

MECHANICAL ENGINEERING, BS

Banner Code: VS-BS-ME

Academic Advising

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Today, the role of mechanical engineer is ever expanding in order to find innovative solutions for contemporary problems, and to address problems yet to be identified. To meet the growing demands of worldwide energy needs spurred by population growth and dwindling supplies of fossil fuels, for instance, mechanical engineers seek innovations in nuclear energy, bio-fuels, wind, and tidal energies to build an energy portfolio that exploits these seemingly limitless resources. From product design, which spans from biomedical devices to turbo-machinery, to manufacturing, which develops machines and systems needed to process raw materials into these products, an awareness of the benefits of advanced materials for sensing and monitoring the health of these systems and an awareness of the stealth threats to manufacturing brought on by an ever present cyber threat are in the minds of the mechanical engineers. Now more mechanical engineers oversee the operations and management of large systems along with the fiscal and human resources needed to run them.

James Michener once said, "Scientists dream about doing great things. Engineers do them." Mechanical engineers use science to advance technologies and to develop products for the benefit of society, in a discipline which dates back to the earliest of times in civilization. The major in mechanical engineering has three program education objectives, namely:

- Graduates have demonstrated success as a mechanical engineer or their chosen career field;
- Graduates have advanced their educational pursuits through graduate education, professional registration, or similar means;
- Graduates have advanced their careers by engaging in professional society participation and community service outreach.

Admissions & Policies

Policies

For policies governing all undergraduate degrees, see AP.5 Undergraduate Policies.

Change of Major

See Change of Major for more information.

Termination from the Major

No math, science, or Volgenau School of Engineering course that is required for the major may be attempted more than three times. Those students who do not successfully complete such a course within three attempts will be terminated from the major. Undeclared students in the Volgenau School who do not successfully complete a course required for

a Volgenau School major within three attempts will also be terminated. For more information, see AP.5.2.4 Termination from the Major.

Once a student has attempted one of these courses twice unsuccessfully, the third attempt must be no later than the next semester of enrollment, excluding summers. Failure to take the course at that time will result in termination from the major. If the student is unable to take the course when required, the student may request an extension to a future semester; extensions require approval of the student's advisor, their department, and the Associate Dean for Undergraduate Programs. The deadline for extension requests is the add deadline for the semester in which the course is required.

Students who have been terminated from a Volgenau School of Engineering major may not register for a Volgenau School course without permission of the department offering the course. This applies to all undergraduate courses offered by the Volgenau School except IT 104 Introduction to Computing (Mason Core) and STAT 250 Introductory Statistics I (Mason Core).

A student may not declare any major in the Volgenau School of Engineering if the student has previously met the termination criteria for that major at any time, regardless of what the student's major was at the time the courses were taken.

Grade Requirements and Advising

Degree requirements include 121 credits distributed in three main areas: mechanical engineering, mathematics and basic science, and humanities and social sciences. Students must complete all math, science and Volgenau School of Engineering courses presented as part of the required 121 credits for the degree with a grade of C or better.

Students are required to see their faculty advisor at least once each year to plan their curriculum.

Requirements

Degree Requirements

Total credits: 121

Engineering

Courses

ECE 285	Electric Circuit Analysis I	3
ECE 286	Electric Circuit Analysis II	3
ME 151	Practicum in Engineering	2
ME 211	Statics	3
ME 212	Solid Mechanics	3
ME 221	Thermodynamics	3
ME 231	Dynamics	3
ME 311	Mechanical Experimentation I	1
ME 313	Material Science	3
ME 321	Mechanical Experimentation II	1
ME 322	Fluid Mechanics	3
ME 323	Heat Transfer	3
ME 341 or ME 342	Design of Mechanical Elements Design of Thermal Systems	3

ME 352	Entrepreneurship in Engineering	3
ME 432	Control Engineering	4
ME 443	Mechanical Design I	3
ME 444	Mechanical Design II (Mason Core)	3
ME 453	Developing the Societal Engineer	2
Technical Electives		
Select 12 credits from the following:		12
ME 431	Systems Dynamics	
ME 498	Independent Study in Mechanical Engineering ¹	
ME 499	Special Topics in Mechanical Engineering ¹	
Total Credits		61

¹ May be repeated for credit.

Mathematics and Science

Select one from the following:		4
CHEM 251	General Chemistry for Engineers (Mason Core)	
CHEM 211 & CHEM 213	General Chemistry I (Mason Core) and General Chemistry Laboratory I (Mason Core)	
MATH 113	Analytic Geometry and Calculus I (Mason Core)	4
MATH 114	Analytic Geometry and Calculus II	4
MATH 213	Analytic Geometry and Calculus III	3
MATH 214	Elementary Differential Equations	3
ME 351	Analytical Methods in Engineering	3
PHYS 160	University Physics I (Mason Core)	3
PHYS 161	University Physics I Laboratory (Mason Core)	1
PHYS 260	University Physics II (Mason Core)	3
PHYS 261	University Physics II Laboratory (Mason Core)	1
Select 3 credits from the list of pre-approved mathematics/science electives		3
Total Credits		32

Mathematics and Science Electives

BIOL 213	Cell Structure and Function (Mason Core)	4
BIOL 309	Introduction to Oceanography	3
CHEM 212 & CHEM 214	General Chemistry II (Mason Core) and General Chemistry Laboratory II (Mason Core)	4
CHEM 300	Chemistry of Semiconductor Processing	3
CHEM 333	Physical Chemistry for the Life Sciences I	3
CLIM 411	Atmospheric Dynamics	3
CLIM 412	Physical Oceanography	3
CLIM 429	Atmospheric Thermodynamics	3
EVPP 210	Environmental Biology: Molecules and Cells	4
GEOL 412	Physical Oceanography	3

PHYS 262 & PHYS 263	University Physics III (Mason Core) and University Physics III Laboratory (Mason Core)	4
PHYS 331	Fundamentals of Renewable Energy	3
MATH 203	Linear Algebra	3
MATH 290	Introduction to Advanced Mathematics	3
MATH 301	Number Theory	3
MATH 302	Foundations of Geometry	3
MATH 312	Geometry	3
MATH 313	Introduction to Applied Analysis	3
MATH 314	Introduction to Applied Mathematics	3
MATH 351	Probability	3
MATH 411	Functions of a Complex Variable	3
STAT 344	Probability and Statistics for Engineers and Scientists I	3
STAT 346	Probability for Engineers	3

Computer Science

CS 112	Introduction to Computer Programming (Mason Core)	4
Total Credits		4

Communication and Economics

COMM 100	Public Speaking (Mason Core)	3
or COMM 101	Interpersonal and Group Interaction (Mason Core)	
ECON 103	Contemporary Microeconomic Principles (Mason Core)	3
Total Credits		6

Additional Mason Core

Arts	3	
Global Understanding	3	
Literature	3	
Western Civilization/World History	3	
Written Communication ¹	6	
Total Credits		18

¹ Both lower and upper level requirement.

Writing Intensive Requirement

Mason's writing-intensive requirement is satisfied by ME 444 Mechanical Design II (Mason Core) (pending approval).

Capstone Experience Requirement

Mason's synthesis requirement for mechanical engineering majors is satisfied by ME 444 Mechanical Design II (Mason Core).