



DEPARTMENT OF  
ENGINEERING

## Engineering Programs

### **BSBME<sup>2</sup>**

Bachelor of Science in Biomedical Engineering

### **BSCE<sup>2</sup>**

Bachelor of Science in Civil Engineering

### **BSEE<sup>2</sup>**

Bachelor of Science in Electrical Engineering

### **BSME<sup>2</sup>**

Bachelor of Science in Mechanical Engineering

### **BSRE<sup>3</sup>**

Bachelor of Science in Robotics Engineering

### **BSE<sup>1</sup>**

Bachelor of Science in Engineering

Concentrations available in:

Biomedical Engineering<sup>4</sup>

Computer Engineering

Environmental Engineering

General Engineering<sup>5</sup>

### **Engineering Minors**

*Available to those majoring in another Engineering discipline:*

Biomedical Engineering

Civil Engineering

Electrical Engineering

Environmental Engineering

Mechanical Engineering

Robotics Engineering

### **Secondary Studies**

*Minors and curriculum focus areas often considered by  
Engineering students:*

Business Administration

Chemistry

Christian Ministries

Computer Science

Economic Development

Leadership

Music

Physics

Pre-Law or Pre-Health Professions

<sup>1</sup>The BSE degree program has been continuously accredited by ABET since 1993.

<sup>2,3</sup>Discipline-specific degree programs are relatively new to Messiah and are eligible for initial accreditation review once the first class has graduated.

<sup>2</sup>BSBME, BSCE, BSEE, and BSME programs graduated their first students in May 2022. The initial accreditation review is underway now, with formal announcement anticipated August 2023.

<sup>3</sup>BSRE anticipates its first graduating class May 2025 with initial accreditation review to follow; formal accreditation announcement anticipated August 2026.

<sup>4</sup>The Biomedical concentration is particularly intended for students who hope to study additional science topics, as recommended for medical school, dental school, and veterinary school preparation.

<sup>5</sup>The General concentration is more accessible (fewer credit hours) and particularly intended for students interested in pairing another area of study, such as a minor, with the Engineering degree.



## Bachelor of Science in Biomedical Engineering (BSBME)

### 8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
<b><u>First Year – Fall</u></b>			<b><u>First Year – Spring</u></b>		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
MATH 111	Calculus I	4	MATH 112	Calculus II	4
CHEM 105	Chemistry	4	PHYS 211	General Physics I	4
COMM 105	QuEST - Oral Communication	3	IDCR 151	Created and Called for Community	3
IDFY 101	First Year Seminar	3	Varies	QuEST - 1st Language Requirement	3
<b>Total</b>		<b>16</b>	<b>Total</b>		<b>16</b>
<b><u>Sophomore – Fall</u></b>			<b><u>Sophomore – Spring</u></b>		
ENGR 214	Materials Engineering	4	ENGR 211	Project Management	1
ENGR 216	Mechanics I	3	ENGR 212	Programming for Engineers	2
MATH 211	Calculus III	4	ENGR 215	Circuits I	4
Varies	Biomedical Science Elective	4	ENGR 323	Mechanics II	3
Varies	QuEST - 2nd Language Requirement	3	MATH 270	Linear and Differential Methods	3
			PHIL or RELI	QuEST - Philosophy or Religion	3
<b>Total</b>		<b>18</b>	<b>Total</b>		<b>16</b>
<b><u>Junior – Fall</u></b>			<b><u>Junior – Spring</u></b>		
ENGR 213	Engineering Statistics	3	ENGR 361	Circuits II	4
ENGR 301	Seminar I	1	ENGR 371	Thermodynamics	3
ENGR 331	Biomechanics	4	ENGR 415	Engineering Project	1
ENGR 415	Engineering Project	1	Varies	Biomedical Science Elective	3
ENGR 432	Design of Medical Devices	4	BIBL 2xx	QuEST - Bible	3
HIST 1xx	QuEST - History	3	ENGL 1xx	QuEST - Literature	3
WELL 1xx	Wellness	1			
<b>Total</b>		<b>17</b>	<b>Total</b>		<b>17</b>
<b><u>Senior – Fall</u></b>			<b><u>Senior – Spring</u></b>		
ENGR 302	Seminar II	1	ENGR 415	Engineering Project	2
ENGR 324	Control Systems	4	ENGR 332	BME Laboratory Techniques	3
ENGR 377	Fluid Dynamics	4	THEO 2xx	QuEST - Christian Beliefs	3
ENGR 415	Engineering Project	2	Varies	QuEST - Ethics/WV/Pluralism	3
ENGR 431	Biomedical Instrumentation	4	Varies	QuEST - Social Science/History	3
Varies	QuEST - 3rd Language/NW/CC	2-3			
<b>Total</b>		<b>17-18</b>	<b>Total</b>		<b>14</b>
					<b>Total Credits</b>
					<b>131</b>

## Bachelor of Science in Biomedical Engineering (BSBME)

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Engineering Design Tools	2
ENGR 211 Project Management	1
ENGR 212 Programming for Engineers	2
ENGR 213 Engineering Statistics	3
ENGR 214 Materials Engineering	4
ENGR 215 Circuits I	4
ENGR 216 Mechanics I	3
ENGR 301 Seminar I	1
ENGR 302 Seminar II	1
<i>Six credits distributed over at least 4 semesters from:</i> ENGR 415 Engineering Project	6
<b>Total</b>	<b>29</b>
Supporting Course Requirements	
CHEM 105 General Chemistry I	4
MATH 111 Calculus I	4
MATH 112 Calculus II	4
MATH 211 Calculus III	4
MATH 270 Linear and Differential Methods	3
PHYS 211 General Physics I	4
<b>Total</b>	<b>23</b>
Biomedical Engineering Requirements	
Science elective, at least seven credits from following science electives, one of which must include a lab: APHS 271 Kinesiology (3) BIOL 170 Cell and Animal Physiology (4) BIOL 260 Genetics (4) BIOL 460 Physiology (4) BIOL 465 Gross Anatomy (4) CHEM 106 General Chemistry II (4) CHEM 309 Organic Chemistry I (4) PHYS 212 General Physics II (4) PHYS 317 Optics (3)	7-8
ENGR 323 Mechanics II (3) OR ENGR 371 Thermodynamics (3)	3
Engineering elective, at least four courses from the follow electives: ENGR 323 Mechanics II (3), if not taken in the prior category ENGR 324 Control Systems (4) ENGR 361 Circuits II (4) ENGR 363 Embedded Systems Design (4) ENGR 371 Thermodynamics (3), if not taken in the prior category ENGR 377 Fluid Dynamics (4) ENGR 421 Robotic Systems (4) ENGR 472 Mechanical Design (4)	15-16

ENGR 331 Biomechanics	4
ENGR 332 BME Laboratory Techniques	3
ENGR 431 Biomedical Instrumentation	4
ENGR 432 Design of Medical Devices	4
<b>Total</b>	<b>40-41</b>
QuEST Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication	3
Created and Called for Community (W)	3
Mathematical Sciences (MATH 111)	met/major
Laboratory Science (CHEM 105)	met/major
Science, Technology & the World	waived
<b>Two of the following (6 credits total):</b> Social Science European History United States History	6
Literature	3
Philosophy and Religion	3
Arts	waived
First Semester of Language	3
Second Semester of Language	3
<b>One of the following**:</b> Third Semester of Language Cross Cultural Non-Western Studies	2 or 3
Bible	3
Christian Beliefs	3
Wellness course	1
Ethics, World Views or Pluralism	3
QuEST requirements	39-40
Major requirements (inclusive of concentration)	92-94
<b>Total credits</b>	<b>131-134</b>

\*Fulfills Writing Enriched course requirement for major.

\*\*The choice of either a third semester of a language, a cross cultural, or a non-western studies course applies **only** to the Engineering majors.

## Bachelor of Science in Civil Engineering (BSCE)

### 8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
<b><u>First Year – Fall</u></b>			<b><u>First Year – Spring</u></b>		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
MATH 111	Calculus I	4	MATH 112	Calculus II	4
CHEM 105	Chemistry	4	PHYS 211	General Physics I	4
IDFY 101	First Year Seminar	3	IDCR 151	Created and Called for Community	3
COMM 105	QuEST - Oral Communication	3	Varies	QuEST - 1st Language	3
<b>Total</b>		<b>16</b>	<b>Total</b>		<b>16</b>
<b><u>Sophomore – Fall</u></b>			<b><u>Sophomore – Spring</u></b>		
ENGR 214	Materials Engineering	4	ENGR 211	Project Management	1
ENGR 216	Mechanics I	3	ENGR 212	Programming for Engineers	2
MATH 211	Calculus III	4	ENGR 213	Engineering Statistics	3
GEOL 201	Foundations of Geology	4	ENGR 215	Circuits I	4
Varies	QuEST - 2nd Language	3	ENGR 323	Mechanics II	3
			MATH 270	Linear and Differential Methods	3
			WELL 1xx	Wellness	1
<b>Total</b>		<b>18</b>	<b>Total</b>		<b>17</b>
<b><u>Junior – Fall</u></b>			<b><u>Junior – Spring</u></b>		
ENGR 301	Seminar I	1	ENGR 344	Construction Methods & Materials	4
ENGR 341	Structural Design I	4	ENGR 345	Fluid Mechanics	4
ENGR 353	Environmental Engineering	4	ENGR 415	Engineering Project	1
ENGR 415	Engineering Project	1	ENGR 441	Structural Design II	4
Varies	QuEST - Social Science/History	3	BIBL 2xx	QuEST - Bible	3
PHIL or RELI	QuEST - Philosophy or Religion	3			
<b>Total</b>		<b>16</b>	<b>Total</b>		<b>16</b>
<b><u>Senior – Fall</u></b>			<b><u>Senior – Spring</u></b>		
ENGR 302	Seminar II	1	ENGR 347	Transportation Engineering	3
ENGR 346	Water Resources Engineering	3	ENGR 415	Engineering Project	2
ENGR 415	Engineering Project	2	ENGR 444	Civil Engineering Design	3
ENGR 443	Geotechnical Engineering	4	Varies	QuEST - 3rd Language/NW/CC	2-3
HIST 1xx	QuEST - History	3	THEO 2xx	QuEST - Christian Beliefs	3
ENGL 1xx	QuEST - Literature	3	Varies	QuEST - Ethics/WV/Pluralism	3
<b>Total</b>		<b>16</b>	<b>Total</b>		<b>16-17</b>
<b>Total Credits</b>					<b>131</b>

## Bachelor of Science in Civil Engineering (BSCE)

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Engineering Design Tools	2
ENGR 211 Project Management	1
ENGR 212 Programming for Engineers	2
ENGR 213 Engineering Statistics	3
ENGR 214 Materials Engineering	4
ENGR 215 Circuits I	4
ENGR 216 Mechanics I	3
ENGR 301 Seminar I	1
ENGR 302 Seminar II	1
<i>Six credits distributed over at least 4 semesters from:</i> ENGR 415 Engineering Project	6
<b>Total</b>	<b>29</b>
Supporting Course Requirements	
CHEM 105 General Chemistry I	4
MATH 111 Calculus I	4
MATH 112 Calculus II	4
MATH 211 Calculus III	4
MATH 270 Linear and Differential Methods	3
PHYS 211 General Physics I	4
<b>Total</b>	<b>23</b>
Civil Engineering Requirements	
GEOL 201 Foundations of Geology	4
ENGR 323 Mechanics II	3
ENGR 341 Structural Design I	4
ENGR 344 Construction Methods and Materials	4
ENGR 345 Fluid Mechanics	4
ENGR 346 Water Resources Engineering	3
ENGR 347 Transportation Engineering	3
ENGR 353 Environmental Engineering	4
ENGR 441 Structural Design II	4
ENGR 443 Geotechnical Engineering	4
ENGR 444 Civil Engineering Design	3
<b>Total</b>	<b>40</b>

Experiential Learning Experience (ENGR 302)	met/major
QuEST Requirements	Credits
First Year Seminar	3
Oral Communication	3
Created and Called for Community (W)	3
Mathematical Sciences (MATH 111)	met/major
Laboratory Science (CHEM 105)	met/major
Science, Technology & the World	waived
<b>Two of the following (6 credits total):</b> Social Science European History United States History	6
Literature	3
Philosophy and Religion	3
Arts	waived
First Semester of Language	3
Second Semester of Language	3
<b>One of the following**:</b> Third Semester of Language Cross Cultural Non-Western Studies	2 or 3
Bible	3
Christian Beliefs	3
Wellness course	1
Ethics, World Views or Pluralism	3
QuEST requirements	39-40
Major requirements (inclusive of concentration)	92
<b>Total credits</b>	<b>131-132</b>

\*Fulfills Writing Enriched course requirement for major.

\*\*The choice of either a third semester of a language, a cross cultural, or a non-western studies course applies **only** to the Engineering majors.

## Bachelor of Science in Electrical Engineering (BSEE)

### 8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
<b><u>First Year – Fall</u></b>			<b><u>First Year – Spring</u></b>		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
MATH 111	Calculus I	4	MATH 112	Calculus II	4
CHEM 105	Chemistry	4	PHYS 211	General Physics I	4
IDFY 101	First Year Seminar	3	IDCR 151	Created and Called for Community	3
COMM 105	QuEST - Oral Communication	3	Varies	QuEST - 1st Language	3
<b>Total</b>		<b>16</b>	<b>Total</b>		<b>16</b>
<b><u>Sophomore – Fall</u></b>			<b><u>Sophomore – Spring</u></b>		
ENGR 215	Circuits I	4	ENGR 211	Project Management	1
ENGR 216	Mechanics I	3	ENGR 212	Programming for Engineers	2
MATH 211	Calculus III	4	ENGR 214	Materials Engineering	4
PHYS 212	General Physics II	4	ENGR 361	Circuits II	4
Varies	QuEST - 2nd Language	3	MATH 270	Linear and Differential Methods	3
			PHIL or RELI	QuEST - Philosophy or Religion	3
<b>Total</b>		<b>18</b>	<b>Total</b>		<b>17</b>
<b><u>Junior – Fall</u></b>			<b><u>Junior – Spring</u></b>		
ENGR 301	Seminar I	1	ENGR 213	Engineering Statistics	3
ENGR 362	Analog Electronics	3	ENGR 364	Electrical Devices	4
ENGR 415	Engineering Project	1	ENGR 365	Linear Systems	3
ENGR 462	Power Electronics	4	ENGR 415	Engineering Project	1
BIBL 2xx	QuEST - Bible	3	HIST 1xx	QuEST - History	3
ENGL 1xx	QuEST - Literature	3	THEO 2xx	QuEST - Christian Beliefs	3
WELL 1xx	Wellness	1			
<b>Total</b>		<b>16</b>	<b>Total</b>		<b>17</b>
<b><u>Senior – Fall</u></b>			<b><u>Senior – Spring</u></b>		
ENGR 302	Seminar II	1	ENGR 363	Embedded Systems Design	4
ENGR 324	Control Systems	4	ENGR 415	Engineering Project	2
ENGR 367	Electromagnetics	3	ENGR 421	Robotic Systems	4
ENGR 415	Engineering Project	2	ENGR 461	Communication Systems	3
Varies	QuEST - Social Science/History	3	Varies	QuEST - Ethics/WV/Pluralism	3
Varies	QuEST - 3rd Language/NW/CC	2-3			
<b>Total</b>		<b>15-16</b>	<b>Total</b>		<b>16</b>
					<b>Total Credits</b>
					<b>131</b>

## Bachelor of Science in Electrical Engineering (BSEE)

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Engineering Design Tools	2
ENGR 211 Project Management	1
ENGR 212 Programming for Engineers	2
ENGR 213 Engineering Statistics	3
ENGR 214 Materials Engineering	4
ENGR 215 Circuits I	4
ENGR 216 Mechanics I	3
ENGR 301 Seminar I	1
ENGR 302 Seminar II	1
<i>Six credits distributed over at least 4 semesters from:</i> ENGR 415 Engineering Project	6
<b>Total</b>	<b>29</b>
Supporting Course Requirements	
CHEM 105 General Chemistry I	4
MATH 111 Calculus I	4
MATH 112 Calculus II	4
MATH 211 Calculus III	4
MATH 270 Linear and Differential Methods	3
PHYS 211 General Physics I	4
<b>Total</b>	<b>23</b>
Electrical Engineering Requirements	
PHYS 212 General Physics II	4
ENGR 324 Control Systems	4
ENGR 361 Circuits II	4
ENGR 362 Analog Electronics	3
ENGR 363 Embedded Systems Design	4
ENGR 364 Electrical Devices	4
ENGR 365 Linear Systems	3
ENGR 367 Electromagnetics	3
ENGR 461 Communication Systems	3
ENGR 462 Power Electronics	4
Engineering elective, choose one course from: ENGR 373 Instrumentation and Measurement (3) ENGR 421 Robotic Systems (4) ENGR 422 Industrial Automation (4) ENGR 431 Biomedical Instrumentation (4)	3-4
<b>Total</b>	<b>39-40</b>

QuEST Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication	3
Created and Called for Community (W)	3
Mathematical Sciences (MATH 111)	met/major
Laboratory Science (CHEM 105)	met/major
Science, Technology & the World	waived
<b>Two of the following (6 credits total):</b> Social Science European History United States History	6
Literature	3
Philosophy and Religion	3
Arts	waived
First Semester of Language	3
Second Semester of Language	3
<b>One of the following**:</b> Third Semester of Language Cross Cultural Non-Western Studies	2 or 3
Bible	3
Christian Beliefs	3
Wellness course	1
Ethics, World Views <b>or</b> Pluralism	3
QuEST requirements	39-40
Major requirements (inclusive of concentration)	91-92
<b>Total credits</b>	<b>130-132</b>

\*Fulfills Writing Enriched course requirement for major.

\*\*The choice of either a third semester of a language, a cross cultural, or a non-western studies course applies **only** to the Engineering majors.



## Bachelor of Science in Mechanical Engineering (BSME)

### 8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
<b><u>First Year – Fall</u></b>			<b><u>First Year – Spring</u></b>		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
MATH 111	Calculus I	4	MATH 112	Calculus II	4
CHEM 105	Chemistry	4	PHYS 211	General Physics I	4
IDFY 101	First Year Seminar	3	IDCR 151	Created and Called for Community	3
COMM 105	QuEST - Oral Communication	3	Varies	QuEST - 1st Language	3
<b>Total</b>		<b>16</b>	<b>Total</b>		<b>16</b>
<b><u>Sophomore – Fall</u></b>			<b><u>Sophomore – Spring</u></b>		
ENGR 214	Materials Engineering	4	ENGR 211	Project Management	1
ENGR 216	Mechanics I	3	ENGR 212	Programming for Engineers	2
MATH 211	Calculus III	4	ENGR 215	Circuits I	4
PHYS 212	General Physics II	4	ENGR 323	Mechanics II	3
Varies	QuEST - 2nd Language	3	MATH 270	Linear and Differential Methods	3
			ENGL 1xx	QuEST - Literature	3
<b>Total</b>		<b>18</b>	<b>Total</b>		<b>16</b>
<b><u>Junior – Fall</u></b>			<b><u>Junior – Spring</u></b>		
ENGR 213	Engineering Statistics	3	ENGR 376	Dynamics and Vibrations	4
ENGR 301	Seminar I	1	ENGR 378	Manufacturing Processes	3
ENGR 371	Thermodynamics	3	ENGR 415	Engineering Project	1
ENGR 415	Engineering Project	1	BIBL 2xx	QuEST - Bible	3
ENGR 472	Mechanical Design	4	Varies	QuEST - Social Science/History	3
WELL 1xx	Wellness	1	Varies	QuEST - 3rd Language/NW/CC	2-3
PHIL or RELI	QuEST - Philosophy or Religion	3			
<b>Total</b>		<b>16</b>	<b>Total</b>		<b>16-17</b>
<b><u>Senior – Fall</u></b>			<b><u>Senior – Spring</u></b>		
ENGR 302	Seminar II	1	ENGR 415	Engineering Project	2
ENGR 324	Control Systems	4	ENGR 421	Robotic Systems	4
ENGR 373	Instrumentation & Measurement	3	ENGR 471	Heat Transfer and Design	4
ENGR 377	Fluid Dynamics	4	HIST 1xx	QuEST - History	3
ENGR 415	Engineering Project	2	Varies	QuEST - Ethics/WV/Pluralism	3
THEO 2xx	QuEST - Christian Beliefs	3			
<b>Total</b>		<b>17</b>	<b>Total</b>		<b>16</b>
<b>Total Credits</b>					<b>131</b>

## Bachelor of Science in Mechanical Engineering (BSME)

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Engineering Design Tools	2
ENGR 211 Project Management	1
ENGR 212 Programming for Engineers	2
ENGR 213 Engineering Statistics	3
ENGR 214 Materials Engineering	4
ENGR 215 Circuits I	4
ENGR 216 Mechanics I	3
ENGR 301 Seminar I	1
ENGR 302 Seminar II	1
<i>Six credits distributed over at least 4 semesters from:</i> ENGR 415 Engineering Project	6
<b>Total</b>	<b>29</b>
Supporting Course Requirements	
CHEM 105 General Chemistry I	4
MATH 111 Calculus I	4
MATH 112 Calculus II	4
MATH 211 Calculus III	4
MATH 270 Linear and Differential Methods	3
PHYS 211 General Physics I	4
<b>Total</b>	<b>23</b>
Mechanical Engineering Requirements	
PHYS 212 General Physics II	4
ENGR 323 Mechanics II	3
ENGR 324 Control Systems OR ENGR 422 Industrial Automation	4
ENGR 371 Thermodynamics	3
ENGR 373 Instrumentation and Measurement	3
ENGR 376 Dynamics and Vibrations	4
ENGR 377 Fluid Dynamics	4
ENGR 378 Manufacturing Processes	3
ENGR 421 Robotic Systems	4
ENGR 471 Heat Transfer Analysis and Design	4
ENGR 472 Mechanical Design	4
<b>Total</b>	<b>40</b>

QuEST Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication	3
Created and Called for Community (W)	3
Mathematical Sciences (MATH 111)	met/major
Laboratory Science (CHEM 105)	met/major
Science, Technology & the World	waived
<b>Two of the following (6 credits total):</b> Social Science European History United States History	6
Literature	3
Philosophy and Religion	3
Arts	waived
First Semester of Language	3
Second Semester of Language	3
<b>One of the following**:</b> Third Semester of Language Cross Cultural Non-Western Studies	2 or 3
Bible	3
Christian Beliefs	3
Wellness course	1
Ethics, World Views or Pluralism	3
QuEST requirements	39-40
Major requirements (inclusive of concentration)	92
<b>Total credits</b>	<b>131-132</b>

\*Fulfills Writing Enriched course requirement for major.

\*\*The choice of either a third semester of a language, a cross cultural, or a non-western studies course applies **only** to the Engineering majors.

## Bachelor of Science in Robotics Engineering (BSRE)

### 8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
<b><u>First Year – Fall</u></b>			<b><u>First Year – Spring</u></b>		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
MATH 111	Calculus I	4	MATH 112	Calculus II	4
CHEM 105	Chemistry	4	PHYS 211	General Physics I	4
IDFY 101	First Year Seminar	3	IDCR 151	Created and Called for Community	3
COMM 105	QuEST - Oral Communication	3	Varies	QuEST - 1st Language	3
	<b>Total</b>	<b>16</b>		<b>Total</b>	<b>16</b>
<b><u>Sophomore – Fall</u></b>			<b><u>Sophomore – Spring</u></b>		
ENGR 215	Circuits I	4	ENGR 211	Project Management	1
ENGR 216	Mechanics I	3	ENGR 212	Programming for Engineers	2
MATH 211	Calculus III	4	ENGR 214	Materials Engineering	4
PHYS 212	General Physics II	4	ENGR 323	Mechanics II	3
Varies	QuEST - 2nd Language	3	ENGR 361	Circuits II	4
			ENGL 1xx	QuEST - Literature	3
	<b>Total</b>	<b>18</b>		<b>Total</b>	<b>17</b>
<b><u>Junior – Fall</u></b>			<b><u>Junior – Spring</u></b>		
ENGR 213	Engineering Statistics	3	ENGR 421	Robotic Systems	4
ENGR 301	Seminar I	1	ENGR 363	Embedded Systems Design	4
MATH 270	Linear and Differential Methods	3	ENGR 415	Engineering Project	1
ENGR 415	Engineering Project	1	BIBL 2xx	QuEST - Bible	3
ENGR 472	Mechanical Design	4	Varies	QuEST - Social Science/History	3
WELL 1xx	Wellness	1			
PHIL or RELI	QuEST - Philosophy or Religion	3			
	<b>Total</b>	<b>16</b>		<b>Total</b>	<b>15</b>
<b><u>Senior – Fall</u></b>			<b><u>Senior – Spring</u></b>		
ENGR 302	Seminar II	1	ENGR 415	Engineering Project	2
ENGR 324	Control Systems	4	ENGR 365	Linear Systems	3
ENGR 373	Instrumentation & Measurement	3	ENGR 378	Manufacturing Processes	3
ENGR 4xx	Industrial Automation	4	HIST 1xx	QuEST - History	3
ENGR 415	Engineering Project	2	Varies	QuEST - Ethics/WV/Pluralism	3
THEO 2xx	QuEST - Christian Beliefs	3	Varies	QuEST - 3rd Language/NW/CC	2-3
	<b>Total</b>	<b>17</b>		<b>Total</b>	<b>16-17</b>
				<b>Total Credits</b>	<b>131</b>

## Bachelor of Science in Robotics Engineering (BSRE)

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Engineering Design Tools	2
ENGR 211 Project Management	1
ENGR 212 Programming for Engineers	2
ENGR 213 Engineering Statistics	3
ENGR 214 Materials Engineering	4
ENGR 215 Circuits I	4
ENGR 216 Mechanics I	3
ENGR 301 Seminar I	1
ENGR 302 Seminar II	1
<i>Six credits distributed over at least 4 semesters from:</i> ENGR 415 Engineering Project	6
<b>Total</b>	<b>29</b>
Supporting Course Requirements	
CHEM 105 General Chemistry I	4
MATH 111 Calculus I	4
MATH 112 Calculus II	4
MATH 211 Calculus III	4
MATH 270 Linear and Differential Methods	3
PHYS 211 General Physics I	4
<b>Total</b>	<b>23</b>
Mechanical Engineering Requirements	
PHYS 212 General Physics II	4
ENGR 323 Mechanics II	3
ENGR 324 Control Systems	4
ENGR 361 Circuits II	4
ENGR 363 Embedded Systems Design	4
ENGR 421 Robotic Systems	4
ENGR 422 Industrial Automation	4
ENGR 373 Instrumentation and Measurement (3) OR ENGR 431 Biomedical Instrumentation (4)	3-4
Engineering elective, select three courses from: ENGR 331 Biomechanics (4) ENGR 362 Analog Electronics (4) ENGR 364 Electrical Devices (4) ENGR 365 Linear Systems (3) ENGR 376 Dynamics and Vibrations (4) ENGR 378 Manufacturing Processes (3) ENGR 432 Design of Medical Devices (4) ENGR 472 Mechanical Design (4)	10-12
<b>Total</b>	<b>40-43</b>

QuEST Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication	3
Created and Called for Community (W)	3
Mathematical Sciences (MATH 111)	met/major
Laboratory Science (CHEM 105)	met/major
Science, Technology & the World	waived
<b>Two of the following (6 credits total):</b> Social Science European History United States History	6
Literature	3
Philosophy and Religion	3
Arts	waived
First Semester of Language	3
Second Semester of Language	3
<b>One of the following**:</b> Third Semester of Language Cross Cultural Non-Western Studies	2 or 3
Bible	3
Christian Beliefs	3
Wellness course	1
Ethics, World Views or Pluralism	3
QuEST requirements	39-40
Major requirements (inclusive of concentration)	92
<b>Total credits</b>	<b>131-132</b>

\*Fulfills Writing Enriched course requirement for major.

\*\*The choice of either a third semester of a language, a cross cultural, or a non-western studies course applies **only** to the Engineering majors.

**Bachelor of Science in Engineering (BSE), Biomedical Concentration**  
**8 Semester Plan**

Course #	Course Name	Credits	Course #	Course Name	Credits
<b>First Year – Fall</b>			<b>First Year – Spring</b>		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
MATH 111	Calculus I	4	MATH 112	Calculus II	4
CHEM 105	Chemistry	4	PHYS 211	General Physics I	4
COMM 105	QuEST - Oral Communication	3	IDCR 151	Created and Called for Community	3
IDFY 101	First Year Seminar	3	Varies	QuEST - 1st Language Requirement	3
<b>Total</b>		<b>16</b>	<b>Total</b>		<b>16</b>
<b>Sophomore – Fall</b>			<b>Sophomore – Spring</b>		
ENGR 214	Materials Engineering	4	ENGR 211	Project Management	1
ENGR 216	Mechanics I	3	ENGR 212	Programming for Engineers	2
MATH 211	Calculus III	4	ENGR 215	Circuits I	4
Varies	Biomedical Science Elective	4	MATH 270	Linear and Differential Methods	3
Varies	QuEST - 2nd Language Requirement	3	PHIL or RELI	QuEST - Philosophy or Religion	3
			ENGL 1xx	QuEST - Literature	3
<b>Total</b>		<b>18</b>	<b>Total</b>		<b>16</b>
<b>Junior – Fall</b>			<b>Junior – Spring</b>		
ENGR 432	Design of Medical Devices	4	ENGR 332	BME Laboratory Techniques	3
ENGR 301	Seminar I	1	Varies	QuEST - Social Science/History	3
ENGR 331	Biomechanics	4	ENGR 415	Engineering Project	1
ENGR 415	Engineering Project	1	Varies	Biomedical Science Elective	3
Varies	Biomedical Science Elective	3	BIBL 2xx	QuEST - Bible	3
HIST 1xx	QuEST - History	3	WELL 1xx	Wellness	1
<b>Total</b>		<b>16</b>	<b>Total</b>		<b>14</b>
<b>Senior – Fall</b>			<b>Senior – Spring</b>		
ENGR 302	Seminar II	1	ENGR 415	Engineering Project	2
Varies	Biomedical Science Elective	4	Varies	Biomedical Science Elective	4
ENGR 213	Engineering Statistics	3	ENGR 421	Robotic Systems	4
ENGR 415	Engineering Project	2	THEO 2xx	QuEST - Christian Beliefs	3
ENGR 431	Biomedical Instrumentation	4	Varies	QuEST - Ethics/WV/Pluralism	3
Varies	QuEST - 3rd Language/NW/CC	2-3			
<b>Total</b>		<b>16-17</b>	<b>Total</b>		<b>16</b>
					<b>Total Credits</b>
					<b>128</b>

## Bachelor of Science in Engineering (BSE), Biomedical Concentration

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Engineering Design Tools	2
ENGR 211 Project Management	1
ENGR 212 Programming for Engineers	2
ENGR 213 Engineering Statistics	3
ENGR 214 Materials Engineering	4
ENGR 215 Circuits I	4
ENGR 216 Mechanics I	3
ENGR 301 Seminar I	1
ENGR 302 Seminar II	1
<i>Six credits distributed over at least 4 semesters from:</i> ENGR 415 Engineering Project	6
<b>Total</b>	<b>29</b>
Supporting Course Requirements	
CHEM 105 General Chemistry I	4
MATH 111 Calculus I	4
MATH 112 Calculus II	4
MATH 211 Calculus III	4
MATH 270 Linear and Differential Methods	3
PHYS 211 General Physics I	4
<b>Total</b>	<b>23</b>
Biomedical Engineering Requirements	
Science elective, at least five courses from following science electives: APHS 271 Kinesiology (3) BIOL 170 Cell and Animal Physiology (4) BIOL 260 Genetics (4) BIOL 460 Physiology (4) BIOL 465 Gross Anatomy (4) CHEM 106 General Chemistry II (4) CHEM 309 Organic Chemistry I (4) CHEM 310 Organic Chemistry II (4) CHEM 410 Biochemistry I (4) PHYS 212 General Physics II (4) PHYS 317 Optics (3)	18-20
ENGR 331 Biomechanics	4
ENGR 332 BME Laboratory Techniques	3
ENGR 421 Robotic Systems	4
ENGR 431 Biomedical Instrumentation	4
ENGR 432 Design of Medical Devices	4
<b>Total</b>	<b>37-39</b>

QuEST Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication	3
Created and Called for Community (W)	3
Mathematical Sciences (MATH 111)	met/major
Laboratory Science (CHEM 105)	met/major
Science, Technology & the World	waived
<i>Two of the following (6 credits total):</i> Social Science European History United States History	6
Literature	3
Philosophy and Religion	3
Arts	waived
First Semester of Language	3
Second Semester of Language	3
<i>One of the following**:</i> Third Semester of Language Cross Cultural Non-Western Studies	2 or 3
Bible	3
Christian Beliefs	3
Wellness course	1
Ethics, World Views or Pluralism	3
QuEST requirements	39-40
Major requirements (inclusive of concentration)	89-91
<b>Total credits</b>	<b>128-131</b>

\*Fulfills Writing Enriched course requirement for major.

\*\*The choice of either a third semester of a language, a cross cultural, or a non-western studies course applies **only** to the Engineering majors.

**Bachelor of Science in Engineering (BSE), Computer Concentration**  
**8 Semester Plan**

Course #	Course Name	Credits	Course #	Course Name	Credits
<b>First Year – Fall</b>			<b>First Year – Spring</b>		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
MATH 111	Calculus I	4	MATH 112	Calculus II	4
CHEM 105	Chemistry	4	PHYS 211	General Physics I	4
IDFY 101	First Year Seminar	3	IDCR 151	Created and Called for Community	3
COMM 105	QuEST - Oral Communication	3	Varies	QuEST - 1st Language	3
	<b>Total</b>	<b>16</b>		<b>Total</b>	<b>16</b>
<b>Sophomore – Fall</b>			<b>Sophomore – Spring</b>		
ENGR 215	Circuits I	4	ENGR 211	Project Management	1
ENGR 216	Mechanics I	3	ENGR 212	Programming for Engineers	2
MATH 211	Calculus III	4	ENGR 214	Materials Engineering	4
PHYS 212	General Physics II	4	ENGR 361	Circuits II	4
Varies	QuEST - 2nd Language	3	MATH 270	Linear and Differential Methods	3
			CIS 284	Computer Programming II	3
	<b>Total</b>	<b>18</b>		<b>Total</b>	<b>17</b>
<b>Junior – Fall</b>			<b>Junior – Spring</b>		
ENGR 213	Engineering Statistics	3	ENGR 365	Linear Systems	3
ENGR 301	Seminar I	1	ENGR 415	Engineering Project	1
ENGR 362	Analog Electronics	3	Varies	QuEST - Social Science/History	3
ENGR 415	Engineering Project	1	PHIL or RELI	QuEST - Philosophy or Religion	3
CIS 384	Elements of Computer Systems	3	HIST 1xx	QuEST - History	3
BIBL 2xx	QuEST - Bible	3	WELL 1xx	Wellness	1
ENGL 1xx	QuEST - Literature	3			
	<b>Total</b>	<b>17</b>		<b>Total</b>	<b>14</b>
<b>Senior – Fall</b>			<b>Senior – Spring</b>		
ENGR 302	Seminar II	1	ENGR 363	Embedded Systems Design	4
ENGR 324	Control Systems	4	ENGR 415	Engineering Project	2
ENGR 415	Engineering Project	2	MATH 180	Discrete Mathematics	3
CIS 385	Data Structures and Algorithms	3	THEO 2xx	QuEST - Christian Beliefs	3
Varies	Computer Engineering Elective	3-4	Varies	QuEST - Ethics/WV/Pluralism	3
Varies	QuEST - 3rd Language/NW/CC	2-3			
	<b>Total</b>	<b>15-17</b>		<b>Total</b>	<b>15</b>
				<b>Total Credits</b>	<b>128</b>

## Bachelor of Science in Engineering (BSE), Computer Concentration

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Engineering Design Tools	2
ENGR 211 Project Management	1
ENGR 212 Programming for Engineers	2
ENGR 213 Engineering Statistics	3
ENGR 214 Materials Engineering	4
ENGR 215 Circuits I	4
ENGR 216 Mechanics I	3
ENGR 301 Seminar I	1
ENGR 302 Seminar II	1
<i>Six credits distributed over at least 4 semesters from:</i> ENGR 415 Engineering Project	6
<b>Total</b>	<b>29</b>
Supporting Course Requirements	
CHEM 105 General Chemistry I	4
MATH 111 Calculus I	4
MATH 112 Calculus II	4
MATH 211 Calculus III	4
MATH 270 Linear and Differential Methods	3
PHYS 211 General Physics I	4
<b>Total</b>	<b>23</b>
Computer Engineering Requirements	
MATH 180 Discrete Mathematics	3
PHYS 212 General Physics II	4
CIS 284 Computer Programming II	3
CIS 384 Elements of Computing Systems	3
CIS 385 Data Structures and Algorithms	3
Elective, select one course from the following: CIS 281 Programming for User Interaction (3) CIS 332 Database Concepts (3) CIS 415 Data Communications and Networking (3) CIS 416 Operating Systems & Computer Architecture (3) CIS 418 Artificial Intelligence (3) ENGR 364 Electrical Devices (4) ENGR 421 Robotic Systems (4)	3-4
ENGR 324 Control Systems	4
ENGR 361 Circuits II	4
ENGR 362 Analog Electronics	3
ENGR 363 Embedded Systems Design	4
ENGR 365 Linear Systems	3
<b>Total</b>	<b>37-38</b>

QuEST Requirements	Credits
<b>Experiential Learning Experience (ENGR 302)</b>	met/major
First Year Seminar	3
Oral Communication	3
Created and Called for Community (W)	3
Mathematical Sciences (MATH 111)	met/major
Laboratory Science (CHEM 105)	met/major
Science, Technology & the World	waived
<b>Two of the following (6 credits total):</b> Social Science European History United States History	6
Literature	3
Philosophy and Religion	3
Arts	waived
First Semester of Language	3
Second Semester of Language	3
<b>One of the following**:</b> Third Semester of Language Cross Cultural Non-Western Studies	2 or 3
Bible	3
Christian Beliefs	3
Wellness course	1
Ethics, World Views <b>or</b> Pluralism	3
QuEST requirements	39-40
Major requirements (inclusive of concentration)	89-90
<b>Total credits</b>	<b>128-130</b>

\*Fulfills Writing Enriched course requirement for major.

\*\*The choice of either a third semester of a language, a cross cultural, or a non-western studies course applies **only** to the Engineering majors.





## Bachelor of Science in Engineering (BSE), Environmental Concentration

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Engineering Design Tools	2
ENGR 211 Project Management	1
ENGR 212 Programming for Engineers	2
ENGR 213 Engineering Statistics	3
ENGR 214 Materials Engineering	4
ENGR 215 Circuits I	4
ENGR 216 Mechanics I	3
ENGR 301 Seminar I	1
ENGR 302 Seminar II	1
<i>Six credits distributed over at least 4 semesters from: ENGR 415 Engineering Project</i>	6
<b>Total</b>	<b>29</b>
Supporting Course Requirements	
CHEM 105 General Chemistry I	4
MATH 111 Calculus I	4
MATH 112 Calculus II	4
MATH 211 Calculus III	4
MATH 270 Linear and Differential Methods	3
PHYS 211 General Physics I	4
<b>Total</b>	<b>23</b>
Environmental Engineering Requirements	
CHEM 106 General Chemistry II	4
GIS 245 Intro to Geographic Information Systems	3
PHYS 212 General Physics II	4
Science elective, Select <b>one</b> of the following: BIOL 170 Cell and Animal Physiology (4) GEOL 201 Foundations of Geology (4)	4
ENGR 345 Fluid Mechanics	4
ENGR 346 Water Resources Engineering	3
ENGR 353 Environmental Engineering	4
ENGR 371 Thermodynamics	3
ENGR 451 Water and Wastewater Treatment	3
ENGR 453 Hazardous Waste and Air Pollution Mgmt.	3
Environmental elective, Select one of the following: BIOL 160 Molecular and Cellular Biology (4) BIOL 172 Diversity of Life and Plant Science (4) CHEM 204 Organic Chemistry for the Life Sciences (4) CHEM 240 Environmental Chemistry (4) ENGR 323 Mechanics II (3)	3-4

ENGR 324 Control Systems (4)	
ENGR 363 Embedded Systems Design (4)	
ENGR 443 Geotechnical Engineering (4)	
GEOL 201 Foundations of Geology (4)	
POLI 323 Public Policy (3)	
#ASI 302 Lake Ecology (3)	
#ASI 332 Environmental Chemistry (3)	
<b>Total</b>	<b>38-39</b>

QuEST Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication	3
Created and Called for Community (W)	3
Mathematical Sciences (MATH 111)	met/major
Laboratory Science (CHEM 105)	met/major
Science, Technology & the World	waived
<b>Two of the following (6 credits total):</b> Social Science European History United States History	6
Literature	3
Philosophy and Religion	3
Arts	waived
First Semester of Language	3
Second Semester of Language	3
<b>One of the following**:</b> Third Semester of Language Cross Cultural Non-Western Studies	2 or 3
Bible	3
Christian Beliefs	3
Wellness course	1
Ethics, World Views or Pluralism	3
QuEST requirements	39-40
Major requirements (inclusive of concentration)	89-90
<b>Total credits</b>	<b>129-131</b>

\*Fulfills Writing Enriched course requirement for major.

\*\*The choice of either a third semester of a language, a cross cultural, or a non-western studies course applies **only** to the Engineering majors.

#Course offered through Au Sable Institute

## Bachelor of Science in Engineering (BSE), General Engineering

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Engineering Design Tools	2
ENGR 211 Project Management	1
ENGR 212 Programming for Engineers	2
ENGR 213 Engineering Statistics	3
ENGR 214 Materials Engineering	4
ENGR 215 Circuits I	4
ENGR 216 Mechanics I	3
ENGR 301 Seminar I	1
ENGR 302 Seminar II	1
<i>Six credits distributed over at least 4 semesters from:</i> ENGR 415 Engineering Project	6
<b>Total</b>	<b>27</b>
Supporting Course Requirements	
CHEM 105 General Chemistry I	4
MATH 111 Calculus I	4
MATH 112 Calculus II	4
PHYS 211 General Physics I	4
Select at least 11 credits from the following: APHS 271 Kinesiology (3) BIOL 170 Cell and Animal Physiology (4) BIOL 172 Diversity of Life and Plant Science (4) BIOL 460 Physiology (4) BIOL 465 Gross Anatomy (4) CHEM 106 General Chemistry II (4) CHEM 309 Organic Chemistry I (4) GEOL 201 Foundations of Geology (4) MATH 211 Calculus III (4) MATH 261 Linear Algebra (3) * MATH 270 Linear and Differential Methods (3) MATH 308 Differential Equations (3) PHYS 212 General Physics II (4) PHYS 251 Modern Physics (4) PHYS 317 Optics (3)	11-12
<b>Total</b>	<b>28</b>
General Engineering Requirements	
Student must choose 27 credit hours of coursework from ENGR courses that includes completion of at least one upper-division content track below. In addition to completing one track, students may fulfill what is needed to achieve 27 credits with any 300 or 400 level ENGR courses beyond the core requirements and those in the track chosen. Some course options have prerequisites. ENGR 415 (up to 2 credits) may count toward this block once one has completed the 4 credits of this course required for the Core).	

Water Resources Track (7 CR) ENGR 345 Fluid Mechanics (4) [Requires MATH 211] ENGR 346 Water Resources Engineering (3)
Embedded Systems Track (8 CR) ENGR 361 Circuits II (4) ENGR 363 Embedded Systems Design (4)
Structural Design Track (11 CR) ENGR 323 Mechanics II (3) ENGR 341 Structural Design I (4) ENGR 441 Structural Design II (4) [Requires MATH 270]
Robotics Track (8 CR) ENGR 324 Control Systems (4) [Requires MATH 270 or 308] ENGR 421 Robotic Systems (4)
Electronics Track (14 CR) ENGR 361 Circuits II (4) ENGR 362 Analog Electronics (3) ENGR 364 Electrical Devices (4) ENGR 461 Communications Systems (3)
Thermal-Fluid Sciences Track (11 CR) ENGR 371 Thermodynamics (3) ENGR 377 Fluid Dynamics (4) [Req. MATH 211 and MATH 270] ENGR 471 Heat Transfer Analysis and Design (4)
Mechanical Design Track (7 CR) ENGR 323 Mechanics II (3) ENGR 472 Mechanical Design (4)
Biomedical Track (7-8 CR) {ENGR 331 Biomechanics (4) OR ENGR 332 Biomedical Lab Techniques (3) OR ENGR 431 Biomedical Instrumentation (4) } ENGR 432 Design of Medical Devices (3)
Environmental Track (7 CR) ENGR 353 Environmental Engineering (4) {ENGR 451 Water and Wastewater Mgmt. (3) OR ENGR 453 Hazardous Waste and Air Pollution Management (3) }
Manufacturing Track (7 CR) ENGR 373 Instrumentation and Measurement (3) ENGR 422 Industrial Automation (4)

#Not permitted if taking MATH 261 or MATH 308.

QuEST requirements shown on next page

QuEST Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication	3
Created and Called for Community (W)	3
Mathematical Sciences (MATH 111)	met/major
Laboratory Science (CHEM 105)	met/major
Science, Technology & the World	waived
<b>Two of the following (6 credits total):</b> Social Science European History United States History	6
Literature	3
Philosophy and Religion	3
Arts	3
First Semester of Language	3
Second Semester of Language	3
<b>One of the following**:</b> Third Semester of Language Cross Cultural Non-Western Studies	2 or 3
Bible	3
Christian Beliefs	3
Wellness course	1
Ethics, World Views <b>or</b> Pluralism	3
QuEST requirements	42-43
Major requirements (inclusive of concentration)	81
<b>Total credits</b>	<b>123-124</b>

\*Fulfills Writing Enriched course requirement for major.

\*\*The choice of either a third semester of a language, a cross cultural, or a non-western studies course applies **only** to the Engineering majors.