

# MECHANICAL ENGINEERING TECHNOLOGY MAJOR, BACHELOR OF SCIENCE (BS)

This degree combines studies of mathematics, computer science, physics and mechanical engineering technology with an emphasis on applications. The Bachelor of Science in Mechanical Engineering Technology is accredited by the Engineering Technology Accreditation Commission (ETAC) of ABET, <https://www.abet.org> (<https://www.abet.org/>), under the General Criteria and the Mechanical Engineering Technology Program Criteria. Before graduation each student will participate in a design project and an internship in industry to gain industrial experience during their academic career before employment. The emphasis of this program is the application of engineering principles to the solution of practical problems. MET graduates are in great demand and are employed in a variety of interesting, high-tech careers throughout the state and region. Employment opportunities are available in mechanical design, industrial engineering technology, industrial management, manufacturing, CAD, applied research and technical sales and service. The number of majors, pre-majors and graduates for Mechanical Engineering Technology are available on the program website (<https://www.ewu.edu/cstem/ment/mechanical-engineering-bs/>).

**Professional Licensing:** Completion of the Mechanical Engineering program at EWU, an ABET-accredited program, meets the curricular requirements on the pathway to becoming licensed as a Professional Engineering (PE License) in Washington State. This program requires that students complete the Fundamentals of Engineering Exam (FE). In addition to these requirements, most states, including the state of Washington, require several years of experience working under a licensed Professional Engineer before being qualified to sit for the Professional Engineer (PE) Exam. Licensure requirements differ by state, please refer to each state's licensing board, or contact [mecheng@ewu.edu](mailto:mecheng@ewu.edu) for more information.

## Minimum Course Grades

Courses that serve as prerequisites to those listed below usually require a minimum grade of C or better. This information can be found in the prerequisites listed for the specific course.

## Courses Required to be Completed at EWU

In order to ensure all EWU Mechanical Engineering Technology graduates meet EWU ABET accreditation requirements, all Mechanical Engineering Technology students are required to take MENG 300, MENG 353, MENG 385, METC 415, 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 Technology curriculum review committee to ensure the student has successfully met the EWU ABET performance indicators required for each course.

Notes: Including university requirements for the degree the above program requires a minimum of 188 credits or an average load of 15.67 credits per quarter, for a 12 quarter, four-year program. The 188 credits are based on the following assumption: a. students have had one year of high school drafting. If this assumption is not true, then the student will have to take METC 102.

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

## Required Supporting Outside Department Courses

|                      |  |   |
|----------------------|--|---|
| CHEM 171 & 171L      | GENERAL CHEMISTRY I and GENERAL CHEMISTRY LABORATORY I | 5 |
| MATH 161             | CALCULUS I   | 5 |
| MATH 162             | CALCULUS II  | 5 |
| PHYS 131 or PHYS 151 | INTRODUCTORY PHYSICS I or GENERAL PHYSICS I            | 4 |
| PHYS 132 or PHYS 152 | INTRODUCTORY PHYSICS II or GENERAL PHYSICS II          | 4 |
| PHYS 133 or PHYS 153 | INTRODUCTORY PHYSICS III or GENERAL PHYSICS III        | 4 |
| PHYS 161             | MECHANICS LABORATORY                                   | 1 |
| PHYS 162             | HEAT AND OPTICS LABORATORY                             | 1 |
| PHYS 163             | ELECTRONICS LABORATORY I                               | 1 |

## Required Supporting MATH Courses—choose from the following 10

|          |                                       |  |
|----------|---------------------------------------|--|
| MATH 141 | PRECALCULUS I                         |  |
| MATH 142 | PRECALCULUS MATH II                   |  |
| MATH 163 | CALCULUS III                          |  |
| MATH 231 | LINEAR ALGEBRA                        |  |
| MATH 241 | CALCULUS IV                           |  |
| MATH 307 | MATHEMATICAL COMPUTING LABORATORY III |  |
| MATH 347 | INTRODUCTORY DIFFERENTIAL EQUATIONS   |  |
| MATH 380 | ELEMENTARY PROBABILITY AND STATISTICS |  |

## Required Departmental Courses

|                                  |   |     |
|----------------------------------|---|-----|
| MENG 201 or CSCD 255 or CSCD 409 | MATLAB or C PROGRAMMING FOR ENGINEERS or SCIENTIFIC PROGRAMMING | 4-5 |
| MENG 207                         | ELECTRICITY   | 3   |
| MENG 217                         | 3D PARAMETRIC COMPUTER AIDED DESIGN                             | 4   |
| MENG 300                         | LABORATORY ANALYSIS AND REPORTS                                 | 5   |
| MENG 307                         | INDUSTRIAL CONTROLS AND INSTRUMENTATION                         | 5   |
| MENG 353                         | INDUSTRIAL MATERIALS  | 5   |
| MENG 385                         | ROBOTICS AND AUTOMATION   | 5   |
| MENG 412                         | FUNDAMENTALS OF ENGINEERING                                     | 2   |
| MENG 452                         | ENGINEERING ECONOMICS   | 2   |
| MENG 493                         | SENIOR SEMINAR  | 1   |
| METC 110                         | ENGINEERING GRAPHICS  | 5   |
| METC 340 or MENG 240             | STATICS or STATICS  | 4-5 |
| METC 341 or MENG 241             | STRENGTH OF MATERIALS or STRENGTH OF MATERIALS                  | 4   |
| METC 342 or MENG 242             | DYNAMICS or DYNAMICS  | 4   |
| METC 387                         | FLUID MECHANICS   | 5   |
| METC 388                         | THERMODYNAMICS AND HEAT TRANSFER                                | 5   |
| METC 415                         | DESIGN OF MACHINE ELEMENTS                                      | 5   |
| METC 456                         | ENGINEERING ETHICS, CONTRACTS AND PATENTS                       | 2   |
| MNTC 301                         | METALLIC PROCESSES  | 5   |

|               |  |   |
|---------------|--|---|
| TECH/HONS 393 | TECHNOLOGY WORLD CIVILIZATION                | 4 |
| TECH 403      | COMPUTER-AIDED DESIGN AND PROJECT MANAGEMENT | 4 |

**Required Supporting Departmental Courses—choose three from the following** 15

|          |  |  |
|----------|--|--|
| MENG 407 | HEATING, VENTILATING AND AIR CONDITIONING    |  |
| MENG 453 | MATERIALS AND DESIGN                         |  |
| MENG 455 | COMPOSITE MATERIALS                          |  |
| MENG 485 | ADVANCED ROBOTICS AND AUTOMATION             |  |
| MENG 486 | PROGRAMMABLE LOGIC CONTROLLERS IN AUTOMATION |  |
| MENG 487 | MECHATRONICS                                 |  |
| METC 417 | ADVANCED PARAMETRIC DESIGN                   |  |
| METC 468 | QUALITY ASSURANCE AND INTRO TO LEAN          |  |
| METC 491 | SENIOR PROJECT                               |  |
| METC 495 | INTERNSHIP (variable credit)                 |  |
| MNTC 404 | COMPUTER NUMERICAL CONTROL                   |  |

**Required Senior Capstone Series**

|           |                                       |   |
|-----------|---------------------------------------|---|
| MENG 490A | SENIOR CAPSTONE: DESIGN LABORATORY I  | 2 |
| MENG 490B | SENIOR CAPSTONE: DESIGN LABORATORY II | 3 |

**Total Credits** 143-145

## Plan of Study

The following plan of study is for a student with zero credits. Individual students may have different factors such as: credit through transfer work, Advanced Placement, Running Start, or any other type of college-level coursework that requires an individual plan.

Courses could be offered in different terms, checking the academic schedule is paramount in keeping an individual plan current. **Students should connect with an advisor to ensure they are on track to graduate.**

All Undergraduate students are required to meet the Undergraduate Degree Requirements (<http://catalog.ewu.edu/undergraduate-degree/>).

| First Year            |         |                       |         |
|-----------------------|---------|-----------------------|---------|
| Fall Quarter          | Credits | Winter Quarter        | Credits |
| ENGL 101              | 5       | ENGL 201              | 5       |
| MATH 141 <sup>3</sup> | 5       | MATH 142 <sup>3</sup> | 5       |
| METC 110              | 5       | MENG 217              | 4       |
|                       | 15      |                       | 14      |
|                       |         |                       | 15      |

| Second Year                                  |         |  |         |
|--|---------|--|---------|
| Fall Quarter                                 | Credits | Winter Quarter                               | Credits |
| MATH 162                                     | 5       | CHEM 171 & 171L                              | 5       |
| PHYS 131 & PHYS 161 (Natural Science BACR 1) | 5       | MENG 201, CSCD 255, or CSCD 409              | 4-5     |
| Humanities & Arts BACR 2 <sup>1</sup>        | 5       | PHYS 132 & PHYS 162 (Natural Science BACR 2) | 5       |
|  | 15      |  | 14-15   |
|  |         |  | 15      |

| Third Year   |         |                |         |
|--------------|---------|----------------|---------|
| Fall Quarter | Credits | Winter Quarter | Credits |
| MENG 300     | 5       | MENG 207       | 3       |
| MENG 385     | 5       | MENG 353       | 5       |
| METC 340     | 5       | METC 341       | 4       |
|              |         |                | 3       |
|              |         |                | 5       |

|  |  |    |  |    |
|--|--|----|--|----|
|  | TECH 393 (Global Studies - graduation requirement) | 4  | Elective - certificate, minor, or general elective | 1  |
|  |  | 15 |  | 16 |
|  |  |    |  | 15 |

| Fourth Year   |         |   |         |
|---|---------|---|---------|
| Fall Quarter  | Credits | Winter Quarter  | Credits |
| MENG 452  | 2       | MENG 412  | 2       |
| MENG 493  | 1       | METC 456  | 2       |
| METC 388  | 5       | MENG 490A (Senior Capstone - graduation requirement)    | 2       |
| TECH 403  | 4       | Mechanical Engineering Technology Elective <sup>2</sup> | 5       |
| Mechanical Engineering Technology Elective <sup>2</sup> | 5       | Diversity - graduation requirement <sup>1</sup>         | 5       |
|   | 17      |   | 16      |
|   |         |   | 13      |

**Total Credits 180-181**

<sup>1</sup> University Graduation Requirements (UGR) and Breadth Area Course Requirements (BACR) courses may be less than 5 credits and additional credits may be required to reach the required 180 total credits needed to graduate. Students should connect with an advisor to ensure they are on track to graduate.

<sup>2</sup> Required Supporting Departmental Courses—choose three from the approved list.

<sup>3</sup> Required Supporting MATH Course

## University Competencies and Proficiencies

English (<http://catalog.ewu.edu/undergraduate-degree/#newitemtext>)

Quantitative and Symbolic Reasoning (<http://catalog.ewu.edu/undergraduate-degree/#mathcomproficiencies>)

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/#generaleducationrequirements>) (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  $\geq 2.0$

## Breadth Area Core Requirements (BACR)

Humanities and Arts (<http://catalog.ewu.edu/undergraduate-degree/#humanitiesandfinearts>)

Natural Sciences (<http://catalog.ewu.edu/undergraduate-degree/#naturalsciences>)

Social Sciences (<http://catalog.ewu.edu/undergraduate-degree/#socialsciences>)

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

Diversity Course List (<http://catalog.ewu.edu/undergraduate-degree/#cultureandgenderdiversity>)

World Language (<http://catalog.ewu.edu/undergraduate-degree/#worldlanguagetext>) (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>)

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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 (<http://catalog.ewu.edu/archives/>) to determine *two important catalog years*.

Requirements in Degree Works (<https://inside.ewu.edu/records-and-registration/degree-works/>) are 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.

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**Students who earn a BS in Mechanical Engineering Technology from EWU should be able to:**

- solve a wide range of applied engineering problems using what they learned both in school and after graduation;
- find the information they need in order to develop problem solutions;
- lead projects and small teams by serving as a liaison between the more technical and applied aspects of engineering and manufacturing;
- use their skills as an Engineering Professional to benefit society in whatever career path they choose.

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