

Mechanical Engineering

The mission of the School of Mechanical, Aerospace, and Materials Engineering is to provide high-quality engineering education to students and equip them with lifelong learning skills, which allow them to adapt to a changing work environment throughout their careers. Also, the School of Mechanical, Aerospace, and Materials Engineering supports faculty growth and development through research and creative activities, because quality teaching and service to humanity and society cannot be achieved without such activities. Finally, the School of Mechanical, Aerospace, and Materials Engineering supports the idea of service to school, college, university, professional societies, and community as part of the mission. The undergraduate program in Mechanical Engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org. The school also offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees.

Bachelor of Science (B.S.) in Mechanical Engineering

The fundamental goal of the undergraduate program in Mechanical Engineering is to offer a high-quality education for our students, designed to achieve the following Program Educational Objectives (PEOs), which describe what graduates are expected to attain within a few years after graduation.

Our Bachelor of Science (B.S.) degree in Mechanical Engineering prepares our students to excel in their careers. Within three to five years of graduating, our graduates will:

1. Attain increased responsibility beyond their entry-level position within Mechanical Engineering or related employment, while recognizing global and societal matters.
2. Become ambassadors for engineering and improve the quality of life in the communities they serve, through collaboration, innovation, and effective communication.
3. Successfully progress within graduate degree programs in Mechanical Engineering, progress toward their professional degrees or professional engineering licenses, and/or continue lifelong learning in a broad range of fields to advance their careers.
4. Successfully serve the profession by acting in a professional and ethical manner.

Also, the undergraduate program is designed to achieve the following Student Outcomes (SOs), which describe what students are expected to know and be able to do by the time of graduation:

1. The ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. The 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. The ability to communicate effectively with a range of audiences.
4. The ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. The ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. The ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.
7. The ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Mechanical engineering is one of the broadest fields of engineering. Mechanical engineers learn measurement and instrumentation, computer-aided design, computer simulation, computer control, and combustion and engine analysis. They learn to design thermal systems for mechanical and electrical equipment including heating, ventilating, air conditioning, and refrigeration. Students learn how to design and produce new materials for advanced engineering applications. Courses are also offered in subjects related to the chemical process and environmental control industries. The school offers a program leading to a Bachelor of Science degree in Mechanical Engineering. Students may choose to obtain a Bachelor of Science in Mechanical Engineering with a specialization in Aerospace Engineering, Energy Engineering, or Materials, Science & Engineering. In addition, a Minor in Energy Engineering is offered to

non-Mechanical Engineering students provided they meet the requirements. Graduates are highly sought after in a variety of industries such as automotive, aerospace and manufacturing.

B.S. Mechanical Engineering Degree Requirements

| Degree Requirements | Credit Hours |
|---|--------------|
| University Core Curriculum Requirements (should include BIOL 202, ECON 240 and MATH 150) | 39 |
| Requirements for Major in Mechanical Engineering | (9)+87 |
| Basic Science | (6)+9 |
| CHEM 200, CHEM 201, CHEM 210 | (3)+4 |
| PHYS 205A, PHYS 205B, PHYS 255A, PHYS 255B | (3)+5 |
| Mathematics Analysis | (3)+14 |
| MATH 150, MATH 250, MATH 251, MATH 305 | (3)+11 |
| ENGR 351 | 3 |
| Required Engineering Courses | 17 |
| ENGR 222 or ENGR 296 or ME 222 | 2 |
| ENGR 250, ENGR 261, ENGR 335, ENGR 350A, ENGR 370A | 15 |
| Required ME Courses | 47 |
| ME 102, ME 300, ME 302, ME 309, ME 312, ME 336, ME 401, ME 407, ME 411, ME 475, ME 495A, ME 495B | 32 |
| Mechanical Engineering Elective Courses. At least 12 credit hours must be from 400-level ME courses and 3 credit hours may be from IMAE 470A or a 400-level course used for a Math minor. | 15 |
| Total | 126 |

Aerospace Engineering Specialization

Aerospace Engineering Specialization requires:

3 credit hours from the following list:

- ME 486, ME 422, ME 480, ME 478, ME 470, ME 449 -AND-

6 credit hours from the following list:

- ME 427, ME 437, ME 447

B.S. Mechanical Engineering - Aerospace Engineering Specialization Degree Requirements

| Degree Requirements | Credit Hours |
|---|--------------|
| University Core Curriculum Requirements | 39 |
| Requirements for Major in Mechanical Engineering | (9)+87 |
| Basic Science | (6)+9 |
| CHEM 200, CHEM 201, CHEM 210 | (3)+4 |
| PHYS 205A, PHYS 205B, PHYS 255A, PHYS 255B | (3)+5 |
| Mathematics Analysis | (3)+14 |
| MATH 150, MATH 250, MATH 251, MATH 305 | (3)+11 |
| ENGR 351 | 3 |
| Required Engineering Courses | 17 |
| ENGR 296 | 2 |
| ENGR 250, ENGR 261, ENGR 335, ENGR 350A, ENGR 370A | 15 |
| Required ME Courses | 47 |
| ME 102, ME 300, ME 302, ME 309, ME 312, ME 336, ME 401, ME 407, ME 411, ME 475, ME 495A, ME 495B | 32 |
| Aerospace Elective Courses | 9 |
| Mechanical Engineering Elective Courses. Must be from 400-level ME courses, or may be from IMAE 470A or a 400-level course used for a Math minor. | 6 |
| Total | 126 |

B.S. Mechanical Engineering - Energy Engineering Specialization Degree Requirements

| Degree Requirements | Credit Hours |
|--|--------------|
| University Core Curriculum Requirements | 39 |
| Requirements for Major in Mechanical Engineering | (9) + 87 |
| Basic Science | (6)+9 |
| CHEM 200, CHEM 201, CHEM 210 | (3)+4 |
| PHYS 205A, PHYS 205B, PHYS 255A, PHYS 255B | (3)+5 |
| Mathematics Analysis | (3)+14 |
| MATH 150, MATH 250, MATH 251, MATH 305 | (3)+11 |
| ENGR 351 | 3 |
| Required Engineering Courses | 17 |
| ENGR 296 or ME 222 | 2 |
| ENGR 250, ENGR 261, ENGR 335, ENGR 350A, ENGR 370A | 15 |
| Required ME Courses | 47 |
| ME 102, ME 300, ME 302, ME 309, ME 312, ME 336, ME 401, ME 407, ME 411, ME 475, ME 495A, ME 495B | 32 |
| Elective Energy Courses ¹ | 12 |
| Mechanical Engineering Courses. Must be from 400-level ME courses, or may be from IMAE 470A or a 400-level course used for a Math minor. | 3 |
| Total | 126 |

¹ *Approved electives: ME 400, ME 405, ME 406, ME 408, ME 410, ME 435, ME 440, ME 446, ME 450, ME 459, ME 493*

B.S. Mechanical Engineering - Materials Science & Engineering Specialization

| Degree Requirements | Credit Hours |
|---|--------------|
| University Core Curriculum Requirements | 39 |

| Degree Requirements | Credit Hours |
|---|--------------|
| Requirements for Major in Mechanical Engineering | (9) + 87 |
| Basic Science | (6)+9 |
| CHEM 200, CHEM 201, CHEM 210 | (3)+4 |
| PHYS 205A, PHYS 205B, PHYS 255A, PHYS 255B | (3)+5 |
| Mathematics Analysis | (3)+14 |
| MATH 150, MATH 250, MATH 251, MATH 305 | (3)+11 |
| ENGR 351 | 3 |
| Required Engineering Courses | 17 |
| ENGR 296 or ENGR 222 | 2 |
| ENGR 250, ENGR 261, ENGR 335, ENGR 350A, ENGR 370A | 15 |
| Required ME Courses | 47 |
| ME 102, ME 300, ME 302, ME 309, ME 312, ME 336, ME 401, ME 407, ME 411, ME 475, ME 495A, ME 495B | 32 |
| Materials Science & Engineering Elective Courses ¹ | 12 |
| Mechanical Engineering Elective Courses. Must be from 400-level ME courses, or may be from IMAE 470A or a 400-level course used for a Math minor. | 3 |
| Total | 126 |

¹ *Approved electives: ME 410, ME 450, ME 463, ME 465, ME 472, ME 486, ME 493*

Energy Engineering (for non-Mechanical Engineering) Minor

| Degree Requirements | Credit Hours |
|--------------------------------------|--------------|
| Required ME Courses | 6 |
| ME 300, ME 302 ¹ | |
| Elective Energy Courses ² | 9 |
| Total | 15 |

¹ Prerequisites for ME 302 are ME 300 and MATH 305. Equivalence for ME 300 and ENGR 370A will be considered.

² Approved electives: ME 400, ME 405, ME 406, ME 408, ME 410, ME 435, ME 440, ME 446, ME 450, ME 459, ME 493.

Capstone Option for Transfer Students

The [SIU Carbondale Capstone Option](#) is available to students who have earned an Associate in Engineering Sciences (A.E.S.) degree with a minimum cumulative 2.0/4.0 GPA on all accredited coursework prior to the completion of the A.E.S., as calculated by the transfer institution's grading policies. The Capstone Option reduces the University Core Curriculum requirements from 39 to 30 credit hours, therefore reducing the time to degree completion.

Students interested in the Capstone Option should contact the College of Engineering, Computing, Technology, and Mathematics Advisement Office to develop a personal coursework pathway to degree completion.

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