The College of Engineering offers programs leading to undergraduate and graduate degrees in computer science and the following engineering disciplines: biosystems, chemical, civil, computer, electrical, materials, mechanical, and mining. Graduate training in biomedical engineering is also offered through the College of Engineering. The College also offers a highly multidisciplinary master of science in manufacturing systems engineering to address the growing need for enhancing manufacturing productivity and quality.

Concern for the individual is a most important feature of education in the College of Engineering. Close faculty-student relationships are necessarily a meaningful part of the educational process. The faculty, in addition to their duties related to instruction and research, serve as advisors to the student in the preparation of the academic program best matched to the student's needs and intellectual capabilities.

Accreditation and Program Assessment

The undergraduate program in Computer Science is accredited by the Computing Accreditation Commission of ABET, www.abet.org.

The undergraduate programs in Biosystems Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Materials Engineering, Mechanical Engineering, and Mining Engineering are accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

In addition, the University of Kentucky is accredited by the Southern Association of Colleges and Schools (SACS), and therefore all degree programs and certificates including those in the College of Engineering are governed by the rules associated with that accrediting body. All programs are assessed periodically based on achievement of their self-proclaimed student learning outcomes and the results are used in the improvement of those programs and certificates.

Undergraduate Certificate in Engineering

The University of Kentucky grants the following undergraduate certificate in the College of Engineering:

• Power and Energy

Information and requirements for this certificate are listed after the Bachelor of Science in Electrical Engineering.

Undergraduate Programs in Engineering

The University of Kentucky grants the following degrees in the College of Engineering:

• Bachelor of Science in Biosystems Engineering
• Bachelor of Science in Chemical Engineering
• Bachelor of Science in Civil Engineering
• Bachelor of Science in Computer Engineering
• Bachelor of Science in Computer Science
• Bachelor of Science in Electrical Engineering
• Bachelor of Science in Materials Engineering
• Bachelor of Science in Mechanical Engineering
• Bachelor of Science in Mining Engineering

While these are the official degrees granted at the bachelor’s level in the college, the prospective student is encouraged to study the wide variety of options available through technical electives, some of which are listed following the degree requirements of each department. Technical electives are included in each curriculum to allow the student to apply the fundamentals of a particular discipline to an area of special interest during the senior year.

Students in any department interested in biomedical engineering may make special arrangements to include a limited amount of such studies in the undergraduate program. The Department of Biosystems and Agricultural Engineering and the Center for Biomedical Engineering have approved an optional program in pre-biomedical engineering. Biomedical engineering is primarily the application of engineering principles to the solution of medical problems.

The Department of Chemical and Materials Engineering has approved an optional program in pre-medicine for chemical engineering majors. Students majoring in chemical engineering may arrange through their advisor to take courses that will satisfy the requirements for this program.

In response to industry requests, the College of Engineering and the Gatton College of Business and Economics have joined to offer a coordinated Bachelor of Science in Engineering and Masters of Business Administration. The intense five-year program may require summer courses to remain on track to complete the engineering part in four years. The MBA will be taken during a student’s fifth year of study beginning in June and finishing the following May. In addition, students in the program will be required to complete a study abroad program designed specifically for the engineering/business student. This program will be conducted immediately upon completion of the MBA course requirements and the majority of costs will be paid by the program. Students earning a 3.25 or better GPA and having completed their junior year will be identified and will receive a letter asking them to apply for the program. Admission is highly competitive and is limited based upon the financial resources available. Selection is based on past academic performance, communication skills, and commitment to the program.

For engineering students interested in manufacturing, the University offers a dual-degree program. This program allows students pursuing a B.S. in Electrical Engineering or Mechanical Engineering to concurrently enroll in the M.S. in
Manufacturing Systems Engineering. The BSEE/MSMSE or BSME/MSMSE dual-degree programs can be completed in five years. Students in the program can participate in intensive summer courses in Lean Manufacturing. Students in the program are strongly encouraged to be Co-op students or to do industry internships to supplement their course work with industry experience. During their junior year, students should apply to the Graduate School for admittance into the dual-degree program.

Graduate programs in the engineering fields of study are listed in The Graduate School section of this Bulletin.

ADMISSION POLICY

The minimum entry requirement for admission into the College of Engineering is:

- ACT math score of 23 or higher, or the SAT equivalent.

Four alternative admission routes include:

1. 3 or above on the Calculus AB portion of the Advanced Placement Exam;
2. Eligibility to enter MA 110 based on the UK Math Department Placement Exam;
3. Completion of or the equivalent of MA 110 with a grade of C or higher;
4. Completion of or the equivalent of MA 109 and MA 112 with a grade of C or higher.

Newly admitted pre-engineering or pre-computer science students are allowed to choose an open major for one semester (12 credit minimum) called General Engineering. All students must select a program before the end of their first semester, preferably when they register for classes for their second semester. Application must be made for admission to a specific pre-engineering program. However, subsequent transfer between programs will be permitted and may be accomplished by applying and satisfying the appropriate specified criteria.

All undergraduate degree programs are divided into pre-engineering and engineering. Pre-engineering is broadly defined as the first two years of a program, while engineering is broadly defined as the last two years of the program. Every student must be admitted to engineering standing in a specific program prior to graduation.

Engineering Standing Admission

Admission to engineering standing in a degree program is necessary in order to be granted a baccalaureate degree in engineering or computer science. Specific departmental requirements for admission to engineering standing are noted below. The same criteria are applied to transfer students with the equivalence of courses determined by the Director of Undergraduate Studies. A student must apply to the specific department for admission to engineering standing. Note: The cumulative grade-point average includes all listed college-level work taken at the University of Kentucky or elsewhere.

Students can request qualification for engineering standing after completing the required set of standing courses in the first three semesters of the published curriculum in their chosen program. Each program can specify its engineering standing requirements, but no program may specify a GPA higher than 2.50 for engineering standing.

Requirements by a program for engineering standing may include many items, such as courses counted in first three semesters, repeat options allowed, number of applications for engineering standing allowed, restrictions on taking upper-level courses, minimum course grades, etc. A student should refer to the UK Bulletin and the undergraduate advisor in their program of choice to identify the specific requirements.

Biomedical Engineering: Completion of a minimum of 35 semester hours acceptable towards the degree in biomedical engineering with a minimum cumulative grade-point average of 2.50. Completion of MA 112, MA 113, MA 114, MA 213, CHE 105 and PHY 231 with a minimum cumulative GPA of 2.50 in these courses. University repeat options may be utilized as appropriate. Students who do not meet these GPA requirements may request consideration based upon departmental review if both of these GPA values are 2.25 or greater.

Chemical Engineering: Completion of CHE 105, CHE 107, CHE 111, CHE 113, MA 114, MA 213, PHY 231, PHY 241, CIS/WRD 110 with a minimum cumulative grade-point average of 2.50 in these courses. Completion of CME 200 with a grade of C or better. University repeat options may be applied as appropriate.

Civil Engineering: Completion of CE 106, CE 120, CE 211, CHE 105, CHE 107, EM 221, CIS/WRD 110, MA 113, MA 114, MA 213, PHY 231, PHY 241 with a minimum cumulative grade-point average (GPA) of 2.50 in these classes and a C or better in each of them as well as 45 or more semester credit hours. University repeat options may be utilized. Students who do not meet this GPA requirement may request consideration based upon departmental review if this core GPA is 2.25 or greater. Students are limited to two applications for engineering standing.

Computer Engineering: Completion of a minimum of 35 semester hours acceptable towards the degree in computer engineering with a minimum cumulative grade-point average of 2.50. Completion of MA 113, MA 114, MA 213, PHY 231, CHE 105, and CIS/WRD 110 with a minimum cumulative GPA of 2.50 in these courses. Completion of EE 211, EE 280, CS 115 and CS 215 with a minimum cumulative GPA of 2.50 in these courses. University repeat options may be utilized as appropriate. In addition, the Electrical and Computer Engineering Department will not permit a third admission into any of these courses. Students who do not meet these GPA requirements may request consideration based upon departmental review if if both of these GPA values are 2.25 or greater.

Electrical Engineering: Completion of a minimum of 35 semester hours acceptable towards the degree in electrical engineering with a minimum cumulative grade-point average of 2.50. Completion of MA 113, MA 114, MA 213, PHY 231, CHE 105, and CIS/WRD 110 with a minimum cumulative GPA of 2.50 in these courses. Completion of EE 211 and EE 280 with passing grades. University repeat options may be utilized as appropriate. In addition, the Electrical and Computer Engineering Department will not permit a third admission into any of these courses. Students who do not meet these GPA requirements may request consideration based upon departmental review if the first two GPAs are 2.25 or greater and they receive a C or better in both EE 211 and EE 280.

Materials Engineering: Completion of CHE 105, CHE 107, CHE 111, CHE 113, MA 114, MA 213, PHY 231, PHY 241, CIS/WRD 110 with a minimum cumulative grade-point average of 2.50 in these courses. Completion of MSE 201 with a grade of C or better. University repeat options may be applied as appropriate.

Mechanical Engineering: 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, CIS/WRD 110 and CIS/WRD 111 (or transfer equivalent courses), CHE 105, MA 113, MA 114, MA 213, PHY 231 and PHY 241 with a minimum cumulative GPA of 2.50 in these courses. A student may exercise one of his/her official University 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. In no case will there be an exception made to the minimum acceptable grade-point averages listed above. Transfer students who have received more than 35 hours transfer credit in the degree program will be considered without the inclusion of ME 101.

Minning Engineering: Completion of a minimum of 36 semester hours acceptable towards the degree in mining engineering with a minimum cumulative grade-point average of 2.50. Completion of CIS/WRD 110, MA 113, MA 114, MA 213, CHE 105 and PHY 231 with a minimum cumulative GPA of 2.50 in these courses. University repeat options may be utilized as appropriate. Students who do not meet these GPA requirements may request consideration based upon departmental review if if both of these GPA values are 2.25 or greater.
COMBINED DEGREE PROGRAM

The College of Engineering has transfer agreements with several institutions throughout the state. Some of these institutions offer a “3+2” year dual degree program. Other academic institutions choose to offer this option to their students without benefit of a formal agreement. These programs enable students to enroll in a pre-engineering curriculum for the first three years at their respective schools and then transfer to the College of Engineering for the final two years. Upon completion, they receive two degrees, one from the school at which they originally enrolled and the other a Bachelor of Science in the appropriate field of engineering from the University of Kentucky.

COOPERATIVE EDUCATION PROGRAM

The nationally recognized engineering co-op program provides students the opportunity to gain practical work experience before graduation. By alternating semesters of academic study with semesters of salaried, full-time career-related employment, a full year of engineering work experience can be presented on a graduate resume. Students who wish to participate in the Cooperative Education program in the College of Engineering should contact the Director of Cooperative Education.

To be eligible for this program, students should have a minimum grade-point average of 2.50. In addition, students should be making sufficient progress in their curriculum prior to the first work tour, which should begin after the sophomore year has been completed. Students will remain on a full-time, continuing student status while they are at work by registering for a one-hour, pass/fail course. The grade, assigned by the director, is based on both a work report written by the student and an evaluation completed by the immediate supervisor. In some states, co-op experience counts towards the practical experience requirement to sit for the Professional Engineer Exam.

The Cooperative Education program contributes significantly to the student’s academic motivation, career preparation, and success with job offers upon graduation. One-third of our students and nearly 100 employers nationwide participate in the UK program.

CONTINUING EDUCATION AND EXTENSION

The College of Engineering recognizes the rapid changes occurring in modern engineering technology. Students in engineering are made aware of the need to continue their studies after graduation. One of the ways to keep abreast of advances in engineering is for graduates and other engineering practitioners to participate in continuing education programs now available through the engineering colleges throughout the country.

The responsibilities of the Technology Exchange Program within the Kentucky Transportation Center, the Lean Manufacturing Program within the Center for Manufacturing at the University of Kentucky and the staff of the former Office for Informational Services and Technical Liaison (OISTL), now administratively housed in the Department of Mining Engineering, are to:

1. create and manage appropriate intensive noncredit technical courses of interest to and needed by practicing engineers;
2. develop appropriate video-based courses and materials to be of interest to practicing engineers. Such activity includes taping, live satellite uplinking, and two-way video/audio of engineering-related courses and activities, Web-based instruction; and,
3. provide assistance in extension activities with other college and University units to be of assistance to engineers throughout the state.

SCHOLARSHIPS

The College of Engineering awards merit-based scholarships to incoming freshman and transfer students as well as to students already enrolled in the College. Freshman scholarship applications are due January 15; transfer scholarship applications are due April 15 for students incoming in the fall, and November 15 for students incoming in the spring; and continuing student applications are due April 15. Awards are made for the upcoming academic year; no new awards are made for the spring semester for freshmen and continuing students.

For further information, visit www.engr.uky.edu/scholarships.

ENGINEERING DEAN’S LIST

Students enrolled in the College of Engineering can make the Engineering Dean’s List for a fall or spring semester by meeting the following requirements during the semester:

- 3.6 or better semester GPA;
- 12 or more credit hours;
- no E, I or F grades;
- no grades out; and
- no more than 3 hours pass/fail.

MINIMUM REQUIREMENTS FOR GRADUATION

NOTE: The following graduation requirements apply to engineering programs only. Separate graduation requirements currently apply to the Computer Science program as described in the corresponding section.

To be awarded a Bachelor of Science degree in any field of engineering, a student must:

1. complete the University and College requirements relating to writing and the UK Core;
2. complete a minimum of 128 hours, exclusive of those earned in freshman college algebra and freshman college trigonometry, with a cumulative standing of not less than 2.0 on a 4.0 scale. In all departments the course requirements exceed this 128 hour minimum.
3. be admitted to engineering standing in an engineering program for at least the final semester, and complete the requirements of that program.
4. complete a minimum of 24 credit hours of departmental courses at or above the 300 level.
5. complete all departmental courses and technical electives with a cumulative standing of 2.0 or higher.
6. complete any additional departmental graduation requirements that may be listed below.

Additional Departmental Graduation Requirements

In the B.S. program in Civil Engineering, the student must earn a C or better in each CE prefix course, except that a maximum of one D is permitted in a CE prefix course numbered 400 or higher. In addition, a C or better must be earned in EM 221 and EM 302.

In the Mining Engineering Department, the student must have earned a grade of C or better in the following courses that are valuable for safe operation of mines: MNG 341, Mine Ventilation; MNG 551, Rock Mechanics; MNG 591, Mine Design Project I; and MNG 592, Mine Design Project II.

Second Bachelor’s Degree Requirements

A student who has earned a bachelor’s degree in the College of Engineering may earn a second bachelor’s degree by meeting the following three conditions on the work applicable to the second degree:

1. The student must have been admitted to engineering standing in the program leading to the second degree at least for the final semester, or equivalent terms, prior to the completion of the degree requirements, and must be enrolled as a student in that degree program during the final semester or term.
2. The student must complete a minimum of 15 credit hours of departmentally approved courses at or above the 300 level.
3. To earn a second degree, a student must complete all degree requirements in that program.

ACADEMIC ADVISING

Sophomores, juniors, and seniors are advised jointly by faculty and professional staff in the department of the student’s major. Professional staff provide academic advising and support services to entering freshman students through the Freshman Advising Center. It is the students’ responsibility to satisfy University and College requirements with consultation from their advisor.
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PROBATION AND ACADEMIC SUSPENSION

Students should refer to the Academic Requirements section of this Bulletin for information concerning the College of Engineering’s probation and academic suspension rules.

BACHELOR OF SCIENCE IN BIOSYSTEMS ENGINEERING

Biosystems engineering provides an essential link between the biological sciences and the engineering profession. This linkage is essential for the development of production and processing systems involving biological materials that preserve our natural resource base. Students have the latitude to develop an area of specialization relating to bioenvironmental engineering, food and bioprocessing, machine systems, or controlled environment engineering. The curriculum is also ideal preparation for those students wanting to pursue a graduate or professional degree in biomedical engineering or veterinary medicine through pre-biomedical engineering and pre-veterinary medicine options.

Engineers completing this program of study find employment in industries related to the production and processing of biological products. Opportunities include placement with manufacturers, consulting firms, or state and federal regulatory agencies. Biosystems engineers may work in the areas of biomedical/biotechnology engineering; environmental engineering; agricultural equipment; heating, ventilation and refrigeration equipment; food processing industries; livestock equipment and housing or greenhouse structures; and bioenergy.

The program educational objectives of the biosystems engineering program are based on the intellectual and professional development of our students. Graduates of the biosystems engineering program are expected within a few years of graduation to have:

• Established themselves as practicing professionals or engaged in advanced study in agricultural, biological, or environmental engineering or related area.
• Demonstrated their ability to work successfully as a responsible professional and function effectively on a professional team.

Degree Requirements

Each student must complete the following:

UK Core Requirements

See the UK Core section of this Bulletin for the complete UK Core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

I. Intellectual Inquiry in the Arts and Creativity

Choose one course from approved list ............................ 3

II. Intellectual Inquiry in the Humanities

Choose one course from approved list ............................ 3

ELECTIVES

III. Intellectual Inquiry in the Social Sciences

Choose one course from approved list ............................ 3

IV. Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences

 CHE 105 General College Chemistry I ............................. 4
 CHE 111 Laboratory to Accompany General Chemistry I ............................. 1

V. Composition and Communication I

CIS/WRD 110 Composition and Communication I ............................. 3

VI. Composition and Communication II

CIS/WRD 111 Composition and Communication II ............................. 3

VII. Quantitative Foundations

MA 113 Calculus I ............................. 4

VIII. Statistical Inferential Reasoning

BAE 202 Statistical Inferences

for Biosystems Engineering ............................. 3

IX. Community, Culture and Citizenship in the USA

Choose one course from approved list ............................ 3

X. Global Dynamics

Choose one course from approved list ............................ 3

UK Core hours ............................................. 33

Premajor Requirements

CIS/WRD 110 Composition and Communication I ............................. 3

CIS/WRD 111 Composition and Communication II ............................. 3

CHE 105 General College Chemistry I ............................. 4

CHE 107 General College Chemistry II ............................. 3

MA 113 Calculus I ............................. 4

MA 114 Calculus II ............................. 4

MA 213 Calculus III ............................. 4

MA 214 Calculus IV ............................. 4

PHY 231 General University Physics ............................. 4

PHY 241 General University Physics Laboratory ............................. 1

PHY 232 General University Physics ............................. 4

PHY 242 General University Physics Laboratory ............................. 1

CS 221 First Course in Computer Science ............................. 2

BAE 202 Statistical Inferences

for Engineers ............................. 2

EM 221 Statics ............................. 3

Subtotal: Premajor hours ............................................. 43

Major Requirements

BAE 102 Introduction to Biosystems Engineering ............................. 1

BAE 103 Energy in Biological Systems ............................. 2

BAE 201 Economic Analysis for Biosystems ............................. 2

BAE 202 Statistical Inferences

for Biosystems Engineering ............................. 3

BAE 305 DC Circuits and Microelectronics ............................. 3

BAE 400 Senior Seminar ............................. 1

BAE 402 Biosystems Engineering Design I ............................. 2

BAE 403 Biosystems Engineering Design II ............................. 2

BIO 150 Principles of Biology I ............................. 3

BIO 152 Principles of Biology II ............................. 3

EE 305 Electrical Circuits and Electronics ............................. 3

EM 302 Mechanics of Deformable Solids ............................. 3

EM 313 Dynamics ........................................................ 3

CE 106 Computer Graphics and Communication ............................. 3

ME 220 Engineering Thermodynamics ............................. 3

ME 325 Elements of Heat Transfer ............................. 3

ME 330 Fluid Mechanics ............................. 3

ME 340 Introduction of Mechanical Systems ............................. 3

Subtotal: Major hours ............................................. 46

Electives

Biological Science Elective ............................. 3

Free Elective ............................................. 3

Core Electives (choose 3 of the following 4 courses)

BAE 417 Design of Machine Systems ............................. 3

BAE 427 Structures and Environment Engineering ............................. 3

BAE 437 Land and Water Resources Engineering ............................. 3

BAE 447 Bioprocess Engineering Fundamentals ............................. 3

Technical Electives (chosen by the student and leading to a concentration in one area of study) ............................................. 12

Subtotal: Electives ............................................. 27

TOTAL HOURS ............................................. 131

Curriculum

The following curriculum meets the requirements for a B.S. in biosystems engineering, provided the student satisfies the graduation requirements listed earlier.

Freshman Year

First Semester

Hours

BAE 102 Introduction to Biosystems Engineering ............................. 1

CHE 105 General College Chemistry I ............................. 4

CIS/WRD 110 Composition and Communication I ............................. 3

MA 113 Calculus I ............................. 4

CE 106 Computer Graphics and Communication ............................. 3

Second Semester

BAE 103 Energy in Biological Systems ............................. 2

CHE 107 General College Chemistry II ............................. 3

CS 221 First Course in Computer Science ............................. 2

BAE 114 Calculus II ............................. 4

PHY 231 General University Physics ............................. 4

PHY 241 General University Physics Laboratory ............................. 1

Sophomore Year

First Semester

Hours

BAE 201 Economic Analysis for Biosystems ............................. 2

BIO 150 Principles of Biology I ............................. 3

EM 221 Statics ........................................................ 3

MA 213 Calculus III ............................. 4

PHY 232 General University Physics ............................. 4

PHY 242 General University Physics Laboratory ............................. 1

Second Semester

BAE 202 Statistical Inferences

for Biosystems Engineering ............................. 3

BIO 152 Principles of Biology II ............................. 3

CIS/WRD 111 Composition and Communication II ............................. 3

or UK Core* ............................................. 3

EM 302 Mechanics of Deformable Solids ............................. 3

MA 214 Calculus IV ............................. 3

ME 220 Engineering Thermodynamics ............................. 3

Junior Year

First Semester

Hours

EE 305 Electrical Circuits and Electronics ............................. 3

EM 313 Dynamics ........................................................ 3

ME 330 Fluid Mechanics ............................. 3

Biological Science Elective ............................. 3

Core** or Technical Elective*** ............................................. 3

Second Semester

ME 325 Elements of Heat Transfer ............................. 3

BAE 305 DC Circuits and Microelectronics ............................. 3

Core** or Technical Elective*** ............................................. 3

Technical Elective*** ............................................. 3

UK Core* ............................................. 6

Senior Year

First Semester

Hours

BAE 402 Biosystems Engineering Design I ............................. 2

ME 340 Introduction to Mechanical Systems ............................. 3

BAE 400 Senior Seminar ............................. 1

Core** or Technical Elective*** ............................................. 3

Free Elective ............................................. 3

UK Core* ............................................. 3
Degree Requirements

The following curriculum meets requirements for the B.S. in chemical engineering, provided the student satisfies the graduation requirements listed earlier.

Each student must complete the following:

UK Core Requirements

See the UK Core section of this Bulletin for the complete UK core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

I. Intellectual Inquiry in Arts and Creativity
CME 455 Chemical Engineering Process Design I ........ 3

II. Intellectual Inquiry in the Humanities
Choose one course from approved list ......................... 3

III. Intellectual Inquiry in the Social Sciences
Choose one course from approved list ......................... 3

IV. Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences
CHE 105 General College Chemistry I ......................... 4
CHE 111 Laboratory to Accompany General Chemistry I ........ 1

V. Composition and Communication I
CIS/WRD 110 Composition and Communication I ......... 3

VI. Composition and Communication II
CIS/WRD 111 Composition and Communication II ....... 3

VII. Quantitative Foundations
MA 113 Calculus I .................................................. 4

VIII. Statistical Inferential Reasoning
STA 210 Making Sense of Uncertainty: An Introduction to Statistical Reasoning ..... 3

IX. Community, Culture and Citizenship in the USA
Choose one course from approved list ......................... 3

X. Global Dynamics
Choose one course from approved list ......................... 3

UK Core hours .................................................. 33

Premajor Requirements

Hours
CIS/WRD 110 Composition and Communication I ............ 3
CIS/WRD 111 Composition and Communication II ......... 3
CHE 105 General College Chemistry I ......................... 4
CHE 107 General College Chemistry II ....................... 3
CHE 111 Laboratory to Accompany General Chemistry I ........ 1
CHE 113 Laboratory to Accompany General Chemistry II ....... 1
CME 200 Process Principles ...................................... 3
MA 113 Calculus I .................................................. 4
MA 114 Calculus II ................................................ 4
MA 213 Calculus III ............................................... 4
PHY 231 General University Physics .......................... 4
PHY 241 General University Physics Laboratory .......... 1

Subtotal: Premajor Requirements: ................................ 36

Major Requirements

Hours
CME 101 Introduction to Chemical Engineering ............ 3
CHE 230 Organic Chemistry I .................................. 4
CHE 231 Organic Chemistry Laboratory I .................... 1
CHE 232 Organic Chemistry II .................................. 3
CHE 446G Physical Chemistry for Engineers ............... 3
MA 214 Calculus IV .............................................. 4
PHY 232 General University Physics .......................... 4
MSE 201 Materials Science ..................................... 4
CME 220 Computational Tools in Chemical Engineering .... 3

Subtotal: Major Requirements: ................................. 36

CME 320 Engineering Thermodynamics ...................... 4
CME 415 Separation Processes .................................. 3
CME 006 The Engineering Profession (3 semesters) .......... 0
CME 330 Fluid Mechanics ....................................... 3
CME 470 Professionalism, Ethics and Safety ............... 2
CME 420 Process Modeling in Chemical Engineering .... 3
CME 425 Heat and Mass Transfer ................................ 4
CME 432 Chemical Engineering Laboratory I .............. 2
CME 433 Chemical Engineering Laboratory II ............. 3
CME 455 Chemical Engineering Process Design I ........... 3
CME 456 Chemical Generator Reactor Design .......... 3
CME 456 Chemical Engineering Process Design II ........ 4
CME 462 Process Control ........................................ 3

Subtotal: Major hours ............................................. 61

In addition to the premajor and major requirements, students must complete the following:

Chemical Engineering Electives

Hours
Total of 6 credit hours must be chosen. Courses recommended are listed below. Other courses may be considered, each on its individual merit. CME 395 (Research) may count for one elective, but not both.
CME 395 Special Problems in Chemical Engineering .... 3
CME 404G Polymeric Materials .................................. 3
CME 505 Analysis of Chemical Engineering Problems ...... 3
CME 515 Air Pollution Control ................................... 3
CME 554 Chemical and Physical Processing of Polymer Systems ........................................... 3
CME 556 Introduction to Composite Materials ............... 3
CME 580 Design of Rate and Equilibrium Processes for Water Pollution Control ................. 3
CME 599 Topics in Chemical Engineering ..................... 3

Technical Electives

Select one (must be a 3 or more credit hour course) from the following:
CME 395, 404G, 505, 515, 554, 556, 580, 599; CHE 226, 510 and above; CS 321 and above; MA 321, 322, 416G, 432G, 433G, 471G, 481G; PHY any above 241; STA 391 and above; BCH 401G; MIE 301, 401G, 402G, 403G; any BIO 148 and above; any Engineering course above that required, e.g. above ME 330.

Chemistry Elective (must total 3 credits)
CHE 226, 510 and above (if not taken as technical elective).

Bio or Materials Elective (must total 3 credits)
BIO 148 and above; MIE 301 and above (if not taken as technical elective).

Supportive Elective

The supportive elective can be any course that carries college credit and is not a more elementary version of a required course. The student completing 3 co-op tours (EGR 399) may count the co-op experience toward the supportive elective.

Subtotal: Electives: ................................................. 18

Graduation Writing Requirement
ENG 2XX Writing Intensive Course ................................. 3

TOTAL HOURS: ............................................. 133

Curriculum

First Semester

Hours
CME 101 Introduction to Chemical Engineering ............ 1
CHE 230 Organic Chemistry I .................................. 3
CHE 231 Organic Chemistry Laboratory I .................... 1
CHE 232 Organic Chemistry II .................................. 3
CHE 446G Physical Chemistry for Engineers ............... 3
MA 214 Calculus IV .............................................. 4
PHY 232 General University Physics .......................... 4
MSE 201 Materials Science ..................................... 4
CME 220 Computational Tools in Chemical Engineering .... 3

CME 101 Introduction to Chemical Engineering ............ 1
CHE 105 General College Chemistry I ......................... 4
CHE 111 Laboratory to Accompany General Chemistry I ........ 1
CIS/WRD 110 Composition and Communication I ....... 3
MA 113 Calculus I .................................................. 4
UK Core .......................................................... 3

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### Second Semester
- MSE 201 Materials Science ........................................... 3
- CHE 107 General College Chemistry II ............................ 3
- CHE 113 Laboratory to Accompany General Chemistry II .... 2
- MA 114 Calculus II ..................................................... 4
- CIS/WRD 111 Composition and Communication II ............. 3

### First Semester
- CME 200 Process Principles ........................................... 3
- MA 213 Calculus III ................................................... 4
- PHY 231 General University Physics .............................. 4
- PHY 241 General University Physics Laboratory .......... 1
- CHE 230 Organic Chemistry I ...................................... 3
- CHE 231 Organic Chemistry Laboratory I ..................... 1

### Second Semester
- CME 320 Engineering Thermodynamics ......................... 4
- CHE 232 Organic Chemistry II ..................................... 3
- CME 220 Computational Tools in Chemical Engineering .......... 3
- MA 214 Calculus IV .................................................. 4
- PHY 232 General University Physics ........................... 4

### Junior Year
- CME 415 Separation Processes ...................................... 3
- CHE 446G Physical Chemistry for Engineers ................ 3
- CME 330 Fluid Mechanics ........................................... 3
- ENG 2XX Writing Intensive Course ............................... 3
- STA 210 Making Sense of Uncertainty: An Introduction to Statistical Reasoning ........................................... 3
- Technical Elective ..................................................... 3
- UK Core ....................................................................... 3

### Second Semester
- CME 006 The Engineering Profession (Junior and Senior) ....... 0
- CME 420 Process Modeling in Chemical Engineering ............. 3
- CME 425 Heat and Mass Transfer .................................... 4
- CME 432 Chemical Engineering Laboratory I ................. 2
- Chemistry Elective .................................................... 3
- Supportive Elective ................................................... 3
- UK Core ....................................................................... 3

### Senior Year
- CME 006 The Engineering Profession (Junior and Senior) ....... 0
- CME 470 Professionalism, Ethics and Safety ................. 2
- CME 433 Chemical Engineering Laboratory II ............... 3
- CME 455 Chemical Engineering Process Design I .......... 3
- CME 550 Chemical Reactor Design ................................ 3
- CME Elective ............................................................ 3
- UK Core ....................................................................... 3

---

**BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING – PADUCAH**

In addition to the program on the Lexington campus, students can pursue a B.S. degree in chemical engineering through the College’s Extended Campus Program in Paducah, Kentucky. The Paducah program uses the same curriculum as the main campus, but provides the opportunity for students to complete all B.S. degree requirements without having to relocate to Lexington.

Consistent with our Vision and Mission statements, the chemical engineering program at the University of Kentucky, including the Extended Campus in Paducah, strives to meet the following specific educational objectives:

- prepare our graduates to successfully pursue careers in engineering practice and/or academia;
- provide a broad education as a foundation for life-long learning; and
- equip our graduates with the ability to carry out problem-solving strategies in engineering.

The Paducah chemical engineering program collaborates with West Kentucky Community and Technical College to provide the foundational math and science courses, as well as the general studies course requirements. Murray State University faculty members teach upper-level non-engineering courses on the Paducah campus. On-site UK chemical engineering faculty members and jointly-appointed Murray engineering faculty members teach the upper-division engineering courses. Program admission, course registration, student advising and other student services all can be completed at the Paducah site.

### Degree Requirements

The following curriculum meets the requirements for a B.S. in civil engineering, provided the student satisfies the graduation requirements listed earlier.

Each student must complete the following:

**UK Core Requirements**
See the UK Core section of this Bulletin for the complete UK Core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

1. Intellectual Inquiry in Arts and Creativity
   - Choose one course from approved list .......................... 3
2. Intellectual Inquiry in the Humanities
   - Choose one course from approved list .......................... 3
3. Intellectual Inquiry in the Social Sciences
   - Choose one course from approved list .......................... 3
4. Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences
   - PHY 231 General University Physics ........................... 4
   - PHY 241 General University Physics Laboratory .......... 1
5. Composition and Communication I
   - CIS/WRD 110 Composition and Communication I .......... 3
6. Composition and Communication II
   - CIS/WRD 111 Composition and Communication II ........ 3
7. Quantitative Foundations
   - MA 113 Calculus I .................................................. 4
8. Statistical Inferential Reasoning
   - STA 381 Engineering Statistics – A Conceptual Approach or CE approved equivalent .......................... 3
9. Community, Culture and Citizenship in the USA
   - Choose one course from approved list .......................... 3
10. Global Dynamics
    - Choose one course from approved list ........................ 3

**Premajor Requirements**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 106 Computer Graphics and Communication</td>
<td>3</td>
</tr>
<tr>
<td>CE 120 Introduction to Civil Engineering</td>
<td>1</td>
</tr>
<tr>
<td>CE 211 Surveying</td>
<td>4</td>
</tr>
<tr>
<td>CHE 105 General College Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CHE 107 General College Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>EM 221 Statics</td>
<td>3</td>
</tr>
<tr>
<td>CIS/WRD 110 Composition and Communication I</td>
<td>3</td>
</tr>
</tbody>
</table>

---

**BACHELOR OF SCIENCE IN CIVIL ENGINEERING**

The student of civil engineering has a broad field of study to provide a strong foundation for entry into the profession or graduate school. Major areas include construction engineering and project management, environmental engineering, geotechnical engineering, materials engineering, structural engineering, transportation engineering, and water resources engineering. Consistent with the Vision and Mission statements, civil engineering graduates from the University of Kentucky will be prepared to:

- Use their technical, teamwork, and communication skills along with leadership principles to pursue civil engineering careers in areas such as structural, transportation, geotechnical, materials, environmental, construction, and water resources engineering, and/or other fields.
- Pursue graduate degrees in civil engineering and other fields.
- Function ethically in their professional civil engineering roles.
- Pursue professional licensure.
- Engage in life-long learning through independent study and by participating in professional conferences, workshops, seminars, or continuing education.
College of Engineering

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Joint-Degree Program Offered by Western Kentucky University (WKU) and the University of Kentucky (UK)

As part of the “Strategy for Statewide Engineering Education in Kentucky,” adopted July 17, 2000 by all the chief executive officers of Kentucky universities and endorsed by the Kentucky Council on Postsecondary Education (CPE), the vision was expressed that “access to undergraduate engineering education will expand primarily through the creation of joint programs managed by multiple postsecondary institutions.” In response, WKU and UK now jointly offer an ABET-accredited baccalaureate degree in civil engineering on the WKU campus in Bowling Green, Kentucky. By CPE definition, a joint-degree program is “a program that is mutually sponsored by two or more institutions leading to a single credential or degree, which is conferred by both or all participating institutions. All institutions share responsibility for all aspects of the program’s delivery and quality.”

The joint civil engineering program is one of only three such joint-degree programs in Kentucky; the others include a joint-degree program between WKU and UK in mechanical engineering, between WKU and the University of Louisville (UL) in electrical engineering.

The WKU/UK joint programs emphasize a project-oriented educational approach. Courses are provided by both WKU and UK faculty. Students are required to complete a minimum of 15 credit hours of engineering course work taught by UK engineering faculty. At present, the UK contribution is provided primarily by distance delivery via interactive television. The curriculum of the joint civil engineering program is under the direction of a joint program faculty, with equal representation from each participating institution. The curriculum for entering students requires 137 credit hours, with the General Studies component based on the requirements of WKU. Students who complete the program will receive a B.S. degree conferred jointly by WKU and UK. Under the terms of the agreements between the degree-conferred institutions, WKU provides basic administrative support for students in the joint-degree program, including admission services, registration, and student financial aid. In addition, academic advising, laboratory and equipment support, and library and media resources are supplied by WKU.

The civil engineering curriculum approved within UK is listed below. The joint program faculty are responsible for ongoing review of the curriculum requirements.
### Degree Requirements

#### Freshman Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 175 Univ Experience – ENGR</td>
<td>1</td>
</tr>
<tr>
<td>CE 176 CE Freshman Design</td>
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</tr>
<tr>
<td>AMS 163 Architectural Drafting</td>
<td>3</td>
</tr>
<tr>
<td>MATH 136 Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 111/113 The Earth and Lab</td>
<td>3/1</td>
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<tr>
<td>Category E World Cultures Elective</td>
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</tr>
<tr>
<td>Total</td>
<td>16</td>
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<tr>
<td>Spring Semester</td>
<td>Hours</td>
</tr>
<tr>
<td>CE 160/161 Surveying I and Lab</td>
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<tr>
<td>MATH 137 Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 255/256 Physics I and Lab</td>
<td>4/1</td>
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<tr>
<td>ENG 100 Freshman English</td>
<td>3</td>
</tr>
<tr>
<td>COMM 161 or 145 Public Speaking</td>
<td>3</td>
</tr>
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<td>Total</td>
<td>19</td>
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#### Sophomore Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 303/304 Construction Mgt and Lab</td>
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</tr>
<tr>
<td>EM 221 or 222 Statics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 237 Multivariable Calculus</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 120/121 College Chemistry I and Lab</td>
<td>3/2</td>
</tr>
<tr>
<td>Category F Health and Wellness Elect</td>
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<tr>
<td>Total</td>
<td>17</td>
</tr>
<tr>
<td>Spring Semester</td>
<td>Hours</td>
</tr>
<tr>
<td>CE 316 Equipment and Methods</td>
<td>3</td>
</tr>
<tr>
<td>CE 331 UK - Transportation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ENG 300 Junior English</td>
<td>3</td>
</tr>
<tr>
<td>CE 412 Foundation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 384 Reinforced Concrete Design</td>
<td>3</td>
</tr>
<tr>
<td>CE Technical Elective</td>
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<tr>
<td>Total</td>
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#### Junior Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 382 or 373 Structural Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CE 410/411 Soil Mechanics and Lab</td>
<td>3/1</td>
</tr>
<tr>
<td>CE 342 Fluid Thermal Science</td>
<td>4</td>
</tr>
<tr>
<td>CE 370/371 Materials of Constr and Lab</td>
<td>2/1</td>
</tr>
<tr>
<td>STAT 301 Probability and Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Category F Health and Wellness Elect</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
</tr>
<tr>
<td>Spring Semester</td>
<td>Hours</td>
</tr>
<tr>
<td>CE 316 Equipment and Methods</td>
<td>3</td>
</tr>
<tr>
<td>CE 331 UK - Transportation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ENG 300 Junior English</td>
<td>3</td>
</tr>
<tr>
<td>CE 412 Foundation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 384 Reinforced Concrete Design</td>
<td>3</td>
</tr>
<tr>
<td>CE Technical Elective</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
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</tbody>
</table>

#### Senior Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 351 or 352 Intro Environmental Eng</td>
<td>3</td>
</tr>
<tr>
<td>CE Technical Elective</td>
<td>3</td>
</tr>
<tr>
<td>CE 400 Senior Design Seminar</td>
<td>1</td>
</tr>
<tr>
<td>ECON 202 Economics (Micro)</td>
<td>3</td>
</tr>
<tr>
<td>HIST 119 or 120 Western Civilization</td>
<td>3</td>
</tr>
<tr>
<td>Category B-II Humanities Elective</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
</tr>
</tbody>
</table>

### Spring Semester

| CE 461 Hydrology | 3 |
| CE Technical Elective | 3 |
| CE 498 Senior Project | 3 |
| Category B-II Humanities Elective | 3 |
| Category C Social and Behavior Se Elect | 3 |
| Total | 15 |

**TOTAL HOURS** | 137

[1] Instead of CE 384 Reinforced Concrete Design, students may take CE 482 Elementary Structural Design or CE 483 UK-Elementary Structural Design if offered.

[2] A two (2) course sequence in four different civil engineering areas is required. The curriculum already includes a two (2) course sequence in structures, geotechnical engineering, and construction. Therefore, each student must select one of their technical electives to cover an additional area such as surveying, materials, environmental engineering, hydrology, or transportation.

### BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

#### Program Educational Objectives

Computer engineering involves modeling, design, implementation, testing, evaluation and integration of computer hardware and software to create computing systems. Computer engineers use both hardware concepts from electrical engineering and system software concepts from computer science. Graduates will be well prepared to work in areas such as digital logic design, computer organization/architecture and design, algorithm design and analysis, embedded systems, compilers, and operating systems. Elective options in the curriculum offer preparation in software engineering, databases, dependable systems, networks, and communications, VLSI, graphics, image processing, visualization, artificial intelligence, and control systems. The program is offered through a partnership between the Department of Electrical and Computer Engineering and the Department of Computer Science.

The program educational objectives related to expectations of program graduates include the following:

- Graduates of the program employed in industry will demonstrate, within five years after graduation, professional advancements, such as technical accomplishments, supervisory responsibilities, or other recognitions of their contributions.
- Graduates of the program who continue their formal education will, within five years after graduation, receive advanced degrees, complete specialized training, or receive professional certifications.
- Graduates of the program will appreciate the preparation received in the program as it relates to their careers and their roles in society.

### Degree Requirements

Each student must complete the following:

#### UK Core Requirements

See the UK Core section of this Bulletin for the complete UK Core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

1. **Intellectual Inquiry in Arts and Creativity**
   - EE 101 Creativity and Design in Electrical and Computer Engineering

2. **Intellectual Inquiry in the Humanities**
   - Choose one course from approved list

3. **Intellectual Inquiry in the Social Sciences**
   - Choose one course from approved list

4. **Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences**
   - PHY 231 General University Physics
   - PHY 241 General University Physics Laboratory

5. **Composition and Communication I**
   - CIS/WRD 110 Composition and Communication I

6. **Composition and Communication II**
   - CIS/WRD 111 Composition and Communication II

7. **Quantitative Foundations**
   - MA 113 Calculus I

8. **Statistical Inferential Reasoning**
   - STA 381 Engineering Statistics – A Conceptual Approach or COE approved equivalent

9. **Community, Culture and Citizenship in the USA**
   - Choose one course from approved list

10. **Global Dynamics**
   - Choose one course from approved list

11. **UK Core hours**

#### Premajor Requirements

<table>
<thead>
<tr>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS/WRD 110 Composition and Communication I</td>
</tr>
<tr>
<td>CS 115 Introduction to Computer Programming</td>
</tr>
<tr>
<td>CS 215 Introduction to Program Design, Abstraction, and Problem Solving</td>
</tr>
<tr>
<td>EE 211 Circuits I</td>
</tr>
<tr>
<td>EE 290 Design of Logic Circuits</td>
</tr>
<tr>
<td>MA 113 Calculus I</td>
</tr>
<tr>
<td>MA 114 Calculus II</td>
</tr>
<tr>
<td>MA 213 Calculus III</td>
</tr>
<tr>
<td>PHY 231 General University Physics</td>
</tr>
<tr>
<td><strong>Subtotal: Premajor hours</strong></td>
</tr>
</tbody>
</table>

#### Major Requirements

<table>
<thead>
<tr>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 101 Creativity and Design in Electrical and Computer Engineering</td>
</tr>
<tr>
<td>EE 100 The Computer Science Profession</td>
</tr>
<tr>
<td>CHE 105 General College Chemistry I</td>
</tr>
<tr>
<td>CS 216 Introduction to Software Engineering</td>
</tr>
<tr>
<td>CS 275 Discrete Mathematics</td>
</tr>
<tr>
<td>PHY 241 General University Physics Laboratory</td>
</tr>
<tr>
<td>PHY 232 General University Physics Laboratory</td>
</tr>
<tr>
<td>PHY 242 General University Physics Laboratory</td>
</tr>
<tr>
<td>MA 214 Calculus IV</td>
</tr>
<tr>
<td>EE 221 Circuits II</td>
</tr>
<tr>
<td>EE 222 Electrical Engineering Laboratory I</td>
</tr>
<tr>
<td>EE 280 Design of Logic Laboratory</td>
</tr>
<tr>
<td>EE/CS 380 Microcomputer Organization</td>
</tr>
<tr>
<td>EE 383 Introduction to Embedded Systems</td>
</tr>
<tr>
<td>CS 315 Algorithm Design and Analysis</td>
</tr>
<tr>
<td>CS 441G Compilers for Algorithmic Languages**</td>
</tr>
</tbody>
</table>
### Curriculum

#### Freshman Year

**First Semester**
- MA 113 Calculus I ................................................. 4
- EE 101 Creativity and Design in Electrical and Computer Engineering or CS 100 The Computer Science Profession ........................................ 1-3
- CIS/WRD 110 Composition and Communication I ........................ 3
- CHE 105 General College Chemistry I ........................................ 4
- CS 115 Introduction to Computer Programming ........................... 3
- UK Core – Humanities .................................................. 3

**Second Semester**
- MA 214 Calculus IV .................................................... 3
- MA 275 Discrete Mathematics .......................................... 4
- CS 216 Introduction to Software Engineering ............................ 3
- EE/CS 308 Microcomputer Organization .................................... 3
- UK Core – Social Sciences ............................................... 3

#### Sophomore Year

**First Semester**
- CS 215 Introduction to Program Design, Abstraction, and Problem Solving ...... 4
- MA 213 Calculus III .................................................... 4
- EE 221 Circuits I ................................................................ 4
- PHYS 232 General University Physics ...................................... 4
- PHYS 242 General University Physics Laboratory ...................... 1
- ECE 281 Digital Design Laboratory ......................................... 2

**Second Semester**
- MA 214 Calculus IV .................................................... 3
- MA 275 Discrete Mathematics .......................................... 4
- CS 216 Introduction to Software Engineering ............................ 3
- EE/CS 308 Microcomputer Organization .................................... 3
- UK Core – Social Sciences ............................................... 3

#### Junior Year

**First Semester**
- EE 221 Circuits II ................................................................ 2
- EE 222 Electrical Engineering Laboratory I .............................. 2
- CS 315 Algorithm Design and Analysis ..................................... 3
- EE 383 Introduction to Embedded Systems .................................. 3
- UK Core – Citizenship - USA .......................................... 3
- STA 381 Engineering Statistics – A Conceptual Approach or COE approved equivalent .................................................. 3

**Second Semester**
- EE 461G Introduction to Electronics ........................................ 3
- CS 470G Introduction to Operating Systems .............................. 3
- EE 480/CS 480G Advanced Computer Architecture** .................. 3
- UK Core – Statistical/Inferential Reasoning ................................ 3
- EE 421G Signals and Systems ............................................... 3

#### Senior Year

**First Semester**
- CS 441G Compilers for Algorithmic Languages** ................. 3
- EE/CS Technical Electives†† ............................................... 6
- Supportive Elective* ...................................................... 3
- Technical Elective† ....................................................... 3

**Second Semester**
- CS 499 Senior Design Project ........................................... 3
- EE/CS Technical Electives†† ............................................... 6
- Supportive Elective* ...................................................... 3
- UK Core – Global Dynamics .............................................. 3

*Technical elective to be chosen from upper-division courses, excluding more elementary versions of required courses, such as precalculus mathematics or PHY 211.

††EE/CS technical electives are senior-level courses in either computer science or electrical engineering disciplines. These include 400-level CS courses and 500-level EE courses, excluding more elementary versions of required courses.

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**Electives**

- Supportive Elective* ...................................................... 6
- Technical Elective† ....................................................... 3
- EE/CS Technical Electives†† ............................................... 12

**Subtotal: Electives ............................................................ 21**

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**Total Minimum hours for Program ........................................ 133**

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**Bachelor of Science in Computer Science**

The computer science program prepares students to identify computational problems in all areas of modern life, to design, implement, and analyze algorithmic solutions, and to build software for a variety of applications. Through required, elective and special topics courses students are exposed to the foundations and current practices of computing and algorithms, software engineering, programming languages, operating systems, graphics and multimedia, scientific computing, and numerical analysis, databases, artificial intelligence, and networks. The program’s educational objective is to equip graduates to succeed in their chosen career path. Specifically, within three to five years after graduation:

- Those employed in industry or entrepreneurial endeavors will demonstrate professional advancement through expanded leadership responsibility, significant technical accomplishment, or other recognition of their contributions.
- Those who continue their formal education will achieve an advanced degree or other technical certification.

In addition, graduates will appreciate the preparation received in the program as it relates to their chosen careers, to their role as educated citizens in a global society, and to continued learning.

For more information, please visit the department Web site at: [www.cs.uky.edu](http://www.cs.uky.edu)

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**Degree Requirements**

Each student must complete the following:

#### UK Core Requirements

See the UK Core section of this Bulletin for the complete UK Core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

1. **Intellectual Inquiry in Arts and Creativity**
   - Choose one course from approved list ........................................... 3

2. **Intellectual Inquiry in the Humanities**
   - Choose one course from approved list ........................................... 3

3. **Intellectual Inquiry in the Social Sciences**
   - Choose one course from approved list ........................................... 3

4. **Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences**
   - Choose one course from approved list ........................................... 3

5. **Composition and Communication I**
   - Choose one course from approved list ........................................... 3

6. **Composition and Communication II**
   - Choose one course from approved list ........................................... 3

7. **Quantitative Foundations**
   - MA 113 Calculus I .................................................... 4

8. **Statistical Inference Reasoning**
   - Choose one course from approved list ........................................... 3

9. **Community, Culture, and Citizenship in the USA**
   - Choose one course from approved list ........................................... 3

10. **Global Dynamics**
    - Choose one course from approved list ........................................... 3

11. **UK Core hours .......................................................... 33**

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**Premajor Requirements**

- CS 100 The Computer Science Profession .................................. 1
- CS 115 Introduction to Computer Programming .......................... 3
- CS 215 Introduction to Program Design, Abstraction, and Problem Solving ...... 4
- CS 216 Introduction to Software Engineering ............................ 3
- CS 275 Discrete Mathematics .......................................... 4
- CIS/WRD 110 Composition and Communication I ...................... 3
- MA 113 Calculus I .................................................... 4
- MA 114 Calculus II .......................................................... 4
- PHYS 231 General University Physics ...................................... 4
- PHYS 241 General University Physics Laboratory ...................... 1

**Subtotal: Premajor requirements ........................................ 31**

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The minor in computer science requires a minimum of 20 hours of course work in CS, to include the following:

- CS 115 (3), CS 215 (4), CS 216 (3), CS 275 (4), CS 315 (3), or equivalent, plus three additional hours of upper-division courses (300 or higher) in computer science. A GPA of at least 2.5 across these courses is required. At least 10 of the credit hours required to complete the minor must be earned at the University of Kentucky.

### Minor in Computer Science

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Hours</th>
</tr>
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<tbody>
<tr>
<td>CS 216 Introduction to Software Engineering</td>
<td>3</td>
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<tr>
<td>EE 280 Design of Logic Circuits</td>
<td>3</td>
</tr>
<tr>
<td>MA 213 Calculus III</td>
<td>4</td>
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<tr>
<td>PHY 231 General University Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHY 241 General University Physics Laboratory</td>
<td>1</td>
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<tr>
<td>CIS/WRD 111 Composition and Communication II</td>
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<table>
<thead>
<tr>
<th>Second Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 275 Discrete Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>CS/EE 380 Microcomputer Organization</td>
<td>3</td>
</tr>
<tr>
<td>PHY 232 General University Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHY 242 General University Physics Laboratory</td>
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</tr>
<tr>
<td>STA 281 Probability and Statistics Using</td>
<td>3</td>
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<tr>
<td>Interactive Computer Techniques</td>
<td>3</td>
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<tr>
<td>UK Core [U]</td>
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**Junior Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 315 Algorithm Design and Analysis</td>
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<tr>
<td>CS/MA 321 Introduction to Numerical Methods</td>
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<tr>
<td>UK Core [U]</td>
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<tr>
<td>ENG 2XX Writing Intensive Course</td>
<td>3</td>
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<tr>
<td>Elective [E]</td>
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<table>
<thead>
<tr>
<th>Second Semester</th>
<th>Hours</th>
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<tbody>
<tr>
<td>CS 375 Logic and Theory of Computing</td>
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</tr>
<tr>
<td>Technical Elective [T]</td>
<td>3</td>
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<tr>
<td>UK Core [U]</td>
<td>3</td>
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<tr>
<td>Natural Science Elective [N]</td>
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<tr>
<td>Elective [E]</td>
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**Senior Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 470G Introduction to Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>Computer Science Elective [C]</td>
<td>3</td>
</tr>
<tr>
<td>Technical Elective [T]</td>
<td>3</td>
</tr>
<tr>
<td>UK Core [U]</td>
<td>3</td>
</tr>
<tr>
<td>Elective [E]</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 499 Senior Design Project</td>
<td>3</td>
</tr>
<tr>
<td>Computer Science Elective [C]</td>
<td>3</td>
</tr>
<tr>
<td>Technical Electives [T]</td>
<td>6</td>
</tr>
<tr>
<td>Elective [E]</td>
<td>3</td>
</tr>
</tbody>
</table>

[U] — Select to satisfy the UK Core areas Arts and Creativity, Humanities, Social Sciences, Citizenship, Global Dynamics.

[N] — Any natural science course excluding more elementary versions of completed required courses.

[C] — Computer Science Elective — include 300-level and above computer science courses with two to be selected from: CS 333, CS 405G, CS 441G, CS 450G and CS 455G.

Students are encouraged to take advantage of special topics courses, cooperative education, independent studies and undergraduate research.

[T] Technical Elective — include any 300-level and above courses in computer science, electrical engineering, mathematics and business and economics. MA 214 is also an acceptable technical elective. Cooperative education credit may be used to satisfy this requirement.

[E] Elective — including one Free Elective and Non-Technical Elective. At least two of the electives (6 credits) cannot be in computer science, mathematics, science or engineering. Note: At least 128 credit hours; a foreign language requirement.

### BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

The electrical engineering undergraduate degree program seeks to produce graduates who are trained in the theory and practice of electrical and computer engineering and are well prepared to handle the professional and leadership challenges of their careers. The program allows students to specialize in high performance and embedded computing, microelectronics and nanotechnology, power and energy, signal processing and communications, high frequency circuits and fields, and control systems, among others.

The following objectives relate to expectations for program graduates while in the early stages of their careers. The EE program objectives are:

- Graduates of the electrical engineering program employed in industry will demonstrate, within five years after graduation, professional advancements, such as technical accomplishments, supervisory responsibilities, or other recognitions of their contributions.
- Graduates of the electrical engineering program who continue their formal education will, within five years after graduation, receive advanced degrees in electrical engineering or other fields, complete specialized training, or receive professional certifications.
- Graduates of the electrical engineering program will appreciate the preparation received in the program as it relates to their careers and their roles in society.

The electrical engineering undergraduate program has identified curriculum tracks as recommended groups of courses for undergraduate students interested in a particular area of electrical engineering. Each track consists of a list of three recommended electives (typically EE Technical Electives) and possibly a recommended lab elective. A student will be considered to have completed a track if these course requirements have been satisfied with a grade of C or better.

Students are not required to participate in a track. Tracks are intended for students as a guide of classes to take in a particular area. Student transcripts will not explicitly mention completion of a track. However, any student completing a track will receive an official recognition of this completion from the department.

The current set of tracks are:

**Electric Power and Energy**

EE Technical Electives EE 537 and EE 538, and one of the following: EE 518, EE 531, or EE 539. Also, EE 416G as a Lab Elective.

**Signals and Systems**

Any three of the following EE Technical Electives: EE 511, EE 512, EE 513, EE 521, EE 571, EE 572, EE 586. Also, EE 422G as a Lab Elective.
### Degree Requirements

Each student must complete the following:

**UK Core Requirements**

- See the UK Core section of this Bulletin for the complete UK Core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

#### I. Intellectual Inquiry in Arts and Creativity

- EE 101 Creativity and Design in Electrical and Computer Engineering .............................................. 3

#### II. Intellectual Inquiry in the Humanities

- Choose one course from approved list ................................................................. 3

#### III. Intellectual Inquiry in the Social Sciences

- Choose one course from approved list ................................................................. 3

#### IV. Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences

- PHY 231 General University Physics ................................................................. 4
- PHY 241 General University Physics Laboratory ..................................................... 1

#### V. Composition and Communication I

- CIS/WRD 110 Composition and Communication I .................................................. 3

#### VI. Composition and Communication II

- CIS/WRD 111 Composition and Communication II .................................................. 3

#### VII. Quantitative Foundations

- MA 113 Calculus I ..................................................................................................... 4

#### VIII. Statistical Inferential Reasoning

- Choose one course from approved list ................................................................. 3

#### IX. Community, Culture and Citizenship in the USA

- Choose one course from approved list ................................................................. 3

#### X. Global Dynamics

- Choose one course from approved list ................................................................. 3

**UK Core hours ........................................................................................................... 33**

### Premajor Requirements

**Hours**

- CIS/WRD 110 Composition and Communication I .................................................. 3
- CHE 105 General College Chemistry I ..................................................................... 4
- MA 113 Calculus I ..................................................................................................... 4
- MA 114 Calculus II .................................................................................................... 4
- MA 213 Calculus III .................................................................................................. 4
- PHY 231 General University Physics .................................................................... 4
- EE 211 Circuits I ....................................................................................................... 4
- EE 280 Design of Logic Circuits .......................................................................... 3

**Subtotal: Premajor hours ......................................................................................... 30**

### Major Requirements

**Hours**

- CS 115 Introduction to Computer Programming ................................................... 3
- CS 215 Introduction to Program Design, Abstraction, and Problem Solving ............... 4
- EE 101 Creativity and Design in Electrical and Computer Engineering! ....................... 3
- EE 221 Circuits II ...................................................................................................... 2
- EE 222 Electrical Engineering Laboratory I ............................................................ 2
- EE 360 Introduction to Semiconductor Devices ....................................................... 3
- EE 380 Microcomputer Organization ...................................................................... 3
- EE 415G Electromechanics .................................................................................... 3
- EE 421G Signals and Systems ................................................................................ 3
- EE 461G Introduction to Electronics ...................................................................... 3
- MA 320 Introductory Probability ............................................................................. 3
- EE 468G Introduction to Engineering Electromagnetics ........................................... 4
- EE 490 Electrical Engineering Capstone Design I†† ............................................... 3
- EE 491 Electrical Engineering Capstone Design II†† .............................................. 3
- MA 214 Calculus IV .................................................................................................. 3
- MA 320 Introductory Probability ............................................................................. 3
- PHY 232 General University Physics .................................................................... 4
- PHY 241 General University Physics Laboratory .................................................... 1
- PHY 242 General University Physics Laboratory .................................................... 1
- **Choose three** of the following lab courses: 
  - EE 281 Logical Design Laboratory .................................................................... 2
  - EE 418G Energy Conversion Laboratory .............................................................. 2
  - EE 462G Electronic Circuits Laboratory ............................................................... 2
  - EE 422G Signals and Systems Laboratory ............................................................ 2

**Subtotal: Major hours ............................................................................................. 61**

### Electives

**Hours**

- Engineering/Science Electives [E] ........................................................................... 6
- EE Technical Electives** ........................................................................................ 12
- Supportive Elective* ............................................................................................... 3
- Technical Elective [T] ............................................................................................. 3

**Subtotal: Electives ................................................................................................. 27**

**TOTAL HOURS:** 134

### Curriculum

#### Freshman Year

<table>
<thead>
<tr>
<th>First Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 101 Creativity and Design in Electrical and Computer Engineering!</td>
</tr>
<tr>
<td>MA 113 Calculus I</td>
</tr>
<tr>
<td>CS 115 Introduction to Computer Programming</td>
</tr>
<tr>
<td>CIS/WRD 110 Composition and Communication I</td>
</tr>
<tr>
<td>UK Core – Humanities</td>
</tr>
<tr>
<td><strong>Subtotal:</strong> Freshman Year Hours</td>
</tr>
</tbody>
</table>

#### Sophomore Year

<table>
<thead>
<tr>
<th>Second Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 213 Calculus III</td>
</tr>
<tr>
<td>PHY 232 General University Physics</td>
</tr>
<tr>
<td>PHY 241 General University Physics Laboratory</td>
</tr>
<tr>
<td>CHE 105 General College Chemistry I</td>
</tr>
<tr>
<td>EE 280 Design of Logic Circuits</td>
</tr>
<tr>
<td>UK Core – Social Sciences</td>
</tr>
<tr>
<td><strong>Subtotal:</strong> Sophomore Year Hours</td>
</tr>
</tbody>
</table>

#### Junior Year

<table>
<thead>
<tr>
<th>First Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 415G Electromechanics</td>
</tr>
<tr>
<td>EE 421G Signals and Systems</td>
</tr>
<tr>
<td>Elective EE Laboratory [L]</td>
</tr>
<tr>
<td>EE 380 Microcomputer Organization</td>
</tr>
<tr>
<td>EE 461G Introduction to Electronics</td>
</tr>
<tr>
<td>MA 320 Introductory Probability</td>
</tr>
<tr>
<td><strong>Subtotal:</strong> Junior Year Hours</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 468G Introduction to Engineering Electromagnetics</td>
</tr>
<tr>
<td>Elective EE Laboratory [L]</td>
</tr>
<tr>
<td>Engineering/Science Elective [E]</td>
</tr>
<tr>
<td>Technical Elective [T]</td>
</tr>
<tr>
<td>UK Core – Statistical/Inferential Reasoning</td>
</tr>
</tbody>
</table>

### Second Semester

- EH 490 Electrical Engineering Capstone Design I†† ............................................... 3
- EE Technical Electives** ........................................................................................ 6
- Elective EE Laboratory [L] .................................................................................... 2
- UK Core – Global Dynamics ................................................................................ 3

### Senior Year

<table>
<thead>
<tr>
<th>First Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EH 490 Electrical Engineering Capstone Design I††</td>
</tr>
<tr>
<td>EE Technical Electives**</td>
</tr>
<tr>
<td>Supportive Elective*</td>
</tr>
<tr>
<td>Engineering/Science Elective [E]</td>
</tr>
<tr>
<td><strong>“Supportive elective” may be selected from any University courses, excluding more elementary versions of required courses, such as precalculus mathematics or PHY 211.</strong></td>
</tr>
<tr>
<td><strong>[M] Math/Statistics Elective: Any upper-division (300-level or higher) math or statistics course (3 credit hours total).</strong></td>
</tr>
<tr>
<td><strong>[E] Engineering/Science Electives: Any engineering, physics, computer science, or math course at the 200-level or higher, other than an electrical engineering course and excluding more elementary versions of required courses (6 credit hours total).</strong> Cooperative education credit may not be used to satisfy this requirement.</td>
</tr>
<tr>
<td><strong>[T] Technical elective may be selected from upper-division (300-level or higher) engineering, mathematics, statistics, computer science, physics, or other technically-related fields and excluding more elementary versions of required courses, to be selected in consultation with the academic advisor (3 credit hours total). Cooperative education credit may not be used to satisfy this requirement.</strong></td>
</tr>
<tr>
<td><strong>[L] Electrical Engineering Laboratory Elective: EE 281, EE 465G, EE 462G, EE 416G (6 credit hours total). EE 101 is a 3-hour course that will satisfy the UK Core I – Intellectual Inquiry in Arts and Creativity requirement. +EE 490 is only taught in the fall semester. EE 491 is only taught in the spring semester. EE 490 satisfies the Graduation Writing Requirement.</strong></td>
</tr>
<tr>
<td><strong>EE Technical Electives (must be 500-level courses). Courses recommended as electrical engineering technical electives are listed below (each course is 3 credit hours):</strong></td>
</tr>
<tr>
<td>EE 511 Introduction to Communication Systems</td>
</tr>
<tr>
<td>EE 512 Digital Communication Systems</td>
</tr>
<tr>
<td>EE 513 Audio Signals and Systems</td>
</tr>
<tr>
<td>EE 517 Advanced Electromechanics</td>
</tr>
<tr>
<td>EE 518 Electric Drives</td>
</tr>
<tr>
<td>EE 521 Introduction to Wireless Communications</td>
</tr>
<tr>
<td>EE 522 Antenna Design</td>
</tr>
<tr>
<td>EE 523 Microwave Circuit Design</td>
</tr>
<tr>
<td>EE 525 Numerical Methods and Electromagnetics</td>
</tr>
<tr>
<td>EE 527 Electromagnetic Compatibility</td>
</tr>
<tr>
<td>EE 531 Alternative and Renewable Energy Systems</td>
</tr>
<tr>
<td>EE 535 Power Systems: Generation, Operation and Control</td>
</tr>
<tr>
<td>EE 536 Power System Fault Analysis and Protection</td>
</tr>
<tr>
<td>EE 537 Electric Power Systems I</td>
</tr>
<tr>
<td>EE 538 Electric Power Systems II</td>
</tr>
<tr>
<td>EE 539 Power Distribution Systems</td>
</tr>
<tr>
<td>EE 560 Semiconductor Device Design</td>
</tr>
<tr>
<td>EE 561 Electric and Magnetic Properties of Materials</td>
</tr>
<tr>
<td>EE 562 Analog Electronic Circuits</td>
</tr>
<tr>
<td>EE 564 Digital Electronic Circuits</td>
</tr>
<tr>
<td>EE 565 Circuit Design With Analog Integrated Circuits</td>
</tr>
<tr>
<td>EE 567 Introduction to Lasers and Masers</td>
</tr>
<tr>
<td>EE 568 Fiber Optics</td>
</tr>
</tbody>
</table>
Undergraduate Certificate in Power and Energy

Requirements for the Undergraduate Certificate in Power and Energy

The purpose of the Power and Energy Undergraduate Certificate is to provide students with a formalized recognition of an emphasis in power and energy as part of their undergraduate degree program. The certificate consists of a series of foundational courses, supplemented with a broad array of elective courses related to power and energy. The elective courses cover a wide variety of areas, including fundamentals, conventional and emerging technologies, smart grid systems, distributed generation, power system protection, energy storage, solar power, biofuels, and others. This certificate is an important part of the new Power and Energy Institute of Kentucky (PEIK), created through a recent grant from the US Department of Energy.

Structure

The Director of the Power and Energy Undergraduate Certificate is responsible for admitting students into the certificate, approving each student’s curriculum for completing the certificate, and notifying the Registrar when certificate requirements have been completed. Students completing the certificate will receive a paper certificate and the certification will also be posted on the student’s official transcript. The certification will not appear on the student’s diploma.

Entrance Requirements

To be accepted into the University of Kentucky Power and Energy Undergraduate Certificate, the student must be pursuing an undergraduate degree and have completed at least 24 credits with a UK cumulative GPA of at least 2.50. A transfer student can be accepted into the certificate if he/she has completed at least 24 credits with a weighted cumulative GPA from all other institutions of at least 2.50.

Exit Requirements

- The student must complete a minimum of 15 credits of course work in the certificate curriculum taken for a letter grade. Courses taken prior to admission into the certificate can be applied to the certificate.
- A minimum of nine credits must be at, or above, the 300-level.
- The student must earn a C or better in each course used to satisfy the certificate.
- The student must complete a three-credit breadth component. The breadth component requires that a student take courses in at least two disciplines, with a minimum of three credits completed in the second discipline.
- The certificate will be awarded to students who complete the certificate curriculum and also complete an undergraduate degree.
- No more than nine credits of the Power and Energy Undergraduate Certificate can be used as required courses in the student’s major, minor, or other certificate. Courses used to satisfy the certificate can be used as electives (including technical electives) in a student’s degree program.
- Courses applied to the Power and Energy Undergraduate Certificate cannot also be applied to the Power and Energy Graduate Certificate.
- The Power and Energy Undergraduate Certificate Director must approve the certificate curriculum for each student.

Power and Energy Undergraduate Certificate Curriculum

The structure of the certificate curriculum is shown below:

**Required Course (3 credits)**

EGR 240 Global Energy Issues .................................................. 3

**Core Elective (3 credits)**

Choose one of the following courses:

- EGR 540 Power Economics and Public Policy .................. 3
- EGR 542 Electric Power Generation Technologies ............ 3
- EGR 546 Electric Power System Fundamentals .................. 3

**Power and Energy Electives (9 credits)**

Choose three courses from the approved list of Power and Energy Electives. The selected courses must be approved by the Director of the Power and Energy Undergraduate Certificate to ensure that the selections maintain a thematic consistency and fulfill the certificate breadth requirement. A partial list of approved power and energy courses is provided below. Additional courses will be added as they are approved for the power and energy certificate curriculum.

- BAE 503 Fundamentals of Biorenewable Resource Engineering ............................................. 3
- BAE 504 Biofuels Production and Properties .................. 3
- CE 351 Introduction to Environmental Engineering .......... 3
- CME 200 Process Principles .............................................. 3
- CME 320 Engineering Thermodynamics ....................... 4
- CME 515 Air Pollution Control .......................................... 3
- EE 415G Electromechanics .............................................. 3
- EE 416G Energy Conversion Laboratory ........................... 3
- EE 518 Electric Drives ..................................................... 3
- EE 531 Alternative and Renewable Energy Systems ........ 3
- EE 535 Power Systems: Generation, Operation and Control .................................................. 3
- EE 536 Power System Fault Analysis and Protection .......... 3
- EE 537 Electric Power Systems I ..................................... 3
- EE 538 Electric Power Systems II .................................... 3
- EE 559 Topics in Electrical Engineering (Subtitle required) .................................................. 3

BACHELOR OF SCIENCE IN MATERIALS ENGINEERING

The materials engineer is responsible for the selection, preparation and application of existing materials and for the development of new and improved materials. Materials engineers study the relationships between atomic and/or molecular constitution, microstructure and physical properties including mechanical, thermal, electrical, and optical behavior. Classes of materials include metals, ceramics, polymers, and electronic materials.

The educational objectives of the materials engineering undergraduate program are as follows:

- Produce graduates with an understanding of materials science and engineering who can function independently as professionals in the practice of engineering or as successful members of related graduate and professional programs.
- Produce graduates who can use their materials science and engineering education to continue their careers with steady advancement and professional development.

Degree Requirements

The following curriculum meets requirements for the B.S. in Materials Engineering, provided the student satisfies the graduation requirements listed earlier. Each student must complete the following:

UK Core Requirements

See the UK Core section of this Bulletin for the complete UK Core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

I. Intellectual Inquiry in Arts and Creativity

Choose one course from approved list ................................. 3

II. Intellectual Inquiry in the Humanities

Choose one course from approved list ............................... 3

III. Intellectual Inquiry in the Social Sciences

Choose one course from approved list ............................... 3

IV. Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences

CHM 105 General Chemistry I .............................................. 4
CHM 111 Laboratory to Accompany General Chemistry I ................. 1

V. Composition and Communication I

CIS/WRD 110 Composition and Communication I .......... 3

VI. Composition and Communication II

CIS/WRD 111 Composition and Communication II ........ 3

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**BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING**

The training of the mechanical engineer is the broadest among the several fields of engineering. The mechanical engineer uses the techniques of mathematics combined with a specialized knowledge of the thermal and energy sciences, solid and fluid mechanics, and the properties of materials. This information is supplemented by an understanding of manufacturing processes, the design and control of systems, and the economics of the technological community.

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.

Consistent with the Vision and Mission statements of the University of Kentucky and the College of Engineering, the undergraduate program in mechanical engineering will prepare our graduates for successful practice or academic pursuits in mechanical engineering. Our educational objectives are:

1. Our graduates will practice mechanical engineering in a variety of fields as professionals and/or be recruited to graduate and professional schools in their career paths.
2. Our graduates will communicate effectively, work in diverse teams, address the challenges of a global society, and exhibit leadership, ethics, and creativity in their work places.
3. Our graduates will value continuing education and professional growth by supporting or participating in professional societies, licensure programs, short courses, or other professional development activities.
### College of Engineering

#### Degree Requirements
Each student must complete the following:

**UK Core Requirements**

See the UK Core section of this Bulletin for the complete UK Core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

**I. Intellectual Inquiry in Arts and Creativity**
- ME 411 ME Capstone Design I 3

**II. Intellectual Inquiry in the Humanities**
Choose one course from approved list 3

**III. Intellectual Inquiry in the Social Sciences**
Choose one course from approved list 3

**IV. Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences**
- PHY 231 General University Physics 4
- PHY 241 General University Physics Laboratory 1

**V. Composition and Communication I**
- CIS/WRD 110 Composition and Communication I 3

**VI. Composition and Communication II**
- CIS/WRD 111 Composition and Communication II 3

**VII. Quantitative Foundations**
- MA 113 Calculus I 4

**VIII. Statistical Inference and Reasoning**
Choose one course from approved list 3

 Recommended:
- STA 210 Making Sense of Uncertainty: An Introduction to Statistical Reasoning or STA 381 Engineering Statistics – A Conceptual Approach 3

**IX. Community, Culture and Citizenship in the USA**
Choose one course from approved list 3

**X. Global Dynamics**
Choose one course from approved list 3

**UK Core hours** 33

**Premajor Requirements**

CIS/WRD 110 Composition and Communication I 3
CIS/WRD 111 Composition and Communication II 3
CHE 105 General College Chemistry I 4
CHE 106 General College Chemistry II 3
MA 113 Calculus I 4
MA 114 Calculus II 4
MA 213 Calculus III 4
MA 214 Calculus IV 3
PHY 231 General University Physics 4
PHY 232 General University Physics 4
PHY 241 General University Physics Laboratory 1
PHY 242 General University Physics Laboratory 3

**Subtotal: Premajor hours:** 38

**Major Requirements**

**First Semester Hours**
- ME 101 Introduction to Mechanical Engineering 3
- ME 151 Manufacturing Engineering 3
- ME 205 Computer-Aided Engineering Graphics 3
- ME 220 Engineering Thermodynamics I 3
- CS 221 First Course in Computer Science for Engineers 2
- EM 221 Statics 2
- EM 302 Mechanics of Deformable Solids 3
- EM 313 Dynamics 3
- EE 305 Electrical Circuits and Electronics 3
- ME 310 Engineering Experimentation I 3
- ME 311 Engineering Experimentation II 3
- ME 321 Engineering Thermodynamics II 3

**Second Semester Hours**
- ME 325 Elements of Heat Transfer 3
- ME 330 Fluid Mechanics 3
- ME 340 Introduction to Mechanical Systems 3
- ME 344 Mechanical Design 3
- ME 411 ME Capstone Design I 3
- ME 412 ME Capstone Design II 3
- ME 440 Design of Control Systems 3
- ME 501 Mechanical Design with Finite Element Methods 3

**Subtotal: Major hours** 59

In addition to the premajor and major requirements, students must complete the following:

**Technical Electives**
Choose 9 hours from the following:
- ME 380 Topics in Mechanical Engineering (Variable Topics) 3
- ME 395 Independent Work in Mechanical Engineering 3
- ME/MFS 503 Lean Manufacturing Principles and Practices 3
- ME/MFS 505 Modeling of Manufacturing Processes and Machines 3
- ME/MSE 506 Mechanics of Composite Materials 3
- ME/MFS 507 Design for Manufacturing 3
- ME 510 Vibro-Acoustic Design in Mechanical Systems 3
- ME/MFS 512 Manufacturing Systems 3
- ME 513 Mechanical Vibrations 3
- ME 514 Computational Techniques in Mechanical System Analysis 3
- ME 527 Applied Mathematics in the Natural Sciences I 3
- ME 530 Gas Dynamics 3
- ME 531 Fluid Dynamics I 3
- ME 532 Advanced Strength of Materials 3
- ME 548 Aerodynamics of Turbomachinery 3
- ME 549 Power Generation 3
- ME/MSE 556 Introduction to Composite Materials 3
- ME 560 Engineering Optics 3
- ME 563 Basic Combustion Phenomena 3
- ME 565 Scale Modeling in Engineering 3
- ME/BME 580 Heating, Ventilating and Air-Conditioning 3
- ME 599 Topics in Mechanical Engineering (Subtitle required) 3
- MFS 599 Topics in Manufacturing Systems Engineering (Subtitle required) 3
- EGR 599 Topics in Engineering 3
- MSE 201 Materials Science 3
- BAE 502 Modeling of Biological Systems 3
- IME 501 Foundations of Biomedical Engineering 3
- IME 530 Biomedical Instrumentation 3

**Subtotal: Technical Electives:** 9

**Mathematics Elective**
Choose one course from the following:
- MA 320 Introductory Probability 3
- MA 321 Introduction to Numerical Methods 3
- MA 322 Matrix Algebra and Its Applications 3
- MA 416G Principles of Operations Research I 3
- MA 432G Methods of Applied Mathematics I 3
- MA 435G Introduction to Complex Variables 3
- MA 481G Differential Equations 3
- STA 381 Engineering Statistics – A Conceptual Approach 3

**Subtotal: Mathematics Elective** 3

**Supportive Elective**

The supportive elective 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 satisfactory because it is more elementary than the required calculus courses. The student completing 3 co-op tours (EGR 399) may count the co-op experience toward the supportive elective.

**Subtotal: Supportive Elective** 3

**Graduation Writing Requirement**

Graduation Writing Requirement to be fulfilled with one course selected from approved list 3

**Subtotal: Graduation Writing Requirement** 3

**TOTAL HOURS:** 130

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**Curriculum**

**Freshman Year**

**First Semester**
- ME 101 Introduction to Mechanical Engineering 3
- CHE 105 General College Chemistry I 4
- MA 113 Calculus I 4
- CIS/WRD 110 Composition and Communication I 3
- UK Core* 3

**Second Semester**
- ME 151 Manufacturing Engineering 3
- CHE 107 General College Chemistry II 3
- MA 114 Calculus II 4
- CIS/WRD 111 Composition and Communication II 3
- UK Core* 3

**Sophomore Year**

**First Semester**
- PHY 231 General University Physics 4
- PHY 241 General University Physics Laboratory 1
- MA 213 Calculus III 4
- CS 221 First Course in Computer Science for Engineers 2
- ME 205 Computer-Aided Engineering Graphics 3
- UK Core* 3

**Second Semester**
- ME 220 Engineering Thermodynamics I 3
- PHY 232 General University Physics 4
- PHY 242 General University Physics Laboratory 1
- MA 214 Calculus IV 3
- EM 221 Statics 3
- Graduation Writing Requirement 3

**Junior Year**

**First Semester**
- ME 321 Engineering Thermodynamics II 3
- ME 330 Fluid Mechanics 3
- EM 302 Mechanics of Deformable Solids 3
- EM 313 Dynamics 3
- EE 305 Electrical Circuits and Electronics 3

**Second Semester**
- ME 310 Engineering Experimentation I 3
- ME 344 Mechanical Design 3
- ME 325 Elements of Heat Transfer 3
- ME 340 Introduction to Mechanical Systems 3
- Mathematics Elective 3

**Senior Year**

**First Semester**
- ME 411 ME Capstone Design I 3
- ME 311 Engineering Experimentation II 3
- ME 440 Design of Control Systems 3
- ME 501 Mechanical Design with Finite Element Methods 3
- Technical Elective? 3

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Degree Requirements

The curriculum requirements for the B.S. degree in mechanical engineering in Paducah are identical to those on the Lexington campus. Refer to those degree requirements for the Paducah degree program. Not all the technical electives listed for the Lexington program will be available in Paducah. The student must satisfy the College graduation requirements listed earlier.

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING – PADUCAH

In addition to the program on the Lexington campus, students can pursue a B.S. degree in mechanical engineering through the College’s Extended Campus Program in Paducah, Kentucky. The Paducah program uses the same curriculum as the main campus, but provides the opportunity for students to complete all B.S. degree requirements without having to relocate to Lexington.

Consistent with the Vision and Mission statements of the University of Kentucky, the mechanical engineering program at the University of Kentucky (UK) Extended Campus Program in Paducah strives to meet the following educational objectives:

The mechanical engineering program will prepare our students for successful practice or academic pursuits in mechanical engineering.

• Our graduates will have the technical skills needed to begin engineering practice or to continue their education. These will include the knowledge of how to design and conduct experiments, mathematics and analytical skills, principles for the design of components and systems, as well as a familiarity with software tools common to the field.

• Our graduates will have the broad education and communication skills needed for a variety of career options, and an appreciation of the need for lifelong learning to maintain their competency.

• Our graduates will have an understanding of the social and ethical responsibilities of engineers, and the impact that engineers have in environmental and societal issues.

The Paducah mechanical engineering program collaborates with West Kentucky Community and Technical College to provide the basic math and science courses, as well as the general studies course requirements. Murray State University faculty members teach upper-level non-engineering courses on the Paducah campus. On-site UK mechanical engineering faculty members and jointly-appointed Murray engineering faculty members teach the upper-division engineering courses. Program admission, course registration, student advising and other student services all can be completed at the Paducah site.

Curriculum

Fall Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>ME 176</td>
<td>Freshman Design</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 116/106</td>
<td>Intro. Coll. Chem/LAB</td>
<td>4</td>
</tr>
<tr>
<td>MATH 136</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>ENG 100</td>
<td>Freshman English</td>
<td>3</td>
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<tr>
<td>COMM 161</td>
<td>Business Speaking</td>
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Sophomore Year

Fall Semester

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<tbody>
<tr>
<td>ENG 100</td>
<td>Freshman English</td>
<td>3</td>
</tr>
<tr>
<td>MATH 136</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 116/106</td>
<td>Intro Coll. Chem/LAB</td>
<td>4</td>
</tr>
<tr>
<td>Category F Elective 1 of 2</td>
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Spring Semester

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<th>Course Title</th>
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<tbody>
<tr>
<td>MATH 331</td>
<td>Differential Equations</td>
<td>3</td>
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<tr>
<td>ME 240/241</td>
<td>Mats./Meth. &amp; LAB (3, 1)</td>
<td>4</td>
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<tr>
<td>PHYS 265/266</td>
<td>Intro E&amp;M &amp; LAB (4, 1)</td>
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<tr>
<td>Category F Elective 2 of 2</td>
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<td>ENG 200</td>
<td>Introduction to Literature</td>
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Junior Year

Fall Semester

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<th>Course Code</th>
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<tbody>
<tr>
<td>ME 220</td>
<td>Eng. Thermo I</td>
<td>3</td>
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<tr>
<td>ME 310</td>
<td>Instrumentation</td>
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<tr>
<td>ME 344</td>
<td>UK Mechanical Design</td>
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<tr>
<td>MATH/SCIENCE ELECTIVE</td>
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<tr>
<td>Category B Elective of 2</td>
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Spring Semester

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<th>Course Title</th>
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<tbody>
<tr>
<td>ME 300</td>
<td>Junior Design</td>
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<tr>
<td>ME 330/332</td>
<td>Fluid Mechanics/LAB</td>
<td>3, 1</td>
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<tr>
<td>EE 210</td>
<td>Circuits/Networks 1</td>
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<td>Category C Elective of 2</td>
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<tr>
<td>Foreign Lang. Modern Language</td>
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Senior Year

Fall Semester

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<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>ME 325/333</td>
<td>Heat Transfer/LAB</td>
<td>3, 1</td>
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<tr>
<td>ME 400</td>
<td>Mech. Engr. Design</td>
<td>2</td>
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<tr>
<td>ME --- ME Tech Elective of 1</td>
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<tr>
<td>ME --- ME Tech Elective of 2</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>ENG 300</td>
<td>Junior English</td>
<td>3</td>
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<tr>
<td>Category E Elective of 1</td>
<td></td>
<td>3</td>
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<tr>
<td>Total</td>
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</table>
College of Engineering

Spring Semester
ME 412 ME Senior Project ............................................ 3
ME --- ME Tech Elective 3 of 4 .................................... 3
ME --- ME Tech Elective 4 of 4 .................................... 3
Category B Elective 2 of 3 ......................................... 3
Category C Elective 2 of 2 ......................................... 3
Total ........................................................................... 18
TOTAL HOURS ................................................................ 127.5

This curriculum applies to students entering in fall 2013 or later. Currently enrolled students may complete a “Request to Change or Extend Catalog Term/Year” form found on the ICAP main page.

Students are admitted as a Pre-Major in Mechanical Engineering. In order to transition from Pre-Major to Major and to graduate with a degree in Mechanical Engineering, students must satisfy the requirements below. All courses listed below must have a grade of C or better.

Written and Oral Communication
ENG 100 or equivalent credit ........................................... 3
COMM 145 or 161 or equivalent credit .......................... 3

Engineering Design
ME 176 Mech Engineering Freshman Design ................. 1
ME 180 Freshman Design II ........................................... 3

Mathematics and Science
MATH 136 Calculus I or equivalent credit ....................... 4
MATH 137 Calculus II or equivalent credit ....................... 4
MATH 237 Multivariable Calculus ................................ 4
PHYS 255/256 University Physics I/IIAB .......................... 5
PHYS 265/266 University Physics II/IIAB ......................... 5
CHEM 110/110 or CHEM 120/121 .............................. 4 or 5

Engineering Science
ME 240/241 Materials and Methods of Mfg .................... 3/1
EM 221 or EM 222 Statics ............................................. 3

TOTAL HOURS ................................................................ 43-44

These Pre-Major eligibility requirements MUST be completed before enrolling ME 300 Junior Design. Check ICAP for progress towards meeting these requirements.

After satisfying the requirements to transition from Pre-Major to Major in Mechanical Engineering, the student must also earn a grade of C or better in the following courses required of the major: EM 303, ME 200, 220, 310, 330, 347, and MATH 331.

Each Mechanical Engineering student’s transcript must include at least 16 hours of credit in the major taught by UK faculty members.

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 489 (fall) or 449 (spring)

Each Mechanical Engineering student must also take at least one mathematics/science elective, for a total of a minimum of 32 hours of mathematics and science beginning at MATH 136. This elective must be chosen from the following list:

ME Program Mathematics and Science Electives
PH 280 Introduction to Environmental Science
(Equivalent to AGRI 280, CHEM 280, ENV 280, and GEOG 280)
ASTR 214 General Astronomy
BIOL 120/121 Biological Concepts: Cells Metabolism and Genetics
BIOL 122/123 Biological Concepts: Evolution, Diversity, and Ecology
BIOL 207/207C General Microbiology
CHEM 222/223 College Chemistry II
GEOG 121 Meteorology
GEOL 111 The Earth
GEOL 112 Earth History
PHYS 316 Computational Physics
PHYS 318 Data Acquisition Using Labview
PHYS 320 Introductory Modern Physics I
MATH 305 Introduction to Mathematical Modeling
MATH 307 Introduction to Linear Algebra
MATH 310 Introduction to Discrete Mathematics
MATH 370 Applied Techniques in Mathematics
STAT 301 Introductory Probability and Applied Statistics
Consult the WKU Undergraduate Catalog and ICAP for the majors B, C, E, and F electives. Categories A and D are covered by the plan of study shown. Review the WKU Undergraduate Catalog for current policies concerning the foreign language course.

BACHELOR OF SCIENCE IN MINING ENGINEERING

Mining engineering requires the broadest knowledge of sciences and other fields of engineering in its practice after graduation. The curriculum below prepares the student for a career in the field of mining.

The objectives of the undergraduate program in mining engineering take into consideration the intellectual and personal development of students, so that after graduation they will be able to:

• Advance in their careers, adapting to new situations and emerging problems, through the application of general purpose engineering skills and the core technical disciplines, analytical procedures, and design practices of the mining engineering profession.
• Function ethically in a variety of professional roles such as mine planner, designer, production manager, mineral processing engineer, consultant, technical support representative, and regulatory specialist with emphasis on the mineral industries of Kentucky and the surrounding region.
• Pursue advanced degrees in mineral-related fields and also those fields that support the mineral industries such as business and law.
• Utilize professional skills such as effective communication, teamwork, and leadership.
• Demonstrate an understanding of the critical role mining engineers play in society with respect to health, safety, and the environment in tangible ways such as achieving professional licensure.

Visit our Web page at: www.engr.uky.edu/mng

Degree Requirements
Each student must complete the following:

UK Core Requirements
See the UK Core section of this Bulletin for the complete UK Core requirements. The courses listed below are (a) recommended by the college, or (b) required courses that also fulfill UK Core areas. Students should work closely with their advisor to complete the UK Core requirements.

I. Intellectual Inquiry in the Humanities
MNG 592 Mine Design Project II ............................... 3

II. Intellectual Inquiry in the Social Sciences
Choose one course from approved list ........................ 3

III. Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences
PHY 231 General University Physics ........................... 4
PHY 241 General University Physics Laboratory ............ 1

IV. Composition and Communication I
CIS/WRD 110 Composition and Communication I ........ 3

V. Composition and Communication II
CIS/WRD 111 Composition and Communication II ....... 3

VI. Quantitative Foundations
MA 113 Calculus I ..................................................... 4

VII. Statistical Inferential Reasoning
Choose one course from approved list ......................... 3

IX. Community, Culture and Citizenship in the USA
Choose one course from approved list ......................... 3

X. Global Dynamics
 Choose one course from approved list ......................... 3

UK Core hours .................................................................. 33

Premajor Requirements

Hours
CIS/WRD 110 Composition and Communication I ........ 3
MA 113 Calculus I ..................................................... 4
MA 114 Calculus II ..................................................... 4
MA 213 Calculus III .................................................... 4
CHE 105 General College Chemistry I ......................... 4
PHY 231 General University Physics ............................ 4
plus an additional 13 credit hours acceptable towards the degree in mining engineering ... 13

Subtotal: Premajor hours ............................................. 36

Graduation Writing Requirement

Hours
MNG 371 Professional Development of Mining Engineers .... 3

Major Requirements

Hours
CHE 107 General College Chemistry II ......................... 3
CS 221 First Course in Computer Science for Engineers .... 2
EE 305 Electrical Circuits and Electronics ..................... 3
EM 221 Statics .......................................................... 3
EM 313 Dynamics ..................................................... 3
EM 302 Mechanics of Deformable Solids ..................... 3
EES 220 Principles of Physical Geology ......................... 4
EES 230 Fundamentals of Geology I ............................. 3
MA 214 Calculus II .................................................... 3
ME 220 Engineering Thermodynamics I ....................... 3
ME 330 Fluid Mechanics ............................................. 3
MNG 101 Introduction to Mining Engineering ............... 1
MNG 191 Mine Graphics ........................................... 1
MNG 211 Mine Surveying .......................................... 2
MNG 264 Mining Methods ........................................... 3
MNG 291 Elements of Mine Design ............................. 2
MNG 301 Minerals Processing .................................... 3
MNG 302 Minerals Processing Laboratory .................... 1
MNG 303 Deformable Solids Laboratory ....................... 1
MNG 322 Mine Safety and Health Management and Processes ........................................... 2
MNG 331 Explosives and Blasting ................................ 2
MNG 332 Mine Plant Machinery ................................. 3
MNG 335 Introduction to Mine Systems Analysis .......... 3
MNG 341 Mine Ventilation ........................................... 3
MNG 371 Professional Development of Mining Engineers .... 3
MNG 435 Mine Systems Engineering and Economics .... 4
### Curriculum

#### Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Hours</th>
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<tbody>
<tr>
<td>CHE 105 General College Chemistry I</td>
<td>4</td>
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<tr>
<td>CS 221 First Course in Computer Science for Engineers</td>
<td>2</td>
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<tr>
<td>CIS/WRD 110 Composition and Communication I</td>
<td>3</td>
</tr>
<tr>
<td>MA 113 Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MNG 101 Introduction to Mining Engineering</td>
<td>1</td>
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<tr>
<td>UK Core – Social Sciences</td>
<td>3</td>
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</table>

**Second Semester**

| CHE 107 General College Chemistry II | 3 |
| MA 114 Calculus II | 4 |
| MNG 191 Mine Graphics | 1 |
| MNG 264 Mining Methods | 3 |
| PHY 231 General University Physics | 4 |
| PHY 241 General University Physics Laboratory | 1 |

#### Sophomore Year

**First Semester**

<table>
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<tr>
<th>Hours</th>
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<tbody>
<tr>
<td>First Semester</td>
</tr>
<tr>
<td>EM 221 Statics</td>
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<tr>
<td>EES 220 Principles of Physical Geology</td>
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<tr>
<td>MA 213 Calculus III</td>
</tr>
<tr>
<td>MNG 331 Explosives and Blasting</td>
</tr>
<tr>
<td>PHY 232 General University Physics</td>
</tr>
<tr>
<td>PHY 242 General University Physics Laboratory</td>
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</table>

#### Second Semester

<table>
<thead>
<tr>
<th>Hours</th>
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<tbody>
<tr>
<td>EM 302 Mechanics of Deformable Solids</td>
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<tr>
<td>MA 214 Calculus IV</td>
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<tr>
<td>ME 220 Engineering Thermodynamics</td>
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<tr>
<td>CIS/WRD 111 Composition and Communication II</td>
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<tr>
<td>MNG 291 Elements of Mine Design</td>
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<tr>
<td>MNG 303 Deformable Solids Laboratory</td>
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<td>MNG 322 Mine Safety and Health Management and Processes</td>
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**Junior Year**

**First Semester**

<table>
<thead>
<tr>
<th>Hours</th>
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<tbody>
<tr>
<td>EM 313 Dynamics</td>
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<tr>
<td>MNG 371 Professional Development of Mining Engineers</td>
</tr>
<tr>
<td>MNG 435 Mine Systems Engineering and Economics</td>
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<tr>
<td>MNG 463 Surface Mine Design and Environmental Issues</td>
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**Second Semester**

<table>
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<tbody>
<tr>
<td>EM 313 Dynamics</td>
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<tr>
<td>MNG 371 Professional Development of Mining Engineers</td>
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<tr>
<td>MNG 435 Mine Systems Engineering and Economics</td>
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<tr>
<td>MNG 463 Surface Mine Design and Environmental Issues</td>
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**Senior Year**

<table>
<thead>
<tr>
<th>Hours</th>
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<tbody>
<tr>
<td>MNG 332 Mine Plant Machinery</td>
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<td>MNG 341 Mine Ventilation</td>
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<td>MNG 551 Rock Mechanics</td>
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<tr>
<td>MNG 591 Mine Design Project</td>
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<td>UK Core – Statistical Inferential Reasoning</td>
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<td>UK Core – Citizenship - USA</td>
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**Second Semester**

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<tbody>
<tr>
<td>MNG 592 Mine Design Project II</td>
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<tr>
<td>(UK Core – Arts and Creativity)</td>
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<td>UK Core – Global Dynamics</td>
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<tr>
<td>Technical Electives**</td>
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<tr>
<td>Supportive Elective</td>
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<tr>
<td>UK Core – Humanities</td>
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*The Mineral Processing Technical Elective is to be chosen from one of the following: MNG 570, Coal Preparation Design or MNG 580, Mineral Processing Plant Design.*

**Courses recommended as technical electives are listed below. These courses must be chosen with the approval of the student’s advisor to ensure that the curriculum includes sufficient engineering design content.

***At the time of publication, MNG 591 was being changed from 2 credit hours to 1 credit hour.

**Technical Electives**: Of the two technical electives in the undergraduate program, students are required to select at least one from departmental courses. The remaining course, chosen with the approval of the student’s advisor, can be used to fulfill specific educational goals.

**MNG 511 Mine Power System Design**

|MNG 531 Advanced Blast Design and Technology |
|MNG 541 Computer Design of Mine Ventilation Systems |
|MNG 561 Mine Construction Engineering I |
|MNG 563 Simulation of Industrial Production Systems |
|MNG 572 Advanced Coal Preparation |
|MNG 575 Coal Preparation Design |
|MNG 580 Mineral Processing Plant Design |
|MNG 581 Geostatistics |
|MNG 599 Topic in Mining Engineering |
|BAE 438G Fundamentals of Groundwater Hydrology |
|CE 471G Soil Mechanics |
|CE 541 Intermediate Fluid Mechanics |
|EES 490G Sedimentary Geology |
|EES 585 Hydrogeology |

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### University of Kentucky

### 2013-2014 Undergraduate Bulletin

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**College of Engineering**

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