

# 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/>).

## Double major

SEAS and non-SEAS students interested in pursuing the BS in mechanical engineering as a double major should see Double Major under SEAS Regulations (<http://bulletin.gwu.edu/engineering-applied-science/#seasregulationstext>) in this Bulletin.

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

## REQUIREMENTS

Code	Title	Credits
<b>Recommended program of study</b>		
<b>First semester</b>		
CHEM 1111	General Chemistry I <sup>1</sup>	
or CHEM 1113	General Chemistry for Engineers	
MAE 1001	Introduction to Mechanical and Aerospace Engineering	
MATH 1231	Single-Variable Calculus I <sup>1</sup>	
SEAS 1001	Engineering Orientation	
UW 1020	University Writing <sup>1</sup>	
One humanities or social sciences elective <sup>2</sup>		
<b>Second semester</b>		
MAE 1004	Engineering Drawing and Computer Graphics	
MAE 1117	Introduction to Engineering Computations	

MATH 1232	Single-Variable Calculus II <sup>1</sup>
MATH 2184	Linear Algebra I
PHYS 1021	University Physics I <sup>1</sup>
One humanities or social sciences elective <sup>2</sup>	
<b>Third semester</b>	
APSC 2057	Analytical Mechanics I
APSC 2113	Engineering Analysis I
MAE 2117	Engineering Computations
MAE 3192	Manufacturing Processes and Systems
MATH 2233	Multivariable Calculus <sup>1</sup>
<b>Fourth semester</b>	
APSC 2058	Analytical Mechanics II
APSC 3115	Engineering Analysis III
CE 2220	Introduction to the Mechanics of Solids
MAE 2131	Thermodynamics
PHYS 1022	University Physics II
<b>Fifth semester</b>	
MAE 3126	Fluid Mechanics I
MAE 3127	Fluid Mechanics Lab
MAE 3166W	Materials Science and Engineering
MAE 3191	Mechanical Design of Machine Elements
MAE 3119	Electronics and Devices for Mechanical Engineers
One humanities or social sciences elective <sup>2</sup>	
<b>Sixth semester</b>	
MAE 3120	Methods of Engineering Experimentation
MAE 3134	Linear System Dynamics
MAE 3167W	Mechanics of Materials Lab
MAE 3187	Heat Transfer
MAE 3193	Mechanical Systems Design
One humanities or social sciences elective <sup>2</sup>	
<b>Seventh semester</b>	
MAE 4151	Capstone Design Project I

MAE 4182	Electromechanical Control System Design
One humanities or social sciences elective <sup>2</sup>	
One technical or robotics elective <sup>3,4</sup>	
One technical elective <sup>3</sup>	
<b>Eighth semester</b>	
MAE 4152W	Capstone Design Project II
MAE 4194	Mechatronics Design
MAE 6245	Robotic Systems
One technical or robotics elective <sup>3,4</sup>	
One humanities or social sciences elective <sup>2</sup>	

<sup>1</sup>Course satisfies the University General Education Requirement (<http://bulletin.gwu.edu/university-regulations/general-education/>) in quantitative reasoning, scientific reasoning, and written communication.

<sup>2</sup>To satisfy the SEAS humanities, social sciences, and non-technical electives 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; and two additional humanities or social sciences or non-technical courses from the MAE Department's preapproved list of electives. Each course selected to satisfy this requirement must be taken for at least 3 credits.

<sup>3</sup>Robotics option students must take two technical electives. 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, MAE 4172, MAE 6298, MAE 6998, and MAE 6999.

<sup>4</sup>Robotics option students must take one 3-credit robotics elective, which must be selected from the following: MAE 6246, MAE 6254, BME 4835, or a technical elective course relevant to robotics with the approval of the undergraduate advisor and department chair.

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