

College of Engineering

Mechanical and Nuclear Engineering

Overview

As designers and innovators, mechanical and nuclear engineers combine science and mathematics to benefit humankind.

Professional options

Careers

Mechanical engineering is a broad-based profession, and graduates are employed in a range of industries, including aerospace, vehicle design and construction, power generation, petroleum production, petrochemical processing, computer, mining, materials processing, agricultural machinery, construction machinery, robotics, military hardware, sterilization and environmental control.

Nuclear engineers find employment in nuclear power plant design, construction or operation; nuclear medicine and health physics; industrial applications such as gauging, tracing, forensics and food sterilization; and research at national laboratories.

Graduates of the department find jobs in:

- **Research and development:** Working as part of a team to find new uses for technological discoveries.
- **Design:** Creating components, systems or processes to meet needs.
- **Manufacturing:** Devising new or improved production processes for the manufacture of components, machines or systems.
- **Sales:** Representing the company providing technical assistance to the customer.
- **Management:** Dealing with human problems, business decisions and long-range planning as associated with technical activities. About 40 percent of all industry executives are engineers.
- **Consulting:** Using their expertise as specialists in one or more branches of engineering and helping others with their technical problems.

Points of pride

The university's Society of Automotive Engineers Formula Car Team won the championship at the Regional Sports Car Club of America in Salina in April 2012.

Academics

Degree options

The Department of Mechanical and Nuclear Engineering at Kansas State University offers undergraduate degrees in mechanical engineering and mechanical engineering with a nuclear option.

Students also may enroll in a dual degree program. The second degree is usually completed with only one additional year of study. No minimum semester hours are required, but the requirements for both degrees must be satisfied. The second degree may be in another engineering program or in business administration, mathematics, physics, chemistry or computer science.

Mechanical engineering also can serve as a pre-law or premedical curriculum. These programs must be carefully planned and arranged in advance.

The Department of Mechanical and Nuclear Engineering offers programs leading to Master of Science and Doctor of Philosophy degrees.

Students in the mechanical engineering program may pursue a formal option in nuclear engineering. Students who follow the nuclear engineering option substitute the courses listed below for four of the technical electives in the curriculum:

- Principles of Radiation Detection
- Radiation Protection and Shielding
- Nuclear Reactor Theory
- Nuclear Reactor Lab

Facilities

Mechanical and nuclear engineering facilities are in the engineering complex and include Rathbone, Seaton and Ward halls. Laboratory experience is an important part of mechanical and nuclear engineering education, and a number of well-equipped laboratories are available: subsonic wind tunnel, internal combustion engines, composite materials, automatic controls, measurements and instruments, experimentation, and design and materials testing. In addition, a variety of modern computer facilities are available.

Specialized nuclear facilities include a 1,250-kilowatt TRIGA Mark II reactor, the InterDisciplinary Engineering and Applied Systems laboratory, the Radiation Measurement

Applications laboratory, the Semiconductor Materials and Radiological Testing laboratory, radiation exposure facilities, Neutron Activation Analysis Laboratory and Nuclear Instrumentation Laboratory.

Accreditation

The program is accredited by the Engineering Accreditation Commission of ABET, abet.org.

Admission

Admission is selective based on academic performance. Submit application, application fee, all transcripts and ACT or SAT scores postmarked by the priority February 1 deadline. Transfer students will be considered for all terms. Freshmen will be considered only for summer and fall terms.

Preparation

High school students interested in mechanical or nuclear engineering should take a college preparatory program. Though not required for entrance, high school courses in chemistry and physics are highly recommended. English and speech courses are important because effective communication is essential to an engineer. Mathematics preparation should include two units of algebra, one unit of geometry, one-half unit of trigonometry and calculus, if available.

Those who have not completed these math courses will be permitted to take makeup courses. Advanced placement is possible in such subjects as chemistry, mathematics and speech. Check with your high school counselor for information.

Financial assistance

Nov. 1 is the priority deadline for incoming freshmen to submit the K-State scholarship application, or Feb. 1 for transfer students. Students should submit their Free Application for Federal Student Aid (FAFSA) by March 1. For additional details, visit k-state.edu/sfa.

Activities

Clubs

Students in mechanical and nuclear engineering may get involved in any of the nationally and internationally competitive, student-led design teams.

- Baja SAE — off-road vehicle
- Formula SAE — race car
- SAE Aero Design — aircraft
- AIAA Unmanned Aerial Vehicle
- ASME Human Powered Vehicle

Additionally, students in mechanical and nuclear engineering are active in numerous professional organizations, including:

- American Institute of Aeronautics and Astronautics
- American Nuclear Society
- Society of Automotive Engineers
- American Society of Heating, Refrigerating and Air Conditioning Engineers
- Society of Manufacturing Engineers

Suggested coursework

The basic sciences of physics, chemistry and mathematics are the foundation of the Bachelor of Science degree in mechanical engineering. Courses in these areas are taken during your freshman and sophomore years. Engineering science courses are phased in during your sophomore year and continue into your junior year.

Engineering application courses begin during your junior year and make up the bulk of the courses during your senior year. Because of the broad and fundamental nature of the curriculum, mechanical engineering provides an excellent background for careers in fields other than engineering, including business management, law or medicine.

Bachelor of Science in mechanical engineering

127 hours.

Freshman

Hrs. Fall semester

4	MATH 220	Analytical Geometry and Calculus I
4	CHM 210	Chemistry I
3	ENGL 100	Expository Writing I
2	ME 101	Introduction to Mechanical Engineering
3	Humanities or social science elective**	
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Hrs. Spring semester

4	MATH 221	Analytical Geometry and Calculus II
5	PHYS 213	Engineering Physics I
2	COMM 105	Public Speaking IA
3	ECON 110	Principles of Macroeconomics
2	ME 212	Engineering Graphics
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Sophomore

Hrs. Fall semester

4	MATH 222	Analytical Geometry and Calculus III
5	PHYS 214	Engineering Physics II
2	IMSE 250	Introduction to Manufacturing Processes and Systems
3	CE 333	Statics
1	CHE 354	Basic Concepts MS and E
1	CHE 355	Mechanical Properties
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Hrs. Spring semester

4	MATH 240	Elementary Differential Equations
3	ME 512	Dynamics
3	ME 513	Thermodynamics I
3	NE 495	Elements of Nuclear Engineering
2	Humanities and social science elective**	
15		

Junior

Hrs. Fall semester

3	CE 533	Mechanics of Materials
4	EECE 519	Electric Circuits and Control
3	MATH 551	Applied Matrix Theory
3	ME 400	Computer Applications in Mechanical Engineering
3	NE 690	Radiation Protection and Shielding

or
3 Technical elective ***
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Hrs. Spring semester

3	ME 533	Machine Design I
4	ME 570	Control of Mechanical Systems I
3	ME 571	Fluid Mechanics
3	ME 535	Measurement and Instrumentation Lab
3	NE 612	Principles of Radiation Detection
3	or Technical elective***	
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Senior

Hrs. Fall semester

2	IMSE 530	Engineering Economic Analysis
3	ME 574	Interdisciplinary Industrial Design Projects I
3	Technical elective***	
3	Technical elective***	
3	NE 630	Nuclear Reactor Theory***
3	ENGL 415	Written Communication for Engineers*
3	Humanities/social science elective****	
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Hrs. Spring semester

3	ME 573	Heat Transfer
3	ME 575	Interdisciplinary Industrial Design Projects II
3	Technical elective***	
3	Technical elective***	
3	NE 648	Nuclear Reactor Lab
3	Humanities/social science elective****	
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* Students must complete the appropriate prerequisite credits for ENGL 415, but may apply only 3 of ENGL 415 prerequisite credit hours toward degree requirements.

**Humanities and social science electives are to be selected from the College of Engineering humanities and social science elective course list approved by the

College of Engineering. Students should select these courses as needed to complete the requirements of the K-State 8 general education program.

***Technical electives are chosen from mechanical and nuclear engineering, College of Engineering, math, chemistry, physics, biology, business administration and statistics classes.

Note: ME 535 and NE 612 may both be taken with one applied as a technical elective. NE 612 must be taken for the nuclear engineering option. Four nuclear engineering courses fulfill the NE option requirements.

**** Humanities/social science electives must be at the 300 level or above during senior year.

For more information about mechanical and nuclear engineering, contact:

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For more information about engineering, contact:

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  KStateEngg

For more information about Kansas State University, contact:

Office of Admissions
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119 Anderson Hall
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k-state@k-state.edu
k-state.edu/admissions

KANSAS STATE UNIVERSITY

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Post-Graduation Statistics
k-state.edu/postgrad-stats
ksdegreestats.org