DEPARTMENT OF TECHNOLOGY

PROGRAM ASSESSMENT PLAN

B.S. DEGREE IN ENGINEERING TECHNOLOGY

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Table of Contents

Appendices

Department of Technology
Program Assessment Plan
B.S. Degree: Engineering Technology

This Engineering Technology degree Program Assessment Plan includes a description of learning outcomes, assessment measures, feedback and continuous improvement mechanisms, and record keeping procedures that guide the Engineering Technology program in continuous improvement. There are two components to the Engineering Technology program assessment. (1) Learning Outcomes Assessment and (2) Program Goals and Plan of Work. Annual assessment data is posted on the Department of Technology website: www.tec.illinoisstate.edu.

Learning Outcomes Assessment

The learning outcomes report, completed is each year, is an aggregate summary of student progress toward meeting identified learning outcomes. The resulting data is reported in a dashboard format (see following page for an example of learning outcomes dashboard), which includes assessment data and a plan for improvement, as necessary. The learning outcomes for the program are reviewed each year for validation by the Engineering Technology program advisory board. Multiple data points are used to assess learning outcomes, as follows:

1. An **Employer Survey** seeks data on how well graduates performed in terms of intended learning outcomes. These surveys are conducted on a three-year cycle. (*Appendix A* presents an example of the employer follow-up survey).

2. The **Senior Exit Survey** solicits both quantitative and qualitative feedback about the extent to which learning outcomes were achieved. An example of the Senior Exit Survey is presented in *Appendix B*.

3. The University Assessment Services conducts the annual **Alumni Survey** and supplies this assessment data to the department. This survey includes questions on the intended learning outcomes for the program shown in *Appendix C*.

4. To assess learning outcomes, the Engineering Technology program faculty review an assessment exam given to seniors in the program.

Assessment data on learning outcomes receives oversight in the following ways. Specific learning outcome assessment data initially go to the Program Coordinator who is responsible for (a) documenting and reporting the results, (b) evaluating if the results conform to performance indicators, and (c) deciding, in conjunction with program faculty and advisory committee as appropriate, whatever corrective action needs to be taken. Corrective actions are documented in the learning outcomes assessment dashboard and filed on the Faculty Server. An annual assessment calendar is used to coordinate assessment and feedback events (See *Appendix E).*

Engineering Technology Learning Outcomes

1. Interpret and apply basic concepts of materials science such as strength of materials, structural properties, conductivity, and mechanical properties. Perform various non-destructive and destructive materials testing procedures.

2. Analyze and apply basic electricity and electronic principles within the various engineering environments and applications such as industrial robots, controls, and other such systems.

3. Monitor and control manufacturing processes or other industrial systems.
   Select appropriate manufacturing processes for product production applications such as forming, molding, separating, conditioning, joining, and finishing.

4. Utilize 2-D and 3-D computer-aided design systems to create drawings and models for products, machines, jigs, fixtures, and other mechanical devices used in engineering environments.

5. Read and interpret engineering documentation such as blue prints, technical drawings and diagrams, production plans, tooling plans, quality plans, and safety plans.

	Direct Measurement	Indirect Measurements			
Engineering Technology Learning Outcomes The graduate will be able to:	*Assessment Exam - Avg by Category	Employer Survey 2013, 2014, 2015, 2016 (employers n=8, alumni n=10)	Senior Survey (n=24, Fall 2016/Spring 2017) (1.0 - 5.0 scale)	Alum Survey	**Planned Curricular Actions for Improvement (2017-2018)**
1. Interpret and apply basic concepts of materials science such as strength of materials, structural properties, conductivity, and mechanical properties. Perform various non-destructive and destructive materials testing procedures.	(TEC 285, 293) 77%	5 meets expectations 0 below expectations 5 N/A	4.4	N/A	TEC293 will have a new instructor.
2. Analyze and apply basic electricity and electronic principles within the various engineering environments and applications such as industrial robots, controls, and other such systems.	(TEC 240, 263) 85%	9 meets expectations 0 below expectations 1 N/A	4.4	N/A	Minor modifications to TEC240 are being made.
3. Monitor and control manufacturing processes or other industrial systems.	(TEC 233, 285, 240, 263, 392) 83%	8 meets expectations 0 below expectations 2 N/A	4.5	N/A	Enhanced utilization of CNC machining is being implemented in TEC233 and TEC392.
4. Select appropriate manufacturing processes for product production applications such as forming, molding, separating, conditioning, joining, and finishing.	(TEC 233, 285, 392) 82%	6 meets expectations 0 below expectations 4 N/A	4.5	N/A	No action at this time. Objective and self-report measures all positive.
5. Utilize 2-D and 3-D computer-aided design systems to create drawings and models for products, machines, jigs, fixtures, and other	(TEC 216, 392) 85%	8 meets expectations 0 below expectations	4.5	N/A	No action at this time. Objective and self-report measures all positive.

mechanical devices used in engineering environments.		2 N/A			
6. Read and interpret engineering documentation such as blue prints, technical drawings and diagrams, production plans, tooling plans, quality plans, and safety plans.	(TEC 216, 392) 85%	10 meets expectations 0 below expectations 0 N/A	4.7	N/A	No action at this time. Objective and self-report measures all positive.

***Direct Measurement Performance Benchmarks** *Performance criteria: at least 75% average in each category indicates good achievement of the learning outcome.	**Action benchmark for Survey Data < 3.5/5.0 scale**	**Action benchmark for Employer Data < 75% "meets expectations" or above**
	5 – well above average 4 – above average 3 – average 2 – below average 1 – well below average	

Program Goals and Plan of Work

The Engineering Technology *Program Goals and Plan of Work*, consists of (a) the program mission, (b) program goals, (c) goal alignment with department, college, and university goals, (d) strategies for attaining goals, (e) an annual plan of work, and (f) a report assessing accomplishments (See an example of the *Program Goals and Plan of Work* document on the following page). An assessment of the *Program Goals and Plan of Work* is submitted to the Department of Technology Chair annually at the beginning of the academic year, after developing a plan of work, and to report on work completed from the previous academic year. Follow-up on the assessment of program outcomes data flows first to the Chairperson or Assistant Chairperson who is responsible for documenting and reporting the results in the Department of Technology Annual Assessment Report. As appropriate, results may be further disseminated to the faculty at large, and/or Advisory Committees for further action aimed at program improvement.

Engineering Technology Program Goals

1. Provide students with high quality educational experiences by featuring a modern, up-to-date curriculum that will develop the technical and managerial knowledge, skills, and attitudes that are foundational to success as ET professionals.

2. Recruit and graduate a diverse group of individuals to support companies and organizations that will employ ET professionals in Illinois and throughout the United States.

3. Provide opportunities for students to interface with ET professionals.

4. Provide service to companies and organizations that employ ET graduates through applied research, consulting/workshops, and participation in professional organizations.

5. Maintain industry and ET alumni relationships in support of the program.

Program Goals and Plan of Work (2016-2017)

Engineering Technology Program

The mission of the program is to prepare technically-oriented managerial professionals and leaders for business, industry, government, and education by articulating and integrating student experiences and core competencies in engineering technology.

ET Goals	*Goal Alignment*	*Strategies*	*Plan of Work for 2016-2017 (September 2016)*	*Report on POW 2016-2017 (September 2017)*
1. Provide students with high quality educational experiences by featuring a modern, up-to-date curriculum that will develop the technical and managerial knowledge, skills, and attitudes that are foundational to success as ET professionals	ISU Educating Illinois Goal #1,2 CAST Strategic Plan Goal # 1, 5 TEC Department Goal 1	a. Maintain strong industry input to program curriculum decision making. b. Maintain high quality curriculum and instruction. c. Maintain modern ET labs. d. Maintain highly qualified faculty.	a. Assemble and conduct a least one advisory board meeting in the 2016/2017 school year. b. Measure student performance for outcomes assessment and revise instruction as needed. c. Finalize preparations for ATMAE accreditation self-study and site visit d. Attend professional development events, including ASEE regional and national conferences, ATMAE national conference, and industry trade shows. e. Update a 5-year equipment and facility plan and seek funding to modernize software and equipment. f. Monitor ET enrollment trends. g. Utilize a consignment IRB2600 robot in the TEC392 class. h. Offer TEC333	a. Advisory board meeting held April 10, 2017 b. Student learning was assessed across all learning outcomes via the ET assessment Exam administered during TEC 392. c. This task is complete. The ET program received full ATMAE accreditation. d. Dr. Devine presented a paper at the ASEE EDGD midyear conference, and attended IMTS. Dr. Laingen attended IMTS. Dr. Reifschneider attended the NPE conference. Mr. Williams attended IMTS. e. A CNC lathe was purchased for use in the ET program. ABB has initiated the process of donating the IRB2600 robot that is currently being used in ET courses on consignment. f. ET enrollments and applications are being carefully monitored by the Department of Technology management team. g. The IRB2600 robot was used during the Fall and Spring semesters in TEC392 on two different projects. h. TEC 333 was offered during the Fall 2016 semester.

2. Recruit and graduate a diverse group of individuals to support companies and organizations that will employ ET professionals in Illinois and throughout the United States.	ISU *Educating Illinois* Goal # 1,2 CAST Strategic Plan Goal # 1, 6 TEC Department Area 1	a. Maintain sustainable enrollment in the ET Program at ISU. b. Promote the program to diverse audiences of potential students. c. Promote industry-sponsored scholarships to existing and potential students.	a. Update the department Website focusing on developing attractive images of the ET labs. Mobile format b. Post appropriate scholarship opportunities and support student efforts for scholarship awards. c. Pursue opportunities to interact with K-12 students and teachers.	a. The ET pages on the department website were updated. b. Scholarship opportunities were advertised by email and personal contact with our students. c. ET and TE&E co-sponsored a booth at the Discover Manufacturing Career Expo in Peoria which was attended by several hundred high school students. The ET Club hosted a group of 2nd grade children in the IML, ET faculty members hosted 40 high school students as part of the Great Plains LIFE Foundation.
3. Provide opportunities for students to interface with ET professionals.	ISU *Educating Illinois* Goal # 1, 2 CAST Strategic Plan Goal # 1, 6 TEC Dept. Goal 1,3	a. Facilitate events that promote student and faculty interaction with industry. b. Promote internship opportunities for ET students. c. Create and maintain relationships with companies and personnel that employ ET professionals.	a. Promote student involvement in the ET student organization. b. Promote student attendance at industry trade shows. c. Organize field trips to applicable companies. d. Invite ET professionals to visit classes. e. Maintain contact with potential employers. f. Encourage students to pursue and secure internships. g. Help students locate internships/temporary job opportunities.	a. Students were encouraged to participate in the ET club. b. Class fieldtrips were taken to IMTS. c. Students took company field trips in TEC285. d. Guest speakers attended TEC233, TEC234, TEC392 & TEC285. e. ET faculty maintain regular contact with many employers. f. Students are being encouraged to get work experience. Student work experience is being verified as a prerequisite to TEC392. g. Emails are sent to the ET list serve announcing internship opportunities. Students are required to gather company names in several ET core classes.

4. Provide service to companies and organizations that employ ET graduates through applied research, consulting/workshops, and participation in professional organizations.	ISU *Educating Illinois* Goal # 2,4 CAST Strategic Plan Goal # 3, 4 TEC Dept. Goal 2.3	a. Tenured or tenure-track faculty will engage in research and technology transfer activities that supports the industry. b. Tenured or tenure-track faculty members will maintain participation and leadership in relevant organizations, boards, or committees. c. Promote student organization participation in industry or community service activities.	a. Promote graduate assistantships to assist with faculty research and ET instruction. b. Conduct scholarly activities such as publishing peer reviewed manuscripts and completing research. c. Provide leadership in professional organizations. d. Conduct training to support regional manufacturing.	a. ET students are encouraged by ET faculty to consider enrolling in the TEC MS program. b. Dr.s Devine and Reifschneider published peer-reviewed articles this year. Dr. Devine created the SMART curriculum and certification program for ABB robotics. c. Dr. Devine was a member of the board of directors of the ASEE/EDGD national organization. Dr. Reifschneider is on the Board of Directors of the Plastics Environmental Division of SPE and was a session chair for the ANTECH conference. d. Dr. Reifschneider provided training for Caterpillar.

5. Maintain industry and ET alumni relationships in support of the Program.	ISU *Educating Illinois* Goal # 3 CAST Strategic Plan Goal # 4,6 TEC Department Goal 2,3	a. Maintain information distribution to alums through the department newsletter and website. b. Encourage participation of ET alumni in homecoming events. c. Establish relationships with companies who employ ET professionals. d. Provide avenues for internship and graduate recruitment.	a. Contribute information to the Department Blog and ET website. b. Develop active participation with related companies. c. Investigate revised procedures to help students locate internships/temporary job opportunities.	a. ET events and news were forwarded to Tec personnel to be posted. b. ET faculty members maintain personal contact with industry contacts. c. This task is ongoing.

Appendix A: Example of Employer Survey

ISU Engineering Technology Employer Surv

Page 1

Engineering Technology Employer Survey

As part of our continuous quality improvement process and accreditation requirements, we would like to know your perceptions on how well prepared our graduates are to apply Engineering Technology knowledge, skills, and attitudes on the job.

If you are not the appropriate person to complete this survey, would you please forward to the individual in your firm who supervises or is knowledgable about the performance of the ISU graduate.

This brief survey has two parts: (a) ratings of 6 individual competencies that graduates should demonstrate, and (b) an open ended section for your comments and suggestions. **Please complete a separate survey for each ISU Engineering Technology graduate** who has worked for your firm for ten (10) years or less. All responses are completely confidential. Anticipated time to complete the survey is less than 10 minutes.

Thank you very much for your feedback on the quality of our Engineering Technology graduates. Your input is very important to our program success!

1. How long has the (or was the) ISU Integrated Manufacturing Systems graduate been employed by your firm?

- ○ Less than 1 year
- ○ 2 years
- ○ 3 years
- ○ 4 years
- ○ 5-10 years

Instructions for questions 2 to 7:

In the left-hand column is a listing of competencies (knowledge, skills, and attitudes) that should be demonstrated by graduates of the Integrated Manufacturing Systems program in the Department of Technology at Illinois State University (ISU). For each of the competencies, please indicate the level of preparation as:

Excellent - Good - Neutral - Fair - Poor - Not Applicable.

2. Interpret and apply basic concepts of materials science such as strength of materials, structural properties, conductivity, and mechanical properties. Perform various non-destructive and destructive materials testing procedures.

	Excellent	Good	Neutral	Fair	Poor	Not Applicable

Materials Testing	○	○	○	○	○	○

3. Analyze and apply basic electricity and electronic principles within the various manufacturing environments and applications such as industrial robots, controls, and other such systems.

	Excellent	Good	Neutral	Fair	Poor	Not Applicable
Electronics	○	○	○	○	○	○

4. Monitor and control manufacturing processes or other industrial systems.

	Excellent	Good	Neutral	Fair	Poor	Not Applicable
Process Control	○	○	○	○	○	○

5. Select appropriate manufacturing processes for product production applications such as forming, molding, separating, conditioning, joining, and finishing.

	Excellent	Good	Neutral	Fair	Poor	Not Applicable
Process selection	○	○	○	○	○	○

6. Utilize 2-D and 3-D computer-aided design systems to create drawings and models for products, machines, jigs, fixtures, and other mechanical devices used in manufacturing environments.

	Excellent	Good	Neutral	Fair	Poor	Not Applicable
CAD	○	○	○	○	○	○

7. Read and interpret manufacturing documentation such as blue prints, technical drawings and diagrams, production plans, tooling plans, quality plans, and safety plans.

	Excellent	Good	Neutral	Fair	Poor	Not Applicable
Plan Interpretation	○	○	○	○	○	○

8. Additional comments, clarifications or suggestions for the ISU Integrated Manufacturing Systems program:

Appendix B: Example of Senior Exit Survey

Department of Technology Senior Survey (ET)

Page 1

Department of Technology Senior Exit Survey

As part of our continuous quality improvement process, we would like to know your perception of how well we have performed as a department and as an academic degree program.

This brief survey has two parts: (a) ratings of general perceptions about the department and its quality, and (b) ratings on how well you achieved the intended learning outcomes for your major. Anticipated time to complete the survey is about 15 minutes.

Thank you very much for your feedback on the quality of the Department of Technology and its programs of study!

Instructions for questions 1 to 17:

This section includes ratings of your perception about the Department of Technology and its quality.

1. Faculty were helpful when I needed assistance.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Faculty	○	○	○	○	○

2. Overall, the quality of instruction was excellent in TEC courses.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Quality	○	○	○	○	○

3. I was treated fairly in my dealings with faculty.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Fairness	○	○	○	○	○

4. Faculty were experts in their subject matter areas.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Expertise	○	○	○	○	○

5. The department's computer resources met my needs.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Computers	○	○	○	○	○

6. Overall, I was satisfied with the quality of laboratory equipment.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lab Equipment	○	○	○	○	○

7. Lab hours provided access to equipment to complete assignments.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lab Access	○	○	○	○	○

8. I was able to get my into TEC courses in a timely manner.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Course Schedule	○	○	○	○	○

9. TEC Advisement Office responded to my inquiries in a timely manner.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Timely Advisement	○	○	○	○	○

10. My TEC advisor was knowledgeable of my academic plan.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Advisement Expertise	○	○	○	○	○

11. My internship was a valuable part of my education.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Did not participate in an internship
Internship	○	○	○	○	○	○

12. TEC department student organizations were a valuable part of my education.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Did not participate in student organization
TEC Student Organizations	○	○	○	○	○	○

13. My TEC major greatly expanded my career options.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Career Options	○	○	○	○	○

14. The content of my TEC courses was state-of-the-art.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Course Content	○	○	○	○	○

15. Overall, I greatly increased my knowledge and skills as a result of my TEC major.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Personal Skills	○	○	○	○	○

16. I would recommend TEC to a good friend or family member.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Recommendation	○	○	○	○	○

17. Would you care to share any additional comments about your experiences with the Dept of Technology?

Instructions for questions 18 to 27:

This section includes ratings on how well you achieved the intended learning outcomes for your major, as well as questions about your job search.

18. I am able to interpret and apply basic concepts of materials science such as strength of materials, structural properties, conductivity, and mechanical properties. I am able to Perform various non-destructive and destructive materials testing procedures.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Materials Testing	○	○	○	○	○

19. I am able to analyze and apply basic electricity and electronic principles within the various manufacturing environments and applications such as industrial robots, controls, and other such systems.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Electronics	○	○	○	○	○

20. I am able to monitor and control manufacturing processes or other industrial systems.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Process Control	○	○	○	○	○

21. I am able to select appropriate manufacturing processes for product production applications such as forming, molding, separating, conditioning, joining, and finishing.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Process selection	○	○	○	○	○

22. I am able to utilize 2-D and 3-D computer-aided design systems to create drawings and models for products, machines, jigs, fixtures, and other mechanical devices used in manufacturing environments.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
CAD	○	○	○	○	○

23. I am able to read and interpret manufacturing documentation such as blue prints, technical drawings and diagrams, production plans, tooling plans, quality plans, and safety plans.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Plan Interpretation	○	○	○	○	○

24. Please provide any feedback about the instruction and your learning related to Engineering Technology/Manufacturing Systems.

25. Who or what influenced you in deciding to pursue the TEC program at ISU?*

Influences

26. At what stage are you in finding a position in your major field?

	Accepted an offer	Have tentative offer	Interviewing	Have not started searching
Job Search	○	○	○	○

Appendix C: Example of Alumni Learning Outcomes Survey

2011 Integrated Manufacturing Systems

Page 1

1. Please indicate how well the IMS sequence prepared you to perform each skill.

	Well above average	Above average	Average	Below average	Well below average	N/A
Interpret and apply basic concepts of materials science such as strength of materials, structural properties, conductivity, and mechanical properties.	○	○	○	○	○	○
Perform various non-destructive and destructive materials testing procedures.	○	○	○	○	○	○
Analyze and apply basic electricity and electronic principles within the various manufacturing environments and applications such as industrial robots, controls, and other such systems.	○	○	○	○	○	○
Monitor and control manufacturing processes or other industrial systems.	○	○	○	○	○	○

Page 2

2. Please indicate how well the IMS sequence prepared you to perform each skill.

	Well above average	Above average	Average	Below average	Well below average	N/A
Select appropriate manufacturing processes for product production applications such as forming, molding, separating, conditioning, joining, and finishing.	○	○	○	○	○	○
Utilize 2-D and 3-D computer-aided design systems to create drawings and models for products, machines, jigs, fixtures, and other	○	○	○	○	○	○

mechanical devices used in manufacturing environments.						
Read and interpret manufacturing documentation such as blueprints, technical drawings and diagrams, production plans, tooling plans, quality plans, and safety plans.						

Appendix D: Annual Assessment & Reporting Calendar

Date	Activity	Accountable
As appropriate by course schedule	IDEA student ratings of instruction (November and April).	Secretary
As appropriate	Share assessment data with program and/or program advisory committees	Program Coordinator
As appropriate	Faculty Retreat - Review annual assessment data and establish improvement priorities.	Chair
April	Conduct TEC Senior Student Exit Survey in each capstone course.	Advisor
April	Organize follow-up survey of employers (minimum 3-year cycle)	Asst Chair & Secretary
April	Mail pre-survey letter to alumni.	Secretary
June	TEC Senior Student Exit Survey results and Employer Survey results distributed to faculty.	Advisor, Asst. Chair
July 30	Alumni data distributed to coordinators	Asst. Chair
August	Coordinators meeting to discuss new assessment data and review assessment process	Asst. Chair
September/October	Organize and conduct scheduled Peer Teaching Observations.	Asst. Chair
November 15	Program Coordinators submit the annual *Learning Outcomes Report*	Program Coordinator
November 15	Program Coordinators submit the annual *Program Goals Report and Plan of Work*	Program Coordinator
December 30	Submit annual TEC Assessment Report to the University Assessment Services (UAS)	Asst. Chair
December 30	Department of Technology Annual Report and Consolidated Annual Budget Report	Chair