MESSIAH UNIVERSITY

DEPARTMENT OF ENGINEERING

Engineering Programs

BSBME[2]
Bachelor of Science in Biomedical Engineering

BSCE[2]
Bachelor of Science in Civil Engineering

BSEE[2]
Bachelor of Science in Electrical Engineering

BSME[2]
Bachelor of Science in Mechanical Engineering

BSRE[3]
Bachelor of Science in Robotics Engineering

BSE[1]
Bachelor of Science in Engineering

Concentrations available in:
- Biomedical Engineering[4]
- Computer Engineering
- Environmental Engineering
- General Engineering[5]

Engineering Minors

Available to those majoring in another Engineering discipline

Biomedical Engineering
Civil Engineering
Electrical Engineering
Environmental Engineering
Mechanical Engineering
Robotics Engineering

Beyond Engineering

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

[1]The BSE degree program has been continuously accredited by ABET since 1993.
[2]Discipline-specific degrees in Biomedical, Civil, Electrical, and Mechanical Engineering were accredited by ABET in 2023.
[3]The Robotics Engineering program has been designed with accreditation criteria in mind, but is not eligible for initial accreditation review until the first class of students graduates, anticipated May 2025.
[4]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.
[5]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
First Year – Fall			**First Year – Spring**		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
CHEM 105	Chemistry	4	ENGL 110	Critical Reading and Writing	3
IDFY 101	First Year Seminar	3	MATH 112	Calculus II	4
MATH 111	Calculus I	4	PHYS 211	General Physics I	4
	Language I	3		Language II	3
				Holistic Wellness	1
	Total	**16**		**Total**	**17**
Sophomore – Fall			**Sophomore – Spring**		
ENGR 213	Engineering Statistics	3	ENGR 211	Project Management	1
ENGR 214	Materials Engineering	4	ENGR 212	Programming for Engineers	2
ENGR 216	Mechanics I	3	ENGR 215	Circuits I	4
MATH 211	Calculus III	4	ENGR 323	Mechanics II	3
COMM 105	Oral Communication	3	IDEG 300	Ethics and the Common Good	3
			MATH 270	Linear and Differential Methods	3
	Total	**17**		**Total**	**16**
Junior – Fall			**Junior – Spring**		
ENGR 301	Seminar I	1	ENGR 332	BME Laboratory Techniques	3
ENGR 371	Thermodynamics	3	ENGR 361	Circuits II	4
ENGR 415	Engineering Project	1	ENGR 415	Engineering Project	1
ENGR 432	Design of Medical Devices	4	APHS 271	Kinesiology	3
BIOL 170	Cellular Foundations of Life	4		Bible	3
	Social Science	3		Philosophy or Religion	3
	Total	**16**		**Total**	**17**
Senior – Fall			**Senior – Spring**		
ENGR 302	Seminar II	1	ENGR 331	Biomechanics	4
ENGR 324	Control Systems	4	ENGR 415	Engineering Project	2
ENGR 415	Engineering Project	2	ENGR 421	Robotic Systems	4
ENGR 431	Biomedical Instrumentation	4		Intercultural Perspective US/Global	3
	Christian Beliefs	3		Literature or Arts	3
	History	3			
	Total	**17**		**Total**	**16**
				Total Credits	**132**

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
Six credits distributed over at least 4 semesters from: 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	
Science elective, at least seven credits from following science electives, one of which must include a lab: APHS 271 Kinesiology (3) BIOL 170 Cellular Foundations of Life (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
Total	**40-41**

Gen Ed Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication (COMM 105)	3
Critical Reading and Writing (ENGL 110)	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 or Religion	3
Arts	waived
Language I	3
Language II	3
Intercultural Perspective US/Global	3
Bible	3
Christian Beliefs	3
Holistic Wellness	1
Ethics and the Common Good (IDEG 300)	3
Gen Ed requirements	39-40
Major requirements (inclusive of concentration)	92-94
Total credits	131-134

*Fulfills Writing Enriched course requirement for the major.

Bachelor of Science in Civil Engineering (BSCE)

8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
First Year – Fall			**First Year – Spring**		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
CHEM 105	Chemistry	4	MATH 112	Calculus II	4
IDFY 101	First Year Seminar	3	PHYS 211	General Physics I	4
MATH 111	Calculus I	4	ENGL 110	Critical Reading and Writing	3
	Language I	3		Language II	3
				Holistic Wellness	1
	Total	**16**		**Total**	**17**
Sophomore – Fall			**Sophomore – Spring**		
ENGR 214	Materials Engineering	4	ENGR 211	Project Management	1
ENGR 216	Mechanics I	3	ENGR 212	Programming for Engineers	2
GEOL 201	Foundations of Geology	4	ENGR 215	Circuits I	4
MATH 211	Calculus III	4	ENGR 323	Mechanics II	3
COMM 105	Oral Communication	3	MATH 270	Linear and Differential Methods	3
			IDEG 300	Ethics and the Common Good	3
	Total	**18**		**Total**	**16**
Junior – Fall			**Junior – Spring**		
ENGR 213	Engineering Statistics	3	ENGR 345	Fluid Mechanics	4
ENGR 301	Seminar I	1	ENGR 347	Transportation Engineering	3
ENGR 341	Structural Design I	4	ENGR 415	Engineering Project	1
ENGR 353	Environmental Engineering	4	ENGR 441	Structural Design II	4
ENGR 415	Engineering Project	1		Social Science	3
	History	3		Philosophy or Religion	3
	Total	**16**		**Total**	**18**
Senior – Fall			**Senior – Spring**		
ENGR 302	Seminar II	1	ENGR 344	Construction Methods & Materials	4
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		Christian Beliefs	3
	Bible	3		Intercultural Perspective US/Global	3
	Literature or Arts	3			
	Total	**16**		**Total**	**15**
				Total Credits	**132**

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
Six credits distributed over at least 4 semesters from: 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 Geotechnical Engineering	4
ENGR 444 Civil Engineering Design	3
Total	**40**

Gen Ed Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication (COMM 105)	3
Critical Reading and Writing (ENGL 110)	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 or Religion	3
Arts	waived
Language I	3
Language II	3
Intercultural Perspective US/Global	3
Bible	3
Christian Beliefs	3
Holistic Wellness	1
Ethics and the Common Good (IDEG 300)	3
Gen Ed requirements	39-40
Major requirements (inclusive of concentration)	92
Total credits	131-132

*Fulfills Writing Enriched course requirement for the major.

Bachelor of Science in Electrical Engineering (BSEE)

8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
First Year – Fall			**First Year – Spring**		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
CHEM 105	Chemistry	4	MATH 112	Calculus II	4
IDFY 101	First Year Seminar	3	PHYS 211	General Physics I	4
MATH 111	Calculus I	4	ENGL 110	Critical Reading and Writing	3
	Language I	3		Language II	3
				Holistic Wellness	1
	Total	**16**		**Total**	**17**
Sophomore – Fall			**Sophomore – Spring**		
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
COMM 105	Oral Communication	3	MATH 270	Linear and Differential Methods	3
			IDEG 300	Ethics and the Common Good	3
	Total	**18**		**Total**	**17**
Junior – Fall			**Junior – Spring**		
ENGR 301	Seminar I	1	ENGR 213	Engineering Statistics	3
ENGR 362	Analog Electronics	3	ENGR 363	Embedded Systems Design	4
ENGR 415	Engineering Project	1	ENGR 364	Electrical Devices	4
ENGR 462	Power Electronics	4	ENGR 365	Linear Systems	3
	History	3	ENGR 415	Engineering Project	1
	Social Science	3		Philosophy or Religion	3
	Total	**15**		**Total**	**18**
Senior – Fall			**Senior – Spring**		
ENGR 302	Seminar II	1	ENGR 415	Engineering Project	2
ENGR 324	Control Systems	4	ENGR 421	Robotic Systems	4
ENGR 367	Electromagnetics	3	ENGR 461	Communication Systems	3
ENGR 415	Engineering Project	2		Christian Beliefs	3
	Bible	3		Intercultural Perspective US/Global	3
	Literature or Arts	3			
	Total	**16**		**Total**	**15**
				Total Credits	**132**

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
Six credits distributed over at least 4 semesters from: 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 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
Total	**39-40**

Gen Ed Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication (COMM 105)	3
Critical Reading and Writing (ENGL 110)	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 or Religion	3
Arts	waived
Language I	3
Language II	3
Intercultural Perspective US/Global	3
Bible	3
Christian Beliefs	3
Holistic Wellness	1
Ethics and the Common Good (IDEG 300)	3
Gen Ed requirements	39-40
Major requirements (inclusive of concentration)	91-92
Total credits	130-132

*Fulfills Writing Enriched course requirement for the major.

Bachelor of Science in Mechanical Engineering (BSME)

8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
First Year – Fall			**First Year – Spring**		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
CHEM 105	Chemistry	4	MATH 112	Calculus II	4
IDFY 101	First Year Seminar	3	PHYS 211	General Physics I	4
MATH 111	Calculus I	4	ENGL 110	Critical Reading and Writing	3
	Language I	3		Language II	3
				Holistic Wellness	1
	Total	**16**		**Total**	**17**
Sophomore – Fall			**Sophomore – Spring**		
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
COMM 105	Oral Communication	3	MATH 270	Linear and Differential Methods	3
			IDEG 300	Ethics and the Common Good	3
	Total	**18**		**Total**	**16**
Junior – Fall			**Junior – Spring**		
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		History	3
ENGR 472	Mechanical Design	4		Philosophy or Religion	3
	Bible	3		Social Science	3
	Total	**15**		**Total**	**17**
Senior – Fall			**Senior – Spring**		
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		Intercultural Perspective US/Global	3
ENGR 415	Engineering Project	2		Literature or Arts	3
	Christian Beliefs	3			
	Total	**17**		**Total**	**16**
				Total Credits	**132**

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
Six credits distributed over at least 4 semesters from: 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 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
Total	**40**

Gen Ed Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication (COMM 105)	3
Critical Reading and Writing (ENGL 110)	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 or Religion	3
Arts	waived
Language I	3
Language II	3
Intercultural Perspective US/Global	3
Bible	3
Christian Beliefs	3
Holistic Wellness	1
Ethics and the Common Good (IDEG 300)	3
Gen Ed requirements	39-40
Major requirements (inclusive of concentration)	92
Total credits	131-132

*Fulfills Writing Enriched course requirement for the major.

Bachelor of Science in Robotics Engineering (BSRE)

8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
First Year – Fall			**First Year – Spring**		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
CHEM 105	Chemistry	4	MATH 112	Calculus II	4
IDFY 101	First Year Seminar	3	PHYS 211	General Physics I	4
MATH 111	Calculus I	4	ENGL 110	Critical Reading and Writing	3
	Language I	3		Language II	3
				Holistic Wellness	1
	Total	**16**		**Total**	**17**
Sophomore – Fall			**Sophomore – Spring**		
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
COMM 105	Oral Communication	3	ENGR 361	Circuits II	4
			IDEG 300	Ethics and the Common Good	3
	Total	**18**		**Total**	**17**
Junior – Fall			**Junior – Spring**		
ENGR 213	Engineering Statistics	3	ENGR 363	Embedded Systems Design	4
ENGR 301	Seminar I	1	ENGR 376	Dynamics and Vibrations	4
ENGR 415	Engineering Project	1	ENGR 415	Engineering Project	1
ENGR 432	Design of Medical Devices	4		Bible	3
MATH 270	Linear and Differential Methods	3		Social Science	3
	History	3			
	Philosophy or Religion	3			
	Total	**18**		**Total**	**15**
Senior – Fall			**Senior – Spring**		
ENGR 302	Seminar II	1	ENGR 378	Manufacturing Processes	3
ENGR 324	Control Systems	4	ENGR 415	Engineering Project	2
ENGR 373	Instrumentation & Measurement	3	ENGR 421	Robotic Systems	4
ENGR 415	Engineering Project	2		Intercultural Perspective US/Global	3
ENGR 422	Industrial Automation	4		Literature or Arts	3
	Christian Beliefs	3			
	Total	**17**		**Total**	**15**
				Total Credits	**133**

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
Six credits distributed over at least 4 semesters from: 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**
Robotics 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 373 Instrumentation and Measurement	3
ENGR 378 Manufacturing Processes	3
ENGR 421 Robotic Systems	4
ENGR 422 Industrial Automation	4
Engineering elective, select two courses from: ENGR 331 Biomechanics (4) ENGR 362 Analog Electronics (3) ENGR 364 Electrical Devices (4) ENGR 367 Electromagnetics (3) ENGR 376 Dynamics and Vibrations (4) ENGR 431 Biomedical Instrumentation (4) ENGR 432 Design of Medical Devices (4) ENGR 472 Mechanical Design (4)	6-8
Total	**39-41**

Gen Ed Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication (COMM 105)	3
Critical Reading and Writing (ENGL 110)	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 or Religion	3
Arts	waived
Language I	3
Language II	3
Intercultural Perspective US/Global	3
Bible	3
Christian Beliefs	3
Holistic Wellness	1
Ethics and the Common Good (IDEG 300)	3
Gen Ed requirements	39-40
Major requirements (inclusive of concentration)	92-93
Total credits	131-133

*Fulfills Writing Enriched course requirement for the major.

Bachelor of Science in Engineering (BSE), Biomedical Concentration

8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
First Year – Fall			**First Year – Spring**		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
CHEM 105	Chemistry	4	CHEM 106	Chemistry II	4
ENGL 110	Critical Reading and Writing	3	MATH 112	Calculus II	4
IDFY 101	First Year Seminar	3	PHYS 211	General Physics I	4
MATH 111	Calculus I	4		Holistic Wellness	1
	Total	**16**		**Total**	**15**
Sophomore – Fall			**Sophomore – Spring**		
ENGR 213	Engineering Statistics	3	ENGR 211	Project Management	1
ENGR 216	Mechanics I	3	ENGR 212	Programming for Engineers	2
BIOL 170	Cell and Animal Physiology	4	ENGR 215	Circuits I	4
CHEM 309	Organic Chemistry	4	CHEM 310	Organic Chemistry II	4
MATH 211	Calculus III	4	MATH 270	Linear and Differential Methods	3
			IDEG 300	Ethics and the Common Good	3
	Total	**18**		**Total**	**17**
Junior – Fall			**Junior – Spring**		
ENGR 301	Seminar I	1	ENGR 214	Materials Engineering	4
ENGR 415	Engineering Project	1	ENGR 332	BME Laboratory Techniques	3
ENGR 432	Design of Medical Devices	4	ENGR 415	Engineering Project	1
CHEM 410	Biochemistry I	4		Language II	3
	Language I	3		Philosophy or Religion	3
COMM 105	Oral Communication	3		Social Science	3
	Total	**16**		**Total**	**17**
Senior – Fall			**Senior – Spring**		
ENGR 302	Seminar II	1	ENGR 331	Biomechanics	4
ENGR 415	Engineering Project	2	ENGR 415	Engineering Project	2
ENGR 431	Biomedical Instrumentation	4	ENGR 421	Robotic Systems	4
	Bible	3		Christian Beliefs	3
	History	3		Literature or Arts	3
	Intercultural Perspective US/Global	3			
	Total	**16**		**Total**	**16**
				Total Credits	**131**

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
Six credits distributed over at least 4 semesters from: 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	
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
Total	**37-39**

Gen Ed Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication (COMM 105)	3
Critical Reading and Writing (ENGL 110)	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 or Religion	3
Arts	waived
Language I	3
Language II	3
Intercultural Perspective US/Global	3
Bible	3
Christian Beliefs	3
Holistic Wellness	1
Ethics and the Common Good (IDEG 300)	3
Gen Ed requirements	39-40
Major requirements (inclusive of concentration)	89-91
Total credits	128-131

*Fulfills Writing Enriched course requirement for the major.

Bachelor of Science in Engineering (BSE), Computer Concentration

8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
First Year – Fall			**First Year – Spring**		
ENGR 111	Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
CHEM 105	Chemistry	4	MATH 112	Calculus II	4
IDFY 101	First Year Seminar	3	PHYS 211	General Physics I	4
MATH 111	Calculus I	4	ENGL 110	Critical Reading and Writing	3
	Language I	3		Language II	3
				Holistic Wellness	1
	Total	**16**		**Total**	**17**
Sophomore – Fall			**Sophomore – Spring**		
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
			IDEG 300	Ethics and the Common Good	3
			MATH 270	Linear and Differential Methods	3
	Total	**15**		**Total**	**17**
Junior – Fall			**Junior – Spring**		
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	CIS 284	Computer Programming II	3
ENGR 415	Engineering Project	1		History	3
	Bible	3		Philosophy or Religion	3
	Literature or Arts	3		Social Science	3
COMM 105	Oral Communication	3			
	Total	**17**		**Total**	**16**
Senior – Fall			**Senior – Spring**		
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 332	Database Concepts	3		Christian Beliefs	3
CIS 384	Elements of Computer Systems	3		Intercultural Perspective US/Global	3
CIS 385	Data Structures and Algorithms	3			
	Total	**16**		**Total**	**15**
				Total Credits	**129**

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
Six credits distributed over at least 4 semesters from: 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**
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 387 Analysis of Algorithms (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
Total	**37-38**

Gen Ed Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication (COMM 105)	3
Critical Reading and Writing (ENGL 110)	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 or Religion	3
Arts	waived
Language I	3
Language II	3
Intercultural Perspective US/Global	3
Bible	3
Christian Beliefs	3
Holistic Wellness	1
Ethics and the Common Good (IDEG 300)	3
Gen Ed requirements	39-40
Major requirements (inclusive of concentration)	89-90
Total credits	128-130

*Fulfills Writing Enriched course requirement for the major.

Bachelor of Science in Engineering (BSE), Environmental Concentration

8 Semester Plan

Course #	Course Name	Credits	Course #	Course Name	Credits
First Year – Fall			**First Year – Spring**		
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	ENGL 110	Critical Reading and Writing	3
	Language I	3		Language II	3
				Holistic Wellness	1
	Total	**16**		**Total**	**17**
Sophomore – Fall			**Sophomore – Spring**		
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
COMM 105	Oral Communication	3	CHEM 106	Chemistry II	4
			IDEG 300	Ethics and the Common Good	3
	Total	**18**		**Total**	**17**
Junior – Fall			**Junior – Spring**		
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		Social Science	3
	Philosophy or Religion	3		Intercultural Perspective US/Global	3
	Total	**15**		**Total**	**17**
Senior – Fall			**Senior – Spring**		
ENGR 302	Seminar II	1	ENGR 415	Engineering Project	2
ENGR 346	Water Resources Engineering	3	ENGR 453	Hazardous Waste & Air Pollution Mgmt	3
ENGR 415	Engineering Project	2		Christian Beliefs	3
BIOL 170	Cellular Foundations of Life	4		History	3
GEOL 201	Foundations of Geology	4		Literature OR Arts	3
	Bible	3			
	Total	**17**		**Total**	**14**
				Total Credits	**131**

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
Six credits distributed over at least 4 semesters from: 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**
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 170 Cellular Foundations of Life (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 170 Cell and Animal Physiology (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) 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)	3-4
Total	**38-39**

Gen Ed Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication (COMM 105)	3
Critical Reading and Writing (ENGL 110)	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 or Religion	3
Arts	waived
Language I	3
Language II	3
Intercultural Perspective US/Global	3
Bible	3
Christian Beliefs	3
Holistic Wellness	1
Ethics and the Common Good (IDEG 300)	3
Gen Ed requirements	39-40
Major requirements (inclusive of concentration)	89-90
Total credits	129-131

*Fulfills Writing Enriched course requirement for the major.

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
Four credits distributed over at least 3 semesters from: ENGR 415 Engineering Project	4
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 at least 11 credits from the following: APHS 271 Kinesiology (3) BIOL 170 Cellular Foundations of Life (4) BIOL 172 Diversity of Life and Plant Science (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) 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
Total	**28**
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).	

#*MATH 270 does not meet this requirement if the student also takes either MATH 261 or MATH 308*

*Fulfills Writing Enriched course requirement for the major.

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 367 Electromagnetics(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 378 Manufacturing Processes (3)
- ENGR 422 Industrial Automation (4)

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).

Gen Ed Requirements	Credits
Experiential Learning Experience (ENGR 302)	met/major
First Year Seminar	3
Oral Communication (COMM 105)	3
Critical Reading and Writing (ENGL 110)	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 or Arts	3
Philosophy or Religion	3
Language I	3
Language II	3
Intercultural Perspective US/Global	3
Bible	3
Christian Beliefs	3
Holistic Wellness	1
Ethics and the Common Good (IDEG 300)	3
Gen Ed requirements	42-43
Major requirements (inclusive of concentration)	81
Total credits	**123-124**

Beyond the Engineering Majors

Some students pursue coursework beyond their Engineering major. This section summarizes requirements for Engineering minors that are available for students to augment their Engineering major. Note that students must achieve at least 12 unique credit hours that are not also attributed to their major to earn the minor.

Upon request, we can also provide proposed plans of study for students interested in Biomedical Engineering (either the BSBME major or the BSE major with Biomedical concentration) followed by Medical, Dental, or Veterinary School. Those course plans include not only degree requirements, but also coursework recommended for MCAT preparation.

Biomedical Engineering Minor
ENGR 215 Circuits I (4)
ENGR 216 Mechanics I (3)
ENGR 331 Biomechanics (4)
ENGR 332 Biomedical Laboratory Techniques (3)
ENGR 431 Biomedical Instrumentation (4)
ENGR 432 Design of Medical Devices (4)

Civil Engineering Minor
ENGR 216 Mechanics I (3)
ENGR 323 Mechanics II (3)
ENGR 341 Structural Design I (4)
ENGR 353 Environmental Engineering (4)

9 to 12 credits from the following:
ENGR 344 Construction Methods and Materials (4)
ENGR 346 Water Resources Engineering (3)
ENGR 347 Transportation Engineering (3)
ENGR 441 Structural Design II (4)
ENGR 443 Geotechnical Engineering (4)
GEOL 201 Foundations of Geology (4)

Electrical Engineering Minor
PHYS 212 General Physics II (4)
ENGR 215 Circuits I (4)
ENGR 361 Circuits II (4)

9 to 12 credits from the following:
ENGR 324 Control Systems (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 422 Industrial Automation (4)
ENGR 461 Communication Systems (3)
ENGR 462 Power Electronics (4)

Environmental Engineering Minor
CHEM 105 General Chemistry I (4)
CHEM 106 General Chemistry II (4)
ENGR 353 Environmental Engineering (4)
ENGR 451 Water and Wastewater Management (3)
ENGR 453 Hazardous Waste and Air Pollution Management (3)

6 to 8 credits from the following:
BIOL 170 Cell and Animal Physiology (4)
CHEM 204 Organic Chemistry for Life Sciences (4)
CHEM 240 Environmental Chemistry (4)
ENGR 324 Control Systems (4)
ENGR 345 Fluid Mechanics (4)
ENGR 346 Water Resources Engineering (3)
ENGR 363 Embedded Systems Design (4)
GEOL 201 Foundations of Geology (4)
GIS 245 Introduction to Geographic Information Systems (3)

Mechanical Engineering Minor
ENGR 214 Materials Engineering (4)
ENGR 216 Mechanics I (3)
ENGR 371 Thermodynamics (3)

4 credits from the following:
ENGR 421 Robotic Systems (4)
ENGR 422 Industrial Automation (4)
ENGR 471 Heat Transfer Analysis & Design (4)
ENGR 472 Mechanical Design (4)

9 to 12 credits from the following:
ENGR 323 Mechanics II (3)
ENGR 324 Control Systems (4)
ENGR 373 Instrumentation & Measurement (3)
ENGR 376 Dynamics and Vibrations (4)
ENGR 377 Fluid Dynamics (4)
ENGR 378 Manufacturing Processes (3)
(Any of ENGR 421, 422, 471, 472 not meeting prior requirement)

Robotics Engineering Minor
ENGR 323 Mechanics II (3)
ENGR 324 Control Systems (4)
ENGR 361 Circuits II (4)
ENGR 421 Robotic Systems (4)
ENGR 422 Industrial Automation (4)

6 to 8 credits from the following:
ENGR 363 Embedded Systems Design (4)
ENGR 373 Instrumentation & Measurement (3)
ENGR 376 Dynamics and Vibrations (4)
ENGR 378 Manufacturing Processes (3)
ENGR 431 Biomedical Instrumentation (4)
ENGR 472 Mechanical Design (4)