

DEPARTMENT OF MECHANICAL ENGINEERING

2008-2009 UNDERGRADUATE STUDENT HANDBOOK

DEPARTMENT CONTACTS

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FOREWORD

This manual has been prepared to assist the mechanical engineering undergraduate students plan a course of study and keep track of their progress in conjunction with their assigned faculty advisor. It is intended to be used only as a supplement to the University of Kentucky Bulletin. The Bulletin, among other things, contains statements of official academic policy regarding current courses, elective requirements as well as pre-engineering and Engineering Standing requirements and is the authoritative source of information for all undergraduate students.

This manual should be retained throughout the student's stay in the department. This manual should be brought to the priority registration conference with the student's Faculty/Academic Advisor each semester and used as an aide in planning courses to be taken in the upcoming semester(s).

Most of the courses in the mechanical engineering curriculum are required of all mechanical engineering students. However, there is a certain degree of flexibility provided by elective courses. The courses that offer the student a choice within certain limits are: (1) the University Studies Program (2) the Supportive Elective, (3) the Mathematics Elective (4) Mechanical Engineering Technical Electives. Each area is discussed in detail in this manual.

A note to all students-- be sure you understand the expectations of the university in regard to cheating and plagiarism. Do not assume that a team effort is allowed unless it is clearly indicated in the assignment. If a team effort is involved, it should be clearly indicated in the submission. **For a discussion of the overall issue and guidelines, refer to the document on the website of the Ombud of the University of Kentucky at <http://www.uky.edu/Ombud/Plagiarism.pdf>.** The Ombud web site also includes a link to a Prentice Hall Companion Website "Understanding Plagiarism" http://wps.prenhall.com/hss_understand_plagiarism_1/0,6622,427064-,00.html

ACADEMIC ADVISING

University of Kentucky Academic Advising Mission Statement

The mission of academic advisors, both faculty and professional, is to:

- assist student in taking responsibility for developing meaningful education plans compatible with their potential and their career and life goals;
- help students formulate important questions about the nature and direction of their education and assist them in finding answers to those questions;
- assist student in acquiring accurate and timely information regarding academic policies, procedures, and requirements;
- facilitate the successful transition of prospective, continuing and nontraditional students to the academic and campus environment.

Mechanical Engineering Academic Advising Mission Statement

Consistent with the mission of the University of Kentucky, Academic Advising in Mechanical Engineering is committed to engaging students in intentional, collaborative, supportive, and meaningful partnerships. Grounded in teaching and learning, Academic Advising will assist students in achieving their personal, educational, cultural, and career goals while becoming self-directed, life-long learners.

Academic Advising Description

Academic advising is an educational process that, by intention and design, facilitates students' understanding of the meaning and purpose of higher education and fosters their intellectual and personal development toward academic success and lifelong learning. (NACADA, 2004)

Academic advising provides students with an opportunity to build a relationship with their advisor for the purpose of gaining assistance in planning their educational career, in learning the skills needed for academic success, and in learning how to access the variety of resources and services available to them.

Academic advising is a collaborative educational process whereby students and their advisors are partners in meeting the essential learning outcomes, ensuring student academic success, and outlining the steps for achievement of the students' personal, academic, and career goals. The advisor/student partnership requires participation and involvement of both the advisor and student as it is built over the student's entire educational experience at the university. Both the student and the advisor have clear responsibilities for ensuring the advising partnership is successful.

Advisor Responsibilities – What you can expect

- Maintain confidentiality.
- Understand and effectively communicate the curriculum, graduation requirements, and university and college policies and procedures.
- Encourage and guide students as they define and develop realistic goals
- Encourage and support students as they gain the skills to develop clear and attainable educational plans.
- Provide students with information about and strategies for utilizing the available resources and services on campus.
- Assist students in understanding the purposes and goals of higher education and its effects on their lives and personal goals.
- Be accessible for meeting with advisees via office hours for advising, telephone or email.
- Assist students in gaining decision making skills and skills assuming responsibility for their educational plans and achievements.

Advisee Responsibilities – What is expected of you

As an advisee you have clear responsibilities in the advising partnership in order to be successful:

- Become familiar with the online resources of the university advising system, including:
 - myUK (<https://myuk.uky.edu/>)
 - APEX - Academic Program Evaluation and eXploration (<http://www.uky.edu/degreeaudit/>)
 - Course Applicability System to determine transfer equivalencies (<http://ky.transfer.org/cas/index.jsp>)
 - UK's GPA calculator (<http://www.uky.edu/Registrar/GPAcalc.htm>)
- Schedule regular appointments or make regular contacts with advisor during each semester.
- Come prepared to each appointment with questions or material for discussion.
- Be an active learner by participating fully in the advising experience.
- Ask questions if you do not understand an issue or have a specific concern.
- Organize official documents in a way that enables you to access them when needed.
- Complete all assignments or recommendations from your advisor.
- Gather all relevant decision-making information.
- Clarify personal values and goals and provide advisor with accurate information regarding your interests and abilities.
- Become knowledgeable about college programs, policies, and procedures.
- Accept responsibility for decisions.

PRE-REQUISITES

The mechanical engineering curriculum is organized in the recommended semester by semester course load. Certain courses are pre-requisites for other courses. *Please note: It is extremely important that the pre-requisite course(s) be taken during the proper semester of study. A delay in taking a pre-requisite course may result in a delay of the student's graduation.* The student who takes the courses in the order listed on the attached curriculum sheet will experience no difficulty. The student who is “**off-schedule**” may find that the number of semesters required to complete this program will be determined not by the number of courses needed, but the sequence in which the courses **must** be taken.

NOTE: PRE-REQUISITES WILL BE RIGIDLY ENFORCED REGARDLESS OF THE STUDENT'S MAJOR.

REPEATED REGISTRATION IN A COURSE

It is the policy of the Mechanical Engineering Department to enforce the University Senate Rule 4.3.3, refusing to allow a student to register in a course for a third time, including correspondence (and special exams effective Fall 2003). A withdrawal from the course shall not be counted as a registration for these purposes. ***This policy applies to ALL students enrolling in any course offered by the Mechanical Engineering Department (regardless of major). These courses carry a prefix of EM and ME. Thus, it will be necessary for a student to change their academic major if the student does not successfully complete***

a ME or EM prefixed course within the limitations stated above.

SPECIAL EXAMS

Any full-time or part-time student enrolled in the University, and in good academic standing, shall have the right to request a special examination for credit in any course offered in the University System, regardless of whether the student has audited the course, is currently enrolled in it, or has studied for it independently.

Approval of requests from undergraduate students rests with the department chair. The Chair of the Mechanical Engineering Department approves/denies request for *Credit by Special Examinations* as per the University Senate Rule 5.2.1.2.

It is the policy of the Chair of Mechanical Engineering to approve/deny request based on the following:

- All special exams must be scheduled and taken prior to the “last day to drop a course without it appearing on the student’s transcript.” (This date appears in the official University Calendar.)
- No special exam will be approved for courses with laboratory content offered through the Mechanical Engineering Department (ME 310, ME 311, ME 411 and ME 412).
- No special exam will be approved in accordance with the department policy to enforce the University Senate Rule 4.3.3. In order to take a special exam, you must be currently enrolled in the University of Kentucky.

To request a special exam, begin by going to room 10 FB, Registrar's Office and request an "Application for Special Exam" form. Complete the top portion of the form and schedule an appointment with Janet Prewitt for further instructions.

UNIVERSITY STUDIES PROGRAM

The University Studies Program is separated into ten areas of study: math, foreign language, inference-logic, written communication, oral communication, natural sciences, social sciences, humanities, cross-cultural, and electives.

Mechanical Engineering students satisfy many of the University Studies Program requirements in conjunction with their curriculum requirements. Typically, a student may satisfy the remaining University Studies Program requirements with the completion of five courses outside the Mechanical Engineering Curriculum (this is the case, only if the student completed two years of the same foreign language in a secondary school).

For Mechanical Engineering students the University Studies Program requirements is to be completed in the following manner:

- I **Math** – satisfied upon completion of curriculum requirements.
- II **Foreign Language** – two semesters of the same foreign language **or** two years of the same foreign language in a secondary school (submit high school transcript to Janet Prewitt for verification).

- III **Inference-Logic** – satisfied upon completion of curriculum requirements.
- IV **Written Communication** – ENG 104 or ENG 101 and ENG 102. The University's writing requirement also has a second component, the Graduation Writing Requirement, see page 70 of the 2006-2007 University Bulletin for more details. The Graduation Writing Requirement **must** be taken at UK.
*Note, courses on the approved list of graduation writing requirements may be used to satisfy both the graduation writing requirement and 3.0 credit hours of the required 6.0 credit hours of humanities or the cross-cultural requirement.
- V **Oral Communication** – **PLEASE NOTE:** Students who enroll at the University of Kentucky **for the first time** in the Fall 2004 through Summer 2007 are not required to complete the Oral Communication requirement. This suspension applies **only** to University Studies Requirements. The Mechanical Engineering Curriculum Requirement, COM 181 Basic Public Speaking, **is not suspended** and continues to be required.
- VI **Natural Sciences** - satisfied upon completion of curriculum requirements.
- VII **Social Sciences** – two courses in **separate** disciplines chosen from the approved list of social sciences courses as listed in the University Bulletin.
- VIII **Humanities** – two courses chosen from the approved list of

humanities courses as listed in the University Bulletin.

- IX **Cross-Cultural** – one course chosen from the approved list of cross-cultural courses as listed in the University Bulletin.
- X **Electives** – satisfied upon completion of curriculum requirements.

REQUIREMENTS FOR ENGINEERING STANDING

Mechanical Engineering students must have completed at least 35 semester credit hours applicable to the degree program with a minimum cumulative GPA of 2.50. In addition, completion of ME 101, ENG 104 (or ENG 101 and ENG 102), CHE 105, MA 113, MA 114, MA 213, PHY 231, PHY 241 with a minimum cumulative GPA of 2.50 or higher is required. Transfer students who have received more than 35 hours transfer credit in the degree program will be considered without the inclusion of ME 101. A student may exercise one (and only one) of his/her official University of Kentucky Repeat Options to improve this grade point average. Written request for exception to the allowed number of repeats should be submitted to the Director of Undergraduate Studies.

Applications for engineering standing are in the rack of forms outside of 157 RGAN.

In no case, will there be an exception made to the minimum acceptable grade point averages listed above.

SUPPORTIVE ELECTIVE

The supportive elective course can be any course that carries college credit and is not a more elementary version of a required course. For example, College Algebra would not be acceptable as it is more elementary than the required Calculus courses. A course in the Human Environmental Sciences would be satisfactory because there are no required Human Environmental Science courses. It is important to note that this is the only course in the Mechanical Engineering curriculum that may be taken on a pass/fail grade option.

One of the most common ways to fulfill the supportive elective is by enrolling in the Co-Op Program and successfully completing three co-op rotations. For more information on the Co-Op Program, contact Ilka Balk, Director of the Co-Op Program, 379 RGAN Bldg., (859) 257- 4178 or Marsha Phillips, Coordinator of the Co-Op Program, 381 RGAN Bldg., (859) 257-8863.

MATHEMATICS ELECTIVE

The Mathematics Elective, scheduled for the second semester of the junior year, must meet two criteria:

1. It must be a course offered by the Department of Mathematics or by the Department of Statistics, and
2. It must not be a course that repeats subject matter already

taken in a required course, and it must be of a general level equal to or higher than that of the required courses in mathematics.

NOTE: Courses such as ECO 391 (Economic and Business Statistics) and STA 291 (Statistical Methods) are NOT acceptable as they are remedial in comparison to the required mathematics courses.

Courses frequently taken to complete the Mathematics elective include:

- STA 381 – Introduction to Engineering Statistics
- MA 320 – Introductory Probability
- MA 321 – Introduction to Numerical Methods
- MA 322 – Matrix Algebra (required for a minor in mathematics)
- *MA 416G – Principles of Operations Research I
- *MA 432G – Methods of Applied Mathematics I
- *MA 481G – Differential Equations I

*These courses are particularly appropriate for students considering graduate study.

APPROVED MECHANICAL ENGINEERING TECHNICAL ELECTIVES

The following is a list of approved technical electives. Insufficient student enrollment or other limitations may result in a course not being offered.

- ME 380 Topics in ME
- ME 395 Independent Work in ME
- ME 503 Lean Manufacturing

- ME 505 Modeling of Manufacturing
- ME 506 Mechanics of Comp. Mat.
- ME 507 Design for Manufacturing
- ME 510 Vibro-Acoustic Des
- ME 512 Manufacturing Systems
- ME 513 Mechanical Vibrations
- ME 527 Applied Math in Nat Sci I
- ME 530 Gas Dynamics
- ME 531 Fluid Dynamics I
- ME 532 Adv. Strength of Materials
- ME 548 Aerodyn of Turbomachinery
- ME 549 Power Generation
- ME 556 Intro. to Composite Mat.
- ME 560 Engineering Optics
- ME 563 Basic Combustion Phenom
- ME 565 Scale Modeling in Engr.
- ME 580 Heating, Ventilating & AC
- ME 599 Topics in ME
- MFS 599 Topics in Manufacturing
- EGR 599 Topics in Engineering
- MSE 201 Material Science
- BAE 502 Modeling of Bio Systems
- BME 501 Foundations of BME
- BME 530 Biomed Instrumentation

In addition to the above list, students may choose to take one course offered by the College of Engineering which is 500 level or above to satisfy one of the three required technical electives.

ADVISING INFORMATION FOR MECHANICAL ENGINEERING STUDENTS

After students have completed the registration for their freshman courses, the advising becomes the responsibility of the Mechanical Engineering Department.

Janet Prewitt, Student Affairs Officer, coordinates advising for the Mechanical Engineering department. Mrs. Prewitt maintains a departmental record for each student enrolled in Mechanical

Engineering and monitors the progress of each student.

Each student is assigned a Mechanical Engineering Faculty Advisor. Once assigned, the name of your faculty advisor will appear on myUK.

During the fall semesters, advising for Priority Registration begins October 1st. During the spring semesters, advising begins the Monday following Spring Break (usually in mid-March).

To prepare for Priority Registration Advising, students must pick up an Advising packet available at the front desk in the department office (151 RGAN) prior to meeting with their advisor. Each faculty advisor will post a form on the outside of his/her office door for their advisees to sign up for an advising conference. Students **are required** to meet with their advisor **prior to registration** for the next semester.

In preparation for the advising conference appointment, students should make a tentative list of courses in which they plan to enroll. ***After the advising conference, the Advising Worksheet (signed by both the advisor and student) must be returned to the ME Office, 151 RGAN, to have the "Advisor Hold" removed.*** No undergraduate student is allowed to register through the University of Kentucky system (myUK) until his/her "advisor hold" is lifted.

Upon receipt of the completed Advising Worksheet, the office staff will lift the "advisor hold" to allow students to register for courses. Registration may be completed through the myUK system during the designated time period;

directions and dates are provided in the Schedule of Classes and on the web.

In addition to advising on academic matters, the faculty advisors encourage students to discuss career planning, job-search or other matters of concern to the student. While the primary emphasis on advising is during the Priority Registration period, students are **encouraged** to visit their advisor at any time during the semester.

GRADUATION REQUIREMENTS

During Priority Registration of the student's final semester, an appointment should be made with Janet Prewitt. During the advising conference, a graduation plan of study will be completed indicating any remaining requirements. To be eligible for any degree, a student must have completed the requirements as approved by the University Senate. Curriculum requirements must include, in addition to specified credits, a specified grade-point average both overall and in the student's major which may in no case be less than 2.0. The student **must** file an application for graduation with the dean of the college from which the degree is to be awarded within 30 days after the beginning of the semester or 15 days in the summer session in which the student expects to complete the work. The last day to submit the Application for Degree is provided in the official University of Kentucky Calendar and in the Schedule of Classes.

PROFESSIONAL ENGINEER FUNDAMENTALS EXAM (FE EXAM)

Students often inquire about why they should take the FE exam if it is not

required. Students may find that many employers place a premium on licensure and reward it with higher pay; others may require it for more senior level positions. Some types of engineering work require a Professional Engineers License which can only be obtained after successfully completing the FE exam and four years of engineering work experience beyond a Bachelor's from an (EAC/ABET) accredited institution.

The FE exam is given in April and October each year. The official website is the Kentucky State Board of Licensure for Professional Engineers and Land Surveyors web site (do not use www.) kyboels.ky.gov

The website provides the application and information on the application process and taking the FE exam.

All applications **must be typed** completing questions 1-15 (while the form can not be submitted on-line, the application is an interactive .pdf file which may be typed, then printed out for submission). Bring your completed, signed application to the ME Department Office, 151 RGAN Bldg., to be signed by the department chair. The **application deadline** to take the FE exam in October is **August 1st**, to take the exam in April the deadline for applications is **February 1st**. It is important to note that if the deadline date is on Saturday or Sunday, the application must be received the Friday prior to the deadline date. The application deadline dates are subject to change without notice; please refer to the official KYBOELS website for official deadlines.

UNDERGRADUATE PROGRAM EDUCATIONAL OBJECTIVES

Consistent with the Vision and Mission statements of the University of Kentucky, the undergraduate program in Mechanical Engineering strives to meet the following educational objectives:

1. Our graduates will have the knowledge in analytical, computational, and experimental methods to begin engineering practice or continue their education. This will include the ability to design components and systems and to solve engineering problems using current analysis and computational methods.
2. Our graduates will have a broad education and the communication skills needed for a variety of career options and an appreciation of the need for life-long learning.
3. Our graduates will have an understanding of the societal, environmental and ethical responsibilities of engineers.

UNDERGRADUATE PROGRAM LEARNING OUTCOMES

Listed below are the ABET-2000 program outcomes established by the Mechanical Engineering Department.

Our graduates will be able to apply knowledge of mathematics, science and mechanical engineering to the solution of problems, particularly in the areas of thermodynamics and energy systems, heat transfer, fluid mechanics, mechanical systems and controls, mechanical design, finite element

methods and computer aided graphics, manufacturing, instrumentation, and experimental method, statistics and linear algebra.

In addition, they will exhibit the ability to:

- design and conduct experiments, and analyze and interpret data;
- identify, formulate and solve engineering problems;
- use the modern technical tools necessary for engineering practice;
- communicate effectively;
- function in a team environment;
- understand professional and ethical responsibilities;
- understand the impact of engineering solutions in a global and societal context;
- understand contemporary issues;
- engage in lifelong learning

**ADMISSION REQUIREMENTS FOR
THE UNIVERSITY SCHOLAR'S
PROGRAM (COMBINED
MASTER'S/BACHELOR'S DEGREE
PROGRAM)**

The University Scholar's Program offers highly motivated undergraduates the opportunity and the challenge of integrating their undergraduate and graduate courses in a single continuous program culminating in both a baccalaureate and master's degree in Mechanical Engineering.

There are also opportunities for similar combined degrees in the following areas:

BSME/MSBME (Biomedical Engineering)
BSME/MSMFS (Manufacturing Systems)

For further information on these programs, check with your advisor.

The University Scholar's program provides students the opportunity to begin preliminary course and research work for the graduate degree under the direction of a faculty advisor during their senior year.

Degree Requirements

Twelve (12) hours of graduate work will count for both graduate and undergraduate programs, reducing the total hours of the graduate program degree requirements by twelve (12). The requirements for the bachelor's degree are unchanged.

Students may take no more than 16 credit hours per semester except by recommendation of the Director of Graduate Studies (DGS) and approval of the Dean of the

Graduate School. Students must have an undergraduate advisor and a graduate advisor. A jointly planned program must be prepared for each student.

Admission Requirements

Application to the University Scholar's Program should be submitted to the DGS at the end of the student's junior year. (You must be accepted into the University Scholar's Program in order for the courses to be applicable to both the bachelor's and master's degree requirements. **Courses taken prior to acceptance are not applicable.**)

Applicants must have completed at least 90 credit hours of work toward the bachelor's degree, or be eligible for senior standing in the semester they are admitted to the program.

The minimum acceptable cumulative undergraduate grade point average is 3.5 in Mechanical Engineering courses (prefixed by EM/ME, includes technical electives regardless of prefix) and 3.2 overall.

For more information regarding the University Scholar's Program, please contact Dr. Scott Stephens, 161 RGAN Bldg., (859) 257-6336 ext. 80649, stephens@engr.uky.edu.