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.

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.

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.