



DEPARTMENT OF
ENGINEERING

Degree Programs and Curriculum Details

Bachelor of Science in Biomedical Engineering (BSBME)

131 CR

Bachelor of Science in Civil Engineering (BSCE)

131 CR

Bachelor of Science in Electrical Engineering (BSEE)

131 CR

Bachelor of Science in Mechanical Engineering (BSME)

131 CR

Engineering Minors

*Available to majors in
another Engineering discipline*

- Biomedical Engineering
- Civil Engineering
- Electrical Engineering
- Environmental Engineering
- Mechanical Engineering

Bachelor of in Engineering (BSE)

Biomedical Concentration
128 CR

Civil Concentration
128 CR

Electrical Concentration
128 CR

Mechanical Concentration
128 CR

Computer Concentration
128 CR

Environmental Concentration
128 CR

General Engineering
128 CR

*Consider pairing with a Messiah
University minor (samples below) or
with courses recommended for
Pre-Med or Pre-Health careers by our
MC Pre- Health Professions Advising
Service.*

- Physics
- Chemistry
- Business Administration
- Leadership
- Computer Science
- Economic Development
- Spanish
- Music
- Pre-Law

The BSE degree has been continuously accredited by ABET since 1993. That accreditation will be maintained indefinitely according to the typical ABET review cycle.

The BSBME, BSCE, BSEE, and BSME degrees began at Messiah University in Fall 2019. Students graduating May 2022 or beyond may select one of these degree paths. Accreditation of new degree programs is not possible until the program has at least one graduate. Successful accreditation at that point would be retroactive to those graduates. Messiah University anticipates applying for accreditation in these programs in the Spring of 2022 with notification of official action by Summer 2023. All concentrations will be maintained within the BSE program through the transition and will also benefit from the curricular enhancements of the new programs.

Bachelor of Science in Biomedical Engineering (BSBME)

8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
<u>First Year – Fall</u>			<u>First Year – Spring</u>		
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
Total		16	Total		16
<u>Sophomore – Fall</u>			<u>Sophomore – Spring</u>		
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 Requirement	3	MATH 270	Linear and Differential Methods	3
			PHIL or RELI	QuEST - Philosophy or Religion	3
Total		18	Total		16
<u>Junior – Fall</u>			<u>Junior – Spring</u>		
ENGR 213	Engineering Statistics	3	ENGR 332	BME Laboratory Techniques	3
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
Varies	QuEST - History	3	ENGL 1xx	QuEST - Literature	3
WELL 1xx	Wellness	1			
Total		17	Total		16
<u>Senior – Fall</u>			<u>Senior – Spring</u>		
ENGR 302	Seminar II	1	ENGR 415	Engineering Project	2
ENGR 324	Control Systems	4	Varies	Biomedical Science Elective	4
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			
Total		17-18	Total		15
					Total Credits
					131

Bachelor of Science in Biomedical Engineering (BSBME)

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Tools for Engineering Design	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
Total	29
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
Total	23
Biomedical Engineering Requirements	
PHYS 212 General Physics II	4
#Science elective, select two of the following: APHS 271 Kinesiology (3) BIOL 170 Cell and Animal Physiology (4) BIOL 460 Physiology (4) BIOL 465 Gross Anatomy (4) CHEM 106 General Chemistry II (4) PHYS 317 Optics (3)	7
ENGR 323 Mechanics II	3
ENGR 324 Control Systems	4
ENGR 331 Biomechanics	4
ENGR 332 BME Laboratory Techniques	3
ENGR 371 Thermodynamics	3
ENGR 377 Fluid Dynamics	4
ENGR 431 Biomedical Instrumentation	4
ENGR 432 Design of Medical Devices	4
Total	40

#Students pursuing BSE with Biomedical Concentration choose one from BIOL 170, BIOL 460, CHEM 106

Experiential Learning Experience (ENGR 302)	Credits
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
Two of the following (6 credits total): 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
One of the following**: 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)	92-93
Total credits	131-133

*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
<u>First Year – Fall</u>			<u>First Year – Spring</u>		
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
Total		16	Total		16
<u>Sophomore – Fall</u>			<u>Sophomore – Spring</u>		
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
Total		18	Total		17
<u>Junior – Fall</u>			<u>Junior – Spring</u>		
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			
Total		16	Total		16
<u>Senior – Fall</u>			<u>Senior – Spring</u>		
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	Soil Mechanics & Foundation Design	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
Total		16	Total		16-17
				Total Credits	131

Bachelor of Science in Civil Engineering (BSCE)

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Tools for Engineering Design	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
Total	29
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
Total	23
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 Soil Mechanics and Foundation Design	4
ENGR 444 Civil Engineering Design	3
Total	40

Experiential Learning Experience (ENGR 302)	Credits
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
Two of the following (6 credits total): 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
One of the following**: 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
Total credits	131-132

*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.

#Students pursuing BSE with Civil Concentration choose one of ENGR 346 or ENGR 347

Bachelor of Science in Electrical Engineering (BSEE)

8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
<u>First Year – Fall</u>			<u>First Year – Spring</u>		
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
Total		16	Total		16
<u>Sophomore – Fall</u>			<u>Sophomore – Spring</u>		
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
Total		18	Total		17
<u>Junior – Fall</u>			<u>Junior – Spring</u>		
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			
Total		16	Total		17
<u>Senior – Fall</u>			<u>Senior – Spring</u>		
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			
Total		15-16	Total		16
					Total Credits
					131

Bachelor of Science in Electrical Engineering (BSEE)

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Tools for Engineering Design	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
Total	29
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
Total	23
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 421 Robotic Systems	4
#ENGR 461 Communication Systems	3
ENGR 462 Power Electronics	4
Total	40

Experiential Learning Experience (ENGR 302)	Credits
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
Two of the following (6 credits total): 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
One of the following**: 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
Total credits	131-132

*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.

#Students pursuing BSE with Electrical Concentration choose one of ENGR 365 or ENGR 461

Bachelor of Science in Mechanical Engineering (BSME)

8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
<u>First Year – Fall</u>			<u>First Year – Spring</u>		
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
Total		16	Total		16
<u>Sophomore – Fall</u>			<u>Sophomore – Spring</u>		
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
Total		18	Total		16
<u>Junior – Fall</u>			<u>Junior – Spring</u>		
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			
Total		16	Total		16-17
<u>Senior – Fall</u>			<u>Senior – Spring</u>		
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			
Total		17	Total		16
					Total Credits
					131

Bachelor of Science in Mechanical Engineering (BSME)

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Tools for Engineering Design	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
Total	29
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
Total	23
Mechanical Engineering Requirements	
PHYS 212 General Physics II	4
ENGR 323 Mechanics II	3
ENGR 324 Control Systems	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
Total	40

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
Two of the following (6 credits total): 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
One of the following**: 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
Total credits	131-132

*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.

#Students pursuing BSE with Mechanical Concentration choose one of ENGR 373 or ENGR 378

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

Course #	Course Name	Credits	Course #	Course Name	Credits
<u>First Year – Fall</u>			<u>First Year – Spring</u>		
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
		Total			16
			Total 16		
<u>Sophomore – Fall</u>			<u>Sophomore – Spring</u>		
ENGR 215	Circuits I	4	ENGR 211	Project Management	1
ENGR 216	Mechanics I	3	ENGR 212	Programming for Engineers	2
7MATH 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
		Total			18
			Total 17		
<u>Junior – Fall</u>			<u>Junior – Spring</u>		
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			
		Total			17
			Total 14		
<u>Senior – Fall</u>			<u>Senior – Spring</u>		
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 2sxx	QuEST - Christian Beliefs	3
Varies	Computer Engineering Elective	3	Varies	QuEST - Ethics/WV/Pluralism	3
Varies	QuEST - 3rd Language/NW/CC	2-3			
		Total			15-16
			Total 15		
					Total Credits 128

Bachelor of Science in Engineering (BSE), Computer Concentration

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Tools for Engineering Design	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
Total	29
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
Total	23
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
#Computer Engineering Elective	3
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
Total	37-38

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
Two of the following (6 credits total): 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
One of the following**: 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
Total credits	128-130

*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.

#Computer Engineering Elective can be any of ENGR 364, ENGR 421, CIS 332, CIS 415, CIS 416, CIS 418, CIS 482

Bachelor of Science in Engineering (BSE), Environmental Concentration

8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
<u>First Year – Fall</u>			<u>First Year – Spring</u>		
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
Total		16	Total		16
<u>Sophomore – Fall</u>			<u>Sophomore – Spring</u>		
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	MATH 270	Linear and Differential Methods	3
			CHEM 106	Chemistry II	4
			Varies	QuEST - 2nd Language	3
Total		15	Total		17
<u>Junior – Fall</u>			<u>Junior – Spring</u>		
ENGR 213	Engineering Statistics	3	ENGR 345	Fluid Mechanics	4
ENGR 301	Seminar I	1	ENGR 415	Engineering Project	1
ENGR 353	Environmental Engineering	4	ENGR 451	Water and Wastewater Management	3
ENGR 371	Thermodynamics	3	GIS 245	Intro to Geographical Info Sys	3
ENGR 415	Engineering Project	1	ENGL 1xx	QuEST - Literature	3
WELL 1xx	Wellness	1	Varies	QuEST - 3rd Language/NW/CC	2-3
Varies	QuEST - Social Science/History	3			
Total		16	Total		16-17
<u>Senior – Fall</u>			<u>Senior – Spring</u>		
ENGR 302	Seminar II	1	ENGR 415	Engineering Project	2
ENGR 346	Water Resources Engineering	3	ENGR 452	Hazardous Waste & Air Pollution Mgmt	3
ENGR 415	Engineering Project	2	PHIL or RELI	QuEST - Philosophy or Religion	3
Varies	Environmental Elective	3	HIST 1xx	QuEST - History	3
Varies	Environmental Science Elective	3	THEO 2xx	QuEST - Christian Beliefs	3
BIBL 2xx	QuEST - Bible	3	Varies	QuEST - Ethics/WV/Pluralism	3
Total		15	Total		17
Total Credits					128

Bachelor of Science in Engineering (BSE), Environmental Concentration

Major Core Requirements	Credits
ENGR 111 Introduction to Engineering	2
ENGR 112 Tools for Engineering Design	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
Total	29
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
Total	23
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 one of the following: BIOL 160 Molecular and Cellular Biology (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

ENGR 324 Control Systems (4) ENGR 363 Embedded Systems (4) ENGR 443 Soil Mechanics & Foundation Design (4) GEOL 201 Foundations of Geology (4) POLI 323 Public Policy (3) #ASI 302 Lake Ecology (3) #ASI 332 Environmental Chemistry (3)	
Total	37-38

Experiential Learning Experience (ENGR 302)	Credits
QuEST Requirements	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
Two of the following (6 credits total): 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
One of the following**: 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
Total credits	128-130

*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 Tools for Engineering Design	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
Total	27
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 12 credits from the following: 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) CHEM 106 General Chemistry II (4) BIOL 160 Molecular and Cellular Biology (4) BIOL 172 Diversity of Life and Plant Science (4) BIOL 460 Physiology (4) APHS 271 Kinesiology (3) GEOL 201 Foundations of Geology (4)	12
Total	28
General Engineering Requirements	
Student must choose 26 credit hours of coursework from ENGR courses beyond those required in the core curriculum. Up to two additional credit hours of ENGR 415 Engineering Project, beyond the minimum requirement of 4 credits, may count towards this total. Selected coursework must include at least one of the following course sequences:	
Option 1 (7 CR) ENGR 345 Fluid Mechanics (4) [Requires MATH 211] ENGR 346 Water Resources Engineering (3)	

Option 2 (8 CR) ENGR 361 Circuits II (4) ENGR 363 Embedded Systems Design (4)	
Option 3 (11 CR) ENGR 323 Mechanics II (3) ENGR 341 Structural Design I (4) ENGR 441 Structural Design II (4) [Requires MATH 270]	
Option 4 (8 CR) ENGR 324 Control Systems (4) [Requires MATH 270 or 308] ENGR 421 Robotic Systems (4)	
Option 5 (14 CR) ENGR 361 Circuits II (4) ENGR 362 Analog Electronics (3) ENGR 364 Electrical Devices (4) ENGR 461 Communications Systems (3)	
Option 6 (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)	
Option 7 (7 CR) ENGR 323 Mechanics II (3) ENGR 472 Mechanical Design (4)	
Option 8 (7 CR) ENGR 331 Biomechanics (4) ENGR 432 Design of Medical Devices (3)	
Option 9 (7 CR) ENGR 353 Environmental Engineering (4) ENGR 451 Water and Wastewater Mgmt. (3) OR ENGR 452 Hazardous Waste & Air Pollution (3) [ENGR 451 and 452 require CHEM 106]	
Option 10 (3 CR) One of: ENGR 373 Instrumentation and Measurement (3) OR ENGR 378 Manufacturing Processes (3) OR ENGR 431 Biomedical Instrumentation (3)	

#Not permitted if taking MATH 261 or MATH 308.

QuEST requirements shown on next page

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
Two of the following (6 credits total): 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
One of the following**: 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	42-43
Major requirements (inclusive of concentration)	81
Total credits	123-124

*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.