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, CybE, SE, or ComS
2. * Only one course either MatE 273 or MatE 392 may be applied as a technical elective
3. * Only Math 207 or Math 317 can apply towards graduation requirements, not both courses
4. 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
5. ENGR/EE/CprE 467, EE 442 & EE 448 **cannot** be used to fulfill any elective requirements

Math Elective (3/4 cr.)

COURSES	DESCRIPTION	CR	PREREQUISITES (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	PREREQUISITES (Check latest catalog for complete lists)
$CprE 430/530	Network Protocols and Security	3	CprE 381 or equivalent
CprE 432x	Cyber Security Practicum	3	CprE 331
CprE/CybE 437x	Introduction to Wireless Security	3	CprE 331 or CprE 430
CprE/CybE 440x	Operating System Security	3	CprE 308 or ComS 352
$CprE/CYBSC 531	Information System Security	3	CprE 489 or CprE 530 or Com S 586 or MIS 535
$CprE/CYBSC 532	Information Warfare	3	CprE 531
$CprE/CYBSC/Math 533	Cryptography	3	Math 301 or CprE 310 or ComS 330
$CprE/CYBSC/Math 535	Steganography and Digital Image Forensics	3	EE 524 or Math 317 or Math 407 or ComS 330
$CprE/CYBSC 536	Computer and Network Forensics	3	CprE 489 or CprE 530
CprE 537	Wireless Network Security	3	Credit or Enrollment in CprE 489 or CprE 530
$CprE/CYBSC 538	Reverse Engineering and Security Testing	3	ComS 321 or CprE 381; ComS 352 or CprE 308
SE 421	Software Analysis and Verification for Safety and Security	3	ComS 309; CprE 310 or ComS 230

COMPUTER ENGINEERING ELECTIVES (3 cr.)

COURSES	DESCRIPTION	CR	PREREQUISITES (Check latest catalog for complete lists)
$CprE/SE 329	Software Project Management	3	ComS 309
$CprE/EE 330	Integrated Electronics	4	EE 201, Cr/E EE 230, CprE 281
$CprE/SE 339	Software Architecture & Design	3	SE 319
CprE 388	Embedded Systems II: Mobile Platforms	4	CprE 288
$ComS/SE/CprE 412	Formal Methods in Software Engineering	3	ComS 330 or CprE 310; Com S 311, Stat 330
$CprE/SE 416	Software Evolution and Maintenance	3	ComS 309
$CprE/EE 418	High Speed Sys. Engr. Meas. & Test.	4	EE 230, EE 311
$CprE/SE 419	Software Tools for Large Scale Data Analysis	4	CprE 308 or ComS 352, ComS 309
$CprE/ComS/Math 424	Introduction to High Performance Computing	3	Math 265; Math 207 or Math 317
$CprE/ComS 425	High Performance Computing for S & E Apps	3	ComS 311, ComS 230, Engl 250
$CprE/ComS 426	Intro to Parallel Algorithms and Program.	4	CprE 308 or ComS 321, CprE 315 or ComS 311
$CprE 430/530	Network Protocols and Security	3	CprE 381 or equivalent
$CprE/EE 435	Analog VLSI Circuit Design	4	EE 330
$CprE/ComS 444	Introduction to Bioinformatics	4	Math 165 or Stat 401 or equivalent
CprE 450	Distributed Systems & Middleware	3	CprE 308 or ComS 352
$CprE/ComS 454	Distributed & Network Operating Systems	3	ComS 311, ComS 352
CprE 458	Real-Time Systems	3	CprE 308 or ComS 352
$CprE/EE 465	Digital VLSI Design	4	EE 330
$CprE/EE 466	Multidisciplinary Engineering Design	3	Sr within 2 semester of graduation, instructor permission
CprE 480	Graphics Processing and Architecture	4	CpreE 381 or ComS 321
CprE 482x	Hardware Design for Machine Learning	4	CpreE 381 or ComS 321
CprE 488	Embedded Systems Design	4	CprE 381 or ComS 321
CprE 489	Computer Networking & Data Comm	4	CprE 381 or EE 324
CprE 490	Independent Study	1-2	Only 2 credits of 490 may be used as tech elective, Senior Classification in CprE

TECHNICAL ELECTIVES (6 cr.)

CybE students may select up to six credits of Technical Electives from 300- and 400-level courses in the following areas: Computer Science, Mathematics, Physics, and other Engineering departments (e.g. ConE 380, or Aer E 494). The courses listed below are approved exceptions to these guidelines.

COURSES	DESCRIPTION	CR	PREREQUISITES (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	Permission of Instructor, ComS 227, ComS 228, ComS 229, Artis 230, Artis 208
Astro 342	Introducation to Solar System Astronomy	3	Phys 222
Astro 344L	Astronomy Laboratory	3	Phys 222
Astro 346	Introduction to Astrophysics	3	Phys 222
Astro 405	Astrophysical Cosmology	3	Astro 346
BME 220	Introduction to Biomedical Engineering	3	See catalog for prereqs
Com S 252	Linux Operating System Essentials	3	
Biol 211	Principles of Biology I	3	HS Bio
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 or 177
Biol 212L	Principles of Biology II Lab	1	Credit or enrollment in Biol 212
Chem 331	Organic Chemistry I	3	Chem 178 or Chem 201
Chem 331L	Organic Chemistry I Lab	1	Chem 177L; credit or enrollment in Chem 331
Chem 332	Organic Chemistry II	3	Chem 331
Chem 332L	Organic Chemistry II Lab	1	Chem 331L; credit or enrollment in chem 332
EE 201	Electrical Circuits	4	Credit or Enrollment in Math 267 & Phys 222
EE 230	Electronic Circuits and Systems	4	EE 201, Math 267, Phys 222
EM 274	Statics of Engineering	3	Cr/E Math 166, Cr/E Phys 221
EM 324	Mechanics of Materials	3	EM 274
EM 327	Mechanics of Materials Laboratory	1	Cr/E EM 324
EM 345	Dynamics	3	EM 274, Cr/E Math 266 or Math 267
MatE 215	Introduction to Materials Science and Engineeering I	3	
*MatE 273	Principles of Materials Science & Engr	3	Chem 167 or 177, Math 165, Soph class
ME 231	Engineering Thermodynamics I	3	Math 166, Chem 167, Phys 221
Mteor 342	Atmospheric Physics II	3	Mteor 341
Mteor 435	Radar Applications in Meteorology	3	Mteor 341
NS 320	Naval Ship Systems I - Engineering	3	NROTC students only – Phys 221, Sophomore
NS 330	Naval Ship Systems II - Weapons	3	NROTC students only – Phys 221, Sophomore
Phys 232	Introduction to Classical Physics II	5	Phys 221 or Phys 241; Math 166
Stat 231	Probability & Statistical Inference for Engr	4	Cr/E in Math 265
Stat 322	Probabilistic Methods for Elec. Engineers	3	EE 224