

ECpE Course Lists (Last revised: 2/2023)

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 525, CprE 526, CprE 537, CprE 541, CprE 542, CprE 543, CprE 545, CprE 546, CprE 548 CprE 550, CprE 558, CprE 563, CprE 580, CprE 581, CprE 583, CprE 584, CprE 587X, CprE 588, CprE 681

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, and they must be from different groups:

- Group 1: (probability, statistics, etc.) EE 523, Stat 483/583, Stat 500, Stat 512, Stat 588
- Group 2: (algorithms, modeling, etc.) CprE 528, CprE 582, ComS 511
- Group 3: (optimization, graph theory, etc.) EE 571, IE 510, IE 519, IE 534
- Group 4: (machine learning) COM S 578, CPRE/EE 529, EE 526

Secure and Reliable Computing

Academic Area Courses:

CprE 530, CprE 531, CprE 532, CprE 535, CprE 536, CprE 537, CprE 538, CprE 539, CprE 560, CprE 562X, CprE 631, CprE 632

General Skills Courses:

CprE 528, CprE 533, CprE 582, EE 425X, Stat 471/571, Stat 483/583, Stat 551, Stat 554, Stat 587, ComS 511, ComS 531, ComS 540, IE 510, IE 519, IE 534, Math 547

Software Systems

Academic Area Courses:

CprE 414x, CprE 419, CprE 550, CprE 554, CprE 556, CprE 557, CprE 558, CprE 563X, SE 421

General Skills Courses:

CprE 528, CprE 582, EE 525, EE 571, ComS 511, ComS 512, ComS 531, ComS 535, ComS 572, ComS 573, IE 510, IE 519, IE 534, Math 547, Math 567

VLSI (EE or CprE majors)

Academic Area Courses:

CprE/EE 435, CprE/EE 465, EE 501, CprE/EE 503X, EE 505, EE 506, EE 507, EE 508, CprE/EE 509X, EE 514, CprE 564, CprE 566

General Skills Courses:

Any 400/500 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 500 level.

Electrical Engineering (EE) Majors

Bioengineering

Academic Area Courses:

CprE 567, CprE 570, EE 526, EE 531, EE 532, EE 538, BME/EE 450X, EE 590H section LD, PHYS 532, PHYS 461, BIOL 444

General Skills Courses:

Choose at least two, and they must be from different groups:

- Group 1: (Statistics, Probability, Optimization, Algorithms) Stat 471/571, Stat 587, EE 523, EE 571, ComS 511
- Group 2: (Materials and Devices) EE 530, EE 535, EE 536, EE 519
- Group 3: (EM) EE 512, EE 514, EE 517, EE 518
- Group 4: (Circuits and VLSI) EE 501, EE 505, EE 507, EE 509

Communications and Signal Processing

Academic Area Courses:

EE 521, EE 522X, EE 523, EE 524, EE 527, CprE/EE 529, EE 571, EE 621, EE 622, EE 623

General Skills Courses:

Choose at least two, and they must be from different groups:

- Group 1: (Optimization) EE 571, CS 578X, IE 631, Math 565
- Group 2: (Linear Algebra) Math 507, Math 510
- Group 3 (Probability, Random Processes) EE 523, Stat 543, Stat 641, Stat 642
- Group 4 (Algorithms, Discrete Mathematics) CprE 528, COM S 511, Math 607
- Group 5 (Analysis) Math 501, Math 515, Math 516, Math 633

Electric Power and Energy Systems

Academic Area Courses:

CprE 539, EE 552, EE 553, EE 554, EE 555, EE 559, EE 653

General Skills Courses:

EE 577, EE 578, EE 519, CprE 539, ComS 561, Math 501, Math/ComS/CprE 525, Math 557, Math 561, Math 562, IE 534, IE 510, IE 631, IE 632, Econ 501, Econ 502, Stat/IE 533, Stat 542, Stat 543, WESEP 501, WESEP 502, WESEP 511

Electromagnetics, Microwave, and Nondestructive Evaluation

Academic Area Courses:

EE 411X, EE 512, EE 513, EE 514, EE 515X, EE 516, EE 517, EE 518, EE 519, EE 533X, EE 538, EE 539/537X, EE 588, EE 617X, EM 518, EM 550

General Skills Courses:

EE 418, EE 524, EE 526, EE 527, EE 529, EE532, Math 481, Math 510, Math 511, Math 517, Math 519, Math 520, Math 525, Math 561, Math 562, Stat 471/571, Stat, 587, Stat 588

Microelectronics and Photonics

Academic Area Courses:

EE 531, EE 532, EE 535, EE 536, EE 538, EE 562, EE 590G section VD, EE 590H

General Skills Courses:

Choose one from each group:

- Group 1: Phys 480, Phys 481, Phys 511, MSE 510, MSE 552, MSE 651
- Group 2: Math 426, Math 481, Stat 471/571, Stat 587

Systems and Controls

Academic Area Courses:

EE 526, EE 571, EE 574, EE 575, EE 576, EE 577, EE 578, EE590B Controls Sp. topics
(Note: only EE 571, EE 576, and EE 577 can be used for Ph.D. Qualifying Exams.)

General Skills Courses:

Choose at least two from different groups:

- Group 1: (Machine Learning) EE 526, EE 529, ME 592
- Group 2: (Stochastics) EE 523, EE 527, EE 573, Math 554, STAT 543, STAT 544, STAT 551
- Group 3: (Systems) EE 565, EE 566, Math 557
- Group 4: (Formal Methods) ComS 507X, ComS 512, ComS 513
- Group 5: (Discrete Math/Computing) Math 547, ComS 511, ComS 531