

MECHANICAL ENGINEERING - ROBOTICS AND AUTONOMOUS VEHICLES CONCENTRATION

Department: Mechanical Engineering (<https://catalog.bradley.edu/undergraduate/engineering-technology/mechanical-engineering/>)

The baccalaureate program in mechanical engineering is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org> (<https://www.abet.org/>).

Mission and Objectives

The mission of the Mechanical Engineering Department is to produce mechanical engineering graduates who possess the acumen, competence, and skills needed to enter, succeed, and lead in professional practice and/or graduate school. The goal is to provide a learning and nurturing environment that stimulates faculty and students to collaborate in solving practical problems, motivates lifelong learning, and helps them reach their highest potential.

The program educational objectives of the department are that alumni meet the following goals within a few years of graduation from the mechanical engineering program:

1. Are in professional practice or are pursuing advanced studies in mechanical engineering or related fields.
2. Are using their educational foundation to engage in lifelong learning
3. Are engaged and adding value in multidisciplinary environments through local, regional, national or international practice to meet global technological and societal changing needs.

Student Outcomes

In order to meet these program educational objectives, students graduating from Bradley's mechanical engineering program will attain the following outcomes.

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet objectives.
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Mechanical engineering is the broadest and most versatile of the engineering professions. Mechanical engineers are particularly concerned with the application of science and technology to translate ideas and theories into realistic engineering solutions that satisfy the needs of society, by using a combination of human, material, and economic resources. The broad discipline of mechanical engineering can be organized into two main branches, namely mechanical systems and thermal systems.

- Within mechanical systems, the following specialties may be pursued: applied mechanics, dynamic and control systems including robotics, materials, nanotechnology, and micro-electromechanical systems (MEMS).
- Within thermal systems, the following specialties may be pursued: energy systems, including aerospace, diesel and gasoline engine power, gas turbines, and solar energy, fluid dynamics, heat transfer, and air pollution control.
- Spanning both branches are the following specialties: bioengineering and computer and microprocessor applications

The concentration in Robotics and Autonomous Vehicles is designed to provide the most essential and practical knowledge/skills in robotics and autonomous vehicles to students majoring in Mechanical Engineering (<https://catalog.bradley.edu/undergraduate/programs/mechanical-engineering-major/>) and other disciplines. Completing this concentration will prepare students for careers in this area or to pursue graduate education in Robotics and Autonomous Vehicles.

The Robotics and Autonomous Vehicles concentration requires the complete Mechanical Engineering curriculum with the following exceptions:

Code	Title	Hours
Approved Robotics and Autonomous Vehicles Concentration		
Technical Electives		
M E 561/ECE 444	Introduction to Robotics	3.0
M E 562	Dynamics, Modeling, and Control of Robots	3.0
M E 564	Sensor, Actuators, and Computer Vision	3.0
Select one Cognition Elective from the following:		3.0
CS 461	Artificial Intelligence	
CS 462	Machine Learning	
CS 463	Knowledge Discovery and Data Mining	
Select one Mechatronics Elective from the following:		3.0
M E 549	Microprocessor Interfacing in Mechanical Systems	
ECE 468	Mechatronics	
Total Hours		15