GRADUATE STUDENT HANDBOOK

Manufacturing Systems Engineering MS Program

2015-2016

Department Chair - Dr. Michael Renfro
Director of Graduate Studies – Dr. Fazleena Badurdeen
Graduate Program Coordinator – Steven Adkins
# Table of Contents

1. Introduction ........................................................................................................... 4
2. Admission to the MFS Program ............................................................................. 4
   A. Classification of Students .................................................................................. 4
      I. Regular Students .............................................................................................. 4
      II. Conditional Students .................................................................................... 4
      III. Post-baccalaureate Students ......................................................................... 5
      IV. Dual Degree .................................................................................................. 5
      V. University Scholars Program .......................................................................... 5
   B. Admission Requirements for Regular Students .................................................. 5
   C. Admission Requirements for the University Scholars Program ......................... 6
      I. Degree Requirements ...................................................................................... 6
      II. Admission Requirements ............................................................................... 6
   D. Application for Admission .................................................................................. 7
      I. Regular Status ................................................................................................ 7
      II. Post-Baccalaureate Status ............................................................................. 7
      III. Dual Degree Status and University Scholar Status ..................................... 8
   E. After Enrollment .................................................................................................. 8
      I. Orientations ..................................................................................................... 8
      II. Graduate Student Profile ............................................................................... 8
      III. Assignment of a Faculty Advisor .................................................................. 9
      IV. Program Planning ......................................................................................... 9
      V. Registration .................................................................................................... 9
      VI. Office Space .................................................................................................. 10
      VII. Keys ............................................................................................................ 10
   F. After Beginning Class Work .............................................................................. 10
      I. Proposed Plan of Study ................................................................................... 10
      II. Application for Degree .................................................................................. 10
III. Time Limits for Degree ........................................................................................................... 10
IV. Courses and Grades .................................................................................................................. 10
V. Incomplete Grades ....................................................................................................................... 11
G. Review and Dismissal .................................................................................................................. 11
H. Seminars ..................................................................................................................................... 12
   I. William Maxwell Reed Seminars ............................................................................................. 12
   II. Safety Training Seminars ......................................................................................................... 12

3. Degree Requirements for the Master of Science Degree ........................................................... 13
   A. Program Options ....................................................................................................................... 13
      I. Plan A (Thesis Plan) .............................................................................................................. 13
      II. Plan B (Research Project) .................................................................................................... 14
      III. Transfer of Credits ............................................................................................................. 16
      IV. Program Approval ............................................................................................................... 16
   B. Requirements by Major Area .................................................................................................. 16
   C. Operational Guidelines for Assistantships ............................................................................. 18
      I. Period of Appointment ......................................................................................................... 18
      II. Service Load ....................................................................................................................... 19
      III. Renewal and Termination of Appointments ..................................................................... 19
      IV. Tuition Scholarships .......................................................................................................... 19
      V. Health Care ....................................................................................................................... 19
      VI. Income Tax Exemptions ...................................................................................................... 20
      VII. Parking Privileges ............................................................................................................ 20
      VIII. Social Security Taxes ...................................................................................................... 20
      IX. Holidays, Vacations and Sick Leave .................................................................................. 20

4. Appendices ................................................................................................................................. 21
1. **Introduction**

The Manufacturing Systems Engineering MS (MFS) program is a multidisciplinary program that is managed by the Mechanical Engineering department. It is administered by a multidisciplinary Faculty Advisory Committee drawing on manufacturing expertise across the College of Engineering. The Committee will also typically consist of one or more members from departments outside the College of Engineering, which by their nature have an affiliation with manufacturing. The faculty are also active in the teaching of courses in the program and are engaged in world-class, cutting-edge research in manufacturing and related areas. As a result, the program provides an intellectually challenging environment in which students can pursue advanced studies and engage in research.

2. **Admission to the MFS Program**

A. **Classification of Students**

Currently, students undertaking graduate work are classified by the Graduate School in 1 of 2 categories, degree students or post-baccalaureate students. Degree students are further classified as regular, conditional, or dual degree. Finally, the University Scholars Program is available for undergraduate students with a minimum of 90 hours, accepted GPA, and senior standing. See Admission Requirements for more detail.

   I. **Regular Students**

   Regular students must satisfy all admission requirements and be accepted by both the Graduate School and the MFS Degree Program.

   II. **Conditional Students**

   A student who wishes to pursue a higher degree, but who, for 1 or more of the reasons listed below, is temporarily ineligible for regular admission status may be recommended by the Director of Graduate Studies as a conditional student:

   - Missing transcripts or other requirements for admission such as letters of recommendation.
   - Temporary waiver of the Graduate Record Examination.
   - Deficiencies of undergraduate courses in engineering.
   - Graduating University of Kentucky seniors lacking no more than six hours for graduation. The consent of the College Dean and the Dean of the Graduate School and approval of the Director of Graduate Studies are necessary. Such students may take no more than twelve credit hours and must complete the undergraduate degree during the semester in which they enroll in the conditional status.
III. Post-baccalaureate Students
Students who hold a baccalaureate degree and who wish to pursue graduate study without a degree objective and students who do not fulfill the entrance requirements of The Graduate School may apply for admission as post-baccalaureate graduate students. A 2.5 grade point average in a 4.0 scale is required. Admission to this status may be granted to an applicant who (1) demonstrates promise but has not qualified for admission to a degree program, or (2) intends not to complete a degree program. Students may take courses for graduate credit but may not apply more than 9 hours credit with a grade of A or B earned in the post-baccalaureate status to any degree program leading to an advanced degree at this institution. All transfers of credit hours to a graduate program must be approved by that program’s Director of Graduate Studies (DGS) and the Graduate Dean. Post-baccalaureate students who wish to apply for a graduate program should notify the Graduate School by updating their existing graduate school application. Applicants must have a 3.0 grade point average on all work attempted as post-baccalaureate students.

IV. Dual Degree
Students enrolled in electrical or mechanical engineering who have a minimum cumulative undergraduate GPA of 3.00 may enroll in the dual degree program. Such students may take graduate level courses beginning in their junior year provided they’ve completed at least 90 credit hours. The dual degree program is structured to appeal to engineering students who plan a career in manufacturing.

V. University Scholars Program
Students in this category must have senior standing, have completed all University studies requirements (a minimum of 90 hours, 3.5 GPA in major, 3.2 GPA overall). The current University Scholars Program provides an opportunity for the very best and brightest students to significantly reduce the time required to complete an undergraduate degree and a master’s degree at the University of Kentucky.

B. Admission Requirements for Regular Students
Applicants seeking admission to the Manufacturing Systems Engineering MS Program as regular students must have been awarded a baccalaureate degree with an undergraduate grade point average of at least 2.8 on a 4.0 scale. To be admitted to the MFS Program the applicant must have been awarded a Bachelor of Science degree from an engineering program accredited by ABET. Applicants who have been awarded Bachelor degrees other than engineering or from engineering programs not accredited by ABET (including those offered by institutions outside the United States) may be admitted only if persuasive evidence (test scores, grades, letters of recommendation) indicate strong academic potential. Students with an undergraduate major not in engineering may also need to complete a certain number of undergraduate engineering courses to prepare them for this program. The extent of this will be evaluated by the Director of Graduate Studies (DGS). For additional information contact the Graduate Admissions Officer.
Beginning Fall 2015, GRE scores are not required for admission into the program. However, note that GRE scores must be submitted if you intend to apply for any fellowships (some are available for full-time students, once enrolled in the program).

All international students (except those with a degree from an accredited U.S. institution) must have a minimum score on the language tests. Two systems may be considered: TOEFL or IELTS per Graduate School requirements.

TOEFL: Applicants must have a minimum score of 550 (paper), 213 (computer), 79 (Internet).
IELTS: Applicants must have an overall band score of at least 6.5.

C. Admission Requirements for the University Scholars Program
   (Combined MS/BS Degrees)

The University Scholars Program (USP) offers highly motivated UK graduates the opportunity to integrate undergraduate and graduate courses in a single continuous program culminating in both bachelors and Masters degrees. Students begin the University Scholars Program during the senior year of their undergraduate program.

I. Degree Requirements
   a) Twelve (12) credit hours of graduate work will count for both graduate and undergraduate programs. Requirements for the BS degree are unchanged.
   b) Students may take no more than 16 credit hours per semester unless one or more courses is taken as an audit, or otherwise with a pass/fail grade, except by recommendation of the Director of Graduate Studies (DGS) and approval of the Dean of the Graduate School.
   c) Students must have both undergraduate and graduate advisors.

II. Admission Requirements
   a) Application to the program should be submitted to the DGS by April 30 of the student’s junior year.
   b) Applicants must have completed at least 90 credit hours of work toward the Bachelors degree, or be eligible for senior standing in the semester they are admitted to the program.
   c) The undergraduate GPA must be at least 3.5 in mechanical engineering courses and 3.2 overall.
d) Admission decisions will be made by the Dean of the Graduate School or his/her appointee.

D. Application for Admission

I. Regular Status
Applicants for admission as regular students must be admitted to both the Graduate School and the Degree Program.

<table>
<thead>
<tr>
<th>Application Deadline</th>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>International Applicants</td>
<td>March 15</td>
<td>August 15</td>
</tr>
<tr>
<td>Domestic Applicants</td>
<td>One month prior to first day of classes</td>
<td>One month prior to first day of classes</td>
</tr>
</tbody>
</table>

(No applications are accepted for the Summer Session.)

The applicant is required to submit the following items to the Graduate School:
- Graduate School Application form
- Payment of the application fee
- 1 official copy of transcripts from all colleges or universities ever attended
- Beginning Fall 2015, GRE scores are not required for admission into the program. However, note that GRE scores must be submitted if you intend to apply for any fellowships (some are available for full-time students, once enrolled in the program). Official TOEFL or IESTL scores. (International students only.) Photocopies not accepted.
- Resume (International students please specify which is your first and which is your family name)
- Statement of Purpose
- 3 letters of recommendation
- To complete the Graduate School Application form and pay your fee online visit the Admissions page of the Graduate School’s website.

II. Post-Baccalaureate Status
All transfers of credit hours to a graduate program must be approved both by that program’s Director of Graduate Studies (DGS) and the Graduate Dean. The process for admission as a post-baccalaureate graduate student is:
- Student applies to Graduate School and pays application fee (by credit card). The program code is POBA. A Graduate School admission application (and accompanying
transcript) must be on file at least 2 weeks in advance of the registration date for the term in which the student plans to enroll. Graduate students with post-baccalaureate status have one month after each semester begins to be admitted to a graduate program by the Graduate School. After that deadline the student must wait until the following semester.

- The Graduate School will evaluate the application and notify the student of its decision.
  - Permission to enroll in any graduate course as a post-baccalaureate student will be granted only if space is available and the student meets the prerequisites.

To be admitted to a graduate degree program subsequent to being a post-baccalaureate, a student must:

- Have a 3.0 on all work attempted in post-baccalaureate status
- May not transfer more than 9 hours or 25% of hours required to earn the degree
- Must have earned an A or B in transferred courses
- Must have transfer approved by program’s Director of Graduate Studies and the Dean of the Graduate School
- Must comply with all admissions requirements for degree-seeking students to the desired program and state the term for which enrollment is desired

### III. Dual Degree Status and University Scholar Status

See the:

- Dual Degree Application Form
- University Scholars Program Application Form

### E. After Enrollment

#### I. Orientations

All new students are encouraged to attend orientation organized by the UK Graduate School. There will be a separate ME Department graduate orientation for all ME and MFS students at the beginning of each Fall semester, and all graduate students are required to attend.

#### II. Graduate Student Profile

The Graduate Program Coordinator (GPC) maintains a personal profile of all MFS graduate students. A *Graduate Student Profile* (see appendix) must be submitted by all new graduate students to the GPC by the end of their second week on campus to ensure that the department has current contact information. An updated *Graduate Student Profile* should be submitted to the GPC immediately after there is any change in contact information or graduate status.
An e-mail listserv is frequently used for general communications with students. All graduate students are subscribed to this mailing list and should check their e-mail at least three times per week if not daily.

III. Assignment of a Faculty Advisor

The Director of Graduate Studies (DGS) serves as the advisor to each student majoring in Manufacturing Systems Engineering until the student has a permanent advisor. Selection of a faculty adviser is based on the interests of the student, on willingness of the faculty member to accept the student, and concurrence of the DGS. Typically the adviser should be appropriate for directing the thesis of the student, and may also be the principal investigator of a funded project which provides funds for the student’s support. The advisor should be selected during the student’s first semester in the program.

IV. Program Planning

New graduate students should meet with a faculty advisor and/or the Program’s Director of Graduate Studies to develop a plan of graduate study. This is accomplished by completing the "Plan of Study" form (see appendix), having it signed by the advisor and the Director of Graduate Studies, and filing it with the Director of Graduate Studies. The primary purpose of this effort is to help precisely define the educational objectives of the student and to assure that the student is fully aware of the University’s and the Department’s degree requirements. This must be accomplished early in the student’s program and, in any case, no later than the end of the first semester of graduate studies.

V. Registration

After developing a proposed program with an advisor and/or the DGS, the student may proceed with registration. All UK students must register for classes through myUK, the web portal to their records and other services and information. In addition to the link above, there is a link on the bottom left corner of the UK home page. Visit the www.uky.edu/registrar/myUK.htm and/or www.uky.edu/Registrar/AccSAIS.htm for general information. Go to www.uky.edu/Registrar/docs/myUK.pdf for specific directions to register for classes. Any student who experiences difficulties with this system can contact Graduate Program Coordinator.

Midway through the current term, preregistration for the next semester’s courses is held for all currently enrolled students. New students are informed of these dates at the time of acceptance. Students who were enrolled in the previous semester may not register at this time. Continuing students who failed to priority register during the previous semester, as well as new and readmitted students who applied after the early registration deadline, must register later during the first week of classes.
VI. Office Space
Office space in the Center for Manufacturing Building is available on a limited basis to graduate students. Contact the Graduate Program Coordinator or your faculty advisor for available spaces.

VII. Keys
Graduate students frequently require keys for access to University offices, laboratories and buildings. Requests for keys are initiated by completing a Key Request form. The student’s advisor and the ME Department Chair must certify the validity of each key request.

F. After Beginning Class Work

I. Proposed Plan of Study
This must be accomplished early in the student’s program and, in any case, no later than the end of the first semester of graduate studies. It should be emphasized that the Plan of Study can, and often will, be changed as the student progresses. Should such a change become necessary, a new Plan of Study should be prepared, following the same procedure as emphasized above.

II. Application for Degree
To be eligible for a degree, graduate students must file a Graduate School Application for Degree using their myUK account. The application deadlines are:
  a) within 30 days after the beginning of the Fall or Spring Semester in which he/she expects to graduate,
  b) or within 15 days after the beginning of summer session.
Further instructions can be found at the Graduate School website.

III. Time Limits for Degree
No course or equivalent credit may be given for graduate study completed more than eight years prior to the end of the semester at which the student expects to receive a degree. Exceptions to this rule are possible under certain conditions if recommended by the Director of Graduate Studies and subsequently approved by the Dean of the Graduate School and the Graduate Council. No activity completed more than 12 years preceding the proposed graduation date will be considered for graduation.

IV. Courses and Grades
Regular Semester: A full-time graduate student must be enrolled in nine (9) or more semester hours of coursework. Graduate students are expected to remain in full-time status until their course and/or residence requirements are met.
Summer Term: Students are expected to conduct full-time research during the summer, so no regularly-scheduled ME graduate courses are offered during this period.

Some of the graduate courses in the MFS program are not offered every semester, some are offered once a year and others once every 2 years. Should a student miss a course while being offered, he/she might not be able to take that course again. The student can avoid this dilemma by planning the program of study well in advance.

V. Incomplete Grades

A grade of 'I' (incomplete) may be assigned to a graduate student if a part of the work of a course remains undone and there is a reasonable possibility that a passing grade will result from completion of the work. All incomplete grades must be removed from the student’s record before he/she may schedule the final examination or be awarded a degree. Removal may be accomplished in two ways:

- complete requirements for all such courses permitting the instructor(s) to issue official grade change(s);
- provide the Dean of the Graduate School with letters from the student’s advisor or special committee Chair, and the DGS, stating that the incomplete course(s) is (are) no longer part of the student’s Plan of Study.

An incomplete grade “I” will automatically be changed to a failing grade “E” if not removed within one calendar year from the date the in-complete grade was assigned.

G. Review and Dismissal

Progress of each graduate student will be reviewed by the DGS, in consultation with the Graduate Studies Committee and the student’s academic advisor, once each academic year, or more often for students on scholastic probation. If a student does not make satisfactory progress in coursework and/or research, that student shall be dismissed from the MFS graduate program.

Conditions for Dismissal

- Students are unable to achieve a 3.0 cumulative GPA after a semester of scholastic probation.

- Students have completed their formal coursework and/or residence requirements but have not made satisfactory progress toward completion of remaining degree requirements.

Dismissal Procedure

- Dismissal is effective at the end of the semester in which the review is made.
• The student will be notified in writing of potential dismissal with- in four weeks of the beginning of the semester during which the re- view is to be conducted.

H. Seminars

I. William Maxwell Reed Seminars
To supplement the student's formal coursework and research experience, the Department of Mechanical Engineering, in conjunction with the Graduate School, offers the William Maxwell Reed (WMR) Seminar Series. There will usually be between six and eight seminars each semester. These will typically be held on Thursdays from 3:30 to 4:30 p.m.

II. Safety Training Seminars
All graduate students who expect to be involved in laboratory work are expected to attend some safety training seminars as provided by the safety committee of the center and the safety training offered by the university.

III. Institute for Sustainable Manufacturing Seminars
The Institute for Sustainable Manufacturing (ISM) is a multidisciplinary institute in the College of Engineering with faculty from different departments. The ISM periodically hosts internationally reputed speakers in sustainable manufacturing and related areas. The specific dates and times of these seminars will be announced ahead of time.

IV. The Power and Energy Institute of Kentucky (PEIK) Seminars
PEIK offers a series of seminars every semester related to energy issues. These seminars are usually held on Friday afternoons. The specific dates and times will be announced ahead of time.

All MFS students are encouraged to attend these seminars, and attendance will be taken.
3. **Degree Requirements for the Master of Science Degree**

A minimum of twenty-four semester hours of course work plus a thesis (Plan A) or thirty-three semester hours including MFS 784 Research Project in Manufacturing Systems Engineering is required. In no case will independent work, used for part of the thesis be counted as part of the twenty-four hours of course work. The thesis must be actively supervised by a member or associate member of the Graduate Faculty. **Students pursuing this degree under the dual degree option must meet the same requirements as all other students.**

**A. Program Options**

The Master of Science in Manufacturing Systems Engineering is offered through the Graduate School. There are currently two options approved for fulfilling the requirements for the MS degree:

**I. Plan A (Thesis Plan)**

This program provides for study and research leading to the degree of Master of Science in Manufacturing Systems Engineering. The thesis plan requires twenty-four credit hours of course work and a thesis. Per Graduate School requirements, one-half or more of the coursework must be at the 600 level (graduate credit only) or above. All students will be required to complete four specified core courses (MFS 606, MFS 605, MFS 505, MFS 611). The electives for each student will be developed in conjunction with a faculty adviser to insure that the program provides breadth and depth of content for the student, and meets the specific needs and interests of the student.

The coursework consists of the following (see Course Descriptions, excerpted from the University Bulletin):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFS 606</td>
<td>Global Issues In Manufacturing</td>
<td>3 hr</td>
</tr>
<tr>
<td>MFS 605</td>
<td>Systems for Factory Information and Control</td>
<td>3 hr</td>
</tr>
<tr>
<td>MFS 611</td>
<td>Organizational Behavior</td>
<td>3 hr</td>
</tr>
<tr>
<td>MFS 505</td>
<td>Modeling of Manufacturing Processes and Machines</td>
<td>3 hr</td>
</tr>
<tr>
<td></td>
<td>Manufacturing Specialization Electives</td>
<td>6 hr</td>
</tr>
<tr>
<td></td>
<td>Other Electives (appropriate courses in Engineering, Computer Science or Business &amp; Economics)</td>
<td>6 hr</td>
</tr>
<tr>
<td>Thesis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>24 hr</td>
</tr>
</tbody>
</table>
**Recommended Sequence for Plan A (an example)**

Since this is a graduate program, a semester by semester sequence cannot be completely defined. Some students will be part-time, and the sequence for full-time students may vary to some degree depending on their individual needs and prerequisites of courses. However, the sequence recommended for a full-time student would be as follows:

Semester 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFS 606</td>
<td>Global Issues In Manufacturing</td>
<td>3 hr</td>
</tr>
<tr>
<td>MFS 611</td>
<td>Organizational Behavior</td>
<td>3 hr</td>
</tr>
<tr>
<td></td>
<td>Manufacturing Specialization Elective 1</td>
<td>3 hr</td>
</tr>
</tbody>
</table>

Semester 2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFS 505</td>
<td>Modeling of Manufacturing Processes and Machines</td>
<td>3 hr</td>
</tr>
<tr>
<td></td>
<td>Manufacturing Specialization Elective 2</td>
<td>3 hr</td>
</tr>
<tr>
<td></td>
<td>Other Elective 1</td>
<td>3 hr</td>
</tr>
</tbody>
</table>

Semester 3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFS 605</td>
<td>Systems for Factory Information and Control</td>
<td>3 hr</td>
</tr>
<tr>
<td></td>
<td>Other Elective 2</td>
<td>3 hr</td>
</tr>
<tr>
<td></td>
<td>Thesis</td>
<td></td>
</tr>
</tbody>
</table>

Students working on their thesis, who have completed all required course work should register for MFS 748 (0 hours) to maintain their status in the university.

**II. Plan B (Research Project)**

The research project option is reserved for students who have significant engineering research or development experience in a manufacturing environment, for which completion of a thesis would be less beneficial than the additional course work involved in Plan B. Approval of the student’s advisor and of the DGS is necessary for a student to pursue Plan B. The Plan B (research project) requires thirty-three credit hours of course work including an individual project. The coursework consists of the following (see Course Descriptions, excerpted from the University Bulletin):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFS 606</td>
<td>Global Issues in Manufacturing</td>
<td>3 hr</td>
</tr>
<tr>
<td>MFS 605</td>
<td>Systems for Factory Information and Control</td>
<td>3 hr</td>
</tr>
<tr>
<td>MFS 611</td>
<td>Organizational Behavior</td>
<td>3 hr</td>
</tr>
<tr>
<td>MFS 505</td>
<td>Modeling of Manufacturing Processes and Machines</td>
<td>3 hr</td>
</tr>
<tr>
<td></td>
<td>Manufacturing Specialization Electives</td>
<td>9 hr</td>
</tr>
<tr>
<td></td>
<td>Other Electives (appropriate courses in Engineering, Computer Science or Business &amp; Economics)</td>
<td>9 hr</td>
</tr>
<tr>
<td></td>
<td>Project</td>
<td>3 hr</td>
</tr>
</tbody>
</table>
Total 33 hr

**Recommended Sequence for Plan B (an example)**

The coursework sequence consists of the following (see Course Descriptions, excerpted from the University Bulletin):

**Semester 1**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFS 606</td>
<td>Global Issues in Manufacturing</td>
<td>3 hr</td>
</tr>
<tr>
<td>MFS 611</td>
<td>Organizational Behavior</td>
<td>3 hr</td>
</tr>
<tr>
<td>Manufacturing Specialization Elective 1</td>
<td>3 hr</td>
<td></td>
</tr>
<tr>
<td>Other Elective 1</td>
<td></td>
<td>3 hr</td>
</tr>
</tbody>
</table>

**Semester 2**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFS 505</td>
<td>Modeling of Manufacturing Processes and Machines</td>
<td>3 hr</td>
</tr>
<tr>
<td>Manufacturing Specialization Elective 2</td>
<td>3 hr</td>
<td></td>
</tr>
<tr>
<td>Other Elective 2</td>
<td></td>
<td>3 hr</td>
</tr>
</tbody>
</table>

**Semester 3**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFS 605</td>
<td>Systems for Factory Information and Control</td>
<td>3 hr</td>
</tr>
<tr>
<td>Manufacturing Specialization Elective 3</td>
<td>3 hr</td>
<td></td>
</tr>
<tr>
<td>Other Elective 3</td>
<td></td>
<td>3 hr</td>
</tr>
<tr>
<td>Project</td>
<td></td>
<td>3 hr</td>
</tr>
</tbody>
</table>

**For both Plan A and Plan B:** Per Graduate School requirements, one-half or more of the coursework must be at the 600 level (graduate credit only) or above. All students will be required to complete four specified core courses (MFS 606, MFS 605, MFS 505, MFS 611). MFS 606 should be taken in the first semester if possible. The electives for each student will be developed in conjunction with a faculty adviser to insure that the program provides breadth and depth of content for the student, and meets the specific needs and interests of the student. The project class (MFS 784) will be conducted in consultation with the student’s advisor.

Students who are granted entry into the Plan B research project option will utilize their advisor’s input and identify an area to demonstrate the application of concepts and tools learned through the Manufacturing Systems Engineering courses. The student will be responsible for documenting the project work in a report. The report will be similar in format to a thesis document but with an orientation towards the application and a smaller scope. The student will follow graduate school requirements for setting up a final exam committee. The student will share the report with the committee and then give an oral presentation on the project findings to the committee. The committee will evaluate the student’s final presentation to ensure successful completion of the Plan B Master project.
III. **Transfer of Credits**
In some cases a student may transfer up to 9 semester hours credit from another program or university. Consult the Graduate School Bulletin for details.

IV. **Program Approval**
Each student’s Plan of Study must be approved by both the faculty advisor and Director of Graduate Studies.

V. **Deficiencies**
A student may not be able to begin immediately a full graduate program leading to the MFS degree; it may be necessary for the student to satisfy prerequisites omitted in his/her undergraduate curriculum. Deficiencies are determined by the Director of Graduate Studies.

VI. **Requirements by Numbering**
A candidate for the MFS degree may credit the following toward degree requirements:
- Any 500-, 600-, or 700-level course; and
- Any 400G level course offered by a program other than Manufacturing System Engineering.
In addition, the following conditions apply:
- A minimum of half of the required credit hours must be 600- and 700-level courses (those meeting as organized classes). For thesis option this means twelve credit hours.
- At least two-thirds of the required credit hours must be in regular courses (excluding MFS 768, 780, 784).

B. **Requirements by Major Area**
At least two-thirds of the course work must be in manufacturing-related areas. All courses must be included in the student’s Plan of Study.

I. **Grades**
The MS degree will be awarded only if the student has attained a grade point average of at least 3.0 on all work taken as a graduate student and on all work carrying graduate credits.

II. **Transfer from Other Degree**
Students currently enrolled in other degree programs at the University may be transferred to the MFS program with the approval of the Director of Graduate Studies and the Dean of the Graduate School. All regulations and procedures stipulated herein shall be applied to such students.

III. **Thesis Requirements**
The thesis must be developed under the direction of a member or associate member of the Graduate Faculty. It must be approved by the thesis director (i.e. a faculty advisor), the Director of Graduate Studies, the examining committee, and the Graduate School, and must
be in conformity with instructions prepared by the Graduate School entitled, “Instructions for the Preparation of Theses and Dissertations.” (see appendix)

IV. Final Examination

MS students will be eligible to sit for the Final Examination only if they have completed all coursework for the degree, or if any remaining coursework is in progress at the time of the examination. Students with “I” grades or “S” grades in credit-bearing courses are not eligible to sit for the final examination. The overall graduate GPA of the student must be 3.0 or better to sit for the examination. The student is required to take a final oral examination for the MFS degree regardless of the option. This examination is administered by an examining committee appointed by the Dean of the Graduate School upon recommendation by the Director of Graduate Studies. The committee must consist of at least three members of which the chairman is the student’s faculty advisor. The Examination Committee must consist of:

i. at least three (3) faculty members,
ii. at least two (2), including the chair, must be full or associate Graduate Faculty members,
iii. at least one (1) must be a full Graduate Faculty member,

The examination is comprehensive and covers the student’s entire program including, but not limited to, the thesis.

The final examination is given no earlier than the beginning of the semester in which the degree is to be awarded and no later than eight days before the last day of classes of that semester. The examination must be declared either pass or failure on a majority basis. In the event of failure, the committee may recommend to the Graduate School the condition under which a second examination may be administered. In so far as it is practicable, the same examination committee gives this examination. A third examination is not permitted.

Final Examination for Plan A Students

The following procedures apply:

i. Submit an “Application for Degree” to the Graduate School within 30 days of the beginning of the semester in which the student will take the examination.
ii. Submit thesis to the thesis director and the Director of Graduate Studies in draft form.
iii. Complete a Final Examination Recommendation Form (see appendix). This form, accompanied by a Thesis Approval form (see appendix), must be submitted to the Graduate School no later than 2 weeks prior to the anticipated date of the examination.
iv. Submit thesis to the examining committee at least one week prior to the final examination.
v. Take final examination.
vi. Modify thesis as required by the examining committee.
vii. Submit thesis in final form to the Graduate School (see calendar for exact date). A copy of the thesis should be filed with the Director of Graduate Studies.

**Final Examination for Plan B Students**

The following procedures apply:

i. Submit an “Application for Degree” to the Graduate School within 30 days of the beginning of the semester in which the student will take the examination.

ii. Complete a Final Examination Recommendation Form (see Appendix D). This form must be submitted to The Graduate School no later than 2 weeks prior to the anticipated date of the examination.

iii. Submit written project report to examining committee at least one week prior to final examination.

iv. Take final examination. A copy of the project should be filed with the Director of Graduate Studies.

V. **Submission of Thesis**

After the final examination is passed, the final copy of the thesis, with appropriate signatures, is submitted. The Graduate School requires two copies, unbound and on 100% cotton paper. The cost of preparation and duplication of the thesis is normally the responsibility of the student. One copy of the thesis must be filed with the Director of Graduate Studies.

VI. **Graduation Fees**

There are no graduation fees for MS candidates. However if a thesis is being submitted, a fee for the binding of the thesis must be paid at the Student Billings and Collection Office when the thesis is submitted to the Graduate School.

VII. **Residence Credits**

An MFS student who has completed the formal coursework and who is/is not receiving a graduate assistantship through the Department or University during Fall or Spring Term, with his/her time principally devoted to the MS MSE thesis, is required to register for MFS 748 (0 hours).

C. **Operational Guidelines for Assistantships**

I. **Period of Appointment**

The appointment period for Research Assistants is determined by the principal investigator or by the Director of the center as the case may be. With the exception of official University holidays, all graduate assistants are expected to provide service throughout the periods of
their appointments. Absences during these periods require notification of and prior approval by the faculty advisor. During periods when classes do not meet and during the summer (May 16-August 15), all assistants are expected to devote full-time to research.

II. Service Load
- During the 9-month academic year, appointments are typically for one-half time service (twenty hours per week).
- Full-time appointments are typically made during the three summer months for students without summer courses.
- During the 9-month academic year, Assistants must be registered as full-time students. However, if the Assistant has completed all the course requirements for the degree, enrollment as a part-time student may be permitted with the approval of the Director of Graduate Studies.

III. Renewal and Termination of Appointments
- All assistants shall maintain satisfactory academic records and progress toward degrees; their assistantships will not be renewed if their academic progress is unsatisfactory.
- Appointments are not renewed beyond the end of the academic term during which all degree requirements have been satisfied.
- Appointments are not renewed if the university requirements are not satisfied.
- Appointments are not renewed if funding is unavailable.

IV. Tuition Scholarships
Nonresident graduate students holding research assistantships or fellowships may be eligible to receive tuition scholarships administered by the Graduate School and awarded each semester to cover the out-of-state portion of the tuition. The Director of Graduate Studies (DGS) is responsible for certifying to the Graduate School those eligible to receive tuition scholarships. Graduate students on traineeships or other externally funded programs where funds are available to pay tuition are not eligible for tuition scholarships.

Nonresident graduate students, not holding assistantships are also eligible for scholarships covering the out-of-state portion of the tuition. These “Kentucky Graduate Scholarships” are based on prior academic performance.

For more information, see the Graduate School homepage.

V. Health Care
Graduate students with full assistantships or fellowships receive the student health insurance plan offered by the University of Kentucky. Other students are eligible to purchase this insurance.

For more information, see the Graduate School homepage.
VI. Income Tax Exemptions
Assistantship stipends are subject to federal and state income taxes (note: unless covered by tax treaty) but exempt from Fayette County tax.

VII. Parking Privileges
Graduate students are automatically eligible for ‘C’ parking permits. Application for ‘E’ permits by Teaching Assistants and Research Assistants shall be accepted only upon additional clarification of the DGS that the individual is employed in a service capacity and is required to meet a firm teaching or research schedule during normal class hours.

VIII. 8. Social Security Taxes
Graduate and Research Assistants holding either F-I or J-I visas are exempt from the payment of social security taxes. Others are similarly exempted only during those academic terms in which they are enrolled as full-time students.

IX. 9. Holidays, Vacations and Sick Leave
Graduate and research assistants are not required to work during official University holidays. However, since they are classified as temporary employees of the University, they are not eligible to receive vacations and sick leave with pay. During the period between semesters students are expected to devote full time to their research projects.
4. Appendices

Admission Criteria for Students without an Undergraduate Engineering Degree (preliminary)

Graduate Student Applicants without an ABET-accredited engineering degree must develop competence and demonstrate ability in the fundamentals of engineering. This is accomplished by completing, or having taken the equivalent of, a set of courses in one of the engineering disciplines. If appropriate, a number of courses drawn from two or more such disciplines could be considered. These courses can be taken in post-baccalaureate or undergraduate status. (NOTE: These courses may have prerequisites — see UK Bulletin)

<table>
<thead>
<tr>
<th>Mechanical Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 151  Manufacturing Engineering</td>
</tr>
<tr>
<td>ME 220  Engineering Thermodynamics</td>
</tr>
<tr>
<td>ME 440  Controls</td>
</tr>
<tr>
<td>ME 330  Fluid Mechanics</td>
</tr>
<tr>
<td>ME 325  Heat Transfer</td>
</tr>
<tr>
<td>ME 344  Mechanical Design</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 211  Circuits I</td>
</tr>
<tr>
<td>EE 221  Circuits II</td>
</tr>
<tr>
<td>EE 280  Design of Logic Circuits</td>
</tr>
<tr>
<td>EE 380  Computer Organization</td>
</tr>
<tr>
<td>EE 415  Electromechanics</td>
</tr>
<tr>
<td>EE 421  Signals &amp; Systems I</td>
</tr>
<tr>
<td>EE 461  Intro. to Electronics</td>
</tr>
<tr>
<td>EE 468  Fields &amp; Waves</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>CME 205  Process Principles I</td>
</tr>
<tr>
<td>CME 210  Process Principles II</td>
</tr>
<tr>
<td>CME 320  Engineering Thermodynamics</td>
</tr>
<tr>
<td>CS 221  Computer Science for Engineers</td>
</tr>
<tr>
<td>ME 330  Fluid Mechanics</td>
</tr>
<tr>
<td>CME 415  Separation Processes</td>
</tr>
<tr>
<td>CME 425  Heat &amp; Mass Transfer</td>
</tr>
<tr>
<td>CME 420  Process Modeling</td>
</tr>
<tr>
<td>CME 550  Reactor Design</td>
</tr>
</tbody>
</table>
Plan of Study
MS in Manufacturing Systems Engineering
University of Kentucky

<table>
<thead>
<tr>
<th>Name of Student:</th>
<th>Student ID No:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Submitted:</td>
<td>Date Degree Expected:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Field of Thesis/Project:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Advisor:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Research Topic:</th>
</tr>
</thead>
</table>

## Core Courses

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Semester &amp; Year</th>
<th>Grade</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFS 606</td>
<td>Global Issues In Manufacturing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MFS 605</td>
<td>Systems for Factory Information and Control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MFS 611</td>
<td>Organizational Behavior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MFS 505</td>
<td>Modeling of Manufacturing Processes and Machines</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Manufacturing Electives
(2 Required for Thesis option, 3 Required for Project option)

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Semester &amp; Year</th>
<th>Grade</th>
<th>Credit Hours</th>
</tr>
</thead>
</table>

## Other Electives
(2 Required for Thesis option, 3 Required for Project option)

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Semester &amp; Year</th>
<th>Grade</th>
<th>Credit Hours</th>
</tr>
</thead>
</table>

**Total Credit Hours**

*Thesis students must have at least 12 hours above 600 level.*

*Project option students must have at least 18 hours (including MFS 784) above the 600 level.*

______________________  __________________
Student Signature       Date

______________________  __________________
Advisor Signature       Date

______________________  __________________
Director of Graduate Studies Signature       Date
Graduate Student Profile
Form available at:
http://www.engr.uky.edu/mfs/files/2014/08/MFS-GraduateStudentProfile.pdf

Dual Degree Form
This form is available at: http://www.research.uky.edu/gs/Forms/JointDegreeMEMFE.pdf

Transfer of Credit Form
This is available at: http://www.research.uky.edu/gs/Forms/TOCMastersSpecialist.pdf

Instructions for the Preparation of Theses and Dissertations
These guidelines are available in the Graduate School website at:
http://www.gradschool.uky.edu/CurrentStudents/theses_prep.html.

Request for Final Master’s Degree Examination Form
This form is available in the Graduate School website at:
http://www.research.uky.edu/cfdocs/gs/MastersCommittee/Student/Selection_Screen.cfm.

Application for Degree
To access this form, login to myUK: https://myuk.uky.edu/irj/portal and click on Student Services / myRecords / Graduate Degree Application.

Thesis Checklist
This form is available at: http://www.engr.uky.edu/mfs/files/2014/08/MSThesis-Checklist.pdf

Non-thesis Checklist
This form is available at: http://www.engr.uky.edu/mfs/files/2014/08/MSNon-thesis-Checklist.pdf