APPROVED TECHNICAL ELECTIVES FOR CYBER SECURITY ENGINEERS

Twenty-one (21) semester credit hours of Technical Electives are required. **Courses not on these lists may be counted as Technical Electives only if they are approved by the Curriculum Committee.** A written request must be submitted and approved **before** the course is taken. **NO Graduate or Undergraduate Seminars** are allowed for Technical Elective credit. Graduate Special Topics courses require ECpE Curriculum Committee review.

- Three (3) credits must be from the list of CprE electives
- Tweleve (12) credits must be taken from the list of Cyber Security electives
- Six (6) credits can be taken from any of the lists below

IMPORTANT NOTATIONS (Please Read):

1. * Course is cross-listed (same course). Can only apply one towards graduation EE, CprE, SE, or ComS
2. Only one course either MatE 273 or MatE 392 may be applied as a technical elective
3. Math 489 & ME 484 are not allowed as EE or Non-EE Technical Electives - They can be used as a general education course.
4. ENGR/EE/CprE 467, EE 442 & EE 448 **cannot** be used to fulfill any elective requirements.
5. EE 351 and EE 388 may be used to fulfill International Perspective requirements - You must choose if you want the course applied to either a general education or technical elective requirement, but not both
6. ENGR/EE/CprE 467, EE 442 & EE 448 **cannot** be used to fulfill any elective requirements
7. ENV S 324 (cross-listed with ENSCI, GEOL, MTEOR) -You must choose if you want the course applied to either a general education OR technical elective requirement but not both
8. A maximum of 2 credits of EE/CprE/CybE/SE 490, Independent Study can be applied towards technical electives

Math Elective (3/4 cr.)

COURSES	DESCRIPTION	CR	PREREQS (Check latest catalog for complete lists)
*Math 207	Matrices and Linear Algebra	3	2 semesters of calculus
Math 265	Calculus III	4	Minimum of C- in Math 166 or 166H
Math 304	Combinatorics	3	Math 166; Math 201
Math 314	Graph Theory	3	Math 166; Math 201
*Math 317	Theory of Linear Algebra	4	Cr or enrollment in Math 201

Cyber Security Enineering Electives (12 cr.)

COURSES	DESCRIPTION	CR	PREREQS (Check latest catalog for complete lists)
CprE 430*	Network Protocols and Security	3	CprE 308 or ComS 252 or 352
CprE 436x*	Digital Forensics	3	CprE 331
CprE 437x*	Introduction to Wireless Security	3	CprE 331 or CprE 430
CybE 440*	Operating System Security	3	CprE 308 or ComS 352
Cybsc 531*	Information System Security	3	CprE 489 or CprE 530 or Com S 586 or MIS 535
CYBSC 532*	Information Warfare	3	CprE 430 or 530
CYBSC 533*	Cryptography	3	CprE 310
CYBSC 535*	Steganography and Digital Image Forensics	3	EE 524 or Math 317 or Math 407 or ComS 230
CYBSC 536*	Computer and Network Forensics	3	CprE 489 or CprE 530
CYBSC 538*	Reverse Engineering and Security Testing	3	CprE 381; CprE 308
SE 421*	Software Analysis & Verification for Safety & Security	3	ComS 309; CprE 310

COMPUTER ENGINEERING ELECTIVES (3 cr.)

COURSES	DESCRIPTION	CR	PREREQS (Check latest catalog for complete lists)
CprE 329*	Software Project Management	3	ComS 309
CprE 330*	Integrated Electronics	4	EE 201, Cr/E EE 230, CprE 281
CprE 339*	Software Architecture & Design	3	SE 319
CprE 388	Embedded Systems II: Mobile Platforms	4	CprE 288
CprE 412*	Formal Methods in Software Engineering	3	Com S 311, Stat 330
CprE 414	Introduction to Software Systmes for Big Data Analytics	4	ComS 363; CprE 315 or 308; Com S 311 or 352
CprE 416*	Software Evolution and Maintenance	3	ComS 309
CprE 418*	High Speed Sys. Engr. Meas. & Test.	4	EE 230, EE 311
CprE 419*	Software Tools for Large Scale Data Analysis	4	CprE 308, ComS 228
CprE 421*	Software Analysis & Verification for Safety & Security	3	ComS 309; CprE 310 or ComS 230
CprE 424*	Introduction to High Performance Computing	3	Math 265; Math 207 or Math 317
CprE 425*	High Performance Computing for S & E Apps	3	ComS 311, Engl 250, SpCm 212
CprE 426*	Intro to Parallel Algorithms and Program.	4	CprE 308 or ComS 321, ComS 311
CprE 430	Network Protocols and Security	3	CprE 308 or Com S 252 or ComS 352
CprE 435*	Analog VLSI Circuit Design	4	EE 330
CprE 440*	Operating System Security	3	CprE 308 or ComS 352
CprE 444*	Introduction to Bioinformatics	4	Math 165 or Stat 401 or equivalent
CprE 450	Distributed Systems & Middleware	3	CprE 308 or ComS 352
CprE 454*	Distributed & Network Operating Systems	3	ComS 311, CprE 308
CprE 458	Real-Time Systems	3	CprE 308 or ComS 352
CprE 459x*	Security & Privacy in Cloud Computing	3	CprE 308
CprE 465*	Digital VLSI Design	4	EE 330
CprE 480	Graphics Processing and Architecture	4	CprE 381 or ComS 321
CprE 487	Hardware Design for Machine Learning	4	CprE 381 or Com S 321
CprE 488	Embedded Systems Design	4	CprE 381 or ComS 321
CprE 489	Computer Networking & Data Comm	4	CprE 288 or ComS 327

TECHNICAL ELECTIVES (6 cr.)

Select from the CybE or CprE electives above and/or the below lists

300 & 400+ level courses from the following majors

AE	BME	ComS	EE	Math
ABE	CE	ConE	EnvE	ME
AerE	ChE	CprE	IE	Phys
BSE	Chem	CybE	MatE	SE

Other approved tech electives that are exceptions

COURSES	DESCRIPTION	CR	PREREQS (Check latest catalog for complete lists)
AerE 494	M2I	1…3	
ArtIS 408	Principles of 3D Animation	3	ARTIS 308 (see adviser for form)
ArtIS 409	Computer/Video Game Design & Dvmt	3	ComS 227, 228; Artis 230 & 308
Astro 342	Introducation to Solar System Astronomy	3	Phys 232 & 232L
Astro 344L	Astronomy Laboratory	3	Phys 232 & 232L
Astro 346	Introduction to Astrophysics	3	Phys 232 & 232L
Astro 405	Astrophysical Cosmology	3	Astro 346
BME 220	Introduction to Biomedical Engineering	3	Biol 212, ENGR 160 or equiv, Math 166, Chem 167 or 177, Phys 232 & 232L
Biol 211	Principles of Biology I	3	HS Biol
Biol 211L	Principles of Biology I Lab	1	Credit or enrollment in Biol 211
Biol 212	Principles of Biology II	3	HS Biol; HS Chem or Cr/E in Chem 163/177
Biol 212L	Principles of Biology II Lab	1	Credit or enrollment in Biol 212
C E 274	Statics of Engineering	3	Phys 231 & 231L; Co-req Math 166
ConE 241	Construction Materials & Methods	3	CprE 185 or ComS 207 or 227
Com S 252	Linux Operating System Essentials	3	Completion of Basic Program
EE 201	Electric Circuits	4	Phys 231 & 231L; Co-req Math 267
EE 230	Electronic Circuits & Systems	4	EE 201; Math 267
ENV S 324[7]	Energy & The Environment	3	Chem 167 or 177
MatE 273[2]	Principles of Materials Science & Engr	3	Chem 167 or Chem 177, Math 165
ME 231	Engineering Thermodynamics I	3	Math 166; Chem 167; Phys 231 & 231L
ME 273x	Science and Practice of Brewing	3	Chem 167 or 177 and Phys 231 or Biol 211 or 212
Mteor 342	Atmospheric Physics II	3	Mteor 341
Mteor 435	Radar Applications in Meteorology	3	Credit or enrollment in MTEOR 341
NS 320	Naval Ship Systems I - Engineering	3	Phys 231; Phys 231L; Sophomore
NS 330	Naval Ship Systems II - Weapons	3	Phys 231, Sophomore
Phys 232	Classical Physics II	4	Phys 231
Phys 232L	Classical Physics II Lab	1	credit or enrollment in Phys 232
Stat 231	Probability & Statistical Inference for Engr	4	Cr/E in Math 265
Stat 322*	Probabilistic Methods for Elec. Engineers	3	EE 224