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OFFICE OF THE SENATE COUNCIL

REQUEST FOR CHANGE IN UNDERGRADUATE PROGRAM

Program: Electrical Engineering

Formal Option : (if applicable) or Specialty Field (if applicable)

Department (if applicable): Electrical and Computer Engineering

College (if applicable): Engineering

Degree title: **Electrical Engineering** Bulletin pp.:187,188

CIP Code: UK ID No.: HEGIS CODE:

Accrediting Agency (if applicable): Accreditation Board of Engineering and Technology (ABET)

I. PROPOSED CHANGE(S) IN PROGRAM REQUIREMENTS

1. Particular University Studies Requirements or Recommendations for this program

	Current	Proposed
I. Mathematics		No Change
II. Foreign Language		No Change
III. Inference-Logic		No Change
IV. Written Communication		No Change
V. Oral Communication		No Change
VI. Natural Sciences		No Change
VII. Social Sciences		No Change
IX. Cross-Cultural		No Change
X. USP Electives (3 must be outside the student's major		No Change

2. University Graduation Writing Requirement — No Change

3. College Depth and Breadth of Study Requirements (if applicable) (including particular courses required or recommended for this program) NOTE: To the extent that proposed changes in 2. through 6. involve additional courses offered in another program, please submit correspondence with the program(s) pertaining to the availability of such courses to your students.

Current	Proposed
	No Change

4. Premajor or Preprofessional Course Requirements (if applicable)

Current	Proposed
	No Change

5. Credit Hours Required

	Current	Proposed
a. Total Required for Graduation:	131	130

b. Required by level:

100 => 19	200 => 29	300 =>9	400-500 => 16

c. Premajor or Preprofessional (if applicable) => 15 (USP courses)
d. Field of Concentration (if applicable)
e. Division of Hours Between Major Subject and Related Field (if applicable)
f. Hours Needed for a Particular Option or Specialization (if applicable)
g. Technical or Professional Support Electives (if applicable) => 39
h. Minimum Hours of Free or Supportive Electives (Required) => 3

6. Major or Professional Course Requirements

Current	Proposed
EE422G is a 3 hour lecture course EE462G lab required and EE416G or EEE281 Elective.	**EE422G will be a 2 hour lab course and the elective choices will be for students to take any 3 out of the 4 labs EE281, EE461G, EE462G, and EE422G**

7. Minor Requirements (if applicable)

Current	Proposed
(NA)	(NA)

Total Hours: 130

8. Rationale for Change(s): (If rationale involves accreditation requirements, please include specific references to those requirements.)

Surveys of employers in the signals and systems area indicted a greater need for students to be able to implement the system's concepts they learn in their theory classes. Many students could pass the exams with little ability to relate theory to practical problems. This issue was also observed self-assessments from student surveys. Students and faculty did not like having to divide the first signals and systems course between systems concepts and probability theory. Probability applications are required by the Accreditation Board of Engineering and Technology (ABET) and that brought about this initial split in the course about 15 years ago. Now with a separate probability theory course required, many of the systems concepts can be more efficiently presented in a single course, leaving the second course to focus on implement of these concepts. Since not all students have in interest in the signals and systems area, it was decided to make this lab elective among a set of our current labs in various focus areas (power systems, computer engineering, signals and systems, and electronics). The proposed change gives student more freedom to purse their interests within the electrical engineering program though these lab electives.

9. List below the typical semester by semester program for a major.

Current	Proposed
(See attached)	(See attached)

Signatures of Approval:

4/28/2006 18 in favor 0 against Date of Approval by Department Faculty	Reported by Department Chair
12/14/06 Date of Approval by College Faculty	Reported by College Dean
3/20/07 *Date of Approval by Undergraduate Council	Reported by Undergraduate Council Chair
*Date of Approval by Graduate Council	Reported by Graduate Council Chair
*Date of Approval by Health Care Colleges Council (HCCC)	Reported by HCCC Chair
*Date of Approval by Senate Council	Reported by Senate Council Office
*Date of Approval by University Senate	Reported by Senate Council Office

*If applicable, as provided by the Rules of the University Senate

Rev 7/06

Updated 11-23-05

Current Curriculum for the Bachelor's of Science Degree in Electrical Engineering

Freshman Year	
First Semester	**Hrs**
EE 101 EE Professions Seminar	1
MA 113 Calculus I	4
CS115 Introduction to Computer Programming	3
ENG 104 Writing I	4
Elective: USP(1)-Social Science	3
Elective: USP(2)-Humanities	3
Total	**18**
Second Semester	
MA 114 Calculus II	4
PHY 231 General University Physics	4
PHY 241 General University Physics Lab	1
CHE 105 General College Chemistry I	3
Elective: Oral Communications	3
Total	**15**

Sophomore Year	
First Semester	**Hrs**
MA 213 Calculus III	4
PHY 232 General University Physics	4
PHY 242 General University Physics Lab	1
EE 211 Circuits I	4
EE 280 Design of Logic Circuits	3
Total	**16**
Second Semester	
MA 214 Calculus IV	3
EE 221 Circuits II	3
EE 222 EE Laboratory I	2
EE 360 Intro to Semiconductor Dev.	3
Elective: Engineering/Science(1)	3
Elective: USP(3)/Writing/Humanities or Cross-Cultural	3
Total	**17**

Junior Year	
First Semester	
EE 415G Electromechanics	3
EE 421G Signals and Systems I	3
EE 416G Energy Conversion Laboratory **or** EE 281 Logical Design Laboratory	2
EE 380 Computer Organization	3
EE 461G Introduction to Electronics	3
MA 320 Probability	3
Total	**17**
Second Semester	**Hrs**
EE 468G Fields and Waves	4
EE462G Electronic Circuits Laboratory	2
EE422G Signals and Sysems II	3
Elective: Technical Elective (1)	3
Elective: Engineering/Science(2)	3
Elective: USP(4)- Social Science	3
Total	**18**

Senior Year	
First Semester	**Hrs**
Elective: EE Technical(1)	3
Elective: EE Technical(2)	3
Elective: Math/Statistics	3
Elective: Engineering/Science(3)	3
Elective: Technical(2)	3
Total	**15**
Second Semester	**Hrs**
EE 499 Electrical Engineering Design	3
Elective: EE Technical(3)	3
Elective: EE Technical(4)	3
Elective: Supportive	3
Elective: USP(5)-Humanities or Cross Cultural	3
Total	**15**
Program Total	**131**

Engineering Standing Admission (see the University Bulletin)

The ECE degree program is 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.

Admission to engineering standing in a degree program is necessary in order to be granted a baccalaureate degree in engineering or computer science. Students must complete at least 30 of the last 36 hours of their programs in residence at the University. Specific departmental requirements for admission to engineering standing are as follows. 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 (ECE) for admission to engineering standing. **Note:** The cumulative grade-point average includes all college-level work taken at the University of Kentucky or elsewhere. The Electrical and Computer Engineering Department's engineering standing requirement is

Completion of EE 211, EE 221, EE 222, and EE 280 with a minimum cumulative GPA of 2.4 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

Repeat Option. An undergraduate student has the option to repeat once as many as three different completed courses with only the grade, credit hours, and quality points for the second completion used in computing the student's academic standing and credit for graduation. The limit of three repeat options holds for a student's entire undergraduate career, no matter how many degrees or programs are attempted. A student may not use the repeat option when retaking a course on a Pass-Fail basis if the course was originally taken for a letter grade. **A student exercising the repeat option must notify in writing the dean of the college in which he or she is enrolled. A student may exercise the repeat option at any time prior to graduation.** If a student officially withdraws from the second attempt, then the grade, credit hours, and quality points for the first completion constitute the grade in that course for official purposes. Permission to attempt again the same course shall be granted by the instructor and the dean of the college in which the student is enrolled. (**Note:** The repeat option cannot be used to raise the student's standing for admission to the University of Kentucky Graduate School.)

The repeat option may be exercised only the second time a student takes a course for a letter grade, not a subsequent time.

A student must be enrolled at UK at the time he/she files the repeat option. Thus, a student who has transferred to another institution would not qualify since he/she is not enrolled at UK.

Pass-Fail Option (see the University Bulletin). Undergraduate students above the freshman level and not on academic probation may select a maximum of four elective courses, with certain restrictions, to be taken on a Pass-Fail basis. Students in the Honors Program above the freshman level may, with advance written approval of the Director of the Honors Program, select additional elective courses to be taken on such a Pass-Fail basis. Credit hours successfully completed under this option will count toward graduation but will not be used in calculating grade-point standing. Courses taken on a Pass-Fail basis are limited to those considered as elective in the student's program and such other courses or types of courses as might be specifically approved by the Senate Council for a college or department. Prerequisites for such courses may be ignored at the student's own hazard. The student is expected to participate fully in the course and take all examinations as though enrolled on a regular basis. Students may change their grading option (pass-fail to letter grade or letter grade to pass-fail; credit to audit or

audit to credit within three (3) weeks from the beginning of classes in the fall or spring semester (or a proportionate amount of time in the summer term or other courses of less than a full semester's duration). After such time, a student may not change his or her grading option without the written approval of the student's academic dean or the dean's designee. The waiver and the rationale for the waiver must be documented in the student's record maintained by the college. Courses offered only on a Pass-Fail basis shall not be included in the maximum number of elective courses which a student may take under these provisions.

Elective Descriptions

USP Elective (5 courses):
The University Studies Program electives (designated as USP) are described in the UK bulletin. Since the required EE curriculum automatically satisfies many of the USP requirements, the only remaining USP categories to be satisfied by students in the EE program are:

- VII. Social Science (2 courses)
- VIII. Humanities (2 courses)
- IX. Cross-Cultural (1 course)

A total of 5 courses must be taken to satisfy USP requirement. The order in which these are taken is not critical; however, they should be selected in consultation with an academic advisor. A listing of these electives can be found in the UK bulletin and on the Web at:
http://www.uky.edu/Registrar/bull0506/toc2.htm

Oral Communications Elective (1 Course):
The any one of the following courses satisfies the oral communications elective:

- COM 181 Basic Public Speaking
- COM 252 Introduction to Interpersonal Communication
- COM 281 Communication in Small Groups
- COM 287 Persuasive Speaking

Writing Elective (1 Course):
In addition to the required ENG104 course in the freshman year, a writing intensive course must be taken once the student achieve sophomore status. Any of the following courses qualify as writing intensive and also satisfy a USP elective (most efficient choice in minimizing total credit hours):

- ENG 230 Introduction to Literature (USP Humanities)
- ENG 231 Literature and Genre (USP Humanities)
- ENG 232 Literature and Place (USP Humanities)
- ENG 233 Literature and Identities (USP Humanities)
- ENG 234 Introduction to Women's Literature (USP Humanities)
- ENG 261 Survey of Western Literature I (USP Humanities)
- ENG 262 Survey of Western Literature II (USP Humanities)
- ENG 264 Major Black Writers (USP Cross-Cultural)
- ENG 270 The Old Testament as Literature (USP Humanities)
- ENG 271 The New Testament as Literature (USP Humanities)

Note that one course satisfies the USP Cross-Cultural requirement, the rest satisfy one of the required Humanities courses.

Engineering/Science Electives (3 Courses):
Engineering, physics, computer science, or math courses at the 200-level or higher, other than an Electrical Engineering course and excluding more elementary versions of required courses, such as PHY 211. To be selected in consultation with academic adviser (9 credit hour minimum). Recommended courses are:

- ME 220 Engineering Thermodynamics I
- EM 221 Statics
- ME 330 Fluid Mechanics
- EM 313 Dynamics
- CE 521 Engineering Economy
- PHY 361 Principles of Modern Physics
- STA 281 Probability and Statistics Using Interactive Computer Techniques
- STA 291 Statistical Method
- STA 321 Basic Statistical Theory I
- STA 381 Introduction to Engineering Statistics
- STA 524 Probability
- STA 525 Introductory Statistical Inference
- CS 215 Introduction to Program Design, Abstraction, and Problem Solving
- CS 216 Introduction to Software Engineering
- CS 315 Algorithm Design and Analysis
- PHY 361 Principles of Modern Physics
- MA 321 Introduction to Numerical Methods
- MA 322 Matrix Algebra and Its Applications
- MA 340 Discrete Structures in Computer Science
- MA 416G Principles of Operations Research I
- MA 432G Methods of Applied Mathematics I
- MA 433G Introduction to Complex Variable

Math Statistics Elective (1 Course):
An upper-division (300-level or higher) math or statistics course that is not more basic than a required course in the curriculum (3 credit hour minimum). Recommended courses are:

- MA 321 Introduction to Numerical Methods
- MA 322 Matrix Algebra and Its Applications
- MA 340 Discrete Structures in Computer Science
- MA 416G Principles of Operations Research I
- MA 432G Methods of Applied Mathematics I
- MA 433G Introduction to Complex Variables
- STA 321 Basic Statistical Theory I
- STA 381 Introduction to Engineering Statistics
- STA 524 Probability
- STA 525 Introductory Statistical Inference

Technical elective (2 Courses):
An upper division engineering, mathematics, statistics, computer science, physics, or other technically-related fields excluding more elementary versions of required courses. To be selected in consultation with academic adviser (6 credit hours minimum).

Supportive elective (1 Course):
A university course, excluding more elementary versions of required courses, such as precalculus mathematics or PHY 211.

EE Technical Electives (4 Courses):
Senior-level courses that focus on application areas within electrical engineering. Recommended electrical engineering technical electives are listed below (12 credit hour minimum).

EE 511 Introduction to Communication Systems
EE 512 Digital Communication Systems
EE 517 Advanced Electromechanics
EE 518 Electric Drives
EE 521 Introduction to Wireless Communications
EE 522 Antenna Design
EE 523 Microwave Circuit Design
EE 524 Solid State Physics
EE 525 Numerical Methods and Electromagnetics
EE 527 Electromagnetic Compatibility
EE 537 Electric Power Systems I
EE 538 Electric Power Systems II
EE 560 Semiconductor Device Design
EE 561 Electric and Magnetic Properties of Materials
EE 562 Analog Electronic Circuits
EE 564 Digital Electronic Circuits
EE 565 Circuit Design With Analog Integrated Circuits
EE 567 Introduction to Lasers and Masers
EE 568 Fiber Optics
EE 569 Electronic Packaging Systems and Manufacturing Processes
EE 571 Feedback Control Design
EE 572 Digital Control of Dynamic Systems
EE 581 Advanced Logical Design
EE 582 Hardware Description Languages and Programmable Logic
EE 583 Microprocessors
EE 584 Introduction of VLSI Design and Testing
EE 585 Fault Tolerant Computing
EE 586 Communication and Switching Networks
EE 587 Microcomputer Systems Design
EE 599 Topics in Electrical Engineering (subtitle required)

Notes

Students may not use STA281 (required by Computer Science) to satisfy our probability requirement MA320.
EE481 is now EE281

Proposed new curriculum (9/15/06) with lab elective structure and modified EE421G and EE422G courses

Freshman Year	
First Semester	**Hrs**
EE 101 EE Professions Seminar	1
MA 113 Calculus I	4
CS115 Introduction to Computer Programming	3
ENG 104 Writing	4
University Studies (Social Science 1)	3
University Studies (Humanities 1)	3
Total	**18**
Second Semester	
MA 114 Calculus II	4
PHY 231 General University Physics	4
PHY 241 General University Physics Lab	1
CHE 105 General College Chemistry I	3
Oral Communications Elective	3
Total	15

Sophomore Year	
First Semester	**Hrs**
MA 213 Calculus III	4
PHY 232 General University Physics	4
PHY 242 General University Physics Lab	1
EE 211 Circuits I	4
EE 280 Design of Logic Circuits	3
Total	**16**
Second Semester	
MA 214 Calculus IV	3
EE 221 Circuits II	3
EE 222 EE Laboratory I	2
EE360 Intro to Semiconductor Dev.	3
Engineering/Science [E] (1)	3
University Studies (Writing Requirement/Humanities 2 or cross-Cultural 1)	3
Total	**17**

Junior Year	
First Semester	**Hrs**
EE 415G Electromechanics	3
EE 421G Signals and Systems I	3
Elective EE Laboratory[L] (1)	**2**
EE 380 Computer Organization	3
EE 461G Introduction to Electronics	3
MA 320 Probability	3
Total	**17**
Second Semester	**Hrs**
EE 468G Fields and Waves	4
Elective EE Laboratory [L] (2)	**2**
Engineering/Science Elective [E] (2)	3
Technical Elective [T] (1)	3
University Studies (Humanities 2 or cross-Cultural 1)	3
Total	**15**

Senior Year	
First Semester	**Hrs**
EE Technical Elective**	3
EE Technical Elective**	3
Elective EE Laboratory [L] (3)	**2**
Math/Statistics Elective [M]	3
Technical Elective [T] (2)	3
University Studies (Social Science 2)	3
Total	**17**
Second Semester	**Hrs**
EE 499 Electrical Engineering Design	3
EE Technical Elective**	3
EE Technical Elective**	3
Supportive Elective***	3
Engineering/Science Elective [E] (3)	3
Total	**15**
Program Total	**130**

Proposed new curriculum (9/15/06) with lab elective structure and modified EE421G and EE422G courses

*To be selected from **University Studies** areas in Social Sciences, Oral Communication, Humanities, and Cross-Cultural in consultation with the academic adviser.

***Supportive elective** is to be chosen from any University courses, excluding courses more elementary than the listed required courses, such as a precalculus mathematics or a non-calculus based physics course.

[M] **Math Statistics Elective**: Any upper-division (300-level or higher) math or statistics course (3 credit hours total).

[E]**Engineering/Science Electives:** Any engineering, science, computer science, or math course more at the 200-level or higher other than an Electrical Engineering course and excluding more elementary versions of required courses. (9 credit hours total).

[T]**Technical elective** may be selected from upper division engineering, mathematics, statistics, computer science, physics, or other technically-related fields in consultation with the academic adviser (6 credit hours total).

[L]Electrical Engineering Laboratory Elective: EE281, EE462G, EE422G, EE416G (6 hours total)

****EE Technical Electives:** Courses recommended as electrical engineering technical electives are listed below (each course is worth 3 Hours).
EE 511 Introduction to Communication Systems
EE 512 Digital Communication Systems
EE 517 Advanced Electromechanics
EE 518 Electric Drives
EE 522 Antenna Design
EE 523 Microwave Circuit Design
EE 527 Electromagnetic Compatibility
EE 537 Electric Power Systems I
EE 538 Electric Power Systems II
EE 560 Semiconductor Device Design
EE 561 Electric and Magnetic Properties of Materials
EE 562 Analog Electronic Circuits
EE 564 Digital Electronic Circuits
EE 565 Circuit Design With Analog Integrated Circuits
EE 567 Introduction to Lasers and Masers
EE 568 Fiber Optics
EE 571 Feedback Control Design
EE 572 Digital Control of Dynamic Systems
EE 581 Advanced Logical Design
EE 583 Microprocessors
EE 585 Fault Tolerant Computing
EE 587 Microcomputer Systems Design
EE 599 Topics in Electrical Engineering (subtitle required)