Mechanical Engineering

Chair: Kathy Lu, PhD

Degree Offered	Bachelor of Science in Mechanical Engineering
Accreditation	The Bachelor of Science in Mechanical Engineering degree program is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the commission's General Criteria and Program Criteria for Mechanical and Similarly Named Engineering Programs.
Website	https://www.uab.edu/engineering/me/undergraduate
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Mechanical engineering is a broad-based discipline that embraces the two major areas of mechanical systems and thermal systems. With an understanding of the phenomena associated with these topics, mechanical engineers conceive and design a wide variety of devices, machines, and systems to meet the needs and desires of a modern economy. Mechanical engineers also engage in applied research, product development, and project management. Mechanical engineers have a primary role in addressing the problems related to manufacturing, productivity, and safety in the workplace; supply and efficient utilization of energy; transportation; and human rehabilitation.

In addition to Blazer Core, the mechanical engineering curriculum includes a core of fundamental engineering coursework and advanced courses in thermodynamics, fluid mechanics, heat transfer, mechanics of machinery, and mechanical design. The program also includes courses in mathematics, calculus-based physics, and chemistry. Laboratory experiences are provided in each area to illustrate the application of theory in engineering practice. With additional coursework, the mechanical engineering program can also be utilized as a pre-health curriculum.

Please refer to the School of Engineering overview for policies regarding admission; change of major; transfer credit; transient status; dual degree programs; reasonable progress; academic warning, probation, and suspension; reinstatement appeals; and graduation requirements.

Vision

To be a nationally and internationally recognized research-oriented mechanical engineering program – a first choice for undergraduate and graduate education.

Mission

To prepare students to be immediately productive and able to adapt to and lead in a rapidly changing environment and to create and apply knowledge for the benefit of society.

Program Educational Objectives

The Educational Objectives of the Mechanical Engineering undergraduate program are the following:

1. Graduates will meet or exceed the expectations of their employers in mechanical engineering or any other career path they choose;
2. Graduates will pursue continuing education opportunities in their chosen field through a variety of means, such as professional development training and advanced education;
3. Graduates will pursue leadership positions in their selected profession and/or communities.

Student Outcomes

Upon completion of the BSME degree program, our graduates will have:

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 and inclusive 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.

Bachelor of Science in Mechanical Engineering

Requirements		Hours
Blazer Core Requirements		**43**
CH 115 & 115R & CH 116	General Chemistry I and General Chemistry I Recitation and General Chemistry I Laboratory	
EH 101	English Composition I	
EH 102	English Composition II	
EGR 103	Computer Aided Graphics and Design	
EGR 200	Introduction to Engineering [1]	
MA 125	Calculus I	
PH 221 & 221L & 221R	General Physics I and General Physics Laboratory I and General Physics I Recitation	
PH 222 & 222L & 222R	General Physics II and General Physics Laboratory II and General Physics II - Recitation	
Academic Foundations: Reasoning		
Thinking Broadly: History & Meaning		
Thinking Broadly: Creative Arts		
Thinking Broadly: Humans & Their Societies		

City as a Classroom [2]		
Other Required Courses		**73**
CE 210	Statics	
CE 220	Mechanics of Solids	
CE 221	Mechanics of Solids Laboratory	
CE 395	Engineering Economics	
CH 117 & 117R	General Chemistry II and General Chemistry II Recitation	
EE 312	Electrical Systems	
EGR 150	Computer Methods in Engineering	
EGR 265	Math Tools for Engineering Problem Solving [3]	
MA 126	Calculus II	
ME 215 & 215R	Dynamics and Dynamics Recitation	
ME 241 & 241R	Thermodynamics I and Thermodynamics Recitation	
ME 242	Thermodynamics II	
ME 321	Introduction to Fluid Mechanics	
ME 322	Introduction to Heat Transfer	
ME 360	Introduction to Mechatronic Systems Engineering	
ME 361 & 361L	Thermo-Fluids Systems and Thermo-Fluids Systems Laboratory	
ME 364	Linear Algebra and Numerical Methods	
ME 370	Kinematics and Dynamics of Machinery	
ME 371	Machine Design	
ME 461 & 461L	Mechanical Systems and Mechanical Systems Laboratory	
ME 498	Capstone Design Project I	
ME 499	Capstone Design Project II	
MSE 280	Engineering Materials	
MSE 401	Materials Processing	
Math/Science Elective		**3**
Choose one course from the following:		
BY 101	Topics in Contemporary Biology	
BY 108	Human Population and the Earth's Environment	
BY 123 & 123L	Introductory Biology I and Introductory Biology I Laboratory	
CH 235 & 235R	Organic Chemistry I and Organic Chemistry I Recitation	
ES 101	Physical Geology	
MA 180	Introduction to Statistics	
MA 360	Scientific Programming	
MA 361	Mathematical Modeling	
MA 444	Vector Analysis	
MA 445	Complex Analysis	
MA 453	Fourier Analysis	
PH 223	General Physics III: Thermodynamics & Quantum Physics	
Mechanical Engineering Electives		**9**
Choose one course from each of the categories below:		
Computer Aided Engineering Courses		
ME 421	Introduction to Computational Fluid Dynamics Basics	
ME 464	Introduction to Finite Element Method	
Thermal Fluids Courses		
ME 411	Intermediate Fluid Mechanics	
ME 421	Introduction to Computational Fluid Dynamics Basics	
ME 445	Combustion	
ME 447	Internal Combustion Engines	
ME 454	Heating, Ventilating and Air Conditioning	
ME 455	Thermal-Fluid Systems Design	
Mechanical Systems Courses		
ME 430	Vehicular Dynamics	
ME 431	Introduction to Vehicle Drive Systems Engineering	
ME 432	Introduction to Electric and Hybrid Vehicle Engineering	
ME 464	Introduction to Finite Element Method	
ME 475	Mechanical Vibrations	
ME 477	Systems Engineering	
ME 478	Automated Manufacturing	
ME 480	Instrumentation and Measurements	
Total Hours		**128**

[1] EGR 200 preferred; other FYE courses accepted
[2] CE 280 preferred; other CAC courses accepted
[3] May substitute MA 227 and MA 252 for EGR 265 and the MA/SCI elective

Residency Requirement

In addition to UAB's residency requirement, to earn a Bachelor of Science in Mechanical Engineering from UAB, the program requires that students complete the following courses at UAB:

Requirements		**Hours**
Any two of the following:		6
ME 322	Introduction to Heat Transfer	
ME 360	Introduction to Mechatronic Systems Engineering	
ME 370	Kinematics and Dynamics of Machinery	
ME 371	Machine Design	
ME 498	Capstone Design Project I	3
ME 499	Capstone Design Project II	3
Total Hours		**12**

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Curriculum for the Bachelor of Science in Mechanical Engineering(BSME)

Freshman			
First Term	**Hours**	**Second Term**	**Hours**
CH 115 & 115R & CH 116^	4	EGR 103#	3
EGR 200[1]	3	EGR 150	3
EH 101%	3	EGR 194	1
MA 125 & 125L*	4	MA 126	4
		PH 221 & 221L & 221R^	4
	14		**15**
Sophomore			
First Term	**Hours**	**Second Term**	**Hours**
CE 210	3	CE 220	3

CH 117 & 117R	3	CE 221	1
EGR 265[2]	4	EH 102[%]	3
ME 241 & 241R	3	ME 215 & 215R	3
PH 222 & 222L & 222R[^]	4	ME 242	3
		Math/Science Elective[2,4]	3
	17		**16**

Junior

First Term	Hours	Second Term	Hours
ME 321	3	EE 312	3
ME 364	3	ME 322	3
ME 370	3	ME 360	3
MSE 280	3	ME 361 & 361L	3
Blazer Core: Reasoning[3]	3	ME 371	3
		Blazer Core: Creative Arts[3]	3
	15		**18**

Senior

First Term	Hours	Second Term	Hours
ME 461 & 461L	3	CE 395	3
ME 498	3	ME 499	3
MSE 401	3	Mechanical Engineering Elective[5]	3
Mechanical Engineering Elective[5]	3	Mechanical Engineering Elective[5]	3
Blazer Core: City as a Classroom[$]	3	Blazer Core: History & Meaning[3]	3
Blazer Core: Humans & Their Societies[3]	3		
	18		**15**

Total credit hours: 128

1 EGR 200 preferred; other FYE courses accepted

2 May substitute MA 227 and MA 252 for EGR 265 and the Math/Science elective

3 Refer to Blazer Core as specific for engineering majors

4 Students may choose from the following: BY 101, BY 108, BY 123, CH 235, ES 101, MA 180, MA 360, MA 361, MA 444, MA 445, MA 453, PH 223

5 Students must choose one course from each area:

- Mechanical Systems: ME 430, ME 431, ME 432, ME 464, ME 475, ME 477, ME 478, ME 480
- Thermal Fluids: ME 411, ME 421, ME 445, ME 447, ME 454, ME 455
- Computer-Aided Engineering content: ME 421, ME 464

^ Satisfies Blazer Core: Scientific Inquiry

% Satisfies Blazer Core: Writing

Satisfies Blazer Core: Communicating in a Modern World

* Satisfies Blazer Core: Quantitative Literacy

$ CE 280 preferred, other City as a Classroom courses accepted