

2019-2020: Manufacturing and Engineering Technology BS

Definition of Unit

Providing Department:

Manufacturing and Engineering Technology

Department/Unit Contact:

Ahmed Alsawy

Mission/Vision Statement:

I. Department Mission/Vision/Goal Statement

The BSET program at TTU is a traditional on-campus lecture/laboratory program with on-ground course delivery offered almost exclusively during the day. There currently are no distance learning courses offered by the Manufacturing and Engineering Technology Department. A co-op program is available through the TTU Office of Career Services as an optional (but popular) choice.

***Mission Statement:** To graduate innovative Technologists or Applied Engineers who solve technological challenges to meet societal needs.*

Student Outcomes

Define Goal:

Graduates of the B.S. in Engineering Technology (ET) Program will

1. attain and succeed in positions related to Mechatronics Engineering Technology and Engineering Technology Management;
2. advance their careers and continue their professional development by pursuing graduate studies, attending workshops, obtaining certification and joining professional organizations;
3. succeed as leaders and managers in areas such as foundry operations, additive manufacturing, robotics, and industrial

Intended Outcomes / Objectives:

1. An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
2. An ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
3. An ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
4. An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes, and
5. An ability to function effectively as a member as well as a leader on technical teams.

Assessment Methods

Frequency of Assessment:

All assessments are completed on a semester or annual basis, unless otherwise noted in the description of a tool. The assessment schedule is attached.

Rationale:

1. Alumni Survey: Indirect Assessment Tool

Historically, alumni surveys have been used for program assessments since the first National Association of Industrial Technology (NAIT) accreditation in 1982. The department has administered the assessment instruments, analyzed and summarized the data, and presented the summary to the faculty for discussions, suggestions, and identification of necessary actions. The format of the alumni survey, which has been recently updated, is designed to assess ETAC of ABET Student Outcomes (1)-(5) and provide information related to the Program Educational Objectives. The survey is conducted every three years to evaluate the professional growth of our graduates.

The alumni survey employs a 5-point “agree/disagree” scale (1 to 5), which is later converted to a 0-4 level-of-attainment scale by simply subtracting 1 point.

2. Co-op Employer Survey: Direct Assessment Tool

Around one-fifth of MET students participate in co-ops or internships during their time at Tennessee Tech. For co-op jobs sponsored through the Tennessee Tech Office of Career Development, the co-op employers are required to complete a formal evaluation of the performance of each student at the end of each co-op semester. In addition, employers of College of Engineering students are asked to respond to additional assessment questions, some of which are related to Student Outcomes. Co-op surveys are a valuable source of feedback directly from employers of our students, providing insight into their performance in-process, i.e., before they graduate. The co-op employer survey employs a 5-point scale (1 to 5), which is then converted to the 0-4 level-of-attainment scale.

3. External Assessment of Senior Projects: Direct Assessment Tool

This assessment method was first introduced in Spring 2014 after the decision to pursue ETAC of ABET accreditation was made. The Manufacturing and Engineering Technology Advisory Board (METAB) members are used as external evaluators to assess the senior project presentations. A new evaluation form was developed for this purpose. The external evaluation of senior projects assessment tool uses the 0-4 level of attainment scale.

4. Faculty Course Assessment Report (FCAR): Indirect Assessment Tool

This assessment tool was added in Spring 2014 after the decision was made to pursue ETAC of ABET accreditation. This measurement tool provides an assessment of the level-of-attainment of the students in a class with regard to the course’s instructional outcomes. The assessment is done

by the course instructor at the completion of the course. Each of the instructional outcomes associated with a student outcome is scored on the faculty course assessment Report using a 0-4 level-of-attainment scale.

5. Graduating Senior Exit Surveys/Interviews: Indirect Assessment Tool

A written survey is one part of the Graduating Senior Exit Interview process. The Senior Exit Survey for the BSET program allows graduating seniors to provide feedback regarding the faculty, the department, the career services, and their perceived attainment of the ETAC of ABET Student Outcomes. The Graduating Senior Exit Survey uses a 1-5 “satisfaction” scale, which is then converted to the 0-4 level-of-attainment scale. The second part of this survey process is that each graduating senior schedules an interview meeting with the department chair. In this confidential interview meeting, the chair discusses with the students their responses. The gathered information serves as a valuable source of suggestions for program improvement, as well as a source of supporting feedback on the student performance. After receiving the feedback from the students, issues of particular or repeated concern are brought to the MET faculty for further discussion and possible action.

Expected Level of Attainment of the Student Outcomes

The expected level of attainment of the student outcomes is considered using the same 4-point scale used for the individual assessment tools.

4 = Excellent

3 = Good

2 = Satisfactory

1 = Low

0 = Negligible

Referring to the above scale, a score of 3.0 or above is a desirable score for each student outcome (1)-(5). A score between 2.0 and 3.0 is a cause for review by the MET faculty with possible action or continued monitoring. A score lower than 2.0 would require corrective action to be taken by the MET Faculty.

Results: SO 1

Results:

Student Outcome 1: Apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline.

Assessment Data (Level of Attainment): 4 = Excellent; 3 = Good; 2 = Satisfactory; 1 = Low; 0 = Negligible

SO 1. Apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline.						
Assessment Instrument	2015-16	2016-17	2017-18	2018-19	Fall 2019	Spring 2020
Co-op Employer Survey	3.12	3.13	3.47	3.2	3.6	3.8
Faculty Course Assessment Reports					3.25	3.54
Course Term Project External Evaluation					3.6	3.8
Course-embedded Assessment					3.43	3.45
Senior Design Project					3.62	3.59
Senior Exit Survey						3.64
Overall Level of Attainment	3.12	3.13	3.47	3.2	3.53	3.51

Attachments:

RELATED ITEM LEVEL 2

Results: SO 2

Results:

Student Outcome 2: Design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;

Assessment Data (Level of Attainment): 4 = Excellent; 3 = Good; 2 = Satisfactory; 1 = Low; 0 = Negligible

SO 2. Design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;		
Assessment Instrument	Fall 2019	Spring 2020
Faculty Course Assessment Reports	3.29	3.29
Course Term Project External Evaluation	3.56	3.83
Course-embedded Assessment	3.12	3.39
Senior Design Project	3.5	3.45
Senior Exit Survey		2.03
Alumni Survey		3.27
Overall Level of Attainment	3.38	3.34

Attachments:

Results: SO 3

Results:

Student Outcome 3: Apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature.

Assessment Data (Level of Attainment): 4 = Excellent; 3 = Good; 2 = Satisfactory; 1 = Low; 0 = Negligible

SO 3. Apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature.						
Assessment Instrument	2015-16	2016-17	2017-18	2018-19	Fall 2019	Spring 2020
Co-op Employer Survey	3.12	3.13	2.67	3.3	3.2	3.2
Faculty Course Assessment Reports					3.16	3.6
Course Term Project External Evaluation					3.42	3.75
Course-embedded Assessment					3.56	3.6
Senior Design Project					3.58	3.2
Senior Exit Survey						3.2
Alumni Survey						2.34
Overall Level of Attainment	3.12	3.13	2.67	3.3	3.43	3.29

Attachments:

RELATED ITEM LEVEL 2

Results: SO 4

Results:

Student Outcome 4: Conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes.

Assessment Data (Level of Attainment): 4 = Excellent; 3 = Good; 2 = Satisfactory; 1 = Low; 0 = Negligible

SO 4. Conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes.		
Assessment Instrument	Fall 2019	Spring 2020
Faculty Course Assessment Reports	3	3
Course-embedded Assessment	3.29	3.14
Senior Design Project	3.42	3.35
Senior Exit Survey		2.52
Alumni Survey		2.98
Overall Level of Attainment	3.33	3.07

Attachments:

Results: SO 5

Results:

Student Outcome 5: Function effectively as a member as well as a leader on technical teams.

Assessment Data (Level of Attainment): 4 = Excellent; 3 = Good; 2 = Satisfactory; 1 = Low; 0 = Negligible

SO 5. Function effectively as a member as well as a leader on technical teams.						
Assessment Instrument	2015-16	2016-17	2017-18	2018-19	Fall 2019	Spring 2020
Co-op Employer Survey	3.4	3.73	3.47	3.76	3.62	3.49
Faculty Course Assessment Reports					3.33	4.0
Course Term Project External Evaluation					3.57	3.81
Course-embedded Assessment					3.75	3.74
Senior Design Project					3.48	3.46
Senior Exit Survey						3.46
Alumni Survey						2.34
Overall Level of Attainment	3.4	3.73	3.47	3.76	3.62	3.49

Attachments: