1. **PURPOSE:** The purpose of the Preliminary Examination is to determine if a student is adequately prepared to pursue doctoral research under the direction of a Dissertation Committee. The examination includes: 1) an evaluation of the student’s academic preparation, 2) an evaluation of a detailed dissertation proposal, and 3) an oral examination. In order to advance to Candidacy, the student must demonstrate the following:

   a. **Preparation.** The student must show sufficient breadth and depth of academic preparation to complete the proposed dissertation research without taking additional courses (other than the one course per term permitted by Rackham).

   b. **Research Ability.** The student must demonstrate evidence of research ability (e.g., publications, directed study project(s), Master’s thesis). Supporting documents should be submitted as an Appendix to the written proposal.

   c. **A suitable dissertation topic and plan.** The student must present a detailed research proposal. The format and content (section titles, page limits, etc.) must follow either NSF or NIH guidelines for an unsolicited research grant. This proposal will be evaluated by the Preliminary Examination Committee (see Section 4) and defended in an oral examination.

2. **PREPARATION**

   **Selecting an Advisor:** After a student completes the Qualifying Process, she/he works with a faculty advisor to prepare for the Preliminary Examination. **In order that the student obtains timely and appropriate advice, she/he must select an advisor within four months of passing the Qualifying Process** (i.e., by the beginning of the Fall Term). The selection of an advisor is reported to the Graduate Program Office and confirmed by obtaining the advisor’s signature on an endorsement form. A student is allowed to change advisors before taking the Preliminary Examination by obtaining an endorsement signature from the new advisor and notifying the Graduate Program Office.
Coursework: Before taking the Preliminary Examination, the student must satisfy the requirements for the qualifying process and complete: 1) at least eight three-credit-hour didactic courses approved by his/her advisor (four three-credit-hour didactic courses if the student enters with a relevant Master’s degree and obtains approval from the IOE Graduate Program Committee, 2) Rackham cognate requirements, 3) required IOE doctoral seminars and directed study courses (IOE 800, 801, 802), and 4) at least one research seminar (e.g., IOE 813, 836, 837, 899).

Preliminary Exam Guidelines

Department of Industrial and Operations Engineering: Preliminary Exam Guidelines

For students matriculating September 2016

1. PURPOSE: The purpose of the Preliminary Examination is to determine if a student is adequately prepared to pursue doctoral research under the direction of a Dissertation Committee. The examination includes: 1) an evaluation of the student’s academic preparation, 2) an evaluation of a detailed dissertation proposal, and 3) an oral examination. In order to advance to Candidacy, the student must demonstrate the following:

a. Preparation. The student must show sufficient breadth and depth of academic preparation to complete the proposed dissertation research without taking additional courses (other than the one course per term permitted by Rackham).

b. Research Ability. The student must demonstrate evidence of research ability (e.g., publications, directed study project(s), Master’s thesis). Supporting documents should be submitted as an Appendix to the written proposal.

c. A suitable dissertation topic and plan. The student must present a detailed research proposal. The format and content (section titles, page limits, etc.) must follow either NSF or NIH guidelines for an unsolicited research grant. This proposal will be evaluated by the Preliminary Examination Committee (see Section 4) and defended in an oral examination.

2. PREPARATION

Selecting an Advisor: After a student completes the Qualifying Process, she/he works with a faculty advisor to prepare for the Preliminary Examination. In order that the student obtains timely and appropriate advice, she/he must select an advisor within four months of passing the Qualifying Process (i.e., by the beginning of the Fall Term). The selection of an advisor is
reported to the Graduate Program Office and confirmed by obtaining the advisor’s signature on an endorsement form. A student is allowed to change advisors before taking the Preliminary Examination by obtaining an endorsement signature from the new advisor and notifying the Graduate Program Office.

**Coursework:** Before taking the Preliminary Examination, the student must satisfy the requirements for the qualifying process and complete: 1) at least eight three-credit-hour didactic courses approved by his/her advisor (four three-credit-hour didactic courses if the student enters with a relevant Master’s degree and obtains approval from the IOE Graduate Program Committee, 2) Rackham cognate requirements, 3) required IOE doctoral seminars and directed study courses (IOE 800, 801, 802), and 4) at least one research seminar (e.g., IOE 813, 836, 837, 899)
3. **EXAMINATION PROCESS, EVALUATION AND OUTCOMES:**

The examination process involves the following steps:

- To evaluate academic preparation, the Preliminary Examination Committee will review undergraduate and graduate transcripts. If the student received a Conditional Pass during the Qualifying Process, the Committee will confirm that all conditions have been satisfied.
- To evaluate research ability and potential, the Examination Committee will review the research proposal and supporting documents (publications, research reports, etc.) provided by the student.
- The primary purpose of the oral examination is a presentation and defense of the proposed research. However, the Examination Committee may also ask questions related to specific knowledge and skills required to successfully execute the research plan.

At the end of the oral examination, the Committee will recommend one of the following outcomes:

a. **Advance to Candidacy:** This recommendation is reserved for students who demonstrate outstanding performance on all aspects of the examination. Under special circumstances, the student may petition to defer formal Candidacy by one semester in order to take additional coursework. This petition must be approved by the student’s advisor and the IOE Graduate Program Advisor.

b. **Conditional Advancement:** The student automatically advances to candidacy upon satisfying a specific requirement (e.g., completing a certain course(s) with a specified grade, performing additional pilot research, completing a specific assignment). This outcome occurs when the Examination Committee believes that the student has presented and defended a strong proposal, but has a deficiency (or deficiencies) that can be removed through additional work.

c. **Deferred Advancement:** The student will be advanced to candidacy upon further clarification of the dissertation research and approval by the student’s Dissertation Committee. This outcome occurs when the Examination Committee believes that additional work is needed to define and/or focus the proposed dissertation research. The committee may also recommend additional coursework.

d. **Fail:** The student has not demonstrated satisfactory potential to perform doctoral research and is not permitted to register for additional terms as a Pre-Candidate. However, a student who is eligible to receive an IOE Master’s Degree and who is missing specific courses may register for a maximum of one additional term to complete this degree. A student who fails the Preliminary Exam is not allowed a retake.
For outcomes a, b, and c, the student is required to formally nominate his/her Dissertation Committee within one month of the oral defense.

4. **STRUCTURE OF PRELIMINARY EXAMINATION COMMITTEES:** The Preliminary Examination Committee consists of at least four faculty members. The Committee is nominated by the student and must be approved by the faculty advisor and the IOE Graduate Program Advisor at least one month before the oral exam. At least three members of the Examination Committee must be IOE tenure-track faculty. The additional member(s) of the Committee must satisfy Rackham guidelines for service on Dissertation Committees.

5. **TIME LIMIT:** To remain in the Ph. D. program, a student must take the Preliminary Examination within three terms of completing the Qualifying process.

6. **SUBMITTING THE DISSERTATION RESEARCH PROPOSAL AND OTHER REQUIRED STATEMENTS:** At least two weeks prior to the Preliminary Examination, the student must submit the following items to the Preliminary Examination Committee and the Graduate Program Office:

   a. The date and time of the oral defense. The student is responsible for scheduling the oral defense.
   b. The final draft of the Dissertation Proposal.
   c. A self-evaluation of preparedness to perform the proposed research, including a listing of additional necessary coursework (two page maximum).
   d. A brief discussion of the resources (faculty advisors, lab/computational facilities, funding, etc.) needed to pursue the research (two page maximum)

   It is expected that the student will work closely with his/her advisor and committee members in developing the proposal and accompanying statements.

7. **GUIDELINES FOR RACKHAM INTERDISCIPLINARY STUDENT-INITIATED JOINT PH.D. STUDENTS**
Note: The following guidelines apply only to those students who:

a. Have been accepted as a Pre-candidate in IOE and completed IOE qualifying process.
b. Have been accepted as a Pre-candidate in another U of M Doctoral program and completed appropriate sections of that program’s qualifying process.
c. Have received formal Rackham approval for a Student-initiated Joint Ph.D. Degree program.

Students in Rackham Joint Degree programs satisfy the following requirements for the IOE Preliminary Exam:

a. Select an IOE advisor within four months of completing the IOE process. (In most cases, the advisor would eventually serve as a co-chair of the student’s Dissertation Committee.)

b. Demonstrate that at least four Rackham-eligible faculty are willing to serve as members of the Preliminary Examination Committee. At least two members must be IOE tenure-track faculty. Committee membership must be approved by the IOE Graduate Program Advisor and the Graduate Program Advisor from the other department. This committee must be nominated and approved within four months of completing the IOE Qualifying process.

c. The Committee evaluates the student’s performance on the Preliminary Exam and determines the outcome using the criteria established in Sections 1 and 3, above.

Approved by the IOE Faculty April 13, 2016