

## **ELECTRICAL ENGINEERING PROGRAM - DOCTORAL QUALIFYING EXAMINATION**

The examination will consist of two, four-hour parts. The exam is closed-book, closed-notes, with no reference materials permitted (any reference tables or materials, if needed, will be provided). A syllabus for each course is available in the Electrical Engineering Department Office. Sample exams are available on the department's Graduate Program web page.

**Part I** (eight questions):

- a. Required Section: Mathematical Methods - 4 questions based on EE 234 and EE 310
- b. When registering for the exam students will be asked to select any two (2) of the topics listed below, from which four questions will be prepared, although questions for at least 4 topic areas will be offered to guarantee some choice in questions. On the day of the exam students answer all 4 math questions and they can choose any 4 questions in the remaining areas (potentially outside of the areas they chose at exam registration).
  1. Circuits (EE 301, EE 305)
  2. Electronics (EE 330, EE 335)
  3. Digital Logic and Microprocessors (EE 354 and EE 367)
  4. Electromagnetic Fields (EE 361)
  5. Energy Conversion (EE 362)
  6. Electronic Materials (EE/Matls 481)

**Part II** (two areas, typically 3-5 questions per area): When registering for the exam students will be asked to select any two (2) areas for the examination. Students are only provided with questions in the areas that they registered for.

1. Applied Electromagnetics (EE 461 Microwave Engineering, EE 462 Antenna Theory)
2. Photonics (EE 464 Fundamentals of Photonics, EE 565 Optical Communication)
3. Computer Engineering (EE/CS 458 Computer Architecture and students choose between CS-520 Computer Networks or CS-535 Algorithm Design and Analysis. Students must notify the Department of the selection in advance.)
4. Control Systems (EE 474 Control Systems Theory, EE 574 Intermediate Control Systems)
5. Electronic Circuits (EE 451 VLSI Design, EE 541 Integrated Circuits and Systems, EE 562 Telecommunication Circuits)
6. Power (EE 471 Electric Power Systems, EE 572 Power Electronics, EE 575 Analysis of Electrical Machinery and Motor Drives)
7. Signal Processing (EE 410 Principles of Discrete Systems, Digital Signal Processing, EE 420 Random Signals and Systems)
8. Communication (EE 421 Communication Systems, EE 429 Wireless Communication Systems)
9. Biomedical Engineering (EE 436 Medical Instrumentation, EE 437 Introduction to Biomedical Imaging)
10. Nano-Engineering (EE 482 Introduction to Nanoelectronics, EE 588 Fundamentals of Nanotechnology)