

# **Master of Science in Industrial Engineering with Creative Component**

## **Overview of Degree Program**

The Master of Science with Creative Component is a graduate degree program in the Department of Industrial and Manufacturing Systems Engineering (IMSE). While the coursework requirements for this degree program are outlined in the IMSE Graduate Handbook the purpose of this document is to describe the creative component. Two faculty members oversee the creative component for an individual student: the student's major professor (a member of the graduate faculty in IMSE) and the IE 599 course administrator. The role of the major professor is to be the domain-area expert that will confirm the contributions and the creative nature of the project. The role of the IE 599 course administrator is to be the instructor of record for the course and to ensure that the student is making appropriate progress on the project relative to an agreed-upon timeline.

The creative component itself must illustrate the student's independence and creativity in their chosen sub-domain area within the broad scope of industrial engineering. The final product is a written report that is defended in a final oral defense. Both the major professor and IE 599 administrator will participate in the final defense. If neither the major professor nor the IE 599 administrator is a member of the IMSE Graduate Committee, a member of that committee will be appointed to also participate in the final oral defense.

## **Appropriate Topics**

- Comprehensive literature review of an industrial engineering topic
- Empirical studies
- Industrial engineering design problem and solution
- Methodology development work
- Instructional modules
- Case studies

This is just a sample of acceptable topics. The specifics for each of these topics would be reviewed and approved by the major professor and the IE 599 administrator at the time of outline development. Other topics, likewise, can be proposed by the student and considered by the major professor and IE 599 administrator. The critical characteristic of a creative component topic is that it is related to a sub-domain area in industrial engineering and it is likely to 1) advance our knowledge in said sub-domain area or 2) demonstrate an innovative application of industrial engineering methods to solve a problem. Any student engaging in industrial research topics must obtain written approval from the industrial partner prior to beginning the creative component, as the final report document will be made available to the public through the IMSE website and the ISU Library.

## **Timelines**

For a Summer Graduation:

- Outline of topic to major professor by February 15
- Major professor reviews and either accepts or rejects the scope and topic of the creative component; Student and major professor attempt to work out any differences by February 22
- First draft of creative component to major professor and IE 599 administrator by the first day of summer semester (Summer I)
- Summer Graduation Application submitted by deadline (Grad College deadline)
- Student and major professor spend the summer editing/revising the creative component to meet the expectations of the major professor
- With the approval of the major professor, student works with IMSE Graduate Program Assistant to schedule the final oral defense of the creative component
- Final Report submitted to major professor and IE 599 administrator at least two weeks before the oral defense date
- Summer Final Oral Defense completed by deadline (Grad College deadline)

For a Spring Graduation:

- Outline of topic to major professor by October 1
- Major professor reviews and either accepts or rejects the scope and topic of the creative component; Student and major professor attempt to work out any differences by October 8
- First draft of creative component to major professor and IE 599 administrator by the first day of spring semester
- Spring Graduation Application submitted by deadline (Grad College deadline)

- Student and major professor spend the spring semester editing/revising the creative component to meet the expectations of the major professor
- With the approval of the major professor, student works with IMSE Graduate Program Assistant to schedule the final oral defense of the creative component
- Final Report submitted to major professor and IE 599 administrator at least two weeks before the oral defense date
- Spring Final Oral Defense completed by deadline (Grad College deadline)

For a Fall Graduation:

- Outline of topic to major professor by May 15
- Major professor reviews and either accepts or rejects the scope and topic of the creative component; Student and major professor attempt to work out any differences by May 22
- First draft of creative component to major professor and IE 599 administrator by the first day of fall semester
- Fall Graduation Application submitted by deadline (Grad College deadline)
- Student and major professor spend the fall semester editing/revising the creative component to meet the expectations of the major professor
- With the approval of the major professor, student works with IMSE Graduate Program Assistant to schedule the final oral defense of the creative component
- Final Report submitted to major professor and IE 599 administrator at least two weeks before the oral defense date
- Fall Final Oral Defense completed by deadline (Grad College deadline)

### **Creative Component Products**

1. Outline of Topic – The outline of the topic for the creative component is a critical first step in the development of the creative component. This outline should be completed early in the semester prior to the planned graduation semester. This document should be in outline format and should be no more than one page (front and back) in length. This should be viewed as a proposal for the creative component. This outline should include all of the following components:
  - Research Question
  - Background
  - Objective(s)/Goal(s)
  - Approach/Methods
  - Expected Results
2. Draft Report – The draft report of the creative component is complete first draft of the final report document on the industrial engineering topic of interest. It must be in a form that will allow the major professor and the IE 599 administrator to advise the student that either the student is, or is not, on track to have an acceptable creative component for the MS degree. The report does not need to be polished at this point, but it does need to be complete. Upon their review of the draft report the major professor and IE 599 administrator will advise the student as to whether they should register for IE 599 or other courses that will allow them to complete the Master of Engineering in Industrial Engineering (coursework-only degree). The document will typically be 30-45 double-spaced pages. The draft report must be submitted to the major professor and the IE 599 administrator before the first day of classes of the semester of planned graduation.
3. Final Report – The final report of the creative component is a comprehensive report on the industrial engineering topic of interest. It must be in a form and format that would allow it to be an archived document. The document will typically be 30-45 double-spaced pages. The final report must be submitted to the major professor and the IE 599 administrator at least two weeks prior to the date set for the oral defense. Upon a successful final oral defense the creative component will be archived in the Iowa State University libraries and will be publicly available.
4. Final Oral Defense Presentation – The final oral defense presentation of the creative component is a distilled presentation of the important contributions of the work of the creative component. The presentation (35-40 minutes) and Q&A defense of the creative component (40-50 minutes) will typically last between 75 and 90 minutes. The defense must be scheduled and passed by the deadlines established by the Iowa State University Graduate College.