MECHANICAL ENGINEERING MAJOR, BACHELOR OF SCIENCE (BS)

This degree combines studies in selected areas of engineering, physics, mathematics, and science to prepare students to solve real-world problems in mechanical engineering. The Bachelor of Science in Mechanical Engineering Degree is accredited by the Engineering Accreditation Commission (EAC) of ABET, http://www.abet.org, under the General Criteria and the Mechanical Engineering Program Criteria. The first two years of the curriculum allow students to establish a solid foundation in mathematics, sciences and introduces foundation subjects in mechanical engineering. The third and fourth year curriculum explores further areas in Mechanical Engineering and a capstone is introduced in the fourth year. The senior year capstone course allows the students to consolidate their education experience.

The primary objective of the Mechanical Engineering program is to prepare students to enter and progress in mechanical engineering positions in business, industry and government. Graduates are generally expected to work in the research and development of ideas, products, and processes by applying engineering principles to the solution of practical problems in the mechanical engineering field. The number of majors, premajors, and graduates for Mechanical Engineering are available on the program website (https://www.ewu.edu/cstem/ment/mechanical-engineering-bs/).

Professional Licensing: Completing the Mechanical Engineering program at EWU counts towards the requirements for obtaining a Professional Engineering (PE) license. A PE license requires a four-year degree from an ABET-accredited school, four years of experience working under a PE, passing the Fundamentals of Engineering (FE) Exam and the Principles of Practice in Engineering (PE) Exam.

Minimum Required to Apply for Admission to the Mechanical Engineering Program

Students interested in this program should declare as a Pre-Mechanical Engineering major early in their freshman year. After completion of the courses listed below, students will then apply for admission to the Mechanical Engineering program at EWU (https://www.ewu.edu/cstem/ment/mechanical-engineering-bs/). The application is due during the first week of the quarter prior to the one desired for program admission. Admission is based upon the student's GPA in core courses shown below. Students must have completed, or be scheduled to complete, the following courses by the end of the quarter in which they apply. Most of the following courses have minimum grade requirements and are prerequisites for Mechanical Engineering and Technology courses in the program. The application can be obtained by email at MechEngineering@ewu.edu (mechengineering@ewu.edu).

Grades ≥C in all of the following are required for admission to the program.

- ENGL 201
- MATH 161 , MATH 162, and MATH 163
- MENG 240 and MENG 241
- PHYS 151, PHYS 152, PHYS 153, PHYS 161, PHYS 162, and PHYS 163
- CHEM 171 and CHEM 171L

Courses Required to be Completed at EWU

In order to ensure all EWU Mechanical Engineering graduates meet EWU ABET accreditation requirements, all Mechanical Engineering students are required to take MENG 300, MENG 353, MENG 385, MENG 405, MENG 412, and MENG 490A / MENG 490B from EWU. Exceptions to this policy will be reviewed on a case by case basis by the Mechanical Engineering curriculum review committee to ensure the student has successfully met the EWU ABET performance indicators required for each course.

Note: pre-program prerequisites include MATH 141, MATH 142, METC 102, METC 110.

Grade Requirements: In order to graduate, students majoring in the department must earn an average GPA ≥2.5 in all courses required for the major (all courses in the list below).

In addition to completing the courses listed below, students must also register for, and take, the Fundamentals of Engineering (FE) Exam in order to graduate with a Mechanical Engineering degree.

Required Supporting Outside Department Courses		
CHEM 171 & 171L	GENERAL CHEMISTRY I and GENERAL CHEMISTRY LABORATORY I (equivalent to banked CHEM 151)	5
MATH/HONS 161	CALCULUS I	5
MATH 162	CALCULUS II	5
MATH 163	CALCULUS III	5
MATH 241	CALCULUS IV	5
MATH 347	INTRODUCTORY DIFFERENTIAL EQUATIONS	4
PHYS 151	GENERAL PHYSICS I	4
PHYS 152	GENERAL PHYSICS II	4
PHYS 153	GENERAL PHYSICS III	4
PHYS 161	MECHANICS LABORATORY	1
PHYS 162	HEAT AND OPTICS LABORATORY	1
PHYS 163	ELECTRONICS LABORATORY I	1
Required Departmental Courses		
MENG 201	MATLAB	4-5
or CSCD 255	C PROGRAMMING FOR ENGINEERS	
MENG 207	ELECTRICITY	3
MENG 217	3D PARAMETRIC COMPUTER AIDED DESIGN	4
MENG 240	STATICS	4
MENG 241	STRENGTH OF MATERIALS	4
MENG 242	DYNAMICS	4
MENG 300	LABORATORY ANALYSIS AND REPORTS	5
MENG 307	INDUSTRIAL CONTROLS AND INSTRUMENTATION	5
MENG 353	INDUSTRIAL MATERIALS	5
MENG 380	THERMODYNAMICS	5
MENG 382	FLUID MECHANICS	5
MENG 385	ROBOTICS AND AUTOMATION	5
MENG 386	ENGINEERING NUMERICAL ANALYSIS	5
MENG 405	DESIGN OF MACHINE ELEMENTS	5
MENG 412	FUNDAMENTALS OF ENGINEERING	2
MENG 444	HEAT TRANSFER	5
MENG 452	ENGINEERING ECONOMICS	2
MENG 493	SENIOR SEMINAR	1

METC 456	ENGINEERING ETHICS, CONTRACTS AND PATENTS	2
MNTC 301	METALLIC PROCESSES	5
TECH/HONS 393	TECHNOLOGY WORLD CIVILIZATION	4
Senior Electives—choose a minimum of 20 credits from the following		**20**
MENG 407	HEATING, VENTILATING AND AIR CONDITIONING	
MENG 453	MATERIALS AND DESIGN	
MENG 455	COMPOSITE MATERIALS	
MENG 482	ADVANCED FLUID DYNAMICS	
MENG 485	ADVANCED ROBOTICS AND AUTOMATION	
MENG 486	PROGRAMMABLE LOGIC CONTROLLERS IN AUTOMATION	
MENG 487	MECHATRONICS	
MENG 492	FINITE ELEMENT ANALYSIS	
METC 417	ADVANCED PARAMETRIC DESIGN	
or METC 468	QUALITY ASSURANCE AND INTRO TO LEAN	
or MENG 491	SENIOR THESIS	
or MENG 495	INTERNSHIP	
Suggested focus areas for the Senior Electives are: Materials and Computational Mechanics—MENG 453, MENG 455, and MENG 492; Robotics and Automation—MENG 485, MENG 486, and MENG 487; Thermal and Fluid Sciences—MENG 407 and MENG 482		
Required Senior Capstone		
MENG 490A	SENIOR CAPSTONE: DESIGN LABORATORY I	2
MENG 490B	SENIOR CAPSTONE: DESIGN LABORATORY II	3
Total Credits		**153-154**

University Competencies and Proficiencies

English (http://catalog.ewu.edu/undergraduate-degree/#newitemtext)
Quantitative and Symbolic Reasoning (http://catalog.ewu.edu/undergraduate-degree/#mathcompproficienciestext)
Placement and Clearance (http://catalog.ewu.edu/placement/)
Prior Learning/Sources of Credit AP, CLEP, IB (http://catalog.ewu.edu/prior-learning/)

General Education Requirements (http://catalog.ewu.edu/undergraduate-degree/#generaleducationrequirementstext) (GER)

- Minimum Credits—180 cumulative credit hours
  - 60 upper-division credits (300 level or above)
  - 45 credits in residence (attendance) at Eastern, with at least 15 upper-division credits in major in residence at Eastern
- Minimum Cumulative GPA ≥2.0

Breadth Area Core Requirements (BACR)

Humanities and Arts (http://catalog.ewu.edu/undergraduate-degree/#humanitiesandfineartsgecrtext)
Natural Sciences (http://catalog.ewu.edu/undergraduate-degree/#naturalsciencesgecrtext)
Social Sciences (http://catalog.ewu.edu/undergraduate-degree/#socialsciencesgecrtext)

University Graduation Requirements (http://catalog.ewu.edu/undergraduate-degree/#universitygraduationrequirementstext) (UGR)

Diversity Course List (http://catalog.ewu.edu/undergraduate-degree/#cultureandgenderdiversityintheuslisttext)
Foreign Language (http://catalog.ewu.edu/undergraduate-degree/#foreignlanguageugrtext) (for Bachelor of Arts)
Global Studies Course List (http://catalog.ewu.edu/undergraduate-degree/#internationalstudiesrequirementtext)
Minor or Certificate (http://catalog.ewu.edu/undergraduate-degree/#majorminororcertificateugrtext)
Senior Capstone Course List (http://catalog.ewu.edu/undergraduate-degree/#capstonecourselisttext)

Application for Graduation (use EagleNET (https://inside.ewu.edu/eaglenet/)) must be made at least two terms in advance of the term you expect to graduate (undergraduate and post-baccalaureate).

```
Use the Catalog Archives (https://catalog.ewu.edu/archives/) to
 determine two important catalog years (http://catalog.ewu.edu/
undergraduate-degree/#activecatalogruletext).
```

```
Degree Works (https://inside.ewu.edu/records-and-registration/
degree-works/) calculates based on these two catalog years.
```

a. The catalog *in effect at the student's first term* of current matriculation is used to determine **BACR** (Breadth Area Credit Requirements) **and UGR** (Undergraduate Graduation Requirements).
b. The catalog *in effect at the time the student declares a major or minor* is used to determine the program requirements.

The most current Program Educational Objectives (PEOs) and Program Learning Outcomes (PLOs) are available on the website (https://www.ewu.edu/cstem/ment/mechanical-engineering-bs/).