III. ENGINEERING

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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

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

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 are new at Messiah College beginning in Fall 2019. Students graduating May 2022 or later may choose 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 College 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.

Dacii	elor of Science in Engineering (E
	Biomedical Concentration
	128 CR
	Civil Concentration
	128 CR
	Electrical Concentration
	128 CR
	Mechanical Concentration
	128 CR
	Computer Concentration
	128 CR
E	Invironmental Concentration
	128 CR
	General Engineering
	123 CR
	onsider pairing with a Messiah
	ge minor (samples below) or with
	ses recommended for Pre-Med or
	P-Health careers by our MC Pre- Ith Professions Advising Service.
	Physics
	Chemistry
	Business Administration
	Leadership
	Computer Science
	Economic Development
	Spanish
	Music
	Pre-Law

8 Semester Plans

Biomedical Engineering (BSBME)

Course #	Course Name	Credits	Course #	Course Name	Credit
	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
COMM 105	Fundamentals of Oral Communication*	3	IDCR 151	Created and Called for Community*	3
IDFY 101	First Year Seminar**	3	Varies	1st Language requirement*	3
	Tota	l 16		Total	16
	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
Varies	2nd Language requirement*	3	MATH 270	Linear and Differential Methods	3
			PHIL or RELI	Philosophy or Religion meeting QuEST*	3
	Tota	l 18		Total	16
	Junior – Fall			lunion Spring	
ENGR 213	Engineering Statistics	3	ENGR 332	Junior – Spring BME Laboratory Techniques	3
ENGR 213 ENGR 301	Seminar I	1	ENGR 415	Engineering Project	1
ENGR 415	Engineering Project	1	Varies	Biomedical Science Elective	3
ENGR 415 ENGR 432	Design of Medical Devices	4	BIBL 2xx	Bible*	3
HIST 1xx	History meeting QuEST*	3	ENGL 1xx	Literature meeting QuEST*	3
ENGR 331	Biomechanics	4	ENGR 371	Thermodynamics	3
WELL 1xx	Wellness*	1		memouynamics	5
	Tota	I 17		Total	16
	Senior – Fall			Senior – Spring	
ENGR 302	Seminar II	1	ENGR 415	Engineering Project	2
ENGR 324	Control Systems	4	Varies	Biomedical Science Elective	4
ENGR 431	Biomedical Instrumentation	4	Varies	Social Science/History meeting QuEST*	3
ENGR 377	Fluid Dynamics	4	THEO 2xx	Christian Beliefs*	3
ENGR 415	Engineering Project	2	Varies	Ethics/WV/Pluralism*	3
Varies	3rd Language/NonWestern/CrossCultural*	2-3			-
			1		

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
COMM 105	Fundamentals of Oral Communication*	3	Varies	1st Language*	3
	Total	16		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 (J-term)	2
GEOL 201	Foundations of Geology	4	ENGR 213	Engineering Statistics	3
Varies	2nd Language*	3	ENGR 323	Mechanics II	3
			MATH 270	Linear and Differential Methods	3
			WELL 1xx	Wellness*	1
	Total	18		Total	17
	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	Social Science/History*	3	BIBL 2xx	Bible*	3
PHIL or RELI	Philosophy or Religion meeting QuEST*	3			
	Total	16		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	Soil Mechanics and Foundation Design	4	Varies	3rd Language/NonWestern/Cross Cultural*	2-3
HIST 1xx	History*	3	THEO 2xx	Christian Beliefs*	3
ENGL 1xx	Literature*	3	Varies	Ethics/WV/Pluralism*	3
	Total	16		Total	16-17

Electrical Engineering (BSEE) 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
COMM 105	Fundamentals of Oral Communication*	3	Varies	1st 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 (J-term)	2
MATH 211	Calculus III	4	ENGR 214	Materials Engineering	4
PHYS 212	General Physics II	4	ENGR 361	Circuits II	4
Varies	2nd Language*	3	MATH 270	Linear and Differential Methods	3
			PHIL or RELI	Philosophy or Religion meeting QuEST*	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 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	Bible*	3	HIST 1xx	History*	3
WELL 1xx	Wellness*	1	THEO 2xx	Christian Beliefs*	3
ENGL 1xx	Literature*	3			
	Total	16		Total	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	Social Science/History*	3	Varies	Ethics/WV/Pluralism*	3
Varies	3rd Language/NonWestern/Cross Cultural*	2-3			
	Total	15-16		Total	16

Mechanical Engineering (BSME) 8 Semester Plan

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	Credits	Course #		Credits
First Year – Fall ENGR 111 Intro to Engineering			· · · · · · · · · · · · · · · · · · ·	
Intro to Engineering	2	ENGR 112	Engineering Design Tools	2
Calculus I*	4	MATH 112	Calculus II	4
Chemistry*	4	PHYS 211	General Physics I	4
First Year Seminar*	3	IDCR 151	Created and Called for Community*	3
Fundamentals of Oral Communication*	3	Varies	1st Language*	3
Total	16		Total	16
Sophomore – Fall			Sophomore – Spring	
Materials Engineering	4	ENGR 211	Project Management	1
Mechanics I	3	ENGR 215	Circuits I	4
Calculus III	4	ENGR 212	Programming for Engineers (J-term)	2
General Physics II	4	ENGR 323	Mechanics II	3
2nd Language*	3	MATH 270	Linear and Differential Methods	3
		ENGL 1xx	Literature*	3
Total	18		Total	16
Junior – Fall			Junior – Spring	
	3	ENGR 376		4
				3
Seminar I	1			1
Mechanical Design	4			3
	1			3
				2-3
Philosophy or Religion meeting QuEST*	3	varios		2-0
T-1-1	40			40.47
lotai	10		lotai	16-17
Senior – Fall			Senior – Spring	
Seminar II	1	ENGR 415	Engineering Project	2
Control Systems	4	ENGR 421	Robotic Systems	4
Instrumentation and Measurement	3	ENGR 471	Heat Transfer and Design	4
Fluid Dynamics	4	HIST 1xx	History*	3
Engineering Project	2	Varies	Ethics/WV/Pluralism*	3
Christian Beliefs*	3			
Total	17		Total	16
	First Year – Fall Intro to Engineering Calculus I* Chemistry* First Year Seminar* Fundamentals of Oral Communication* Image: Sophomore – Fall Materials Engineering Mechanics I Calculus III General Physics II 2nd Language* Junior – Fall Engineering Statistics Thermodynamics Seminar I Mechanical Design Engineering Project Wellness* Philosophy or Religion meeting QuEST* Seminar II Seminar II Seminar II Seminar II Seminar II Seminar II Control Systems Instrumentation and Measurement Fluid Dynamics Engineering Project Christian Beliefs*	Course NameCreditsFirst Year - FallIntro to Engineering2Calculus I*4Chemistry*4First Year Seminar*3Fundamentals of Oral Communication*3Fundamentals of Oral Communication*16Total 16Sophomore - FallMaterials Engineering4Mechanics I3Calculus III4General Physics II42nd Language*3Total 18Junior - FallEngineering Statistics3Thermodynamics3Seminar I1Mechanical Design4Engineering Project1Wellness*1Philosophy or Religion meeting QuEST*3Seminar II1Control Systems4Instrumentation and Measurement3Fluid Dynamics4Engineering Project2Christian Beliefs*3	Course Name Credits Course # First Year – Fall Intro to Engineering 2 ENGR 112 Calculus I* 4 MATH 112 Chemistry* 4 PHYS 211 First Year Seminar* 3 IDCR 151 Fundamentals of Oral Communication* 3 Varies Total 16	First Year – Fall First Year – Spring Into to Engineering 2 ENGR 112 Engineering Design Tools Calculus I* 4 MATH 112 Calculus II Chemistry* 4 PHYS 211 General Physics I First Year Seminar* 3 IDCR 151 Created and Called for Community* Fundamentals of Oral Communication* 3 Varies 1st Language* Total 16 Total Sophomore – Spring Materials Engineering 4 ENGR 211 Project Management Mechanics I 3 ENGR 212 Programming for Engineers (J-term) General Physics II 4 ENGR 212 Programming for Engineers (J-term) General Physics II 4 ENGR 233 Mechanics II 2nd Language* 3 MATH 270 Linear and Differential Methods 2nd Language* 3 ENGR 376 Dynamics and Vibrations 1 Total 18 Total Junior – Fall Junior – Spring Social Science/History* Engineering Project 1 BiBL 2xx Bible*

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
COMM 105	Fundamentals of Oral Communication*	3	Varies	1st 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 (J-term)	2
MATH 211	Calculus III	4	ENGR 214	Materials Engineering	4
PHYS 212	General Physics II	4	ENGR 361	Circuits II	4
Varies	2nd Language*	3	MATH 270	Linear and Differential Methods	3
			CIS 284	Computer Programming II	3
	Total	18		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	Varies	Social Science/History*	3
ENGR 415	Engineering Project	1	PHIL or RELI	Philosophy or Religion meeting QuEST*	3
CIS 384	Elements of Computer Systems	3	WELL 1xx	Wellness*	1
BIBL 2xx	Bible*	3	HIST 1xx	History*	3
ENGL 1xx	Literature*	3			
	Total	17		Total	14
	Senior – Fall			Capier Spring	
ENGR 302	Semior – Fail Seminar II	1		Senior – Spring	
ENGR 302 ENGR 324	Control Systems	4	ENGR 363	Embedded Systems Design	1
ENGR 324 ENGR 415	Engineering Project	4	ENGR 303 ENGR 415	Engineering Project	4 2
Varies	Computer Engineering Elective	2 3-4	MATH 180	Discrete Mathematics	2
CIS 385	Data Structures and Algorithms	3-4 3	THEO 2xx	Christian Beliefs*	3
Varies	3rd Language/NonWestern/Cross Cultural*	2-3	Varies	Ethics/WV/Pluralism*	3
		2-3	Valies		3
	Total	15-17		Total	15

Engineering (BSE) with 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	IDCR 151	Created and Called for Community*	3
COMM 105	Fundamentals of Oral Communication*	3	Varies	1st Language*	3
	Tota	al 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 (J-term)	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	2nd Language*	3
	Tota	al 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	ENGL 1xx	Literature*	3
WELL 1xx	Wellness*	1	Varies	3rd Language/NonWestern/Cross Cultural*	2-3
Varies	Social Science/History*	3			
	Tota	al 16		Total	16-17
	Senior – Fall			Senior – Spring	
ENGR 302	Seminar II	1	PHIL or RELI	Philosophy/Religion meeting QuEST*	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	HIST 1xx	History*	3
Varies	Environmental Science Elective	4	THEO 2xx	Christian Beliefs*	3
BIBL 2xx	Bible*	3	Varies	Ethics/WV/Pluralism*	3
	Tota	al 16		Total	17