BACHELOR OF SCIENCE WITH A MAJOR IN MECHANICAL ENGINEERING, ROBOTICS OPTION

Mechanical engineering encompasses a vast range of industrial activities. Mechanical engineers conceive, plan, design, and direct the manufacture, distribution, and operation of complex systems. Applications include aerospace, energy conversion, computer-aided design and manufacturing, power and propulsion systems, robotics, and control systems. The bachelor of science with a major in mechanical engineering, robotics option degree program prepares students to work in the robotics industry or to pursue graduate study in robotics engineering. It provides a strong foundation in robotic mechanisms design, analysis, and integration; kinematics, dynamics, and control of robots; mechatronics design; sensing, actuation, and measurement; microprocessors for robotic systems; robotic haptics; and topics on artificial intelligence. The mechanical engineering (ME) program is accredited by the Accreditation Commission of ABET (https://www.abet.org).

Visit the program website (http://www.mae.seas.gwu.edu/programs-degrees) for additional information.

Bachelor of Sciences with a Second Major in Mechanical Engineering, Robotics Option

Any undergraduate student who is enrolled at GW may declare a second major in mechanical engineering only if his or her primary degree is a BS. The student must meet the degree requirements for a bachelor of science in mechanical engineering, including SEAS general, major, technical electives, humanities/social science, and SEAS/technical GPA requirements. Students earning other degrees (e.g., BA, BBA, BFA) must meet the requirements for a double degree (http://bulletin.gwu.edu/university-regulations/#DDegrees).

Graduation grade-point average criteria:
To satisfactorily complete a second major in biomedical engineering, a student must have a minimum grade-point average of 2.2 in all technical engineering courses outlined in the fifth, sixth, seventh, and eighth semesters of the curriculum.

REQUIREMENTS

Recommended program of study

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td></td>
<td><strong>First semester</strong></td>
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</tr>
<tr>
<td>CHEM 1111</td>
<td>General Chemistry I ¹</td>
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<tr>
<td>UW 1020</td>
<td>University Writing ¹</td>
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<td></td>
<td><strong>Second semester</strong></td>
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<tr>
<td>MATH 2184</td>
<td>Linear Algebra I</td>
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<tr>
<td>MAE 1004</td>
<td>Engineering Drawing and Computer Graphics</td>
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<tr>
<td>MATH 1232</td>
<td>Single-Variable Calculus II ¹</td>
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<tr>
<td>MAE 1117</td>
<td>Introduction to Engineering Computations</td>
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<tr>
<td>PHYS 1021</td>
<td>University Physics I ¹</td>
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<td><strong>Third semester</strong></td>
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<tr>
<td>APSC 2057</td>
<td>Analytical Mechanics I</td>
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<td>APSC 2113</td>
<td>Engineering Analysis I</td>
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<tr>
<td>MAE 2117</td>
<td>Engineering Computations</td>
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<tr>
<td>MATH 2233</td>
<td>Multivariable Calculus ¹</td>
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<td>PHYS 1022</td>
<td>University Physics II ¹</td>
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<td><strong>Fourth semester</strong></td>
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<tr>
<td>APSC 2058</td>
<td>Analytical Mechanics II</td>
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<tr>
<td>ECE 2110</td>
<td>Circuit Theory</td>
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<tr>
<td>MAE 2131</td>
<td>Thermodynamics</td>
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<tr>
<td>CE 2220</td>
<td>Introduction to the Mechanics of Solids</td>
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<td><strong>Fifth semester</strong></td>
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<tr>
<td>MAE 3166W</td>
<td>Materials Science and Engineering</td>
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<tr>
<td>MAE 3191</td>
<td>Mechanical Design of Machine Elements</td>
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<tr>
<td>MAE 3192</td>
<td>Manufacturing Processes and Systems</td>
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<tr>
<td>APSC 3115</td>
<td>Engineering Analysis III</td>
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<tr>
<td>MAE 3126</td>
<td>Fluid Mechanics I</td>
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<td><strong>Sixth semester</strong></td>
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<tr>
<td>ECE 2115</td>
<td>Engineering Electronics</td>
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<tr>
<td></td>
<td><strong>Humanities or social sciences elective ²</strong></td>
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¹ Exclusively or primarily for electrical engineering.
² Not included in credit requirement.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>MAE 3120</td>
<td>Methods of Engineering Experimentation</td>
</tr>
<tr>
<td>MAE 3193</td>
<td>Mechanical Systems Design</td>
</tr>
<tr>
<td>MAE 3134</td>
<td>Linear System Dynamics</td>
</tr>
<tr>
<td>MAE 3167W</td>
<td>Mechanics of Materials Lab</td>
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<tr>
<td>MAE 4182</td>
<td>Electromechanical Control System Design</td>
</tr>
<tr>
<td>MAE 4183</td>
<td>Controls Lab</td>
</tr>
<tr>
<td>MAE 4151</td>
<td>Capstone Design Project I</td>
</tr>
<tr>
<td>MAE 6245</td>
<td>Robotic Systems</td>
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<tr>
<td>MAE 3187</td>
<td>Heat Transfer</td>
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**Seventh semester**

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<tr>
<td>MAE 4151</td>
<td>Capstone Design Project I</td>
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<td>Two Technical electives</td>
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<td>Humanities or social sciences elective</td>
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**Eighth semester**

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<tr>
<td>MAE 4152W</td>
<td>Capstone Design Project II</td>
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<tr>
<td>MAE 4194</td>
<td>Mechatronics Design</td>
</tr>
<tr>
<td>MAE 4195</td>
<td>Mechatronics Lab</td>
</tr>
<tr>
<td>MAE 6245</td>
<td>Robotic Systems</td>
</tr>
<tr>
<td>MAE 3187</td>
<td>Heat Transfer</td>
</tr>
<tr>
<td>Humanities or social sciences elective</td>
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</table>

1 Course satisfies the University General Education Requirement (http://bulletin.gwu.edu/university-regulations/general-education) in math, science, and writing.

2 To satisfy the SEAS humanities and social sciences requirement, all mechanical engineering students must take one humanities course and two social sciences courses from the University General Education Requirement (http://bulletin.gwu.edu/university-regulations/general-education); PHIL 2135 Ethics in Business and the Professions; and two additional humanities or social sciences or non-technical courses from the MAE Department’s pre-approved list of electives. Each course selected to satisfy this requirement must be taken for at least 3 credits. NOTE: Students in the patent law concentration must take MAE 2170 History and Impact of the U.S. Patent System in lieu of one of the additional humanities or social sciences or non-technical course.

3 All technical electives must be approved by the undergraduate advisor. On a case-by-case basis, technical electives may be chosen from other departments if approved by both the undergraduate advisor and the department chair. Technical electives are chosen from MAE courses in the 3000, 4000, and 6000 series, excluding: MAE 3171 Patent Law for Engineers, MAE 4172 Engineering Design and the Patent System, MAE 6298 Research, MAE 6998 MS Thesis Research, and MAE 6999 MS Thesis Research. Visit the program website (http://www.mae.seas.gwu.edu/programs-degrees) for additional information.