UNIVERSITY
OF
EVANSVILLE

Civic Mission…Sacred Trust

Mechanical Engineering Program Guide Book 2009-2010

The University of Evansville operates under a nondiscriminatory policy with regard to race, color, creed or religion, national origin, gender, sexual orientation, age, or disability.

MECHANICAL ENGINEERING PROGRAM GUIDE BOOK 2009-10

Table of Contents

Web Page

mece.evansville.edu/mechanical/index.asp

The mechanical engineering program at the University of Evansville (UE) is accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET).

Revised 2009

MECHANICAL ENGINEERING AT THE UNIVERSITY OF EVANSVILLE

Mechanical engineering is one of the broadest fields of engineering, encompassing applications as diverse as automotive or aerospace vehicles, power generation, manufacturing processes, plastic and other petrochemical products, and even electronic hardware. These applications require a fundamental understanding of the static and dynamic relationships between forces, the nature of materials, principles of energy conservation and transformation, design and analysis of machines, the transmission of heat, and the flow of fluids. The mechanical engineering curriculum provides a rigorous treatment of fundamental principles in these subject areas and the necessary background in mathematics and the basic sciences to prepare students for these courses. Through elective choices, students may investigate special areas of mechanical engineering including internal combustion engines, turbomachinery, power plants, mechatronics, and advanced computational methods.

In addition to strong technical skills, today's engineers in the global marketplace must be adept at working with other people who have very different professional backgrounds and who may be from other countries with different cultures. The University of Evansville is helping engineers meet that challenge by providing students with a strong liberal arts background and providing an opportunity for an international experience at our Harlaxton College campus in England.

The mission of the mechanical engineering program is to provide a personalized educational experience for talented and motivated students who seek a Bachelor of Science in Mechanical Engineering degree. Our program objectives are:

Educational Objectives

1. Graduates shall be engaged in professional practice, continuing education, and/or other activities benefiting society.
2. Graduates shall have developed habits consistent with an attitude of professionalism, an awareness and appreciation for different cultures, and the understanding of engineering influence in a global context.

The mechanical engineering program is designed to provide our graduates with a firm grounding in basic science, engineering science, and engineering design that can serve as a basis for continued learning, either formally or informally. Our program strives to maintain a balance between a traditional approach to teaching engineering principles and incorporating current industrial practices. For example, computer-aided design and analysis, applications of automatic data acquisition, and

concurrent engineering have all been incorporated into the curriculum. Faculty members aggressively seek funding from external sources to develop laboratories and courses that use state-of-the-art equipment.

The size of the program allows students to define individual experiences in undergraduate research or projects in student sections of professional societies. Student chapters of the American Society of Mechanical Engineers (ASME) and the Society of Automotive Engineers (SAE) are sponsored by the department to support and encourage the professional development of students. A national honorary society for mechanical engineering students, Pi Tau Sigma, is also represented. Students may also participate in university-wide chapters of the Society of Women Engineers (SWE) and the National Society of Black Engineers (NSBE).

A unique and exciting integrated design sequence is offered to all students. Students from all grade levels work together on practical real-life projects. Students apply design skills that they learn in their course work and throughout the integrated design sequence directly to meaningful projects. The goal is to teach both technical and non-technical skills through collaborative design-build-and-test projects.

The integrated design sequence consists of courses that offer specific skills that will be used in the team environment. The freshman course, Mechanical Engineering 197, provides skills in computer-aided modeling, sketching and product fabrication techniques. The sophomore course, Mechanical Engineering 297, provides instruction in basic computer-controlled machining techniques and further instruction in computer-aided modeling. The junior course, Mechanical Engineering 397, provides skills in instrumentation and automatic data acquisition for measurements. The senior course, Mechanical Engineering 497, provides skills in project management.

After students gain an understanding of fundamental concepts, design education is continued during the junior year through assigned design projects as a part of normal course work. The design projects are progressively more complex, culminating in the senior capstone design experience, Mechanical Engineering 495/497. There are many different types of projects including industry-sponsored projects; projects, such as the SAE Mini Baja and Formula SAE cars, that are entered into national and regional competitions; and undergraduate research projects. The engineering topics are divided approximately as two-thirds engineering science and one-third engineering design. The allocation between engineering science and design typically is carried throughout the selection of mechanical engineering technical electives as described below. This philosophy prepares our graduates to enter the professional practice of mechanical engineering or to further their education in graduate school.

You may have heard the phrase "It's not what we do, it's how we do it." That is certainly true of the mechanical engineering program at UE. Our mechanical engineering curriculum is fairly typical of most colleges and universities. What makes our program different and, we believe, better are the following points.

- Our small size allows for close personal contact between students and professors and between other students.
- Our size and dedication to teaching give us great flexibility. We keep our courses up to date and use the latest techniques, such as team building, cooperative learning, and concurrent engineering.
- Our emphasis is on preparing students to be lifelong learners while preparing them to enter the practice of engineering upon graduation.
- A co-op program, featuring alternative terms of paid, full-time professional employment and school is available.
- The University's size and diversity mean that engineering students can continually interact with students and faculty in other programs allowing free intellectual and social interchange.

WHAT MECHANICAL ENGINEERS DO

Listed below are responses from several of our alumni about their job responsibilities.

Name: Alex Mlsna **Title:** Design Engineer
Company: SMC Pneumatics (Indianapolis, Indiana)
Job Responsibilities:
Design new products based on customer specifications. Experimental testing of existing products and of new developmental prototypes. Also, provide technical support to sales and customer inquiries.

Name: Scott Farley **Title:** Design Engineer
Company: General Electric Aircraft Engines (Cincinnati, Ohio)
Job Responsibilities:
Design, analyze, and oversee manufacture of configuration hardware for all General Electric aircraft engine product lines. Configuration hardware includes such items as fuel manifolds, secondary air systems, and cable routings.

Name: Kurt Kimball **Title:** Mechanical Engineer
Company: IPEC-Planar (Phoenix, Arizona)
Job Responsibilities:
Responsible for the reliability, availability, and maintainability of our silicon wafer polishing machine. Includes research, design, and testing designs to improve the overall reliability of our product.

Name: John Weaver **Title:** Development Engineer
Company: Allison Engine Company (Indianapolis, Indiana)
Job Responsibilities:

Perform detailed heat transfer and secondary flow analysis of gas turbine engine components. Further duties include: develop design software and analytical tools, coordinate analytical work with other technical/project engineers, and plan and evaluate results from engine tests.

Name: Mary Miller **Title:** Senior Engineer-Refrigeration Technology
Company: Whirlpool Corporation (Evansville, Indiana)
Job Responsibilities:

Responsible for implementing new models and features for Whirlpool-built top-freezer refrigerators. Involves working cooperatively with our research and development, industrial design, marketing, customer focus, and manufacturing departments, as well as with other engineers to develop, design, and implement new models and features that customers want and need.

Name: Les Owen **Title:** Manager, Technical and Regulatory
Company: BP Pipelines Inc. (Anchorage, Alaska)
Job Responsibilities:

Manage a technical group responsible for all technical and regulatory issues relating to BP's common carrier pipeline businesses in Alaska, including the Trans Alaska Pipeline System (TAPS), Endicott, Kaparuk, Milne Point, and three new systems under development. Requires interaction with government agencies, partners, and pipeline operators as well as diverse strategy development.

Name: Chor Weng Tan **Title:** Managing Director, Education
Company: American Society of Mechanical Engineers (New York, New York)
Job Responsibilities:

Directing the society's educational programs, including engineering education both at the undergraduate and graduate levels; pre-college math/science/engineering education; professional development and continuing education of practicing engineers.

THE MECHANICAL ENGINEERING DEGREE PROGRAM

FIRST YEAR	
Fall	**Spring**
Calculus I	Calculus II
General Chemistry	Calculus Physics I
Introduction to Engineering	Integrated Design I
The Ancient World to the Reformation	First-Year Seminar
General Education Elective	Statics

The first year of the mechanical engineering program contains two semesters of calculus which cover differentiation and integration with applications of each. Calculus II contains a brief introduction to differential equations. There is one semester of chemistry which assumes that students have had a good high school chemistry course as a prerequisite. The first semester of Calculus Physics is taken in the spring of the freshman year; it covers mechanics, thermodynamics, and sound. The required world cultures and first-year seminar courses are taken in the freshman year. World Cultures 110 deals with the ancient world to the Reformation and includes studies of Sumerian, Chinese, Greek, Roman, Indian, and Medieval European cultures. First-Year Seminar 120 includes a range of global and interdisciplinary topics. Students will encounter challenging texts, perform critical analysis, and engage in expository writing.

The first semester of the freshman year also contains Introduction to Engineering (Engineering 101). This course meets three times a week and each student is enrolled in a section in which the student's academic advisor is the instructor. While students at this level do not have the necessary background to complete an advanced engineering design, they do have the mathematical ability to perform a "guided" engineering design. Students spend the semester designing and building a project in addition to learning teaming skills, presentation skills, and basic computer skills including computer graphics, word processing, and spreadsheets. The current project is a compressed air-powered launcher. Students are guided through the process of designing and constructing a properly sized air cylinder and elastic straps to launch a specified projectile for distance and accuracy. The semester concludes with a competition between the teams.

In the first semester of the freshman year, students are required to take a course in computer programming (Engineering 122). The course currently uses Microsoft's VisualBasic to teach students to apply computer solution techniques to a variety of mechanical engineering problems. The course assumes only a familiarity with computers and no previous programming experience.

Freshman mechanical engineering students take Statics (rigid body mechanics) during the spring semester. In this course students learn to determine necessary forces and torques required to keep a component or component assemblies in equilibrium, assuming engineering components are manufactured from a perfectly rigid material. Also during this semester, mechanical engineering students take the first of four courses composing the integrated design sequence. Students work with upperclassmen to design, build, and test a mechanical engineering project.

SECOND YEAR	
Fall	**Spring**
Calculus III	Differential Equations
Calculus Physics II	Numerical Methods for Engineers
Dynamics	Mechanics of Materials
Circuit Analysis	Integrated Design II
Health and Wellness	Circuits and Systems

During the first semester of the second year, mechanical engineering students complete the calculus sequence with Mathematics 323. This course covers advanced topics including vectors, multiple integrals, and line and surface integrals. The calculus sequence is followed by a course in differential equations. This course includes standard solution methods, difference equations, numerical techniques, and some nonlinear methods. The second semester of Calculus Physics is taken in the first semester of the sophomore year and covers electricity, magnetism, optics, and an introduction to nuclear physics.

Dynamics, taken during the fall semester, is a study of the forces necessary to move and accelerate rigid bodies. Dynamics introduces a variety of methods, including energy balances, to obtain solutions to these problems. During the second semester, students take Mechanics of Materials (Mechanical Engineering 232) which begins a study of how materials deform under applied loads and torques and is the foundation course for designing reliable mechanical devices.

Sophomore mechanical engineering students spend two semesters studying electrical circuits. Because mechanical engineering is such a broad area,

mechanical engineers often become involved in measuring and/or controlling physical phenomena such as the quantity of air flowing through a duct or the speed at which a machine component operates. These courses provide students with the basic background to perform such tasks. Electronics concepts are reinforced in a variety of laboratory assignments during the junior and senior years.

The second course in the integrated design sequence is taken during the spring semester of the sophomore year. Sophomore students work with freshman and junior mechanical engineering students to assist seniors to design, build, and test their senior projects. Students submit résumés and interview for positions on these teams in competition with other students.

At the end of the sophomore year students have completed many of the required courses that are fundamental to an understanding of engineering design and analysis. They have developed an approach for solving engineering problems and have a basic understanding of how engineering components behave.

THIRD YEAR	
Fall	**Spring**
Engineering Mathematics	Fluid Mechanics
Machine Analysis	Machine Design
Materials Science	Thermo-Fluid Laboratory
Materials Laboratory	Integrated Design III
Thermodynamics	Manufacturing Methods
Foreign Language or General Education Elective	Foreign Language or General Education Elective

In the junior year, mechanical engineering students begin to concentrate in their major. They take required courses to continue to expand their basic understanding as well as courses to increase their breadth of understanding of mechanical engineering. The materials laboratory gives students hands-on experience with how materials fail. Laboratory experiments are performed to see how much force is required to produce failure in metal and plastic specimens. Materials Science supplements the materials laboratory with a study of material behavior. Machine analysis is a study of how mechanisms move as well as the determination of the inertial forces that are associated with the movement.

Thermodynamics is the initial course for the “energy stem” of mechanical engineering. Thermodynamics is a study of energy use and its transformation from one form to another, such as the combustion of fuel in

an engine to produce work. Thermodynamic principles are expanded upon in the second semester Fluid Mechanics course.

During the spring semester, hands-on experience is gained in the Thermo-Fluid Laboratory where experimental set-ups are used to observe the behavior of various thermodynamic systems and fluid flow phenomena. The Engineering Mathematics course provides students with basic numerical methods used in solving engineering mathematical problems and introduces students to probability and statistics. In the spring semester, junior mechanical engineering students learn to design and construct instrumentation systems for measuring physical phenomena to participate in the integrated design sequence.

A year of foreign language may be taken in either the junior or senior year for students who have not established proficiency equivalent to one year of college level foreign language.

FOURTH YEAR	
Fall	**Spring**
Heat Transfer	ME Elective
System Modeling/Control	Professional Practice II
Professional Practice I	General Education Elective
ME Elective	Free Elective
Technical Elective	General Education Elective
General Education Elective	General Education Elective (if required)

There are two required mechanical engineering courses in the senior year, Heat Transfer and Systems Modeling/Control. Most courses are electives that students take in their area of interest. In the first of the two required senior design courses, students work in teams on three projects. In the first project the instructor functions as the team leader. By the third project, students must perform completely independently of the instructor. In the second semester students choose their own teams and a semester-long project in which they design, build, and test a complete system. These projects have varied from Baja buggies to undergraduate research projects sponsored by industry. Underclassmen in the integrated design sequence compete for support positions on these senior teams. A senior usually serves as a team leader.

Students finish the last of their general education requirements and select electives in their area of specialization during both semesters of their senior year.

ADMISSION TO UPPER DIVISION

Students pursuing the Bachelor of Science in Mechanical Engineering (BSME) degree must be admitted to upper division by the mechanical engineering program faculty before they are permitted to participate in any 300- or 400-level mechanical engineering courses. Application for upper division admission is normally made during the semester preceding the one in which 300-level courses will be taken. The application process consists of submitting an application form for review by the mechanical engineering faculty. The deadline for submitting application materials is: spring semester, the Friday preceding the start of Spring Break; summer, the Wednesday preceding the start of fall classes; fall semester, the Friday preceding the start of Fall Break. The requirements for admission are:

- Students must have completed a minimum of 45 credit hours with a minimum GPA of 2.50, and received a letter grade of C- or better in each of the following courses:

  Mathematics 221 (or 211)
  Mathematics 222 (or 212)
  Mathematics 323
  Chemistry 118
  Engineering 101
  Mechanical Engineering 197
  Mechanical Engineering 212

- At the time of application students must be enrolled in, or have received credit for, three of the following five courses:

  Mathematics 324
  Physics 210
  Mechanical Engineering 213
  Mechanical Engineering 232
  Mechanical Engineering 297

- Students must either have passed the writing proficiency exam or obtained a C- or better in both World Cultures 110 and First-Year Seminar 120. Transfer students must meet the University catalog requirements for writing proficiency.

Following the review, conditional acceptance will be granted to students successfully completing the previous requirements. Conditional acceptance allows students to preregister for 300-level classes. Full acceptance is granted after the student completes 60 credit hours with a minimum GPA of 2.50, and received a letter grade of C- or better in all of the classes listed above.

Transfer students must also apply for admission to upper division. Transfer students may request a one semester probationary period in order to establish the requirements as listed above. The request must be made in writing and submitted to the program director no later than the first week of the semester.

AREAS OF SPECIALIZATION

Studies in mechanical engineering can be classified in the two very broad areas: machine design and thermo-fluids. In this broad description the machine design area is generally thought of as "how big to make it so it does not fail." But the area also involves displacement and vibration analysis, manufacturing, sound, and advanced material behavior. The thermo-fluids area involves energy conversion and efficiency. But, again, in this broad definition it also includes fields of study in power plant design, turbomachinery, heat transfer, and internal combustion engines.

Machine Design Electives
Advanced Mechanics of Materials
Fracture Mechanics
Computer Aided Mechanical Design
Finite Elements
Mechanical Vibrations
Mechatronics

Thermo-Fluids Electives
Internal Combustion Engines
Advanced Thermodynamics
Principles of Turbomachinery
Advanced Fluid Mechanics
Advanced Heat Transfer
Energy Systems
Heating, Ventilation, and Air Conditioning
Power Plant Engineering
Combustion

In addition to the above, students may elect to choose from specified electives in physics, mathematics, chemistry, civil, and electrical engineering.

UNDERGRADUATE RESEARCH

The University's UExplore Undergraduate Research Program is an opportunity for students to perform undergraduate research with faculty in a collegial relationship. Undergraduate research is an excellent way for students to acquire a distinctive experience for their résumé and a competitive edge when seeking employment or admission to graduate schools. Students may work on research topics of their own interest or work on faculty-defined projects. Students may also receive a $3,500 fellowship and board for summer research. Recent mechanical engineering projects include building a novel flaring device for hydrocarbon processing applications, understanding water-spray-driven air-

flow-patterns for nuclear reactor containment, measuring the lift on model dragonfly wings in a wind tunnel, building a wheelchair simulator, and developing a new steam sensor.

THE CO-OP PROGRAM

Mechanical engineering majors are encouraged to participate in cooperative education (co-op program). In this program, a student completes the BSME degree requirements in five years but at the end of that time the student has a BSME plus four terms of industrial experience as a mechanical engineer.

The typical mechanical engineering co-op student goes to school the first two years just as a non co-op student does. At the end of the sophomore year the student goes to work and works through the summer. The student is back in school in the fall and out to work in the spring. Thereafter, the student alternates between work and school.

CO-OP CALENDAR			
Year	**Fall**	**Spring**	**Summer**
1	School 1	School 2	Work option
2	School 3	School 4	Work 1
3	School 5	Work 2	School/Work option
4	Work 3	School 6	Work 4
5	School 7	School 8	

Some students who are exceptionally well prepared to enter the work force may begin their co-op period in the summer after the freshman year. This is unusual and most students begin after the sophomore year. The summer after the junior year may be either school or work as needed. Many students work through this summer thereby completing a full calendar year on the job.

To enter the co-op program students should enroll in the co-op orientation course (EXED 090). This is a non-credit course which should be taken during the fall of the sophomore year. This course covers such topics as résumé writing, interviewing, and what is expected on the job. During the spring of the sophomore year the typical co-op student interviews with prospective employers. The Office of Career Services and Cooperative Education takes care of contacting employers and arranging interviews for students. Actual placement in a co-op position is dependent on the outcome of the interview process.

Co-op students in mechanical engineering have a wide range of employers to choose from. Employers are located in the immediate Evansville area, in the surrounding region of Indiana, Kentucky, and Illinois, and at various places throughout the country. The companies listed below are some of the companies that have employed mechanical engineering co-op students in the past. If a student wants to work for a company with which we do not have a co-op relationship, the Office of Career Services and Cooperative Education will contact that company and attempt to establish a program. The requirement to qualify as a legitimate co-op employer is that the company has to provide a mechanical engineering opportunity for a prospective engineer that is relevant to the student's education and chosen profession. Some of the companies who hire UE mechanical engineering co-op and internship students are listed here:

George Koch Sons	ALCOA
General Electric	NWSC Crane
GE Aircraft Engines	Toyota
Patriot Engineering	Cinergy
Boeing	Bowen Engineering
Kimball International	Vectren Energy Delivery
Electronics Research Inc.	Whirlpool
Professional Consultants Inc.	Daimler-Chrysler
Sumitomo Electric Wiring Systems	LexMark

The real value of the co-op program is the experience that it provides. A co-op job can be a financial benefit, but the net income from one term at work does not typically cover the cost of one term in education. The co-op program gives employers an opportunity to look at a student as a prospective employee without making a commitment to long term employment. Likewise, the co-op program gives the student a chance to look at a company and gain some experience before entering the work force as a working professional.

Co-op students normally get a higher salary offer upon graduation than non co-op students. In many cases the co-op employer provides a long-term employment opportunity for the co-op student upon graduation. About 25 percent of mechanical engineering students participate in the co-op program.

HARLAXTON COLLEGE OPTION

The University of Evansville's Harlaxton College is located just outside of Grantham, England, in the rolling English countryside. Harlaxton is about a one hour ride by train from London. Engineering students who choose to spend a semester studying at Harlaxton have easy access to England's culture, history, and entertainment.

Harlaxton College is housed in a large Victorian manor where about 200 students and faculty live and hold classes. The manor house has a number of historic state rooms where classes are held. A soccer field, sports hall, student lounges, bistro, and tennis courts are also available on the grounds.

Engineering students who wish to study one semester in England are encouraged to do so during the first semester of their sophomore year. At Harlaxton, engineering students typically take calculus, British studies, and general education classes. Harlaxton College is on the semester system and all classes earn credit at UE in the same way they would if they were taken in Evansville. Since the engineering program requires a number of general education classes, all classes taken at Harlaxton can count as required courses toward the engineering degree. Tuition at Harlaxton is the same as tuition at the Evansville campus and all scholarships and loans may be applied to Harlaxton costs.

Students at Harlaxton are encouraged to travel on weekends. The college arranges eight to 10 weekend field trips to locations such as Nottingham, London, Scotland, Paris, and Rome. During some semesters, less frequent but longer trips are arranged to Ireland and the continent.

Harlaxton has its own resident British faculty as well as visiting faculty from the Evansville campus and other selected campuses in the United States. Likewise, students at Harlaxton come from the Evansville campus and various other campuses around the United States.

Harlaxton College Costs

While the tuition at Harlaxton College is the same as on the Evansville campus and all scholarships apply to Harlaxton, there are additional costs associated with travel. The typical airplane round trip is $1,200 and the typical student at Harlaxton College will spend an additional $3,000 on weekend trips, souvenirs, and other miscellaneous expenses.

HONORS PROGRAM – MECHANICAL ENGINEERING

The Honors Program is open to selected mechanical engineering majors on entrance to the University. Admittance to the Honors Program is determined by the University Honors Committee on the basis of standardized test scores, an essay, and other student work completed in high school. The Honors Program provides participants with the opportunity to interact with other Honors Program students both socially and academically. Special honors courses and other academic events are available for honors students both in general education and in the major. Honors students have special library privileges and are able to register early.

1. Honors students must have a grade point average of 3.5 or better to remain in the program.
2. To complete the program, honors students must acquire a total of at least 21 points in the Honors Program made up of the following:

A minimum of 13 points from
Honors Courses (generally three points each). Honors courses offered on a regular basis include World Cultures 110 and First-Year Seminar 120, various general education courses which are part of the general education requirements, and honors courses in other departments which are not part of the general education requirements.

Honors Colloquia (generally one point each). Honors colloquia are offered on a variety of topics and include small group discussion of a book, a research topic, or a topic of current interest.

Major Courses (generally three points each). These are courses within the major which are given a section designation of H.

A minimum of three points from
Senior Honors Project. In mechanical engineering this requirement is satisfied by the Mechanical Engineering 495/497 senior project sequence. This is a year-long sequence in which mechanical engineering students write a proposal, complete a design and construct a project. The honors project in mechanical engineering is more challenging and has a significant design and/or research component.

Alternate Courses (points vary)
Alternate honors courses include courses taken for independent study and contract courses. A contract course is a non-honors course in which a written contract, which requires additional or alternative course work, is prepared. The contract must be pre-approved by the instructor, the department chair, and the honors director.

STUDENT ORGANIZATIONS

American Society of Mechanical Engineers

The American Society of Mechanical Engineers was founded in 1880 as an educational and technical society. Today it is the largest and most prestigious mechanical engineering society in the world with over 115,000 members. As a member of the student section of ASME at the University of Evansville, mechanical engineering students have the opportunity to participate in a wide variety of activities and services of this national organization. Upon graduation student members are eligible to upgrade their membership status to associate member and gain additional benefits.

The local student organization participates in a variety of social and technical activities.

- Local section meetings
- Industrial tours
- Attend and participate in regional and national ASME meetings
- Network with guest speakers from business and industry
- Gain leadership skills as an officer in the local section
- Scholarship opportunities for upperclassmen

Society of Automotive Engineers

The Society of Automotive Engineers was founded in 1905. SAE is a nonprofit educational and scientific organization dedicated to advancing mobility technology to better serve humanity. Nearly 70,000 engineers and scientists, who are SAE members, develop technical information on all forms of self-propelled vehicles including automobiles, trucks and buses, off-highway equipment, aircraft, aerospace vehicles, marine, rail, and transit systems.

Mechanical engineering students at UE have been primarily involved in the SAE Mini-Baja competition. The Mini-Baja is a small ATV racer which uses an eight horsepower Briggs and Stratton engine. Students design and build a chassis of their choice, but the engine cannot be modified. The competition consists of two parts: static and dynamic. The static events focus on how well the vehicle was engineered. The goal of the dynamic events is to determine which vehicle performs best on various off-road courses.

The Mini-Baja is an annual competition sponsored by SAE for engineering students. Approximately 70 engineering schools across North America compete in this activity.

The University of Evansville is one of two schools in Indiana that participates in the international SAE formula car competition. This senior-led project designs and builds a formula-style race care with an engine greater than 610cc and competes against 130 other schools from

around the world. The vehicle is judged on static inspection and engineering design, solo performance through timed road courses, and high-performance track endurance.

ΠΤΣ Pi Tau Sigma

Pi Tau Sigma is the national honorary fraternity for mechanical engineers. The fraternity was founded at the University of Illinois in 1915. The University of Evansville Phi Rho chapter was founded in 1986.

The primary purpose of Pi Tau Sigma is to recognize those mechanical engineering students whose academic achievements, character, and attitude place them at the head of their class. Membership in Pi Tau Sigma is by invitation based on election by the active members of the chapter. To be eligible for consideration, a junior must rank in the upper 25 percent of the class and a senior must rank in the upper 35 percent of the class. Initiation into the UE chapter, with a one-time payment of national dues, makes one a lifetime member of Pi Tau Sigma.

Pi Tau Sigma activities emphasize scholarship and service. Members have served as tutors and often serve as guides and laboratory assistants for special events such as Engineering Open House. Pi Tau Sigma often co-sponsors activities such as tours and speakers with ASME.

Society of Women Engineers

The Society of Women Engineers is a national organization with student sections on each engineering campus. The section is an interdisciplinary organization with membership cutting across all the engineering disciplines and is also open to men who are interested in the mission and activities of the group.

The mission of SWE is to encourage women to achieve full potential in careers as engineers and leaders, to expand the image of the engineering profession as a positive force in improving the quality of life, and to demonstrate the value of diversity.

DEGREE REQUIREMENTS – BSME

The Bachelor of Science in Mechanical Engineering requires at least 127 hours of course work distributed as follows:

General education (37 hours minimum)

World Cultures 110 and First-Year Seminar 120 (6 hours); General Education electives: American Traditions (3 hours), International Perspectives (3 hours), Creative Dimension (3 hours), Philosophical/Spiritual Dimension (3 hours), Human Behavior and Society (3 hours), and Health and Wellness (1 hour); Mathematics 221 (4 hours); Chemistry 118 and Physics 210 (8 hours). In addition, the University proficiency requirements in a foreign language and writing in English must be met (see University degree requirements). The senior seminar requirement will be fulfilled by Mechanical Engineering 495 (3 hours).

Note: Mathematics 211 may be taken in place of Mathematics 221.

Lower division required courses (44 hours)

Mathematics 222, 323, 324; Physics 211; Engineering 101; Electrical Engineering 210, 215; Mechanical Engineering 197, 212, 213, 224, 230, 232, 297.

Upper level required courses (34 hours)

Engineering 390; Mechanical Engineering 318, 330, 342, 344, 360, 362, 366, 368, 397, 452, 497.

Electives (12 hours)

One of Mechanical Engineering 432, 434, 444, 446, 448, 453; one of Mechanical Engineering 462, 463, 466, 468, 470, 472, 473, 476; three hours technical elective from Mechanical Engineering, Civil Engineering, Computer Science, Electrical Engineering, Engineering, Mathematics, Physics, Biology, or Chemistry; five hours free elective.

Note: Mathematics 211 or lower, Physics 1xx, Chemistry10x, software courses and Writing 101, 102 may not be applied to the 12 hour requirement.

The engineering topics are divided approximately as ⅔ engineering science and ⅓ engineering design. The allocation between engineering science and design typically is carried throughout the selection of mechanical engineering technical electives. This philosophy prepares our graduates to enter the professional practice of engineering or to further their education in graduate school.

Bachelor of Science in Mechanical Engineering

FALL			SPRING		
FRESHMAN					
CHEM 118	Principles of Chemistry	4	FYS 120	First-Year Seminar	3
ENGR 101	Introduction to Engineering	3	MATH 222	Calculus II	4
MATH 211/221	Calculus I	4/5	ME 197	Integrated Design I	2
WC 110	The Ancient World to the Reformation	3	ME 212	Statics	3
	General Education	3	PHYS 210	Calculus Physics I	4
		17/18			16
SOPHOMORE					
EE 210	Circuits	3	EE 215	Circuits and Systems	4
EXED 090	Building Your Professional Image	0	MATH 324	Differential Equations	3
MATH 323	Calculus III	4	ME 224	Numerical Methods for Engineers	3
ME 213	Dynamics	3	ME 232	Mechanics of Materials	3
PHYS 211	Calculus Physics II	4	ME 297	Integrated Design II	2
	Health and Wellness	1			15
	General Education	3			
		18			
JUNIOR					
ENGR 390	Applied Engineering Mathematics	3	ME 318	Manufacturing Methods	3
ME 330	Materials Laboratory	1	ME 344	Design of Machine Elements	3
ME 230	Materials Science	3	ME 360	Thermo/Fluid Dynamics Lab	2
ME 342	Machine Analysis	3	ME 366	Fluid Mechanics	3
ME 362	Thermodynamics	4	ME 397	Integrated Design III	3
	Foreign Language 111*	3		Foreign Language 112*	3
		14/17			14/17
SENIOR					
ME 368	Heat Transfer	3	ME 497	Professional Practice II	3
ME 452	System Modeling and Control	3	ME 4xx	Elective	3
				Free Elective	3
ME 495	Professional Practice I	3		General Education	3
ME 4xx	Elective	3		General Education	3
	General Education	3			15
	Technical Elective	3			
		18			

*Note: Only if necessary to meet University foreign language requirement

Harlaxton College Option Plan of Study

FALL			SPRING		
FRESHMAN					
CHEM 118	Principles of Chemistry	4	FYS 120	First-Year Seminar	3
ENGR 101	Introduction to Engineering	3	MATH 222	Calculus II	4
MATH 211/221	Calculus I	4/5	ME 197	Integrated Design I	2
WC 110	The Ancient World to the Reformation	3	ME 212	Statics	3
	General Education	3	PHYS 210	Calculus Physics I	4
		17/18			16
				16	
SOPHOMORE					
ID H282/382	The British Experience	6	EXED 090	Building Your Professional Image	0
MATH 323	Calculus III	4	MATH 324	Differential Equations	3
	General Education	3	ME 213	Dynamics	3
	General Education	3	ME 224	Numerical Methods for Engineers	3
		16	ME 230	Materials Science	3
			ME 232	Mechanics of Materials	3
			ME 297	Integrated Design II	2
					17
JUNIOR					
EE 210	Circuits	3	EE 215	Circuits and Systems	4
ME 330	Materials Laboratory	1	ME 318	Manufacturing Methods	3
ME 342	Machine Analysis	3			
ME 362	Thermodynamics	4	ME 344	Design of Machine Elements	3
PHYS 211	Calculus Physics II	4			
	Health and Wellness	1	ME 360	Thermo/Fluid Dynamics Lab	2
		16			
			ME 366	Fluid Mechanics	3
			ME 397	Integrated Design III	3
					18
SENIOR					
ENGR 390	Applied Engineering Mathematics	3	ME 497	Professional Practice II	3
ME 368	Heat Transfer	3	ME 4xx	Elective	3
ME 452	System Modeling and Control	3		Foreign Language 112*	3
ME 495	Professional Practice I	3		Technical Elective	3
				Free Elective	3
ME 4xx	Elective	3			15
	Foreign Language 111*	3			
		18			

*Note: Only if necessary to meet University foreign language requirement

MECHANICAL ENGINEERING COURSES

Visit our Web site at mece.evansville.edu/mechanical/courses.asp for course descriptions.

ME 197 Integrated Design I
ME 212 Statics
ME 213 Dynamics
ME 224 Numerical Methods for Engineers
ME 230 Materials Science
ME 232 Mechanics of Materials
ME 297 Integrated Design II
ME 318 Manufacturing Methods
ME 330 Materials Laboratory
ME 342 Machine Analysis
ME 344 Design of Machine Elements
ME 360 Thermo/Fluid Dynamics Laboratory
ME 362 Thermodynamics
ME 366 Fluid Mechanics
ME 368 Heat Transfer
ME 397 Integrated Design III
ME 432 Advanced Mechanics of Materials
ME 434 Fracture Mechanics
ME 444 Computer Aided Mechanical Design
ME 446 Finite Elements
ME 448 Mechanical Vibrations
ME 452 System Modeling and Control
ME 453 Mechatronics
ME 462 Advanced Thermodynamics
ME 463 Principles of Turbomachinery
ME 465 Internal Combustion Engines
ME 466 Advanced Fluid Mechanics
ME 468 Advanced Heat Transfer
ME 470 Combustion
ME 472 Energy Systems
ME 473 Heating, Ventilating, and Air Conditioning
ME 476 Power Plant Engineering
ME 495 Professional Practice I
ME 497 Professional Practice II
ME 498 Independent Study in Mechanical Engineering
ME 499 Special Topics in Mechanical Engineering

ENGR 101 Introduction to Engineering
ENGR 390 Applied Engineering Mathematics
ENGR 409 Engineering Economy and Decision Making

FACULTY

Philip M. Gerhart, PhD, PE 812-488-2651
Dean and Professor pg3@evansville.edu
Specialty areas: Thermo-fluid sciences, power plant engineering, fluid machinery, performance testing

John Layer, PhD, PE 812-488-2195
Assistant Professor jl118@evansville.edu
Specialty areas: Finite elements, machine design

Douglas W. Stamps, PhD 812-488-2186
Professor ds38@evansville.edu
Specialty areas: Heat transfer, combustion, thermodynamics

David Unger, PhD, PE 812-488-2899
Professor du2@evansville.edu
Specialty areas: Fracture mechanics, engineering materials, machine design

UNIVERSITY OF EVANSVILLE
Civic Mission…Sacred Trust

Department of Mechanical and Civil Engineering
1800 Lincoln Avenue
Evansville, Indiana 47722
812-488-2652