

Department of

Mechanical Engineering



Greg Roach, Department Chair

Keith Bourgeois, Bill Cooley, Russell Daines, Adam Dean, Alan Dutson, Nathan Harris, David Johnson, Kyle Kinghorn, Jim Lawrence, Garth Miller, Greg Roach, David Saunders, Aaron Schellenberg

Kenna Carter, Department Secretary (208) 496-7630
<http://www.byui.edu/mechanical-engineering>

Mechanical Engineering

The Mechanical Engineering Department has three Bachelor of Science programs and one AAS engineering technology program.

- 4-Year Bachelor of Science in Mechanical Engineering, BSME (470)
- 4-Year Bachelor of Science in Manufacturing and Supply Chain (490)
- 4-Year Bachelor of Science in Agricultural Engineering Technology (647)
- 2-Year Associate of Applied Science in Engineering Technology (380)

These programs are designed to provide students with the competencies necessary to work in a variety of exciting fields within engineering and engineering technology. These majors offer excellent placement potential, professional job satisfaction, and substantial salaries. Students entering any of these programs can expect a well-designed and rigorous curriculum based on industry standards.

The Bachelor of Science degree program in Mechanical Engineering is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>

Engineering Programs

Using techniques, skills, and modern engineering modeling tools, students must demonstrate their abilities to apply mathematics, engineering science, and technology principles necessary for analyzing, modeling, and solving engineering problems. Students must communicate effectively in written and oral presentation. Each student must gain an understanding of professional and ethical behavior in the workplace. Finally, students will develop a desire to enhance their abilities as a professional engineer as they grow to understand that learning is a life-long process.

The 4-year Bachelor of Science degree program in Mechanical Engineering (BSME – 470) provides students with a solid foundation in mathematics, engineering science, solid mechanics, and thermal

sciences. Students also choose a focus area in one of the following: agricultural technology, automotive, biomedical, civil engineering, computer-aided engineering, design of mechanical systems, engineering management, engineering mechanics, manufacturing engineering, manufacturing supply chain management, material science, mining engineering, petroleum engineering, pre-medical, product development, programming, robotic systems, thermal science, welding, or general engineering.

Students in the BSME program are required to take and pass the Mechanical Engineering competency exam prior to registering for any 300 or 400 level Mechanical Engineering courses.

Students in the BSME program are strongly encouraged to take the Fundamentals of Engineering (FE) exam before they graduate. This is an important milestone of achievement for each mechanical engineering student in preparing him/her for future licensing as a Professional Engineer.

Mechanical Engineering (470)

The Bachelor of Science program in Mechanical Engineering (470) is available to students entering BYU-Idaho on any admission track.

Program Educational Objectives: Program Educational Objectives for the baccalaureate degree in Mechanical Engineering are to produce engineering graduates who:

1. Demonstrate and maintain faith in God, and exhibit high standards of personal integrity and professional ethics through lifelong service to family, church, profession, and community. [Service]
2. Provide leadership in their chosen field of endeavor through the application of effective interpersonal, communication, and teamwork skills. [Leadership]
3. Apply fundamental principles of design and analysis to develop innovative solutions in an industrial and societal context. [Design]
4. Maintain currency in their field through continued learning and education. [Lifelong Learning]

Student Outcomes: To achieve the educational objectives, the following outcomes will be measured during the course of study within the BSME program. Assessment methods consistent with accreditation recommendations will be used to determine how each student meets these outcomes. The Mechanical Engineering program at BYU-Idaho is designed to give students the ability to:

1. Apply knowledge of fundamental math, science, and engineering principles. (Fundamentals)
2. Design and conduct experiments and analyze the resulting data. (Experiments)
3. Design components, systems, or processes necessary to meet product specifications and design constraints. (Engineering Design)
4. Function well within a multidisciplinary team. (Team Work)
5. Identify, formulate, and solve engineering problems (Model & Solve)
6. Maintain high ethical, moral, and professional standards. (Ethics)
7. Communicate effectively in both oral and written format. (Communication)
8. Understand the impact engineering has on the world. (Global Impact)
9. Recognize the need for, and engage in life-long learning. (Continued Learning)
10. Understand contemporary issues. (Contemporary Issues)
11. Use the techniques, skills, and modern engineering tools necessary for engineering practice. (Engineering Tools)

Manufacturing and Supply Chain (490)

The Bachelor of Science program in Manufacturing and Supply Chain (490) is available to students entering BYU-Idaho on any admission track.

Student Outcomes:

1. Engineering Fundamentals: Apply practical knowledge of mathematics, science, engineering, and technology to engineering technology problems.
2. Business Fundamentals: Apply knowledge and skills in accounting, finance, marketing, and operations management to demonstrate effective business analysis and decision making.
3. Manufacturing Processes: Demonstrate extensive practical experience with a variety of manufacturing processes.
4. Quality Management and Control: Use tools and methods for measuring quality to develop or implement effective quality systems in a manufacturing enterprise.
5. Supply Chain and Operations Management: Utilize supply chain knowledge and skills to demonstrate effective management and decisions if forecasting, planning, sourcing, supplier management, purchasing, and logistics management.
6. Team Work: Function well within a multidisciplinary team.
7. Ethics: Maintain high ethical, moral, and professional standards.
8. Communication: Apply written, oral, and graphical communication in both technical and non-technical environments.

Agricultural Engineering Technology (647)

The Bachelor of Science program in Agricultural Engineering Technology (647) is available to students entering BYU-Idaho on any admission track.

Students who seek advanced degrees find opportunities in education, commercial industry, research, extension, and government service.

The Agriculture Engineering Technology program prepares students for a career in the technical and mechanical world of agriculture. Students will attain skills and knowledge necessary to be employed in the following activities:

1. Design, development, and testing of advanced machinery systems for agricultural, food, and bioenergy production systems.
2. Evaluation, development and modeling of systems for sustainable protection and improvement of soil and water resources.
3. Design and development of environmentally and economically sustainable animal production systems.
4. Development and evaluation of management systems to insure food quality, safety, and biosecurity.
5. Manage complex agricultural and biological systems.
6. Technical sales and implementation of technology solutions.
7. Design and implementation of structures to store and process crops.

Student Outcomes:

1. Apply knowledge of mathematics, engineering, and applied science. [Foundations]
2. Identify, formulate, and solve applied engineering problems. [Model & Solve]
3. Specify, manage, and test machine systems in the context of agricultural production or processing systems. [Machine Systems]
4. Implement elements of precision technology in agricultural systems. [Precision Technology]
5. Develop a basic understanding of plant and soil science. [Plant and Soil Science]

6. Use the techniques, skills, and modern engineering tools necessary for professional practice. [Engineering Tools]
7. Communicate effectively in both oral and written format. [Communication]
8. Function well within a multidisciplinary team. [Teamwork]

Engineering Technology (380)

The 2-year associate program in Engineering Technology (380) is designed as a transfer associate degree whereby students transfer to a 4-year university to complete their education. Common engineering technology programs include manufacturing, welding, design, and mechanical engineering technology. The associate program in Engineering Technology is available to students on any track.

Student Outcomes: Student Outcomes for the associate degree in Engineering Technology are as follows. The Engineering Technology program at BYU-Idaho is designed to give students the ability to:

1. Apply knowledge of fundamental math, science, and engineering principles. (Fundamentals)
2. Use the techniques, skills, and modern engineering tools necessary for engineering practice. (Engineering Tools)
3. Communicate effectively in both oral and written format. (Communication)
4. Design components, systems, or processes necessary to meet product specifications and design constraints. (Design Concepts)
5. Demonstrate an understanding of modern manufacturing processes. (Mfg Processes)
6. Function well within a multidisciplinary team (Team Work)

General Information

Mathematics and physical sciences are critical components of any engineering or engineering technology curriculum. The normal entry level mathematics class for Mechanical Engineering and Engineering programs is Calculus I (FDMAT 112). For the Technology programs the entry level math course is Pre-Calculus (MATH 109) or College Algebra (FDMAT 110).

Entering freshman students should consult with their advisor to ensure they are beginning with the mathematics course for which they are prepared. Students with weak mathematics skills are advised to enroll in a preparatory mathematics course to strengthen their skills. For Mechanical Engineering, Civil Engineering, and Engineering Technology programs, the normal entry level chemistry course is General Chemistry (CHEM 105).

It is imperative that students develop and follow a plan of study that will allow them to complete all the required courses within the credit hour limits. Students should consult with their advisor/mentor early to make sure their educational plan is correct. Sample curriculum flow charts can be found on the department web page at <http://www.byui.edu/mechengr>.

AAS in Engineering Technology (380)

Core Courses <i>Take 1 course:</i> CHEM 101 3 CHEM 105 4 ----- 3 <i>Take these courses:</i> MATH 111 2 FDMAT 110 3 OR <i>Take this course:</i> MATH 109 5 ----- 5	<i>Take these courses:</i> FDMAT 112* 4 ME 142 3 ME 172 3 ME 201 3 ME 202 3 ME 231 2 ME 250 3 ----- 21 <i>Take 1 course:</i> PH 105 4 PH 121 3 ----- 3	Technical Electives <i>Take 12 credits:</i> MATH 113 & 214 6 or MATH 215 4 MATH 330 3 ME 101 1 ME 162 3 ME 204 3 ME 231L 1 ME 250L 1 ME 272 3 ME 280 3 ME 299 1 ME 305 or ECEN 150 2-3 ME 398R 1 ----- 12	Program Notes: •No Double Counting of Major Courses •No Grade Less Than C- in Major Courses •*FDMAT 112 needs to be taken to satisfy a major requirement as well as the Foundations Quantitative Reasoning requirement.
Credit Requirements: Foundations 17 Major 44 ----- Total 61		Tracks Available: Fall-Winter Yes Winter-Spring Yes Spring-Fall Yes Online Yes	

BS in Mechanical Engineering (470)

Entry Courses <i>Take these courses your first 2 semesters:</i> ME 101 1 ME 142 3 ME 172 3 ME 201 3 ----- 10 Core Courses <i>Take these courses:</i> MATH 215 4 MATH 316 4 MATH 330 3 ME 202 3 ME 204 3 ME 231 2 ME 231L 1 ME 250 3 ME 250L 1 ME 280 3 ME 305 3 ME 310 3 ME 322 3 ME 342 3 ME 360 3 ME 370 3 ME 380 3 ME 423 3 ME 480 3 PH 223 4 ----- 58 Experiential Learning <i>Take 2 courses:</i> ME 299 1 ME 398R 1 ME 490R 1 ----- 2	<i>Complete one 12-credit emphasis from the following lists or take 6 credits of general courses:</i>			
Agricultural Technology <i>Take these courses:</i> AGTEC 301 3 AGTEC 320 3 AGTEC 465 3 AGTEC 474 3	Automotive <i>Take 12 credits:</i> AUTO 125 1 AUTO 131 2 AUTO 131L 1 AUTO 132 2 AUTO 132L 1 AUTO 155 2 AUTO 155L 2 AUTO 221 3 AUTO 231 3 AUTO 232 3 AUTO 340 3	Manufacturing Supply Chain <i>Take these courses:</i> B 361 3 B 461 3 B 478 3 <i>Take 1 course:</i> B 466 3 B 468 3 ME 340 3	Petroleum Engineering <i>Take these courses:</i> GEOL 111 3 GEOL 111L 1 <i>Take 8 credits:</i> GEOL 340 3 GEOL 370 4 GEOL 425 3 GEOL 435 3 Product Development <i>Take these courses:</i> B 341 3 B 383 3 ME 438 3 <i>Take 3 credits:</i> B 466 3 B 483 3 CIT 380 3	General <i>Take 6 credits:</i> CE 321 3 CE 341 3 CE 351 3 CE 370 3 CE 421 3 CE 433 3 CE 441 3 MATH 472 3 ME 331 3 ME 332 3 ME 337 3 ME 340 3 ME 342 3 ME 398R 1 ME 410 3 ME 422 3 ME 425 3 ME 438 3 ME 445 3 ME 460 3 ME 465 3 ME 470 3 ME 490R 1 ME 495R 3 WELD 350 3
Bio-Medical <i>Take 12 credits:</i> BIO 180 4 BIO 181 4 BIO 460 4 BIO 461 5	Material Science <i>Take 12 credits:</i> CHEM 106 4 CHEM 220 5 CHEM 351 4 CHEM 352 4 CHEM 461 3 CHEM 462 3	Pre-Medical <i>Take 12 credits:</i> BIO 180 4 BIO 181 4 CHEM 106 4 CHEM 351 4 CHEM 352 4 CHEM 481 3	Programming <i>Take this course:</i> CS 124 3 <i>Take 9 credits:</i> CIT 225 3 CS 165 3 CS 213 3 ME 425 3 ME 438 3 ME 470 3	Welding <i>Take these courses:</i> WELD 170 3 WELD 223 3 <i>Take 6 credits:</i> WELD 243 3 WELD 329 3 WELD 338 3 WELD 350 3 WELD 480 3
Credit Requirements: Foundations 42 Major 76 Electives 2 ----- Total 120		Tracks Available: Fall-Winter Yes Winter-Spring Yes Spring-Fall Yes		

Foundations Requirements for BS in Mechanical Engineering

Eternal Truths		Academic Fundamentals		Cultural Awareness
Cornerstone Courses <i>Take these courses:</i>	Other Religion Courses <i>Take 6 credits:</i>	Reading, Writing, & Critical Thinking <i>Take this course:</i>	Science Foundations <i>Take this course:</i>	American Foundations <i>Take 1 course:</i>
FDREL 200 2	FDREL 100 2	FDENG 101 3	FDSCI 101 2	FDAMF 101 3
FDREL 225 2	FDREL 130 2			FD CIV 101 3
FDREL 250 2	FDREL 190 1-3			
FDREL 275 2	FDREL 211 2			
8	FDREL 212 2	Advanced Research Writing	Science Issues <i>Take these courses:</i>	Humanities, International, Literature & World <i>Take 1 course:</i>
	FDREL 215 2	<i>Take either:</i>	CHEM 105 4	FDHUM 110 3
	FDREL 234 2	FDENG 301 3	PH 121 7	FDWLD 101 3
	FDREL 235 2	OR		
	FDREL 261 2	<i>Take 1 course from the following list:</i>		<i>Take 1 course:</i>
	FDREL 301 2	GEOL 316 3		FDHUM 214 3
	FDREL 302 2	B 320 3		FDHUM 299 3
	FDREL 324 2	HUM 305 3		FDINT 211 3
	FDREL 325 2			FDINT 212 3
	FDREL 327 2	Quantitative Reasoning		FDINT 215 3
	FDREL 333 2	<i>Complete 1 option:</i>		FDINT 299 3
	FDREL 341 2	<i>Option 1</i>		FDLIT 216 3
	FDREL 342 2	FDMAT 112 4		FDLIT 299 3
	FDREL 343 2			FDWLD 201 3
	FDREL 345 2	<i>Option 2</i>		
	FDREL 351 2	MATH 109 and 5		
	FDREL 352 2	FDMAT 112 4		
	FDREL 390R 1-2			
	FDREL 397 2	<i>Option 3</i>		
	FDREL 404 2	FDMAT 110 and 3		
	FDREL 431 2	MATH 111 and 2		
	FDREL 471 2	FDMAT 112 4		
	FDREL 475 2			
	6			Credits: 42

BS in Manufacturing and Supply Chain (490)

Core Courses <i>Take these courses:</i>	<i>Take these courses:</i>	Interdisciplinary Courses <i>Take 1 course:</i>	Program Notes:
FDMAT 112* 4	ACCTG 180 3	ME 398R 1	•No Double Counting of Minor Courses
ME 101 1	B 211 3	IDS 398R 1	•No Grade Less Than C- in Minor Courses
ME 172 3	B 301 3		
ME 201 3	B 341 3		
ME 202 3	B 361 3	<i>Take 1 course:</i>	•*FDMAT 112 needs to be taken to satisfy a major requirement as well as the Foundations Quantitative Reasoning requirement.
ME 231 2	B 461 3	ME 340 3	
ME 231L 1	B 466 3	IDS 499 2	
17	B 478 3		
	MATH 330 or 221A 3		
<i>Take 3 credits:</i>	ME 331 3		
ME 142 3	ME 332 3		
or	36		
B 215 3			
3			
Credit Requirements:		Tracks Available:	
Foundations 40		Fall-Winter Yes	
Major 59		Winter-Spring Yes	
Elective 21		Spring-Fall Yes	
Total 120			

BS in Agricultural Engineering Technology (647)

Entry Courses	Elective Courses	Internship	Program Notes:
<i>Take these courses:</i>	<i>Take 3 credits:</i>	<i>Take 1 course:</i>	
AGTEC 124 2	CHEM 101 3	APS 398R 1	<ul style="list-style-type: none"> • No Double Counting of Major Courses • No Grade Less Than C- in Major Courses
AGTEC 186 1	CHEM 105 4	ME 398R 1	
AGTEC 220 1	MATH 215 4	IDS 398R 1	
AGTEC 286 3	MATH 316 4	1	
AGTEC 301 3	ME 101 1	Capstone	
AGTEC 320 3	ME 162 3	<i>Take 1 course:</i>	
AGTEC 360 4	ME 231L 1	AGTEC 490 2-3	
AGTEC 465 3	ME 250 3	IDS 499 2-3	
APS 220 3	ME 250L 1	2	
APS 220L 1	ME 272 3		
FDMAT 112 4	ME 280 3		
ME 142 3	ME 299 1		
ME 172 3	ME 310 3		
ME 201 3	ME 322 3		
ME 202 2	ME 331 3		
ME 204 3	ME 332 3		
ME 231 2	ME 337 3		
ME 305 3	ME 340 3		
PH 121 3	ME 370 3		
WELD 170 3	ME 380 3		
53	3		
Credit Requirements:		Tracks Available:	
Foundations	40	Fall-Winter	Yes
Major	59	Winter-Spring	Yes
Elective	21	Spring-Fall	Yes
Total	120		

Minor in Engineering (206)

Core Courses	Technical Electives	Program Notes:	
<i>Take these courses:</i>	<i>Take 3 credits:</i>		
FDMAT 112* 4	CHEM 105 4	<ul style="list-style-type: none"> • No Double Counting of Minor Courses • No Grade Less Than C- in Minor Courses • *FDMAT 112 needs to be taken to satisfy a major requirement as well as the Foundations Quantitative Reasoning requirement. 	
ME 101 1	CHEM 106 4		
ME 142 3	MATH 113 3		
ME 172 3	MATH 214 3		
ME 201 3	MATH 215 4		
ME 202 3	ME 204 3		
ME 231 2	ME 250 3		
ME 231L 1	ME 250L 1		
ME 280 3	ME 305 3		
23	ME 331 3		
	ME 332 3		
	PH 121 3		
	PH 123 3		
	PH 220 3		
	PH 223 4		
	3		
Credit Requirements:		Tracks Available:	
Total	26	Fall-Winter	Yes
		Winter-Spring	Yes
		Spring-Fall	Yes

Minor in Manufacturing Technology (244)

Core Courses	Technical Electives	Program Notes:	
<i>Take these courses:</i>	<i>Take 6 credits:</i>		
ME 172 3	CHEM 101 3	<ul style="list-style-type: none"> • No Double Counting of Minor Courses • No Grade Less Than C- in Minor Courses 	
ME 231 2	ME 101 1		
ME 231L 1	ME 250 3		
ME 331 3	ME 250L 1		
ME 332 3	ME 398R 1		
WELD 170 3	WELD 243 3		
WELD 224 3	WELD 329 3		
18	WELD 480 3		
	6		
Credit Requirements:			Tracks Available:
Total	24	Fall-Winter	Yes
		Winter-Spring	Yes
		Spring-Fall	Yes

Manufacturing Technology Concentration (D 146)

Core Courses <i>Take these courses:</i> FDMAT 112 4 MATH 330 3 ME 101 1 ME 142 3 ME 172 3 ME 201 3 ME 202 3 ME 231 2 ME 231L 1 ME 331 3 ME 332 3 <hr style="width: 50%; margin-left: 0;"/> 29	Interdisciplinary Courses <i>Take 1 course:</i> IDS 398R 1-3 ME 398R 1 <hr style="width: 50%; margin-left: 0;"/> 1 <i>Take 1 course:</i> IDS 499 2 ME 340 3 <hr style="width: 50%; margin-left: 0;"/> 2	Program Notes: <ul style="list-style-type: none"> • No Double Counting of Concentration Courses • No Grade Less Than C- in Concentration Courses
Credit Requirements: Total 32		Tracks Available: Fall-Winter Yes Winter-Spring Yes Spring-Fall Yes

Mechanical Engineering Concentration (D 152)

Core Courses <i>Take these courses:</i> FDMAT 112 4 ME 142 3 ME 172 3 ME 201 3 ME 202 3 ME 204 3 ME 231 2 ME 305 3 PH 121 3 <hr style="width: 50%; margin-left: 0;"/> 27 <i>Interdisciplinary Courses</i> <i>Take 1 course:</i> IDS 398R 1-3 ME 398R 1 <hr style="width: 50%; margin-left: 0;"/> 1 <i>Take 1 course:</i> IDS 499 2 ME 340 3 <hr style="width: 50%; margin-left: 0;"/> 2	Electives <i>Take 6 credits:</i> CHEM 101 3 CHEM 105 4 MATH 330 4 ME 101 1 ME 162 3 ME 231L 1 ME 250 3 ME 250L 1 ME 272 3 ME 280 3 ME 299 1 ME 310 3 ME 331 3 ME 332 3 ME 337 3 ME 340 3 <hr style="width: 50%; margin-left: 0;"/> 6	Suggested Elective Emphasis CAD & Online ME 162 3 ME 272 3 Materials Science CHEM 101 OR 105 3-4 ME 101 1 ME 250 3 ME 250L 1 ME 299 1 Manufacturing ME 101 1 ME 231L 1 ME 299 1 ME 331 3 ME 332 3 Mechanical Design ME 101 1 ME 231L 1 ME 272 3 ME 280 3 ME 299 1 MFG Quality MATH 330 3 ME 340 3 Robotics ME 310 3 ME 337 3	Program Notes: <ul style="list-style-type: none"> • No Double Counting of Concentration Courses • No Grade Less Than C- in Concentration Courses
Credit Requirements: Total 36		Tracks Available: Fall-Winter Yes Winter-Spring Yes Spring-Fall Yes	

Computer-Aided Design and Drafting (CADD) Certificate (C 121)

Core Courses <i>Take these courses:</i> FDMAT 110 3 ME 142 3 ME 162 3 ME 172 3 ME 272 3 <hr style="width: 50px; margin-left: 0;"/> 15	Program Notes: •Grade of C- or higher required in all Certificate Courses
Credit Requirements:	
Total 15	

Mechanical Engineering Predefined Clusters

Engineering	6300
<i>Take 15 credits:</i>	
FDMAT 112 Calculus I	4
ME 101 Introduction to Engineering and Technology	1
ME 142 Engineering Computation I	3
ME 172 Engineering Graphics	3
ME 201 Engineering Mechanics: Statics	3
ME 202 Strength of Materials	3
ME 204 Engineering Mechanics: Dynamics	3
ME 231 Manufacturing Processes I	2
Total Credits	15

Manufacturing	6301
<i>Take 12 credits:</i>	
ME 172 Engineering Graphics	3
ME 231 Manufacturing Processes I	2
ME 231L Manufacturing Processes I Lab	1
ME 331 Manufacturing Processes II	3
ME 332 Computer Numerical Control (CNC)	3
WELD 170 Welding Fundamentals	3
Total Credits	12

Welding	6302
<i>Take these courses:</i>	
WELD 170 Welding Fundamentals	3
WELD 224 Advanced Welding Processes	3
<i>Take 6 credits:</i>	
ME 172 Engineering Graphics	3
ME 231 Manufacturing Processes I	2
ME 231L Manufacturing Processes I Lab	1
WELD 243 Gas Tungsten Arc Welding	3
WELD 329 Code, Certification & Inspection	3
WELD 480 Welding Fabrication	3
Total Credits	12

Fabrication	6303
<i>Take these courses:</i>	
ME 172 Engineering Graphics	3
ME 231 Manufacturing Processes I	2
ME 231L Manufacturing Processes I Lab	1
WELD 170 Welding Fundamentals	3
<i>Take 3 credits:</i>	
ME 331 Manufacturing Processes II	3
ME 332 Computer Numerical Control (CNC)	3
WELD 224 Advanced Welding Processes	3
WELD 243 Gas Tungsten Arc Welding	3
Total Credits	12

Course Descriptions

Credits*

- ME 101 Introduction to Engineering and Technology (1:1:0:0)**
 This course provides an introduction to the field of engineering and engineering technology. Topics include investigation of industry, curricula, career planning, design process. In addition, student teams will complete an engineering project.
 (Fall, Winter, Spring)
- ME 115 Computerized Tech Illustration (2:2:0:0)**
 This course will explore the basic system of technical illustration, the use of construction aids and grids, and special techniques in rendering an animation. Students will be introduced to 3D Solids modeling and rendering using the computer software (3D Studio MAX R3) and animation techniques. This course is designed heavily around the use of 3D drawings. Students will learn to accurately portray any given object three dimensionally (both manually and using the computer).
 (Fall, Winter, Spring)
- ME 142 Engineering Computation I (3:3:0:0)**
 Prerequisites: MATH 109 or FDMAT 112 or (FDMAT 110 and MATH 111)
 This course provides an introduction to computation in the context of engineering problem solving. Fundamental principles of computation, such as computer representation of numbers and round-off error, are presented. Basic numerical methods, including numerical integration, differentiation, and root finding, are covered. An introduction to computer programming, including flowcharts, loops, condition statements, and functions, is given. Emphasis is placed on using MS Excel to solve computational problems, using VBA within Excel to create computer programs, and use of a commercial math software package.
 (Fall, Winter, Spring)

- ME 162 Computer-Aided Draft and Design (3:3:0:0)**
 Computer aided drafting and design using AutoCAD software. Topics include coordinate systems, display control, basic geometric construction and editing, scales, layer, annotation and dimensions, blocks, attributes, plotting. Applications in mechanical, civil, electrical, and architectural disciplines.
 (Fall, Winter, Spring)
- ME 172 Engineering Graphics (3:3:0:0)**
 Fundamentals of 3D parametric modeling and engineering design concepts including: orthographic projection, auxiliary views, sectioning, dimensions, working drawings, assembly modeling, parametric modeling fundamentals, and standards (ANSI and ISO). Instruction in computer-aided design tools with application to Mechanical Engineering.
 (Fall, Winter, Spring)
- ME 201 Engineering Mechanics: Statics (3:3:0:0)**
 Corequisite: FDMAT 112
 Concepts of forces, moments and other vector quantities, free body diagrams, particle and rigid body statics, trusses, frames and machines, friction, centroids, and moments of inertia. Vector analysis used.
 All students enrolled/planning to enroll in ME 201 will be required to demonstrate proficiency in math fundamentals by achieving a minimum score of 80% in the ALEKS Math Prep for College Physics course.
 (Fall, Winter, Spring)
- ME 202 Strength of Materials (3:3:0:0)**
 Prerequisite: ME 201
 Review of equations of static equilibrium; introduction to engineering stress and strain; thermal loading; stress distributions and deflections resulting from axial, torsional, and transverse (beam) loadings; combined loading problems; stress and strain transformation, Mohr's circle; column buckling.
 (Fall, Winter, Spring)

ME 204 Engineering Mechanics: Dynamics (3:3:0:0)

Prerequisites: ME 201 and PH 121

The study and application of the concepts of dynamics to particles, systems of particles, and rigid bodies. Scalar and vector analysis used.
 (Fall, Winter, Spring)

ME 231 Manufacturing Processes I (2:2:0:0)

Prerequisite: ME 172

Introduction to manufacturing processes. Topics include: basic material science, mass reduction processes (milling, turning, drilling, etc.), separating and deforming processes (cutting, shearing, bending, etc.), mass conserving processes (casting and polymer/composite processes), joining processes (thermal, mechanical, and chemical), finishing processes, new technologies in manufacturing, and measuring tools.
 (Fall, Winter, Spring)

ME 231L Manufacturing Processes I Lab (1:0:2:0)

Co-requisite: ME 231

Hands-on laboratory to gain experience in using various machines and processes to fabricate parts.
 (Fall, Winter, Spring)

ME 250 Materials Science (3:3:0:0)

Prerequisites: (CHEM 105 and ME 202) or CHEM 101

Concurrent Requisite: ME 250L

Atomic structure and microstructure of engineering materials, including metals, ceramics, polymers, and composites. Factors influencing the fabrication, processing, and selection of materials in engineering analysis and design. Case studies of engineering material failures. Use of material selection.
 (Fall, Winter, Spring)

ME 250L Materials Lab (1:0:2:0)

Concurrent Requisite: ME 250

Laboratory investigations in materials science and strength of materials. Introduction to technical writing.
 (Fall, Winter, Spring)

ME 272 Advanced CADD (3:3:0:0)

Prerequisite: ME 172

Applications of computer aided drafting and design using SolidWorks software. Topics include ANSI and ISO drafting standards, geometric dimensioning and tolerancing, sheet metal, weldments, and working drawings.
 (Fall, Winter, Spring)

ME 280 ME Design I: Mechanical Design (3:2:2:0)

Prerequisites: ME 142 and ME 202 and ME 231 and ME 231L

This course focuses on the practical aspects of mechanical design and teaches concepts such as the integration of engineering analysis and design, the strategic use of CAD in making design decisions, the effective use of vendor off-the-shelf mechanical components, and manufacturing process considerations in design. The concepts are taught in the context of small design projects where students design and build mechanical devices throughout the semester.
 (Fall, Winter, Spring)

ME 299 Student Mentorship (1:1:0:0)

Course Requirement: Instructor Approval Required

Under faculty direction, student mentors work closely with and give guidance to a small group of students. Student mentors should have received a grade of B+ or better in any course they mentor.
 (Fall, Winter, Spring)

ME Competency Exam- Fundamentals of Engineering Competency 1

Competency Exam required of all Mechanical and Civil Engineering majors prior to taking upper division engineering classes. Topics on the exam include statics (ME 201), mechanics of materials (ME 202), and dynamics (ME 204). Students should wait until they have completed these courses before they take the exam. The exam is offered the 1st, 9th, and 11th week of each semester.
 (Fall, Winter, Spring)

ME 305 Mechatronics and Measurement Systems I (3:2:3:0)

Formerly: ME 210

Total Course Fees: \$65.00

Prerequisite: FDMAT 112 and ME 142 and ME Competency

This course provides an introduction to electricity, circuits, electric power, and simple laboratory equipment like multimeters and oscilloscopes.
 (Fall, Winter, Spring)

ME 310 Mechatronics and Measurement Systems II (3:2:3:0)

Prerequisite: ME 305 and ME Competency Exam

This course covers the basics of various types of motors and their selections. Basics of instrumentation and sensors are also discussed and implemented in a laboratory setting using LabVIEW.
 (Fall, Winter, Spring)

ME 322 Thermodynamics I (3:3:0:0)

Prerequisite: ME 204

Fundamentals of classical thermodynamics. Thermodynamic property relationships for ideal gasses, vapors, liquids, and solids. First and second law analysis of open and closed systems. Energy and entropy concepts in power and refrigeration cycles.
 (Fall, Winter, Spring)

ME 331 Manufacturing Processes II (3:2:2:0)

Prerequisite: ME 231 and ME 231L

Integration of manufacturing processes. Continued emphasis in mechanical reduction, deformation, and consolidation processes, with focus on Joining processes.
 (Winter)

ME 332 Computer Numerical Control (CNC) (3:2:2:0)

Prerequisite: ME 231 and ME 231L

Automated machine control through Computer-Aided Manufacturing (CAM) and Computer Numerical Control (CNC). Students gain practical laboratory experience on CAM, CNC, and manual programming on a variety of CNC equipment (machining center, lathe, wire EDM, and plasma cutter). Principles of machining variables, tooling, and setups will be reviewed.
 (Fall, Spring)

ME 337 Kinematics (3:3:0:0)

Prerequisite: ME 204

Motion analysis of mechanisms, including position, velocity, and acceleration, rolling contact, cams, gears, and synthesis of mechanisms. Includes computer-aided engineering techniques.
 (Spring)

ME 340 Manufacturing Quality (3:3:0:0)

Prerequisite: MATH 330

Enable students to become lean thinkers and implement lean tools in their careers, communities, and personal lives. Prepare students for the Lean Bronze knowledge certification exam and help them complete the first of three required tactical projects required for Lean Bronze certification
 (Fall, Winter)

ME 342 Engineering Computation II (3:3:0:0)

Prerequisites: MATH 316 and ME 142 and ME 202 and ME 204

This course builds on the basics of engineering computation from ME 142. Additional topics in numerical methods and computer programming are covered. Computational techniques and tools are applied to engineering problems through the implementation and solution of numerical methods.
 (Winter)

ME 360 Fluid Mechanics (3:3:2:0)

Prerequisites: ME 142 and ME 250L and MATH 316 and (ME 322 or CE 321)

Introduction to fluid mechanics and incompressible fluid flow, fluid statics, fluid dynamics, control volume analysis of fluid flow, dimensional analysis and scale models, internal and external viscous flow, turbomachinery, and open channel flow. Flow measurement lab included.
 (Fall, Winter, Spring)

Mechanical Engineering
Brigham Young University-Idaho 2016-2017

ME 370 Machine Design (3:3:2:0)

Prerequisites: (ME 280 and ME 250L) or CE 321

Analysis, modeling and design of mechanical components and systems, materials, processes and structural analysis, static and dynamic failure theories.
(Fall, Winter, Spring)

ME 380 ME Design II: Product Design (3:3:0:0)

Prerequisite: ME 370

This course introduces a structured design method for product development. The methodology includes such topics as product specifications, concept generation, concept selection, and prototyping. Other topics that are associated with the design process, such as economic analysis and intellectual property, are also presented.
(Fall, Winter, Spring)

ME 398R Internship (1:0:0:0)

Repeatable Course: may earn maximum of 2 credits

Internship Fees: \$81.50 (LDS) \$163 (non-LDS) per credit

Exempt from tuition, but charged this independent course fee

Industrial work experience.

(Fall, Winter, Spring)

ME 410 System Dynamics (3:3:2:0)

Prerequisites: ME 204 and ME 310

This course provides an introduction to dynamic system modeling and analysis. Major topics covered in this course include lumped parameter models of dynamic systems, derivation of state equations, analytical and numerical solution of state equations, and frequency response analysis. Professional software is used in obtaining numerical solutions of state equations.
(Fall)

ME 422 Thermodynamics II (3:3:0:0)

Prerequisite: ME 322

Application of principles of thermodynamics to air standard cycles (Otto, Diesel, Brayton, Sterling, and Ericsson), steam power cycles (Rankine, combined and cogeneration), and refrigeration and heat pump cycles. Property calculations for gas mixtures. Processes involving air water mixtures, psychrometric charts, etc. with applications to air-conditioning and drying processes. Introduction to thermodynamic calculations for combustion chemical reactions. Laboratory experience analyzing thermodynamic systems.
(Spring)

ME 423 Heat Transfer (3:3:2:0)

Prerequisites: ME 322 and ME 360

Fundamentals of conduction, convection, and radiation modes of heat transfer, fundamental equations for steady and unsteady conduction, convection correlations, environmental radiation and radiation properties, heat exchanger analysis and design, and design of systems involving multi-mode heat transfer. Heat transfer lab included.
(Fall, Winter, Spring)

ME 425 Computational Fluid Dynamics (3:2:3:0)

Corequisite: ME 360

Introduction to computational methods to solve and analyze problems in fluid mechanics. This course presents the processes of grid generation, applying initial and boundary conditions, selection of solution algorithms and models, solution generation and convergence, and post-processing including flow visualization, and determination of global properties. Incompressible and compressible flows will be covered. Results will be compared with selected analytical solutions.
(Fall)

ME 438 CAE Modeling and Digital Simulation (3:3:0:0)

Prerequisite: ME 380

A study of advanced CAD and engineering applications in design, modeling, simulation, and customization. The use of CAD and engineering software tools is stressed. Topics include engineering design process, advanced solids modeling techniques, kinematic analysis, digital simulation techniques, optimization, and customization techniques.
(Fall)

ME 445 Mechanics of Composite Materials (3:2:2:0)

Prerequisites: ME 142 and ME 250

An introduction to laminated composite materials and structures. An investigation of the micromechanical and macromechanical behavior of anisotropic plies. Development of classical lamination theory for predicting the mechanical behavior of laminated composite plates. Laboratory work involving fabrication and testing of composite laminates.
(Winter)

ME 460 Fundamentals of Finite Element Analysis (3:3:0:0)

Prerequisites: ME 142 and (ME 370 or CE 321)

This course provides an introduction to the finite element method. Characteristics and limitations of several basic finite elements are evaluated. The finite element method is applied to both structural and thermal problems. Applications of the finite element method are carried out with commercial software.
(Winter, Spring)

ME 465 Fluid Power Fundamentals (3:2:2:0)

Prerequisite: ME 360

This course is a technical elective in Mechanical Engineering and teaches fundamentals of fluid power. Students will explore hydraulic and pneumatic systems including hydraulic fluids, air preparation components, pumps, compressors, cylinders, motors, valves, circuits, controls, and commercial applications.
(Fall)

ME 470 Advanced Mechatronics (3:3:2:0)

Total Course Fees: \$100.00

Prerequisite: ME 310

This course provides an introduction to systems that contain both electrical and mechanical elements. Methods for modeling, sensing, and controlling the behavior of such systems using a microcontroller and programmable logic controller are discussed.
(Winter)

ME 480 Mechanical Engineering Design III: Capstone Design (3:2:2:0)

Prerequisite: ME 380

Course Requirement: Seniors Only

Comprehensive one-semester integrated design experience using the engineering design process and skills gained in engineering science classes. Typical projects include product conception, development, design, and manufacture.
(Fall, Winter, Spring)

ME 490R Special Problems in Mechanical Engineering (1:1:0:0)

Repeatable Course: May earn maximum of 2 credits

Course Requirement: Instructor Approval Required

Students complete individual major projects or research in engineering, under the supervision of a faculty member.
(Fall, Winter, Spring)

ME 495R Special Topics in Mechanical Engineering (3:2:2:0)

Repeatable Course: May earn maximum of 9 credits

Course Requirement: Instructor Approval Required

A one-semester course emphasizing current topics in engineering.
(Fall, Winter, Spring)