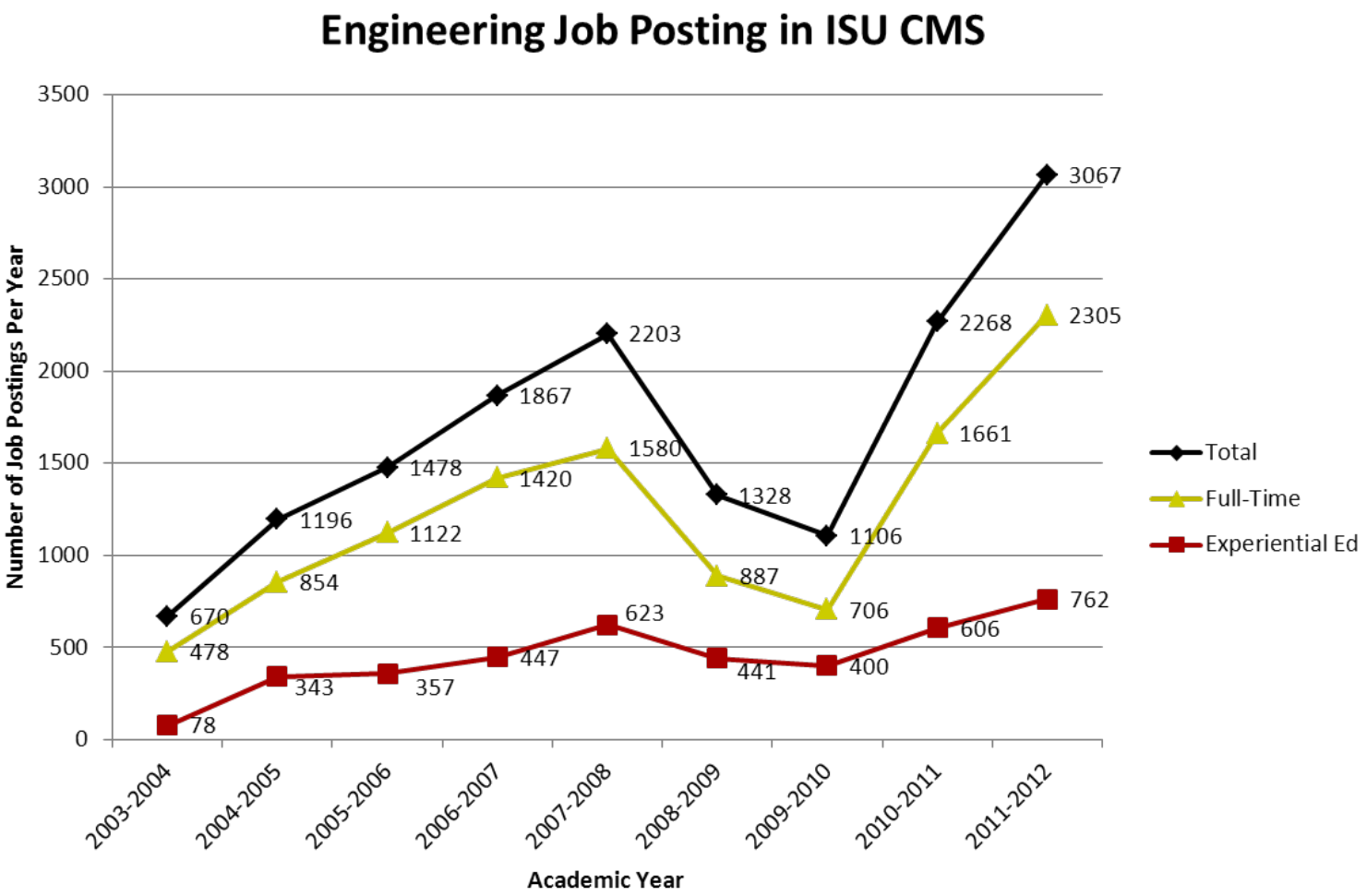
2011-2012 Experiential Education

Dept		Grads	Grads Reporting	Co-op			Internship			Summer Internship			No Experience			Total Co-op, Intern or Summer Exp	Int'l Ed or Work Exp
				Exp.	No Place Info[1]	Placed	Exp.	No Place Info[1]	Placed	Exp.	No Place Info[1]	Placed	No Exp.	No Place Info[1]	Placed		
Aero E	No.	94	73	0	0	0	21	0	16	24	1	16	28	0	13	45	17
	%		78%	0%			22%		76%	33%		70%	38%		46%	62%	23%
Ag E	No.	38	38	0	0	0	6		6	22		20	10	2	5	28	3
	%		100%	0%			16%		100%	58%		91%	26%		63%	74%	8%
BSE	No.	3	3	0	0	0	0	0	0	1	0	1	2	0	2	1	1
	%		100%	0%			0%			33%		100%	67%		100%	33%	33%
Chem E	No.	79	70	1	0	1	16	1	14	23	4	17	30	4	13	40	22
	%		89%	1%		100%	20%		93%	33%		89%	43%		50%	57%	31%
CE	No.	124	103	4	0	3	26	3	17	46	0	29	27	1	15	76	33
	%		83%	3%		75%	21%		74%	45%		63%	26%		58%	74%	32%
Con E	No.	71	65	1	0	1	9	0	8	41	0	33	14	0	7	51	8
	%		92%	1%		100%	13%		89%	63%		80%	22%		50%	78%	12%
Cpr E	No.	60	52	0	0	0	9	0	9	17	0	16	26	2	15	26	4
	%		87%	0%			15%		100%	33%		94%	50%		63%	50%	8%
EE	No.	68	59	0	0	0	7	0	4	23	2	17	29	1	20	30	6
	%		87%	0%			10%		57%	39%		81%	49%		71%	51%	10%
IE	No.	47	43	1	0	1	14	1	11	19	0	15	9	1	5	34	14
	%		91%	2%		100%	30%		85%	44%		79%	21%		63%	79%	33%
ME	No.	233	212	6	0	5	70	4	55	77	8	55	59	11	23	153	42
	%		91%	3%		83%	30%		83%	36%		80%	28%		48%	72%	20%
Mat E	No.	42	37	0	0	0	7	1	4	15	0	10	15	0	10	22	11
	%		88%	0%			17%		67%	41%		67%	41%		67%	59%	30%
SE	No.	25	22	0	0	0	2	0	2	16	0	15	4	0	2	18	1
	%		88%	0%			8%		100%	73%		94%	18%		50%	82%	5%
TOTALS	No.	884	777	13	0	11	187	10	146	324	15	244	253	22	130	524	162
	%		88%	1%		85%	21%		82%	42%		79%	33%		56%	67%	21%
Last Year (2011-2012)																	
TOTALS	No.	843	751	17	0	13	208	7	147	314	17	190	212	22	93	539	178
	%		89%	2%		76%	25%		73%	42%		64%	28%		49%	72%	24%

Engineering Students in Experiential Education Program



Engineering Job Postings in ISU CMS



Career Fairs

Fall 2012

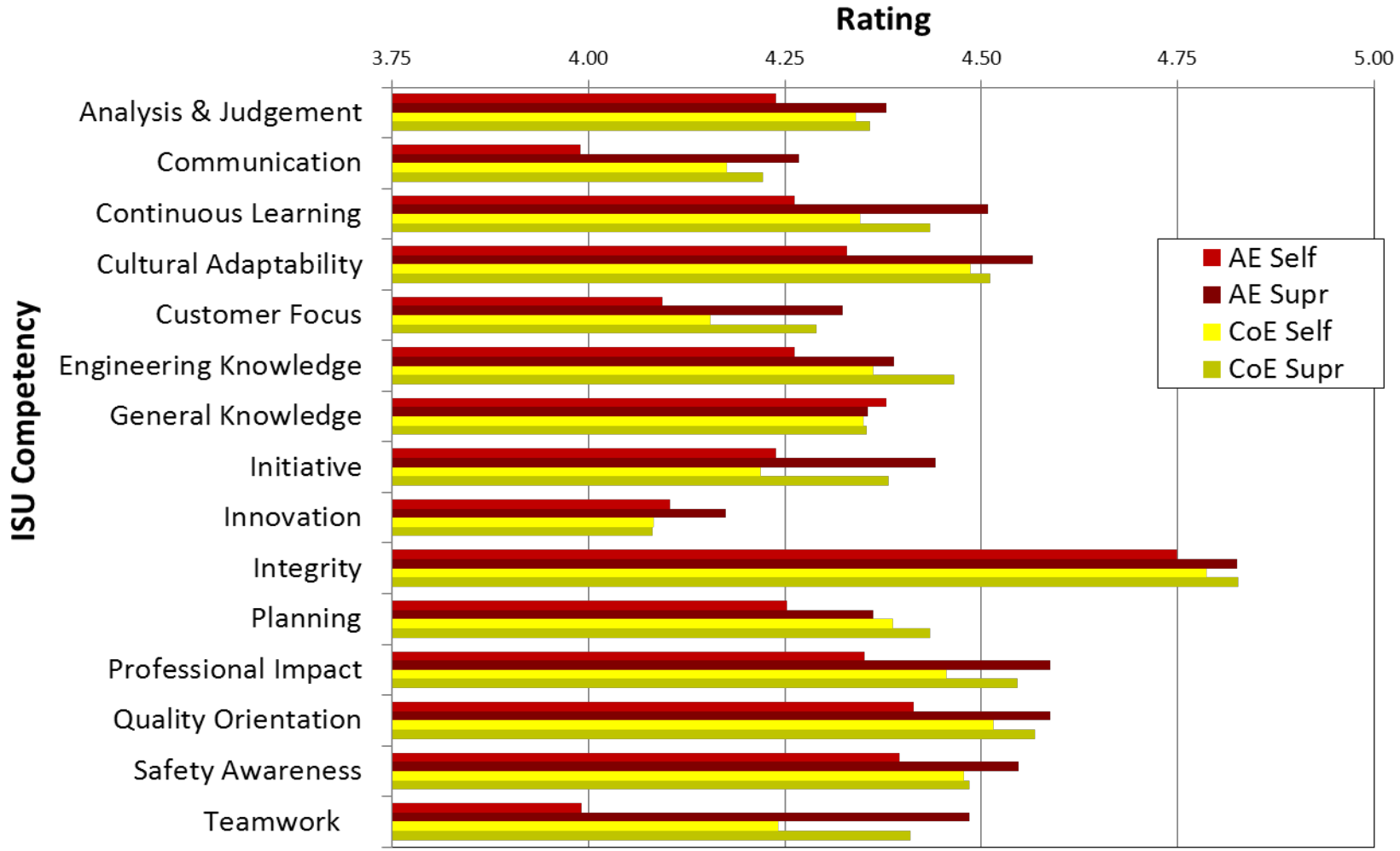
- **Employers**
  - 287 employers (Limited by booth space – 318 booths)
- **Students**
  - Over 5,000 students, ranging from freshmen to alumni
  - Large student contribution with many leadership development opportunities
- **Positions**
  - Internships, co-ops, and full-time positions

Spring 2013

- **February 12th**
- **Registration opens mid-Nov.**

OPAL Assessment

AE and COE Coop/Intern Achievement



Industry Engagement/ Connecting with Students

1. Attend the Spring and Fall Career Fairs
2. Post a Job on the Online ISU Career Management System (ISU CMS)
3. Conduct On-Campus Interviews
4. Host an Employer Information/Networking Session
5. Provide Co-op and Internship Job Opportunities
6. Participate in Educational and Student Development Programs
   - Employer Q & A Panels
   - Help With Workshops & Mock Interview Sessions
   - Make a Technical Presentation to a Class or Student Org
   - Contribute to a Student Capstone Design Project
7. Provide Guidance and/or Financial Support to Student Organizations
8. Participate in and Sponsor ISU's Engineers Week Activities (Held in September)
9. Fund Scholarships or Otherwise Support the College of Engineering
10. Sponsor Research Involving Students (Engineering Research Institute)
11. Serve on an Advisory Council (By Invitation of the Department Chair)

Questions

and

Feedback

CALS CAREER SERVICES UPDATE

Mike Gaul
Director, Career Services
College of Agriculture and Life Sciences
mikegaul@iastate.edu

College Majors That Are Useless

Yahoo Education, January 2012

Record CALS Enrollment

3900 Undergraduates
655 Graduates

Points of Pride

- Placement rates
- Career Day
- Interviews
- Job postings
- Starting salaries

Agribusiness Loan Officer,
First National Bank of Omaha

Top 10 Employers of 2010-2011Bachelor Degree Recipients

• Pioneer Hi-Bred International	29
• Monsanto	17
• Iowa State University	16
• John Deere	9
• Quality Manufacturing	7
• USDA	6
• AmeriCorps	5
• Syngenta	5
• Ag Leader Technology	4
• JBS	4

Five Year Placement Summary

AST	135 grads	99.3%	(97.6%)
I TEC	254 grads	97.0%	(95.6%)

Salary Information

Technical & Biosystems Engineering, Industrial Technology and Packaging Services = $50,214 (250)

Agricultural Economics and Economics = $43,450 (348)

Food Science, Human Nutrition, and Dietetics = $42,448 (96)

Internships

Questions?

ABE Research & Extension Update

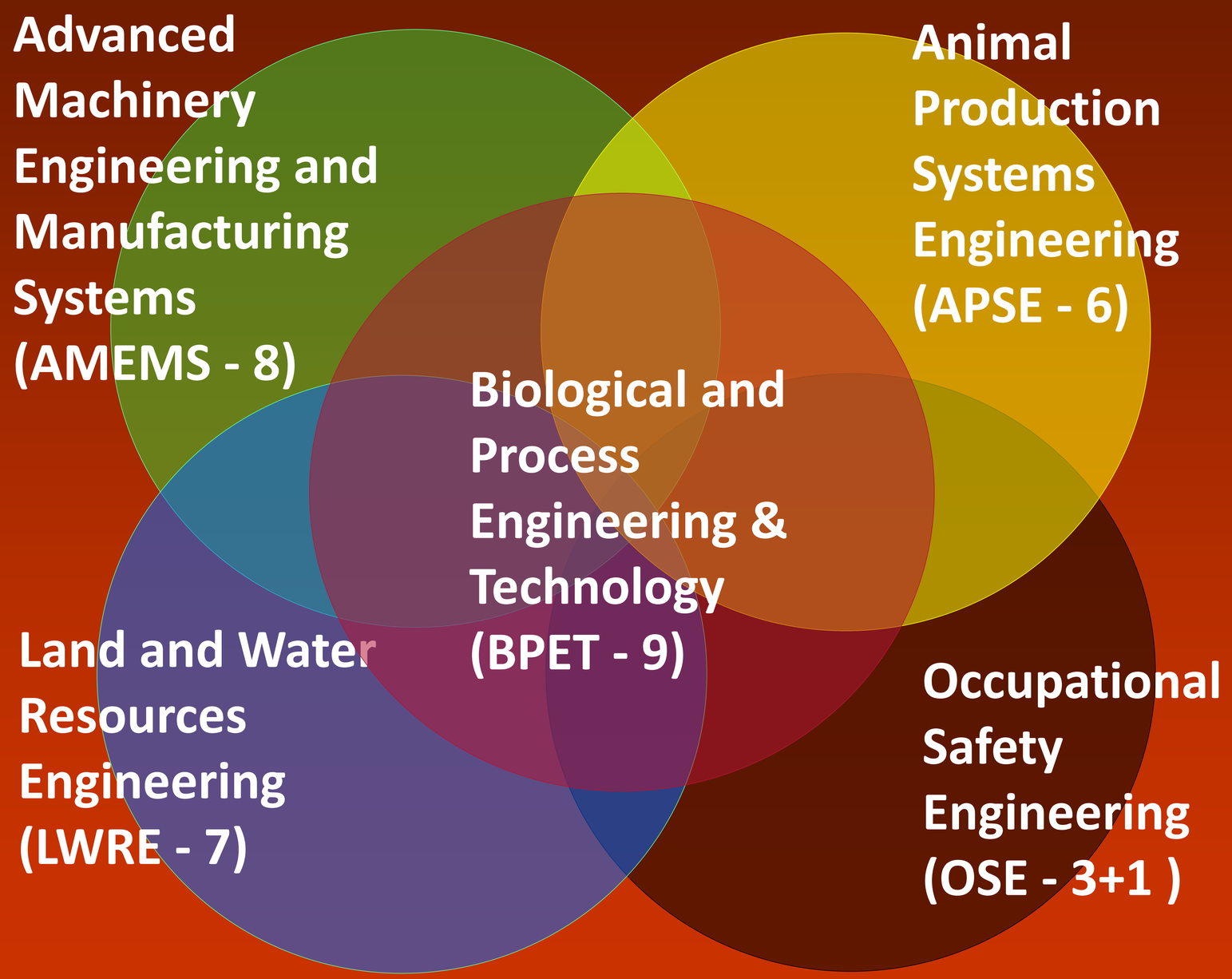
Hongwei Xin, Professor

Associate Chair of Research

hxin@iastate.edu

EAC Fall Conference, October 26, 2012

Unique & Collaborative ABE Theme Areas



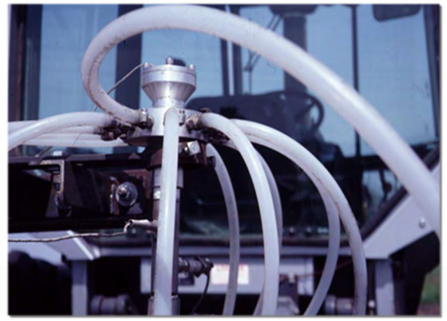
Iowa State University
Agricultural and Biosystems Engineering

Advanced Machinery Engineering and Manufacturing Systems Focus Group

Faculty: Baughman, Birrell, Darr, Hanna, McGill, Snell, Steward, Tang

Machine Design, Testing, and Manufacturing

- Combine cleaning for identity preservation
- NH_3 manifold design
- Implement steering systems

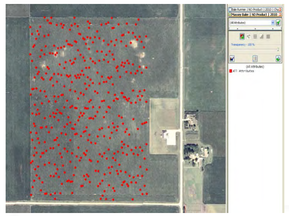


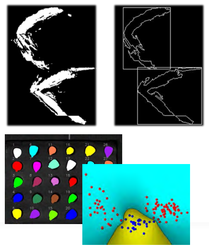
Biomass Harvest, Storage, and Transportation

- Engineering systems for sustainable, high quality biomass collection
- Developing best management practices for biomass storage
- Generate system level decision models

Sensors and Embedded Networks

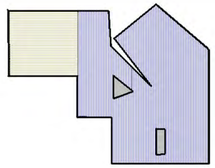
- Active machine vision for plant spacing estimation
- Dielectric spectroscopy for hydraulic oil condition sensing
- CAN bus data acquisition and control integration





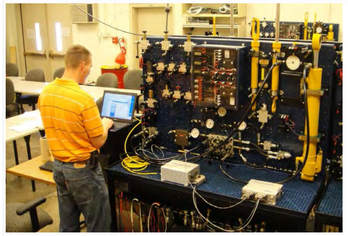
Field Automation, Machine Intelligence, and Robotics

- Sensing and control at the vehicle-terrain interface
- Mission and path planning
- Autonomous vehicle design
- Auto-guidance simulation in virtual environments



Example Laboratory Facilities

Sauer-Danfoss Fluid Power Lab



Ag Leader Precision Ag Lab

BioCentury Research Farm

Advanced Machinery Related Courses

- Modeling and Controls for Agricultural Systems
- Precision Farming Systems
- Electronic Integration for Machinery Systems
- Instrumentation Systems
- Applied Computational Intelligence for Agricultural and Biological Systems

IOWA STATE UNIVERSITY
Agricultural and Biosystems Engineering

Animal Production Systems Engineering Focus Group

Xin Group: *Air Emissions*

- Quantification and mitigation of aerial emissions from animal feeding operations continue to be of great importance to the sustainable development and economic prosperity of the U.S. animal agriculture. Yet, the baseline data and practical means to mitigate aerial emissions under U.S production conditions are lacking.
- The goal is to collect/expand baseline data on gaseous and particulate matters (PM) and to explore effective means that will help our animal farmers to improve environmental stewardship while maintaining viable production economics.
- Specific objectives include a) extensive measurement of gaseous (noxious and GHG) and PM emissions from livestock and poultry facilities; b) development and evaluation of potential mitigation techniques; and c) timely dissemination of research findings to producers, allied industries, academic professionals, and government agencies.

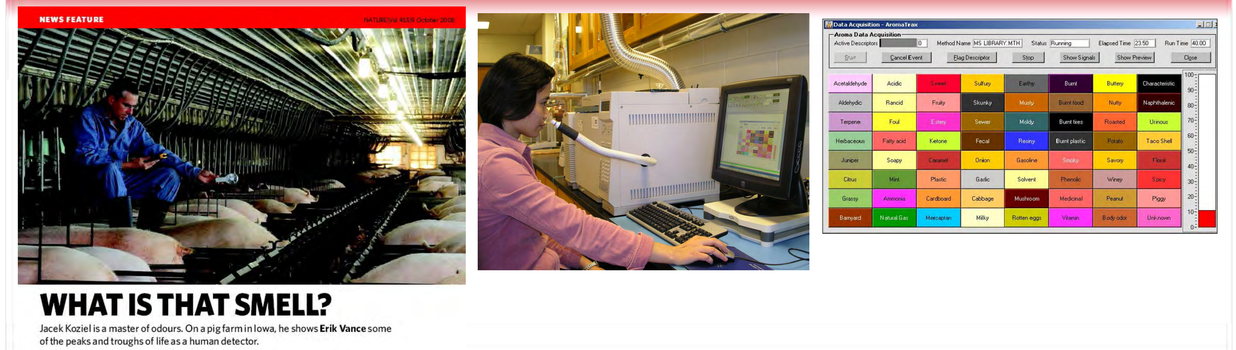
Xin and Hoff Groups: *Animal Welfare*

- The issue of animal welfare has moved to the forefront of animal agriculture in the United States. Much attention and debate are being focused on the adequacy of contemporary production systems in accommodating the animal's natural behaviors and thus well-being.
- The overall goal of our work in this area is to evaluate alternative production systems and to develop management tools that will lead to enhanced animal welfare while producing safe/quality proteins with the lowest input of resources.
- Specific objectives of this project is to include a) systematic evaluation different animal production systems with regards to animal welfare, food safety, environmental impact, use of natural resources and production economics which all contribute to the production sustainability; **b) automated electronic detection of sow lameness**.

Hoff and Harmon Groups: *Gas/odor Mitigation & Facility Siting*

- Investigating on-farm performance of odor and gas mitigation technologies, developed both in-house and by outside vendors.
- Research focus on cost-effective practical solutions for ready on-farm implementation
- The overall goal is practical, economical solutions for producers.
- Developed and implemented an odor dispersion model for swine facility siting in the pre-planning stages of new or expanding applications.

Koziel Group: *Chemical Analysis of Odor*



Glanville Group: *Bio-secure Containment & Disposal of Pathogen-Contaminated* Materials

- Catastrophic livestock & poultry losses caused by disease, severe weather, fire, and building system failures, pose serious environmental & health issues worldwide.
- Research focuses on bio-secure methods for management of contaminated animal tissue, manure, and feed.
- Specific objectives include new and improved methods for emergency containment & decontamination; bio-secure methods for process monitoring; and post-process chemical treatment for pathogen suppression.

IOWA STATE UNIVERSITY

Agricultural and Biosystems Engineering

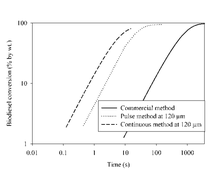
Biological & Process Engineering and Technology Focus Group

Faculty: Bern, Brumm, Grewell, Hurburgh, Misra, Mosher, Raman, Rosentrater, Yu

Grewell Group: *Biomass to Products*

- Develop enabling technologies to efficiently convert biomass to fuels, chemicals and materials
- Using natural polymers for the production of bioplastics that are sustainable and biodegradable
- Using high power ultrasonics to enhance biofuel production from a wide range of feedstocks, including ethanol from lignocellulosic feeds, oil from yeast for biodiesel production, soy oil to biodiesel as well as biomethane from waste streams

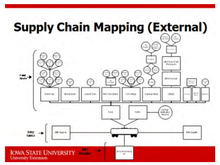


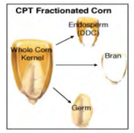



Hurburgh Group: *Grain Quality, Instrumentation, Food Safety Management Systems*

- Measurement of product characteristics and in-process parameters is important for maximizing values in grain handling/processing
- Current efforts focus on (1) instrumentation and calibration, (2) application of formalized food safety management systems to grain handling and processing, (3) quality control charting and training for industry, (4) assessment of new technologies to improve grain based biofuel processing, (5) provision of advice and response to current grain management issues, and (6) support to the grain market, especially on current issues of public interest or safety

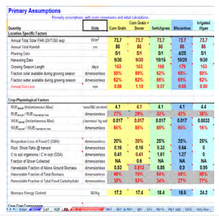
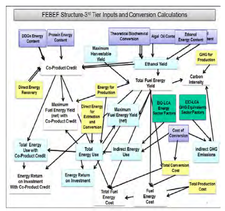
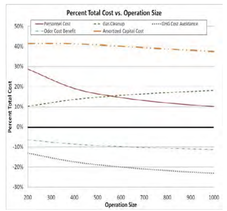
Iowa Grain Quality Initiative

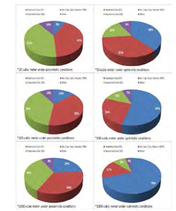
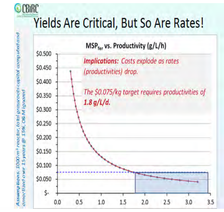





Raman Group: *Techno-Economic and Lifecycle Assessment*

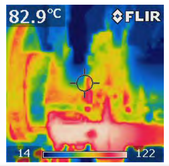
- Economic and environmental sustainability are interlinked
- We need insight into how novel biomass production and processing systems perform
- Current efforts focus on understanding the cost structures of fermentative bioprocesses (for the NSF Engineering Research Center for Biorenewable Chemicals) and examining the energy requirements, GHG emissions, and cost associated with terrestrial and aquatic biomass production systems

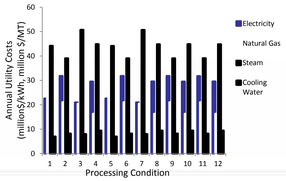




Rosentrater Group: *Sustainability of Biorenewable Resources*

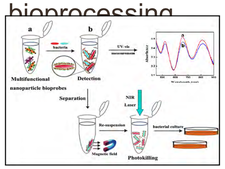
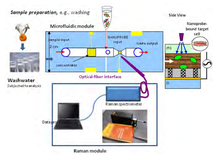
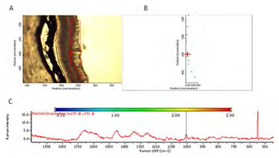
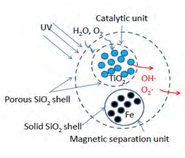
- Sustainability is crucial to the long-term viability of biorenewable systems
- The overall goal of this work is to improve the sustainability of bio-based industries
- This includes developing new products, increasing efficiencies, and improving life cycles




Yu Group : *Biosensors and Bionanotechnology*

- Biosensors are easy-to-use tools for biosafety and biosecurity monitoring and disease diagnosis
- The overall goal of our work is to develop rapid and field-deployable biosensors for rapid detection and characterization of various biologically-important targets
- This includes (1) functionalized nanoparticle based molecular probes for recognizing chemical and biological targets in water, (2) Raman spectroscopic biosensing for food safety surveillance and medical diagnosis, (3) applying nanotechnology to address engineering problems in bioprocessing

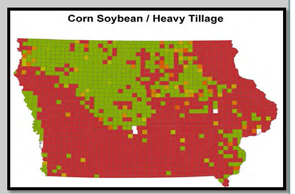
Iowa State University
Agricultural and Biosystems Engineering

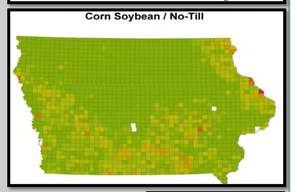
Land and Water Resource Engineering Focus Group

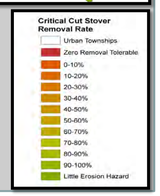
Faculty: Glanville, Helmers, Kaleita, Kanwar, Mickelson, Soupir, Tim

Corn Biomass Harvest and Sustainable Soil Loss Rates

In the near term, biomass from corn crop residues may be used as a cellulosic feedstock for ethanol production. However, when left on-field, such residue has value for, among other things, limiting soil loss through erosion.







ABE professor Amy Kaleita and graduate student Jim Newman are evaluating corn stover removal rates under a range of management systems to determine critical removal rates above which significant soil loss is expected to occur.

This research has been funded by the Center for Global and Regional Environmental Research.

Researchers in the Water and Environmental Stewardship Engineering focus area of the Department of Agricultural & Biosystems Engineering (ABE) are working closely with stakeholders to develop engineered solutions and best management practices that protect and conserve the soil and water resources of Iowa, our nation, and the world.

Poultry Manure Amendments in Agriculture and Groundwater Quality

Corn growers and egg producers have established an economic synergism using poultry manure as an alternative to chemical fertilizer.

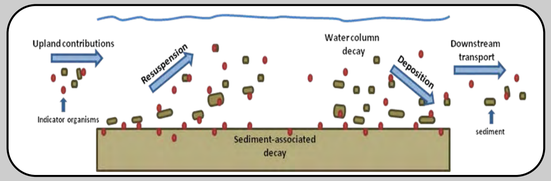
Studies being conducted by ABE professor Ramesh Kanwar and Research Associate Andre Salazar are evaluating subsurface tile drain water quality for chemicals, pathogens, and pharmaceuticals to determine the environmental impact of using poultry manure fertilizer in corn/ soybean crop production..

The goal of this project is to determine optimal parameters for poultry manure use as crop fertilizer with minimal effect to groundwater quality.

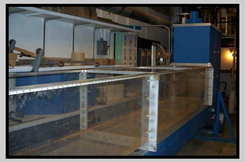
This research is being funded by the Iowa Egg Council

Fate and Transport of Fecal Indicators in Sediment Laden Streams

The leading cause of water quality impairments in Iowa is pollution due to harmful microorganisms. Predicting the risk to public health requires accurate models of bacteria deposition, resuspension, transport, and survival in the sediment and the water column. We are developing relationships for bacteria resuspension as a function of sediment and flow, and bacteria decay as a function of natural mortality, solar radiation, temperature, and predators.0

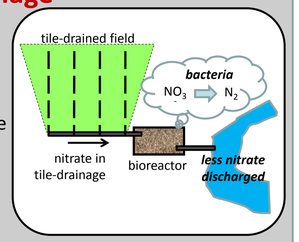


ABE professor Michelle Soupir and CCEE professor Chris Rehmann are conducting flume experiments to improve modeling of bacteria in streams and allocations of bacteria loads in impaired watersheds.



Agricultural Water Treatment: Nitrate Removal from Tile Drainage

Tile drains are critical components of Iowa's highly productive farmlands. However, nitrate in drainage is a major contributor to nitrogen export from the region. We are studying the potential of denitrifying bioreactors as simple, edge-of-field systems for nitrate removal from tile drainage.



Packed with carbonaceous materials, such as woodchips, these systems reduce nitrogen discharge into surface waters by allowing soil bacteria to convert nitrate to nitrogen gas.

ABE professors Alok Bhandari and Matthew Helmers and graduate student Laura Christianson are evaluating designs and practices to improve the field performance of bioreactors in Iowa.

This research is being conducted in partnership with the Iowa Soybean Association.

Drainage Water Quality, Drainage Design, and Watershed Design

Use of subsurface drainage systems is essential on much of the farmland in Iowa. However, methods are needed that can reduce nitrate export form these systems. Through research in this area we are evaluating how in-field nutrient management and cropping practices impact nitrate loss along with how drainage systems can be managed and designed to minimize nitrate export. In addition, we are evaluating how strategic placement of buffers can be used to reduce sediment and nutrient loss

ABE professor Matthew Helmers along with other collaborators at ISU, the USDA-ARS, and the U.S. Forest Service are involved in these projects.

Research is being funded by a variety of organizations including the Iowa Department of Agriculture and Land Stewardship, USDA-NRCS, Leopold Center for Sustainable Agriculture, Agricultural Drainage Management Coalition, NSF, and U.S. Forest Service.

Evaluation of Soil Contamination Caused by Emergency Bio-reduction of Catastrophic Livestock Mortalities

Mass burial of livestock following a disease outbreak can cause serious nitrogen contamination in soil.

Studies by ABE professor Tom Glanville and Dr. Heekwon Ahn of USDA-ARS, showed the amount of N added to soil by emergency composting procedures was only 10-25% of N added to soil by burial, indicating that composting poses a lower pollution threat to soil and shallow groundwater than burial. Elevated NH_3-N suppressed soybean emergence, however, emphasizing the desirability of planting ammonia-tolerant and high N-using crops on composting sites during the 1st cropping season following emergency composting.

This research is being supported by Iowa Department of Natural Resources and the U.S. Department of Agriculture .

Iowa State University
Agricultural and Biosystems Engineering

Occupational Safety Engineering Focus Group

Faculty: Freeman, Hanna, Keren, Schwab

Occupational Safety – *Overall Theme*

The health and safety of populations are socially and economically important to Iowa, the U.S. and the world. A group of diverse talents and interests are engaged in the singular goal of zero injuries. Occupational safety engineering and technology is required to develop and disseminate injury and loss prevention measures and strategies to provide safer places to live and work. Occupational safety engineering and technology has the major role of developing, evaluating, and implementing injury and loss prevention measures and strategies for a safer future.

Occupational Safety – *Bioenergy Feedstock Production*

cenusa bioenergy

The US agricultural workforce was over 1.8 million strong in 2008. While not the largest workforce population for an industry in the United States, it received the distinction as the most deadly industry with a worker fatality rate of 25.1 deaths per 100,000 workers (NSC 2008). This death rate is more than five times the all-industry average death rate. The leading source of fatalities for agriculture, accounting for nearly one quarter, was machinery.

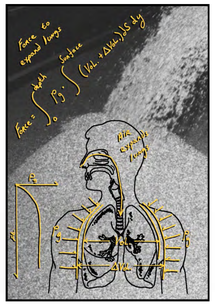
Adaptive changes for bioenergy feedstock production will have inherent differences from current agricultural production processes and can pose some unique risks.

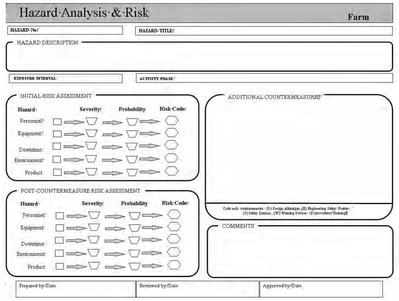
Occupational Safety – Evaluate Injury and Loss Prevention Strategies

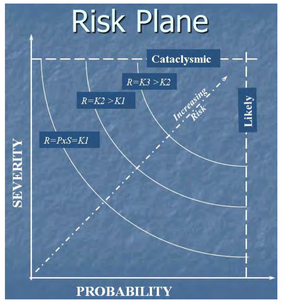
The Iowa State University project helping to make Iowa farms a safer place to work and live is critical to agriculture. New technological innovations in delivery of information, training, and education are important to employ but the impacts must be identified and the effectiveness of these prevention strategies must be measured.

Occupational Safety – *Bioenergy Feedstock Production*

- Conducting detailed analysis of all tasks associated with bioenergy feedstock production for hazard targets of personnel, equipment, environment, downtime, and product.
- Identifying potentially hazardous respiratory exposure limits associated with the production of bioenergy feedstock.

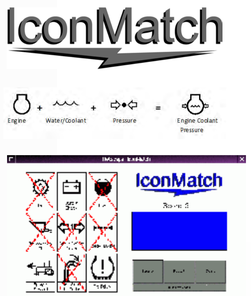


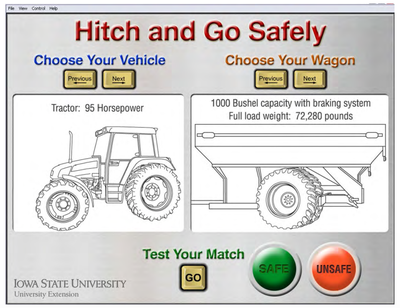




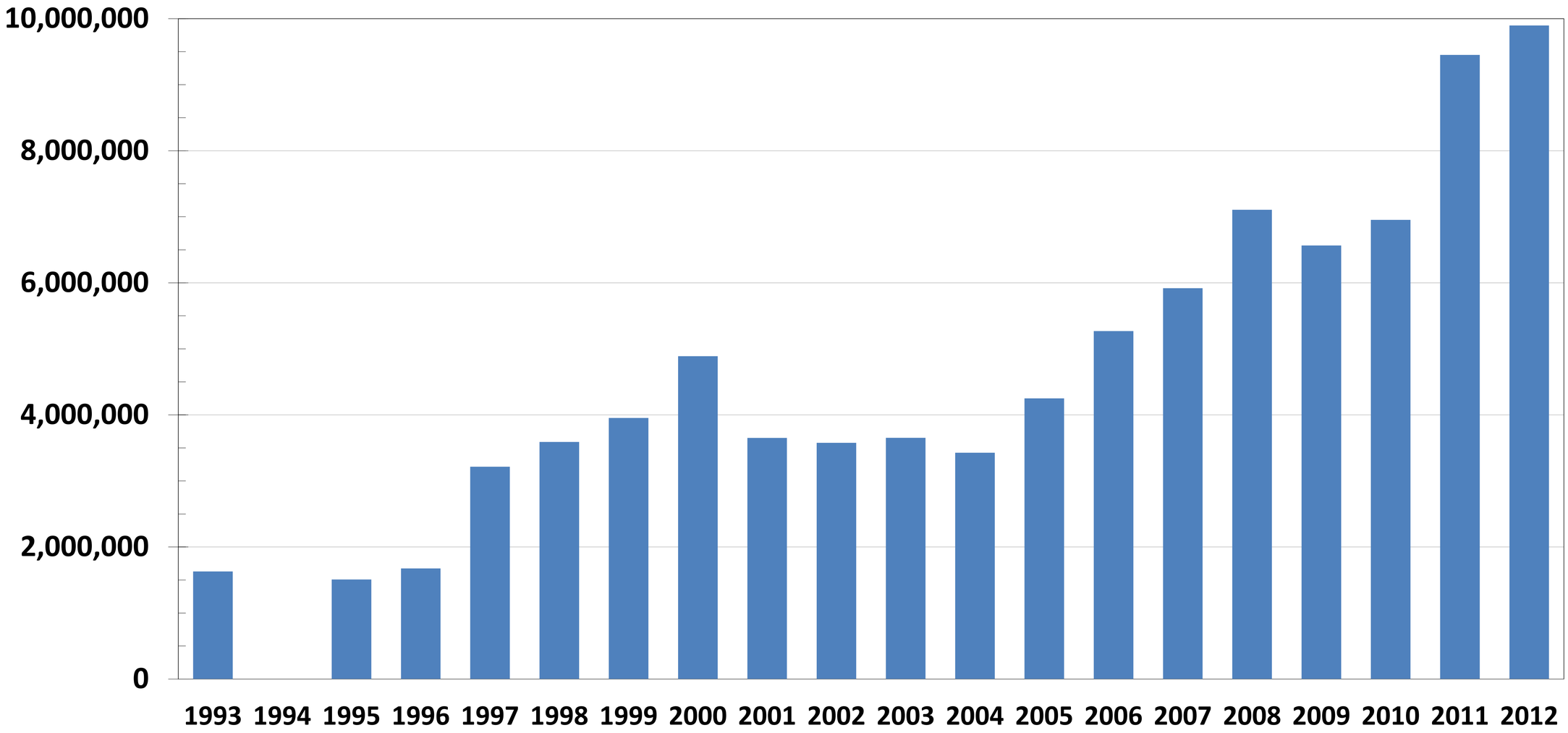
Occupational Safety – Evaluate Injury and Loss Prevention Strategies

- Providing safety education and training to traditional and non-traditional audiences.
- Developing electronic delivery systems for dissemination of technical and training information on injury and loss prevention.





ABE Research Expenditure



ABE Research KPI for 2010

KPI	Description	Goal	Actual	% Goal	S.D.
1	No. grad Students	3/FFTE	3.4	114	3.3
2	No. refereed pubs	3/FFTE/yr	3.0	100	2.5
3	PI/Co-PI on ext'l $	100%	96%	96	-
4	Grants expenditure	$7 M/dept/yr	$5.913 M	84	
5	Ext'l grant awards	$250 K/FFTE	$203.9 K	82	$288K
6	Cross-dept/area programming efforts	85% faculty	56%	66	-
7	International activity	80% faculty	48%	60	-

* From ABE 2010-2015 Strategic Plan; FFTE = faculty full-time equivalent

ABE Research KPI for 2011

KPI	Description	Goal*	Actual	% Goal	S.D.
1	No. grad Students	3/FFTE	4.4 (n=26)	146	4.2
2	No. refereed pubs	3/FFTE/yr	4.3 (n=26)	143	4.9
3	PI/Co-PI on ext'l $	100%	81% (21/26)	81	-
4	Grants expenditure	$7 M/dept/yr	$9.45 M	135	
5	Ext'l grant awards	$250 K/FFTE	$363 K (n=26)	145	$133K
6	Cross-dept/area programming efforts	85% faculty	73% (19/26)	86	-
7	International travel	80% faculty	35% (9/26)	44	-

* From ABE 2010-2015 Strategic Plan; FFTE = faculty full-time equivalent

Rank of ABE vs. Peers for 2010-11

(Based on ASABE National Survey Data)

Category	ABE	Category	ABE
Total PhD Students	6	Grad student/FTE	10
PhD graduates (3-yr avg)	4	Grad student/R FTE	5
Refereed articles	7	Total pubs/FTE	15
		Total pubs/R FTE	7
Grants expenditure	1	Grant exp/R FTE	3
		Grant exp/FTE	5
Total Exp Stn Budget	7	Total faculty	3
Total Extension Budget	12	Total Instruction Budget	1

Research Proposals Submitted & Funded for FY12

- # of Proposals Submitted: 105
- Total amount of proposed awards: $114,276,488
- # of proposals funded: 75 (71%)
- PI awards: $7,924,086
- Co-PI awards: $17,763,931
- Total awards: $25,688,017

Examples of ABE-Industry Partnership (Darr's Group)

DuPont Cellulosic Ethanol

Objective: Investigate biomass supply chain logistics, equipment optimization, and biomass quality improvements through collaborative research.

Outcomes: *Nevada, IA selected as location of the first DCE plant (partially due to ISU collaboration and support).*
ISU research results have led to a $20/ton direct reduction in supply chain costs.
Research data disseminated, through outreach, to producers for making sound biomass decisions.
Biorefinery development opens new jobs for ISU graduates.

AGCO Corporation

Objective: Develop single pass corn stover harvesting machinery to lower production costs and increase quality of biomass feedstocks.

Outcomes: *DuPont is currently adopting AGCO single pass harvesting technologies into their industrial scale supply chain.*
ISU research demonstrates $8/ton cost savings and 100% elimination of soil contamination through single-pass harvesting systems.

Deere & Company

Objective: Develop novel machine control and intelligence systems using model-based software development and eliminating re-engineering of project deliverables.

Outcomes: *ISU has demonstrated the ability to directly transfer research results into commercial products through MBSD engineering.*
MBSD success has opened up additional opportunities for collaborative research and has led to strong job opportunities for program graduates.

Examples of ABE-Industry Partnership – Extension Program (Harmon)

Ventilation Workshops: "Your Unseen Employee - The Ventilation System

- 4-state cooperative effort with other universities
- Funding from Iowa Pork Producers Association to construct the demo trailer
- In CY 2011 and 2012, 27 workshops held with one more scheduled.
- A total of 467 participants have been through the 6-hour workshops. Participants claimed influence over 20 million finishing pigs and over 250,000 sows. Post-meeting surveys indicated 3.4/4 on benefit gained.
- Companies requesting the workshops include: Murphy Brown, LLC; Cargill; TriOak Foods; Swine Graphics; Interstate Milling; Orange City Vet Clinic; Spencer Ag; Farmers Cooperative Society; and Deluxe Feeds, Inc.

Siting for new swine farms to minimize the impact on neighbors

- Partnership with the Coalition to Support Iowa's Farmers (CSIF)
- Through use of the Community Assessment Model (CAM) developed by Steve Hoff, show farmers the potential impact of new swine facilities on neighbors
- A voluntary program in which CSIF sends a specialist to the site to document the location of the site, neighbors and the location within the state. Using CAM, the site is analyzed and a printout of the number of hours each neighbor is anticipated to be exposed to "detectable" and "recognizable" odor levels.
- In the last 2 years, 26 producers have requested siting assistance. Potential investment is roughly $25 million. This model was written into state law but was never funded.

Examples of ABE-Government Agency Partnership – Extension Program (Helmers)

Iowa Learning Farms (ILF)

- A partnership between ISU/ABE, IDALS, IDNR, and USDA NRCS
- Goal: To increase the awareness about conservation practices and increase adoption
- OFL rainfall simulator and conservation station visited approximately 125 locations in 2011 and demonstrated the impact of residue cover and use of conservation practices on soil erosion to broad stakeholder groups.
- No-till or reduced tillage and cover crops field days were conducted in various areas of Iowa.
- Since 2008, 83% of farmers attending ILF field days have made a change in their behavior:
  - **Average of 33% of farmers increased surface residue management on 64,145 new acres of strip-till or no-till**
  - **461 = average number of increased acres put into no-till/strip-till**
  - **5,947 = new acres with cover crops since 2010**

Drainage Water Quality

- ABE and IDALS have been involved with a 20+ year partnership on research and extension projects related to drainage water quality. This work highlights the importance of weather and land management on drainage water quality and has improved the understanding of the performance of various land management and drainage management practices. Work from these studies have been extensively used in the statewide nutrient reduction strategy being developed for Iowa.

Drainage Design

- Partnership with drainage contractors, suppliers, producers, agency staff, ABE field engineers (Greg Brenneman, Kapil Arora) and faculty from Midwest universities to implement the research needed to answer drainage questions raised by the agricultural community and provide education for drainage contractors.
- Field days and meetings in Iowa have reached over 1000 producers and contractors with the research info
- Iowa Drainage School has reached 125 individuals with detailed, hands-on training.
- Evaluations from this past year's Drainage School showed the 34 participants impacting over 45,000 acres/yr. All of the participants rated the school as good or excellent and anticipated increased revenues in excess of $300,000.
- When asked "How will you apply the knowledge gained from this program?", responses included "designing systems for my customers", "be able to ask contractors some intelligent questions", "as a starting point to getting into the tile business", "it gives me a better understanding why tile systems are placed the way they are", "better oversight of contractors and better design of my own tile installations", and "trouble shooting current drainage problems along with layout future tile projects".

Examples of Academia-Industry-Government Partnership – The Egg Industry Center

EIC Programs

- Develop and distribute newsletters on U.S. egg industry stats, economic analysis & forecasting
- A clearinghouse of science-based information related to egg production, processing, and utilization; expertise database; current and emerging issues related to the industry.
- Conduct problem-solving research/outreach
- Sponsor applied research projects
- Held annual educational forums

EIC Partnerships

- American Egg Board
- Allied companies (domestic & international)
- International Egg Commission
- State egg commodity groups (e.g., Iowa Egg Council)
- United Egg Producers
- Land-Grant universities in USA
- USDA Agricultural Research Service (ARS)

Egg Industry Center

http://www.ans.iastate.edu/EIC

We Welcome and Appreciate Your Guidance on How to Enhance Our Research & Extension Programs!

External Advisory Council
Videoconference – April 24, 2013
4:00-5:00 p.m.

Present: Schueller, Korslund, Jacobsen, Harpenau, Deberg, Garrison, , Loyd, Pieper, Saunders, Klocke, Kinney, Farrington, McKee, Vinchattle, Vincent

Gary Schueller opened the meeting and asked new members to briefly introduce themselves.

Steve Mickelson shared information (as provided in PowerPoint) on our new facilities, new hires, highlights of 2012, and some of our goals for 2013.

Raj Raman went through the points in his PowerPoint on the economic impact of our students, the accreditation of our engineering and technology programs, the role of the EAC in the continuous improvement process, comments from Fall 2012 graduates, challenges in the capstone courses, and promoting of the FE exam amongst our students. Raman noted that the "single design" model might not be the best fit for our students since there are so many areas that can be explored in our curriculums. Regarding the "single design" model for the capstone course, feedback was given as follows:

- John Pieper: an alternative to single design can be single design+ where a final or tangential element can be uniquely developed by each student

Hongwei Xin made his presentation on growing the ABE graduate programs. A couple of items were presented to the group:

- EAC interest in forming a subcommittee to help us championing the cause of strategically building up a graduate fellowship endowment funds.
- What would it take for you and your company to value the PhD more?

Xin would like to get a subcommittee together to discuss the possibility of building graduate fellowship endowment funds – any volunteers? What would it take for your company to value the PhD?

- Schueller noted that a PhD in his company would be more for the research side.
- Pieper noted that a PhD combined with some business experience (return to campus after a few years in business) might be beneficial.
- Deberg mentioned that his company would rather do hands-on experience vs. MS.
- Saunders added that in his company an advanced business degree was expected – all went through the same program.

Schueller volunteered to work with Xin on the subcommittee to build up a graduate fellowship fund. If other EAC members are interested in participating, please contact Gary or Dr. Xin.

The communication plan for the EAC was discussed. What information would you like to have access to and how often? What forms of communication work best for you? The EAC agreed the format of having a Spring EAC teleconference followed by a Fall face-to-face meeting is acceptable. Saunders would like to be more connected with faculty to share what is going on in

industry. The frequency and forms of communication seem to be acceptable. EAC members would like to connect with ABE focus groups. We will plan to have focus groups meet with EAC members at the Fall meeting. It was suggested that EAC benchmark other College of Engineering EACs. Schueller will follow-up. Bio sheets for ABE faculty are available at http://www.abe.iastate.edu/abe-department/1099-2/ . Printed copies are available if needed. With a new communications director on board in ABE, we hope to have more regular communication with our EAC and constituents. EAC members indicated a meet and greet with faculty members during lunch at the Fall EAC meeting would be beneficial to EAC and faculty members. We will also consider a meet and greet involving EAC members and faculty the night before or morning of the Fall meeting. The Fall agenda was approved as shown with the addition of breakout sessions with the focus groups.

The Fall meeting will be held on the ISU campus on Friday, October 25, 2013. Actual location will be determined soon.

Mickelson noted that we have now shifted the focus of our EAC from the building to educational and research excellence.

As noted on the last page of the presentation pdf, Dr. David Grewell is the director of the new Center for Bioplastics and Biocomposites. If anyone is interested in becoming involved in this initiative, you may contact Dr. Grewell directly.

Thanks everyone for participating. Meeting adjourned at 4:59 p.m.

ABE External Advisory Council
Fall 2013 – October 25, 2013
1124 Biorenewables Lab

PRESENT: Buss, Cox, DeBerg, Degner, Farrington, Harpenau, Haverly, Jacobsen, Kinney, Kornicki, Korslund, Loyd, Pieper, Saunders, Schueller, Vinchattle

GUESTS: Deans Wintersteen & Rajala

ABE FACULTY: Mickelson, Brumm, Raman, Grewell, Freeman, Steward, Keren, Soupir, Birrell, Tang, Andersen, Harmon, Hoff, Koziel, Rosentrater, Yu, Schwab

Deans Wintersteen and Rajala gave updates on the Colleges of Agriculture and Life Sciences and Engineering. Deans also fielded questions from the EAC on a variety of subjects.

EAC members introduced themselves and new members were welcomed to the Council. Besides attending one or two meetings a year, council members are interested in providing assistance to the department throughout the year.

Steve Mickelson gave a powerpoint presentation on the status of the department (attached).

The council was asked to provide input on ABE curricula. Raman distributed 22 folder which represented the 11 options in each of the four programs in ABE. Council members were asked to review and provide feedback on questions (comments are attached).

Student leaders from ASABE, AST, ABEGO, SME, ¼ Scale Tractor Team, Alpha Epsilon, Epsilon Pi Tau, BSE, and Antique Tractor Club were present to have lunch with the EAC members.

After lunch, EAC members toured ABE's new facilities – Elings and Sukup Hall.

EAC members were divided according to their areas of interest and met with ABE focus groups. Land and Water Resources Engineering and Animal Production Systems Engineering met together as one group; Occupational Safety Engineering, Biological and Process Engineering and Technology and Advanced Machinery Engineering and Manufacturing Systems were the other three groups that met.

Steve Freeman gave an update on the graduate program. He noted that the number of graduate students admitted to our department is directly related to the number of grants that the faculty have funded. He shared that we are in pursuit of creating an ABE Graduate Student Excellence

Fellowship Endowment (goal is to raise $5M). We are working on strategies to increase the number of graduate students, especially PhD students. However, we realize that it is a tough sell to get undergraduates to continue on for their M.S. when placement and starting salaries are so high. Also, we understand that much of industry does not require a Masters or PhD.

Diversity issues in the classroom and in the workplace were discussed. Council members were asked how these issues are handled. One commented that "one strike and you're out" is a typical response. Raman and Mickelson would like to have industry people who do guest lecturing to include a slide on diversity.

David Grewell presented information to the EAC members on the proposed Bioplastics NSF Center. He invited members to consider having their company be involved in this initiative.

Steve Mickelson thanked Larry Buss and Bob Loyd for their six years of service to the EAC.

Gary Schueller, EAC Chair, led the business meeting and reported the outcome of this meeting to Steve Mickelson, Raj Raman and David Grewell.

ABE opportunities to strengthen undergraduate programs

- Industrial Technology
  - ✓ Need to promote more international experiences
  - ✓ Need to emphasize better oral communication as this is critical to selling their ideas
  - ✓ Foreign language experience is important
  - ✓ Need more in-depth exposure to occupational safety – ergonomics and time study
- Staffing level
  - ✓ Staff members feel over extended
  - ✓ Can we reach out to other colleges to supplement?
  - ✓ Drive for increasing students will spread staff thinner
    - Industry has had to learn to do more with significantly less. Look for opportunities to learn from industry.
- Math, science, and engineering require strong communication and project planning skills. Need to emphasize public speaking option, project planning, and writing skills.

ABE opportunities to grow and strengthen research/extension programs

- Increasing public challenges in water quality, animal health, and odor control.
- Bio Science is on the cutting edge. Industrial technology is playing catch up. Need partnerships with industry to advance the field. Need research in new materials and new processes.

Ways the EAC can help grow graduate programs

- New building will help attract students. Need to see how this helps.
- Need to better understand/quantify how the department benefits from growth.
- More on-line, night and weekend offerings might help expand the program.

Lessons learned from the workplace addressing diversity issues and could be incorporated within ABE.

- Diversity is not a matter of choice
- Diversity is more than teaching, it must be experienced
- Study abroad/immersion is critical to experiencing diversity
- Need to talk about what diversity means in industry
- College of Business has a program that promotes diversity. Look to replicate this program.
- Challenge leadership of on-campus clubs to reach out to others that might not otherwise join their club. The antique tractor club could reach out to other students that might not otherwise get exposure to antique tractors or the hand on experience available to club members.

Opportunities to meaningfully engage the EAC during the year

- Wendell Saunders working with Shelly Jordon to pilot a alumni event in Des Moines
- EAC members need to get more familiar with faculty and look for opportunities to collaborate.
- Need to identify opportunities between faculty and industry to share and dialogue on requirements and expectations
- Professor as an intern program to help professors stay in tune with and/or get direct line experience with current industry practices.

Overall the EAC felt the format of the meeting was good, although they would have preferred to have more time when reviewing the curriculum and would have been beneficial to have that information ahead of the meeting. Part of ABE vision supports feeding the world – does the curriculum support this?

Gary Schueller has agreed to continue to chair the EAC for another term – all were in favor. Thanks Gary!

Mickelson asked EAC members to drop him an email as they reflect on the day's meeting or for future topics of discussion.

Finals thoughts:

- Remind students at every class about diversity issues.
- EAC would like more time on curriculum review – deep review on 2-3 courses at a time. Look at the core courses in technology and engineering and have faculty members present during discussion.
- Use social media to contact alumni.

Meeting adjourned at 4:50 p.m.

ABE External Advisory Council
Phone Conference – April 9, 2014
12:00-1:00 p.m.

EAC Members: Schueller, Saunders, Korslund, Riley, Jacobsen, Kinney, Vinchattle,

ABE: Mickelson, Raman, Helmers

Mickelson started the call by introducing new member Kyle Riley. Kyle works as a Water Resource Engineer for Snyder & Associates. He received both his B.S. and M.S. in Agricultural Engineering from Iowa State.

The PowerPoint outlining the ABE Operating Plan for FY15 was the basis of the meeting. Questions were encouraged as the slides were reviewed.

Saunders noted that the monthly newsletters seemed to have a lack of I TEC news. Mickelson and Anderson will work with our communication specialist to be sure I TEC happenings are included.

Our Fall meeting will be Friday, September 26th on the ISU Campus. This meeting will be key for collecting information for the upcoming ATMAE accreditation of our technology programs which will happen in Spring 2015. EAC members requested that information for that meeting be sent to them at least one month in advance for review and action. Raman will visit with Schwab on the expectations of the EAC and inform the members by May 1st. Raman requested EAC members to give honest feedback on the curriculum during the preparation of the accreditation report and to give positive affirmation during the actual team visit.

Saunders questioned if there will be a new list for equipment needed. ABE does have differential tuition dollars that can be used for equipment and TA support. We do not want to move old equipment to the new facilities if possible.

EAC members will be given a copy of the proposal for the Davison Fellowship. Please provide feedback.

It was the consensus of the members participating in the phone call that ABE is headed in the right direction. It is encouraging to see that new faculty and staff are being hired.

An itinerary for the Fall meeting will be generated and shared with the EAC members.

A reminder that the dedication of the new facilities will be Thursday, September 25, 2014 at 4:00 p.m. A reception for EAC members will be held following the dedication (approximately 6:00-8:00 p.m.).

Agricultural and Biosystems Engineering
Iowa State University
External Advisory Council
Fall 2014

TENTATIVE AGENDA

Thursday, September 25, 2014

4:30 p.m.	Building Dedication including program – Sukup Atrium
5:30 p.m.	Reception and facility tours – Elings and Sukup Halls

***Friday, September 26, 2014* – 1306 Elings Hall**

8:00-8:30 a.m.	Coffee, juice, pastries with ABE Faculty
8:30-9:00 a.m.	Remarks by College of Agriculture and Life Sciences Associate Dean Joe Colletti and College of Engineering Associate Dean Ron Cox
9:00-9:30 a.m.	Introduction of new members and purpose and goals of EAC – Schueller
9:30-10:00 a.m.	Departmental Update – Mickelson
10:00-10:15 a.m.	Break
10:15-10:45 a.m.	Detailed program review by option – Raman
10:45-11:00 a.m.	Review of responses to specific questions EAC asked of each of the programs in Fall 2013 visit – Raman
11:00-11:45 a.m.	ATMAE Preparation – Schwab, Brumm
11:45-12:45 p.m.	Lunch with student leaders
12:45-2:00 p.m.	ATMAE Preparation – Schwab, Brumm
2:00-2:30 p.m.	EAC business meeting
2:30-3:00 p.m.	Wrap up with ABE faculty
3:00 p.m.	Facility tours for those who were not able to go on 09-25-2014

ABE External Advisory Council
Friday, September 26, 2014

PRESENT: Harpenau, Schueller, Korslund, Degner, Kinney, Garrison, Riley, Saunders, Pohlmann, Klocke, Pieper, Jacobson

GUESTS: Chuck & Jane Olsen, Joe Colletti, Ron Cox (opening session)

ABE FACULTY: Raman, Schwab, Brumm, Freeman, Mickelson

Associate Dean Joe Colletti gave a brief update on the College of Agriculture and Life Sciences. Associate Dean Ron Cox did the same for the College of Engineering.

New members were introduced (Garrison, Pohlmann) and Rich Degner was recognized for his service on the council.

Steve Mickelson provided an update on the department (see attached PowerPoint).

The EAC members received prior to this meeting, instructions to review the results of the alumni survey [2014 Technology Graduate Survey Results document]. The EAC members were given a brief overview of the four options (AST-ABM, AST-MS, ITEC-M, or ITEC-OS) by Technology Curriculum Chair Tom Brumm, followed by a question and answer period focused on the alumni survey. The EAC members received the working document for review of the general outcomes based on the technology degree option. Each degree option group reviewed those documents for their assigned option. Each group determined that the general outcomes for their option were appropriate. After completing that task, there was discussion in which the EAC members concluded that the general outcomes should be the same across all four technology options. Schueller moved to adopt the same general outcomes for all four degree options (AST-ABM, AST-MS, ITEC-M, or ITEC-OS). Motion was seconded by Harpenau and the motion passed unanimously. The EAC was thanked for their contributions to the technology programs by Raman, Schwab, Brumm, and Freeman.

The EAC members discussed the following issues during their business meeting:

- What is working well?
    - Staff additions and retention – phenomenal
    - Teaching lab coordinators are a great addition – will need to quantify their value in order to protect these position in the event of budget cuts
    - Move to the new facilities went well
- Concerns:
    - There may be a large influx of students
    - ME students not meeting their standards will flood to ABE
    - Large area might cause a loss of community. What will be done to keep the culture?
    - Quality of education vs. quantity
    - More students – more faculty – what next

    - Problem when/if we raise the GPA of students – need to find the right balance. There are a lot of successful "C" students.
    - Not enough publicity on the I TEC program. Need to hilite I TEC faculty/staff members in the alumni newsletter.

- Course corrections/changes
    - How will "big data" be incorporated into the courses?
    - Data integrity and propriety of information? Student need to be aware of this.
    - Encourage more club involvement by students.
    - Council would like to review a particular course and pick an exam or student project to review vs. just the syllabus.

- General meeting format – currently meeting a full day in the Fall and phone conference in the Spring
    - Council would like to have a face-to-face Spring meeting also (10:00-3:00)
    - Council would prefer to receive documents in advance – maybe through "workspace" or "blackboard" so that comments could be posted through the internet.
    - Have a phone conference a couple of hours prior to the meeting to discuss agenda items.
    - Continue to have the Deans give college updates.
    - Didn't feel as much was covered today as in past meetings.
    - Provide minutes of the meetings so council members can share with their supervisors.

- Election of new chair
    - Motion by Schueller to nominate Josh Jacobson to take over as Chair of the External Advisory Council; second by Degner; motion carried. Thanks to Josh for accepting this position.

The council gave their report to several ABE faculty members. Schueller was thanked for his two years of service as the Chair of the EAC.

Agenda items for future EAC meetings can be share with Steve Mickelson or Josh Jacobson at any time.

Meeting adjourned at 2:58 p.m.

ABE External Advisory Council FY14 Highlights and FY15 Goals

Dr. Steven K. Mickelson

Chuck R. and Jane F. Olsen Professor of Engineering

Chair

ABE Department Vision

ISU's Department of Agricultural and Biosystems Engineering: The **premier team** *serving agriculture, industry and society* through engineering and technology for agriculture, industry, and living systems.

ABE Department Mission

The **mission** of the Agricultural and Biosystems Engineering Department is:

- to ***promote undergraduate student learning*** in agricultural and biosystems engineering and industrial and agricultural technology,
- to ***promote graduate student learning*** in agricultural engineering and industrial and agricultural technology,
- to ***discover and improve new technologies*** for all stakeholders, and
- to ***provide engineering and technology expertise*** in the fields of agriculture, industry and biosystems for the state, nation, and world.

ABE Department Values/Guiding Principles

- Diversity of students, staff, faculty, stakeholders, and viewpoints
- Partnerships with stakeholders
- Sustainability of resources and infrastructure
- Systems approach
- Lifelong learning

2014 Department Highlights

- Successful move to our new facilities!
- Record UG student numbers for Fall 2014: 730 (10% growth)
- 4th place US News - UG programs
- 4th place US News - graduate programs
- Hongwei Xin promoted to Distinguished Professor
- Steve Freeman promoted to University Professor
- Matt Helmers promoted to Professor
- David Grewell promoted to Professor
- Michelle Soupir promoted to Associate Professor
- Chenxu Yu Promoted to Associate Professor
- 100% retention of faculty and department support staff

2014 Faculty Awards

- Matt Helmers, CALS Dean's Professorship
- Hongwei Xin, Iowa Egg Council Endowed Professorship
- Manjit Misra, Seed Science Endowed Chair
- Mark Hanna, ASABE Fellow
- Steve Hoff, ASABE Henry Giese Structures and Environment Award
- Matt Helmers, ASABE G.B. Gunlogson Countryside Engineering Award
- Michelle Soupir – ASABE New Holland Young Research Award
- Dan Anderson – ASABE Outstanding Reviewer for the S&W Division
- Amy Kaleita – NAE Gilbreth Leadership Award
- Hongwei Xin - Industry Workhorse of the Year – US Poultry

2014 Faculty Awards

- Jay Harmon – CALS Outstanding Achievement in Extension and Outreach
- David Grewell – CALS Outstanding Service in Student Recruitment and Retention
- Sunday Tim – CALS Faculty Award for Diversity Enhancement
- Michelle Soupir – COE Early Career Engineering Faculty Research Award
- Kurt Rosentrater, COE Superior Engineering Extension Award
- Mark Hanna – ISU Award for Achievement in Intellectual Property
- Wes Buchele – Anson Marston Medal Award
- Steve Mickelson – Corly Brooke LC Advocate Award

Recent Departmental Hiring Highlights

- Hired Jennifer Grouwinkel, Accountant (11/1/13)
- Hired Ben McCarty, Student Support Specialist (5/16/14)
- Hired Dr. Shweta Chopra, Assistant Professor (8/16/14)
- Hired Russ Hoffman, Lecturer (8/16/14)
- Hired Tim Shepherd, Lab Coordinator (8/16/14)
- Hired Dr. Adina Howe, Assistant Professor (1/1/15)
- Hiring physical modeling faculty member (pending)
- Search ongoing for Grain System Management faculty position (Fall 2015 start date)

One Year Goals (FY15)

- Transition into the new facilities with no loss in key program functions (research, teaching, extension)√
- Successfully reaccredit both technology degree programs by ATMAE (accreditation visit Spring 2015)
- Hire two lab coordinators to support the management of our hands-on teaching laboratories√
- Hire a lecturer to support our Advanced Machinery Engineering and Manufacturing Systems educational program (help decrease student to faculty ratio in this area below 25:1)
- Increase graduate student numbers by 10%, to 82√ (currently at 86)
- Increase undergraduate female enrollment by 2%, to 14%
- Increase under-representative student enrollment by 2%, to 7%
- Use differential tuition strategically (long-term TA support for high performing R/T faculty, update equipment, student retention efforts)√
- Enhance research visibility by getting 100% of TT faculty utilizing the ISU Digital Repository (⇧ 17%)√
- Help with NAE nomination for at least two of our faculty

Five Year Goals

- Raise funds to fully fund Davidson Graduate Fellowships (10-12 fellows/year) ~$5M
- Continue to hire tenure-track faculty to keep our student to faculty ratio below 25:1 (currently 29:1) – Presidential High Impact Hires?
- Hire tenure-track faculty in key research areas (biomanufacturing, big data, advanced machinery engineering, ecological engineering, advanced manufacturing, bioenergy)
- Increase tenure-track faculty diversity (women to 20% (⇧5%), URMs to 10% (⇧6%))
- Increase graduate student numbers to 4 students/TT faculty members Increase undergraduate female enrollment to 20% (⇧8%), including in technology programs
- Increase undergraduate URM enrollment to 10% (⇧5%)
- Have two faculty admitted to the National Academy of Engineering

My Overall ABE Vision

- ABE will become the #1 Agricultural and Biosystems department in the nation.
- ABE will strengthen our partnerships with our constituents by effectively communicating the value and impact of our educational, research and extension/outreach programs.
- ABE will be recognized by our national and international peers as experts in our themes of excellence (focus areas).

Questions?