

## Mechanical Engineering

Accredited by the Engineering Accreditation Commission of ABET, [www.abet.org](http://www.abet.org)

### 1. University Requirements: (23-24)

Writing, Rhetoric and American Cultures (WRA)	4
Integrative Studies in Humanities (IAH)	8
Integrative Studies in Social Sciences (ISS)	8
Bioscience (one of the following):	
BS 161, ENT 205, IBIO 150, MMG 141,	
MMG 201, PLB 105, PSL 250	3-4

### 2. College Requirements: (28)

CEM 141 General Chemistry	4
EGR 100 Introduction to Engineering Design	2
MTH 132 Calculus I	3
MTH 133 Calculus II	4
MTH 234 Multivariable Calculus	4
MTH 235 Differential Equations	3
PHY 183 Physics for Scientists & Engineers I	4
PHY 184 Physics for Scientists & Engineers II	4

### 3. Major Requirements: (69)

#### A. Complete all of the following courses: (17)

CE 221 Statics	3
CEM 161 Chemistry Laboratory I	1
CSE 231 Introduction to Programming I	4
ECE 345 Electronic Instrumentation and Systems	3
MSE 250 Materials Science and Engineering	3
STT 351 Probability and Statistics for Engineering	3

#### B. Complete all of the following courses: (40)

ME 201 Thermodynamics	3
ME 222 Mechanics of Deformable Solids	3
ME 280 Graphic Communications	2
ME 300 Professional Issues in Mechanical Eng	1
ME 332 Fluid Mechanics (W)	4
ME 361 Dynamics	3
ME 371 Mechanical Design I	3
ME 391 Mechanical Engineering Analysis	3
ME 410 Heat Transfer	3
ME 412 Heat Transfer Laboratory (W)	2
ME 451 Control Systems (W)	4
ME 461 Mechanical Vibrations	3
ME 471 Mechanical Design II	3
ME 481 Mechanical Engr Design Projects (W)	3

### C. Senior Electives: (9)

#### Complete a minimum of nine credits from the following:

ME 416 Computer Asstd Design of Thermal Sys	3
ME 417 Design of Alternative Energy Systems	3
ME 422 Introduction to Combustion	3
ME 423 Intermed Mech of Deformable Solids	3
ME 425 Experimental Mechanics	3
ME 426 Introduction to Composite Materials	3
ME 433 Intro to Computational Fluid Dynamics	3
ME 440 Aerospace Engineering Fundamentals	3
ME 442 Turbomachinery	3
ME 444 Automotive Engines	3
ME 445 Automotive Powertrain Design	3
ME 456 Mechatronic System Design	3
ME 464 Intermediate Dynamics	3
ME 465 Computer Aided Optimal Design	3
ME 475 Computer Aided Design of Structures	3
ME 477 Manufacturing Processes	3
ME 478 Product Development	3
ME 490 Independent Study in Mechanical Engr	1-4
ME 491 Selected Topics in Mechanical Engr	1-4
ME 494 Biofluid Mechanics and Heat Transfer	3
ME 495 Tissue Mechanics	3
ME 497 Biomechanical Design in Product Dev	3

#### D. Design-Intensive courses. Complete a minimum of three *additional* credits from: (3)

ME 416 Computer Ast Design of Thermal Sys	3
ME 417 Design of Alternative Energy Systems	3
ME 442 Turbomachinery	3
ME 445 Automotive Powertrain Design	3
ME 456 Mechatronic System Design	3
ME 465 Computer Aided Optimal Design	3
ME 475 Computer Aided Design of Structures	3
ME 497 Biomechanical Design in Product Dev	3

Courses used to fulfill item 3.c. may not be used to fulfill 3.d.

### Concentrations:

The Department offers concentrations in automotive powertrain, biomedical engineering, computational design, energy, engineering mechanics, global engineering, and manufacturing engineering to students wishing an area of specialization in their degree. The concentrations are available to, but not required of, any student enrolled in the Bachelor of Science degree program in mechanical engineering. NOTE: Completing the Bachelor of Science degree in mechanical engineering with a concentration may require more than 128 credits. Upon completion of the required courses for one of these concentrations, certification will appear on the student's official transcript.

#### Automotive Powertrain Concentration (12)

To earn a Bachelor of Science degree in Mechanical Engineering with an automotive powertrain concentration, students must complete requirements 1., 2., 3.a., 3.b., and 3.d. above and the following:

##### All of the following (9)

ME 422	Intro to Combustion	3
ME 444	Automotive Engines	3
ME 445	Automotive Powertrain Design	3

##### One of the following (3)

ME 433	Intro to Computational Fluid Dynamic	3
ME 442	Turbomachinery	3

#### Biomedical Engineering Concentration (16)

To earn a Bachelor of Science degree in Mechanical Engineering with a biomedical engineering concentration, students must complete requirements 1., 2., 3.a., 3.b., and 3.d. above and the following:

##### Both of the following courses (7):

BS 161	Cells and Molecular Biology	3
PSL 250	Introductory Physiology	4

##### Select nine credits from the following courses (9):

BE 444	Biosensors for Medical Diagnostics	3
ECE 445	Biomedical Instrumentation	3
ME 494	Biofluid Mechanics and Heat Transfer	3
ME 495	Tissue Mechanics	3
ME 497	Biomechanical Design in Product Dev	3
MSE 425	Biomaterials and Biocompatibility	3

#### Computational Design Concentration (12)

To earn an Bachelor of Science degree in Mechanical Engineering with a computational design concentration, students must complete requirements 1., 2., 3.a., 3.b., and 3.d. and the following:

##### All of the following (12)

ME 416	Computer Assisted Design of Thermal Systems	3
ME 433	Intr to Computational Fluid Dynamics	3
ME 465	Computer Aided Optimal Design	3
ME 475	Computer Aided Design of Structures	3

#### Energy Concentration (12)

To earn a Bachelor of Science degree in Mechanical Engineering with an energy concentration, students must complete requirements 1., 2., 3.a., 3.b., and 3.d. and the following:

##### All of the following courses (9)

ME 416	Computer Assisted Design of Thermal Systems	3
ME 417	Design of Alternative Energy Systems	3
ME 422	Intro to Combustion	3

##### One of the following courses (3)

ME 440	Aerospace Engineering Fundamentals	3
ME 442	Turbomachinery	3
ME 444	Automotive Engines	3

#### Engineering Mechanics Concentration (12)

To earn a Bachelor of Science degree in Mechanical Engineering with a engineering mechanics concentration, students must complete requirements 1., 2., and 3.a., and 3.b. above and the following:

##### All of the following (12)

ME 423	Intermed Mechanics of Deform Solids	3
ME 425	Experimental Mechanics	3
ME 464	Intermediate Dynamics	3
ME 475	Computer Aided Design of Structures	3

#### Global Engineering (12)

To earn a Bachelor of Science degree in Mechanical Engineering with a global engineering concentration, students must complete requirements 1., 2., 3.a., and 3.b. above and 12 credits of approved mechanical engineering courses from a MSU co-sponsored Study Abroad institution. At least 3 credits must include a team design project.

### **Manufacturing Engineering Concentration (13)**

To earn a Bachelor of Science degree in Mechanical Engineering with a manufacturing engineering concentration, students must complete requirements 1., 2., 3.a., 3.b., and 3.d. above and the following:

#### **All of the following courses (10):**

EC 210	Economics Principles Using Calculus	3
ME 372	Machine Tool Laboratory	1
ME 477	Manufacturing Processes	3
ME 478	Product Development	3

#### **Select one of the following courses (3):**

CHE 472	Composite Materials Processing	3
ECE 415	Computer Aided Manufacturing	3
ME 426	Introduction to Composite Materials	3

### **Other Electives (Variable)**

**Total Credits Required for Degree** **128**

The requirements listed apply to students admitted to the major of Mechanical Engineering in the Department of Mechanical Engineering beginning Fall 2016. The Department of Mechanical Engineering (ME) constantly reviews program requirements and reserves the right to make changes as necessary. Consequently, each student is strongly encouraged to consult with his/her advisor to obtain assistance in planning an appropriate schedule of courses. Students who have questions about Mechanical Engineering should contact the Mechanical Engineering Department Advising Office, 2560 Engineering Building, phone (517) 355-3338.

Some courses may have prerequisites, which are not otherwise required in the program. Students should check course descriptions to ensure they are aware of prerequisites.

## Mechanical Engineering Sample Program

Freshman Year				Sophomore Year			
Fall	Credits	Spring	Credits	Fall	Credits	Spring	Credits
Bioscience	3/4	CEM 161	1	ME 280	2	MSE 250	3
CEM 141	4	CSE 231	4	MTH 234	4	ME 201	3
EGR 100	2	MTH 133	4	CE 221	3	ME 222	3
MTH 132	3	PHY 183	4	PHY 184	4	MTH 235	3
ISS 2XX	4	WRA 1XX	4	IAH 201-210	4	IAH 211 or >	4
<b>Total</b>	<b>16-17</b>	<b>Total</b>	<b>17</b>	<b>Total</b>	<b>17</b>	<b>Total</b>	<b>16</b>
Junior Year				Senior Year			
Fall	Credits	Spring	Credits	Fall	Credits	Spring	Credits
Elective	4	Elective	4	ME 410	3	ME 412	2
ME 300	1	ME 371	3	ME 471	3	ME 451	4
ME 391	3	ME 332	4	ME 461	3	ME 481	3
ME 361	3	ECE 345	3	Senior Elective	3	Senior Elective	3
STT 351	3	ISS 3XX	4	Senior Elective	3	Senior Elective	3
<b>Total</b>	<b>14</b>	<b>Total</b>	<b>18</b>	<b>Total</b>	<b>15</b>	<b>Total</b>	<b>15</b>

**Program Educational Objectives for the Undergraduate Program  
in Mechanical Engineering  
Department of Mechanical Engineering  
Michigan State University  
(Approved by the Department Faculty December 10, 2015)**

**Our graduates will:**

- Be competent and ethical engineers practicing in a diverse range of activities
- Use their mechanical engineering education as a stimulus for personal and professional growth
- Be recognized for their capability, creativity, and application of knowledge
- Be independent and critical thinkers who identify problems and develop effective solutions.