

**Volgenau School of Engineering - Bioengineering, BS with Prehealth Concentration**

Catalog Year: 2019 - 2020		Grades		
Mason Core Reqs (21 credits)	Course Information	Credits	Earned	Needed
Written Communication:	ENGH 101 (100)	3		
*Oral Communication	*Satisfied by Major Requirements			
*Quantitative Reasoning	*Satisfied by Major Requirements			
*Information Technology	*Satisfied by Major Requirements			
Arts		3		
Global Understanding		3		
Literature		3		
*Natural Science	*Satisfied by Major Requirements			
*Social & Behavioral Science	Choose from: PSYC 100 or SOCI 101	3		
Western Civ/World History		3		
**Written Communication	ENGH 302 - **Natural Science Section Only	3		
*Capstone/Synthesis	*Satisfied by Major Requirements			
<b>Major Requirements (118 credits) 'C' or better is required for All BENG, BIOL, CHEM, CS, ECE, ME courses required for the degree</b>				
<b>Bioengineering Requirements (43 credits)</b>		Credits	Earned	Needed
BENG 101	Introduction to Bioengineering	3		
BENG 214	Physiology for Engineers	3		
BENG 230	Continuum Biomechanics and Transport I	3		
BENG 240	Biomaterials	3		
BENG 241	Biomechanics and Biomaterials Laboratory	1		
BENG 320	Bioengineering Signals and Systems	3		
BENG 330	Computational Methods in Bioengineering	3		
BENG 331	Computational Methods in Bioengineering Laboratory	1		
BENG 350	Neural System Designs	3		
BENG 360	Biomedical Imaging	3		
BENG 370	Bioinstrumentation and Devices I	3		
BENG 371	Bioinstrumentation and Devices Laboratory	1		
BENG 391	Bioengineering Professional Development	1		
BENG 414	Pathophysiology and the Role of New Technologies in Human Diseases	3		
BENG 475	Intellectual Property, Regulatory Concepts and Product Development	3		
BENG 492	Senior Advanced Design Project I	3		
BENG 493	RS: Senior Advanced Design Project II	3		
<b>Additional Supporting Coursework (38 credits)</b>		Credits	Earned	Needed
BIOL 213	Cell Structure and Function (Bioengineering-specific section)	3		
CS 112	Introduction to Computer Programming	4		
MATH 113	Analytic Geometry and Calculus I	4		
MATH 114	Analytic Geometry and Calculus II (B- or better required)	4		
MATH 203	Linear Algebra (Bioengineering-specific section)	3		
MATH 213	Analytic Geometry and Calculus III	3		
MATH 214	Elementary Differential Equations (B- or better required)	3		
STAT 350	Introductory Statistics II	3		
PHYS 160/161 and 260/261	University Physics I & II with Labs	8		
COMM 100 or 101	Public Speaking or Fundamentals of Communication	3		
<b>Pre-Health Concentration (37 credits)</b>				
BIOL 483 or CHEM 463	General Biochemistry I	4		
CHEM 211/213	General Chemistry I with lab	3/1		
CHEM 212/214	General Chemistry II with lab	3/1		
CHEM 313/315	Organic Chemistry I with lab	3/2		
CHEM 314/318	Organic Chemistry II with lab	3/2		
<b>Technical Electives (9 credits) from:</b> Computational Biomedical Engineering: BENG 420, 430, 435, 550; Biomedical Imaging & Devices: BENG 437, 438, 470, 538; Biomaterials & Nanomedicine: BENG 413, 421, 441, 541; Neurotechnology & Computational Neuroscience: BENG 426, 429, 434, 487, 526; Research & Design: BENG 390, 395, 417, 499, 501. Note: PreHealth students should take BIOL 311 (Genetics) as an additional Biology Technical Elective Course				
Technical Elective #1:		3		
Technical Elective #2:		3		
Technical Elective #3:		3		



# Volgenau School of Engineering

## BIOENGINEERING, B.S.

2019 - 2020

### 2019-2020 Sample Schedule for BS in Bioengineering for Pre-Health Concentration

<b>First Semester</b>	<b>Credits</b>	<b>Second Semester</b>	<b>Credits</b>
MATH 113 Analytic Geometry & Calculus I	4	MATH 114 Analytic Geometry & Calculus II	4
CHEM 211 General Chemistry I	3	PHYS 160 University Physics I	3
CHEM 213 General Chemistry I Lab	1	PHYS 161 University Physics I Lab	1
BENG 101 Introduction to Bioengineering	3	CHEM 212 General Chemistry II	3
Mason Core (ENGH 101) <sup>1</sup>	3	CHEM 214 General Chemistry II Lab	1
		CS 112 Introduction to Computer Programming	4
<b>Total Hours</b>	<b>14</b>	<b>Total Hours</b>	<b>16</b>

**Summer I:** CHEM 313/315 Organic Chemistry I +Lab AND CHEM 314/318 Organic Chemistry II +Lab – **10 credits**

<b>Third Semester</b>	<b>Credits</b>	<b>Fourth Semester</b>	<b>Credits</b>
MATH 213 Analytic Geometry & Calculus III	3	MATH 214 Elementary Differential Equations	3
MATH 203 Linear Algebra <sup>2</sup>	3	BENG 230 Continuum Biomechanics and Transport I	3
PHYS 260 University Physics II	3	BENG 240 Biomaterials	3
PHYS 261 University Physics II Lab	1	BENG 241 Biomechanics and Biomaterials Lab	1
BIOL 213E Cell Structure & Function <sup>2</sup>	4	BENG 214 Physiology for Engineers	3
		Mason Core (Communication) <sup>1</sup>	3
<b>Total Hours</b>	<b>14</b>	<b>Total Hours</b>	<b>16</b>

**Summer II:** Mason Core (PSYC 100) AND Mason Core (Literature)<sup>1</sup> – **6 credits**

<b>Fifth Semester</b>	<b>Credits</b>	<b>Sixth Semester</b>	<b>Credits</b>
BENG 414 Pathophysiology & the Role of New Technologies in Human Diseases	3	BENG 360 Biomedical Imaging	3
BENG 320 Bioengineering Signals & Sys	3	BENG 370 Bioinstrumentation and Devices I	3
BENG 330 Computational Methods in BE	3	BENG 371 Bioinstrumentation and Devices Lab	1
BENG 331 Computational Methods in BE Lab	1	BENG 350 Neural System Designs	3
		BENG 475 Intellectual Property, Regulatory Concepts, & Product Development (Glob. Und.) <sup>1</sup>	3
STAT 350 Introductory Statistics II	3	Mason Core (ENGH 302 Advanced Comp.: Nat Sci. and Multidisc.) <sup>1</sup>	3
BENG 391 BE Professional Development	1		
<b>Total Hours</b>	<b>14</b>	<b>Total Hours</b>	<b>16</b>

**Summer III:** Mason Core (SOC 101)<sup>1</sup> – **3 credits**

<b>Seventh Semester</b>	<b>Credits</b>	<b>Eighth Semester</b>	<b>Credits</b>
BENG 492 Senior Advanced Design Project I	3	BENG 493 Senior Advanced Design Project II	3
BENG Technical Elective #1*	3	BENG Technical Elective #2	3
Mason Core (Arts) <sup>1</sup>	3	BENG Technical Elective #3	3
BIOL 483 General Biochemistry	4	Mason Core (HIST 100 or 125) <sup>1</sup>	3
<b>Total Hours</b>	<b>13</b>	<b>Total Hours</b>	<b>12</b>

<sup>1</sup><http://catalog.gmu.edu/mason-core> Mason Core Categories: One course from each: Oral Communication, ENGH101, Arts, Global Understanding (BENG 475), Literature, Western Civilization/World History, Social Behavioral Science (ECON 103 or PSYC 100 or SOC 101). ENGH 101 and Mason Core-Literature must be completed before taking ENGH 302.

<sup>2</sup>All bioengineers will be required to register for a specific section of MATH 203 including a 1-hour recitation with practical applications and for a specific section of BIOL 213.

\*Students take three technical electives. Technical electives can be selected such that they can specialize within Pre-health (see [catalog.gmu.edu](http://catalog.gmu.edu)) or take technical electives in any combination, specified from the list given in the current catalog.