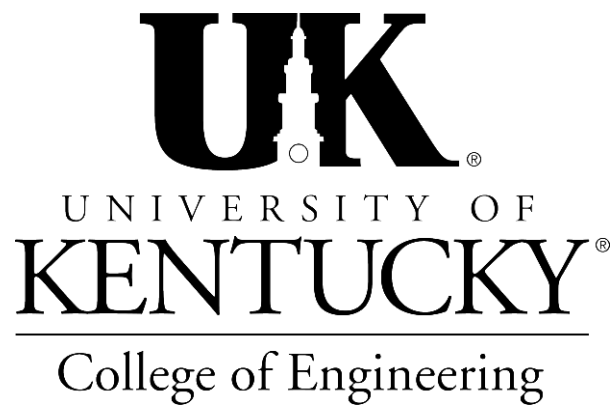


GRADUATE STUDENT HANDBOOK
DEPARTMENT OF MECHANICAL ENGINEERING
2015-2016



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Graduate School forms can be found at: <http://www.research.uky.edu/gs/gforms.html>

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FOREWORD

This handbook is intended to be a general guide for graduate students in the Department of Mechanical Engineering. It outlines the rules and procedures of the current MS and PhD programs in the department. This information is not intended to be a substitute for the *Graduate Bulletin* which is the authoritative source of information for all graduate students. This guide will be updated periodically in response to changes as they occur. If you have any questions or suggestions, please contact me.

We wish you a successful stay in the graduate program. Enjoy it, but work hard.

Dr. Haluk Karaca
Director of Graduate Studies and Professor

and

Dr. Michael Renfro
Chair and Professor
August, 2015

<http://www.engr.uky.edu/me/graduate/>

MECHANICAL ENGINEERING

GRADUATE STUDENT HANDBOOK (2015-2016)

I. INTRODUCTION

The Department of Mechanical Engineering at the University of Kentucky provides an intellectually challenging environment in which to pursue advanced studies and engage in research. The department offers programs of study leading to the MS degree in mechanical engineering as well as the PhD degree. Financial assistance is available to many qualified applicants in the form of graduate teaching assistantships, research assistantships or fellowships. Stipends will vary depending on the student's program level and type of support.

Graduate students work closely with faculty who are recognized authorities in their discipline(s), and many of the department's research projects are at the forefront of technology in their respective fields. Graduate research may be focused in any of the following areas.

Manufacturing—analytical and numerical modeling, optimization of machining processes and systems, lean, sustainable and precision manufacturing, and robotics and machine vision.

Mechanics—dynamic analysis of solids, contact mechanics, system identification of structures, thermal stress and boundary element methods.

Systems and Design—application of nontraditional materials, finite element methods, acoustics, vibration and noise prediction, rotating machinery dynamics, control systems, engineered surfaces, magnetic bearing technology, and boundary element methods in acoustics.

Thermal-Fluid Sciences—combustion & fire research, computational & experi-

mental fluid dynamics, conduction, convection, radiation, phase change heat transfer, energy conversion & utilization, gas dynamics and high speed flows, optics, painting technology and nano-technology.

II. GENERAL PROCEDURES

A. Admission Requirements (Regular Admission)

Applicants seeking admission to a graduate program in the Department of Mechanical Engineering (ME) as regular students must have been awarded a baccalaureate degree. Admission to the ME graduate programs normally requires a Bachelor's degree in engineering (not necessarily in mechanical engineering), a grade point average (GPA) of 3.0/4.0 or 70% on all graduate and undergraduate work, and Graduate Record Examination (GRE) scores of at least 310 (new scoring system) for the combined Quantitative and Verbal sections (with at least 160 on the quantitative section) and 3.5 for the Analytical section. An undergraduate degree in mathematics, chemistry or physics combined with a strong interest in engineering topics may be suitable preparation when certain required undergraduate courses are taken (see Appendix A for further details). Exceptions to these requirements may be made if other persuasive evidence of the student's potential for success is available.

All international students, except those with a degree from a U.S. institution, must have a minimum score of 550 (paper), 213 (computer), or 95 (Internet) on the Test of English as a Foreign Language (TOEFL).

It is possible to directly admit a student with a bachelor's degree to the PhD

program if the student's qualifications are exceptional (minimum undergraduate GPA of 3.5/4.0 and composite GRE of at least 315, with minimum of 165 on the quantitative section). Under some circumstances, such arrangement can be made with a recommendation of a faculty member.

Regular admission to the Master's program constitutes admission to candidacy for that degree. Admission to candidacy for the PhD degree is automatically granted when the student passes the oral Qualifying Examination (page 15).

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

The University Scholars Program (USP) offers highly motivated UK ME undergraduates 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.

1. 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.

2. 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.

C. Post-Baccalaureate Status

This special graduate status applies to students who satisfy some, or all of the following:

- 1.** have received a baccalaureate degree from an accredited college or university;
- 2.** wish to pursue graduate study without a degree objective;
- 3.** have not fulfilled entrance requirements of the UK Graduate School;
- 4.** are UK resident students.

Post-baccalaureate status is not available for non-resident students or International applicants.

Students in post-baccalaureate status may take courses for graduate credit but may apply no more than nine (9) credit hours with a grade of A or B earned in the post-baccalaureate status to any graduate degree program at UK. All transfers of credit hours to the ME graduate program must be approved by the DGS and the Dean of the Graduate School.

Post-baccalaureate status is not a form of probationary admission to a degree-granting graduate program. Post-baccalaureate students who wish to apply for a ME graduate program must satisfy the standard admission requirements for the Department of Mechanical Engineering and the Graduate School.

D. Activities for New Students

1. Orientations

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

2. Graduate Student Profile

The Graduate Program Coordinator (GPC) maintains a personal profile of all Mechanical Engineering graduate students. A *Graduate Student Profile* (Appendix B) 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 email listserv is frequently used for general communications with students. All graduate students are subscribed to this list and should check their email at least three times during the week.

3. Assignment of a Faculty Advisor

The DGS serves as the advisor to new graduate students until each identifies a permanent advisor. All graduate students are encouraged to meet with faculty in their area(s) of interest and select an advisor in the first four weeks of their first semester, and no later than the end of the first semester. Students unable to find an advisor should report to the DGS, and he/she will continue as temporary advisor for the remainder of the first semester.

4. Program Planning

New students should consult with the DGS or their thesis advisor to discuss their individual *Plan of Study* (Appendices C1–C4). The

Plan of Study supports the educational objectives of the student. It is critical that every student be fully aware of university and departmental degree requirements. An initial *Plan of Study* may be subject to future modifications, but any modifications to the *Plan of Study* must be submitted to, and approved by, the student's advisor, and by the DGS. It should be updated every semester until all course requirements are completed

5. Classification and Registration

New and readmitted graduate students register using their online myUK account during the Add/Drop window in the week prior to the start of classes. Refer to the Registrar's website at

<http://www.uky.edu/Registrar/RegistrationWindow.htm>

for these dates each semester. 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.

6. Office Space

Office space is available on a limited basis to MS option A and PhD graduate students. Contact your thesis advisor regarding available spaces. Priority for the limited office space will be given to those engaged in research projects, PhD students and teaching assistants (TAs).

7. 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 available in the ME Department office. The ME Department Chair and

the student's advisor must certify the validity of each key request.

E. Activities for Continuing Students

1. Plan of Study

All students, in consultation with their faculty advisor, must update and obtain approval for their *Plan of Study* (Appendices C1–C4) before registration each semester. This update ensures that students are on track with respect to course requirements for completion of their degree. The plan of study must be signed by the advisor and by the DGS.

2. 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 along -- with specific dates -- can be found at the Graduate School website.

3. Time Limits for Graduate Degrees

Masters Candidates: Students first enrolled in a master's/specialist program in the fall 2005 semester and beyond have 6 years to complete all requirements for the degree, but still have the opportunity to request extensions up to an additional 4 years for a total of 10 years.

- a. Extensions up to additional 4 years for a total of 10 years may

be approved directly by the Dean of the Graduate School.

- b. No activity completed more than 12 calendar years preceding the proposed graduation date will be considered.

PhD Candidates: All degree requirements for the doctorate must be completed within five (5) years following the semester or summer session in which the candidate successfully completed the Oral Qualifying Examination. After the five-year period, degree candidates who provide evidence of the likelihood of completing the degree during an extension of time may be granted such extension by the Graduate Council upon re-taking the qualifying examination. Requests will be considered only upon written recommendation of the DGS.

4. PhD Annual Assessment

Phd Candidates: The Mechanical Engineering Graduate program seeks to assess the progress of ME Doctoral students. Each academic year PhD students will submit an Assessment form, CV, Plan of Study, and a One (1) to two (2) page summary of progress to their advisor/advisory committee after spring semester finals. The advisor/advisory committee will attach their comments on each Phd student and submit to the DGS. All materials should be received by the DGS no later than July 1st.

F. Leaving the Department

All students (those leaving the department prior to finishing a program as well as those graduating) must conduct an exit interview before leaving the Department. The *Graduate Student Exit Interview* form (Appendix L) must be signed by the thesis advisor and the DGS before departure. Departing students must return all key(s) for offices and buildings, clear office/lab spaces, return books/solution manuals, and file

a UK employee separation form. The Department will keep a profile of all alumni to maintain future contact.

G. Courses and Grades

1. 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.

2. 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.

3. Incomplete Grades

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:

- a. complete requirements for all such courses permitting the instructor(s) to issue official grade change(s);
- b. 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 incomplete grade was assigned.

4. Repeat Options

A student may repeat a graduate course and count only the second grade as part of the graduate grade point average. This action will be initiated only by petition (*Request*

for Repeat Option on the Graduate School website) from the DGS to the Dean of the Graduate School. The repeat option may be invoked only once in a student's particular degree program.

5. Scholastic Probation

Students will be placed on scholastic probation if they have completed 12 or more semester hours of graduate coursework with a cumulative GPA of less than 3.0. Students will have one full-term semester, or the equivalent (9 hours), to remove the scholastic probation by attaining a 3.0 cumulative GPA. If probation is not removed after one semester, or 9 credit hours, the student will be dismissed from the Graduate School. Students on academic probation are ineligible for any financial support (TA, RA, fellowship or scholarship).

H. 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 ME graduate program.

1. Conditions for Dismissal

- a. Students are unable to achieve a 3.0 cumulative GPA after a semester of scholastic probation.
- b. Students have completed their formal coursework and/or residence requirements but have not made satisfactory progress toward completion of remaining degree requirements.

2. Dismissal Procedure

- a. Dismissal is effective at the end of the semester in which the review is made.

- b. The student will be notified in writing of potential dismissal within four weeks of the beginning of the semester during which the review is to be conducted.
- c. If the student is in the PhD program, the student's Advisory Committee shall be consulted by the DGS before a dismissal decision is made.

I. Departmental Seminars

1. 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.

Students are to register for **ME 799**, ME Graduate Seminary course, required 4 times for PhD students and 2 times for MS students. Students will write a one page abstract for each seminar attended and upload a pdf copy to blackboard.

Attendance for students not enrolled in ME 799 is highly encouraged so as to develop and encourage scholarship among students.

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. The specific date for each seminar will be provided by e-mail and online announcements.

Continued funding of Teaching Assistants will be partially based on attendance at the William Maxwell Reed seminars. The attendance record of each Research Assistant will be reported by the GPC to their faculty advisor. Attendance at these seminars will also be considered when evaluating students

for awards of RAs, fellowships and scholarships.

During weeks when there is no scheduled WMR seminar, there will often be graduate student seminars, or ME faculty seminars. Attendance rules stated above apply.

Anyone required to attend who has a conflict must notify the graduate program coordinator via e-mail to obtain prior approval for their absence.

2. Safety Training Seminars

All graduate students are required to attend scheduled safety training seminars that are provided by the safety committee of the College of Engineering.

III. THE MASTER OF SCIENCE DEGREE

A. Program Options

There are two options for fulfilling the requirements for the MS degree, Option A and Option B. Students are by default admitted directly into the Option A program. The Option B program is intended for part-time students, or those with no interest in careers involving research, and requires a minimum of 5 years full-time prior professional experience in an engineering field. Students must seek approval from the DGS to be admitted to the Option B program. The Option B program is not desirable for students whose goal is to later pursue the PhD.

1. Option A (Thesis Plan)

Option A requires a minimum of 24 semester hours of coursework and a thesis. The thesis must be actively supervised by a full or associate member of the Graduate Faculty.

2. Option B (Non-Thesis Plan)

Option B requires a minimum of 30 semester hours of coursework. A

final examination administered by the student's Advisory Committee must be passed to complete degree requirements. Option B students must have a faculty advisor throughout their program of study. Only those students having five or more years of industrial experience working as an engineer are eligible for this program, and they will not be eligible for TA support.

3. Transfer of Program

A student in the Option A MS program may transfer to a PhD program upon recommendation of a faculty member. To initiate this transfer, a student must complete a *Transfer of Program Request* (Appendix F), and reapply to the Graduate School. Students **may not** transfer from the Option A MS program or from a PhD program to the Option B MS program. Students who wish to transfer from the PhD program to the MS Option A program must submit a written request to the DGS. Such requests will be granted only with approval of the student's advisor, the DGS, and a majority of the ME Department Graduate Studies Committee.

B. Course Requirements

1. Transfer of Credits

A student may transfer as many as nine (9) hours, or 37.5% of regular course degree requirements (Plan A), for a Masters degree. These hours include all post-baccalaureate work, graduate work taken at another accredited university, or as a student in another graduate degree program at UK. The following restrictions apply to transfer of graduate course credits:

- a. Transfer of credit from independent work, research, workshops, practica or thesis work is not permitted;
- b. Transfer credit is accepted only from regionally-accredited institutions;

- c. Short courses lasting fewer weeks than the number of credits may not be transferred.
- d. A student must have been in graduate status (includes post baccalaureate) at the time the courses were taken in order for the courses to be transferable.
- e. Graduate credits earned in the UK University Scholars Program are not considered transfer credits.
- f. All transfer of credit hours to the ME graduate program, regardless of source, must be approved by the DGS and the Dean of the Graduate School.

2. Requirements by Course Level

No courses offered by the ME Department that are numbered below 500 may be credited toward the MSME degree. A MS candidate may apply the following courses toward their degree requirements:

- a. Any 500-, 600-, or 700-level course; and
- b. Any 400G-level course offered by a department other than Mechanical Engineering.
- c. The following restrictions apply to the *Plan of Study* for all MS candidates:
 - i. It must include a minimum of 12 hours (15 for Option B) of regular 600- and 700-level courses (those meeting as regular organized classes listed in the UK course catalog);
 - ii. It can include a maximum of six (6) hours of irregular 500-, 600- and 700-level courses (such as ME 599, ME 699 and ME 780);
 - iii. It must include (at least) two (2) mathematics courses

approved by the DGS (see Appendix J);

- iv. In no case can independent work, taken as ME 780, be included as part of the 24 hours of coursework for Option A when the course material is related to the student's thesis topic.
- v. No more than a combined total of two special-topic courses, such as ME 599 or 699, or independent work (ME 780) may be counted toward requirements for the degree.
- vi. In the case of an independent course project, the instructor must provide the DGS with a course syllabus (including outline of topics and grade requirements) to obtain approval for the course on the *Plan of Study*.

3. Requirements by Major Area

At least two-thirds of all required coursework must be in Mechanical Engineering. The DGS may approve courses from another department related to the student's major area. All courses must be approved by the student's advisor and the DGS and included in the student's *Plan of Study*.

There are four major research and instruction areas in the Mechanical Engineering program: Manufacturing, Mechanics, Systems and Design and Thermal-Fluid Sciences. Option A students in each major area should select their courses according to guidelines in Appendices D1–D4. Courses listed in Appendices D1–D4 may be interchanged or substituted with alternative courses to satisfy special interdisciplinary student interests, or if certain courses may not be available. Any such request must be initiated by the student in consultation with the student's faculty advisor and approved by the DGS.

Option B students should select their courses according to the guidelines in Appendix D5. Requests to include courses not shown in Appendix D5 for Option B students must be approved by the DGS after recommendation by the student's advisor.

4. 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 credit.

5. When Formal Coursework is Completed

Registration in ME 748 *Masters Thesis Research* is limited to Option A MS students who have completed all course requirements. Registration in ME 748 guarantees that a student is considered full-time for the purposes of student financial aid, loan deferments, insurance coverage and visa status. The DGS must certify that the student is working at least ½ time (i.e., 20 hours per week) on the thesis project. Registration in ME 748 is limited to a maximum of six (6) semesters (not counting summer terms). All ME 748 registrations are processed in the Graduate School through the recommendation of the DGS.

C. Application for Degree

To be eligible for graduation, students must file an *Application for Degree* form with the Graduate School within 30 days after the start of the semester (or by 15 days into the Eight-Week Summer Session) in which they expect to complete their work. The application can be electronically submitted via your myUK account.

D. Thesis Requirements (Option A)

The thesis must be developed under the direction of a full or an associate member of the Graduate Faculty. It must be approved by the thesis director

and Examination Committee, the DGS, and the Graduate School. The thesis must conform with instructions prepared by the Graduate School entitled, *Preparation of Theses and Dissertations* available on the Graduate School website.

E. ME 799 Requirement

ME graduate students will be required to register for ME 799 and attend ME seminars. This course is required 2 times for MS students, is required for graduation, but is 0 credit hours and does not count toward minimum credit hours or residency requirements. Grading for course will be based on 1) attendance, 2) assignments. A Satisfactory/ Unsatisfactory (S/U) grade will be assigned. To obtain the "S" grade, the students must attend and submit a meaningful abstract for at least 75% of the seminars.

F. Final Examination

Both Option A and Option B students must submit the *Request for Final Masters Degree Examination* Form to schedule their final examination. This form is available on the Graduate School website and must be submitted to the Graduate School at least two (2) weeks prior to the exam date. This form cannot be submitted until all members of a student's advisory committee have received the complete, final thesis for Option A students; otherwise, the DGS will not approve the request. The Examination Committee must consist of:

1. at least three (3) faculty members,
2. at least two (2), including the chair, must be full or associate Graduate Faculty members,
3. at least one (1) must be a full Graduate Faculty member,
4. the majority must be from the ME Department.

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. Furthermore, Option A Students must have submitted at least two (2) refereed conference papers, with one having been accepted for presentation before the thesis student can sit for the Final Examination.

Option A students must submit a thesis in partial fulfillment of the degree program. A draft of this thesis must be submitted to the advisor no less than one (1) month prior to the defense and no less than two (2) weeks prior to the defense to the rest of the advisory committee. The examination will be automatically cancelled if these deadlines are not met. The Final Examination for an Option A student will primarily constitute a defense of the thesis research as represented in the thesis and provided to the Advisory Committee.

Option B students are not required to prepare a thesis; so their final examination will cover their general knowledge of the mechanical engineering field. The format of the Option B final examination should follow the guidelines found in Appendix E and must be approved in advance by the examination committee.

The final exam must be conducted no later than eight (8) days before the last day of classes for the degree to be awarded at the end of that term. The University Calendar, or the Graduate School websites, provide the exact dates. The exam is open to the public and it must be emphasized that it is an examination, not a party. Providing refreshments of any sort during the exam is strongly discouraged.

G. Submission of Thesis (Option A)

After the final examination is passed, the final copy of the thesis with all

revisions required by the advisory committee and the appropriate signatures must be submitted to the Graduate School, in either hardcopy or electronic forms (electronic is strongly recommended). The Graduate School requires two unbound copies on 100% cotton paper if the hard copy form is used. The cost of preparation and duplication of the thesis is normally borne by the student. Theses can also be submitted electronically as per the guidelines on the Graduate School website. The thesis in its final form must be submitted 15 days prior to the end of the semester in which the degree is expected.

IV. THE DOCTOR OF PHILOSOPHY DEGREE

Successful completion of the MS program does not guarantee admission to the PhD program. Students who wish to immediately continue for the PhD degree must apply by letter to the DGS and to the Graduate School by no later than the fourth week of the semester in which the MS degree is expected, or within 60 days following the defense.

A. General Requirements

To obtain a PhD degree from the Department of Mechanical Engineering, a student must complete all of the following requirements.

1. Earn 48 graduate credit hours while in graduate standing after having received a Bachelor degree. Those with a MS degree may satisfy this requirement by earning an additional 24 graduate credit hours taken at UK. Students with a MS from another institution must obtain a letter from the DGS recommending transfer of their MS course credit to their PhD course requirements.
2. The following restrictions apply to PhD coursework:

- a. Residency and research courses may not be used to satisfy course requirements.
 - b. No more than nine (9) hours (including those taken for the MS) may be in "Topics" courses (e.g., ME 599, ME 699) in Mechanical Engineering.
 - c. No more than six (6) hours (including those taken for the MS) may be in "Project" courses (e.g., ME 780) in Mechanical Engineering.
 - d. At least half of the required hours must be in Mechanical Engineering.
 - e. At least half of the required hours must be at the 600 level, but not necessarily all in ME.
 - f. No more than nine (9) credit hours of the above requirements may be waived based on courses taken at other institutions. The decision on this waiver will be made by the Graduate School and the DGS upon recommendation of the student's Advisory Committee. Transfer courses are subject to all of the above conditions.
 - g. Satisfy the PhD requirement in mathematics courses. (Appendix J)
3. Pass the **PhD Preliminary Oral Examination** to be taken immediately after the end of the first semester, or within the second semester. This is an oral exam intended to demonstrate the student's knowledge of basic concepts from mechanical engineering with a focus on the student's particular area of study. It will be administered by three members of the technical area committee corresponding to the student's proposal research. Failure on a second attempt will result in dismissal from the Ph.D. program. Students who enter the ME Ph.D. program without a BS and/or MS in

Mechanical Engineering may delay their Preliminary Oral Exam until the beginning of the semester following completion of all required undergraduate prerequisite courses. This exam must have been passed before a student can schedule the Written Qualifying Examination.

4. Pass the **Written Qualifying Examination** which constitutes the written portion of the Qualifying Examination required by the Graduate School. This written exam tests students' in-depth knowledge in subjects related to their program area within the field of mechanical engineering. This is a uniform examination that is required in two of the ten sub-areas given in Appendix H. Area exams, and exam syllabi, are prepared by the corresponding ME Department Technical Area Committees. The PhD Written Qualifying Exam must be taken no later than the student's third Fall Semester. An extra year (fourth Fall Semester) is permissible for students admitted directly into the PhD program after their BS degree and for students required to take undergraduate prerequisite courses. This time requirement may be modified for part-time students with approval of the student's advisor and the DGS. Failure to attempt the Written Qualifying Exam within the specified time limit will result in the student's dismissal from the ME doctoral program.
5. Pass the **PhD Oral Qualifying Examination**. This exam inspects the soundness of the student's proposed doctoral dissertation research plan. A prospectus prepared by the student and submitted to the student's Advisory Committee is required at least two (2) weeks in advance of the exam. Only those who have passed the written qualifying exam and have satisfied the PhD mathematics requirement may sit for this exam. This exam is

mandated by the Graduate School, so all Graduate School regulations regarding this exam must be met.

6. Pass the **Final Oral Examination**. This exam is the dissertation defense and is mandated by the Graduate School, so all Graduate School regulations regarding this exam must be met.
7. Meet all other applicable Graduate School regulations.

B. Major Professor

Each student's program is guided by a major professor and an advisory committee throughout the student's graduate career. Their functions are to provide continuity of direction and counsel and to instill intellectual stimulation throughout the entire doctoral program.

The DGS serves as temporary advisor to all beginning graduate students and performs most initial advisory functions until the student's advisor (major professor) has been established during the student's first semester (or earlier) at UK. Once identified, the Major Professor assumes primary advisory functions and chairs the Advisory Committee. The Major Professor and Advisory Committee are formally appointed by the Dean of the Graduate School with concurrence of the DGS.

C. Advisory Committee

The Advisory Committee provides advice to the student and sets specific program requirements (within applicable Department, Graduate School and University regulations) which the student must satisfy. The student is encouraged to select faculty members who can best provide these functions related to the chosen research area. The Advisory Committee should be in place by the completion of 18 credit hours of graduate work or at least one year prior to taking the Written Qualifying Examinations. The following requirements apply to the PhD Advisory Committee:

1. The Advisory Committee has a core of at least four (4) members. This core includes the Major Professor as Chair, and two other members from the major area.
2. The core must include at least one representative from outside the ME department.
3. All members of the core must be members of the UK Graduate Faculty and three (including the Major Professor, or a co-chair) must possess full Graduate Faculty status (see the Graduate School website for a listing of Graduate Faculty status).
4. Additional faculty members may serve as members of the Advisory Committee.
5. The core of the Advisory Committee must be kept at its full complement throughout the graduate career of the student. In the event of a vacancy on the Advisory Committee, an appropriate replacement must be made prior to any function requiring a committee decision.
6. The student must complete the *Doctoral Advisory Committee Request* form online at the Graduate School website.
7. The Advisory Committee provides guidance on the dissertation project, administers the oral part of the Qualifying Examination, and administers the Final Examination on the dissertation research.

D. Qualifying Examination

The purpose of this exam is to determine whether the student should be admitted to candidacy. In Mechanical Engineering there are both written and oral components to the Qualifying Examination. The procedure for the written exam is given in Appendix G.

The written part of the Qualifying Exam is administered only during the week starting on the Monday following Labor Day of each fall semester. At the end of the preceding spring semester, the DGS will require that qualified students submit their application to take the

examination. Details of the written exam coverage are in Appendix H.

The oral portion of the Qualifying Examination is described in Appendix I. This exam is administered by the student's Advisory Committee and can be conducted only after the written portion of the exam has been passed and all other requirements for the degree have been completed (except the dissertation and final exam). Students with an "I" grade in credit bearing courses cannot sit for the Qualifying Exam until letter grades are assigned for these courses. The oral exam must be scheduled online at the Graduate School website and approved by the DGS at least two weeks in advance, following receipt by the advisory committee of the student's prospectus.

The following requirements apply to the oral portion of the Qualifying Examination:

1. The exam cannot commence without the Major Professor having received the Qualifying Examination card from the DGS;
2. All members of the Advisory Committee must be present for the oral examination;
3. Results of the examination must be reported by the DGS to the Graduate School within 10 days;
4. If the result of the oral examination is failure, the Advisory Committee will determine the conditions to be met before another oral examination may be given, or if one should not be given and the student dismissed from the program;
5. The minimum time between oral examinations is four (4) months. A second examination must be taken within one (1) year after taking the first examination;
6. If the result of the second oral examination is failure, the student will be dismissed.

E. Mathematics Requirement

In addition to ME courses in preparation for the written portion of the Qualifying Examination in Appendix H, PhD students must also fulfill the ME Depart-

ment's PhD math requirement. This requirement is explained in Appendix J. Students are advised to consult with their advisor to determine which math courses will best support their research objectives. Students must receive approval from the DGS for any exceptions to the requirements in Appendix J.

F. ME 799 Requirement

ME graduate students will be required to register for ME 799 and attend ME seminars. This course is required 4 times for PhD students, is required for graduation, but is 0 credit hours and does not count toward minimum credit hours or residency requirements. Grading for course will be based on 1) attendance, 2) assignments. A Satisfactory/ Unsatisfactory (S/U) grade will be assigned. To obtain the "S" grade, the students must attend and submit a meaningful abstract for at least 75% of the seminars.

G. Residence Requirement

1. Actual Presence on Campus

The purpose of a residency requirement is to encourage doctoral students to experience contact with the academic community. While a well-prepared student of superior ability may complete the doctorate in three years of full-time residence, more than three years is usually necessary, often considerably more.

2. Pre-Qualifying Residency Requirement

- a. Doctoral students must complete the requirement of 48 credit hours of graduate coursework within five (5) years of entry into the doctoral program. Extensions up to an additional three years may be requested to fulfill the pre-qualifying requirement.

Students who hold an awarded MSME degree from UK and have completed the full-time residency requirements for that degree may

apply those semesters to satisfy the above (requires letter from the DGS and approved by the Graduate School).

3. Post-Qualifying Residency Requirement

Under the current post-qualifying residency policy, students are required to remain continuously enrolled in a two (2) credit hour course, ME 767 *Dissertation Residency Credit*, every fall and spring semester until they have defended their dissertation. A student must complete two (2) semesters of ME 767 to be eligible to graduate. Residency credit will be applied for a qualifying examination taken at any time during the first semester of enrollment in this course. However, the request to schedule the examination must be submitted and approved within the first six (6) weeks of the semester. Two hours of ME 767 constitutes full-time enrollment. All students pay the in-state tuition fee plus other mandatory fees for these two credit hours. Non-resident students will receive a scholarship to cover the out-of-state portion of their bill. Students will be responsible for tuition and fees (including applicable out-of-state charges) resulting from enrollment in any additional coursework beyond the two (2) hours of ME 767.

H. Admission to Doctoral Candidacy

Students are admitted to PhD candidacy after they have successfully completed both (written and oral) portions of the Qualifying Examination. The Registrar is notified by the Graduate School, and the date is entered on the student's transcript.

I. Application for Degree

Students must file an *Application for Degree* with the Graduate School within 30 days after the start of the semester (or 15 days into the Eight-Week sum-

mer session), in which they expect to complete their work. The *University Calendar* and *Graduate Bulletin* contain the specific deadline dates each semester. The application is submitted electronically via myUK account.

I. Doctoral Final Examination

1. Scheduling of Examination

Scheduling of the PhD final examination should normally be conducted as follows.

- a. PhD candidates must submit a *Notification of Intent to Schedule a Final Doctoral Examination* from the Graduate School website (see Appendix L) at least eight (8) weeks before the planned exam date.
- b. Upon submission of the form, the Graduate School will appoint an Outside Examiner from another department on campus.
- c. Following the appointment of the Outside Examiner, the final examination date may be set (This date must follow delivery of the complete dissertation to the student's major advisor by at least four (4) weeks preceding the proposed examination date, and to the remainder of the committee, including the outside examiner, by at least two (2) weeks before the exam. If these deadlines are not met, the DGS will cancel the examination and inform the student's advisor.
- d. The *Request for Final Doctoral Examination* must be submitted via the Graduate School website at least two (2) weeks before the scheduled date for the final exam.
- e. The Graduate School will send announcements of the examination to each Advisory Committee member and to the PhD candidate.

The following restrictions apply to Doctoral final examinations.

- a. Exams must be scheduled while classes are in session (Fall and Spring semesters, Four-Week and Eight-Week summer sessions).

Examination deadlines and their relation to degree conferral can be found at the *University Calendar* website.

- b. A student cannot sit for the Final Examination until all remaining "I" or "S" grades in credit-bearing courses have been assigned letter grades. The student must also be currently enrolled to sit for the exam.
- c. A student must have submitted at least three (3) papers to archival journals, with at least one (1) having been accepted before sitting for the final examination.

2. Procedures for Conducting the Final Examination

- a. The DGS and Advisory Committee Chair must verify that the Final Examination card and exam scoring sheets have been brought to the examination room before the exam may begin. If the examination card has not been received, the Committee Chair or DGS must call the Associate Dean of the Graduate School to determine whether the examination may proceed.
- b. The Final Examination may not begin until all voting members of the Advisory Committee are present. The names of voting members will be on the Final Examination card; names of non-voting members will not be on the card.
- c. A Final Examination may be cancelled at any time *prior* to its official start for substantive reasons with no permanent consequences for the student. The student has not failed the examination in this case because the exam had never officially begun. Substantive reasons for an exam cancellation can include a missing advisory committee member, a sudden difficulty in the candidate's personal life that may affect examination preparation and/or performance, or a late opinion on the part of one or more committee members

that the dissertation is not ready to defend. In such cases, the committee should discuss the issues at hand and reach a decision on whether to hold the examination. The candidate also has the right to cancel the Examination *prior* to its start. If the examination is cancelled, it must be formally rescheduled with the Graduate School with a minimum two- week interval.

- d. All committee members must be present for the entire examination process. If a Committee member is in contact via electronic means, such as a pre-approved telephone or interactive video (ITV) conference, and the connection is lost, the examination process must stop until the connection is reestablished.
- e. The examination must be completed once it has begun. The committee vote must be recorded on the Examination card, and scores entered on the score sheets, with the signatures of all voting members. There are only two outcomes possible: Pass or Fail, and these outcomes must be consistent with the score appearing on the score sheet for each voting member. The Examination may not be suspended to permit the candidate to correct deficiencies. The only suspensions that are permitted are short breaks to allow the candidate or committee to refresh themselves. No refreshments beyond bottled water will be permitted in the examination room without pre-approval by the DGS. This is not a party!
- f. If a true emergency arises during the Examination, the committee chair or DGS will immediately call the Graduate School to seek guidance.

J. Submission of Dissertation

The final copy of the dissertation is prepared and submitted to the Graduate School after the Final Examination is passed and all committee requirements have been met. *Instructions for the Preparation of Theses and Dissertations* on the Graduate School website provides the requirements for dissertation preparation and submittal. Either hardcopy or electronic versions are acceptable. Two (2) unbound 100% cotton copies with the signatures of the advisor and the Director of Graduate Studies are required for the hardcopy version. The dissertation must be received by the Graduate School within 60 days of the Final Examination. The candidate must be re-examined if this deadline is not met. The dissertation must be accepted by the Graduate School by the last class day of the semester in which the candidate will graduate.

V. OPERATIONAL GUIDELINES FOR DEPARTMENTAL FELLOWSHIPS

A. Harper Industries Achievement Fellowship

Harper Industries Achievement Fellowships are available to offset some of the first-year tuition for new University Scholars in the ME graduate program. The award is \$1,500 for one year.

All students who apply to the University Scholars Program in the UK ME Department are eligible for consideration. Candidates must have an undergraduate cumulative GPA of 3.5 or higher.

B. Harper Industries Graduate Fellowship

The Harper Industries Fellowship provides \$18,000 for 12 months to an outstanding student applying to the

UK ME graduate program (PhD or Option A MS). This fellowship does allow the student to obtain teaching experience if they so desire.

1. Criteria for Eligibility

Any new student who has applied to the graduate program in the UK ME Department may be nominated. Candidates must have an undergraduate cumulative GPA of 3.5 or higher. Likewise, candidates must have a GPA of 3.5 or higher for any graduate work.

2. Nomination Process

Candidates for the Harper Industries Graduate Fellowship are self-nominated. Eligible students must submit a letter of self-nomination to the DGS. Nomination letters, graduate application, and other supporting documents must be received by the March 1 deadline. Nomination letters should include a resume and cover letter that lists special qualifications (e.g., previous scholarships, honors and awards, service or volunteer activities, publications).

C. TVA Graduate Fellowship

Students interested in applying for a TVA Fellowship should contact either the DGS or Dr. Kozo Saito, TVA Professor.

VI. OPERATIONAL GUIDELINES FOR ASSISTANTSHIPS

In general, it is department policy to give preference to PhD students when teaching assistantships and research assistantships are assigned.

A. Teaching Assistantships (TA)

1. Responsibilities

Teaching Assistants provide support to professors in charge of teaching Mechanical Engineering

courses. Their duties may include, but are not limited to:

- a. holding office hours;
- b. correcting and grading homework, exams, or reports;
- c. conducting recitation sessions;
- d. helping with laboratory experiments or equipment setup.
- e. Devoting 20 hrs. per week performing research for their major professor.

2. Period of Appointment

TA appointments are made on either a semester or yearly basis. Reappointment depends upon satisfactory performance in teaching responsibilities, academic achievement involving coursework and research, and departmental activities (seminar attendance). Evaluations are performed at the end of each semester when considering the continuation of assistantship appointments.

International students must pass the Language Screening Examination administered by the Teaching and Learning Support Center to be eligible for a TA appointment, and all new TAs, including domestic, must attend TA orientation.

- a. The appointment period for a TA is typically one semester, and renewals are considered by the DGS each semester based on availability, performance, and available department funds.
- b. In some cases, appointments may be made for 4.5 months beginning August 26th and ending December 29th for the fall semester or beginning December 30th and ending May 4th for the Spring semester.
- c. Appointments are not normally made for the summer months.
- d. **Stipend and Compensation**
The stipend for MS TAs is \$6250 per semester. The stipend for PhD TAs is \$6750 per semester. These rates are based on a full-

time TA which requires 20 hours per week devoted to teaching-related services. Half-time TAs devote 10 hours per week and are paid \$3125 and \$3375 per semester for MS and PhD students, respectively.

B. Research Assistantships (RA)

1. Responsibilities

Research Assistants are responsible for conducting research under the supervision of their faculty advisor. Their duties may include but are not limited to:

- a. conducting experiments;
- b. designing and fabricating experimental equipment;
- c. computer modeling of engineering/physical processes;
- d. writing proposals, progress reports, conferences, and/or journal publications.

2. Period of Appointment

The normal period of appointment for a research assistant is one (1) year. However, the length may vary depending on availability of outside research funding and performance of the RA.

3. Stipend and Compensation

Stipends for RAs are as follows:

MS Students	\$675 biweekly
PhD Students (no MS)	\$700 biweekly
PhD w/ MS (Pre-Qual)	\$725 biweekly
PhD w/ MS (Post-Qual)	\$750 biweekly

These rates are based on a full-time RA which requires 20 hours per week devoted to research-related services. Half-time RAs devote 10 hours per week and are paid half of the stipends of full-time RAs.

C. Renewal and Termination of RA and TA Appointments

All assistants shall maintain satisfactory academic records and progress toward their degrees; assistantships cannot be renewed if academic progress is unsatisfactory, e.g., scholastic probation,

or failure to complete required examinations within the specified time.

1. Appointments can not be renewed beyond the end of the academic term during which all degree requirements will be satisfied.
2. Appointments are not renewed if the assistant's overall service to the department and University is unsatisfactory.
3. Appointments will not be renewed if funding is unavailable.

D. Holidays, Vacations and Sick Leave

Teaching and research assistants are not required to work during the following official University holidays: New Year's Day, Martin Luther King Day, Memorial Day, Independence Day, Labor Day, Presidential Election Day, Thanksgiving Day, Day after Thanksgiving, Christmas Day and Bonus Holidays (Dec. 24 -Jan. 2).

However, since TAs and RAs are classified as temporary employees of the University, they are not eligible to receive vacation days and sick leave with pay. Students are expected to devote full-time work to their research projects between semesters, except for the one week holiday period after Christmas day.

Appendix A

Special Requirements for Entry into Mechanical Engineering Graduate Programs

1. Any graduate of an ABET accredited Mechanical Engineering program may enter the ME graduate program directly, provided GPA and GRE admission requirements have been met. However, some graduate courses require knowledge of certain ME undergraduate work as prerequisites. The DGS may determine whether one or more of these prerequisites must be taken if they were not part of the student's undergraduate ME program.
2. Students with a bachelors degree in certain fields may be required to take specific undergraduate ME courses to attain required prerequisites in their chosen field of study. Some typical examples are:
 - a. an engineering major other than Mechanical Engineering, or
 - b. a non-engineering technical field, such as mathematics, physics, or chemistry.

Such students must have completed the equivalent of, or must complete with a grade of B or better within the first year of UK graduate study, one or more of the following courses:

ME 321	Thermodynamics II
ME 325	Elements of Heat Transfer
ME 330	Fluid Mechanics
ME 344	Mechanical Design
ME 440	Design of Control Systems

Students lacking the prerequisites for any of these courses which pertain to their graduate field of study will be given one additional semester to meet the above requirements.

Appendix B

Mechanical Engineering Graduate Student Profile

Today's Date: _____ Date Degree Expected: _____

Last Name: _____ First Name: _____

Student ID Number: _____ E-Mail: _____

Gender: (check one) Male _____ Female _____ Citizenship: _____

Current Street Address: _____

City, State, Zip Code: _____

Cell Phone Number: _____ Alternate Phone Number: _____

Permanent Address: _____

City, State, Zip Code: _____

Name of Emergency Contact (within the United States): _____

Emergency Contact Phone Number: _____ Relationship: _____

Program: (check one)

MS Option A (thesis) _____ MS Option B (course) _____

PhD without MS _____ PhD with MS _____

**PhD students only: Date you expect to take the Qualifying Exam: _____

Faculty Advisor: _____ Paducah _____

Assistantship: (check if applicable) RA _____ TA _____ GA _____ FS _____

Office/Lab Location: _____ Desk Number: _____ Office/Lab Phone: _____

Technical Area: (check one)

Manufacturing ___ Mechanics ___ Systems & Design ___ Thermal-Fluids ___

Thesis Topic: (if applicable) _____

Appendix C1

Mechanical Engineering Master of Science Plan of Study (Option A)

Last Name: _____ First Name: _____ SID#: _____

Committee Chair: _____ Date Degree Expected: _____

Thesis Topic: _____

Technical Area:

Manufacturing _____ Mechanics _____ Systems and Design _____ Thermal Fluids _____

COURSES REQUIRED TO SATISFY DEGREE REQUIREMENTS				
Courses in Your Area of Study + Two (2) Related Courses				
No.	Title	Number	Date Completed	Grade
1				
2				
3				
4				
5				
6				
Mathematics Requirement (Must select 2; See Appendix J)				
7				
8				
Notes: a) At least 12 hours must be at the 600 level or greater with remainder being 4XXG or above. b) All course substitutions must be approved by the Advisor & DGS prior to enrollment. c) Only 2 independent (project) work courses (ME 780) may count towards satisfying the degree. These courses will only be counted towards the degree IF the project content is NOT directly related to the students thesis topic. d) All special project course requests (ME 780) must include a project description and course syllabus from the professor in charge and must be submitted with this form for approval. e) Advisory committee chair must be selected during the <u>first semester</u> of study.				

Concurrent degree program, if any: _____

EXTRA COURSES & COURSES FROM OUTSIDE OF ME DEPT.					
No.	Title	Number	Date Completed	Grade	Concurrent Program
1					
2					
3					
4					
5					
6					
7					

Signatures

Date

Student: _____

Advisor: _____

Director of Graduate Studies: _____

All students must file a Plan of Study EACH SEMESTER, even if there are no changes. Only those courses listed on this form will count towards a student's degree program. Students are required to obtain their advisor's signature BEFORE the DGS will consider signing this form.

Appendix C2

Mechanical Engineering Master of Science Plan of Study (Option B)

Last Name: _____ First Name: _____ SID#: _____

Committee Chair: _____ Date Degree Expected: _____

Oral Exam Presentation Topic: _____

COURSES REQUIRED TO SATISFY DEGREE REQUIREMENTS				
600 Level Courses (Must select 5)				
No.	Title	Number	Date Completed	Grade
1				
2				
3				
4				
5				
500 Level Courses (Must select 3)				
6				
7				
8				
Mathematics Requirement (Must select 2; see Appendix J.)				
9				
10				
Notes: a) At least 15 hours must be at the 600 level or greater with remainder being 4XXG or above. b) All course substitutions must be approved by the Advisor & DGS prior to enrollment. c) Only 2 independent (project) work courses (ME 780) may count towards satisfying the degree requirements. d) All special project course requests (ME 780) must include a project description and course syllabus from the professor in charge and must be submitted with this form for approval. e) Advisory committee chair must be selected during the <u>first semester</u> of study.				

Concurrent degree program, if any: _____

EXTRA COURSES & COURSES FROM OUTSIDE OF ME DEPT.					
No.	Title	Number	Date Completed	Grade	Concurrent Program
1					
2					
3					
4					
5					
6					
7					

Signatures

Date

Student: _____

Advisor: _____

Director of Graduate Studies: _____

All students must file a Plan of Study EACH SEMESTER, even if there are no changes. Only those courses listed on this form will count towards a student's degree program. Students are required to obtain their advisor's signature BEFORE the DGS will consider signing this form.

**Appendix C3
Mechanical Engineering PhD Plan of Study (No Prior MS)**

Last Name: _____ First Name: _____ SID#: _____

Advisor: _____ Date Degree Expected: _____

Dissertation Topic: _____

Manufacturing _____ Mechanics _____ Systems and Design _____ Thermal-Fluids _____

COURSES REQUIRED TO SATISFY DEGREE REQUIREMENTS				
Primary Area Courses (Must select 13)				
No.	Title	Number	Date Completed	Grade
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
Mathematics Requirements (Must select 3 per Appendix J of this handbook.) (Should be taken during first year of program.)				
No.	Title	Number	Date Completed	Grade
14				
15				
16				
Notes: a) At least 24 hours must be at the 600-level or greater. b) At least 24 hours must be ME Courses. c) No more than 9 hours may be ME 599 or ME 699. d) Only 2 independent (project) courses (ME 780) may count towards satisfying degree requirements. These courses will only be counted towards the degree IF the project content is NOT directly related to the students thesis topic. All ME 780 courses must include a project description and course syllabus from the professor in charge and must be submitted with this form for approval by the DGS. e) No more than 9 credit hours may be waived based on courses taken at other institutions. All course substitutions and waivers must be approved by the Advisor & DGS prior to enrollment. f) All required courses must be completed, and the PhD qualifying exam, passed before the student can enroll in the Post Qualifying Residency Requirement courses (ME 767 or ME 769).				
EXTRA COURSES, AUDITED COURSES, COURSES OUTSIDE OF DEPARTMENT				
No.	Title	Number	Date Completed	Grade
1				
2				

Semester began program _____ Date completed Preliminary Oral Exam _____ Date completed Written Qualifying Exam _____ Date completed Oral Qualifying Exam _____

Signatures

Date

Student: _____

Advisor: _____

Director of Graduate Studies: _____

All students must file a Plan of Study EACH SEMESTER, even if there are no changes. Only those courses listed on this form will count towards a student's degree program. Students are required to obtain their advisor's signature BEFORE the DGS will consider signing this form.

Appendix C4 Mechanical Engineering PhD Plan of Study (Prior/Concurrent MS)

Last Name: _____ First Name: _____ SID#: _____

Advisor: _____ Date Degree Expected: _____

Dissertation Topic: _____

Manufacturing _____ Mechanics _____ Systems and Design _____ Thermal-Fluids _____

COURSES REQUIRED TO SATISFY DEGREE REQUIREMENTS				
Primary Area Courses (Must select 5)				
No.	Title	Number	Date Completed	Grade
1				
2				
3				
4				
5				
6*				
Mathematics Requirements (Must select 3 per Appendix J of this handbook.) (Should be taken during first year of program.)				
No.	Title	Number	Date Completed	Grade
7				
8				
9*				
<p>* Only one of these two rows need be completed, if you are transferring a mathematics course from a previous MS degree.</p> <p>Notes: a) At least 12 hours must be at the 600-level or greater. b) At least 12 hours must be course. c) No more than 9 hour (including those taken for MS) may be ME 599 or ME 699. d) Only 2 independent (project) courses (ME 780) may count towards satisfying degree requirements. These courses will only be counted towards the degree IF the project content is NOT directly related to the students thesis topic. All ME 780 courses must include a project description and course syllabus from the Professor in charge and must be submitted with this form for approval by the DGS. e) No more than 9 credit hours may be waived based on courses taken at other institutions. All course substitutions and waivers must be approved by the Advisor & DGS prior to enrollment. f) All required courses must be completed, and the PhD Oral Qualifying Exam passed, before the student can enroll in the Post Qualifying Residency Requirement courses (ME 767 or ME 769). g) Concurrent MS/PhD students must file both this form and the appropriate MS plan of study.</p>				
EXTRA COURSES, AUDITED COURSES, COURSES OUTSIDE OF DEPARTMENT				
No.	Title	Number	Date Completed	Grade
1				
2				
3				

Semester began _____ Date completed _____ Date completed _____ Date completed _____
 program _____ Preliminary Oral Exam _____ Written Qualifying Exam _____ Oral Qualifying Exam _____

Signature

Date

Student: _____

Advisor: _____

Director of Graduate Studies: _____

All students must file a Plan of Study EACH SEMESTER, even if there are no changes. Only those courses listed on this form will count towards a student's degree program. Students are required to obtain their advisor's signature BEFORE the DGS will consider signing this form.

Appendix D1

MSME Program Requirements Manufacturing Area

In addition to an acceptable thesis the student in Option A must earn a minimum of 24 graduate credits in the following courses. At least two-thirds of the coursework must be in the Mechanical Engineering Department, at least two-thirds must be in regular courses, and at least half must be at the 600 level or above.

Manufacturing Courses (select at least four)

- ME 503 Lean Manufacturing Principles and Practices
- ME 505 Modeling of Manufacturing Processes and Machines
- ME 507 Design for Manufacturing
- ME 512 Manufacturing Systems
- ME 606 Seminar and Project in Manufacturing Systems Engineering
- ME 607 Analysis of Metal Cutting Processes
- ME 608 Non-Traditional Manufacturing Process
- MFS 563 Simulation of Industrial Production Systems
- MFS 605 Systems for Factory Information and Control
- ME 699 Topics in ME (with approval of advisor)

Related Courses (select at least two)

- ME 501 Mechanical Engineering Design with Finite Element Methods
- ME 599 Topics in Mechanical Engineering (with approval of advisor)
- ME 603 Mechanics of Plastics Solids I
- ME 610 Engineering Acoustics
- ME 641 Foundations of Solid Mechanics
- ME 645 Advanced Control System Analysis
- ME 647 Systems Optimization I
- ME 651 Mechanics of Elastic Solids I
- ME 780 Special Problems in ME (with approval of advisor)

Mathematics Courses (two required; see Appendix J)

Appendix D2

MSME Program Requirements Mechanics Area

In addition to an acceptable thesis the student in Option A must earn a minimum of 24 graduate credits in the following courses. At least two-thirds of the coursework must be in the Mechanical Engineering Department, at least two-thirds must be in regular courses, and at least half must be at the 600 level or above.

Mechanics Courses (select at least four)

- ME 506 Mechanics of Composite Materials
- ME 513 Mechanical Vibrations
- ME 532 Advanced Strength of Materials
- ME 602 Dynamics of Distributed Mechanical Systems
- ME 603 Mechanics of Plastic Solids I
- ME 613 Nonlinear Oscillations
- ME 641 Foundations of Solid Mechanics
- ME 644 Advanced Dynamics I
- ME 651 Mechanics of Elastic Solids I

Related Courses (select at least two)

- ME 599 Topics in Mechanical Engineering (with approval of advisor)
- ME 610 Engineering Acoustics
- ME 611 Boundary Element Methods in Engineering
- CE 699 Topics in CE: Advanced Finite Element Analysis in Engineering
- CE 783 Structural Finite Element Analysis
- ME 780 Special Problems in ME (with approval of advisor)

Mathematics Courses (two required; see Appendix J)

Appendix D3

MSME Program Requirements Systems and Design Area

In addition to an acceptable thesis the student in Option A must earn a minimum of 24 graduate credits in the following courses. At least two-thirds of the coursework must be in the Mechanical Engineering Department, at least two-thirds must be in regular courses, and at least half must be at the 600 level or above.

Systems and Design Courses (select at least four)

ME 501	Mechanical Design with Finite Elements Methods
ME 602	Dynamics of Distributed Mechanical Systems
ME 610	Engineering Acoustics
ME 611	Boundary Element Methods in Engineering
ME 645	Advanced Control System Analysis
ME 647	System Optimization I

Related Courses (select at least two)

CE 783	Structural Finite Element Analysis
ME 507	Design for Manufacturing
ME 513	Mechanical Vibrations
ME 532	Advanced Strength of Materials
ME 644	Advanced Dynamics I
ME 699	Topics in ME: Computational Techniques in Mechanical Systems Design
ME 780	Special Problems in ME (with approval of advisor)

Mathematics Courses (two required; see Appendix J)

Appendix D4

MSME Program Requirements Thermal-Fluid Sciences Area

In addition to an acceptable thesis the student in Option A must earn a minimum of 24 graduate credits in the following courses. At least two-thirds of the coursework must be in the Mechanical Engineering Department, at least two-thirds must be in regular courses, and at least half must be at the 600 level or above.

Thermal-Fluids Courses (select at least four)

ME 530	Gas Dynamics
ME 531	Fluid Dynamics I
ME 563	Basic Combustion Phenomena
ME 620	Advanced Engineering Thermodynamics I
ME 626	Advanced Heat Convection
ME 627	Radiation Heat Transfer
ME 628	Boiling and Condensation
ME 631	Fluid Dynamics II
ME 634	Turbulent Flows
ME 690	Numerical Analysis of Partial Differential Equations
ME 691	CFD for Incompressible Flow
ME 692	CFD for Compressible Flow

Related Courses (select at least two)

ME 548	Aerodynamics of Turbomachinery
ME 549	Power Generation
ME 599	Topics in Mechanical Engineering (with approval of advisor)
ME 610	Engineering Acoustics
ME 699	Topics in Mechanical Engineering (with approval of advisor)
ME 780	Special Problems in ME (with approval of advisor)

Mathematics Courses (two required; see Appendix J)

Appendix D5

MSME Graduate Course Options – Non-Thesis (Option B)

Total Credit Hour Requirements = 30

500-Level (or above) Courses – no more than 9 credit hours from:

ME 501	Mechanical Design with Finite Elements Methods
ME 513	Mechanical Vibrations
ME 530	Gas Dynamics
ME 531	Fluid Dynamics I
ME 548	Aerodynamics of Turbomachinery
ME 563	Basic Combustion Phenomenon
ME 599	Power Generation
ME 580	Heating, Ventilating, and Air Conditioning
ME 599	Topics in ME: Design of Lean Production Systems

600-Level Courses – at least 15 credit hours from:

MFS 605	Systems for Factory Information and Control
ME 602	Dynamics of Distributed Mechanical Systems
ME 607	Analysis of Metal Cutting Processes
ME 610	Engineering Acoustics
ME 620	Advanced Engineering Thermodynamics I
ME 626	Advanced Heat Convection
ME 627	Radiation Heat Transfer
ME 628	Boiling and Condensation
ME 634	Turbulent Flows
ME 644	Advanced Dynamics I
ME 690	Numerical Analysis of Partial Differential Equations
ME 691	CFD for Incompressible Flow
ME 692	CFD for Compressible Flow
ME 699	Topics in ME
ME 780	Special Problems in Mechanical Engineering

Auxiliary Elective Courses (Option B)

EE 517	Advanced Electromechanics
EE 530	Robotics
EE 611	Deterministic Systems
ME 503	Lean Manufacturing Principles and Practices
ME 505	Modeling of Manufacturing Processes and Machines
ME 506	Mechanics of Composite Materials
ME 512	Manufacturing Systems
ME 513	Mechanical Vibrations
ME 532	Advanced Strength of Materials
ME 556	Introduction to Composite Materials
ME 607	Analysis of Metal Cutting Processes
MFS 605	Systems for Factory Information and Control

(Other available courses may be taken with approval of DGS)

Mathematics Courses (two required; see Appendix J)

(For Paducah students, equivalent math courses may be taken from Murray State and transferred to UK)

Appendix E

MS Option B – Final Examination Guidelines

The Final Examination will be conducted by an examination committee comprised of at least three (3) Mechanical Engineering faculty members. The chair of this committee must be appointed by the end of the student's first semester, and in accordance with deadlines set forth by the graduate school. It is the student's responsibility to obtain the Examination Committee appointment form and to ask appropriate faculty members to serve on the committee. Unless modified by the Examination Committee, the following guidelines will be used during the examination:

There will be two (2) distinct portions of the Final Examination:

1. student presentation of a project with faculty questions regarding the project; and
2. faculty questions on subject matter covered during the student's MS coursework.

In order to pass the Final Exam, students must satisfactorily answer questions in BOTH of these areas. **The Student Project must be selected in consultation with the Examination Committee and approved, in advance of the examination, by the Examination Committee Chair.** The detailed format of the final examination is at the discretion of the Final Examination Committee and must be in accordance with Graduate School requirements. However, unless modified by the Examination Committee, the following guidelines are suggested.

1. The Student Project Presentation should take no more than 30-45 minutes
2. Since Option B students conduct no formal research project, the project presentation may be based on an independent self study project. The primary emphasis of the project presentation is to assess the student's communication skills, not the originality or the complexity of the project itself.
3. The first slide of the presentation (before the title slide), should give the student's name and list all courses taken in pursuit of the Option B MS degree (including the semester in which each course was taken.)
4. The student should bring hard copies of the presentation for each of the committee members.
5. Questions on coursework should be concept oriented without involved calculations or lengthy derivations.

Appendix F
Transfer of Program Request

Last Name: _____ First Name: _____

Student ID Number: _____ E-Mail: _____

Phone Number: _____

Original Program: MS (Option A) _____ MS (Option B) _____ PhD _____

Upon recommendation of Professor _____, I hereby request to transfer my graduate program to: MS (Option A) _____
PhD _____.

Current Thesis Advisor: _____ New Thesis Advisor: _____

New Thesis Title: _____

Reason for Transfer Request:

Signatures

Date

Student: _____

Advisor: _____

Director of Graduate Studies: _____

Appendix G

Departmental Procedure for PhD Qualifying Examination

The Qualifying Examination consists of both written and oral components. The written part of the Qualifying Examination is satisfied by passing a written examination which is administered by the DGS, employing questions provided by the appropriate technical area committee(s), while the oral part is satisfied by passing an oral examination, including the research proposal, conducted by the student's advisory committee in accordance with UK Graduate School regulations.

1. Examination Procedure

- 1-1. Each student must select two (2) Area Exams from the list in Appendix I in consultation with his/her thesis committee chair(s).
- 1-2. Students who wish to take any Area Exam must inform the DGS through the GPC at least one month before the end of the semester prior to that in which the exam is to be taken.
- 1-3. Area Exams are closed book and are three hours in duration. Each exam will consist of six (6) to eight (8) questions taken from materials on the syllabus. The student may select any four (4) problems to be graded.
- 1-4. A passing score on three (3) of the four (4) questions answered is required in order to pass the exam. In particular, each area exam is graded separately and results are not averaged over the two exams.
- 1-5. Results will be announced two weeks after the completion of the last set of exams.
- 1-6. Both Area Exams must be passed to pass the written portion of the Qualifying Examination. Upon passing, the student can then prepare for the oral part of the Qualifying Examination.
- 1-7. Students who fail any one Area Exam are permitted to repeat only that Area Exam, or to select another Area Exam in consultation with the student's advisor and the DGS, to be taken within one year. Note that if a new exam is selected, only one attempt to pass is allowed.
- 1-8. Only two attempts to pass the written portion of the Qualifying Examination are allowed. If both area exams have not been passed by the second attempt, the student will be dismissed from the PhD program.

Any appeal associated with examination results, exam contents, etc., must be submitted in writing to the DGS within two weeks of the date of the announcement of the results. Appeals based on merit will be handled by the DGS, the Graduate Studies Committee, and the appropriate Technical Area Committees. Any re-evaluation of exam scores must be done by the appropriate original exam grader. Appeals based on procedural issues will be heard and decided by the ME Graduate Studies Committee. Any further appeals will be heard through established university channels.

Appendix H

Written Portion of the Qualifying Examination

For the written portion of the Qualifying Exam, a student must select two (2) of the Area Exams listed below. The syllabi for each exam are sent to students after registering for the exams with the Graduate Program Coordinator. There will be at least six (6) problems on each exam. Students are expected to attempt four (4) problems and demonstrate a passing level of performance on at least three (3).

Technical Area: Manufacturing

- Manufacturing Systems
- Manufacturing Processes

Technical Area: Mechanics

- Dynamics
- Solid Mechanics

Technical Area: Systems and Design

- Computational Techniques
- Vibro-Acoustics
- Control Systems
- Micro-Nano

Technical Area: Thermal Fluids

- Fluid Dynamics
- Thermal Science

Appendix I

Procedure for the Oral Portion of the Qualifying Examination

1. Once a student has passed the written part of the Qualifying Examination, he/she can prepare for the oral part.
2. The student must schedule the oral Qualifying Examination during the first six weeks of the semester in order for that semester to count toward the student's post qualifying residency. At least a two-week notice is required by the Graduate School to set an examination date.
3. Members of the student's Advisory Committee must be given a copy of the candidate's "Prospectus" at least two (2) weeks in advance of the oral Qualifying Examination date. The prospectus should document the nature, significance, methodology, and the expected outcomes of the proposed dissertation research.
4. The Advisory Committee of each student is responsible for deciding the format of the oral examination, for administering the oral examination, and for deciding the final result of the Qualifying Examination.

Appendix J

ME Graduate Program Mathematics Requirements

The mathematics requirement for the PhD degree in Mechanical Engineering may be satisfied by completing three (3) courses chosen in accordance with the following guidelines. Only two (2) courses are required for the MS degree. Approval of courses by the student's advisor and the DGS is required.

1. Any 400G-, 500-, or 600-level course offered by the UK Department of Mathematics, except MA 432G (which may be used only at the MS level), and/or 500-600 level courses offered by the UK Statistics Department may be taken to satisfy the mathematics requirement. A student may choose to apply no more than one of the following engineering courses toward satisfaction of the mathematics requirement:

CE 783	Structural Finite Element Analysis
CE 699	Advanced Finite Element Analysis in Engineering
CME 780	FE Methods for Fluid Dynamics and Transport Processes
EE 420G	Electrical Engineering Analysis I
EE 525	Numerical Methods and Electromagnetics
EE 625	Computational Electromagnetics
ME 611	Boundary Element Methods in Engineering
ME 613	Nonlinear Oscillations
ME 690	Numerical Methods for Partial Differential Equations

2. For PhD students, at least one of the three courses must be outside the area of numerical analysis (or statistics) and offered by the UK Department of Mathematics, and at least one of the three courses must be a 500 or higher-level course taken while in graduate standing.
3. No more than one graduate-level mathematics course from other institutions or from a previous MS degree (other than one in mathematics) may be applied toward the PhD requirement; and any such course will be subject to all conditions given above, and approval of the DGS and the Graduate School. No such courses may be transferred to satisfy the MS mathematics requirement.
4. An overall GPA of 3.0, or better, for mathematics alone, is required to satisfy the PhD mathematics requirement.

If a student possesses an extensive mathematics background (e.g., a Masters degree in mathematics or applied mathematics), exceptions/modifications to the PhD mathematics requirements may be proposed by the student's advisor. Any such deviations must be approved by the DGS.

The following list contains mathematics courses often taken by ME students for satisfaction of the mathematics requirements. This list is not all inclusive, and students may wish to choose other courses. Any such course(s) must be approved by the student's advisor and the DGS.

MA 432G	Methods of Applied Mathematics (MS students only)
MA 433G	Introduction to Complex Variables

MA 471G	Advanced Calculus I (highly recommended)
MA 472G	Advanced Calculus II
MA 481G	Differential Equations
MA 483G	Introduction to Partial Differential Equations
MA 485G	Fourier Series and Boundary Value Problems
MA 506	Methods of Theoretical Physics I
MA 507	Methods of Theoretical Physics II
MA 522	Matrix Theory and Numerical Linear Algebra I
MA 527	Applied Mathematics in the Natural Sciences I
MA/EGR 537	Numerical Analysis (Note: CS 537 should <u>not</u> be taken by the ME students)
MA 565	Linear Algebra
MA 575	Principles of Analysis
MA 622	Matrix Theory and Numerical Linear Algebra II
MA 625	Numerical Methods for Differential Equations
MA 633	Theory of Partial Differential Equations

Students in some areas could strongly benefit from classes in statistical analysis. This is especially true for students who are experimentalists in any of the four technical areas. But other students, for example Manufacturing students, could also find statistics classes beneficial. No more than two (2) statistics classes may be used by PhD students to satisfy their math requirement, and MS students may apply at most one (1) statistics class toward their math requirement.

Appendix K

Mechanical Engineering Graduate Student Exit Interview

Name: _____ Student ID Number: _____

Degree Awarded: _____ Date: _____

Name of Prospective Employer/Graduate School: _____

City State/Country Zip

Salary: _____ Permanent E-Mail Address: _____

Forwarding Address: _____

City State/Country Zip

_____ Thesis/Dissertation submitted to advisor

_____ Returned keys to office, desk and/or building
(key numbers: _____)

_____ Office Check-Out (no papers or books left in desk or office)

_____ Lab Check-Out (lab was clean and orderly)

_____ Returned books/solution manuals (TAs only)

_____ University of Kentucky Employee Separation Form
(required by payroll)

Signature

Date

Student: _____

Advisor: _____

Director of Graduate Studies: _____

Appendix L

Graduate School Forms

Please retrieve copies of all Graduate School forms at: <http://www.research.uky.edu/gs/gforms.html>. Questions about these forms should be directed to Jonathan Garrett in the Graduate School, 257-2591, jgarret@uky.edu.

- **Add/Drop Worksheet**
- **Request for Credit Overload**
- **Extension of Incomplete ("I") Grade**
- **Request for Post Mid-Term Withdrawal**
- **Request for Repeat Option**
- **University Scholars Program Application**
- **Concurrent Masters Degrees Form**
- **Transfer of Credit Form**
- **Application for Degree**
Must be submitted electronically within first four (4) weeks of graduating semester via myUK. After logging in, click on Student Services -> myRecords -> Graduate Degree Application.
- **Request for Final Masters Degree Examination** (MS students only)
Must be submitted with Thesis Approval Form no later than two (2) weeks prior to exam date. Last day to sit for an exam is the Thursday prior to Dead Week in order to graduate during the current semester.
- **Thesis Approval Form** (MS students only)
Must be submitted with Request for Final Examination no later than two (2) weeks prior to exam date. Approval of the thesis at this stage is confirming that it is ready to defend, and the final thesis should be brought to Graduate School after the exam to review for final formatting.
- **Electronic Masters Thesis Approval Form** (MS students only)
- **Formation of an Advisory Committee** (PhD students only)
Must be submitted electronically within the first year of study as a PhD student.
http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection_Screen.cfm
- **Recommendation for Qualifying Examination** (PhD students only)
Must be submitted electronically no later than two (2) weeks prior to exam date.
http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection_Screen.cfm
- **Notification of Intent to Schedule a Final Doctoral Examination** (PhD candidates only)
Must be submitted electronically eight (8) weeks prior to anticipated exam date.
http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection_Screen.cfm
- **Request for Final Doctoral Examination** (PhD candidates only)
Must be submitted electronically no later than two (2) weeks prior to exam date.
http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection_Screen.cfm
- **Electronic Doctoral Dissertation Approval Form** (PhD candidates only)

Copies of all forms must be submitted to Peter Hayman, 155 RGAN Building, upon submission to the appropriate Graduate School office (noted on each form).

Appendix M

A Step-by-Step Guide to Obtaining a Masters Degree

As outlined in previous pages of the handbook, there are certain requirements every student must satisfy in order to graduate with a Masters degree. The list below can be used as a guide to help a student while enrolled. Depending on a specific case, there may be additional steps needed in order to graduate. Be sure to review the steps with the Graduate Program Coordinator, your advisor, and/or the DGS throughout the process.

- ____ Within the first semester find a faculty advisor.
- ____ Submit a Graduate Student Profile and a Plan of Study to the Graduate Program Coordinator.
- ____ With input from your faculty advisor, form an advisory committee, making sure the Graduate School requirements (with respect to Associate and full Graduate faculty) on said committees are met.
- ____ Complete all required coursework required for a Masters Degree (Option A: 24 hours; Option B: 30 hours) while maintaining a 3.0 GPA and meeting all other requirements set forth by the Department and Graduate School.
- ____ Apply for graduation by scheduled date via myuk. Specific dates can be found on the UK Registrars website under the Academic Calendar.
- ____ Schedule and take the Final Exam following the requirements set forth by the Department and the Graduate School.
- ____ Submit thesis to the Graduate School (Option A) within 60 days of Final Exam.
- ____ Return all keys etc. to the Department, and fill out an Exit Interview Form (page 41).

Appendix N

A Step-by-Step Guide to Obtaining a PhD Degree

As outlined in previous pages of this handbook, there are certain requirements every student must satisfy in order to graduate with a PhD degree. The list below can be used as a guide to help a student while enrolled. Depending on a specific case, there may be additional steps needed in order to graduate. Be sure to review the steps with the Graduate Program Coordinator, your advisor, and/or the DGS throughout the process.

- ____ Within the first semester find a faculty advisor.
- ____ Enroll in coursework until all degree requirements are met. The number of hours varies depending on certain situations, but 48 hours is required for any PhD student coming directly from a Bachelors degree.
- ____ With input from your faculty advisor, form an advisory committee, making sure the Graduate School requirements on the committee are met with respect to members Graduate Faculty rank. Submit the committee to the Graduate School for approval through the Candidate Forms page on the Graduate School website.
- ____ Take and pass the Preliminary Oral Exam in either your first or (early) second semester of enrollment.
- ____ Take and pass the Written Qualifying Exam as required by the Department. You may not take the Written Qualifying Exam until the Preliminary Exam has been passed.
- ____ Take and pass the Oral Qualifying Exam as required by the Department and Graduate School. Students may enroll for the exam via the Candidate Forms page on the Graduate School website. Students may not take the Oral Qualifying Exam until both Written Exams are passed.
- ____ Complete a minimum of two semesters of Post-Qualifying Residency as required by the Graduate School.
- ____ Apply for graduation by scheduled date via myuk. Specific dates can be found on the UK Registrars website under the Academic Calendar.
- ____ Submit a Notification of Intent to take your final exam to the Graduate School by the dates set. Specific dates can be found on the Graduate School website.

- ____ Request a Final Doctoral Examination once the Notification of Intent has been approved. Follow all Graduate School rules and deadlines.
- ____ Submit dissertation to the Graduate School within 60 days of Final Exam.
- ____ Return all keys etc. to the Department, and fill out an Exit Interview Form (page 41).