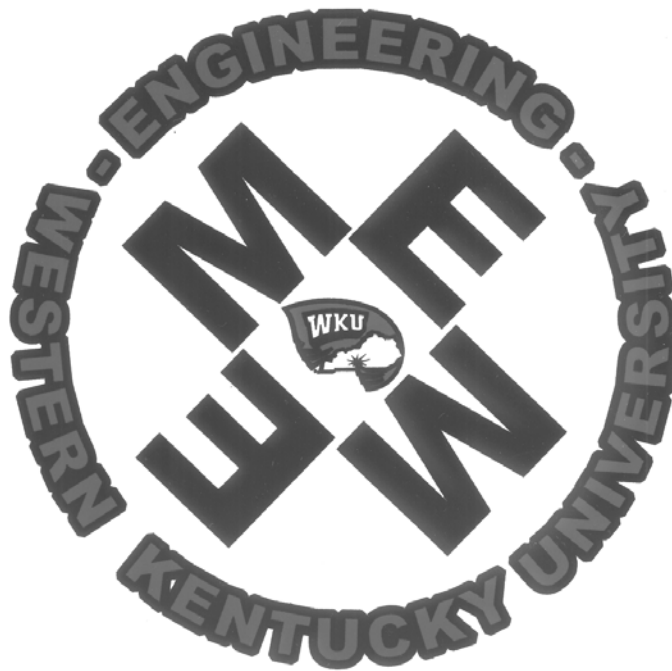


# STUDENT HANDBOOK

## WKU/UK JOINT BACHELOR OF SCIENCE PROGRAM IN MECHANICAL ENGINEERING

DEPARTMENT OF ENGINEERING  
WESTERN KENTUCKY UNIVERSITY  
EBS 2101  
BOWLING GREEN, KY 42101  
[WWW.WKU.EDU/ENGINEERING](http://WWW.WKU.EDU/ENGINEERING)



**AUGUST 2010**

Accredited by the EAC Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700

**Welcome to the Mechanical Engineering (ME) program at Western Kentucky University (WKU). The faculty has assembled this handbook to familiarize you with the policies and standards associated with this program. This handbook will be periodically updated, so check the engineering home page at [www.wku.edu/engineering](http://www.wku.edu/engineering) for the latest edition. Although this handbook is as accurate as we can make it, the WKU University Catalog is the final authority on policies and procedures. Copies of the catalog are available in the WKU Bookstore, and are also available online.**

### **ABET Accreditation, Mission, and Program Outcomes**

**This program is accredited by the EAC Accreditation Commission of ABET. The Commission can be contacted at ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700.**

The Mission Statement for the ME program is shown on page 5, along with the Program Outcomes and Objectives from the ABET ME accreditation plan. These Program Outcomes are a description of the skills the mechanical engineering graduate should possess at the point of graduation. Program Objectives are intended to be a concise description of what WKU graduates actually do in their practice 3-5 years after graduation. We have begun surveying our graduates on a regular basis to ensure these Objectives are a realistic description of their activities and to determine the graduates' level of preparation for these activities.

### **A Joint Program with the University of Kentucky**

**This is a Joint Program with the University of Kentucky (UK). Diplomas from this program are jointly awarded by both WKU and UK. Students do not go to the UK campus in Lexington to take classes. However, students matriculating at WKU in Fall 2004 and later are required to have at least 16 hours of transcript credit in the major taught by a UK faculty member. At the current time, these hours are offered through interactive video service (IVS). Courses in the ME curriculum (and other departments as well) are not offered each academic semester. Thus, it is very important you work with your faculty advisor to monitor your progress towards this and the other academic requirements of the program.**

### **Minors**

**A wide range of minors is available at WKU. Some students who complete the ME degree program requirements choose to earn a minor in Mathematics with additional Mathematics coursework, see the Mathematics department for details. In addition, a multidisciplinary minor in Entrepreneurship is now available. Engineering students can receive this minor upon completion of their engineering degree plus the following three courses: Accounting 200, Marketing 320, and Management 312. The advisor for the Entrepreneurship minor is in the College of Business (234 Grise Hall). Other minors are described in the WKU catalog under the appropriate program or department.**

### **Curriculum, Courses, and Academic Advising**

**Taking personal responsibility for tracking your progress through the curriculum is key to your academic success. A suggested plan of study is shown on page 7. This form is a template**

for completing the degree program in eight semesters. You must recognize that this can only be achieved by taking a relatively aggressive pace of courses. If you get off sequence or you cannot take the full listed load for a given semester, make sure you work with your advisor to select the appropriate courses to minimize prerequisite problems in later semesters.

The table on page 8 documents the prerequisites and corequisites for courses in the ME program. **You must pay very close attention to these requirements, so be cautious in planning and modifying your schedule.** For instance, if you drop a class without considering the prerequisite requirements for the next semester, you may need to add a year to your course of study. Once again, work carefully with your advisor.

If you choose to change your major to Mechanical Engineering, you must use a “Change of Major/Minor/Advisor” form available on Topnet. Students declaring ME as their major must use “543P Mechanical Engineering Pre-Major” for the “Major 1” code and name until their records are reviewed by an ME faculty advisor.

Academic advising is done by faculty in the program. Scheduling appointments is done in AdvisorTrac, accessible through <https://tracweb.wku.edu> with user name and password the same as your WKU email account. You may get a security certificate error when you try to log on, but approve the site and enter anyway. This is a known problem under review. Once in the system, search for your academic advisor to make an appointment. (Note: Prof. Joel Lenoir is found under Henry Lenoir)

Academic advisors are assigned as follows:

- New students and those not currently taking ME 200: Prof. Joel Lenoir, EBS 2118
- Students currently in or above ME 200, but not yet in ME 300: Prof. Robert Choate, EBS 2114
- Students currently in or above ME 300: Dr. Chris Byrne, EBS 2112

The iCAP (Interactive Curriculum and Academic Progress) system in Topnet is used to monitor degree program progress. Be sure to review your iCAP report regularly and always check it before an advising appointment.

### **Foreign Language Requirement**

**Foreign language placement is required.** The WKU foreign language requirements have changed for students entering WKU in summer 2004 and later. See the Modern Languages page at [www.wku.edu/mlis](http://www.wku.edu/mlis) for details on the General Education Placement Policy.

### **Academic Standards and Graduation Requirements**

**The individual student is responsible for understanding and following the Academic Standards for the program.** Basic admission and academic policies of the program are listed on page 9. Students who enter the ME program are categorized as “pre-majors” until they satisfy the eligibility standards. **The eligibility standards for transition from pre-major to major are listed on page 9. Pay particular attention to the graduation requirement of a grade of C or better for the courses listed. This policy is strictly enforced. Your progress towards satisfying these requirements is tracked on the iCAP (Interactive Curriculum and Academic Progress) system found in Topnet. See your advisor for details.**

### **Mathematics Elective Courses**

The Mechanical Engineering Program requires students to complete four required Mathematics courses (MATH 136, 137, 237, and 331) and one elective Mathematics course. This elective may be MATH 307, MATH 350, STAT 301, or any other 300 or 400 level Math course covered by the following guidelines (adapted from the UK ME Student Handbook).

**The required Mathematics Elective must meet three criteria:**

- 1. It must be a course offered by the Department of Mathematics.**
- 2. It must not be a course repeating subject matter already covered in a required course.**
- 3. It must be of a general level greater than or equal to the required courses in Mathematics**

Work with your academic advisor to select an appropriate Mathematics elective. If you are interested in a Mathematics minor or double major, work with the Mathematics department since not all Mathematics courses count towards the minor or major.

### **Course Offering Plan**

The ME Joint Program relationship between WKU and UK allows an expanded range and depth of course offerings, along with increased opportunities for students to take required courses. As shown in the suggested plan of study on page 6, some courses may be offered from either institution. **The following list of courses is scheduled to be offered from the University of Kentucky through the spring semester 2011.** Of course, changes to this plan may be required but sufficient advance notice will be given. Pay particular attention to this list and schedule, since each ME student is required to have a minimum of 16 hours of transcript credit in the major taught by a UK faculty member.

#### **University of Kentucky Course Offerings to the WKU/UK ME Joint Program**

<b>Fall Semester</b>	<b>Spring Semester</b>
EM 221: UK Statics	EM 221: UK Statics
EM 313: Dynamics	EM 302: UK Mechanics of Deform. Solids
ME 344: Mechanical Design	EM 313: Dynamics
ME 416: UK Dynamics Systems Elective	ME 321: Engineering Thermodynamics II
ME 498: UK – ME Selected Topics (Fall)	ME 499: UK – ME Selected Topics (Spring)

One additional ME 498 or ME 499 will be offered by a UK faculty member each year.

### **Technical Electives**

Three Technical Electives are required in the ME program. These are primarily satisfied through the six Selected Topics courses, four from WKU and two from UK:

ME 494: WKU – ME Selected Topics	ME 495: WKU – ME Selected Projects
ME 496: WKU – ME Selected Topics (Fall)	ME 497: WKU – ME Selected Topics (Spring)
ME 498: UK – ME Selected Topics (Fall)	ME 499: UK – ME Selected Topics (Spring)

Technical elective courses offered in recent semesters from each institution include:

WKU	UK
Reliability Engineering	Design for Manufacturing
Advanced Strength of Materials	Finite Element Analysis
Energy Conversion and Sustainability	Kinematics and Dynamics
Failure Analysis and Prevention	HVAC
Materials Processing and Selection	

These and similar courses will be offered each year, watch Topnet and the ME Program Bulletin board for course announcements as they become available.

### **Student Laptops for Mechanical Engineering**

The Mechanical Engineering program is moving to a required laptop program beginning in ME 180: Freshman Design II. Course fees are used in this and some subsequent courses to provide software and other resources the student uses in the class. The student then retains for permanent use. The Department of Engineering recognizes most incoming students purchase laptops for use inside and outside of class. WKU has an easily accessible wireless environment that makes laptops an attractive choice over a desktop computer.

However, not all laptops may be suitable for use with engineering software. Here are some suggestions for specifying a laptop. Please contact the department at 270-745-2461 if you have any questions.

#### **Operating System:**

- Microsoft Windows Vista or 7: 32 or 64 bit (**64 bit allows use of more RAM memory**)

#### **RAM memory:**

- At least 3 gigabytes of RAM required
- **For best performance with engineering software, use 4-8 gigabytes & 64 bit Windows**

#### **Graphics cards:**

- Integrated graphics generally sufficient
- **Discrete graphics card for maximum performance**

#### **Hard Drive:**

- 320-500 gigabytes of storage highly recommended

#### **Optical Media:**

- DVD reader/burner highly recommended

#### **Default Software:**

- Microsoft Office: Word, Excel, Powerpoint
- PDF writer

#### **Security Software:**

- Low overhead software such as Microsoft Security Essentials highly recommended

Netbook computers are useful for email and similar applications, but cannot run the software you would run in class. Macintosh computers may work if a Windows operating system can run on the machine. Windows is required to run engineering software such as AutoCAD, Solidworks, Mathcad, etc. Students are highly advised to purchase a repair and service plan to cover their computer systems. Due to the nature of their usage environment, laptops might need a damage protection plan as well.

# **WKU/UK Joint Program in Mechanical Engineering**

## **Mission Statement**

The Mechanical Engineering program produces graduates who are well prepared for the start of productive, successful careers as practicing engineers. Our graduates will have a strong competitive advantage with their unique background of engineering fundamentals combined with practical knowledge and experience.

The Mechanical Engineering program will provide a project-based, learner-driven environment relevant to the needs of our region. In support of this learning environment, the professional engineering activities of the faculty will create opportunities for the students to practice the art and science of contemporary Mechanical Engineering.

## **Program Educational Objectives**

### **Technical**

1. Our graduates demonstrate competence in the use of scientific, technical, and professional skills for the practice of Mechanical Engineering.
2. Our graduates have demonstrated the ability to identify problem causation and have implemented practical, application-oriented solutions.
3. Our graduates have demonstrated the ability to find additional knowledge necessary to solve unfamiliar problems.

### **Professional**

1. Our graduates exhibit excellent two-way communication skills (written, oral, visual, and graphical) with a wide variety of audiences.
2. Our graduates have demonstrated ethical professional behavior and a comprehension of the breadth of the Engineer's professional roles and responsibilities.

### **Societal**

1. Our graduates have adapted to an ever-changing world by engaging in life-long learning and professional development activities.
2. Our graduates have contributed to their region's economic development through their professional practice.

# **WKU/UK Joint Program in Mechanical Engineering**

## **Program Outcomes**

### **Fundamental Skills**

1. Mechanical Engineering graduates can formulate mathematical descriptions of physical systems to predict system response.
2. Mechanical Engineering graduates can characterize relationships between and within mechanical, thermal and electrical engineering systems.
3. Mechanical Engineering graduates can measure physical quantities and can plan, conduct, analyze and evaluate experiments.

### **Professional Skills**

4. Mechanical Engineering graduates can use structured problem solving techniques, appraise the needs of clients, produce product/project definition statements, and propose appropriate engineering solutions.
5. Mechanical Engineering graduates can execute a design from inception through completion, and convey/document solutions in a wide variety of formats.

### **Engineering Professionalism**

6. Mechanical Engineering graduates can successfully manage projects.
7. Mechanical Engineering graduates can participate effectively in multi-disciplinary teams.
8. Mechanical Engineering graduates can judge appropriate professional and ethical conduct.

### **Life-Long Learning**

9. Mechanical Engineering graduates are able to keep abreast of technology and have demonstrated the ability to learn without direct supervision.
10. Mechanical Engineering graduates are on a path leading to professional registration.

### **Societal Awareness**

11. Mechanical Engineering graduates demonstrate knowledge of the impact of engineering practice on society, have considered the importance of contemporary societal issues as an element of their engineering decision process and have participated in activities involving the community.

**WKU/UK Joint Bachelor of Science  
Program in Mechanical Engineering**

**Curriculum and Suggested Plan of Study**

<b>FALL SEMESTER</b>			<b>SPRING SEMESTER</b>		
ME 175	University Experience	2	ME 180	Freshman Design II	3
CHEM 120/121	Chemistry I & LAB (4,1)	5	MATH 137	Calculus II	4
MATH 136	Calculus I	4	PHYS 255/256	Intro. Mech. & LAB (4,1)	5
ENG 100	Freshman English	3	HIST 119/120	Western Civilization	3
COMM 161	Business Speaking	<u>3</u>	*Foreign Lang.	Modern Language	<u>3</u>
		<b>17</b>			<b>18</b>
MATH 237	Multivariable Calculus	4	ME 200	Sophomore Design	3
EM 221	UK Statics	3	MATH 331	Differential Equations	3
ME 240/241	Mats./Meth. & LAB (3,1)	4	EM 313	UK Dynamics	3
PHYS 265/266	Intro E&M & LAB (4,1)	5	EM 303	WKU Mech. Def. Solids	3
ENG 200	Introduction to Literature	<u>3</u>	ME 285	Intro. Ind. Automation	1
		<b>19</b>	ME 347	Mechanics LAB	1
			Category B	Elective 1 of 2	<u>3</u>
					<b>17</b>
ME 220	Eng. Thermo I	3	ME 300	Junior Design	2
ME 344	UK Mechanical Design	3	ME 310	Eng. Instrumentation	3
EE 350	EE Fundamentals	4	ME 321	UK Eng. Thermo II	3
MATH ---	Math Elective 1 of 1	3	ME 330	Fluid Mechanics	3
Category C	Elective 1 of 2	3	ME ---	ME Tech Elective 1 of 3	3
Category F	Elective 1 of 2	<u>1</u>	ENG 300	Junior English	<u>3</u>
		<b>17</b>			<b>17</b>
ME 325	Heat Transfer	3	ME 412	ME Senior Project	3
ME 416	UK Dyn. Systems Elect.	3	ME ---	ME Tech Elective 3 of 3	3
ME 400	Mech. Engr. Design	2	Category C	Elective 2 of 2	3
ME 440	Thermal/Fluid Sys. LAB	2	Category B	Elective 2 of 2	3
ME 445	Dynamic Syst. LAB	2	Category E	Elective 1 of 1	3
ME ---	ME Tech. Elective 2 of 3	<u>3</u>	Category F	Elective 2 of 2	<u>1</u>
		<b>15</b>			<b>16</b>

**PROGRAM TOTAL = 136 hours**

**Notes:**

- Each student's transcript must have at least 16 hours of credit in the major taught by a UK faculty member.
- UK faculty are scheduled to deliver the following courses to the ME Joint Program:  
EM 221, EM 313, ME 321, ME 344, ME 416, and a range of technical electives: ME 498 (Fa) or 499 (Sp).
- Check the ME Student Handbook for the latest institutional course offering plan, including technical electives and a list of suitable Mathematics electives.
- \* Review the WKU Undergraduate Catalog for the current policies concerning the foreign language course.
- Consult the WKU Undergraduate Catalog and ICAP for category B, C, E, and F electives. Categories A and D are covered by the plan of study shown.

**Approved by MEJPF, 04 May 2007  
Revised for college curricular changes, 02 Sept 2009**

**WKU-UK Joint Program in Mechanical Engineering**

**Pre-requisite: required before taking a course      Co-requisite: a course required at the same time (concurrent)**

**Pre/Co: a course taken before or at the same time**

<u>COURSE</u>	<u>PREREQUISITES</u>	<u>COREQUISITES</u>
ME 175: University Experience Mech. Engr.	none	none
ME 180: Freshman Design II	ME 175/176/Permit, MATH 136 ≥C	none
ME 200: Sophomore Design	ME 180≥C, EM 221	none
ME 220: Engineering Thermodynamics I	ME 200	none
ME 240/241: Materials and Methods of Mfg.	CHEM 116 or higher, MATH 136≥C	ME 241
ME 285: Introduction to Industrial Automation	ME 180≥C	none
ME 300: Junior Design	ME 200, ME 344	Pre/Co ME 310, Pre-Major Satisfied
ME 310: Engineering Instru. & Exp.	EM 303, ME 285	Pre/Co ME 347
ME 321: UK Engineering Thermodynamics II	ME 220, MATH 331	none
ME 325: Heat Transfer	ME 330	none
ME 330: Fluid Mechanics	ME 220	Pre/Co MATH 331
ME 344: UK Mechanical Design	EM 303, ME 240	none
ME 347: Mechanical Systems Laboratory	ME 241	Pre/Co EM 303, Pre/Co MATH 331
ME 400: Mechanical Engineering Design	ME 300	none
ME 416: UK Dynamic Systems Elective	EM 313, MATH 331	none
ME 412: ME Senior Project	ME 400	none
ME 440: Thermal-Fluid Systems Laboratory	ME 310≥C	Pre/Co ME 325
ME 445: Dynamic Systems Laboratory	ME 310≥C	Pre/Co ME 416
ME 496: WKU ME Selected Topics (Fall)	Course Dependent	Course Dependent
ME 497: WKU ME Selected Topics (Spring)	Course Dependent	Course Dependent
ME 498: UK ME Selected Topics (Fall)	Course Dependent	Course Dependent
ME 499: UK ME Selected Topics (Spring)	Course Dependent	Course Dependent
EM 221: UK Statics	MATH 136	Pre/Co MATH 137, Pre/Co PHYS 255
EM 303: WKU Mechanics Of Deformable Solids	MATH 137, EM 221≥C	none
EM 313: UK Dynamics	EM 221	Pre/Co MATH 237, Pre/Co MATH 331
EE 350: Electrical Engineering Fundamentals	PHYS 265	Pre/Co MATH 331
CHEM 120/121: College Chemistry I / LAB	Placement or CHEM 116≥C	
MATH 136: Calculus and Analytic Geometry I	MATH 117	
MATH 137: Calculus and Analytic Geometry II	MATH 136≥C	
MATH 237: Multivariable Calculus	MATH 137	
MATH 331: Differential Equations	MATH 137	
PHYS 255/256: Introductory Mechanics / LAB	MATH 136≥C	MATH 137
PHYS 266/266: Intro Elect. And Mag. / LAB	PHYS 255≥C, MATH 137≥C	

## WKU/UK Joint Program in Mechanical Engineering

### Academic Standards

#### Pre-Major Status

All students intending to major in mechanical engineering are admitted as pre-majors in the program. Progression from a pre-major status to full enrollment as a major is performance based. After all pre major requirements have been satisfied, a student “declares a major” by filing a Change of Major/Minor/Advisor Form with the assistance of their faculty advisor. This form is available to students on TOPNET.

#### Eligibility to transition from Pre-Major to Major in the Joint WKU/UK ME Program

In order to transition from the pre-major to major and to graduate with a degree in mechanical engineering, students must earn a GPA of 2.5 in the following courses and a grade of “C” or better in each course in the list:

ME 175: University Experience (or ME 176 for transfer students)	2/1 hours
ENG 100: Introduction to College Writing	3 hours
COMM 145 or 161: Public or Business Speaking	3 hours
HIST 119 or 120: Western Civilization	3 hours
MATH 136: Calculus I	4 hours
MATH 137: Calculus II	4 hours
ME 180: Freshman Design II	3 hours
ME 240/241: Materials and Methods of Manufacturing and Laboratory	3/1 hours
PHYS 255/256: University Physics I and Laboratory	4/1 hours
CHEM 120/121: College Chemistry I and Laboratory	4/1 hours
TOTAL HOURS =	36/35 hours

**This eligibility requirement must be complete before enrolling in ME 300: Junior Design. It is monitored during advising meetings with the use of iCAP.**

#### Graduation Requirements

After satisfying the requirements to transition from Major to Pre-Major and to graduate with a degree in mechanical engineering, students must satisfy the following three additional requirements:

- Satisfy the graduation requirements of WKU, including a minimum GPA of 2.0 in all coursework.
- Have a grade of C or better for each course in the Pre-Major Transition list above as well as in EM 221, EM 303, ME 200, ME 220, ME 310, ME 330, ME 347, MATH 237, and MATH 331.
- Each student’s transcript must have at least 16 hours of course work in the major taught by a UK faculty member.

These academic standards are encoded into iCAP for review by students and faculty advisors as well as for degree certification by the Registrar’s office.