

Department of Electrical and Computer Engineering Rules and Procedures for the Ph.D. Written Qualifying Examination

The procedures to be followed in creating, administering, and taking the Ph.D. Written Qualifying Examination (WQE), which constitutes the Doctoral Qualifying Examination for the Department of Electrical and Computer Engineering are set forth in this document.

This document provides the details of the responsibilities and the general structure of the WQE, the timetable and procedures, and the results of the WQE.

I. Responsibilities

Overall responsibility for the WQE rests with the EECE Graduate Committee. It determines the goals and form of the WQE, sets the level of performance students must achieve in order to pass, and reviews the results after each offering. Questions regarding the WQE should be directed to the committee through the Director of Graduate Studies (DGS).

The Ph.D. Written Qualifying Examination (WQE) Committee is composed of the members of the Graduate Committee and the department chair. The research advisors of WQE applicants may be added to the committee at its discretion.

The EECE graduate office handles the registration of students and the administration for the WQE. The DGS and the Graduate Committee report the results of the WQE to the students.

II. General Structure of the WQE

1. The WQE is a ten-hour examination, administered over two days.
2. Only basic scientific calculators are allowed during the WQE, which will be specified by the EECE department.
3. The WQE consists of four parts from

- a) the required EECE graduate courses, Mathematics and Methods in Engineering and Random Variables and Stochastic Processes, (3 hours),
 - b) a selected major area (3 hours), and
 - c) two selected minors from the department approved list (2 hours each).
4. The questions will consist of problems from undergraduate curriculum, elective courses, and first year graduate level courses.
 5. The WQE Topics are listed by course numbers in Appendix A.

III. Timetable and Procedures

1. The WQE is given once a year in January before the beginning of the Spring Semester.
2. Students who are required to take the WQE must register by the last day of classes of the Fall semester. The graduate office will query all registered students for their selected major and minor areas. Students must designate one major area and two minor areas in accordance with their plans of study.
3. The Department Chair selects who writes the exam questions for each area, with recommendations from the WQE committee. The names of faculty writing questions will never be revealed to any students.
4. The DGS collects the exam questions and solutions from fellow faculty no later than four weeks before the WQE date. Questions must be accompanied with solutions.
5. The EECE Graduate Committee will compile and review exam questions and solutions.
6. Following the offering of the exam, faculty who have composed the WQE questions must grade them within two weeks after the start of the semester. Students will be informed of exam results within three weeks after the exam.

IV. Results of WQE

1. A passing grade is a total score of 75% or better with a weight of 30%, 30%, 20%, and 20% given to the required, major, and each of the two minor areas, respectively.
2. Doctoral students who pass the WQE may continue in the Ph.D. program and will be advanced to doctoral candidacy.
3. Students who fail the WQE attempt must retake the WQE the next time it is offered.
4. Students who fail the second WQE attempt will be informed in writing by the EECE Department that they will not be allowed to continue their Ph.D. program.
Students who fail the second WQE attempt may petition the Dean of the Graduate School for approval to retake the WQE at its next offering.

December 1, 2017

Appendix A

Core Graduate Program Research Areas and CE/WQE Related Courses Marquette University Electrical & Computer Engineering Department

Required Foundation courses:

EECE 6010 Advanced Engineering Mathematics

EECE 6020 Stochastic Processes in Engineering

Core Research Areas

(Used as Primary and Related areas for the PhD Written Qualify Exam)

1. Signal Processing

Core course: EECE 5510 Digital Signal Processing

Related undergraduate course: EECE 5560

Related graduate courses: EECE 6510, 6520, 6530, 6540

2. Control Theory

Core course: EECE 6310 Modern Control Theory

Related undergraduate courses: ELEN 3020, EECE 5310, 5320

Related graduate courses: EECE 6320, 6330, 6340

3. Electromagnetic Fields and Waves

Core course: ELEN 3110, 3120 Electromagnetic Fields 1 & 2.

Related undergraduate courses: 5150, 5565

Related graduate course: EECE 6120

4. Power and Energy Systems

Core courses: ELEN 3210 Electric Drives and

EECE 5210 Design and Analysis of Motor Drive Systems

Related undergraduate courses: EECE 3210, 5210, 5220, 5230, 5240, 5250

Related graduate courses: EECE 6210, 6220, 6230

5. Solid-State Devices, Microsensors and MEMS/NEMS Systems

Core course: ELEN 4430 Physical Principles of Solid State Devices

Related undergraduate courses: EECE 5460, 5490

Related graduate courses: EECE 6430

6. Algorithms and Machine Learning

Core course: EECE 6810 Algorithm Analysis and Application

Related undergraduate courses: COEN 5650, 5850, 5860, 5870

Related graduate courses: EECE 6820, 6822, 6830, 6840

7. Embedded Systems and Computer Hardware

Core course: COEN 4710 Computer Hardware and COEN 4720 Embedded Systems Design

Related undergraduate course: COEN 4730

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