To be adopted:

Proposed Changes to Electrical Engineering Undergraduate Program

PRESENT:
Undergraduate Program Focus Areas
The electrical engineering undergraduate program offers the following focus areas:

1. Communications, Signal Processing and Networking
   Fundamental and state-of-the-art theory and applications of communications, networking of devices, and related signal processing, involving information sources in the form of audio, video, image and text messages and transmission media of wire, wireless (radio frequency), fiber optics, etc.

2. Computer Engineering
   The Electrical Engineering department offers a Computer Engineering program in conjunction with the Computer Science and Engineering department. Example applications are embedded system design, reconfigurable systems, parallel and high-performance computing, microprocessors, nanometer integrated circuit design, and computeraided design (CAD) techniques. See detailed descriptions in the Computer Engineering Program.

3. Control and Robotics
   Theory and design of control of systems and robots. Example applications include control systems in automotive, satellite, aircraft, computer hard drive, robotic manufacturing, autonomous robots, cell phone signal tracking, among others.

4. Intelligent Systems
   Theory, design and development of systems capable of intelligent decisions. Example applications include video surveillance systems, medical imaging devices, intelligent transportation systems, and manufacturing automation.

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4. Nanotechnology, Advanced Materials and Devices
   Synthesis and characterization of advanced materials at nanometer scale, theory, design and fabrication of electronic and optoelectronic devices. Example applications include creation of ultra-fast low-power
5. Nanotechnology, Advanced Materials and Devices: Synthesis and characterization of advanced materials at nanometer scale, theory, design and fabrication of electronic and optoelectronic devices. Example applications include creation of ultra-fast low-power transistors, efficient solar cells for energy generation, high-density memory for smart phones and mobile services, and tiny devices for medical applications.

5. Power Engineering: Power electronics, AC and DC power and their conversion, electro-mechanical energy conversion, electric motors, large-scale power generation and transmission systems, long-distance transmission and distribution of electric power, design of motion control drive circuits for robotic and industrial automation systems, and other related topics.

6. VLSI Design and Systems: Theory, design and methodologies of very large scale, nanometer integrated circuits. Example applications include microprocessors, analog and mixed signal circuits, RF circuits for cell phones and wireless networks, system-on-chip (SOC), application specific integrated circuits (ASIC).

All undergraduates in the College of Engineering must see an advisor at least annually. For details, visit student.engr.ucr.edu.

Major Requirements

1. Lower-division requirements (73 units)
a) One course in the biological sciences chosen from an approved list
b) CHEM 001A, CHEM 01LA
c) CS 010, CS 013, CS 061
d) EE 001A, EE 01LA, EE 001B, EE 010, EE 020
e) MATH 008B or MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 010B, MATH 046
f) PHYS 040A, PHYS 040B, PHYS 040C

2. Upper-division requirements (82 units)
a) EE 100A, EE 100B, EE 105, EE 110A, EE 110B, EE 114, EE 115, EE 116, EE 132, EE 141, EE 175A, EE 175B, EE 175C
b) CS 120A/EE 120A, CS 120B/EE 120B
c) ENGR 180W
d) Twenty (20) units of technical electives

Major Requirements

1. No Change
a) No Change

2. No Change
a) No Change

b) No Change
b) No Change

c) No Change
c) No Change
d) No Change
d) No Change

e) No Change
e) No Change

f) No Change
f) No Change

d) Twenty (20) units of technical electives
The choice of technical electives must ensure that the upper division requirements include at least one coherent sequence of at least three electrical engineering courses to ensure depth in one area of electrical engineering. Example course sequences are available through the Student Affairs Office in the College of Engineering or student.engr.ucr.edu.

**JUSTIFICATION:**
The Department of Electrical Engineering has been building the Power Engineering area by adding undergraduate courses and hiring appropriate faculty. Given that this foundation is in place, the EE faculty considers it the appropriate time to change the catalog text to reflect the change. The Computer Engineering (CEN) focus is deleted because the EE and CSE departments now share a CEN degree program.

The CEN program is listed separately in the Catalog.

ENGR 160 is a recently approved course that covers optimization methods for engineering designs and system analysis. It is an important subject for electrical engineering as designs of many electrical devices, circuits and systems involve some form of optimization. Adding this technical elective strengthens the electrical engineering curriculum.

**APPROVALS:**
Approved by the faculty of the Department of Electrical Engineering: 04/09/14
Approved by the Executive Committee of the Bourns College of Engineering: 04/15/14
Approved by the Committee on Educational Policy: 04/28/14