

ECpE Course Lists (Last revised: 9/2024)

To satisfy the qualifying exam requirements, a Ph.D. student needs to take at least two courses from an academic area, and two courses from its associated skills courses selected according to the instructions below.

Note: this list is subject to change, so please check the website for the latest version:

<https://www.ece.iastate.edu/academics/graduate-guidelines/>

Computer Engineering (CprE) Majors

Computing and Networking Systems

Academic Area Courses:

CprE 5250, CprE 5260, CprE 5370, CprE 5410, CprE 5420, CprE 5430, CprE 5450, CprE 5460, CprE 5480, CprE 5500, CprE 5580, CprE 5630, CprE 5800, CprE 5810, CprE 5830, CprE 5840, CprE 5870X, CprE 5880, CprE 6810

Note: in the CNS area, if a course listed above is also on the course lists of other academic areas, it can be used as an outside area course on the POS.

General Skills Courses:

Choose at least two (they must be from different groups):

- Group 1: (probability, statistics, etc.) EE 5230, Stat 4830/5830, Stat 5000, Stat 5120, Stat 5880
- Group 2: (algorithms, modeling, etc.) ComS 5110, CprE 5280, CprE 5820
- Group 3: (optimization, graph theory, etc.) EE 5710, IE 5100, IE 5190, IE 5340
- Group 4: (machine learning) ComS 5780, CPRE/EE 5290, EE 5260

Secure and Reliable Computing

Academic Area Courses:

CprE 5300, CprE 5310, CprE 5320, CprE 5350, CprE 5360, CprE 5370, CprE 5380, CprE 5390, CprE 5600, CprE 5620X, CprE 6310, CprE 6320, CprE 6810, CYBSC 6340

General Skills Courses:

ComS 5110, ComS 5310, ComS 5400, CprE 5280, CprE 5330, CprE 5350, CprE 5820, EE 4250X, IE 5100, IE 5190, IE 5340, Stat 4710/5710, Stat 4830/5830, Stat 5510, Stat 5540, Stat 5870, Math 5470

Software Systems

Academic Area Courses:

CprE 4140x, CprE 4190, CprE 5500, CprE 5540, CprE 5560, CprE 5570, CprE 5580, CprE 5630X, SE 4210

General Skills Courses:

ComS 5110, ComS 5120, ComS 5310, ComS 5350, ComS 5720, ComS 5730, CprE 5280, CprE 5820, EE 5260, EE 5710, IE 5100, IE 5190, IE 5340, Math 5470, Math 5670

VLSI (EE or CprE majors)

Academic Area Courses:

CprE 5640, CprE 5660, CprE/EE 4350, CprE/EE 4650, EE 5010, CprE/EE 5030X, EE 5050, EE 5060, EE 5070, EE 5080, CprE/EE 5090X, EE 5140

General Skills Courses:

Any 4000/5000 level courses in algorithms, machine learning, optimization, Math, statistics, controls, signal processing, and security that are intended for majors and approved by the faculty advisor. ECpE courses must be at 5000 level.

Electrical Engineering (EE) Majors

Bioengineering

Academic Area Courses:

BIOL 4440, CprE 5670, CprE 5700, EE 5260, EE 5310, EE 5320, EE 5380, BME/EE 4500X, EE 5900H section LD, EE 5900I, PHYS 4610, PHYS 5320

General Skills Courses:

Choose at least two (they must be from different groups):

- Group 1: (Statistics, Probability, Optimization, Algorithms) ComS 5110, EE 5230, EE 5710, Stat 4710/5710, Stat 5870
- Group 2: (Materials and Devices) EE 5190, EE 5300, EE 5350, EE 5360,
- Group 3: (EM) EE 5120, EE 5140, EE 5170, EE 5180
- Group 4: (Circuits and VLSI) EE 5010, EE 5050, EE 5070, EE 5090

Communications and Signal Processing

Academic Area Courses:

EE 5210, EE 5220X, EE 5230, EE 5240, EE 5270, CprE/EE 5290, EE 5710, EE 6210, EE 6220, EE 6230

General Skills Courses:

Choose at least two (they must be from different groups):

- Group 1: (Optimization) EE 5710
- Group 2: (Linear Algebra) Math 5100
- Group 3 (Probability, Random Processes) EE 5230, Stat 5430
- Group 4 (Algorithms, Discrete Mathematics) ComS 5110, Math 6070

Electric Power and Energy Systems

Academic Area Courses:

CprE 5390, EE 5520, EE 5530, EE 5540, EE 5550, EE 5590, EE 6530

General Skills Courses:

ComS 5610, CprE 5390, Econ 5010, Econ 5020, EE 5190, EE 5260, EE 5770, EE 5780, IE 5100, IE 5340, IE 6310, IE 6320, Math 5010, Math/ComS/CprE 5250, Math 5570, Math 5610, Math 5620, Stat/IE 5330, Stat 5420, Stat 5430, WESEP 5010, WESEP 5020, WESEP 5110

Electromagnetics, Microwave, and Nondestructive Evaluation

Academic Area Courses:

EE 4110X, EE 5120, EE 5130, EE 5140, EE 5150X, EE 5160, EE 5170, EE 5180, EE 5190, EE 5330X, EE 5380, EE 5390/5370X, EE 5880, EE 6170X, EM 5180, EM 5500

General Skills Courses:

EE 4180, EE 5240, EE 5260, EE 5270, EE 5290, EE 5320, Math 4810, Math 5100, Math 5110, Math 5170, Math 5190, Math 5200, Math 5250, Math 5610, Math 5620, Stat 4710/5710, Stat 5870, Stat 5880

Microelectronics and Photonics

Academic Area Courses:

EE 5310, EE 5320, EE 5350, EE 5360, EE 5380, EE 5620, EE 5900G section VD, EE 5900H

General Skills Courses:

Choose one from each group:

- Group 1: MSE 5100, MSE 5520, MSE 6510, Phys 4800, Phys 4810, Phys 5110
- Group 2: Math 4260, Math 4810, Stat 4710/5710, Stat 5870

Systems and Controls

Academic Area Courses:

EE 5260, EE 5710, EE 5740, EE 5750, EE 5760, EE 5770, EE 5780, EE5900B Controls Sp. topics
(Note: only EE 5710, EE 5760, and EE 5770 can be used for Ph.D. Qualifying Exams.)

General Skills Courses:

Choose at least two (they must be from different groups):

- Group 1: (Machine Learning) EE 5260, EE 5290, ME 5920
- Group 2: (Stochastics) EE 5230, EE 5270, EE 5730, Math 5540, STAT 5430, STAT 5440, STAT 5510
- Group 3: (Systems) EE 5650, EE 5660, Math 5570
- Group 4: (Formal Methods) ComS 5070X, ComS 5120, ComS 5130
- Group 5: (Discrete Math/Computing) ComS 5110, ComS 5310, Math 5470