

## 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:  
IND E 508, Stochastic Processes in Engineering  
IND E 513, Linear Optimization Models  
IND E 535, Engineering Simulation  
IND E 599 Integer Programming

### Section B:

Courses that cover relevant topics include:  
IND E 521, Quality Control in Manufacturing  
IND E 524, Robust Design & Quality Engineering  
IND E 526, Reliability in Product Design & Testing  
IND E 546, Analytical Methods in Human Factors & Transportation

### Section C:

Courses that cover relevant topics include:  
IND E 519, Healthcare Modeling and Decision Making  
IND E 543, Virtual Interface Technology  
IND E 549, Human Factors in Engineering Design