

## Guidelines for Ph.D. Qualifying Exam

The Industrial & Systems Engineering Ph.D. Qualifying Exam is offered once per year, in the spring quarter. The Qualifying Exam must be taken no later than the second time it is offered while in residence. A Ph.D. student is allowed to take the qualifying exam at most twice. Students planning on taking the Qualifying Exam must register with the ISE student advising office in February. The Qualifying Exam is administered as a take-home test over several days in spring quarter, followed by an oral examination. Specific details will be announced through the ISE student advising office. The exam is open book and notes.

### Course Requirements:

Students are expected to acquire a breadth of knowledge in industrial engineering before taking the Qualifying Exam. INDE 508, INDE 513 and INDE 524 are Ph.D. core courses. Each student is required to successfully complete these three core courses before taking the Qualifying Exam. Students must also successfully complete INDE 591, INDE 592, and INDE 593 before taking the Qualifying Exam. Students are required to take at least one non-core course from each of the three sections below before their Ph.D. degree can be awarded. Students are advised to (but not required to) complete these non-core courses before taking the Qualifying Exam.

### Exam Format:

The qualifying exam will include a one-week take-home written examination followed by an oral exam. The oral exam is administered by an ISE faculty sub-committee. The written test is open book, notes and other reference materials. Students will be allowed to refer only to their solutions to the written exam during the oral exam. On the written exam, students will be required to answer one question each from Sections A, B, and C below.

### Section A:

Courses that cover relevant topics include:

[INDE 508](#), Stochastic Processes in Engineering

[INDE 513](#), Linear Optimization Model

[INDE 517](#), Markov Decision Processes

[INDE 535](#), Engineering Simulation

### Section B:

Courses that cover relevant topics include:

[INDE 521](#), Quality Control in Manufacturing

[INDE 524](#), Robust Design & Quality Engineering

[INDE 526](#), Reliability in Product Design & Testing

[INDE 546](#), Analytical Methods in Human Factors & Transportation

### Section C:

Courses that cover relevant topics include:

[INDE 519](#), Healthcare Modeling and Decision Making

[INDE 543](#), Virtual Interface Technology

[INDE 548](#), Human Performance Modeling

[INDE 549](#), Human Factors in Engineering Design

[INDE 570](#), Supply Chain Systems