IE-PhD Program Guidelines

[Last Update: 1/11/2023]
Outline

• PhD Program Milestones

• Several reminders for GRA and GTA
Contacts

• Department Chair: Dr. Pratik Parikh, pratik.parikh@louisville.edu

• IE-PhD Director (PhD-DGS): Dr. Monica Gentili, monica.gentili@louisville.edu

• Administrative Assistant: Mrs. Nancy White, nancy.white@louisville.edu
PhD – Requirements

ADMISSION. Student must be formally admitted to his or her degree program.

COURSEWORK. Student must complete a curriculum of courses (see next slide).

ADVANCEMENT TO CANDIDACY. A student is advanced to candidacy for the PhD when he or she has completed satisfactorily all the required coursework and has completed Milestone 1 (Dissertation topic and Advisor’s selection) and Milestone 2 (passed the Doctoral Qualifying Exam - DQE-).

DISSERTATION. The candidate must present a dissertation on a topic related to his or her area of specialization that presents the results of original research and gives evidence of excellent scholarship. The dissertation must be approved by the professor or committee under whose direction it is written. At the time of the final defense the student is supposed to have at least one paper submitted to a peer reviewed journal.
PhD – Coursework (1/2)

<table>
<thead>
<tr>
<th>Post-Baccalaureate Coursework</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved Master’s Level Coursework ¹</td>
<td>30</td>
</tr>
<tr>
<td>Core Courses (Select two courses from a focus area below)</td>
<td>6</td>
</tr>
<tr>
<td>Technical Electives ²</td>
<td>9</td>
</tr>
<tr>
<td><strong>IE 700</strong></td>
<td>9</td>
</tr>
<tr>
<td>Dissertation Research in Industrial Engineering</td>
<td></td>
</tr>
</tbody>
</table>

**Minimum Total Hours**  
54

¹ Master's level coursework must be approved by the Department.
² Non-IE Electives must be approved by the department.

- 3.0 GPA or better
- At most 6 hours of C grades counted towards your degree
# PhD – Core Courses – Select two from your focus area

## Focus Areas

### Data Analytics & Operations Research
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 610</td>
<td>Foundations of Optimization I</td>
<td>3</td>
</tr>
<tr>
<td>IE 662</td>
<td>Predictive Analytics for Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>IE 663</td>
<td>Predictive Analytics for Decision Making II</td>
<td>3</td>
</tr>
<tr>
<td>IE 694</td>
<td>Advanced Topics in IE (Algorithms for Combinatorial Optimization OR Stochastic Modeling)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Human Factors
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 581</td>
<td>Advanced Topics in Human Factors Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 585</td>
<td>Usability Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 694</td>
<td>Advanced Topics in IE (Quality of Care and Patient Safety)</td>
<td>3</td>
</tr>
<tr>
<td>IE 694</td>
<td>Advanced Topics in IE (Health IT and Clinician Support)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Advanced Manufacturing
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 563</td>
<td>Experimental Design in Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IE 600</td>
<td>Additive Manufacturing Processes</td>
<td>3</td>
</tr>
<tr>
<td>IE 601</td>
<td>Additive Manufacturing Structure Design</td>
<td>3</td>
</tr>
<tr>
<td>Milestone</td>
<td>Due date</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Milestone 1: Dissertation Topic and Advisor’s selection</td>
<td>9-12 months from enrollment</td>
<td></td>
</tr>
<tr>
<td>Milestone 2: Doctoral Qualifying Exam (DQE)</td>
<td>12-16 months from enrollment</td>
<td></td>
</tr>
<tr>
<td>Milestone 3: PhD Committee Members selection</td>
<td>In agreement with your advisor (ideally before the end of the 3\textsuperscript{rd} calendar year)</td>
<td></td>
</tr>
<tr>
<td>Milestone 4: PhD Proposal Defense</td>
<td>In agreement with your advisor (ideally before the end of the 4\textsuperscript{th} calendar year)</td>
<td></td>
</tr>
<tr>
<td>Milestone 5: PhD Dissertation Defense</td>
<td>In agreement with your advisor (within 4 years from candidacy)</td>
<td></td>
</tr>
</tbody>
</table>
What else beyond 24 (6+9+9) credit hours?

• Your doctoral research and dissertation!!!

• Get engaged in research as early as possible.
  • Ideally, during the first semester.
  • At the latest, by the end of the first year.
  • Identify your research advisor at the end of the first year, if not sooner (Milestone 1).

• Additional courses may be taken with mutual agreement between you and your advisor.
Milestone 1: Dissertation Topic and Advisor’s Selection

- By the end of the 12th month from enrollment, PhD student must accomplish Milestone 1 (300 words summary of dissertation topic) and advisor signature.

To finalize Milestone 1:

1. PhD student fills Milestone 1 section of the PhD Student Milestone form, have it signed by their advisor and sends it to the PhD-DGS and cc the Department Chair. **PhD student Milestone form has to be requested to the Administrative Assistant.**

2. PhD student submits Milestone 1 in the PhD Tracker.
Milestone 2:
Doctoral Qualifying Exam (DQE) (1/2)

a) Student passes a DQE posed by a committee, led by student’s research mentor, two other IE faculty members selected by the student’s mentor. Committee chair may decide to add one non-IE faculty member.

b) Suggested time: by the end of the 16th month from enrollment (4th semester including summers).

c) The qualifying exam will contain two parts: written and oral. The lengths for written and oral exams are expected to be 1-2 weeks and 2 hours, respectively. However, the exam committee makes the ultimate decision on the exact length for both exams.

BEFORE THE DQE:

a) One week before the DQE: student will inform PhD-DGS and the Administrative Assistant about the intention to take the DQE and must provide the following information: Name of committee member including the dissertation chair, and Date/Time of Written part of the exam; Date/Time/Place of oral part of the exam, if available, should also be provided or can be provided as soon as available (but no less than 1 week before the oral exam).

b) One week before the DQE: student will send the committee members:
   1. Updated transcripts
   2. Research summary file: a 2-3 page document with the following information: 1) summary of research idea; 2) achieved accomplishment/work; and 3) next steps in the research.

DQE RESULTS

- Result of the DQE is either PASS or FAIL.
- If the student DID NOT pass the DQE. Upon DQE committee recommendation, the student may be allowed to retake the exam. Retake must occur at the end of the following semester. Failure on the 2nd attempt would result in the student being dismissed from the program.
Milestone 2:
Doctoral Qualifying Exam (DQE) (2/2)

AFTER THE DQE:

1. Advisor MUST notify PhD-DGS via email the result of the DQE (Pass/Fail). Email should be cc’ed to the Department chair and all the DQE committee members.

2. PhD student collects signature to fill Milestone 2 section of the PhD Student Milestone form and sends it to the PhD-DGS and cc the Department Chair. PhD student Milestone form has to be requested to the Administrative Assistant.

3. PhD student submit Milestone 2 in the PhD Tracker including all the following needed information:
   1. Date/Time/Place of oral part of the exam
   2. Updated Transcripts
   3. Pdf of the Research summary file provided to the committee
   4. Pdf file of the DQE exam questions
   5. Pdf file of the written answers to the question

NOTE that only after steps 1-3 are completed and if the course requirements are met PhD-DGS will change student status to PhD candidacy.
Doctoral Qualifying Exam (DQE):
Recommended structure of the written part

The purpose of this examination is to determine student’s aptitude and skillset for research that would lead to successful completion of a doctoral dissertation. The evaluation committee is seeking to answer this primary question: *Does the prospective candidate have the required knowledge, skill, and disposition to successfully complete a dissertation?*

In light of the goal of the examination, I would recommend to structure the questions of the exam so that both required *skillset* and *research potential* are assessed during the exam.

A suggested format for the questions, for a committee composed of three members, is the following:

- 3 course related questions (at least one on the core courses of the focus area)
- 3 research related questions

At least one month before the scheduled date of the written part of the exam, the chair of the committee should communicate to the student which courses they should focus while preparing for the exam.

Once questions are assembled the committee should agree on the length of the written part which should not exceed 2 weeks.
Candidacy

• Student enters into candidacy after the completion of
  a) Required coursework
  b) Milestones 1 and 2

• After entering candidacy status, students need to be enrolled in DOCT 600-03. They should only need to enroll themselves in the first semester and then they will automatically be enrolled for every semester after that until they apply for their degree with necessary credit hours to either maintain their full-time status (e.g., for fellowship or assistantship recipients) or continuous enrollment.

• Time between entering candidacy and final successful dissertation defense (Milestone 5) is ≥9 months, but ≤4 years. If the 4-year mark is exceeded, then the candidate may be dismissed from the program, unless an extension is requested to the Graduate School and granted.
Milestone 3: Form your PhD Dissertation Committee

- The dissertation committee will consist of at least four voting members of the graduate faculty.
- At least three of the committee members will be from the IE department and at least one of the committee members will be a non-IE member.
- A non-IE member, but a faculty from UofL, can be from any department (e.g., CECS, Mathematics) with approval by the advisor and the Director of the Doctoral Program (PhD-DGS).
- If the non-IE faculty is a non-UofL member, then they MUST be approved by the Speed School; please contact the PhD-DGS for information on the approval process.
- The chair of the dissertation committee will be the student’s research advisor.
- Consult with your research advisor on forming the committee.
- Documents to be filled:
  1. Student has the Thesis Dissertation Advisory Committee Form signed by committee members and sends it to the PhD-DGS. Form signed by PhD-DGS and Department Chair is sent to Katherine Markuson (who will send it to Courtney Kerr). The form is available on the graduate school website (https://louisville.edu/graduate/forms/thesis-dissertation-advisory-committee-committee-appointment-form/view).
  2. Student fills Milestone 3 section of the PhD Student Milestone Form, have it signed by the advisor and the committee members and sends it to the PhD-DGS and cc Department Chair. PhD student Milestone form has to be requested to the Administrative Assistant.
Milestone 4: Proposal Defense (1/3)

DISSERTATION PROPOSAL

• The dissertation proposal should provide a clear and thorough plan of the proposed research.
• The proposal includes the first several chapters of what will become the dissertation.
• Proposal should also include an anticipated timeline that accounts for all phases of the dissertation research, a discussion of potential challenges to meeting that timeline, and ways to address the challenges.
• Please consult with your advisor on the expectations for the contents of your dissertation proposal.
Milestone 4: Proposal Defense (2/3)

• Consult with your advisor to set up the date for your proposal defense

• Proposal defense will take at least 100 minutes: 40 minutes for student’s presentation (open doors) + 10 minutes of Q&A with the audience (open doors) + 50 minutes or more for Q&A with the committee (closed doors)

BEFORE THE PROPOSAL DEFENSE

• One month before the defense, student or advisor informs PhD-DGS and Administrative Assistant about the intention to defend the proposal and provides the following information to PhD-DGS: Dissertation Title, Abstract, Advisor Name, Committee Member Names, Date/Time/Place of Defense

• At least two weeks before the proposal defense, students send the committee members the dissertation proposal for review. All committee members will review the entire dissertation proposal and provide feedback either prior to the decision to move forward with the student’s dissertation proposal defense or during the proposal defense.

• At least two weeks before the proposal defense the student fills the flyer template for proposal defense announcement and send it to the PhD-DGS and Administrative Assistant.
Milestone 4: Proposal Defense (3/3)

RESULTS OF THE PROPOSAL DEFENSE

➢ **Satisfactory**: the committee has accepted the proposal, and the student is cleared to continue working on the proposed research and finish writing the dissertation.

➢ **Unsatisfactory**: the committee may recommend either i) that a second defense is permitted after a period of additional preparation, or ii) that the student is dropped from the PhD program.

AFTER THE PROPOSAL DEFENSE

If the defense was satisfactory:

1. Advisor notifies PhD-DGS via email communicating the proposal defense was satisfactory. Cc the chair of the department and all the committee members.

2. PhD student collects signature to fill Milestone 4 section of the PhD Student Milestone form and submits it to the PhD-DGS and cc the Department Chair. **PhD student Milestone form has to be requested to the Administrative Assistant.**

3. PhD student submit Milestone 3&4 in the PhD Tracker including all the needed information:
   1. Date/Time/Place of the proposal defense
   2. Pdf file of the proposal
   3. PPT slides of the presentation of the proposal

If the defense was unsatisfactory:

a) Advisor communicates to the IE-PhD DGS the result of the proposal defense was unsatisfactory and whether the student is either allowed a second defense or must be disenrolled from the program. Cc the chair of the department and all the committee members.
Milestone 5: Final PhD Defense (1/4)

- Consult with your advisor to set up the date for your final defense

- To qualify for dissertation defense at least one manuscript must be under review, in press, or published by a peer-reviewed journal prior to scheduling the final defense.

- Final defense will take around 150 minutes: 45 minutes for student’s presentation (open doors) + 15 minutes of Q&A with the audience (open doors) + 60-90 minutes for Q&A with the committee (closed doors)

- Suggested organization of the final defense
  - Student presentation (open-doors)
  - Q&A from the audience (open-doors)
  - Q&A from the committee members (closed-doors)
  - Committee discussion (closed-doors)
  - Convey decision to the candidate (closed-doors)
Milestone 5: Final PhD Defense (2/4)

RESULTS OF THE FINAL DEFENSE
There are three possible evaluation decisions for the doctoral defense. Final decision cannot have more than one opposing vote.

Pass: it requires that both the defense and the dissertation are acceptable, the student is considered ready to earn the doctoral degree.

Pass with revisions: the committee considered both the defense and the dissertation are acceptable, but the committee requires revisions to the dissertation, which will be checked by the entire committee or by the advisor only. The committee should also agree upon the length of time allowed for submission of the revised dissertation. All of these must be communicated clearly to the student at the end of the defense. Once the revised document has been approved, the student is ready to earn the doctoral degree, and the committee members sign the PhD signature page and the Milestone 5 section of the PhD Milestone form.

Fail: the committee has decided that the dissertation is unsatisfactory and may not be rewritten. Committee sign the PhD signature page and the Milestone 5 section. This decision normally results in the termination of a doctoral student’s program. In rare circumstances, the committee may decide to give the student another chance to return at a later date and defend the work. This must be agreed upon by the committee (unanimously), accepted by the student, and also approved by the PhD-DGS.
Before the Final PhD Defense (3/4)

1. **Application for degree.** At the beginning of the semester in which the student will graduate, the student completes the application for degree via ULINK. Due date for applications are listed on the graduate school website: [http://louisville.edu/registrar/registration/dates-1/special-dates-for-graduating-seniors](http://louisville.edu/registrar/registration/dates-1/special-dates-for-graduating-seniors)

2. **Dissertation draft review.** Student emails draft of dissertation to Courtney Kerr in SIGS for approval of formatting. See [https://louisville.edu/graduate/sigs/Programs/theses-dissertations](https://louisville.edu/graduate/sigs/Programs/theses-dissertations)

3. **One month before** the defense, student or advisor informs PhD-DGS and Administrative Assistant about the intention to defend the proposal and provides the following information: Dissertation Title, Abstract, Advisor Name, Committee Member Names, Date/Time/Place of Defense.

4. **At least two weeks before** the final defense, students send the committee members the entire dissertation for review.

5. **At least two weeks before the final defense** the student fills the flyer template for dissertation defense announcement and send it to the PhD-DGS and Administrative Assistant.
After the Final PhD Defense (4/4)

Once the student is considered ready to earn the doctoral degree:

1. **Final dissertation document.** Student emails final dissertation to Courtney Kerr in SIGS. See [http://louisville.edu/graduate/current-students/thesis-dissertation-information](http://louisville.edu/graduate/current-students/thesis-dissertation-information)

2. **Original signature page.** Student submits signature page (electronic signatures might be available) to Courtney Kerr in SIGS (Houchens building or via email), Administrative Assistant, and PhD-DGS. Signature page is available from the University of Louisville Graduate School website: [https://louisville.edu/graduate](https://louisville.edu/graduate)

3. **Communication to the PhD-DGS.** Advisor notifies PhD-DGS via email communicating the dissertation defense was satisfactory. Cc the chair of the department and all the committee members.

4. **Milestone form.** PhD student collects signature to fill Milestone 5 section of the PhD Student Milestone form and submits it to the PhD-DGS and cc the Department Chair. **PhD student Milestone form has to be requested to the Administrative Assistant.**

5. **PhD Tracker.** PhD student submit Milestone 5 in the PhD Tracker including all the needed information:
   1. Date/Time/Place of the proposal defense
   2. Pdf file of the dissertation
   3. PPT slides of the presentation of the dissertation defense.

6. **Dissertation evaluation form.** Committee members fill the Dissertation evaluation from and send it to the Administrative Assistant - Nancy White ([nancy.white@louisville.edu](mailto:nancy.white@louisville.edu))

7. **Exit survey.** Student fills the exit survey form and sends it to the Administrative Assistant - Nancy White ([nancy.white@louisville.edu](mailto:nancy.white@louisville.edu))

8. **Department chair submits change of grade forms** (one form for each semester IE 700 was taken) to change all IE 700 grades from X (deferred grade) to P (pass).
Communications

• Keep your communications alive with your advisor, and if necessary, with the PhD-DGS and Department Chair.

• We won’t know the issues unless you tell us!

• For PhD students, regular communication with your advisor is extremely important.
  
    o What things should I communicate on? Examples include: expectations on publications, expectations on works that would constitute a PhD proposal, expectations on travel support, excused absence, etc.
    
    o When should I communicate? As early as possible.
    
    o Whom else should I contact, if a topic is sensitive? PhD-DGS and department chair.
Requirements for continuous advising

a) Each student MUST meet with the advisor at least once a month. Typically, it is expected that they meet twice a month to ensure continuous progress towards their dissertation. The advisor may require weekly meetings as well.

b) If the student is unable to meet per advisor requirements (and a gap of no more than a month), they must inform their advisor ahead of time. After two missed appointments without informing the advisor (or without a legitimate reason), the advisor may decide to step down from his/her role. If this occurs, and a new advisor is not identified in 30 days, then the student will not be able to continue in the program.

c) Your advisor may also determine that sufficient progress has not been made over several months and decide to step down. If an advisor decides to step down and a new advisor is not identified in 30 days, then the student will not be able to continue in the program.
Reminders for GRA, GTA, and Fellows

1. Maintain your **full-time status (see next page)** in order to be eligible for funding.
2. Keep satisfactory performance (course, research and TA work) in order to get continued funding. Annual assessment takes place in May.
3. If you are a GRA, it is an academic courtesy to inform your research advisor beforehand about your activities (e.g., travels, job employment) that may affect your research work.
4. If you are a GTA, it is required that you are present on campus on the first day of the semester and stay present on campus until the end of the final examination period upon completing your GTA duties. In case there is a conflict (e.g., travels, job employment), inform your responsible instructor beforehand for permission.
5. A first-time GTA who will perform an actual teaching job has to take an English proficiency test organized by graduate school (SIGS). You will receive a notification from SIGS directly.
6. For unfunded graduate students, always check with Department Chair and PhD-DGS for the availability of teaching assistantship. Although rare, sometimes limited assistantships do exist.
Full-time Study

• Full-Time Study is defined as enrollment in:
  1. 9 credit hours during the Fall semester, OR
  2. 9 credit hours during the Spring semester, OR
  3. 6 credit hours during the Summer semester, OR
  4. In degree candidacy status.

• Full-Time Study for University Fellows and Graduate Assistants
  1. All University Fellows and Graduate Assistants receiving financial support must be enrolled as full-time students during the period for which they are receiving support.
  2. Maximum number of hours in a semester is 12.

• International students must comply with F1 visa requirements:
  1. Maintain full-time status in the Fall and Spring semesters
  2. NO requirement in the Summer, unless funded as a GRA, GTA, or fellow
Other Points of Contacts

• F1-extension, OPT, CPT, etc.
  o International Center (Thomas Beard: thomas.beard@Louisville.edu)
  o F1-extension: PhD-DGS will write verification letter.
  o CPT (curriculum practical training) applicants:
    ▪ Your research advisor will write a letter stating that performing the job (usually away from campus) is essential to helping finish your dissertation.

• Other related issues (e.g., not receiving a paycheck, seeing an unexpected balance in your account):
  o Fellows/GTAs financial related: Laura Newton (laura.newton@louisville.edu). Make sure you copy PhD-DGS and Department Chair.
  o GTA human resource related: Susan Cunningham (susan.cunningham@Louisville.edu) and Debbie Hudson (debbie.hudson@Louisville.edu). Make sure you copy PhD-DGS and Department Chair.
  o GRA supported by advisor’s grant: contact advisor.
Additional Information

• More information can be found on the University of Louisville Graduate School website:

https://louisville.edu/graduate