

# College of Engineering & Computer Science

Syracuse University

**Undergraduate Curriculum Sheets**

**Fall 2019**

# College of Engineering and Computer Science

Aerospace Engineering

Fall 2019

Name \_\_\_\_\_

SUID \_\_\_\_\_

pr= prerequisite, co=corequisite

Minor/Second Major (if any): \_\_\_\_\_

	CREDIT GRADE	FIRST-YEAR SOPHOMORE				JUNIOR		SENIOR		VAR +/-
		F	S	F	S	F	S	F	S	
<b>MATHEMATICS (15)</b>										
MAT295 Calculus 1	(4)____	4								
MAT296 Calculus 2 (pr: MAT 295 min C-)	(4)____		4							
MAT397 Calculus 3 (pr: MAT 296 min C-)	(4)____			4						
MAT485 Diff Eqn & Matrix Algebra for Engrs (pr: MAT 397)	(3)____				3					
<b>SCIENCES (12)</b>										
CHE106 General Chem Lecture I (co: CHE 107)	(3)____	3								
CHE107 General Chem Lab I (co: CHE 106)	(1)____	1								
PHY211 General Physics 1 (co: PHY 221, MAT 295)	(3)____		3							
PHY221 General Physics Lab 1 (co: PHY 211)	(1)____		1							
PHY212 General Physics 2 (pr: PHY 211, 221, co: PHY 222, MAT 296)	(3)____			3						
PHY222 General Physics Lab 2 (co: PHY 212, MAT296)	(1)____			1						
<b>WRITING SKILLS/SOCIAL SCIENCE/HUMANITIES (15)</b>										
WRT105 Studio 1: Practices of Academic Writing	(3)____	3								
WRT205 Studio 2: Critical Research and Writing (pr: WRT 105)	(3)____		3							
SSH Elective _____	(3)____		3							
SSH Elective _____	(3)____		3							
SSH Elective _____	(3)____			3						
<b>PROGRAM CUSTOMIZATION (15)</b>										
Course1 _____	(3)____					3				
Course2 _____	(3)____						3			
Course3 _____	(3)____							3		
Course4 _____	(3)____								3	
Course5 _____	(3)____									3
<b>ENGINEERING (23)</b>										
ECS101 Intro. to Engr. & Comp. Sci.	(3)____	3								
ECS104 Engr. Comp Tools (co: MAT 295)	(3)____		3							
ECS221 Statics (pr: PHY 211, co: MAT 296)	(3)____			3						
ECS222 Dynamics (pr: ECS 221, MAT 296)	(3)____				3					
ECS325 Mechanics of Solids (pr: ECS 221, co: MAT 397)	(4)____				4					
ECS326 Engr. Materials, Prop. & Proc.	(3)____			3						
ELE231 Elec. Engr. Fundamentals 1 (pr: MAT 295)	(3)____					3				
ELE291 Elec. Engr. Laboratory 1 (co: ELE 231)	(1)____					1				
<b>AEROSPACE ENGINEERING (48)</b>										
AEE342 Aerodynamics (pr: MAE 341)	(4)____						4			
AEE343 Compressible Flow (pr: MAE 251, MAE 341)	(3)____						3			
AEE427 Aircraft Performance & Dynamics (pr: MAE 341)	(4)____							4		
AEE446 Propulsion (pr: AEE 343)	(3)____							3		
AEE471 Des. & Anal. of Aero. Struct. (pr: ECS 325)	(4)____						4			
AEE472 Syn. of Aerospace Systems (pr: AEE 427)	(4)____								4	
AEE577 Space Flight (pr: ECS 222)	(3)____							3		
MAE251 Thermodynamics (pr: PHY 211)	(4)____			4						
MAE284 Intro to CAD (pr: ECS 101)	(3)____			3						
MAE312 Engineering Analysis (pr: ECS 104, MAT 485)	(3)____					3				
MAE315 Mech/Aero Lab I (pr: ECS 325, co: MAE 341)	(3)____					3				
MAE321 Dynamics of Mech. Systems (pr: ECS 325, ECS 222, MAT 485)	(3)____						3			
MAE322 Control Systems for MAE (pr: MAT414 or 485, co: MAE321)	(3)____								3	
MAE341 Fluid Mechanics (pr: ECS 221, MAT 397, PHY 211)	(4)____					4				
<b>TOTAL CREDITS</b>	<b>128</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>13</b>	<b>13</b>	

\*See reverse side for all notes

**AEROSPACE ENGINEERING**  
**Curriculum Notes**  
**2019-2020**

1. There are a total of 24 elective credits in the B.S. AEE program. These credits may be distributed in one of the following two ways:

**Option 1:** A student may complete any University minor or second major that requires at least 12 credit hours beyond the core AEE curriculum. In addition to, or as part of, this minor or second major, at least 9 credit hours must be taken from the social sciences or humanities (SS/H). Excluding those courses that count towards the minor or second major, a maximum of 6 credit hours that are neither SS/H nor technical electives may be taken as part of the 24 elective credits.

**Option 2:** A student who does not complete a University minor or second major must take at least 9 credits from the social sciences or humanities (SS/H), at least 6 credits of technical electives, and a maximum of 6 credit hours that are neither SS/H nor technical electives.

2. Technical electives consist of all 300 level and above courses offered by any department within the college of engineering and computer science or by the math or physics departments, except for ECS 391, ECS 392 and any course numbered 300, 400 or 500 that is offered outside of the MAE department. However, in some instances, these courses may be approved by petition. In addition, no more than 3 credit hours of technical electives may be taken outside of the MAE department.
3. Many technical electives in the MAE Department are scheduled on a 2-year rotation, so students should make themselves aware of technical elective offerings starting in their third year.
4. Social science or humanities (SS/H) courses are to be selected from the "Humanities List", the "Social Sciences List", or any foreign language course, as published in the SU Course Catalog.
5. Only courses taken (1) for a letter grade, (2) at the 300-level or greater, or (3) offered by the physical education department may be used to satisfy the requirements for the elective credits that are neither SS/H nor technical electives.

# College of Engineering and Computer Science

Bioengineering

Fall 2019

Name \_\_\_\_\_

SUID \_\_\_\_\_

pr= prerequisite, co=corequisite

Minor/Second Major (if any): \_\_\_\_\_

	CREDIT GRADE	FIRST-YEAR		SOPHOMORE		JUNIOR		SENIOR		VAR +/-
		F	S	F	S	F	S	F	S	
<b>MATHEMATICS (15)</b>										
MAT295 Calculus 1	(4) _____	4								
MAT296 Calculus 2 (pr: MAT 295 min C-)	(4) _____		4							
MAT397 Calculus 3 (pr: MAT 296 min C-)	(4) _____			4						
MAT485 Diff. Eq. & Matrix Alg. (pr: MAT 397)	(3) _____				3					
<b>SCIENCES (19)</b>										
CHE106 General Chemistry 1	(3) _____	3								
CHE107 General Chemistry Lab 1 (co: CHE 106)	(1) _____	1								
CHE116 General Chemistry 2 (pr: CHE 106)	(3) _____		3							
CHE117 Gen. Chemistry Lab 2 (pr: CHE 107, co: CHE 116)	(1) _____		1							
CHE275 Organic Chemistry 1 (pr: CHE 116)	(3) _____			3						
PHY211 General Physics 1 (co: PHY 221, MAT 295)	(3) _____		3							
PHY221 Gen. Physics Lab 1 (co: PHY 211)	(1) _____		1							
PHY212 Gen. Phys. 2 (pr: PHY 211,221, co: PHY 222, MAT 296)	(3) _____			3						
PHY222 General Physics Lab 2 (co: PHY 212)	(1) _____			1						
<b>WRITING/SOCIAL SCIENCES/HUMANITIES (24)</b>										
WRT105 Studio 1: Practices of Academic Writing	(3) _____	3								
WRT205 Studio 2: Critical Research and Wrt (pr: 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		
<b>ENGINEERING (19)</b>										
ECS101 Intro. to Engr. & Comp. Sci.	(3) _____	3								
ECS104 Engr. Comput. Tools (co: MAT 295)	(3) _____		3							
ECS221 Statics (pr: PHY 211, co: MAT 296)	(3) _____			3						
ECS326 Engr. Materials, Prop. & Proc.	(3) _____				3					
ELE231 Elec. Engr. Fundamentals 1 (pr: MAT 295, PHY 211)	(3) _____			3						
ELE251 Fundamentals of Linear Systems	(3) _____				3					
ELE292 Electrical Engineering Lab (co: ELE 251)	(1) _____				1					
<b>BIOENGINEERING (41)</b>										
BEN201 Biological Principles for Engineers	(4) _____			4						
BEN212 Exp. Methods in BMCE (pr: MAT 296, ECS 104)	(3) _____				3					
BEN231 Bioengineering Fundamentals	(3) _____			3						
BEN333 Fluid Transport (pr: MAT 397, PHY 212)	(3) _____					3				
BEN341 Fund. Of Heat & Mass Transfer (pr: BEN 333)	(3) _____						3			
BEN364 Quantitative Physiology (pr: BEN 201)	(3) _____						3			
BEN375 Biomedical Systems, Signals and Control	(3) _____						3			
BEN385 Bioengineering Laboratory I	(3) _____						3			
BEN465 Biomechanics (pr: ECS 221, MAT 485, BEN 364)	(3) _____							3		
BEN468 Biomaterials & Medical Devices	(3) _____						3			
BEN481 Bioinstrumentation (co: BEN 465, BEN 481)	(3) _____							3		
BEN485 Bioengineering Laboratory II (co: BEN 465, BEN 481)	(3) _____							3		
BEN486 Bioengineering Capstone Design I	(1) _____							1		
BEN487 Bioengineering Capstone Design II	(3) _____								3	
<b>TECHNICAL ELECTIVES (12)</b>										
BIO Elective _____	(3) _____							3		
Tech Elective _____	(3) _____							3		
Tech Elective _____	(3) _____								3	
Tech Elective _____	(3) _____								3	
<b>TOTAL CREDITS</b>		<b>130</b>	<b>17</b>	<b>15</b>	<b>18</b>	<b>18</b>	<b>16</b>	<b>15</b>	<b>16</b>	<b>15</b>

**BIOENGINEERING  
Curriculum Notes  
2019-2020**

1. Bioengineering students must complete a minimum of **18 credits in the Social Science or Humanities** disciplines using any one of the following options:
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<sup>†</sup>.

**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](http://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.

<sup>†</sup>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.

### **Biology Elective:**

Biology elective encompasses upper-division courses prefixed with BIO (300-level or higher). The breadth of biology elective option is intended to be flexible to allow students to deepen their biology knowledge. Students are recommended to work with academic advisors to identify an elective course to build towards their long-term career objectives. The biology elective is subject to approval by the student's academic advisor and program director. Courses not included in the pre-approved list may be approved by petition if found to have sufficient biological content. Please note that the following courses are **NOT** considered a biology elective: BIO 316, BIO 317, BIO 355.

### **Technical Electives:**

Technical electives broadly encompass Math, Science (excluding Social Science), or Engineering course 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 towards the technical elective requirement. 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 approval by the student's academic advisor and program director. Courses not included in the description above may be approved by petition if found to have sufficient technical content.

**College of Engineering and Computer Science**

Chemical Engineering

Fall 2019

Name \_\_\_\_\_

SUID \_\_\_\_\_

pr= prerequisite, co=corequisite

Minor/Second Major (if any): \_\_\_\_\_

	(CREDIT)	FIRST YEAR		SOPHOMORE		JUNIOR		SENIOR		
		GRADE	F	S	F	S	F	S	F	S
<b>MATHEMATICS (15)</b>										
MAT295 Calculus 1	(4) _____		4							
MAT296 Calculus 2 (pr: MAT 295 min C-)	(4) _____			4						
MAT397 Calculus 3 (pr: MAT 296 min C-)	(4) _____				4					
MAT485 Diff. Eq. & Matrix Alg. (pr: MAT 397)	(3) _____					3				
<b>SCIENCES (26)</b>										
CHE106 General Chemistry 1	(3) _____		3							
CHE107 General Chemistry Lab 1 (co: CHE 106)	(1) _____		1							
CHE116 General Chemistry 2 (pr: CHE 106)	(3) _____			3						
CHE117 Gen. Chemistry Lab 2 (pr: CHE 107, co: CHE 116)	(1) _____			1						
CHE275 Organic Chemistry 1 (pr: CHE 116)	(3) _____				3					
CHE276 Org. Chemistry Lab 1 (pr: CHE 117, co: CHE 275)	(2) _____				2					
CHE346 Phys. Chem. 1 (pr: CHE 116, MAT 296 co: PHY 212)	(3) _____					3				
CHE347 Phys/An. Chem. Lab (pr: CHE 275/276, co: CHE 346)	(2) _____					2				
PHY211 General Physics 1 (co: PHY 221, MAT 295)	(3) _____			3						
PHY221 Gen. Physics Lab 1 (co: PHY 211)	(1) _____			1						
PHY212 Gen. Phys. 2 (pr: PHY 211,221, co: PHY 222, MAT 296)	(3) _____				3					
PHY222 General Physics Lab 2 (co: PHY 212)	(1) _____				1					
<b>WRITING/SOCIAL SCIENCES/HUMANITIES (27)</b>										
WRT105 Studio 1: Practices of Academic Writing	(3) _____		3							
WRT205 Studio 2: Critical Research and Wrt (pr: WRT 105)	(3) _____				3					
WRT307 Adv. Wrt Studio: Prof. Wrt (pr: WRT 205)	(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	
<b>ENGINEERING (9)</b>										
ECS101 Intro. to Engr. & Comp. Sci.	(3) _____		3							
ECS104 Engr. Comput. Tools (co: MAT 295)	(3) _____			3						
ECS326 Engr. Materials, Prop. & Proc.	(3) _____					3				
<b>CHEMICAL ENGINEERING (36)</b>										
CEN212 Exp. Methods in BMCE (pr: MAT 296, ECS 104)	(3) _____				3					
CEN231 Mass and Energy Balances	(3) _____			3						
CEN252 Chem. Engr. Thermodynamics 1 (pr: CEN 231)	(3) _____				3					
CEN311 Chemical Engineering Lab 1 (co: CEN 341)	(2) _____						2			
CEN333 Fluid Transport (pr: MAT 397, PHY 212)	(3) _____					3				
CEN341 Fund. Of Heat & Mass Transfer (pr: CEN 333)	(3) _____						3			
CEN353 Chem. Engr. Thermodynamics 2 (pr: CEN 252)	(3) _____					3				
CEN412 Chemical Engineering Lab 2 (pr: CEN 341)	(2) _____							2		
CEN542 Mass & Heat Transf. Operations (pr: CEN 341)	(3) _____							3		
CEN574 Process Design (pr: CEN 353, 587)	(4) _____								4	
CEN575 Process Control (pr: MAT 485)	(3) _____						3			
CEN587 Chemical Reaction Engineering (pr: CEN 341)	(4) _____							4		
<b>TECHNICAL ELECTIVES (15)</b>										
Choose one of: CHE 356, CEN 421, CEN 451	(3) _____						3			
Tech Elective _____	(3) _____						3			
Tech Elective _____	(3) _____							3		
Tech Elective _____	(3) _____								3	
CEN Tech Elective _____	(3) _____								3	
<b>TOTAL CREDITS</b>		<b>128</b>	<b>17</b>	<b>15</b>	<b>16</b>	<b>18</b>	<b>17</b>	<b>17</b>	<b>15</b>	<b>13</b>

\*See reverse side for all notes

**CHEMICAL ENGINEERING**  
**Curriculum Notes**  
**2019-2020**

1. Chemical engineering students must complete a minimum of **15 credits of Technical Electives** from mathematics, natural sciences, and engineering courses not included in the required chemical engineering curriculum. All technical electives are subject to approval by the student's academic advisor and program director. Courses not included in the description above may be approved by petition if found to have sufficient technical content.
  - a. **3 credits of this requirement are restricted and must be chosen from:**
    - CHE 356 Physical Chemistry (pr: CHE 346), or
    - CEN 421 Biochemical Engineering (pr: CHE 275), or
    - CEN 451 Molecular and Statistical Thermodynamics (pr: CEN 353).
  - b. **At least one additional technical elective must be in chemical engineering.**
    - CEN 421 or CEN 451 may be used to complete requirement (1b) if not already used to fulfill requirement (1a).
  
2. Chemical engineering students must complete a minimum of **18 credits Social Sciences, Humanities, and/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.

# College of Engineering & Computer Science

Civil Engineering

Fall 2019

Name \_\_\_\_\_

SUID \_\_\_\_\_

pr= prerequisite, co=corequisite

Minor/Second Major (if any): \_\_\_\_\_

## MATHEMATICS (15)

- MAT295 Calculus 1
- MAT296 Calculus 2 (pr: MAT 295 min C-)
- MAT397 Calculus 3 (pr: MAT 296 min C-)
- MAT485 Diff. Equations & Matrix Algebra (pr: MAT 397)

## SCIENCES (16)

- CHE106 General Chemistry I
- CHE107 General Chemistry Lab I (co: CHE 106)
- PHY211 General Physics 1 (co: PHY 221, MAT 295)
- PHY221 General Physics Lab 1 (co: PHY 211)
- PHY212 General Physics 2 (pr: PHY 211, 221, co: PHY 222, MAT 296)
- PHY222 General Physics Lab 2 (co: PHY 212)

Select one of the following two options:

- EAR105 Earth Science (3) and EAR104 Earth Science Lab (1)\*\*
- EAR203 Earth System Science (4)

## WRITING SKILLS (9)

- WRT105 Studio 1: Practices of Academic Writing
- WRT205 Studio 2: Critical Research and Writing (pr: WRT 105)
- WRT307 Adv Writing Studio: Professional Writing (pr: WRT 205)

## SOCIAL SCIENCE /HUMANITIES (18)

(See curriculum notes)

- SSH Elective \_\_\_\_\_
- SSH Elective \_\_\_\_\_
- SSH Elective \_\_\_\_\_
- SSH Elective \_\_\_\_\_
- SSH Elective \_\_\_\_\_
- SSH Elective \_\_\_\_\_

## ENGINEERING (19/20)

- ECS101 Intro. to Engr. & Comp. Sci.
  - ECS221 Statics (pr: PHY 211, co: MAT 296)
  - ECS222 Dynamics (3) (pr:ECS 221, MAT 296)
  - ECS325 Mechanics of Solids (pr: ECS 221, co: MAT 397)
  - CIE/ECS 326 Engineering Materials
- Select One of the Following 2 Courses:
- CIE442 Treatment Proc. In Envir. Engr (pr: CIE 327 or MAE 341, CIE 341)
  - CIE463 Intro to Sustainable Engr

## CIVIL ENGINEERING (44)

- CIE273 Intro to Geomatics and BIM (pr: MAT 295)
- CIE274 Sustainability in Civil & Env. Systems (pr: CHE 106, MAT 296)
- CIE327/MAE341 Fluid Mechanics (pr: MAT 397, ECS 221)
- CIE329 Prob, Stats and Risk for Civ & Env Engr (pr: MAT 485 or MAT 331)
- CIE331 Analysis of Structures and Materials (pr: ECS 325)
- CIE332 Design of Concrete Structures (pr: CIE 331)
- CIE337 Intro to Geotechnical Engineering (pr: ECS 325)
- CIE338 Foundation Engineering (pr: CIE 337)
- CIE341 Intro to Environmental Engr. (pr: CIE 274)
- CIE352 Water Resources Engr. (pr: CIE 327 or MAE 341)
- CIE401 Construction Engineering & Project Management
- CIE443 Transportation Engineering
- CIE475 Capstone Design

## ELECTIVES (6)

- Free Elective \_\_\_\_\_
- Tech Elective \_\_\_\_\_

## TOTAL CREDITS

CREDIT GRADE	FIRST-YEAR		SOPHOMORE		JUNIOR		SENIOR		VAR
	F	S	F	S	F	S	F	S	
(4) _____	4								
(4) _____		4							
(4) _____			4						
(3) _____				3					
(3) _____	3								
(1) _____	1								
(3) _____		3							
(1) _____		1							
(3) _____			3						
(1) _____			1						
(4) _____		4							
(3) _____	3								
(3) _____				3					
(3) _____					3				
(3) _____	3								
(3) _____		3							
(3) _____			3						
(3) _____		3							
(3) _____						3			
(3) _____							3-4		
(3) _____	3								
(3) _____			3						
(3) _____				3					
(4) _____					4				
(4) _____						4			
(3) _____							3		
( ) _____								3-4	
(3) _____			3						
(3) _____				3					
(4) _____					4				
(4) _____						4			
(3) _____							3		
(3) _____								3	
(3) _____									3
(4) _____									4
(3) _____									3
(3) _____									3
<b>127-128</b>	<b>17</b>	<b>18</b>	<b>17</b>	<b>16</b>	<b>17</b>	<b>17</b>	<b>12/13</b>	<b>13</b>	

\*If SS/H taken, then take CIE 463 Fall senior year  
 \*\*If CIE 442 taken, then take SS/H Fall senior year

See reverse side for all notes



# CIVIL ENGINEERING

## Curriculum Notes

### 2019-2020

## SS/HUM ELECTIVES

All CIE students are required to complete at least 18 credits of SS/HUM electives. A *minimum* of one course (or 3 credits) must be chosen from each of the three groups of designated courses listed below. The remaining three SS/HUM electives (or 9 credits) can be selected from the lists below or, in addition to the lists, may be chosen from:

- any College of Arts and Sciences courses that are listed on their Humanities and Social Sciences lists in the SU Bulletin – Undergraduate Course Catalog / Liberal Arts Core
- any foreign language courses (except student's native language)
- ECS 391 – Legal Aspects of ECS
- ECS 392 – Ethical Aspects of ECS.

<b>Group 1: Economics and Social Issues</b>
ECN 101 – Intro to Microeconomics
ECN 102 – Intro to Macroeconomics
ECN 203 – Economics Ideas and Issues
GEO 353 – Geographies of Environmental Justice
SOC 101 – Introduction to Sociology
SOC 102 – Social Problems
SOC 230/WGS 230 – Intergroup dialogue
SOC 248/WGS 248 – Ethnic Inequality & Intergroup Relations
SOC 305/WGS 305 – Sociology of Sex and Gender
SOC 363 – Urban Sociology

<b>Group 2: Global Affairs</b>
ECN 365 – The World Economy ( requires ECN101,102 or 203 as pre-req)
GEO 103 – Environment and Society
GEO 105 – World Urban Geography
GEO 272 – World Cultures
GEO 273 – World Political Economy
MAX 123 – Critical Issues for the U.S.
MAX 132 – Global Community
PAF 351 – Global Social Problems
PSC 124 – International Relations
PSC 352 – International Law
PSC 355 – International Political Economy
PSC 364/AAS364 – African International Relations
PSC 365/AAS 365 – International Political Economy of the Third World

<b>Group 3: U.S. Government, Public Policy and Policy Studies</b>
ECN/WGS 358 – Economics of US Poverty & Discrimination
GEO 203 – Society and the Politics of Nature
GEO 314 – Hazardous Geographic Environments
GEO 356 – Environmental Ideas & Policy
PAF 101 – An Introduction to the Analysis of Public Policy
PAF 451 – Environmental Policy
PSC 121 – American National Government & Politics
PSC 125 – Political Theory
PSC 202 – Intro to Political Analysis
PSC 302- Environmental Politics and Policy
PSC 305 – US Congressional Politics
PSC 306 – African American Politics
PSC 308 – The Politics of US Public Policy
PSC 312 – Urban Government & Politics
PSC 318 – Technology, Politics & Environment
PSC 360 – Sustainability Science & Policy

## Technical Electives

Technical Electives MUST be CIE courses numbered 300 and above. They are to be selected in consultation with a student's advisor to advance the student's knowledge in a specific area of interest in civil or environmental engineering.

## Free Electives

Any SU or ESF three or four credit course except Academic Excellence Workshops, Physical Education and remedial courses.

# College of Engineering and Computer Science

Computer Engineering

Fall 2019

Name \_\_\_\_\_

SUID \_\_\_\_\_

pr= prerequisite, co=corequisite

Minor/Second Major (if any): \_\_\_\_\_

	CREDIT	FIRST-YEAR		SOPHOMORE		JUNIOR		SENIOR		VAR	
		GRADE	F	S	F	S	F	S	F		S
<b>MATHEMATICS (21)</b>											
PHI 251 Logic	(3)			3							
MAT295 Calculus 1	(4)	4									
MAT296 Calculus 2 (pr: MAT 295 min C-)	(4)		4								
MAT331 1st Course in Linear Algebra (pr: MAT 296)	(3)				3						
CIS375 Intro to Discrete Mathematics (pr: PHI 251)	(3)			3							
CIS321 Intro. to Probability and Statistics* (pr: MAT 295)	(4)						4				
<b>SCIENCES (12)</b>											
CHE106 General Chemistry I	(3)	3									
CHE107 General Chemistry I Lab (co: CHE 106)	(1)	1									
PHY211 General Physics 1 (co: PHY 221, MAT 295)	(3)		3								
PHY221 General Physics Lab 1 (co: PHY 211)	(1)		1								
PHY212 General Physics 2 (pr: PHY 211, 221, co: PHY 222, MAT 296)	(3)				3						
PHY222 General Physics Lab 2 (co: PHY 212)	(1)				1						
<b>WRITING SKILLS (9)</b>											
WRT105 Studio 1: Practices of Academic Writing	(3)	3									
WRT205 Studio 2: Critical Research and Writing (pr: WRT 105)	(3)				3						
WRT307 Adv. Writing Studio: Prof. Writing (pr:WRT 105, 205)	(3)						3				
<b>SOC. SCIENCE/HUMANITIES/GEN. ED. (18)</b>											
SSH Elective _____	(3)		3								
SSH Elective _____	(3)								3		
ECS392 Ethical Aspects of ECS	(3)					3					
Arts & Science Elective _____	(3)			3							
Arts & Science Elective _____	(3)								3		
Arts & Science Elective _____	(3)							3			
<b>GENERAL ENGINEERING (3)</b>											
ECS101 Intro. to Engr. & Comp. Sci.	(3)	3									
<b>COMPUTING CORE (15)</b>											
ECS102 Intro. to Computing	(3)	3									
CSE283 Intro. To Object-Oriented Design (pr: ECS 102)	(3)		3								
CSE384 Systems and Network Programming	(3)				3						
CSE389 Web Sys Arch, and Programming (pr: CIS 351 or CSE 283)	(3)			3							
CIS351 Data Structures	(3)			3							
<b>DIGITAL CORE (7)</b>											
CSE261 Digital Logic Design	(3)				3						
CSE262 Digital System Design and Simulation	(1)				1						
CSE397 FPGA and Microcontroller Design Lab (pr: CSE 261, ELE 231)	(3)					3					
<b>ENGINEERING FUNDAMENTALS (4)</b>											
ELE251 Fundamentals of Linear Systems	(3)			3							
ELE292 Linear Systems Laboratory (co: ELE 251)	(1)			1							
<b>COMPUTER ENGINEERING BREADTH (15)</b>											
CSE381 Computer Architecture (pr: CSE 261)	(3)					3					
CSE398 Embedded and Mobile Systems Lab (pr:CSE 397)	(3)						3				
CSE464 Intro to VLSI	(3)					3					
CSE484 Intro to Computer & Network Security (pr: CIS 486 or CSE 486)	(3)					3					
CSE486 Design of Operating Systems (pr: CIS 341,342, 351 or CSE 381, 382)	(3)						3				
<b>Design (6)</b>											
CSE491 Senior Design Project I (pr: CSE 398)	(3)							3			
CSE492 Senior Design Project II (pr: CSE 491)	(3)								3		
<b>TECHNICAL ELECTIVES (18)</b>											
Tech Elective _____	(3)						3				
Tech Elective _____	(3)							3			
Tech Elective _____	(3)							3			
Tech Elective _____	(3)							3			
Tech Elective _____	(3)								3		
Tech Elective _____	(3)									3	
<b>TOTAL CREDITS</b>	<b>128</b>	<b>17</b>	<b>17</b>	<b>16</b>	<b>17</b>	<b>15</b>	<b>16</b>	<b>15</b>	<b>15</b>		

## Computer Engineering Curriculum Notes 2019-2020

### **Technical Electives**

Students are required to 18 credits of upper division electives with the ELE, CSE, or CIS prefix. A minimum of 9 credits from courses with a prefix of CSE and a minimum of 6 credit hours must be 400 level or higher.

### **Social Sciences and Humanities Electives**

This 6-credit requirement for SSH electives may be fulfilled by any combination of courses whose contents are in the social science and humanities area. A glossary of course designations with such contents can be found in the Humanities Division and the Social Sciences Division of the College of Arts and Sciences with the exception of the following Anthropology - Physical courses: ANT 131, 331, 431, 432, and 433. These glossaries are given in The College of Arts and Sciences section of the Undergraduate Catalog.

### **Arts and Science Electives**

The purpose of this 9-credit requirement of arts and science elective courses is to provide students with a broad liberal arts educational experience in a diversity of subjects. In general courses from the college of arts and sciences will satisfy this requirement with the exception of courses with pass/fail grades, and 100-level courses in CHE, MAT, and PHY.

### **General Information**

Note that CPS courses cannot be taken to fulfill any of the requirements for the Computer Engineering undergraduate program. These courses are designed for non-majors in Computer Engineering or in Computer Science.

### **Minors**

In order to promote interdisciplinary study and facilitate the pursuit of minors, students may use up to 6 credits of technical electives towards completing minor requirements (in programs other than MAT, and ELE). This special rule applies only when a student actually completes a minor requirement.

# College of Engineering and Computer Science

Computer Science  
Fall 2019

Name \_\_\_\_\_  
SUID \_\_\_\_\_

pr=prerequisite, co=corequisite

Minor/Second Major (if any): \_\_\_\_\_

CREDIT GRADE	FIRST-YEAR		SOPHOMORE		JUNIOR		SENIOR		VAR +/-
	F	S	F	S	F	S	F	S	

<b>G Writing Skills (6 cr) Minimum Grade C-</b>										
E	WRT105	Studio 1: Practices of Academic Writing	(3)	3						
N	WRT205	Studio 2: Critical Research and Writing (pr: WRT 105)	(3)			3				
<b>Presentational Skills (3 cr)</b>										
<b>Select one of the following three courses:</b>										
	CRS 225	Public Advocacy (3)	(3)			3				
	CRS/CAS325	Presentational Speaking (3)								
E	IST 344	Info. Reporting & Presentations (3)								
<b>D SSH/VPA (21 credits)</b>										
U	ECS 392	Ethical Aspects of ECS	(3)					3		
C	PHI 251	Logic	(3)	3						
A	SSH/VPA	_____	(3)	3						
T	SSH/VPA	_____	(3)			3				
I	SSH/VPA	_____	(3)				3			
O	SSH/VPA	_____	(3)					3		
N	SSH/VPA	_____	(3)						3	
<b>Natural Sciences (8 cr)</b>										
	PHY211	General Physics 1 (co: PHY 221, MAT 295)	(3)	3						
R	PHY221	General Physics Lab 1 (co: PHY 211)	(1)	1						
Also select one of the following three options:										
	PHY 212&222	General Physics 2 & Lab	(4)		4					
E	CHE 106&107	General Chemistry I & Lab								
Q	BIO 121	General Biology I								
<b>M Free Electives (9 cr)</b>										
N	Free Elec	_____	(3)				3			
T	Free Elec	_____	(3)					3		
S	Free Elec	_____	(3)						3	
<b>Mathematics (15-16 cr) Minimum Grade of C-</b>										
	MAT295	Calculus 1	(4)	4						
M	MAT296	Calculus 2 (pr: MAT295)	(4)	4						
A	MAT397/ 331	Calculus or Linear Algebra (pr: MAT 296)	(4-3)		4 or 3					
J	CIS321	Intro. to Probability & Statistics (pr: MAT 295)	(4)		4					
<b>O Engineering Courses (6 cr)</b>										
R	ECS101	Intro. to Engineering & Computer Sci	(3)	3						
	ECS102	Intro. to Computing	(3)	3						
<b>Comp Sci Core (34 cr) 2.667 GPA &amp; Minimum Grade C-</b>										
	CIS252	Intro. to Computer Science	(4)	4						
	CIS375	Intro. to Discrete Mathematics (pr: PHI 251)	(3)		3					
	CIS341	Comp. Organization & Prog. Systems (pr: ECS 102 or CIS 252)	(3)		3					
	CSE384	Systems & Network Programming	(3)		3					
R	CIS351	Data Structures (pr: CIS 252)	(3)		3					
E	CIS352	Programming Lang: Theory & Prac. (pr: CIS 375, CIS 351)	(3)		3					
Q	CIS453	Software Specification & Design (pr: CIS 351 or CSE 382)	(3)		3					
U	CIS454	Software Implementation (pr: CIS 453)	(3)		3					
I	CIS473	Automata and Computability (pr: CIS 375, or MAT 375)	(3)		3					
R	CIS477	Intro. to Analysis of Algorithms (pr: CIS 375, CIS 351)	(3)		3					
E	CIS486	Design of Operating Systems (pr: CIS 341, 342, 351 or CSE 381, 382)	(3)		3					
<b>M Upper Division Courses (18 cr) Minimum Grade C- At least 9 credits of Upper Division MUST be in CIS or CSE</b>										
E	Upper Div	_____	(3)				3			
N	Upper Div	_____	(3)					3		
T	Upper Div	_____	(3)					3		
S	Upper Div	_____	(3)					3		
	Upper Div	_____	(3)						3	
	Upper Div	_____	(3)							3
<b>TOTAL CREDITS</b>			<b>120-121</b>	<b>16</b>	<b>15</b>	<b>13-14</b>	<b>16</b>	<b>15</b>	<b>15</b>	<b>15</b>

## GPA WORKSHEET

**REQUIREMENTS: Minimum grade of C- in English, Mathematics, Core, and Upper Division Courses**

123 credits to graduate

2.0 Overall GPA to graduate

2.667 Core Course GPA

Restrictions/exclusions as noted in the Undergraduate Handbook

**CORE GPA TALLY SHEET:**

2) Divide Total Grade Points by Total Course Credits for Core Grade Point Average (GPA).

CORE COURSE	HR	GRD	TOTAL GRD POINTS	TOTAL COURSE CR	CORE GPA	CALCULATION DATE AND INITIALS
CIS252	4					
CIS375	3					
CIS341	3					
CSE384	3					
CIS351	3					
CIS352	3					
CIS453	3					
CIS454	3					
CIS473	3					
CIS477	3					
CIS486	3					
				÷	=	
				÷	=	
				÷	=	
				÷	=	
				÷	=	
				÷	=	
				÷	=	
				÷	=	
				÷	=	
				÷	=	

**GRADING CHART: Credit hours X points per grade = Grade Points Earned**

GRD	PTS
A	4.000
A-	3.667
B+	3.333
B	3.000
B-	2.667
C+	2.333
C	2.000
C-	1.667
D	1.000
F	0.000

In most cases an excellent approximation can be obtained by taking A-= 11/3, B+=10/3, etc. The correct GPA, however, is that determined by using the table.

# College of Engineering and Computer Science

Electrical Engineering

Fall 2019

Name \_\_\_\_\_

SUID \_\_\_\_\_

pr= prerequisite, co=corequisite

Track: \_\_\_\_\_

Minor: \_\_\_\_\_

	CREDIT	FIRST-YEAR		SOPHOMORE		JUNIOR		SENIOR		VAR	
		GRADE	F	S	F	S	F	S	F		S
<b>MATHEMATICS (19)</b>											
MAT295 Calculus 1	(4)	4									
MAT296 Calculus 2 (pr: MAT 295 min C-)	(4)		4								
MAT397 Calculus 3 (pr: MAT 296 min C-)	(4)			4							
MAT485 Diff Eqn & Matrix Algebra for Engrs (pr: MAT 397)	(3)				3						
CIS321 Probability and Statistics (pr: MAT 295)	(4)					4					
<b>SCIENCES (15)</b>											
CHE106 General Chemistry I	(3)	3									
CHE107 General Chemistry I Lab (co: CHE 106)	(1)	1									
PHY211 General Physics 1 (co: PHY 221, MAT 295)	(3)		3								
PHY221 General Physics Lab 1 (co: PHY 211)	(1)		1								
PHY212 General Physics 2 (pr: PHY 211, 221, co: PHY 222, MAT 296)	(3)			3							
PHY222 General Physics Lab 2 (co: PHY 212)	(1)			1							
Science/Math Elective _____	(3)								3		
<b>WRITING SKILLS (9)</b>											
WRT105 Studio 1: Practices of Academic Writing	(3)	3									
WRT205 Studio 2: Critical Research and Writing (pr: WRT 105)	(3)			3							
WRT307 Adv. Writing Studio: Professional Writing (pr:WRT 205)	(3)					3					
<b>SOC. SCIENCE/HUMANITIES/GEN. ED. (15)</b>											
SSH Elective _____	(3)		3								
SSH Elective _____	(3)			3							
ECS392 Ethical Aspects of ECS	(3)							3			
Arts & Sciences Elective _____	(3)			3							
Arts & Sciences Elective _____	(3)							3			
<b>GENERAL ENGINEERING (3)</b>											
ECS101 Intro. to Engr. & Comp. Sci.	(3)	3									
<b>COMPUTING CORE (9)</b>											
ECS102 Intro. to Computing	(3)	3									
CSE384 Systems and Network Programming	(3)			3							
CIS351 Data Structures	(3)			3							
<b>DIGITAL CORE (7)</b>											
CSE261 Digital Logic Design	(3)			3							
CSE262 Digital System Design and Simulation	(1)			1							
CSE397 FPGA and Microcontroller Design Lab (pr: CSE 261, ELE 231)	(3)					3					
<b>ELECTRICAL ENGINEERING FUNDAMENTALS (10)</b>											
ELE231 Electrical Engr. Fundamentals I (pr: MAT 295)	(3)		3								
ELE251 Fundamentals of Linear Systems	(3)			3							
ELE292 Linear Systems Laboratory (co: ELE 251)	(1)			1							
ELE351 System and Signal Analysis (pr: ELE 232, MAT 296)	(3)					3					
<b>ELECTRICAL ENGINEERING BREADTH (16)</b>											
ELE314 Intro to Power Engineering (pr: ELE 231)	(3)					3					
ELE324 Electromagnetics (pr: MAT 397, PHY 212)	(4)					4					
ELE333 Analog Circuits (pr: ELE 231, 232)	(3)						3				
ELE354 Communications Systems (pr:ELE351, CIS321)	(3)						3				
ELE392 DSP and Controls Lab (pr: ELE 292, co: 333)	(3)						3				
<b>ELECTRICAL ENGINEERING DESIGN (6)</b>											
ELE491 Senior Design Project 1	(3)							3			
ELE492 Senior Design Project 2 (pr: ELE 491)	(3)								3		
<b>TECHNICAL ELECTIVES (18)</b>											
Tech Elective _____	(3)						3				
Tech Elective _____	(3)						3				
Tech Elective _____	(3)							3			
Tech Elective _____	(3)							3			
Tech Elective _____	(3)								3		
Tech Elective _____	(3)									3	
<b>FREE ELECTIVES (3)</b>											
Free Elective _____	(3)									3	
<b>TOTAL CREDITS</b>	<b>130</b>	<b>17</b>	<b>14</b>	<b>18</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>15</b>	<b>15</b>		

## Electrical Engineering Curriculum Notes 2019-2020

### **Technical Electives**

Students are required to 18 credits of upper division electives with the ELE, CSE, or CIS prefix. A minimum of 9 credits from courses with a prefix of ELE and a minimum of 6 credit hours must be 400 level or higher.

### **Math/Science Elective**

A minimum number of credits in math and natural science are required for engineering students. The 3-credit math/science elective allows electrical engineering students to satisfy this requirement with a math or natural science course that aligns with their interests. A list of math and natural science courses can be found on the College of Arts and Sciences section of the Undergraduate Catalog.

### **Social Sciences and Humanities Electives**

This 6-credit requirement for SSH electives may be fulfilled by any combination of courses whose contents are in the social science and humanities area. A glossary of course designations with such contents can be found in the Humanities Division and the Social Sciences Division of the College of Arts and Sciences with the exception of the following Anthropology - Physical courses: ANT 131, 331, 431, 432, and 433. These glossaries are given in The College of Arts and Sciences section of the Undergraduate Catalog.

### **Arts and Science Electives**

The purpose of this 6-credit requirement of arts and science elective courses is to provide students with a broad liberal arts educational experience in a diversity of subjects. In general courses from the college of arts and sciences will satisfy this requirement with the exception of courses with pass/fail grades, and 100-level courses in CHE, MAT, and PHY.

### **Free Elective**

This free elective further allows students to take any 3 credits from across the wide range of courses offered at the university. Courses graded as pass/fail cannot be counted.

# College of Engineering & Computer Science

Environmental Engineering

Fall 2019

Name \_\_\_\_\_

SUID \_\_\_\_\_

pr= prerequisite, co=corequisite

Minor/Second Major (if any): \_\_\_\_\_

## MATHEMATICS (15)

- MAT295 Calculus 1
- MAT296 Calculus 2 (pr: MAT 295 min C-)
- MAT397 Calculus 3 (pr: MAT 296 min C-)
- MAT485 Diff. Equations & Matrix Algebra (pr: MAT 397)

## SCIENCES (20)

- CHE106 General Chemistry I
  - CHE107 General Chemistry I Lab (co: CHE 106)
  - CHE116 General Chemistry 2 (pr: CHE 106)
  - CHE117 General Chemistry Lab 2 (pr: CHE 107, co: CHE 116)
  - PHY211 General Physics 1 (co: PHY 221, MAT 295)
  - PHY221 General Physics Lab 1 (co: PHY 211)
  - GEO383 Geographic Information System
- Select one of the following two options:**
- EAR105 Earth Science (3) **and** EAR104 Earth Science Lab (1)\*\*\*
  - EAR203 Earth System Science

## WRITING SKILLS (6)

- WRT105 Studio 1: Practices of Academic Writing
- WRT205 Studio 2: Critical Research and Writing (pr: WRT 105)

## SOCIAL SCIENCE /HUMANITIES (18)

(See curriculum notes)

- SSH Elective \_\_\_\_\_
- SSH Elective \_\_\_\_\_
- SSH Elective \_\_\_\_\_
- SSH Elective \_\_\_\_\_
- SSH Elective \_\_\_\_\_
- SSH Elective \_\_\_\_\_

## ENGINEERING (16/17)

- ECS101 Intro. to Engr. & Comp. Sci.
  - ECS221 Statics (pr: PHY 211, co: MAT 296)
  - ECS325 Mechanics of Solids (pr:ECS 221, co: MAT 397)
  - CIE561 Air Resources I
- Select One of the Following 5 Courses:**
- ECS222 Dynamics (3) (pr: ECS 221, MAT 296)
  - CIE/ECS 326 Engineering Materials
  - ELE231 Elec. Engr. Fundamentals (3 or 4) (pr: MAT 295)
  - MAE251 Thermodynamics (4) (pr: PHY 211)
  - CHE346 Physical Chemistry (3) (pr: CHE 116, MAT 296, co: PHY 212)

## ENVIRONMENTAL ENGINEERING (36)

- CIE271 Env. Chemistry & Analysis
- CIE274 Sustainability in Civil & Env Engr. Systems (pr: CHE106, MAT296)
- CIE327/MAE341 Fluid Mechanics (pr: MAT 397, ECS 221)
- CIE329 Prob, Stats and Risk for Civ & Env Engr (pr: MAT 485 or MAT 331)
- CIE337 Intro to Geotechnical Engineering (pr: ECS 325)
- CIE341 Intro Environmental Engineering (pr: CIE 274)
- CIE352 Water Resources Engr. (pr: CIE 327 or MAE 341)
- CIE442 Treatment Proc. In Env Engr. (pr: CIE 327 or MAE 341, CIE 341)
- CIE472 Applied Env. Microbiology
- CIE475 Capstone Design

## ELECTIVES (18)

- Prof. Elective \_\_\_\_\_
- Prof. Elective \_\_\_\_\_
- Prof. Elective \_\_\_\_\_
- Tech Elective \_\_\_\_\_
- Tech Elective \_\_\_\_\_
- Free Elective \_\_\_\_\_

## TOTAL CREDITS

CREDIT GRADE	FIRST-YEAR		SOPHOMORE		JUNIOR		SENIOR		VAR +/-
	F	S	F	S	F	S	F	S	
(4) _____	4								
(4) _____		4							
(4) _____			4						
(3) _____				3					
(3) _____	3								
(1) _____	1								
(3) _____		3							
(1) _____		1							
(3) _____		3							
(1) _____		1							
(4) _____						4			
(4) _____			4* or 4						
(3) _____	3								
(3) _____				3					
(3) _____		3							
(3) _____			3* or 3						
(3) _____		3							
(3) _____			3						
(3) _____					3				
(3) _____	3								
(3) _____			3						
(4) _____				4					
(3) _____							3		
( ) _____							3** or 4		
(3) _____			3						
(3) _____				3					
(4) _____					4				
(4) _____						4			
(4) _____							4		
(4) _____								4	
(4) _____									4
(3) _____							3		
(4) _____									4
(3) _____								3	
(3) _____								3	
(3) _____									3
(3) _____							3** or 3		
(3) _____					3				
<b>129-130</b>	<b>17</b>	<b>18</b>	<b>16-17</b>	<b>16-17</b>	<b>17</b>	<b>15</b>	<b>16-17</b>	<b>13-14</b>	

\*Only one (EAR 104 & 105 or EAR 203) is required, the other must be SS/HUM Elective



# Environmental Engineering Curriculum Notes 2019-2020

## SS/HUM ELECTIVES

All CIE students are required to complete at least 18 credits of SS/HUM electives. A *minimum* of one course (or 3 credits) must be chosen from each of the three groups of designated courses listed below. The remaining three SS/HUM electives (or 9 credits) can be selected from the lists below or, in addition to the lists, may be chosen from:

- any College of Arts and Sciences courses that are listed on their Humanities and Social Sciences lists in the SU Bulletin – Undergraduate Course Catalog / Liberal Arts Core
- any foreign language courses (except student's native language)
- ECS 391 – Legal Aspects of ECS
- ECS 392 – Ethical Aspects of ECS.

Group 1: Economics and Social Issues
ECN 101 – Intro to Microeconomics
ECN 102 – Intro to Macroeconomics
ECN 203 – Economics Ideas and Issues
GEO 353 – Geographies of Environmental Justice
SOC 101 – Introduction to Sociology
SOC 102 – Social Problems
SOC 230/WGS 230 – Intergroup dialogue
SOC 248/WGS 248 – Ethnic Inequality & Intergroup Relations
SOC 305/WGS 305 – Sociology of Sex and Gender
SOC 363 – Urban Sociology

Group 2: Global Affairs
ECN 365 – The World Economy ( requires ECN101,102 or 203 as pre-req)
GEO 103 – Environment and Society
GEO 105 – World Urban Geography
GEO 272 – World Cultures
GEO 273 – World Political Economy
MAX 123 – Critical Issues for the U.S.
MAX 132 – Global Community
PAF 351 – Global Social Problems
PSC 124 – International Relations
PSC 352 – International Law
PSC 355 – International Political Economy
PSC 364/AAS364 – African International Relations
PSC 365/AAS 365 – International Political Economy of the Third World

Group 3: U.S. Government, Public Policy and Policy Studies
ECN/WGS 358 – Economics of US Poverty & Discrimination
GEO 203 – Society and the Politics of Nature
GEO 314 – Hazardous Geographic Environments
GEO 356 – Environmental Ideas & Policy
PAF 101 – An Introduction to the Analysis of Public Policy
PAF 451 – Environmental Policy
PSC 121 – American National Government & Politics
PSC 125 – Political Theory
PSC 202 – Intro to Political Analysis
PSC 302- Environmental Politics and Policy
PSC 305 – US Congressional Politics
PSC 306 – African American Politics
PSC 308 – The Politics of US Public Policy
PSC 312 – Urban Government & Politics
PSC 318 – Technology, Politics & Environment
PSC 360 – Sustainability Science & Policy

## PROFESSIONAL ELECTIVES

Professional Electives are *upper-level courses* (300 and above; as well as ECS 222, ELE 231, and MAE 251 that have not been used for degree credits), generally from professional schools at SU and SUNY-ESF, and must be selected in consultation with the student's academic advisor. Many Professional Electives can be used towards completion of a minor. Approved Professional Electives are courses offered in the following schools/colleges with the indicated prefixes that meet the above stated criteria.

School/College	Course Prefix
Architecture	ARC
Arts and Sciences	AST, BCM, BIO, CHE, ECN, EAR, GEO, MAX, MAT, PAF, PHY
Engineering and Computer Science	All course prefixes
Information Studies	IST
Whitman	ACC, BUA, EEE, FIN, INB, LPP, MAR, O&M, MGT, SOM
Newhouse	COM
VPA	CRS
SUNY-ESF	All course prefixes

## Technical Electives

Technical Electives MUST be CIE courses numbered 300 and above. They are to be selected in consultation with a student's advisor to advance the student's knowledge in a specific area of interest in civil or environmental engineering.

## Free Electives

Any SU or ESF three or four credit course except Academic Excellence Workshops, Physical Education and remedial courses.



**MECHANICAL ENGINEERING**  
**Curriculum Notes**  
**2019-2020**

1. Mechanical Engineering students must take at least 3 credit hours in the Social Science/ Humanities in addition to ECN203. Further, they must take one Numerical Elective (3 credits), one of which must be either MAE530, MAE571, or MAE573, as well as complete one of the following two 18-credit options, for a total of eight (8) Electives (24 credit hours):

**Option 1:** A University Minor – typically 18 credits coordinated by the offering department; the minor must have fewer than 12 credits of overlap with required MEE courses. A second major also satisfies this option.

**Option 2:** A Distribution of Electives – an additional 6 credits of Social Sciences/Humanities, 9 credits of Technical Electives, and a 3-credit Free Elective.

2. Technical Electives are courses at the 300 level or higher taken within the Mechanical and Aerospace (MAE) department. Selected courses from other ECS departments, mathematics, or natural sciences may be accepted as Technical Electives, but no more than 3 credit hours of the Technical Electives can be taken outside the MAE department.
3. Many technical electives in the MAE Department are scheduled on a 2-year rotation, so students should check availability of Technical Electives starting in their third year.
4. Mechanical Engineering students seeking to complete a Mathematics Minor can take a mathematics course as a Free Elective but must still complete one of the 2 options listed above.
5. Mechanical Engineering students seeking to complete the Energy Systems Minor (15 credits) must take an additional 3-credit Social Sciences/Humanities Elective.
6. Students may bundle courses into free electives if desired. The bundled courses must be taken for a letter grade and either be at the 300-level or greater, or be a physical education course. AEW credit cannot be bundled.
7. Social science or humanities (SS/H) courses are to be selected from any foreign language course, the “Humanities List”, or the “Social Sciences List”, as published in the SU Course Catalog.

# College of Engineering and Computer Science

Systems & Information Science

Fall 2019

Name \_\_\_\_\_

SUID \_\_\_\_\_

pr=prerequisite, co=corequisite

Minor/Second Major (if any): \_\_\_\_\_

CREDIT GRADE	FIRST-YEAR		SOPHOMORE		JUNIOR		SENIOR		VAR +/-
	F	S	F	S	F	S	F	S	

### Writing and Communication Skills (9 cr)

WRT105 Studio 1: Practices of Academic Writing  
 WRT205 Studio 2: Critical Research and Writing (pr: WRT 105)

Select one of the following three courses:

CRS/CAS325 Presentational Speaking (3)  
 IST 344 Info. Reporting & Presentations (3)

(3)___	3								
(3)___				3					
(3)___						3			

### Arts & Sciences Elec (39 cr) 6 cr Hum, 6 cr SS, 6 cr Nat Sci. & Math, 21 cr (in total) SS and/or Hum and/or VPA

Humanities \_\_\_\_\_  
 Humanities \_\_\_\_\_  
 Soc.Scie \_\_\_\_\_  
 Soc.Scie \_\_\_\_\_  
 NS/Math \_\_\_\_\_  
 NS/Math \_\_\_\_\_  
 A&S/VPA \_\_\_\_\_  
 A&S/VPA \_\_\_\_\_  
 A&S/VPA \_\_\_\_\_  
 A&S/VPA \_\_\_\_\_  
 A&S/VPA \_\_\_\_\_  
 A&S/VPA \_\_\_\_\_  
 A&S/VPA \_\_\_\_\_  
 A&S/VPA \_\_\_\_\_

(3)___	3								
(3)___		3							
(3)___		3							
(3)___		3							
(3)___			3						
(3)___				3					
(3)___					3				
(3)___						3			
(3)___							3		
(3)___								3	
(3)___									3

### Free Electives (3 cr)

Free Elec \_\_\_\_\_

(3)___			3						
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### Mathematics Foundations (13 cr)

MAT194 Pre-Calculus  
 PHI 251 Logic  
 CIS 375 Intro to Discrete Math (pr: PHI 251)  
 CIS 223 Statistical Reasoning and Practice (pr: MAT 194)

(4)___	4								
(3)___		3							
(3)___			3						
(3)___				3					

### SIS Core (32 cr)

ECS101 Intro to Engr & Comp Sci

(3)___	3								
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### Computing Core (20 Cr)

ECS102 Intro to Computing  
 CIS 252 Intro to Computer Science  
 CIS 351 Data Structures (pr: CIS 252)  
 CIS/CSE386 \* Princ of Computer Systems Des. (pr: ECS 102, CIS 351)  
 CIS 453 Software Specifications & Design (pr: CIS 351 or CSE 382)  
 CIS 454 Software Implementations (pr: CIS 453)

(3)___	3								
(4)___		4							
(4)___			4						
(3)___					3				
(3)___							3		
(3)___								3	

### Information Management Core (9 cr) \*\*

IST 335 Intro to Information-Based Organ.  
 IST 352 Information Analysis of Organ Sys.  
 IST 345 Managaging Information Sys Projects

(3)___			3						
(3)___				3					
(3)___					3				

### Short Technical Sequence (6 cr)

Tech Spec \_\_\_\_\_  
 Tech Spec \_\_\_\_\_

(3)___						3			
(3)___					3				

### Focus Area (18 cr)

Elective \_\_\_\_\_  
 Elective \_\_\_\_\_  
 Elective \_\_\_\_\_  
 Elective \_\_\_\_\_  
 Elective \_\_\_\_\_  
 Elective \_\_\_\_\_

(3)___					3				
(3)___				3					
(3)___						3			
(3)___							3		
(3)___								3	
(3)___									3

### TOTAL CREDITS

120	16	16	16	15	15	15	15	12	
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\* Students will take CIS/CSE 389 Web Systems Programming and Architecture when CIS/CSE 386 are not offered

\*\* This group of courses are currently under review and will like to be changed in this academic year

# Systems & Information Science Curriculum Notes 2019-2020

## SIS Specializations

All SIS students must complete both a *Short Technical Sequence* (6 credits) and a *Focus Area* (18 credits).

The Short Technical Sequence requires a two-course sequence in one of several applied-technology areas: Database Management, Networking, Security Management, Systems, and Web Design Management.

The Focus Area requires 18 credits in a specific domain, which represents a potential area for the application of a student's information management and computing skills.

Students **may not** count the same course towards both their Short Technical Sequence and their Focus Area.

### ***Short Technical Sequence***

Students must complete one of the following short technical sequences:

<b><i>Database Management *</i></b>	
IST 359	Intro to Database Management Systems
<i>And choose one of the following</i>	
IST 469	Advanced Data Admin: Concepts & Database Management
CSE 581	Intro to Database Management Systems

<b><i>Networking</i></b>	
IST 233	Intro to Comp Networking
<i>And choose one of the following</i>	
IST 452	Advanced Comp Networking
CIS/CSE/ELE 458	Data Networks: Basic Principles

<b><i>Security Management *</i></b>	
IST 323	Intro to Information Security
CSI 483/CSE 484	Intro to Comp & Network Security

<b><i>Systems *</i></b>	
GET 439	Enterprise Technologies
CSE 483	Windows Programming

<b><i>Web Design &amp; Management</i></b>	
IST 263	Design Management of Internet Services
<i>And choose one of the following</i>	
IST 479	E Commerce Technologies
IST 523	Graphic Design for the Web

### ***Focus Areas***

The following options satisfy the Focus Area requirement:

1. Any minor (of at least 18 credits) throughout the University, with the following exceptions:
  - Computer Engineering
  - Computer Science
  - Information Management and Technology
2. Information Assurance and Security (IAS)

<b><i>Information Assurance &amp; Security (IAS) *</i></b>	
IST 323	Intro to Information Security
CIS/CSE 583	Systems Assurance Seminar
<i>And choose four of the following:</i>	
IST 471	Internship (3 credit IAS-related internship, subject to approval)
CIS 483/CSE 484	Intro to Comp & Network Security
CIS/CSE 487	Access Control, Security & Trust
IST 425	Enterprise Risk Management
IST 429	Organizational Info Security
<i>Note: Students who take the Information Assurance &amp; Security focus area cannot take the Security Management short technical sequence.</i>	

Other remarks

1. Short technical sequence(s) and focus area that are marked with a \* are currently under review and will likely to change in this academic year. Students should contact the program coordinator for details.
2. Students can be a dual major with any majors throughout the University, with the following exceptions:
  - Computer Science
  - Information Management and Technology