BS COMPUTER SCIENCE
2021-2022

This document displays only your course requirements at the time of publication of the catalog. You must use your Degree Progress Report to track all your graduation requirements.

Note: No Major or Support courses may be selected as credit/no credit.

MAJOR COURSES		
CSC/CPE 101	Fundamentals of Computer Science	4
CSC/CPE 123	Introduction to Computing [1]	4
CSC/CPE 202	Data Structures	4
CSC/CPE 203	Project-Based Object-Oriented Prog & Design	4
CSC 225	Introduction to Computer Organization	4
CSC 248	Discrete Structures	4
CSC 300	Professional Responsibilities	4
or PHIL 323	Ethics, Science and Technology [6]	
Select from the following:		4
CSC 307	Introduction to Software Engineering	
or		
CSC 308	Software Engineering I	
& CSC 309	**and** Software Engineering II [2]	
CPE 315	Computer Architecture	4
Select from the following:		4
CSC 321	Introduction to Computer Security [3]	
or CSC 323	Cryptography Engineering	
or CSC 325	Introduction to Privacy: Policy and Technology	
CSC 349	Design and Analysis of Algorithms	4
CSC/CPE 357	Systems Programming	4
CSC 430	Programming Languages	4
CSC 445	Theory of Computation I	4
CSC/CPE 453	Introduction to Operating Systems	4
Select from the following:		4
CSC 491	Senior Project I	
& CSC 492	**and** Senior Project II (2, 2)	
or		
CSC 497	Research Senior Project I	
& CSC 498	**and** Research Senior Project II (2, 2)	
Concentration or General Curriculum in CSC ***(See reverse for list)***		28
Total Major Units		**92**

SUPPORT COURSES			
ES/WGS 350	Gender, Race, Culture, Science & Technology		4
or ES 351	Gender, Race, Class, Nation in Global Engineering, Technology & International Development		
MATH 141	Calculus I (B4) [4]		4
MATH 142	Calculus II (B4) [4]		4
MATH 143	Calculus III (Area B Electives) [4]		4
MATH 206	Linear Algebra I		4
or MATH 244	Linear Analysis I		
PHIL 230	Philosophical Classics: Knowledge and Reality (C2) [4]		4
or PHIL 231	Philosophical Classics: Ethics & Political Philosophy (C2) [4]		
STAT 312	Statistical Methods for Engineers (Upper-Division B) [4]		4
Life Science Support Elective **Select from the following (B2):** [4]			4
BIO 111	BIO 213 & BMED 213	MCRO 221	
BIO 161	BOT 121		
Physical Sci Support Elect **Select one sequence from the following (B1 & B3):** [4]			12
CHEM 124 **&** CHEM 125 **&** CHEM 126			
PHYS 141 **&** PHYS 132 **&** PHYS 133			
Additional Sci Support Elect **Select from the following (Area B Elect):** [4,5]			4
BIO 111	BOT 121	MCRO 221	
BIO 161	CHEM 124	PHYS 141	
Total Support Units			**48**

GENERAL EDUCATION		
Area A English Language Communication and Critical Thinking		
A1	Oral Communication	4
A2	Written Communication	4
A3	Critical Thinking	4
Area B Scientific Inquiry and Quantitative Reasoning		
B1	Physical Science (4 units in Support) [4]	0
B2	Life Science (4 units in Support) [4]	0
B3	One lab taken with either a B1 or B2 course	
B4	Math/Quantitative Reasoning (8 units in Support) [4]	0
Upper-Division B (4 units in Support) [4]		0
Area B Electives (8 units in Support) [4]		0
Area C Arts and Humanities		
Lower-division courses in Area C must come from three different subject prefixes.		
C1	Arts	4
C2	Humanities (4 units in Support) [4]	0
Lower-Div C Elective - Select a course from C1 or C2 (NO **PHIL**)		4
Upper-Division C		4
Area D Social Sciences		
D1	American Institutions (Title 5, Section 40404 Req)	4
Area D Elective - Select either a lower-division D2 or upper-division D course.		4
Area E Lifelong Learning and Self-Development		
Lower-Division E		4
Area F Ethnic Studies		
Lower-Division F		4
Total GE Units		**40**
FREE ELECTIVES [6]		**0**
TOTAL DEGREE UNITS		**180**

FOOTNOTES

1 Although new students are strongly encouraged to take CSC/CPE 123, an additional 4 units of CPE/CSC Technical Electives within your selected concentration or, if not selected, the General Curriculum may substitute for CSC/CPE 123.
2 CSC 309 counts as a Technical Elective. Students in the Artificial Intelligence and Machine Learning concentration or the Privacy and Security concentration are advised to take CSC 307 instead of CSC 308 and CSC 309.
3 Students in the Privacy and Security Concentration must take CSC 321.
4 Required in Major or Support; also satisfies General Education (GE) requirement.
5 No double-counting is allowed between Additional Science Support Elective and Life Science Support Elective or Physical Science Support Elective.
6 If a General Education (GE) course is used to satisfy a Major or Support requirement, additional units of Free Electives may be needed to complete the total units required for the degree.

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General Curriculum in Computer Science

Technical Electives		
Select from the lists in Technical Electives Guidelines below [1,2]		24
Mathematics/Statistics Elective		
Select from the following:		4
MATH 241	Calculus IV	
MATH 248	Methods of Proof in Mathematics	
MATH 306	Linear Algebra II	
MATH 335	Graph Theory	
MATH 336	Combinatorial Math	
MATH 437	Game Theory	
MATH 470	Selected Advanced Topics	
STAT 323	Design and Analysis of Experiments I	
STAT 324	Applied Regression Analysis	
STAT 330	Statistical Computing with SAS	
STAT 331	Statistical Computing with R	
STAT 334	Applied Linear Models	
STAT 416	Statistical Analysis of Time Series	
STAT 418	Categorical Data Analysis	
STAT 419	Applied Multivariate Statistics	
STAT 434	Statistical Learning: Methods and Applications	
Total Units		**28**

1 Consultation with advisor is recommended prior to selecting technical electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.
2 An additional 4 units of CPE/CSC Technical Electives is needed if CPE/CSC 123 is not taken in the major.

Technical Electives Guidelines for General Concentration

Courses used to satisfy any other Major, Support, or General Education requirement are not allowed to count toward the Technical Electives Elective requirement. Credit/No Credit grading is not allowed.

Select Technical Electives from the following: [1,2]

CSC 305	Individual Software Design and Development
CSC 309	Software Engineering II
CSC 313	Teaching Computing
CSC 321	Introduction to Computer Security
CSC 323	Cryptography Engineering
CSC 325	Introduction to Privacy: Policy and Technology
CSC 344	Music Programming
CSC 365	Introduction to Database Systems
CSC 366	Database Modeling, Design and Implementation
CSC 369	Introduction to Distributed Computing
CSC 371	Game Design
CSC 377	Introduction to Mixed Reality
CSC 378	Interactive Entertainment Engineering
CSC 400	Special Problems [2]
CSC 402	Software Requirements Engineering
CSC 405	Software Construction
CSC 406	Senior Project - Software Deployment
CSC 409	Current Topics in Software Engineering
CSC 422	Network Security
CSC 424	Software Security
CSC/CPE 425	Wireless Security
CSC 429	Current Topics in Computer Security
CSC 431	Compiler Construction
CSC 436	Mobile Application Development
CSC 437	Dynamic Web Development

Artificial Intelligence and Machine Learning Concentration

CSC 365	Introduction to Database Systems	4
or DATA 301	Introduction to Data Science	
CSC 466	Knowledge Discovery from Data	4
CSC 480	Artificial Intelligence	4
CSC 487	Deep Learning	4
STAT 334	Applied Linear Models	4
Select from the following: [1]		8
CPE/EE 428	Computer Vision	
CSC 481	Knowledge Based Systems	
CSC 482	Speech and Language Processing	
CSC 566	Topics in Advanced Data Mining	
CSC 580	Artificial Intelligence	
CSC 581	Computer Support for Knowledge Management	
CSC 582	Computational Linguistics	
EE 509	Computational Intelligence	
STAT 434	Statistical Learning: Methods and Applications	
Total Units		**28**

1 An additional 4 units of CPE/CSC Technical Electives is needed if CPE/CSC 123 is not taken in the major.

Data Engineering Concentration

CSC 365	Introduction to Database Systems	4
CSC 366	Database Modeling, Design and Implementation	4
CSC 436	Mobile Application Development	4
or CSC 437	Dynamic Web Development	
or CSC 309	Software Engineering II	
CSC 466	Knowledge Discovery from Data	4
CSC 468	Database Management Systems Implementation	4
or CSC 469	Distributed Systems	
Select from the following: [1]		4
CPE/EE 428	Computer Vision	
CSC 369	Introduction to Distributed Computing	
CSC 400	Special Problems [2]	
CSC 468	Database Management Systems Implementation	
CSC/CPE 469	Distributed Systems	
CSC 480	Artificial Intelligence	
CSC 482	Speech and Language Processing	
CSC 487	Deep Learning	
CSC 560	Database Systems	
CSC 566	Topics in Advanced Data Mining	
CSC 569	Distributed Computing	
Mathematics/Statistics Elective		
Select from the following:		4
MATH 241	Calculus IV	
MATH 248	Methods of Proof in Mathematics	
MATH 306	Linear Algebra II	
MATH 335	Graph Theory	
MATH 336	Combinatorial Math	
MATH 437	Game Theory	
MATH 470	Selected Advanced Topics	
STAT 323	Design and Analysis of Experiments I	
STAT 324	Applied Regression Analysis	
STAT 330	Statistical Computing with SAS	
STAT 331	Statistical Computing with R	
STAT 334	Applied Linear Models	
STAT 416	Statistical Analysis of Time Series	

CSC 448	Bioinformatics Algorithms
CSC/CPE 454	Implementation of Operating Systems
CSC/CPE 458	Current Topics in Computer Systems
CSC 466	Knowledge Discovery from Data
CSC 468	Database Management Systems Implementation
CSC/CPE 469	Distributed Systems
CSC/CPE 471	Introduction to Computer Graphics
CSC 473	Advanced Rendering Techniques
CSC 474	Computer Animation
CSC/CPE 476	Real-Time 3D Computer Graphics Software
CSC 477	Scientific and Information Visualization
CSC 478	Current Topics in Computer Graphics
CSC 480	Artificial Intelligence
CSC 481	Knowledge Based Systems
CSC 482	Speech and Language Processing
CSC 484	User-Centered Interface Design and Development
CSC 486	Human-Computer Interaction Theory and Design
CSC 487	Deep Learning
CSC 490	Selected Advanced Topics [2]
CSC 496	Selected Advanced Laboratory [2]
CSC 508	Software Engineering I
CSC 509	Software Engineering II
CSC/CPE 515	Computer Architecture
CSC 521	Computer Security
CSC 524	System Security
CSC 530	Languages and Translators
CSC 540	Theory of Computation II
CSC 549	Advanced Algorithm Design and Analysis
CSC 550	Operating Systems
CSC 560	Database Systems
CSC/CPE 564	Computer Networks: Research Topics
CSC 566	Topics in Advanced Data Mining
CSC/CPE 569	Distributed Computing
CSC 570	Current Topics in Computer Science
CSC 572	Computer Graphics
CSC 580	Artificial Intelligence
CSC 581	Computer Support for Knowledge Management
CSC 582	Computational Linguistics
CPE 400	Special Problems for Undergraduates [2]
CPE 416	Autonomous Mobile Robotics
CPE 419	Applied Parallel Computing
CPE/EE 428	Computer Vision
CPE/EE 442	Real Time Embedded Systems
CPE 464	Introduction to Computer Networks
CPE 465	Advanced Computer Networks
CPE 488	Microelectronics and Electronics Packaging
DATA 301	Introduction to Data Science

The following restrictions must be satisfied.

4 units must be satisfied by a course that has as a prerequisite either 1) An upper-division course required by the major (excluding CSC 357) **or** 2) Another Technical Elective.

Select from the following:

CSC 325	Introduction to Privacy: Policy and Technology
CSC 366	Database Modeling, Design and Implementation
CSC 402	Software Requirements Engineering
CSC 405	Software Construction
STAT 418	Categorical Data Analysis
STAT 419	Applied Multivariate Statistics
STAT 434	Statistical Learning: Methods and Applications
Total Units	**28**

1 An additional 4 units of CPE/CSC Technical Electives is needed if CPE/CSC 123 is not taken in the major.

2 Up to 4 units may be taken from CSC 400.

Game Development Concentration		
COMS 404	Video Games & Society	4
CSC 371	Game Design	4
CSC 377	Introduction to Mixed Reality	4
CSC 378	Interactive Entertainment Engineering	4
ISLA 340	Media Arts and Technologies: Storytelling [1]	4
Select from the following: [2]		4
ART 182	Foundation in Digital Art I	
ART 183	Foundation in Digital Art II	
ART 376	The Art of Mixed Reality	
ART 384	Digital 3D Modeling and Design	
CSC 309	Software Engineering II	
CSC 471	Introduction to Computer Graphics	
CSC 473	Advanced Rendering Techniques	
CSC 474	Computer Animation	
CSC 476	Real-Time 3D Computer Graphics Software	
CSC 478	Current Topics in Computer Graphics	
CSC 480	Artificial Intelligence	
ISLA 240	Introduction to Media Arts and Technologies	
ISLA 341	Media Arts & Technologies: Cinematic Process	
ENGL 387	Fiction Writing	
ENGL 411	New Media Arts I	
ENGL 412	New Media Arts II	
Mathematics/Statistics Elective		
Select from the following:		4
MATH 241	Calculus IV	
MATH 248	Methods of Proof in Mathematics	
MATH 306	Linear Algebra II	
MATH 335	Graph Theory	
MATH 336	Combinatorial Math	
MATH 437	Game Theory	
MATH 470	Selected Advanced Topics	
STAT 323	Design and Analysis of Experiments I	
STAT 324	Applied Regression Analysis	
STAT 330	Statistical Computing with SAS	
STAT 331	Statistical Computing with R	
STAT 334	Applied Linear Models	
STAT 416	Statistical Analysis of Time Series	
STAT 418	Categorical Data Analysis	
STAT 419	Applied Multivariate Statistics	
STAT 434	Statistical Learning: Methods & Applications	
Total Units		**28**

1 Note: Course prerequisite is ISLA 240 or the completion of an ART or TH course in GE Area C1

2 An additional 4 units of CPE/CSC Technical Electives is needed if CPE/CSC 123 is not taken in the major.

CSC 406	Senior Project - Software Deployment
CSC 409	Current Topics in Software Engineering
CSC 422	Network Security
CSC 424	Software Security
CSC/CPE 425	Wireless Security
CSC 429	Current Topics in Computer Security
CSC 437	Dynamic Web Development
CSC 448	Bioinformatics Algorithms
CSC/CPE 454	Implementation of Operating Systems
CSC 466	Knowledge Discovery from Data
CSC 468	Database Management Systems Implementation
CSC 473	Advanced Rendering Techniques
CSC 474	Computer Animation
CSC/CPE 476	Real-Time 3D Computer Graphics Software
CSC 477	Scientific and Information Visualization
CSC 478	Current Topics in Computer Graphics
CSC 481	Knowledge Based Systems
CSC 482	Speech and Language Processing
CSC 484	User-Centered Interface Design and Development
CSC 486	Human-Computer Interaction Theory and Design
CSC 487	Deep Learning
CSC 508	Software Engineering I
CSC 509	Software Engineering II
CSC/CPE 515	Computer Architecture
CSC 521	Computer Security
CSC 530	Languages and Translators
CSC 540	Theory of Computation II
CSC 549	Advanced Algorithm Design and Analysis
CSC 550	Operating Systems
CSC 560	Database Systems
CSC/CPE 564	Computer Networks: Research Topics
CSC 566	Topics in Advanced Data Mining
CSC 572	Computer Graphics
CSC 580	Artificial Intelligence
CSC 581	Computer Support for Knowledge Management
CSC 582	Computational Linguistics
CPE 416	Autonomous Mobile Robotics
CPE 465	Advanced Computer Networks
Up to 4 units may be taken from the Approved External Elect listed below:	
AERO 450	Introduction to Aerospace Systems Engineering
ART 376	The Art of Mixed Reality
ART 384	Digital 3D Modeling and Design
BUS 310	Introduction to Entrepreneurship
CHEM 216	Organic Chemistry I
CHEM 217	Organic Chemistry II
CHEM 218	Organic Chemistry III
CHEM 312	Survey of Organic Chemistry
ECON 339	Econometrics
EE 201	Electric Circuit Theory
& EE 251	**and** Electric Circuits Laboratory
EE 314	Introduction to Communication Systems
EE/CPE 336	Microprocessor System Design
EE 424	Introduction to Remote Sensing
ENVE 542	Sustainable Environmental Engineering
IME 301	Operations Research I
IME 314	Engineering Economics

Graphics Concentration		
CSC/CPE 471	Introduction to Computer Graphics	4
Select from the following:		8
CSC 473	Advanced Rendering Techniques	
CSC 474	Computer Animation	
CSC/CPE 476	Real-Time 3D Computer Graphics Software	
CSC 572	Computer Graphics	
Technical Electives		
Select from the lists in Technical Electives Guidelines below [1,2]		4
Tracks		
Select courses from one of the following tracks:		8
GPU/Systems Track		
CSC 473	Advanced Rendering Techniques	
or CSC 474	Computer Animation	
or CSC 476	Real-Time 3D Computer Graphics Software	
or CSC 572	Computer Graphics	
Additional Technical Electives		
Art Track		
CSC 350	Computing for Interactive Arts Capstone I	
& CSC 450	**and** Computing for Interactive Arts Capstone II	
or ART 376	The Art of Mixed Reality	
or ART 384	Digital 3D Modeling and Design	
CSC 371	Game Design	
or CSC 377	Introduction to Mixed Reality	
or CSC 378	Interactive Entertainment Engineering	
Mathematics/Statistics Elective		
Select from the following:		4
MATH 241	Calculus IV	
MATH 248	Methods of Proof in Mathematics	
MATH 306	Linear Algebra II	
MATH 335	Graph Theory	
MATH 336	Combinatorial Math	
MATH 437	Game Theory	
MATH 470	Selected Advanced Topics	
STAT 323	Design and Analysis of Experiments I	
STAT 324	Applied Regression Analysis	
STAT 330	Statistical Computing with SAS	
STAT 331	Statistical Computing with R	
STAT 334	Applied Linear Models	
STAT 416	Statistical Analysis of Time Series	
STAT 418	Categorical Data Analysis	
STAT 419	Applied Multivariate Statistics	
STAT 434	Statistical Learning: Methods and Applications	
Total Units		**28**

1 Consultation with advisor is recommended prior to selecting technical electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.

2 An additional 4 units of CPE/CSC Technical Electives is needed if CPE/CSC 123 is not taken in the major.

Technical Electives Guidelines for Graphics Concentration

Courses used to satisfy any other Major, Support, or General Education requirement are not allowed to count toward the Technical Electives requirement. Credit/No Credit grading is not allowed.

Select Technical Electives from the following: [1,2]

CSC 305	Individual Software Design and Development
CSC 309	Software Engineering II

IME 315	Financial Decision Making for Engineers
IME 356	Manufacturing Automation
MATH 241	Calculus IV
MATH 242	Differential Equations I
MATH 248	Methods of Proof in Mathematics
MATH 341	Theory of Numbers
MATH 350	Mathematical Software
MATH 412	Introduction to Analysis I
ME 211	Engineering Statics
ME 212	Engineering Dynamics
ME 405	Mechatronics
PHIL 412	Epistemology
PHIL 422	Philosophy of Mind
PSY 329	Research Methods in Psychology
PSY 333	Quantitative Research Methods for the Behavioral Sciences
PSY 357	Cognition
STAT 323	Design and Analysis of Experiments I
STAT 324	Applied Regression Analysis
STAT 330	Statistical Computing with SAS
STAT 331	Statistical Computing with R
STAT 334	Applied Linear Models
STAT 416	Statistical Analysis of Time Series
STAT 418	Categorical Data Analysis
STAT 419	Applied Multivariate Statistics
STAT 434	Statistical Learning: Methods and Applications

1 A total of 24 Technical Elective units selected from upper-division and graduate CSC and CPE courses open to those in the major and not otherwise required by the major. An additional 4 units of CPE/CSC Technical Electives is needed if CPE/CSC 123 is not taken in the major.

2 Up to a combined 4 units may be taken from CSC 400, CPE 400, CSC 490, or CSC 496.

Privacy and Security Concentration		
CPE 464	Introduction to Computer Networks	4
Select from the following: [1]		12
CPE/CSC 422	Network Security	
CPE 426	Introduction to Hardware Security	
CSC 323	Cryptography Engineering	
CSC 325	Introduction to Privacy: Policy and Technology	
CSC 424	Software Security	
CSC 425	Wireless Security	
CSC 429	Current Topics in Computer Security	
CSC 521	Computer Security	
CSC 524	System Security	
Select from the following: [1,2]		8
CPE/CSC 422	Network Security	
CPE 426	Introduction to Hardware Security	
CPE/CSC 431	Compiler Construction	
CPE/CSC 454	Implementation of Operating Systems	
CPE 465	Advanced Computer Networks	
CSC 323	Cryptography Engineering	
CSC 325	Introduction to Privacy: Policy and Technology	
CSC 400	Special Problems [2]	
CSC 424	Software Security	
CSC 425	Wireless Security	
CSC 429	Current Topics in Computer Security	
CSC 521	Computer Security	

CSC 313	Teaching Computing
CSC 321	Introduction to Computer Security
CSC 323	Cryptography Engineering
CSC 325	Introduction to Privacy: Policy and Technology
CSC 344	Music Programming
CSC 365	Introduction to Database Systems
CSC 366	Database Modeling, Design and Implementation
CSC 369	Introduction to Distributed Computing
CSC 371	Game Design
CSC 377	Introduction to Mixed Reality
CSC 378	Interactive Entertainment Engineering
CSC 400	Special Problems [2]
CSC 402	Software Requirements Engineering
CSC 405	Software Construction
CSC 409	Current Topics in Software Engineering
CSC 422	Network Security
CSC/CPE 425	Wireless Security
CSC 429	Current Topics in Computer Security
CSC 431	Compiler Construction
CSC 436	Mobile Application Development
CSC 437	Dynamic Web Development
CSC 448	Bioinformatics Algorithms
CSC/CPE 454	Implementation of Operating Systems
CSC/CPE 458	Current Topics in Computer Systems
CSC 466	Knowledge Discovery from Data
CSC 468	Database Management Systems Implementation
CSC/CPE 469	Distributed Systems
CSC 473	Advanced Rendering Techniques
CSC 474	Computer Animation
CSC/CPE 476	Real-Time 3D Computer Graphics Software
CSC 477	Scientific and Information Visualization
CSC 478	Current Topics in Computer Graphics
CSC 480	Artificial Intelligence
CSC 481	Knowledge Based Systems
CSC 482	Speech and Language Processing
CSC 484	User-Centered Interface Design and Development
CSC 486	Human-Computer Interaction Theory and Design
CSC 487	Deep Learning
CSC 490	Selected Advanced Topics [2]
CSC 496	Selected Advanced Laboratory [2]
CSC 508	Software Engineering I
CSC 509	Software Engineering II
CSC/CPE 515	Computer Architecture
CSC 521	Computer Security
CSC 524	System Security
CSC 530	Languages and Translators
CSC 540	Theory of Computation II
CSC 549	Advanced Algorithm Design and Analysis
CSC 550	Operating Systems
CSC 560	Database Systems
CSC/CPE 564	Computer Networks: Research Topics
CSC 566	Topics in Advanced Data Mining
CSC/CPE 569	Distributed Computing
CSC 570	Current Topics in Computer Science
CSC 572	Computer Graphics
CSC 580	Artificial Intelligence

CSC 524	System Security	
MATH 341	Theory of Numbers	
MATH 437	Game Theory	
MATH 451	Numerical Analysis I	
MATH 453	Numerical Optimization	
MATH 481	Abstract Algebra I	
Mathematics/Statistics Elective		
Select from the following:		4
MATH 241	Calculus IV	
MATH 248	Methods of Proof in Mathematics	
MATH 306	Linear Algebra II	
Total Units		**28**

Students in this concentration must take CSC 321 as part of their major.

1 Courses taken in this list cannot be double-counted in the concentration.

2 An additional 4 units of CPE/CSC Technical Electives is needed if CPE/CSC 123 is not taken in the major.

3 Up to 4 units may be taken from CSC 400.

CSC 581	Computer Support for Knowledge Management
CSC 582	Computational Linguistics
CPE 416	Autonomous Mobile Robotics
CPE 419	Applied Parallel Computing
CPE/EE 428	Computer Vision
CPE/EE 442	Real Time Embedded Systems
CPE 464	Introduction to Computer Networks
CPE 465	Advanced Computer Networks
Up to 4 units may be taken from the Approved External Elect listed	
AERO 450	Introduction to Aerospace Systems Engineering
ART 376	The Art of Mixed Reality
ART 384	Digital 3D Modeling and Design
BUS 310	Introduction to Entrepreneurship
CHEM 216	Organic Chemistry I
CHEM 217	Organic Chemistry II
CHEM 218	Organic Chemistry III
CHEM 312	Survey of Organic Chemistry
ECON 339	Econometrics
EE 201	Electric Circuit Theory
& EE 251	**and** Electric Circuits Laboratory
EE 314	Introduction to Communication Systems
EE/CPE 336	Microprocessor System Design
EE 424	Introduction to Remote Sensing
ENVE 542	Sustainable Environmental Engineering
IME 301	Operations Research I
IME 314	Engineering Economics
IME 315	Financial Decision Making for Engineers
IME 356	Manufacturing Automation
MATH 241	Calculus IV
MATH 242	Differential Equations I
MATH 248	Methods of Proof in Mathematics
MATH 341	Theory of Numbers
MATH 350	Mathematical Software
MATH 412	Introduction to Analysis I
ME 211	Engineering Statics
ME 212	Engineering Dynamics
ME 405	Mechatronics
PHIL 412	Epistemology
PHIL 422	Philosophy of Mind
PSY 329	Research Methods in Psychology
PSY 333	Quantitative Research Methods for the Behavioral Sciences
PSY 357	Cognition
STAT 323	Design and Analysis of Experiments I
STAT 324	Applied Regression Analysis
STAT 330	Statistical Computing with SAS
STAT 331	Statistical Computing with R
STAT 334	Applied Linear Models
STAT 416	Statistical Analysis of Time Series
STAT 418	Categorical Data Analysis
STAT 419	Applied Multivariate Statistics
STAT 434	Statistical Learning: Methods and Applications

1 A total of 8-12 technical elective units (depending on Track) selected from upper-division and graduate CSC and CPE courses open to those in the major and not otherwise required by the major.

An additional 4 units of CPE/CSC Technical Electives is needed if CPE/CSC 123 is not taken in the major.

2 Up to a combined 4 units may be taken from CSC 400, CSC 490, or CSC 496.