

# Mechanical Engineering

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(Bachelor of Science)

## UW-Green Bay Engineering

One of the fastest-growing regions in the state and the Midwest for engineering jobs, Northeast Wisconsin will see tremendous growth in the need for and recruitment of new engineers. This region has the most open positions for engineers in the state and has seen an 18% increase in demand for engineers since 2010. Engineering as a career focuses on theoretical aspects of mathematical, scientific and engineering principals. New professionals with a Bachelor of Science in Mechanical Engineering from UW-Green Bay will be perfectly-timed and well-prepared to meet the swell in demand for engineers, leading to high-paying, rewarding careers in some of the region's most sought after employers.

## Mechanical Engineering

The University of Wisconsin-Green Bay is proud to be home of the only Mechanical Engineering program in Northeast Wisconsin. Part of the College of Science, Engineering and Technology (CSET) and offered through the (<https://www.uwgb.edu/mechanical-engineering/stem-center/>) Richard J. Resch School of Engineering (RSE), the Bachelor of Science (B.S.) in Mechanical Engineering is designed as a cutting-edge program that will offer students individualized attention from award-winning professors, a hands-on education with state-of-the-art equipment, and opportunities for research and internships with some of the largest companies and employers in the region. The UW-Green Bay Mechanical Engineering program is housed in the newly constructed STEM Innovation Center building.

Mechanical engineering is a diverse and flexible engineering discipline. Mechanical engineers work in number of fields including design of machinery, controls, vibrations and acoustics, power generation, renewable energy, energy conservation, fluid flow and heat transfer applications, and air-conditioning. The program synthesizes math, science, engineering science, and engineering design. The program provides electives in several general areas, including thermal-sciences, mechanical design and manufacturing, robotics and automation, mechanical and environmental systems, and renewable energy. Students begin the practice of design in their freshman year and integrate it throughout their programs which culminate in a team-oriented capstone design project in the senior year. The program is geared to prepare students for the lifelong practice of mechanical engineering and for immediate entry to positions in industry or further studies in graduate schools.

Students will benefit from relationships with local technical colleges, and local industry to complete a B.S. in engineering in the Northeast Wisconsin area. Students may start earning their degree at UW-Green Bay or local technical colleges to give maximum flexibility in degree completion. In addition, the Northeast Wisconsin Educational Resource Alliance, NEW ERA, has established advisory boards linking leaders in regional industry and participating institutions to the major. Through these relationships students will have many opportunities for internships, co-op experiences, and employment after graduation.

## Mechanical Engineering Program Learning Outcomes

1. Be employed as a mechanical engineer and perform all functions assigned to a mechanical engineer including completing engineering designs and other applications using both practical and theoretical knowledge characterized by their interdisciplinary strengths.
2. Function effectively both as a leader and as a mentor of project teams, demonstrating effective communication skills and ethical behavior.
3. Achieve positions of increased responsibility within an organization and practice continued education through advanced degree or certificate programs or participation in continuing education in engineering or related professional fields.
4. Adapt to changing industrial and technological advancements and be committed to continuous improvement.

## Contact

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## Major

| Code  | Title   | Credits      |
|---|---|--------------|
| <b>Supporting Courses</b>                                       |   | <b>33-39</b> |
| MATH 202  | Calculus and Analytic Geometry I  |              |
| MATH 203  | Calculus and Analytic Geometry II   |              |
| MATH 260  | Introductory Statistics   |              |
| MATH 209  | Multivariate Calculus   |              |
| ET 207  | Parametric Modeling   |              |
| ENGR 104  | Engineering Graphics  |              |
| ENGR 204  | Programming for Engineers   |              |
| ENGR 236  | Technical Writing   |              |
| PHYSICS 202   | Principles of Physics II  |              |
| PHYSICS 204   | Introductory Physics Lab II   |              |
| <b>Chemistry options (choose one):</b>                          |   |              |
| CHEM 211<br>& CHEM 212<br>& CHEM 213<br>& CHEM 214<br>or ET 206 | Principles of Chemistry I<br>and Principles of Chemistry II<br>and Principles of Chemistry I Laboratory<br>and Principles of Chemistry II Laboratory<br>Chemistry for Engineers |              |
| <b>Fundamentals Courses</b>                                     |   | <b>16</b>    |
| ENGR 201  | Engineering Materials   |              |
| ENGR 213  | Mechanics I   |              |
| ENGR 214  | Mechanics II  |              |
| ENGR 216  | Basic Manufacturing Processes   |              |
| ENGR 220  | Mechanics of Materials  |              |
| ENGR 221  | Mechanics of Materials Lab  |              |
| <b>Upper-Level Courses</b>                                      |   |              |
| <b>Supporting Courses</b>                                       |   | <b>7</b>     |
| ENGR 326  | Numerical Methods   |              |
| MATH 305  | Ordinary Differential Equations   |              |
| <b>Fundamentals Courses</b>                                     |   | <b>6</b>     |
| ENGR 308  | Electrical and Electronic Circuits  |              |
| ENGR 312  | Engineering Measurements  |              |
| ENGR 322  | Engineering Measurements Lab  |              |
| <b>Advanced Courses</b>   |   | <b>23</b>    |
| ENGR 324  | Engineering Thermodynamics  |              |
| ENGR 336  | Fluids  |              |
| ENGR 337  | Fluids Lab  |              |
| ENGR 340  | Analysis of Dynamic Systems   |              |
| ENGR 408  | Finite Element Analysis   |              |
| ENGR 420  | Machine Component Design I  |              |
| ENGR 430  | Heat Transfer   |              |
| ENGR 431  | Thermal Lab   |              |
| ENGR 432  | Automatic Controls  |              |
| <b>Capstone Requirement</b>                                     |   | <b>3</b>     |
| ENGR 460  | Senior Design   |              |
| <b>Technical Electives (choose three courses):</b>              |   | <b>9</b>     |
| ET 360  | Project Management  |              |
| ET 385  | Robotics  |              |
| ET 390  | Mechatronics  |              |
| ET 400<br>or ENGR 494   | Co-op/Internship in Engineering Technology<br>Co-op   |              |

|          |                                     |
|----------|-------------------------------------|
| ENGR 334 | Industrial Decision Processes       |
| ENGR 344 | Mechanical Vibration                |
| ENGR 422 | Machine Component Design II         |
| ENGR 498 | Independent Study (up to 3 credits) |

**Total Credits****97-103**

## Curriculum Guide

The following curriculum guide is for a four-year **Mechanical Engineering** degree program and is subject to change without notice. Students should consult their program advisor to ensure that they have the most accurate and up-to-date information available.

Total **123** credits necessary to graduate.

| Course                    | Title  | Credits   |
|---------------------------|--|-----------|
| <b>Freshman</b>           |  |           |
| <b>Fall</b>               |  |           |
| MATH 202                  | Calculus and Analytic Geometry I                         | 4         |
| ET 206                    | Chemistry for Engineers                                  | 4         |
| ENGR 104                  | Engineering Graphics                                     | 1         |
| First Year Seminar (FYS)  |  | 3         |
| General Education         |  | 3         |
| <b>Credits</b>            |  | <b>15</b> |
| <b>Spring</b>             |  |           |
| MATH 203                  | Calculus and Analytic Geometry II                        | 4         |
| ENGR 204                  | Programming for Engineers                                | 2         |
| ET 207                    | Parametric Modeling                                      | 2         |
| MATH 260                  | Introductory Statistics                                  | 4         |
| General Education         |  | 3         |
| <b>Credits</b>            |  | <b>15</b> |
| <b>Sophomore</b>          |  |           |
| <b>Fall</b>               |  |           |
| MATH 209                  | Multivariate Calculus                                    | 4         |
| ENGR 201                  | Engineering Materials                                    | 2         |
| ENGR 213                  | Mechanics I  | 3         |
| ENGR 236                  | Technical Writing  | 3         |
| General Education         |  | 3         |
| <b>Credits</b>            |  | <b>15</b> |
| <b>Spring</b>             |  |           |
| ENGR 214                  | Mechanics II   | 3         |
| ENGR 216                  | Basic Manufacturing Processes                            | 3         |
| ENGR 220                  | Mechanics of Materials                                   | 3         |
| ENGR 221                  | Mechanics of Materials Lab                               | 1         |
| General Education         |  | 3         |
| General Education         |  | 3         |
| <b>Credits</b>            |  | <b>16</b> |
| <b>Junior</b>             |  |           |
| <b>Fall</b>               |  |           |
| PHYSICS 202 & PHYSICS 204 | Principles of Physics II and Introductory Physics Lab II | 5         |
| MATH 305                  | Ordinary Differential Equations                          | 4         |
| ENGR 326                  | Numerical Methods  | 3         |
| ENGR 308                  | Electrical and Electronic Circuits                       | 3         |
| <b>Credits</b>            |  | <b>15</b> |
| <b>Spring</b>             |  |           |
| Technical Elective I      |  | 3         |
| ENGR 312                  | Engineering Measurements                                 | 2         |
| ENGR 322                  | Engineering Measurements Lab                             | 1         |
| ENGR 324                  | Engineering Thermodynamics                               | 3         |
| ENGR 340                  | Analysis of Dynamic Systems                              | 3         |
| General Education         |  | 3         |
| <b>Credits</b>            |  | <b>15</b> |

|                        |                            |            |
|------------------------|----------------------------|------------|
| <b>Senior</b>          |                            |            |
| <b>Fall</b>            |                            |            |
| Technical Elective II  |                            | 3          |
| ENGR 336               | Fluids                     | 3          |
| ENGR 337               | Fluids Lab                 | 1          |
| ENGR 408               | Finite Element Analysis    | 3          |
| ENGR 420               | Machine Component Design I | 3          |
| General Education      |                            | 3          |
| <b>Credits</b>         |                            | <b>16</b>  |
| <b>Spring</b>          |                            |            |
| Technical Elective III |                            | 3          |
| ENGR 430               | Heat Transfer              | 3          |
| ENGR 431               | Thermal Lab                | 1          |
| ENGR 460               | Senior Design              | 3          |
| General Education      |                            | 3          |
| General Education      |                            | 3          |
| <b>Credits</b>         |                            | <b>16</b>  |
| <b>Total Credits</b>   |                            | <b>123</b> |

Technical Electives (choose any three):

1. ENGR 334 Industrial Decision Processes (3 s.h.)
2. ENGR 344 Mechanical Vibration (3 s.h.)
3. ENGR 422 Machine Component Design II (3 s.h.)
4. ENGR 432 Automatic Controls (3 s.h.)
5. ENGR 498 Independent Study (1-4 s.h.)
6. ET 360 Project Management (3 s.h.)
7. ET 385 Robotics (3 s.h.)
8. ET 390 Mechatronics (3 s.h.)
9. ET 400 Co-op/Internship in Engineering Technology (3 s.h.) or ENGR 494 Co-op (1-2 s.h.)
10. ET 415 Solar and Alternate Energy Systems (3 s.h.)

## Faculty

**Maruf Hossain**; Professor; Ph.D., University of Memphis

**John F Katers**; Professor; Ph.D., Marquette University\*

**Patricia A Terry**; Professor; Ph.D., University of Colorado, chair\*

**Riaz Ahmed**; Associate Professor; Ph.D., University of South Carolina

**Michael Holly**; Associate Professor; Ph.D., University of Wisconsin - Madison

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