

College of Engineering and Computer Science

Bioengineering

Fall 2017

Name _____

SUID _____

pr= prerequisite, co=corequisite

Minor/Second Major (if any): _____

MATHEMATICS (15)

MAT295 Calculus 1

MAT296 Calculus 2 (p: MAT 295 min C-)

MAT397 Calculus 3 (p: MAT 296 min C-)

MAT485 Diff. Eq. & Matrix Algebra (p: MAT 397)

SCIENCES (24)

CHE106 General Chemistry 1

CHE107 General Chemistry Lab 1 (c: CHE 106)

CHE116 General Chemistry 2 (p: CHE106)

CHE117 General Chemistry Lab 2 (p: CHE 107, c: CHE 116)

CHE275 Organic Chemistry 1 (p: CHE 116)

CHE276 Organic Chemistry Lab 1 (p: CHE 117, c: CHE 275)

PHY211 General Physics 1 (c: PHY 221, MAT 295)

PHY221 General Physics Lab 1 (c: PHY 211)

PHY212 General Physics 2 (p: PHY 211,221 , c: PHY 222, MAT 296)

PHY222 General Physics Lab 2 (c: PHY 212)

BIO 327 Cell Biology (p: BIO 121 or BEN 301, CHE 106)

WRITING SKILLS/SOCIAL SCIENCE/HUMANITIES (24)

WRT105 Studio 1: Practices of Academic Writing

WRT205 Studio 2: Critical Research and Writing (p: WRT 105)

SSH Elective _____

SSH Elective _____

SSH Elective _____

SSH Elective _____

SSH Elective _____

SSH Elective _____

ENGINEERING (18)

ECS101 Intro. to Engr. & Comp. Sci

ECS104 Engr. Comput. Tools (c: MAT 295)

ECS221 Statics (p: PHY 211, c: MAT 296)

ECS326 Engr. Materials, Prop. & Proc.

ELE231 Elec. Engr. Fundamentals 1 (p: MAT 295)

ELE232 Elec. Engr. Fundamentals 2 (p: ELE 231)

BIOENGINEERING (40)

BEN212 Exp. Methods in BMCE (p: MAT 296, ECS 104)

BEN231 Mass and Energy Balances

BEN301 Biol. Prin. for Engineers (p: CHE 275, MAT 397, ECS 104)

BEN333 Fluid Transport (p: MAT 397, PHY 212)

BEN341 Heat & Mass Transfer (p: BEN 333)

BEN364 Quantitative Physiology (p: BEN 301)

BEN465 Biomechanics (p: ECS 221, MAT 485, BEN 364)

BEN468 Biomaterials

BEN481 Bioinstrumentation (p: ELE 231, 232)

BEN485 Bioengineering Laboratory (c: BEN 465, BEN 481)

BEN487 Bioengineering Capstone Design

BEN575 Process Control (p: MAT 485)

TECHNICAL ELECTIVES (9)

Tech Elec _____

Tech Elec _____

Tech Elec _____

TOTAL CREDITS

CREDIT	FIRST-YEAR		SOPHOMORE		JUNIOR		SENIOR		VAR	
	GRADE	F	S	F	S	F	S	F		S
MATHEMATICS (15)										
MAT295 Calculus 1	(4)___	4								
MAT296 Calculus 2 (p: MAT 295 min C-)	(4)___		4							
MAT397 Calculus 3 (p: MAT 296 min C-)	(4)___			4						
MAT485 Diff. Eq. & Matrix Algebra (p: MAT 397)	(3)___				3					
SCIENCES (24)										
CHE106 General Chemistry 1	(3)___	3								
CHE107 General Chemistry Lab 1 (c: CHE 106)	(1)___	1								
CHE116 General Chemistry 2 (p: CHE106)	(3)___		3							
CHE117 General Chemistry Lab 2 (p: CHE 107, c: CHE 116)	(1)___		1							
CHE275 Organic Chemistry 1 (p: CHE 116)	(3)___			3						
CHE276 Organic Chemistry Lab 1 (p: CHE 117, c: CHE 275)	(2)___			2						
PHY211 General Physics 1 (c: PHY 221, MAT 295)	(3)___		3							
PHY221 General Physics Lab 1 (c: PHY 211)	(1)___		1							
PHY212 General Physics 2 (p: PHY 211,221 , c: PHY 222, MAT 296)	(3)___			3						
PHY222 General Physics Lab 2 (c: PHY 212)	(1)___			1						
BIO 327 Cell Biology (p: BIO 121 or BEN 301, CHE 106)	(3)___							3		
WRITING SKILLS/SOCIAL SCIENCE/HUMANITIES (24)										
WRT105 Studio 1: Practices of Academic Writing	(3)___	3								
WRT205 Studio 2: Critical Research and Writing (p: WRT 105)	(3)___			3						
SSH Elective _____	(3)___	3								
SSH Elective _____	(3)___			3						
SSH Elective _____	(3)___				3					
SSH Elective _____	(3)___					3				
SSH Elective _____	(3)___						3			
SSH Elective _____	(3)___							3		
ENGINEERING (18)										
ECS101 Intro. to Engr. & Comp. Sci	(3)___	3								
ECS104 Engr. Comput. Tools (c: MAT 295)	(3)___		3							
ECS221 Statics (p: PHY 211, c: MAT 296)	(3)___			3						
ECS326 Engr. Materials, Prop. & Proc.	(3)___				3					
ELE231 Elec. Engr. Fundamentals 1 (p: MAT 295)	(3)___				3					
ELE232 Elec. Engr. Fundamentals 2 (p: ELE 231)	(3)___					3				
BIOENGINEERING (40)										
BEN212 Exp. Methods in BMCE (p: MAT 296, ECS 104)	(3)___			3						
BEN231 Mass and Energy Balances	(3)___			3						
BEN301 Biol. Prin. for Engineers (p: CHE 275, MAT 397, ECS 104)	(4)___					4				
BEN333 Fluid Transport (p: MAT 397, PHY 212)	(3)___					3				
BEN341 Heat & Mass Transfer (p: BEN 333)	(4)___						4			
BEN364 Quantitative Physiology (p: BEN 301)	(4)___						4			
BEN465 Biomechanics (p: ECS 221, MAT 485, BEN 364)	(3)___							3		
BEN468 Biomaterials	(3)___								3	
BEN481 Bioinstrumentation (p: ELE 231, 232)	(3)___							3		
BEN485 Bioengineering Laboratory (c: BEN 465, BEN 481)	(4)___							4		
BEN487 Bioengineering Capstone Design	(3)___								3	
BEN575 Process Control (p: MAT 485)	(3)___						3			
TECHNICAL ELECTIVES (9)										
Tech Elec _____	(3)___							3		
Tech Elec _____	(3)___								3	
Tech Elec _____	(3)___								3	
TOTAL CREDITS	130	17	15	16	18	16	17	16	15	

*See reverse side for all notes

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BIOENGINEERING
Curriculum Notes
2017-2018

1. Bioengineering students must complete a minimum of **9 credits of Technical Electives** from mathematics, natural sciences, and engineering courses not included in the required bioengineering curriculum. These courses are intended to be challenging (200-level or higher), although relevant AP credits and introductory biology courses (BIO 121 and BIO 123/124) may also count. The breadth of technical elective options is intended to be flexible to allow students to develop skill-sets for their chosen careers. It is highly recommended that students work with academic advisors to identify technical electives to build towards their long-term career objectives. Technical electives are subject to academic advisor and program director approval, and courses not included in the description above may be approved by petition if found to have sufficient technical content.

2. Bioengineering students must complete a minimum of **18 credits Social Sciences, Humanities, or Foreign Language** using any one of the following options:
 - Option 1:** Complete a minimum of 18 credits from the Social Sciences List* and/or Humanities List* and/or of a foreign language†.

 - Option 2:** Petition to use completion of the Engineering and Computer Science Management minor to complete the Social Science and Humanities elective requirement.

*The Humanities List and Social Sciences List of approved courses are published by the College of Arts and Sciences in the Undergraduate Catalog for Advising (coursecatalog.syr.edu). Students should confirm that a course intended to fulfill this requirement is in one of these lists.

*Please note that the following courses are **NOT** social sciences or humanities: ANT 131, ANT 431, ANT 433, all CFS, GEO 155, GEO 215, GEO 316, GEO 326, GEO 482, GEO 455, HNR 250, HNR 255, HNR 350, HNR 355, HNR 450, HNR 455; PSY 223, PSY 252, PSY 323, PSY 324, PSY 334. This list is not exhaustive.

*Students may count *ECS 392- Ethical Aspects of ECS* towards their Social Science and Humanities elective requirements.

†Foreign language grammar and/or oral practice courses may not be in student's native language. Foreign language courses focused on literature, culture, or linguistics in a student's native language are acceptable.