

BS in Mechanical Engineering Technology Program

Mission

The mission of an undergraduate BS program in Mechanical Engineering Technology (MET) is to prepare individuals by providing a comprehensive knowledge and hands-on skills in a state-of-the-art mechanical engineering technology education. The MET program perpetuates Indiana State University's mission to educate students to become productive citizens and enhance the quality of life of the citizens of Indiana by preparing technical professionals for business and industry through a balanced curriculum.

Educational Objectives

The undergraduate program in Mechanical Engineering Technology will prepare graduates with knowledge, problem solving ability, and hands-on skills to enter careers in the design, installation, manufacturing, testing, evaluation, technical sales, maintenance, or management of mechanical and related systems and processes. The graduates can:

1. Apply the latest technology and engineering tools to solve technical problems in the practice of mechanical engineering technology and related interdisciplinary fields.
2. Remain technically current and adapt to rapidly changing technologies through self improvement with continuous learning or post-graduate education.
3. Demonstrate independent thinking, self-management, and functioning effectively in team-oriented and open-ended activities in an industrial environment.
4. Communicate effectively in oral, written, and graphical forms.
5. Perform ethically and professionally in business, industry, and society.
6. Develop leadership skills and responsibility in their chosen career field.
7. Understand global issues and the impact of technology and engineering solutions on the society and environment.

Student Learning Outcomes

This Mechanical Engineering Technology discipline encompasses the areas (and principles) of materials, applied mechanics, computer-aided drafting/design, manufacturing, experimental techniques/procedures, analysis of engineering data, machine/mechanical design/analysis, and automation/control systems, among others. The Mechanical Engineering Technology (MET) students by the time of graduation will have:

- a. an appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline (all the courses)
- b. an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology (MATH 115 or MET 215), MATH 123, 301, CHEM 100, PHYS 105, MET 302, 304, 306, 406)
- c. an ability to conduct, analyze and interpret experiments, and apply experimental results to improve processes (MFG 370, 371/225, MET 403, MET 406, MET 413)
- d. an ability to apply creativity in the design of systems, components, or processes appropriate to the MET program educational objectives (MET 103, 203, 403, 302, 306, 406, 408)
- e. an ability to function effectively on teams (MET 130, 302, 405, 406, 413)

- f. an ability to identify, analyze and solve technical problems (MET 302, 306, 404, 405, 406, 408)
- g. an ability to communicate effectively (COMM 101, ENG 305T, MET 130, 103, 203, 403, 405, 413, 430)
- h. a recognition of the need for, and an ability to engage in lifelong learning (MET 130, 430, TGMT 421)
- i. an ability to understand professional, ethical and social responsibilities (MET 130, 404, 430, other Gen Ed, professional society)
- j. a respect for diversity and a knowledge of contemporary professional, societal and global issues (MET 130, TGMT 335, 421, Gen Ed: USD, IC)
- k. a commitment to quality, timeliness, and continuous improvement (All the courses)

Specifically, the students will be able to:

1. Identify mechanical systems that satisfy the given engineering requirements. (MET 306/404/406)
2. Describe the necessary assumptions in designing mechanical systems. (All the courses)
3. Apply proper engineering principles and theories to solve close-ended analysis and open-ended design problems. (MET 215/302/304/306/406)
4. Develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools. (MET 103/203/403)
5. Select engineering materials for specific applications. (MFG 371)
6. Design mechanical parts and systems. (MET 406/408)
7. Identify and inspect tolerances in mechanical parts and assemblies. (MET 103/413)
8. Communicate through engineering drawings, written reports, or oral presentations. (MET 103/130/203/430 and other courses)
9. Manage design work/processes. (MET 404)
10. Implement design and produce parts. (MET 351/409/493 and MFG 370/371)
11. Estimate cost and manage engineering projects. (MET 404/405/409)
12. Evaluate the performance of mechanical systems. (MET 409)
13. Explain the potential impact of mechanical systems on environment and society, including safety. (MET 404/409)
14. Recognize the need and analyze/plan the requirement for system's control and integration. (ECT 280)

Assessment

The faculty of the MET program has adopted the following processes/evidences to assess the achievements of the program learning outcomes and education objectives listed above including computer usage, drawings, and written and oral communications. Single evidence may not be enough to assess all the outcomes. Therefore several evidences have been identified.

Direct Evidence:

1. Co-op/Internship Evaluation by Supervisor/faculty (N.A.: can be kept in file from MET 351): Which of the outcomes were assessed and how did the students do?
2. Senior Project (can be kept in file from MET 409)
3. Course Project (can be kept in file from MET 203, 302, 304, 306, 403, 404, 405, 406, 408, 413)

4. HW/Quiz/Exam (can be kept in file from MET 103, 203, 302, 304, 306, 403, 404, 405, 406, 408, 413)
5. Lab reports (can be kept from MFG 370/371, ECT 280)
6. Student Portfolio (MET 430)
7. MET program faculty assessment on students' attainment of the learning outcomes based on the Exit Interview (not available: can be done)
8. Society for Manufacturing Engineers (SME) Certification Exam (don't have record)

Indirect Evidence:

1. Course outlines (syllabi) and textbooks
2. Graduation Rate
3. Placement Rate
4. Student Evaluation on the program learning outcomes assessment (Not available: can be done in MET 430)
5. Alumni Survey
6. Employer Survey
7. Rate of Students going into graduate programs

Evaluation/Continuous Improvement

Every semester program faculty members meet to interpret the data and evidences collected from the assessment practices. This helps to find the extent to which program outcomes and educational objectives are being achieved and to take decisions and actions to continuously improve the program through a documented plan.

Curriculum

Major Required Courses: 48 credit hours

- MET 103 (3) Intro to Technical Graphics
- MET 130 (2) Intro to Engr. & Tech.
- MET 203 (3) Intro to Solid Modeling
- MET 302 (3) Applied Statics
- MET 306 (3) Applied Mechanisms
- MET 403 (3) Advanced CAD Concepts
- MET 404 (3) Engr. Design & Mgmt.
- MET 405 (3) Econ. Analy. For Engr. & Tech
- MET 406 (3) Strength of Materials
- MET 408 (3) Elements of Machine Design
- MET 413 (3) Applications & Gaging of GD&T
- MET 430 (1) Senior Seminar
- CS 151 (3) Intro to Computer Science
- ECT 160 (3) Fundamentals of Electronics
- *ECT 280 (3) Intro to Automation
- MFG 370 (3) Fund. of Machine Tool Processes
- *MFG 371 (3) Manufact. Processes & Materials

Technical Electives: 6 cr. hours from the following:

- MET 304 (3) Engr. Analysis (Dynamics)
- MET 329 (3) Fluid Power Technology

*MET 337 (3) Thermo Systems
MET 351 (3) Industrial Co-op
MET 407 (3) Tools & Die Design
MET 409 (3) Senior Project
Other courses approved by the MET advisor

Management Electives: 6 cr. hours from the following:

TMGT 471 (3) Production Plan & Control I
TMGT 473 (3) Quality control of Ind. Products I
TMGT 478 (3) Industrial Organ. & Functions
MGT 301 (3) Survey of Management

Science and Math Required Courses: 24 cr. hours

MATH 115 (3)
MATH 123 (3)
MET 215 (3)
MATH 301 (3)
SMS: F 4 Chem. 100 (3) & 100L (1)
SMS: F or E 4 Phys. 105 (3) & 105L (1)
4 * Phys. 106 (3) & 106L (1)

Other General Education: 41 - 44 cr. hours

COMM 101 (3) Intro to Speech
ENG 101/5 (6) Freshman Writing OR
ENG 107 (3) Rhetoric & Writing
ENG 305T (3) Technical Writing
PE 101 (2) Fitness for Life
Foreign Language (6)
SBS: F 3
SBS: F or E 3
LAPS: LL 3
LAPS: LE 3
HS 3
MCS: USD 3
MSC: IC 3
GECAP 3

* or a similar course approved by the MET advisor

Total: Minimum 125 semester hours required for graduation.

Transfer credits will be accepted based on a course-by-course evaluation, or an agreement between ISU and a partner institution.