Department of Electrical and Computer Engineering
Annual Report

Prepared by: DAVID C. JILES, Department Chair

Iowa State University
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Section 1. Organization, leadership, and management

1. With which constituency groups have you shared your organization chart, governance document, strategic plan, and KPIs?
   - Organization Chart – Engineering Department Chairs, ECpE Website (Appendix A.1)
   - Governance Document – External Advisory Board, pending revision to post publicly on the ECpE Website (Appendix A.2)
   - Strategic Plan – External Advisory Board, pending revision to post publicly on the ECpE Website (Appendix A.3)
   - KPIs – External Advisory Board (Appendix A.4)

2. Describe the areas of responsibility and authority delegated to your department’s associate chairs. See attached List of Administrative Responsibilities.
   - **Associate Chair** – overall responsibilities for Resources, Teaching (Faculty and TA assignments, evaluations, TEAs), and Space; ABET oversight; chairs IPDC
   - **Director of Research (DOR)** – identifies research opportunities, develops plans for research, and monitors progress and performance of the Strategic Research Areas
   - **Director of Graduate Education (DOGE)** – overall responsibilities for graduate student admissions, graduate student review process; chairs Graduate Studies Committee,
   - **Director of Undergraduate Education (DOUGE)** – overall responsibilities for undergraduate programs (EE, CprE, SE, ICET), undergraduate student recruitment, course catalog; chairs Curriculum Committee; ABET advisor
   - **Director of Student Professional Development (DOSPD)** – oversees activities for professional development of graduate and undergraduate students; chairs Student Professional Development Committee
   - **Director of Strategic Planning (DOSP)** – coordinates development of long-term strategic vision for department; chairs Strategic Planning Committee

3. Describe your department’s process for engaging students, faculty, and other stakeholders in budgeting, planning, and decision-making (e.g., an advisory council for differential tuition and technology fee funds).
   - **Student Engagement**
     - Students are represented on the Curriculum Committee (2 students), Infrastructure Planning and Development Committee (1 student)
     - Undergraduate Recruitment and Retention Committee (3 students)
     - Students are engaged during Undergraduate and Graduate Open Forums (spring and fall semesters)
   - **Faculty Engagement**
     - Administrative retreat (July)
     - Annual faculty retreat (August)
     - Research Committee
     - Administrative Committee
     - Strategic Planning Committee
     - Infrastructure Planning and Development Committee
   - **Stakeholder Engagement**
     - Advisory boards meet twice per year to get input on budget, planning, and decision making (ECpE External Advisory Board, and EPRC and IAC Industrial Advisory Boards)
4. Describe progress being made to improve efficiency and increase collaboration (with other departments, with the college, or with other organizations on campus).
   - The department continually works to find areas of common processes or services to improve efficiencies and collaboration.
   - Education – New
     - Computer Science – Joint program in Software Engineering, joint appointments
     - Materials Science and Engineering – joint appointment, courtesy appointments, shared courses EE/MSE 519 and EE/MSE 539
     - Bioengineering Minor – ChemE, ABE, ECpE
     - Working with Mechanical Engineering to revamp EE442 and EE448 allowing for laboratory enhancements to increase the students learning through new processes. The lab upgrade is funded by EFTF
   - Research – New
     - Ames Laboratory – collaborative research, shared postdoctoral appointment
     - Materials Science and Engineering - collaboration on proposals and projects
     - Venture Fund in bio-informatics (multiple departments)
     - Venture Fund in Wind Energy (multiple departments)
   - Education – Ongoing
     - Multidisciplinary Senior Design – with ME, AeroE, MSE, ECpE
     - Masters of Science in Information Assurance (CS, MIS, Math, Poly Sci)
     - Software Engineering degree program – jointly run with Computer Science
     - Bioinformatics Graduate Studies – ECpE, CS, other bio departments
     - Senior design projects funded by SSCL, VRAC, etc.
     - LCTT (Learning Community Task Team) meetings during the semester
     - Participation in Advisors Exchange to increase collaboration with university advising
     - Currently working with Information Technology Services (central IT) and others across the COE and other colleges across campus on a range of IT infrastructure projects
   - Research – Ongoing
     - VRAC – joint HCl faculty, and active research projects
     - CNDE – ECpE faculty participate in research with CNDE
     - Information Assurance Center (CS, math, Poly Sci, MIS)
     - MRC – collaborative faculty

5. Describe your department’s efforts and policy for mentoring early career faculty.
   - When new faculty are hired, a senior faculty member is assigned as their mentor. They are encouraged to use the resources available through the Provost’s office and are encouraged to meet formally on a monthly basis. In addition, the new faculty meet with the department chair, informally, in the fall and in the spring. In addition, the new faculty meet formally with the department chair in the spring for their annual review.
     - See “new” faculty mentor calendar (Appendix A.5)
   - During the second and following years, faculty are encouraged to continue their formal monthly meetings with their mentors as they work through the tenure-track process. In addition, second-year hires are scheduled to meet with the department chair once in fall and once in spring, in addition to the annual review meeting in the spring.
     - See “after the first year” faculty mentor calendar (Appendix A.6)
   - Workshop for NSF CAREER award proposal development
   - Director of Research – administrative position created to provide guidance and directions on multi-group, diverse, and/or large proposal submissions
• Peer Teaching Evaluation gives feedback to early career faculty on their teaching and allows them to observe their peers in teaching

6. Describe your department’s efforts and policy for staff professional development.
• Staff are encouraged to attend and given release time for on-campus trainings when available.
• When on-campus training is not available, concessions are made to allow for off-campus training in areas of greatest enhancements to the department, college and university.
• Department secretary, accountant, fiscal specialist, communications specialist, and human resources specialist are provided the opportunity to attend all on-campus training related to their duties, whether from HR, Accounting, or other.

Section 2. External engagement, private fund raising, and gift stewardship

1. Describe efforts in your department to communicate and interact with alumni and corporations.
• Alumni Days – annually in May, the department hosts alumni for a reception; retirees, faculty, and staff are invited to attend
• Department Chair Visits – 1-2 visits per semester, arranged with the CoE Development office
• Company visits to ISU – 3-4 visits per semester, arranged with the CoE Development office or with individual companies (examples include Rockwell, Garmin, Lockheed Martin).
• Connections – ECpE alumni newsletter, mailed in Spring and Fall (also posted on Website)
• Awards – ECpE Alumni Awards (3 awarded annually in spring), submit nominations to CoE, ISU, and AA awards for appropriate alumni
• Senior Design Capstone Course – invite industry people to campus for two-day event in spring and fall semesters; review 492 design projects and demonstrations; in addition, industry speakers are invited to present guest lectures in 491 and 492
• Alumni are invited to talk in classes and at student organization meetings
• Encourage visits to and from industry and student career development activities with companies (examples include Google, National Instruments, Texas Instruments, and Microsoft)

2. What are the top private fundraising priorities in your department?
• Information Assurance Center – is seeking funds for “IT Adventures”
• Phase II Coover Addition
• Scholarships are needed for women and under-represented minorities

3. Describe your efforts to steward current donors and their gifts.
• Meetings with key donors throughout year
• Annual letter from department chair to donors (list of top 100 donors provided by Foundation)
• Verbal and written communication with donors by department chair throughout the year

4. What process is used in your department for gift compliance (tracking that funds are being expended and balances are not unduly accumulating, ensuring that the donor’s intent is being met, and seeing that reports/letters are being sent)?
• Funding is tracked by fiscal specialist
• MOAs are reviewed with each new appointment
• Faculty appointed are provided a copy of the MOA and are informed through letter of appointment of the reporting requirements
• Chair periodically reviews accounts to track spending
Section 3: Faculty responsibilities

1. Do all faculty members have a signed Position Responsibility Statement?
   - Yes
   - All faculty members in the department have revised their PRS in 2011
   - During annual reviews in Spring 2011, faculty PRS were updated, and signed

2. Summarize your department’s policy on teaching load and definition of “research active.”
   - Teaching Load: 3 courses per academic year for all tenured and tenure-track faculty
   - Research Active: Faculty who are research active (3 or more fully externally funded graduate students) can buy out of course assignments

3. Summarize your department’s policy for a faculty member to buy-out of an assigned course using research funds.
   - 1st course: 1 month
   - 2nd course: 1 month + 1.5 months
   - 3rd course: 1 month + 1.5 months + 2 months (4.5 months total)

Section 4. Teaching assignments

1. What is your department’s target for the maximum percentage of student credit hours (SCH), section credits (SC), or course sections (CS) instructed by non-tenure eligible faculty?
   - ECpE target for maximum SCH by NTE faculty is 20%
   - Current (AY2011) SCH by NTE faculty is 14.7%

2. How was that target determined? Has it been discussed with the faculty?
   - Discussed the ISU requirements with faculty during a scheduled monthly Faculty Meeting in December 2010.
   - Target was decided and currently the department is well below the maximum number of SCH allowed.

3. Provide explanation and justification if the target exceeds 25%.
   - N/A
Section 5. Undergraduate program

Bar chart showing total BS degrees awarded over the period 2003-2011. (Data for 2010-11 still subject to final verification)

Bar chart showing total undergraduate numbers over the period 2003-2011

A. Student success

1. Describe efforts in your department to improve student retention.
   - **NEW:** Courses such as “Professional Programs Orientation (EE/CprE 166), “Program discovery” (EE/CprE 294) and “Program Exploration” (EE/CprE 394) are broadly based courses administered by ECpE Student Services which explain the roles of Electrical and Computer Engineers in Society
   - **NEW:** Fridays at Noon (FAN) – events scheduled for one Friday a month by the Student Services office for freshman engineering students, presentations by faculty and/or student groups plus free pizza lunch
   - Scholars’ Fair each fall, demonstration of engineering projects by current students and student organizations for the purpose of recruitment and retention – all ECpE and non-declared engineering students are invited
   - Expose undergraduate students to practical work through various NSF REU projects
   - Facilitate REU students’ participation in Annual ISU Undergraduate Research Symposium in Spring semester
   - Facilitate students’ engagement in various design contests sponsored by IEEE, ACM, and industry (e.g., Texas Instrument), as well as fellowships and awards (e.g., NSF, IBM, CRA)
   - Take Your Professor To Lunch – faculty mentors are assigned to all incoming freshman, small group takes their mentor to lunch once during first semester

2. Describe efforts to promote timely progress to degree (e.g., ensuring course availability, promoting curriculum flexibility, strengthening advising, and providing financial aid).
   - IEEE/HKN Help Sessions – set up on a by-course-needed basis
   - Increased number of courses available through study abroad
   - Faculty mentors – formalized through new courses 294/394
   - New scholarships – worked with Foundation to increase number of scholarships in the department
3. Describe proactive efforts to recruit students, both direct entry and transfer.
   - Hosted activities such as “Take your Adventure Home” and “IT-Adventures”
   - Developed new course such as CprE 131 Computer Security Literacy
   - 2+2 joint degree program with three international institutes: BITS, Pilani (India), Lanzhou Jiaotong University (China), Anhui University (China)
   - Annual Scholar’s Fair in Fall semester
   - Created promotional VEISHEA displays in Spring semester that are attractive to potential students

B. **Innovation**

1. Describe how your department is improving the undergraduate student learning experience using the differential tuition funds allocated to your department’s block budget.
   - These funds are being used to help improve the labs for **undergraduate** courses, such as “Computer Networking and Data Communications” (CprE 489) and “Communications Systems Laboratory”, (EE423).

2. Describe how your department is improving the undergraduate student learning experience using the technology fee funds allocated to your department’s block budget.
   - EFTF was spent on computing initiatives to manage and maintain cutting edge systems, networking, software and hardware.
   - $149,613 was spent on lab and software upgrades in the current year for both graduate and undergraduate student use. See Appendix A.7
   - $195,000 was spent on special initiatives to enhance graduate and undergraduate learning experiences including 3 classroom recording systems to allow for complete recording of lectures, Biomedical trainers, Controls lab Quanser Trainers, Mobile recording systems for classes, 2050 lab replacement for (Graphics Programming Unit) GPU programming (CprE 480X).

3. Describe the new undergraduate program initiatives underway in your department.
   - Mentoring program – EE/Cpr E 294 “Program Discovery” and EE/Cpr E 394 “Program Exploration”
   - Continuous updating of courses and experimental course development
   - Bioengineering minor – curriculum development is underway
   - Energy minor – curriculum development is underway
   - REU in Wind Energy – new summer program initiated in 2011

C. **Student groups**

Describe how your department supports student groups, particularly those with a strong project, design, and fabrication emphasis. Copy the section below as needed. It is not necessary to list information for every student group—only those groups with a strong connection to your department.

Name of student group your department supports: **IEEE ISU Student Chapter**
Faculty advisor: Sumit Chaudhary
Is the faculty advisor’s work recognized in his or her Position Responsibility Statement: Yes
How does your department support that student group: Department provides space for the group to hold regular chapter meetings, and host corporate informational meetings, and facilitate project demos.
Name of student group your department supports: **Information Assurance Student Group**  
Faculty advisor: Doug Jacobson  
Is the faculty advisor’s work recognized in his or her Position Responsibility Statement: Yes  
How does your department support that student group: Department provides space for the group to run its cyber defense competitions.

Name of student group your department supports: **HKN ISU Student Chapter**  
Faculty advisor: Timothy Bigelow  
Is the faculty advisor’s work recognized in his or her Position Responsibility Statement: Yes  
How does your department support that student group: Department provides space for the group to hold regular chapter meetings and host corporate informational meetings

Name of student group your department supports: **Digital Women**  
Faculty advisor: Diane Rover/Deb Martin  
Is the faculty advisor’s work recognized in his or her Position Responsibility Statement: Yes  
How does your department support that student group: Weekly meetings with academic advisor, and the department provides space for the group to hold regular meetings and provides financial support on limited basis.

Name of student group your department supports: **Critical Tinkers**  
Faculty advisor: Mani Mina  
Is the faculty advisor’s work recognized in his or her Position Responsibility Statement: Yes How does your department support that student group: Department provides space for the group to conduct research.

**Section 6: Graduate program**

Bar chart showing total graduate degrees awarded over the period 2003-2011. (Data for 2010-11 still subject to final verification)

Bar chart showing total graduate numbers over the period 2003-2011
1. Describe how your department is improving the graduate student learning experience using the differential tuition funds allocated to your department’s block budget.
   - These funds are used to improve the labs of graduate courses, such as Cpr E 546 “Wireless sensors networks”

2. Describe how your department is improving the graduate student learning experience using the technology fee funds allocated to your department’s block budget.
   - EFTF funds were spent on computing initiatives to manage and maintain cutting edge systems, networking, software and hardware.
   - Specifically we spent $149,613 on laboratory and software upgrades in the current year for both graduate and undergraduate student use. See Appendix A.7
   - An additional $195,000 was spent on special initiatives to enhance graduate and undergraduate learning experiences.

3. Describe the new graduate program initiatives underway in your department.
   - NEW: graduate study/research area of bioengineering is being created
   - NEW: IGERT for Wind Energy – an NSF graduate fellowship proposal has been submitted, and is awaiting outcome
   - A weekly graduate seminar is held in Fall and Spring semesters
   - Annual graduate student poster session in Spring semester
   - Recruitment of Chinese graduate students via CSC (Chinese Student Council) Scholarships
   - Fall semester workshops to help students prepare for applications for various competitive fellowships and awards such as NSF Graduate Research Fellowship

Section 7. Diversity

1. Describe how your department has established, and is maintaining and promoting, a diversity initiative, as best suited to the need of your department, which is directed at recruitment, retention, and academic success of women and/or under-represented minority students.
   - Digital Women
     - This is the first club at ISU dedicated to the interests of women in computer science, computer engineering, software engineering and electrical engineering
   - We have made efforts to proactively recruit women and under-represented minority faculty.
     - The department targeted specific resource sites for women and URM candidates and made focused phone calls around the country to recruit candidates in these categories. Although we were unsuccessful in having any women or URM in our top-tier of candidates for FY12 faculty hiring we will continue these efforts to establish a more diverse group of faculty.
   - We have made effort to proactively recruit women and under-represented minority students.
     - The department has sought Graduate School and College of Engineering fellowships to attract women and underrepresented minority students.
     - The department has also sought Scholarships from donors for support of women and underrepresented minority undergraduate students.
     - Students in these categories also were invited to visit the department before making their decisions.
     - Weekly follow-up contacts with all domestic students who indicate an interest in ECpE

2. What is the name of that program?
   - The program is called “Digital Women”
2. Who is the Professor-in-Charge of that program? Attach a copy of that faculty member’s Position Responsibility Statement and indicate that effort is acknowledged as an assignment.
   - Diane Rover. This activity is acknowledged as part of the PRS

3. Describe the staff support provided to this program.
   - Program Assistant I – Supports graduate admissions and recruiting (½ of appointment)
   - Secretary 1 – Advising office support
   - Program Assistant I – Supports diversity program (⅕ of appointment)

4. What are the goals and key performance indicators for this program?

As described in the Department’s Budget and Hiring Report of March 25, 2011

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<th>KPI</th>
<th>2010-11</th>
<th>2015-2016</th>
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<td>200</td>
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<tr>
<td>URM UGs</td>
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<td>150</td>
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<tr>
<td>Women Gs</td>
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<td>76*</td>
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<tr>
<td>URM Faculty</td>
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<td>2</td>
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</tbody>
</table>

*Goal of 10 PhD, remainder master’s students

Section 8. International engagement

1. Describe how your department has established, and is maintaining and promoting, an international initiative, as best suited to the need of your department, which is directed at such opportunities as study abroad or co-op abroad programs, recruiting pipelines, research partnerships, distance education, and joint degrees.
   - The department is working with Dr. Mutfi Akinc (International Programs) to help establish an agreement between ISU CoE and the University of Science and Technology of China (USTC) to allow students from USTC with Chinese Scholarship Council (CSC) support to enroll with tuition benefits. This will enhance the quality of admitted graduate students with CSC fellowship.
   - We are also working on agreements with Birmingham University, Brunel University, Cardiff University and Swansea University all in the UK.
   - Department has three signed MOAs with Lanzhou Jiaotong University and Anhui University in China, and BITS-Dubai
     - Lanzhou Jiaotong – 3 joint UG programs (EIE/EE, CST/CprE, SE) and two joint grad degree programs (MSEE, MSCprE)
     - Anhui University – 3 joint UG programs (EE, CprE, SE) and two joint grad degree programs (MSEE, MSCprE)
     - BITS-Dubai – 2+2 programs for UG students and exchange program for graduate students (1-2 semesters)

2. What is the name of that program?
   - Chinese Scholarship Council program
   - ISU Study Abroad program
3. Who is the Professor-in-Charge of that program? Attach a copy of that faculty member’s Position Responsibility Statement and indicate that effort is acknowledged as an assignment.
   - Chris Chu works with Lanzhou Jiaotong University
   - Daji Qiao works with Anhui University
   - Arun Somani works with BITS-Dubai

4. Describe the staff support provided to this program.
   - Communications Specialist in the department provides marketing materials

5. What are the goals and key performance indicators for this program?
   - Goals are to establish a total of 6 additional strategic international partnerships with overseas universities.
   - These will include (i) creating research partnerships with leading research universities with whom we can conduct “cutting edge” research, and (ii) establishing relations with leading teaching universities which can serve as a feeder for highly qualified graduates to enter our PhD program

Section 9. Other information

Please add any other information – up to one page in length – which you would like to report

Nothing more at this time

Section 10. Faculty Activity

![Research Expenditures](image)

Bar chart showing data for research expenditures

1. Complete the attached electronic spreadsheet with information on faculty activity.
   List your department’s tenured and tenure track faculty members in rank order (highest to lowest) by research expenditures in the most recent year. For the most recent year, also indicate for each faculty member the number of student credit hours taught; number of refereed journal and refereed conference
papers that were published; and the number of graduate students for which the faculty member served as major advisor or co-major advisor. This is attached as Appendix A.8

2. Summary of publications and patents in the most recent year

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
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<tr>
<td>Refereed journal articles that were published</td>
<td>122</td>
</tr>
<tr>
<td>Refereed conference articles that were published</td>
<td>152</td>
</tr>
<tr>
<td>Total patents awarded (not disclosures or pending)</td>
<td>1</td>
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3. List the major awards that were received by your faculty last year.

- New Fellows in 2010
  - AAAS (Aluru)
  - IEEE (Aluru)
  - American Physical Society (Biswas)
  - American Physical Society (Dalal)
  - IEEE (Jacobson)
- National Science Foundation CAREER Awards (Dong and Ying)
- IBM Faculty Award (Chu)
- IEEE Transactions on Computer-Aided Design Donald O. Pederson Best Paper Award – international award (Chu)
- Technology Association of Iowa Prometheus Award for Innovation in Education: Best Use of Innovation in Teaching (Daniels)
- 2010 Iowa Women of Innovation Award, Research Innovation and Leadership, Technology Association of Iowa (Dickerson)
- Cyber 7 Award (Jacobson)
- Honorary Professor, Cardiff University, UK (Jiles)
- Honorary Professor, Sheffield University, UK (Jiles)
- Honorary Distinguished Professor: National Taiwan University of Science & Technology (Somani)

4. List the major external service roles of your faculty last year.

- Conference Chairs
  - Chairman IEEE Voltage Stability Working Group (Ajjarapu)
  - Chair, Task Force on Cyber Security, CAMS Subcommittee, IEEE PES Society (G. Manimaran)
  - Administrative Committee, IEEE Magnetics Society (Jiles)
  - American Society for Engineering Education (ASEE): ECE Division Program Chair, 2010 ASEE Annual Conference (Rover)
  - Conference Chair and Editor, SPIE ASPDA “Organic Semiconductors in Sensors and Bioelectronics III” (Shinar R)
  - Technical Program Chair of the 7th International ICST Conference on Heterogeneous Networking for Quality, Reliability, Security and Robustness (Qiao)
  - Program Chair, 9th IEEE International Conference on Development and Learning (ICDL) (Stoytchev)
- Journal Editors
  - Editor: IEEE Transactions on Power Systems (Ajjarapu)
  - Editor: IEEE Power Engineering Letters (Ajjarapu)
  - Editor, Journal of Microprocessors and Microsystems (2008 - present) (Chang)
  - Editor, IEEE Transactions on Wireless Communication, 2010-present (Guan)
  - Editor-in-Chief, IEEE Transactions on Magnetics (Jiles)
Editor-in-Chief of IEEE Power Engineering Society Letters (McCalley)
Editorial Advisory Board for the Encyclopedia of Software Engineering (Nguyen)
Editorial Advisory Board for Journal of Pervasive Computing and Communications (Somani)
Associate Editor of various major journals (12 instances)

Invited Plenary addresses, Invited Keynote Speakers
- Keynote at IEEE IPDPS, top conference in parallel processing (Aluru)
- “Magnetic modeling - breaking through the materials barrier” (Invited Keynote Address) D. C. Jiles, Eighth International Conference on Computation in Electromagnetics, Wroclaw, Poland, 11-14 April 2011. (Jiles).
- Invited presentation on power system dynamic analysis at a conference in Medellin, Colombia in July 2010; 150 attendees from all over South America (McCalley)
- IEEE Communication Society Distinguished Lecturer 2009-13 (Somani)

Other
- Member of the International Advisory Board of the Emirates Journal for Engineering Research (EJER); 2007–present (Kamal)
- Systems Stem Research Chair within Power Systems Engineering Research Center (McCalley)
- ABET: Commissioner, Engineering Accreditation Commission (EAC), representing IEEE (Rover)
- Michigan State University, external advisory committee member for NSF STEP (STEM Talent Expansion Program) grant (Rover)

Appendices

A.1 Department of Electrical and Computer Engineering Organization Chart
A.2 Governance Document
A.3 Strategic Plan
A.4 Key Performance Indicators
A.5 Faculty Mentor Calendar for New Faculty
A.6 Faculty Mentor Calendar for Faculty after First Year
A.7 EFTF Spending on Teaching Initiatives
A.8 Faculty Activity Chart