

Department of

Mechanical Engineering

**Garth Miller, Department Chair**

Adrian Baird, Bill Cooley, Adam Dean, Alan Dutton, Russell Daines; David Johnson, David Saunders; Aaron Schellenberg; Greg Roach

*Kenna Carter, Secretary (208) 496-7630
<http://www.byui.edu/MechEngr/>*

Department of Mechanical Engineering

The Mechanical Engineering Department has two engineering programs and three engineering technology programs from which to select a career path. These are:

- 4-Year Bachelor of Science in Mechanical Engineering, BSME (470)
- 2-Year Associate of Applied Science in Engineering (351)
- 2-Year Associate of Applied Science in Engineering Technology (380)
- 2-Year Associate of Applied Science in Welding and Fabrication Technology (374)
- 4-year Bachelor of Science in Welding and Fabrication Technology Management (474)

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 the Accreditation Board for Engineering and Technology (ABET).

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 should understand that learning is a life-long process and develop a desire to continue to enhance their abilities as a professional engineer.

The 4-year bachelor of science program in Mechanical Engineering (470) provides students with a solid foundation in mathematics, engineering science, solid mechanics and thermal sciences. In addition, students choose a focus area in automotive, bio-medical, computer aided engineering, mechanical systems design, engineering management, engineering mechanics, manufacturing engineering, manufacturing supply chain management, material science, mining/petroleum, pre-medical, product development, robotic systems, thermal science, or general engineering.

Students in the BSME program are 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.

The 2-year associate program in Engineering (351) allows students to continue their engineering education at a 4-year university in engineering fields other than mechanical engineering. Areas of emphasis available in the associate program include chemical, civil, electrical, and mechanical engineering.

The bachelor of science program in Mechanical Engineering (470) and associate program in Engineering (351) are available to students entering Brigham Young University-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]

Program 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)

Engineering Technology Programs

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.

Program Outcomes. Program 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)

The 2-year associate program in Welding and Fabrication Technology (374) provides hands-on training in welding and manufacturing processes. The curriculum includes a solid foundation in welding theory, manufacturing processes, and material science. This program develops skills leading to welder certification and is designed for immediate employment in the welding, manufacturing, or fabrication industries. The associate program in Welding and Fabrication Technology is available on the Fall/Winter and Winter/Spring tracks.

The 4-year bachelor of science program in Welding and Fabrication Technology Management (474) adds a curriculum of business management fundamentals to complement the technical courses offered in the associate program (374), providing graduates with increased career opportunities. The bachelor of science program in Welding and Fabrication Technology Management is available on the Fall/Winter and Winter/Spring tracks.

Program Outcomes. Program Outcomes for the baccalaureate degree in welding and fabrication technology management are as follows. Students will:

1. Demonstrate their knowledge and application of the laws of physical science and math to fundamental design and fabrication problems. [Fundamentals]
2. Use modern CAD/CAM software to develop solutions to design and fabrication problems. [CAD/CAM Tools]
3. Competently present their technical findings to peers, supervisors, and the faculty in both oral and written format. [Communication]
4. Design, model, and manufacture components or elementary systems to meet product specifications. [Design Concepts]
5. Demonstrate an understanding of modern manufacturing processes. [Manufacturing Processes]
6. Demonstrate an understanding of modern welding processes. [Welding Processes]
7. Learn to function as a contributing team member in a technical work environment. [Team Work]
8. Understand how technology is used in all functions of business to improve productivity, communication, and customer service. [Technological Literacy]
9. Understand international trade and financial systems. Core sources

in marketing and organizational behavior will address cross-cultural issues. [Global Literacy]

10. Develop quantitative reasoning skills by utilizing business software and web-based applications to solve finance, marketing, and operational problems addressed in the curriculum. [Quantitative Analysis]
11. Participate in business case studies, internships, and/or consulting projects to develop skills in these areas. [Problem Solving & Project Management]
12. Receive education, encouragement, and support in operating and growing business ventures in appropriate courses, guest seminars and practicums. [Entrepreneurial Spirit]
13. Learn how to identify and eliminate any incongruities between their personal ethical tendencies and the gospel of Jesus Christ. [Business Ethics]

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 (FDMAT 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, Engineering, and Engineering Technology programs, the normal entry level chemistry course is General Chemistry (Chem 105). For the Welding and Fabrication Technology programs the normal entry level chemistry course is Introduction to General Chemistry (Chem 101).

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 (351)

Take required Foundations courses (19 credits)

Major Requirements

No Double Counting of Major Courses - Students must maintain a minimum grade of C- in their major courses

Core Courses	Select One Option			
Take these courses: CHEM 105 4 MATH 113 3 MATH 214 3 MATH 371 3 PH 220 3 <hr style="width: 10%; margin-left: 0;"/> 16	Chemical Engineering Option <i>Take these courses:</i> CHEM 106 4 CHEM 351 4 CHEM 352 4 ME 142 3 PH 121 3 <hr style="width: 10%; margin-left: 0;"/> 18 <i>Take 6 credits:</i> CHEM 461 3 MATH 341 3 ME 201 2 ME 202 3 ME 330 3 PH 123 3 PH 220 3 <hr style="width: 10%; margin-left: 0;"/> 6	Civil Engineering Option <i>Take these courses:</i> CONST 340 3 ME 142 3 ME 172 3 ME 201 2 ME 202 3 ME 204 3 ME 250 3 ME 250L 1 PH 123 3 <hr style="width: 10%; margin-left: 0;"/> 24	Electrical Engineering Option <i>Take these courses:</i> CS 124 3 CS 165 3 CS 235 3 CS 237 3 ECEN 150 3 ECEN 160 3 ECEN 250 4 PH 121 3 <hr style="width: 10%; margin-left: 0;"/> 25	Mechanical Engineering Option <i>Take these courses:</i> ME 101 1 ME 131 3 ME 142 3 ME 172 3 ME 201 2 ME 202 3 ME 204 3 ME 250 3 ME 250L 1 PH 123 3 <hr style="width: 10%; margin-left: 0;"/> 25
Total Major Credits=41				
This major is available on the following tracks:				
Fall-Winter---- YES	Winter-Spring---- YES	Spring-Fall---- YES		

AAS in Engineering Technology (380)

Take required Foundations courses (19 credits)

Major Requirements

No Double Counting of Major Courses - Students must maintain a minimum grade of C- in their major courses

Core Courses Take these courses: CHEM 105 4 FDMAT 112* 4 MATH 111 2 ME 101 1 ME 131 3 ME 142 3 ME 172 3 ME 201 2 ME 202 3 ME 250 3 ME 250L 1 PH 105 4 <hr style="width: 10%; margin-left: 0;"/> 33	Technical Electives Take 8 credits: ARCH 100 3 ARCH 110 3 CONST 340 3 ECEN 150 3 MATH 113 3 ME 105 4 ME 204 3 ME 210 2 ME 280 3 ME 330 3 ME 331 3 ME 332 3 WELD 120 3 WELD 123 4 WELD 229 3 WELD 280 3 <hr style="width: 10%; margin-left: 0;"/> 8	Program Notes: <i>*Note to students: FDMAT 112 needs to be taken to satisfy a major requirement as well as partially satisfy the Foundations Quantitative Reasoning requirement. Full completion of Foundations will also require FDMAT 108T.</i>
Total Major Credits=41		
This major is available on the following tracks:		
Fall-Winter---- YES	Winter-Spring---- YES	Spring-Fall---- YES

AAS in Welding and Fabrication Technology (374)

Take required Foundations courses (19 credits)

Major Requirements

No Double Counting of Major Courses - Students must maintain a minimum grade of C- in their major courses

Core Courses

Take these courses:

CHEM 101	4
MATH 111	2
ME 101	1
ME 105	4
ME 131	3
ME 172	3
ME 250	3
ME 299	1
ME 332	3
PH 105	4
WELD 120	3
WELD 123	4
WELD 229	3
WELD 280	3
	<hr style="width: 50px; margin-left: 0;"/>
	41

Program Notes:

Total Major Credits=41

This major is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- NO

BS in Welding and Fabrication Technology Management (474)

Take required Foundations courses

Major Requirements

No Double Counting of Major Courses - Students must maintain a minimum grade of C- in their major courses

Entry Courses

Take these courses your first 2 semesters:

ME 101	1
ME 105	4
ME 131	3
ME 172	3
	<hr style="width: 50px; margin-left: 0;"/>
	11

Core Courses

Take these courses:

ACCTG 180	3
B 101	3
B 301	3
B 321	3
B 341	3
B 361	3
CHEM 101	4
CIT 140	3
ECON 150	3
FDMAT 221*	3
MATH 111	2
ME 250	3
ME 332	3
PH 105	4
WELD 120	3
WELD 123	4
WELD 229	3
WELD 280	3
	<hr style="width: 50px; margin-left: 0;"/>
	56

Supplemental Courses

Take 1 course:

B 398	3
ME 299	1
ME 398	1-3
	<hr style="width: 50px; margin-left: 0;"/>
	1

Program Notes:

Additional Elective Credits Required for Graduation - 2
**Note to students: FDMAT 221 needs to be taken to satisfy a major requirement as well as partially satisfy the Foundations Quantitative Reasoning requirement. Full completion of Foundations will also require FDMAT 108T.*

Total Major Credits=68

This major is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- NO

BS in Mechanical Engineering (470)

Take required Foundations courses

Major Requirements

No Double Counting of Major Courses - Students must maintain a minimum grade of C- in their major courses

Entry Courses	<i>Choose a 12 credit emphasis from the following list</i>			<i>Program Notes:</i>
<i>Take these courses your first 2 semesters:</i>				** Complete online accounting tutorial (approximately 10 hours) prior to taking first business course.
ME 101 1	Automotive		Engineering Mechanics	
ME 131 3	AUTO 125 1		<i>Take this course:</i>	
ME 142 3	AUTO 131 3		ME 425 3	
ME 172 3	AUTO 132 3		<i>Take 9 credits:</i>	
ME 201 2	<i>Choose 6 credits</i>		ME 337 3	
12	AUTO 155 4		ME 410 3	
Core Courses	AUTO 201 4		ME 445 3	
<i>Take these courses:</i>	AUTO 221 3		ME 460 3	
CHEM 105 4	AUTO 231 3		Manufacturing	
MATH 215 4	AUTO 232 3		<i>Take these courses:</i>	
MATH 316 4	AUTO 340 3		ME 332 3	
ME 202 3	Bio-Medical		B 461** 3	
ME 204 3	<i>Choose 12 credits</i>		<i>Take 3 credits:</i>	
ME 210 2	BIO 180 4		ME 105 4	
ME 250 3	BIO 181 4		ME 331 3	
ME 250L 1	BIO 460 4		<i>Take 3 credits:</i>	
ME 280 3	BIO 461 5		ME 465 3	
ME 310 2	Computer Aided Engineering		ME 470 3	
ME 322 3	<i>Take this course:</i>		**Manufacturing Supply Chain	
ME 330 3	ME 342 3		<i>Take these courses:</i>	
ME 360 3	<i>Choose 9 credits:</i>		B 361 3	
ME 370 3	ME 332 3		B 461 3	
ME 380 3	ME 425 3		B 466 4	
ME 423 3	ME 438 3		B 468 2	
ME 480 3	ME 460 3		Material Science	
PH 223 4			<i>Take these courses:</i>	
54			CHEM 106 4	
Experiential Learning	Design of Mechanical Systems		CHEM 351 4	
<i>Take 2 courses:</i>	<i>Choose 12 credits:</i>		CHEM 461 3	
ME 299 1	ME 331 3		ME 445 3	
ME 398 1-3	ME 337 3		Mining/Petroleum	
ME 490 1-3	ME 438 3		<i>Take these courses:</i>	
2	ME 460 3		GEOL 111 3	
	ME 465 3		GEOL 111L 1	
	Engineering Management**		Choose 9 credits	
	<i>Choose 9 credits:</i>		GEOL 250 4	
	B 211 4		GEOL 340 3	
	B 301 3		GEOL 425 3	
	B 321 3		GEOL 435 3	
	<i>Take 3 credits:</i>		GEOL 445 3	
	B 361 3		ME 465 3	
	B 383 3		General	
	CIT 380 3		<i>Take 12 credits:</i>	
			MATH 472 3	
			ME 331 3	
			ME 332 3	
			ME 337 3	
			ME 342 3	
			ME 398 1-3	
			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 490 1-3	
			ME 495R 3	

Total Major Credits=80

This major is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- YES

Minor in Engineering (206)

Major Requirements

Students must maintain a minimum grade of C- in their major courses

Core Courses <i>Take these courses:</i>		Technical Electives <i>Take 3 credits:</i>		Program Notes: <i>*Note to students: FDMAT 112 needs to be taken to satisfy a major requirement as well as partially satisfy the Foundations Quantitative Reasoning requirement. Full completion of Foundations will also require FDMAT 108T.</i>
FDMAT 112*	4	CHEM 105	4	
ME 101	1	CHEM 106	4	
ME 131	3	MATH 113	3	
ME 142	3	MATH 214	3	
ME 172	3	MATH 215	4	
ME 201	2	ME 204	3	
ME 202	3	ME 210	2	
ME 280	3	ME 250	3	
	<u>22</u>	ME 250L	1	
		ME 331	3	
		ME 332	3	
		PH 123	3	
		PH 220	<u>3</u>	
			3	

Total Minor Credits=25

This major is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- YES

Minor in Welding and Fabrication Technology (217)

Major Requirements

No Double Counting of Major Courses - Students must maintain a minimum grade of C- in their major courses

Core Courses <i>Take these courses:</i>		Technical Electives <i>Take 4 credits:</i>		Program Notes:
ME 105	4	CHEM 101	4	
ME 131	3	FDMAT 110	3	
WELD 120	3	Math 111	2	
WELD 123	4	ME 172	3	
WELD 280	3	ME 250	3	
	<u>17</u>	ME 332	3	
		WELD 229	<u>3</u>	
			5	

Total Minor Credits=22

This major is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- NO

Mechanical Engineering

Brigham Young University-Idaho 2011-2012

Mechanical Engineering Pre-approved Clusters

<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">Engineering Cluster</th> <th style="text-align: right;">6300</th> </tr> </thead> <tbody> <tr> <td colspan="3"><i>Take 15 credits</i></td> </tr> <tr> <td>FDMAT 112</td> <td>Calculus 1</td> <td style="text-align: right;">4</td> </tr> <tr> <td>ME 101</td> <td>Introduction to Mechanical Engineering</td> <td style="text-align: right;">1</td> </tr> <tr> <td>ME 131</td> <td>Manufacturing Processes 1</td> <td style="text-align: right;">3</td> </tr> <tr> <td>ME 142</td> <td>Engineering Computation 1</td> <td style="text-align: right;">3</td> </tr> <tr> <td>ME 172</td> <td>Visualization in Engineering Design</td> <td style="text-align: right;">3</td> </tr> <tr> <td>ME 201</td> <td>Engineering Mechanics: Statics</td> <td style="text-align: right;">2</td> </tr> <tr> <td>ME 202</td> <td>Strength of Materials</td> <td style="text-align: right;">3</td> </tr> <tr> <td>ME 204</td> <td>Engineering Mechanics: Dynamics</td> <td style="text-align: right;">3</td> </tr> <tr> <td colspan="2">Total Credits</td> <td style="text-align: right;">15</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">Manufacturing Cluster</th> <th style="text-align: right;">6301</th> </tr> </thead> <tbody> <tr> <td colspan="3"><i>Take 12 credits</i></td> </tr> <tr> <td>ME 105</td> <td>Essentials of Welding</td> <td style="text-align: right;">4</td> </tr> <tr> <td>ME 131</td> <td>Manufacturing Processes 1</td> <td style="text-align: right;">3</td> </tr> <tr> <td>ME 172</td> <td>Visualization in Engineering Design</td> <td style="text-align: right;">3</td> </tr> <tr> <td>ME 331</td> <td>Manufacturing Processes 2</td> <td style="text-align: right;">3</td> </tr> <tr> <td>ME 332</td> <td>Advanced CNC</td> <td style="text-align: right;">3</td> </tr> <tr> <td colspan="2">Total Credits</td> <td style="text-align: right;">12</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">Welding Cluster</th> <th style="text-align: right;">6302</th> </tr> </thead> <tbody> <tr> <td colspan="3"><i>Take these courses:</i></td> </tr> <tr> <td>ME 105</td> <td>Essentials of Welding</td> <td style="text-align: right;">4</td> </tr> <tr> <td>WELD 123</td> <td>Advanced Welding Processes</td> <td style="text-align: right;">4</td> </tr> <tr> <td colspan="3"><i>Take 6 credits:</i></td> </tr> <tr> <td>ME 131</td> <td>Manufacturing Processes 1</td> <td style="text-align: right;">3</td> </tr> <tr> <td>ME 172</td> <td>Visual Engineering</td> <td style="text-align: right;">3</td> </tr> <tr> <td>WELD 120</td> <td>Gas Tungsten Arc Welding</td> <td style="text-align: right;">3</td> </tr> <tr> <td>WELD 229</td> <td>Code, Certification & Inspection</td> <td style="text-align: right;">3</td> </tr> <tr> <td>WELD 280</td> <td>Welding Fabrication</td> <td style="text-align: right;">3</td> </tr> <tr> <td colspan="2">Total Credits</td> <td style="text-align: right;">14</td> </tr> </tbody> </table>	Engineering Cluster		6300	<i>Take 15 credits</i>			FDMAT 112	Calculus 1	4	ME 101	Introduction to Mechanical Engineering	1	ME 131	Manufacturing Processes 1	3	ME 142	Engineering Computation 1	3	ME 172	Visualization in Engineering Design	3	ME 201	Engineering Mechanics: Statics	2	ME 202	Strength of Materials	3	ME 204	Engineering Mechanics: Dynamics	3	Total Credits		15	Manufacturing Cluster		6301	<i>Take 12 credits</i>			ME 105	Essentials of Welding	4	ME 131	Manufacturing Processes 1	3	ME 172	Visualization in Engineering Design	3	ME 331	Manufacturing Processes 2	3	ME 332	Advanced CNC	3	Total Credits		12	Welding Cluster		6302	<i>Take these courses:</i>			ME 105	Essentials of Welding	4	WELD 123	Advanced Welding Processes	4	<i>Take 6 credits:</i>			ME 131	Manufacturing Processes 1	3	ME 172	Visual Engineering	3	WELD 120	Gas Tungsten Arc Welding	3	WELD 229	Code, Certification & Inspection	3	WELD 280	Welding Fabrication	3	Total Credits		14	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">Fabrication Cluster</th> <th style="text-align: right;">6303</th> </tr> </thead> <tbody> <tr> <td colspan="3"><i>Take these courses:</i></td> </tr> <tr> <td>ME 105</td> <td>Essentials of Welding</td> <td style="text-align: right;">4</td> </tr> <tr> <td>ME 131</td> <td>Manufacturing Processes 1</td> <td style="text-align: right;">3</td> </tr> <tr> <td>ME 172</td> <td>Visual Engineering</td> <td style="text-align: right;">3</td> </tr> <tr> <td colspan="3"><i>Take 3 credits:</i></td> </tr> <tr> <td>ME 331</td> <td>Manufacturing Processes 2</td> <td style="text-align: right;">3</td> </tr> <tr> <td>ME 332</td> <td>Advanced CNC</td> <td style="text-align: right;">3</td> </tr> <tr> <td>WELD 120</td> <td>Gas Tungsten Arc Welding</td> <td style="text-align: right;">3</td> </tr> <tr> <td>WELD 123</td> <td>Advanced Welding Processes</td> <td style="text-align: right;">4</td> </tr> <tr> <td colspan="2">Total Credits</td> <td style="text-align: right;">13</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">Mechanical Engineering Introductory Module</th> <th style="text-align: right;">6305</th> </tr> </thead> <tbody> <tr> <td colspan="3"><i>Take these courses:</i></td> </tr> <tr> <td>ME 101</td> <td>Introduction to Mechanical Engineering</td> <td style="text-align: right;">1</td> </tr> <tr> <td>ME 131</td> <td>Manufacturing Processes 1</td> <td style="text-align: right;">3</td> </tr> <tr> <td>ME 142</td> <td>Engineering Computation 1</td> <td style="text-align: right;">3</td> </tr> <tr> <td>ME 172</td> <td>Engineering Graphics</td> <td style="text-align: right;">3</td> </tr> <tr> <td>ME 201</td> <td>Engineering Mechanics: Statics</td> <td style="text-align: right;">2</td> </tr> <tr> <td colspan="2">Total Credits</td> <td style="text-align: right;">12</td> </tr> </tbody> </table>	Fabrication Cluster		6303	<i>Take these courses:</i>			ME 105	Essentials of Welding	4	ME 131	Manufacturing Processes 1	3	ME 172	Visual Engineering	3	<i>Take 3 credits:</i>			ME 331	Manufacturing Processes 2	3	ME 332	Advanced CNC	3	WELD 120	Gas Tungsten Arc Welding	3	WELD 123	Advanced Welding Processes	4	Total Credits		13	Mechanical Engineering Introductory Module		6305	<i>Take these courses:</i>			ME 101	Introduction to Mechanical Engineering	1	ME 131	Manufacturing Processes 1	3	ME 142	Engineering Computation 1	3	ME 172	Engineering Graphics	3	ME 201	Engineering Mechanics: Statics	2	Total Credits		12
Engineering Cluster		6300																																																																																																																																																		
<i>Take 15 credits</i>																																																																																																																																																				
FDMAT 112	Calculus 1	4																																																																																																																																																		
ME 101	Introduction to Mechanical Engineering	1																																																																																																																																																		
ME 131	Manufacturing Processes 1	3																																																																																																																																																		
ME 142	Engineering Computation 1	3																																																																																																																																																		
ME 172	Visualization in Engineering Design	3																																																																																																																																																		
ME 201	Engineering Mechanics: Statics	2																																																																																																																																																		
ME 202	Strength of Materials	3																																																																																																																																																		
ME 204	Engineering Mechanics: Dynamics	3																																																																																																																																																		
Total Credits		15																																																																																																																																																		
Manufacturing Cluster		6301																																																																																																																																																		
<i>Take 12 credits</i>																																																																																																																																																				
ME 105	Essentials of Welding	4																																																																																																																																																		
ME 131	Manufacturing Processes 1	3																																																																																																																																																		
ME 172	Visualization in Engineering Design	3																																																																																																																																																		
ME 331	Manufacturing Processes 2	3																																																																																																																																																		
ME 332	Advanced CNC	3																																																																																																																																																		
Total Credits		12																																																																																																																																																		
Welding Cluster		6302																																																																																																																																																		
<i>Take these courses:</i>																																																																																																																																																				
ME 105	Essentials of Welding	4																																																																																																																																																		
WELD 123	Advanced Welding Processes	4																																																																																																																																																		
<i>Take 6 credits:</i>																																																																																																																																																				
ME 131	Manufacturing Processes 1	3																																																																																																																																																		
ME 172	Visual Engineering	3																																																																																																																																																		
WELD 120	Gas Tungsten Arc Welding	3																																																																																																																																																		
WELD 229	Code, Certification & Inspection	3																																																																																																																																																		
WELD 280	Welding Fabrication	3																																																																																																																																																		
Total Credits		14																																																																																																																																																		
Fabrication Cluster		6303																																																																																																																																																		
<i>Take these courses:</i>																																																																																																																																																				
ME 105	Essentials of Welding	4																																																																																																																																																		
ME 131	Manufacturing Processes 1	3																																																																																																																																																		
ME 172	Visual Engineering	3																																																																																																																																																		
<i>Take 3 credits:</i>																																																																																																																																																				
ME 331	Manufacturing Processes 2	3																																																																																																																																																		
ME 332	Advanced CNC	3																																																																																																																																																		
WELD 120	Gas Tungsten Arc Welding	3																																																																																																																																																		
WELD 123	Advanced Welding Processes	4																																																																																																																																																		
Total Credits		13																																																																																																																																																		
Mechanical Engineering Introductory Module		6305																																																																																																																																																		
<i>Take these courses:</i>																																																																																																																																																				
ME 101	Introduction to Mechanical Engineering	1																																																																																																																																																		
ME 131	Manufacturing Processes 1	3																																																																																																																																																		
ME 142	Engineering Computation 1	3																																																																																																																																																		
ME 172	Engineering Graphics	3																																																																																																																																																		
ME 201	Engineering Mechanics: Statics	2																																																																																																																																																		
Total Credits		12																																																																																																																																																		

Mechanical Engineering

Brigham Young University-Idaho 2010-2011

Course Descriptions

Credits*

ME 101 Introduction to Mechanical Engineering	(1:1:0)
This course provides an introduction to the field of mechanical engineering and related fields. Topics include investigation of curricula; career planning; design process; engineering software tools. In addition, student teams will complete an engineering project. (Fall, Winter, Spring)	
ME 105 Essentials of Welding	(4:2:4)
Total Course Fees: \$30.00 A course in beginning welding designed to teach the fundamentals of arc welding including: safety, power sources, electrodes, oxyfuel cutting, and oxyacetylene welding with an introduction to weld symbols, metallurgy, and metal identification. (Fall, Winter, Spring)	
ME 115 Computerized Technical Illustration	(2:2:0)
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). (As needed)	
ME 131 Manufacturing Processes 1	(3:2:2)
Introduction to manufacturing processes. Topics includes milling, turning, drilling, sawing, casting, polymer processes, joining processes, deformation processes, and measurement tools and procedures. (Fall, Winter, Spring)	
ME 142 Engineering Computation 1	(3:3:0)
Co-requisites: FDMAT112 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 172 Engineering Graphics	(3:3:0)
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	(2:2:1)
Co-requisites: FDMAT112 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. (Fall, Winter, Spring)	
ME 202 Strength of Materials	(3:3:0)
Prerequisites: 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)
Prerequisites: ME 201 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 210 Electro-Mechanical Devices 1	(2:1:3)
Prerequisites: FDMAT112 This course provides an introduction to electricity, circuits, electric power, and simple laboratory equipment like multimeters and oscilloscopes. (Fall, Winter, Spring)	
ME 250 Materials Science	(3:3:0)
Prerequisites: CHEM 105; ME 202 Atomic 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)
Formerly ME 218 Concurrent Registration: ME 250 Laboratory investigations in materials science and strength of materials. (Fall, Winter, Spring)	
ME 280 ME Design 1: Mechanical Design	(3:2:2)
Prerequisites: ME 142; ME 131; ME 172; ME 202 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	(1:0:0)
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 310 Electro-Mechanical Devices 2	(2:1:3)
Prerequisites: MATH 215; ME 210 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 1	(3:3:2)
Prerequisites: 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. Laboratory experiences with thermodynamic devices. (Fall, Winter, Spring)	
ME 330 Engineering Statistics	(3:3:0)
Prerequisites: FDMAT 112; ME 142 Introduction to statistical methods for science and engineering. Review of basic statistical concepts of central tendency, dispersion of data, probability laws, hypothesis testing, and confidence intervals. Introduces statistical process control, design of experiments, statistical tolerance analysis, and concepts of six sigma quality. (Fall, Winter, Spring)	
ME 331 Manufacturing Processes 2	(3:2:2)
Prerequisites: ME 131; ME 172 Integration of manufacturing processes. Continued emphasis in mechanical reduction, deformation and consolidation processes, with focus on Joining processes. (As needed)	
ME 332 Computer Numerical Control	(3:2:2)
Prerequisites: ME 131; ME 172 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. (As needed)	

Mechanical Engineering

Brigham Young University-Idaho 2011-2012

ME 337 Kinematics Prerequisites: ME 204 Motion analysis of mechanisms, including position, velocity, and acceleration; rolling contact; cams; gears; synthesis of mechanisms. Includes computer-aided engineering techniques.	(3:3:0)	ME 425 Computational Fluid Dynamics Co-requisites: 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. (As needed)	(3:3:2)
ME 342 Engineering Computation 2 Prerequisites: MATH 316; ME 142; ME 202; ME 204 This course builds on the basics of engineering computation from ME 142. Additional numerical methods, including curve fitting, optimization, and ordinary differential equations are covered. Additional topics in computer programming are also presented. Computational techniques are implemented in MS Excel, VBA within Excel, and a commercial math software package. (As needed)	(3:3:0)	ME 438 CAE Modeling and Digital Simulation Prerequisites: ME 380 A study of advanced Computer-Aided Design 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. (As needed)	(3:3:0)
ME 360 Fluid Mechanics Prerequisites: ME 204; ME 142; MATH 316 Introduction to fluid mechanics and incompressible fluid flow, fluid statics, fluid dynamics, control volume and differential analysis of fluid flow, dimensional analysis and scale models, internal and external viscous flow, turbomachinery. Flow measurement lab included. (Fall, Winter, Spring)	(3:3:2)	ME 445 Mechanics of Composite Materials Prerequisites: ME 142, 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. (As needed)	(3:3:0)
ME 370 Machine Design Prerequisites: ME 250L, ME 280 Analysis, modeling and design of mechanical components and systems; materials, processes and structural analysis; static and dynamic failure theories; analysis and design of machine elements. Use of computer-aided design tools emphasized. (Fall, Winter, Spring)	(3:3:2)	ME 460 Fundamentals of Finite Element Analysis Prerequisites: ME 142; ME 370 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. (As needed)	(3:3:0)
ME 380 ME Design 2: Product Design Total Course Fees: \$13.00 Prerequisites: ME 250; ME 370 This course introduces a structured design methodology 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)	(3:2:2)	ME 465 Fluid Power Fundamentals Prerequisites: 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. (As needed)	(3:2:2)
ME 398 Internship Industrial work experience. (Fall, Winter, Spring)	(1-3:0:0)	ME 470 Mechatronics Prerequisites: 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. (As needed)	(3:3:2)
ME 410 System Dynamics Prerequisites: MATH 316; ME 204; ME 210 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. (As needed)	(3:3:2)	ME 480 ME Design 3: Capstone Design Prerequisites: ME 322; ME 360; ME 380 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)	(3:2:2)
ME 422 Thermodynamics 2 Prerequisites: ME 322 Application of principles of thermodynamics to air standard cycles (Otto, Diesel, Brayton, Sterling, and Ericsson), steam power cycles (Rankine), 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. (As needed)	(3:3:2)	ME 490 Special Problems in Mechanical Engineering Students complete individual major projects or research in engineering, under the supervision of a faculty member. (Fall, Winter, Spring)	(1-3:0:0)
ME 423 Heat Transfer Prerequisites: ME 142; MATH 316; ME 322 Fundamentals of conduction, convection, and radiant modes of heat transfer; fundamental equations for steady and unsteady conduction; convection correlations; environmental radiation and radiation properties; heat exchanger analysis and design; design of systems involving multi-mode heat transfer. Heat transfer lab included. (Fall, Winter, Spring)	(3:3:2)	ME 495R Special Topics in Mechanical Engineering A one-semester course emphasizing current topics in engineering. (As needed)	(3:0:0)
		WELD 120 Gas Tungsten Arc Welding Co-requisites: ME 105 Gas Tungsten arc welding of carbon steel, and aluminum alloys. Students will be given instruction on theory and application for welding in all positions using the AWS EG3 standards. (Fall, Spring)	(3:2:3)

WELD 123 Advanced Welding Processes**(4:2:4)**

Prerequisites: ME 105

Continued proficiency in the use of arc welding processes in accordance with AWS EG2 (qualifications of welding personnel). This is a competency-based curriculum detailing acceptable skill requirements for entry level welders.

(Fall, Spring)

WELD 229 Code, Certification and Inspection**(3:2:3)**

Co-requisites: WELD 123

Welding procedure, specification, and qualification according to standards of AWS D1.1, ASME Section IX and API 1104. Interpretation of weldments, NDT inspection methods, and required reports, in accordance with AWS EG4 requirements.

(Winter)

WELD 280 Welding Fabrication**(3:1:4)**

Co-requisites: WELD 123

The use and application of equipment, tools, fasteners, and processes used in fabrication practices in the welding industry. Interpretation of drawings for fabrication of small projects. Techniques for layout, fitting, squaring, tacking, and fabricating will be developed.

(Winter)