MFE PhD Program Details

The WPI Graduate Catalog features general information, requirements, and course descriptions for this degree work. Additional requirements of the Manufacturing Engineering program are:

1. **Independent Research Presentation.** Prior to admission to candidacy for the PhD in Manufacturing Engineering, the student must present a seminar for the Manufacturing Engineering faculty.

2. **Comprehensive Examination.** Successful completion of the Manufacturing Engineering Doctoral Qualifying / Comprehensive Examination (MFEQE). A description of the exam follows.


**The MFEQE**

**PURPOSE**
The purpose of this exam is to determine if the student’s breadth and depth of understanding the fundamental areas of Manufacturing Engineering is adequate to conduct independent research and successfully complete a PhD dissertation.

**SCHEDULE**
The MFEQE will be offered as required. Students must apply to the director of the Manufacturing Engineering department.

**ADMINISTRATION OF THE EXAM**
The MFEQE consists of both written and oral components. The written exam must be successfully completed before the oral exam can be taken. The oral exam will be given within two weeks of the completion of the written exam.

A member of the Manufacturing Engineering faculty will be appointed to be chairperson of the MFEQE Committee. This person should not be the student's PhD dissertation advisor. The student's PhD dissertation advisor may be a member of the MFEQE Committee. At the present time, the MFEQE Committee will consist of all members of the Manufacturing Engineering faculty with the rank of assistant professor or higher. Faculty from other departments at WPI or other colleges/universities may be asked to participate in this examination if the Manufacturing Engineering faculty feels this is necessary. The committee will exercise its discretion in handling any extenuating circumstances or problems.

**WRITTEN EXAM**
The written exam will be open book. The written exam will be given in four two-hour sections, over two or three days.

The student must select three of the following seven areas for the written examination:

- Manufacturing Systems
- Manufacturing Processes
- Control Systems
- Design
- Materials
- Financial Processes
- Statistics and Quality Assurance

The detailed description of the seven areas is the same as it is for the MS degree in Manufacturing Engineering. In addition, the student must select one additional area for examination that is related to the student’s proposed area of research (i.e., Artificial Intelligence, Materials Science, Statistics, and so forth). This area must be approved by the student’s academic advisor and the Manufacturing Engineering Graduate Committee. Questions of both a theoretical/scientific and a practical/engineering nature will be included in the written exam. In each of the above sections, a choice of questions will be given. The writer of the question will grade that question with a grade of A–D, or between 0 and 100. The student must pass each section of the exam. The MFEQE Committee will determine the passing grade each time the exam is given. Deficiencies found in the written exam may be further questioned in the oral exam.

**ORAL EXAM**
When the student passed the written exam with deficiencies, the oral exam will be necessary. The oral exam will be given by the MFEQE Committee and focus on, but not be limited to, the deficient subjects. The MFEQE Committee will determine if a student passes the oral exam by a simple majority vote.
Possible Results of the MFEQE

1. The student passes and continues to work towards the PhD.
2. The student may fail but be allowed to take the MFEQE for a second time in at least one semester after the first. The MFEQE Committee will identify the areas of deficiency for the student. This result may be determined after the written component of the examination, or after both the written and oral components have been taken.
3. The student may fail the exam and not be allowed to continue in the Manufacturing Engineering PhD program at WPI. This result may be determined after the written component of the examination, or after both the written and oral components have been taken.

Admission to Candidacy

To be admitted to candidacy for the PhD in Manufacturing Engineering, a student must:

1. Pass the MFEQE.
2. Submit and receive approval for Admission to Candidacy summarizing the student's course of study. This application must be approved by the Manufacturing Engineering Graduate Committee.

   It is recommended that the student develop a plan of study early in the PhD program in cooperation with the dissertation advisor and the Dissertation Committee. The plan of study may be submitted to and approved by the Manufacturing Engineering program prior to taking the MFEQE. The application for candidacy with the plan of study should be submitted to the Committee on Graduate Studies and Research after the MFEQE is passed.

PhD Research Proposal

At least one year prior to completion of the PhD dissertation, the student must present a formal seminar to the public describing the proposed dissertation research project. This PhD Research Proposal will normally be presented after admission to candidacy. A formal written research proposal must be given to the student's PhD Dissertation Committee at least one week prior to the presentation. There is no grade for the research proposal. The purpose of the proposal defense is to test the candidate's ability for research, and help the student in directing the research toward a successful PhD dissertation. Therefore, suggestions and redirections of the dissertation research will be made by the Dissertation Committee. A formal written and oral PhD Research Proposal also provides the opportunity to inform the Dissertation Committee and the entire Manufacturing Engineering community of the proposed research project, and to obtain input from all interested parties.

The student’s PhD dissertation advisor is the chairperson of this committee. The same PhD Dissertation Committee will judge the student’s dissertation.

PhD Dissertation Presentation and Defense

Upon completion of the PhD dissertation, the student must successfully defend the dissertation. The same format will be used as for the research proposal.

The student’s PhD Dissertation Committee, with the dissertation advisor acting as chairperson, will determine if the student passes, by a simple majority vote. The possible results of the dissertation defense are:

1. Pass.
2. Pass with corrections/amplifications/additions to the dissertation that must be finally approved by the dissertation advisor and/or the entire committee.
3. Not pass, correct deficiencies and present the dissertation again to only the committee.
4. Fail, and be terminated from the program.

PhD Dissertation Committee

The student’s dissertation advisor chairs this committee. With the advice of the dissertation advisor, the student will select a Dissertation Committee of at least five members, made up from members of the Manufacturing Engineering faculty and representing more than one department or person from outside WPI (i.e., from industry or another college/university). This committee will participate in the "PhD Research Proposal" and the "PhD Dissertation Defense." The student should call on the members of this committee for advice with regard to course selection and research projects during the entire PhD program. It is recommended that this committee be selected early in the student’s PhD program, and prior to taking the comprehensive examination.

The committee will exercise its discretion in handling any extenuating circumstances or problems.