

III. ENGINEERING

Contents

Students with Advanced Placement credit:.....	1
Engineering Programs.....	2
8 Semester Plans	3
Biomedical Engineering (BSBME)	3
Civil Engineering (BSCE)	4
Electrical Engineering (BSEE)	5
Mechanical Engineering (BSME).....	6
Robotics Engineering (BSRE)	7
Engineering (BSE) with Biomedical Concentration.....	8
Engineering (BSE) with Computer Concentration.....	9
Engineering (BSE) with Environmental Concentration	10
Engineering (BSE) with General Concentration.....	11
Beyond the Engineering Majors	12
Bachelor of Science in Engineering (BSE), Biomedical Concentration + Pre-Med Requirements	14
Bachelor of Science in Biomedical Engineering (BSBME) + Pre-Med Requirements.....	15

Students with Advanced Placement credit:

Requirements for some courses in mathematical sciences can be met through Advanced Placement exam credit. Messiah College credit for various AP exams can be found at the following link, or through the registrar's website:

http://www.messiah.edu/info/21351/transfer_ap_clep_courses/2107/apclepib_equivalencies/3

Engineering Programs

BSBME²

Bachelor of Science in Biomedical Engineering

BSCE²

Bachelor of Science in Civil Engineering

BSEE²

Bachelor of Science in Electrical Engineering

BSME²

Bachelor of Science in Mechanical Engineering

BSRE³

Bachelor of Science in Robotics Engineering

BSE¹

Bachelor of Science in Engineering

Concentrations available in:

Biomedical Engineering⁴

Computer Engineering

Environmental Engineering

General Engineering⁵

Engineering Minors

Available to those majoring in another Engineering discipline

Biomedical Engineering

Civil Engineering

Electrical Engineering

Environmental Engineering

Mechanical Engineering

Robotics Engineering

¹The BSE degree program has been continuously accredited by ABET since 1993.

^{2,3}Discipline-specific degree programs are relatively new to Messiah and are eligible for initial accreditation review once the first class has graduated.

²BSBME, 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.

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

⁴The Biomedical concentration in the BSE degree is particularly intended for students who hope to study additional science topics, as recommended for medical school, dental school, and veterinary school preparation.

⁵The 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.

8 Semester Plans

Biomedical Engineering (BSBME)

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
Varies	QuEST 1st semester language *	3	IDCR 151	Created and Called for Community*	3
IDFY 101	First Year Seminar*	3	Varies	QuEST 2 nd semester language *	3
Total		16	Total		16
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	Varies	Engineering elective	3
COMM 105	Fundamentals of Oral Communication*	3	MATH 270	Linear and Differential Methods	3
			PHIL or RELI	QuEST Philosophy or Religion*	3
			WELL 1xx	Wellness*	1
Total		17	Total		17
Junior – Fall			Junior – Spring		
ENGR 301	Seminar I	1	ENGR 331	Biomechanics	4
ENGR 431	Biomedical Instrumentation	4	Varies	Biomedical Science elective	3
ENGR 415	Engineering Project	1	ENGR xxx	Engineering Elective	4
ENGR xxx	Engineering Elective	4	ENGR 415	Engineering Project	1
Varies	Biomedical Science Elective	3-4	BIBL 2xx	QuEST Knowledge of the Bible*	3
Varies	QuEST Social Science/History 1 of 2*	3	Varies	QuEST Literature *	3
Total		16-17	Total		18
Senior – Fall			Senior – Spring		
ENGR 302	Seminar II	1	ENGR 415	Engineering Project	2
Varies	Engineering elective	4	ENGR 332	BME Laboratory Techniques	3
ENGR 432	Design of Medical Devices	4	ENGR xxx	Engineering Elective	4
Varies	QuEST Social Science/History 2 of 2*	3	Varies	QuEST Christian Beliefs *	3
ENGR 415	Engineering Project	2	Varies	QuEST Ethics/WV/Pluralism*	3
Varies	QuEST 3rd Language/NW/CrossCultural*	2-3			
Total		16-17	Total		15

*QuEST (General Education) requirement

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
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
Varies	QuEST 1st semester language *	3	Varies	QuEST 2 nd semester language *	3
		Total			16
Sophomore – Fall			Sophomore – Spring		
ENGR 214	Materials Engineering	4	ENGR 211	Project Management	1
ENGR 216	Mechanics I	3	ENGR 215	Circuits I	4
MATH 211	Calculus III	4	ENGR 212	Programming for Engineers	2
GEOL 201	Foundations of Geology	4	ENGR 213	Engineering Statistics	3
COMM 105	Fundamentals of Oral Communication	3	ENGR 323	Mechanics II	3
			MATH 270	Linear and Differential Methods	3
			WELL 1xx	Wellness*	1
		Total			18
Junior – Fall			Junior – Spring		
ENGR 301	Seminar I	1	ENGR 344	Construction Methods and 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 1 of 2*	3	BIBL 2xx	QuEST Knowledge of the Bible*	3
PHIL or RELI	QuEST Philosophy or Religion*	3			
		Total			16
Senior – Fall			Senior – Spring		
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/CrossCultural*	2-3
Varies	QuEST Social Science/History 2 of 2*	3	Varies	QuEST Christian Beliefs *	3
Varies	QuEST Literature *	3	Varies	QuEST Ethics/WV/Pluralism*	3
		Total			16
		Total			16-17

*QuEST (General Education) requirement

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
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
Varies	QuEST 1st semester language *	3	Varies	QuEST 2 nd semester language *	3
		Total			Total
		16			16
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	Fundamentals of Oral Communication	3	MATH 270	Linear and Differential Methods	3
			PHIL or RELI	QuEST Philosophy or Religion*	3
		Total			Total
		18			17
Junior – Fall			Junior – Spring		
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 Knowledge of the Bible*	3	Varies	QuEST Social Science/History 1 of 2*	3
WELL 1xx	Wellness*	1	Varies	QuEST Christian Beliefs *	3
Varies	QuEST Literature *	3			
		Total			Total
		16			17
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 367	Electromagnetics	3	ENGR 421	Robotic Systems**	4
ENGR 415	Engineering Project	2	ENGR 461	Communication Systems	3
Varies	QuEST Social Science/History 2 of 2*	3	Varies	QuEST Ethics/WV/Pluralism*	3
Varies	QuEST 3rd Language/NW/CrossCultural*	2-3			
		Total			Total
		15-16			16

*QuEST (General Education) requirement

**Additional elective options meet this requirement

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
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
Varies	QuEST 1st semester language *	3	Varies	QuEST 2 nd semester language *	3
		Total			Total
		16			16
Sophomore – Fall			Sophomore – Spring		
ENGR 214	Materials Engineering	4	ENGR 211	Project Management	1
ENGR 216	Mechanics I	3	ENGR 215	Circuits I	4
MATH 211	Calculus III	4	ENGR 212	Programming for Engineers	2
PHYS 212	General Physics II	4	ENGR 323	Mechanics II	3
COMM 105	QuEST – Oral Communication	3	MATH 270	Linear and Differential Methods	3
			Varies	QuEST Literature *	3
		Total			Total
		18			16
Junior – Fall			Junior – Spring		
ENGR 213	Engineering Statistics	3	ENGR 376	Dynamics and Vibrations	4
ENGR 371	Thermodynamics	3	ENGR 378	Manufacturing Processes	3
ENGR 301	Seminar I	1	ENGR 415	Engineering Project	1
ENGR 472	Mechanical Design	4	Varies	QuEST Social Science/History 1 of 2*	3
ENGR 415	Engineering Project	1	BIBL 2xx	QuEST Knowledge of the Bible*	3
WELL 1xx	Wellness*	1	Varies	QuEST 3rd Language/NW/CrossCultural*	2-3
PHIL or RELI	QuEST Philosophy or Religion*	3			
		Total			Total
		16			16-17
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 and Measurement	3	ENGR 471	Heat Transfer and Design	4
ENGR 377	Fluid Dynamics	4	Varies	QuEST Social Science/History 2 of 2*	3
ENGR 415	Engineering Project	2	Varies	QuEST Ethics/WV/Pluralism*	3
Varies	QuEST Christian Beliefs *	3			
		Total			Total
		17			16

*QuEST (General Education) requirement

**Additional elective options meet this requirement

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
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
Varies	QuEST 1st semester language *	3	Varies	QuEST 2 nd semester language *	3
			WELL 1xx	Wellness	1
		Total			Total
		16			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
Varies	QuEST 2 nd semester language *	3	ENGR 361	Circuits II	4
			Varies	QuEST Literature *	3
		Total			Total
		18			17
Junior – Fall			Junior – Spring		
ENGR 213	Engineering Statistics	3	ENGR 376	Dynamics and Vibrations**	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 Knowledge of the Bible*	3
ENGR 432	Design of Medical Devices**	4	Varies	QuEST Social Science/History 1 of 2*	3
Varies	QuEST Philosophy or Religion*	3			
		Total			Total
		15			15
Senior – Fall			Senior – Spring		
ENGR 302	Seminar II	1	ENGR 415	Engineering Project	2
ENGR 324	Control Systems	4	ENGR 421	Robotic Systems	3
ENGR 373	Instrumentation & Measurement	3	ENGR 378	Manufacturing Processes	3
ENGR 4xx	Industrial Automation	4	Varies	QuEST Social Science/History 2 of 2*	3
ENGR 415	Engineering Project	2	Varies	QuEST Ethics/WV/Pluralism*	3
Varies	QuEST Christian Beliefs *	3	Varies	QuEST 3rd Language/NW/CrossCultural*	2-3
		Total			Total
		17			16-17
					Total Credits
					131-132

*QuEST (General Education) requirement
**Additional elective options meet this requirement

Engineering (BSE) with 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
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
Varies	Biomedical Science Elective	4	Varies	Biomedical Science Elective	4
		Total			Total
		17			17
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
MATH 211	Calculus III	4	ENGR 215	Circuits I	4
Varies	Biomedical science elective	3-4	MATH 270	Linear and Differential Methods	3
COMM 105	QuEST – Oral Communication	3	Varies	Biomedical Science Elective	3-4
WELL 1xx	Wellness	1	PHIL or RELI	QuEST Philosophy or Religion*	3
		Total			Total
		17-18			16-17
Junior – Fall			Junior – Spring		
ENGR 301	Seminar I	1	ENGR 214	Materials Engineering	4
ENGR 431	Biomedical Instrumentation	4	ENGR 415	Engineering Project	1
ENGR 415	Engineering Project	1	ENGR 331	Biomechanics	4
Varies	QuEST Literature *	3	Varies	QuEST Social Science/History 1 of 2*	3
Varies	Biomedical science elective	4	Varies	QuEST 2 nd semester language *	3
Varies	QuEST 1st semester language *	3			
		Total			Total
		16			15
Senior – Fall			Senior – Spring		
			ENGR 332	BME Laboratory Techniques	3
ENGR 302	Seminar II	1	ENGR 421	Robotic Systems	4
ENGR 432	Design of Medical Devices	4	ENGR 415	Engineering Project	2
ENGR 415	Engineering Project	2	Varies	QuEST Christian Beliefs *	3
BIBL 2xx	QuEST Knowledge of the Bible*	3	Varies	QuEST Ethics/WV/Pluralism*	3
Varies	QuEST 3rd Language/NW/CrossCultural*	2-3			
Varies	QuEST Social Science/History 2 of 2*	3			
		Total			Total
		15-16			15

*QuEST (General Education) requirement

Engineering (BSE) with 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
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
Varies	QuEST 1st semester language *	3	Varies	QuEST 2 nd semester language *	3
		Total			Total
		16			16
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	QuEST – Oral Communication	3	MATH 270	Linear and Differential Methods	3
			CIS 284	Computer Programming II	3
		Total			Total
		18			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	Varies	QuEST Social Science/History 1 of 2*	3
ENGR 415	Engineering Project	1	PHIL or RELI	QuEST Philosophy or Religion*	3
CIS 384	Elements of Computer Systems	3	WELL 1xx	Wellness*	1
BIBL 2xx	QuEST Knowledge of the Bible*	3	Varies	QuEST Social Science/History 2 of 2*	3
Varies	QuEST Literature *	3			
		Total			Total
		17			14
Senior – Fall			Senior – Spring		
ENGR 302	Seminar II	1			
ENGR 324	Control Systems	4	ENGR 363	Embedded Systems Design	4
ENGR 415	Engineering Project	2	ENGR 415	Engineering Project	2
Varies	Computer Engineering Elective	3-4	MATH 180	Discrete Mathematics	3
CIS 385	Data Structures and Algorithms	3	Varies	QuEST Christian Beliefs *	3
Varies	QuEST 3rd Language/NW/CrossCultural*	2-3	Varies	QuEST Ethics/WV/Pluralism*	3
		Total			Total
		15-17			15

*QuEST (General Education) requirement

Engineering (BSE) with Environmental Concentration 8 Semester Plan

*QuEST (General Education) requirement

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	IDCR 151	Created and Called for Community*	3
Varies	QuEST 1st semester language *	3	Varies	QuEST 2 nd semester language *	3
Total		16	Total		16
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
			CHEM 106	Chemistry II	4
			COMM 105	QuEST – Oral Communication	3
Total		15	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	Varies	QuEST Literature *	3
WELL 1xx	Wellness*	1	Varies	QuEST 3rd Language/NW/CrossCultural*	2-3
Varies	QuEST Social Science/History 1 of 2*	3			
Total		16	Total		16-17
Senior – Fall			Senior – Spring		
ENGR 302	Seminar II	1	PHIL or RELI	QuEST Philosophy or Religion*	3
ENGR 346	Water Resources Engineering	3	ENGR 415	Engineering Project	2
ENGR 415	Engineering Project	2	ENGR 453	Hazardous Waste and Air Pollution Mgmt	3
Varies	Environmental Elective	3	Varies	QuEST Social Science/History 2 of 2*	3
Varies	Environmental Science Elective	4	Varies	QuEST Christian Beliefs *	3
BIBL 2xx	QuEST Knowledge of the Bible*	3	Varies	QuEST Ethics/WV/Pluralism*	3
Total		16	Total		17

*QuEST (General Education) requirement

Engineering (BSE) with General Concentration (example) 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	IDCR 151	Created and Called for Community*	3
COMM 105	Fundamentals of Oral Communication*	3	Varies	QuEST 1st semester language *	3
			WELL 1xx	Wellness	1
		Total			Total
		16			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
BIOL 170	Cell and Animal Physiology	4	MATH 270	Linear and Differential Methods	3
Varies	QuEST 2 nd semester language *	3	PHIL or RELI	QuEST Philosophy or Religion*	3
			Varies	QuEST Literature *	3
		Total			Total
		15			16
Junior – Fall			Junior – Spring		
ENGR 213	Engineering Statistics	3	ENGR 323	Mechanics II**	3
ENGR 301	Seminar I	1	ENGR 361	Circuits II**	4
ENGR 373	Instrumentation & Measurement**	3	ENGR 415	Engineering Project	1
ENGR 371	Thermodynamics**	3	BIBL 2xx	QuEST Knowledge of the Bible*	3
ENGR 415	Engineering Project	1	Varies	QuEST Social Science/History 2 of 2*	3
Varies	QuEST Social Science/History 1 of 2*	3			
		Total			Total
		14			16-17
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 472	Mechanical Design**	4	ENGR 421	Robotic Systems**	4
ENGR 415	Engineering Project	2	Varies	QuEST Christian Beliefs *	3
Varies	ART/DANC/MUGE/THEA fulfilling QuEST	3	Varies	QuEST Ethics/WV/Pluralism*	3
Varies	QuEST 3rd Language/NW/CrossCultural*	2-3			
		Total			Total
		15-16			17

*QuEST (General Education) requirement

**Additional elective options meet this requirement (the plan shown completes the Mechanical Design Track. Other track options are Biomedical, Electronics, Embedded Systems Design, Environmental, Manufacturing, Robotics, Structural Design, Thermal-Fluid Sciences, and Water Resources.)

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.

We also include on the pages that follow recommended programs 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 Mechanics I (3)
ENGR 216 Circuits I (4)
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)

Robotics Engineering Minor

ENGR 323 Mechanics II (3)
ENGR 361 Circuits II (4)
ENGR 324 Control Systems (4)

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)

- 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)

Bachelor of Science in Engineering (BSE), Biomedical Concentration + Pre-Med Requirements 8 Semester Plan

Italicized courses are not required for the degree, but recommended for MCAT preparation.

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
BIOL 170	Cell & Animal Physiology	4	CHEM 106	Chemistry II	4
CHEM 105	Chemistry I *	4	MATH 112	Calculus II	4
MATH 111	Calculus I *	4	PHYS 211	General Physics I	4
IDFY 101	First Year Seminar *	3	IDCR 151	Created and Called for Community*	3
Total		17	Total		17
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
CHEM 309	Organic Chemistry I	4	ENGR 215	Circuits I	4
MATH 211	Calculus III	4	CHEM 310	Organic Chemistry II	4
COMM 105	Fundamentals of Oral Communication*	3	MATH 270	Linear and Differential Methods	3
WELL 1xx	Wellness	1	PHIL or RELI	QuEST Philosophy or Religion*	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 331	Biomechanics	4
ENGR 431	Biomedical Instrumentation	4	ENGR 415	Engineering Project	1
<i>BIOL xxx</i>	<i>Pre-Health Biology Elective</i>	4	BIBL 2xx	QuEST Knowledge of the Bible*	3
CHEM 410	Biochemistry I	4	PSYC 101	Intro to Psychology	3
Varies	QuEST 1st semester language *	3	Varies	QuEST 2 nd semester language *	3
Total		17	Total		18
Senior – Fall			Senior – Spring		
ENGR 302	Seminar II	1	ENGR 332	BME Laboratory Techniques	3
ENGR 415	Engineering Project	2	ENGR 415	Engineering Project	2
ENGR 432	Design of Medical Devices	4	ENGR 421	Robotic Systems	4
Varies	QuEST Literature *	3	Varies	QuEST Christian Beliefs *	3
HIST	QuEST History *	3	Varies	QuEST 3rd Language/NW/CrossCultural*	3
Varies	QuEST - 3rd Language/NW/CC	2-3			
Total		15-16	Total		15
Total Credits					134

*QuEST (General Education) requirement

Bachelor of Science in Biomedical Engineering (BSBME) + Pre-Med Requirements

8 Semester Plan

Italicized courses are not required for the degree, but recommended for MCAT preparation.

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
BIOL 170	Cell & Animal Physiology	4	MATH 112	Calculus II	4
CHEM 105	Chemistry I *	4	PHYS 211	General Physics I	4
MATH 111	Calculus I *	4	CHEM 106	Chemistry II	4
IDFY 101	First Year Seminar *	3	IDCR 151	Created and Called for Community*	3
Total		17	Total		17
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
<i>CHEM 309</i>	<i>Organic Chemistry I</i>	4	ENGR 215	Circuits I	4
MATH 211	Calculus III	4	ENGR xxx	Engineering Elective	3
COMM 105	Fundamentals of Oral Communication*	3	<i>CHEM 310</i>	<i>Organic Chemistry II</i>	4
WELL 1xx	Wellness*	1	MATH 270	Linear and Differential Methods	3
Total		18	Total		17
Junior – Fall			Junior – Spring		
ENGR 301	Seminar I	1	ENGR 331	Biomechanics	4
ENGR xxx	Engineering Elective	3-4	ENGR 415	Engineering Project	1
ENGR 415	Engineering Project	1	ENGR xxx	Engineering Elective	4
ENGR 431	Biomedical Instrumentation	4	BIBL 2xx	QuEST Knowledge of the Bible*	3
<i>BIOL xxx</i>	<i>Pre-Health Biology Elective</i>	4	Varies	QuEST Literature *	3
<i>CHEM 410</i>	<i>Biochemistry I</i>	4	<i>PSYC 101</i>	<i>Intro to Psychology *</i>	3
Total		17-18	Total		18
Senior – Fall			Senior – Spring		
ENGR 214	Materials Engineering	4	ENGR 332	BME Laboratory Techniques	3
ENGR 302	Seminar II	1	ENGR 415	Engineering Project	2
ENGR 415	Engineering Project	2	ENGR xxx	Engineering Elective	4
ENGR 432	Design of Medical Devices	4	Varies	QuEST History 2 of 2*	3
ENGR xxx	Engineering Elective	4	Varies	QuEST Christian Beliefs *	3
Varies	QuEST 3rd Language/NW/CrossCultural*	2-3	Varies	QuEST Ethics/WV/Pluralism*	3
Total		17-18	Total		18
Summer Courses					
Varies	QuEST 1st semester language *	3			
Varies	QuEST 2 nd semester language *	3			
PHIL or RELI	QuEST Philosophy or Religion*	3			
Total		9	Total Credits		148

*QuEST (General Education) requirement