UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Office of the Provost and Vice Chancellor
for Academic Affairs

Swanlund Administration Building
601 East John Street
Champaign, IL 61820

August 23, 2011

Gay Miller, Chair
Senate Committee on Educational Policy
Office of the Senate
228 English Building, MC-461

Dear Professor Miller:

Enclosed is a copy of a proposal from the College of Engineering to establish the undergraduate minor in Electrical and Computer Engineering.

This proposal has been approved by the College of Engineering's Executive Committee. It now requires Senate review.

Sincerely,

Kristi A. Kuntz
Assistant Provost

KAK/njh

Enclosures

    c: A. Cangellaris
        J. Erickson
        B. Heuser
        S. Kamin
        E. Kudeki
        E. Stovall
        J. Hanks

College of Engineering

Executive Committee
306 Engineering Hall, MC-266
1308 West Green Street
Urbana, IL 61801

May 19, 2011

Kristi Kuntz
Assistant Provost
217 Swanlund Administration Building
MC-304

Via: Ilesanmi Adesida, Engineering College

Dear Ms. Kuntz:

The College of Engineering Executive Committee has reviewed and approved the following:

New Program: "Undergraduate Minor in Electrical and Computer Engineering"

Attached is a copy of the request.

Sincerely yours,

Brent J. Heuser, Secretary
Executive Committee

Approval Recommended:

Ilesanmi Adesida, Dean
College of Engineering

Date

BJH/jmh

Enclosure

c: Andreas Cangellaris
   Jeff Erickson
   Sam Kamin
   Erhan Kudeki
   Michael Pleck
   Elizabeth Stovall
   Jean Hanks

Senate Educational Policy Committee
Proposal Check Sheet

PROPOSAL TITLE (Same as on proposal): <u>Establishment of a New Undergraduate Minor in Electrical and Computer Engineering in the Department of Electrical and Computer Engineering, College of Engineering</u>

PROPOSAL TYPE (Please select all that apply below):

A. ☒ Program and degree proposals

1. This proposal is for a graduate program or degree

    ☐ Yes   ☒ No

2. **Degree** proposal (e.g. B.S.A.E., M.S.C.E.)

    ☐ New degree — please name the new degree: _____

    ☐ Revision of an existing degree — please name the existing degree to be revised: _____

3. **Major** proposal (disciplinary focus, e.g., Mathematics)

    ☐ New major — please name the new major: _____

    ☐ Revision of an existing major — please name the existing major to be revised: _____

4. **Concentration** proposal (e.g. Financial Planning)

    ☐ New concentration — please name the new concentration: _____

    ☐ Revision of an existing concentration — please name the existing concentration to be revised: _____

5. **Minor** proposal (e.g. Cinema Studies)

    ☒ New minor — please name the new minor: <u>Electrical and Computer Engineering</u>

    ☐ Revision of an existing minor — please name the existing minor to be revised: _____

6. ☐ Proposal for renaming an existing degree, major, concentration, or minor

  ☐ degree   ☐ major   ☐ concentration   ☐ minor

  Please provide the current name: _____

  Please provide the proposed new name: _____

7. ☐ Proposal for terminating an existing degree, major, concentration, or minor

  Please name the existing degree, major, concentration, or minor: _____

8. ☐ Proposal for a multi-institutional degree between Illinois (UIUC) and a foreign institution

  Please name the existing Illinois degree or program: _____

  Please name the partnering institution: _____

B. ☐ **Proposal for renaming existing academic units** (college, school, department, or program)

  Please provide the unit's current name: _____

  Please provide the unit's proposed new name: _____

C. ☐ **Proposal for reorganizing existing units** (colleges, schools, departments, or programs)

  ☐ Change in status of an existing and approved unit (e.g. change from a program to department) — please indicate current unit name including status: _____

  ☐ Transfer an existing unit

  Please provide the current unit's name and home: _____

  Please provide the new home for the unit: _____

  ☐ Merge two or more existing units (e.g., merge department A with department B)

  Please provide the name and college of unit one to be merged: _____

  Please provide the name and college of unit two to be merged: _____

  ☐ Terminate an existing unit — please provide the current unit's name and status: _____

D. ☐ **Other educational policy proposals** (e.g., academic calendar, grading policies, etc.)

  Please indicate the nature of the proposal: _____

Proposal to the Senate Educational Policy Committee

PROPOSAL TITLE: Establishment of a New Undergraduate Minor in Electrical and Computer Engineering in the Department of Electrical and Computer Engineering, College of Engineering

SPONSOR: Erhan Kudeki, Professor of Electrical and Computer Engineering and Associate Head for Undergraduate Affairs, 265-0128, erhan@illinois.edu.

COLLEGE CONTACT: Charles Tucker, III, Associate Dean for Undergraduate Programs, 333-2280, ctucker@illinois.edu

BRIEF DESCRIPTION: The Electrical and Computer Engineering (ECE) Minor will provide a choice between exposure to the electrical engineering (EE) and computer engineering (CE) disciplines. Students in the ECE Minor will take a common set of required courses in Circuits, Programming, and Probability or Statistics. Depth in the ECE Minor will be established via an advanced core requirement and an advanced elective requirement in EE or CE.

JUSTIFICATION: The ECE Minor will be open to all UIUC undergraduates outside the ECE Department with the exception that Computer Science majors cannot elect the Computer Engineering Option within the Minor. The aim of the ECE Minor is to expose engineering students outside of ECE, as well as undergraduates in sciences and or mathematics, to methodologies and applications of focus in electrical and computer engineering disciplines. Engineering students outside of ECE would benefit from a knowledge and understanding of electrical and computer engineering principles that can be applied to interdisciplinary work in the areas of computation, system and product design, signal processing, and optimization. Students outside of engineering would benefit from instruction in engineering as a framework for analytical problem solving. For example, it has been said for many years that students in the life sciences would benefit from a minor in engineering to prepare them for careers in bioengineering which is engineering applied to biological applications and processes. Students in engineering disciplines such as chemical and biomolecular engineering would benefit from this minor as many of the applications in this discipline are computationally oriented.

REQUIREMENTS AND RELATED INFORMATION:

Course Requirements

1. Circuits (4 hours): ECE 110—Intro Elec & Computer Engrg; or ECE 205—Elec & Electronic Circuits and ECE 206—Elec & Electronic Circuits Lab

2. Programming (3-4 hours): one of (with no particular preference) CS 101—Intro Computing: Engrg & Sci, CS 125—Intro to Computer Science, or ECE 190—Intro to Computing Systems

3. Probability or Statistics (3-4 hours): one course from an approved list (see Appendix A.1)

4. Option:

   a. EE Option (10-11 hours):

      1) EE Core Requirement: ECE 210—Analog Signal Processing (4 hours)

      2) EE Advanced Electives: two courses (300 level or above) from an approved list (6-7 hours, see Appendix A.2)

      – Or –

   b. CE Option (9-11 hours):

      1) CE Core Requirement: ECE 290—Computer Engineering I (3 hours) or CS 231—Computer Architecture I (3 hours). ECE 290 should be taken unless CS 231 credit exists

      2) CE Advanced Electives: two courses (300 level or above) from an approved list (6-8 hours, see Appendix A.3)

5. Additional ECE Course Work (0-5 hours): Elective ECE-rubric courses to attain 18 total hours of ECE-rubric credit. No additional hours are needed in this category if all courses taken to satisfy Requirements 1-4 are ECE-rubric ones.

Accordingly, the number of credit hours required to complete the ECE Minor ranges from 19-23 hours if no additional ECE-rubric course work (Requirement 5) is needed, and up to 28 if it is.

Prerequisites for the Minor: None, other than credit in basic science and mathematics courses required as standard prerequisites for the courses to be taken under the program.

Admission to the Minor: Students with B- or better grades in ECE 110 or ECE 205 will be formally accepted to the program upon application.

Minor Advisor: ECE Advisors in the ECE Undergraduate Advising Office in 156 Everitt will be responsible for advising the students enrolled in the program.

Certification of Successful Completion: The requirements will be coded into and verified via DARS, and then verified by the CoE as the other minors are.

BUDGETARY AND STAFF IMPLICATIONS:

a. *Additional staff and dollars needed:* None.

b. *Internal reallocations (e.g. change in class size, teaching loads, student-faculty ratio, etc.):* Minimal. Enrollment in the minor is projected to be about 20 students per year.

That's a negligible fraction of the approximately 800 and 550 students enrolled in ECE 110 and ECE 205/206 annually. Furthermore, ECE 110 and ECE 205/206 are already handling many non-ECE students, the pool that we will draw from for the new ECE minor. Similarly, the core EE and CE Option courses, ECE 210 and ECE 290, with enrollments averaging almost 500 and 400, can easily absorb the 20 or so students annually split between the two courses. Hence, additional costs and impacts will be negligible and can be easily handled by the department.

c. *Effect on course enrollment in other departments and explanations of discussions with representatives of those departments:* Minimal. Students taking the programming requirement courses CS 101 or CS 125 will likely do so to satisfy requirements of their major. The core CE Option course CS 231 is one of two alternates and only a few students are expected to enroll annually, a negligible fraction of the average annual enrollment of about 400.

d. *Impact on library, computer use, laboratory use, equipment, etc.:* None.

Proposed Effective Date: Spring 2012

Statement for the Programs of Study Catalog: See Appendix B.

CLEARANCES:

Signatures:

Unit Representative: _____   Date: Feb 21, 2011 _____

College Representative: _____   Date: 5/17/11 _____

Graduate College Representative: _____   Date: _____

Provost Representative: _____   Date: _____

Educational Policy Committee Representative: _____   Date: _____

Appendix A. Distribution Requirement Elective Courses

Credit hours are shown in parentheses

A.1 Approved list of courses on probability/statistics:

ECE 313 – Probability with Engrg Applic (3)
STAT 400 – Statistics and Probability I (4)
MATH 463 – Statistics and Probability I (4)
GE 331 – Analyt Methods for Uncertainty (3)
CEE 202 – Engineering Risk & Uncertainty (3)
EPSY 480 – Educational Statistics (4)

A.2 Advanced Core Electives in EE:

ECE 310 – Digital Signal Processing, I (3)
ECE 329 – Fields and Waves I (3)
ECE 330 – Power Circuits & Electromechanics (3)
ECE 340 – Semiconductor Devices (3)
ECE 342/343 – Electronic Circuits/Laboratory (4)

A.3 Advanced Core Electives in CE:

ECE 385 – Digital Systems Laboratory (2)
ECE 391 – Computer Systems Engineering (4)
ECE 411 – Computer Organization and Design (4)

APPENDIX B. STATEMENT FOR THE PROGRAMS OF STUDY

Electrical and Computer Engineering Minor

Electrical and computer engineering transforms our day-to-day lives through a multitude of innovative technologies and products. The ECE minor is intended to expose students from other disciplines to the unlimited opportunities for innovation in this exciting field, and to the methodologies and tools used by electrical and computer engineers for the exploration and design of new technologies and products. This minor is open to all UIUC undergraduates outside the ECE Department with the exception that Computer Science majors cannot elect the Computer Engineering Option within the Minor.

Hours	Required Courses
4	*Circuits Requirement:* ECE 110—Intro Elec & Computer Engrg **or** ECE 205—Elec & Electronic Circuits + ECE 206—Elec & Electronic Circuits Lab
3-4	*Programming Requirement:* one of (with no particular preference) CS 101—Intro Computing: Engrg & Sci CS 125— Intro to Computer Science ECE 190—Intro to Computing Systems
3-4	A probability or statistics course chosen from an approved list
10-11 - or - 9-11	A. Electrical Engineering Option[1] • *Core Requirement:* ECE 210—Analog Signal Processing • *Advanced Core Electives:* Two ECE courses chosen from an approved list - - - - - - or - - - - - - B. Computer Engineering Option[1] • *Core Requirement[2]:* ECE 290—Computer Engineering I **or** CS 231—Computer Architecture I • *Advanced Core Electives:* Two ECE courses chosen from an approved list
0-5	Elective ECE courses to achieve a minimum of 18 hours of ECE course work[3].
19-28	Total

1. To complete the minor, both the Core and Advanced Core courses from Option "A" or "B," must be completed.

2. ECE 290 should be taken unless CS 231 credit already exists.

3. No additional hours are needed in this category if all courses taken to satisfy the previous requirements are ECE ones.

For more information regarding the Electrical and Computer Engineering minor, visit the Electrical and Computer Engineering minor Web site, contact the Electrical and Computer

Engineering Undergraduate Programs Office (156 Everitt Laboratory, 217-333-0716, ece-advisor@illinois.edu), or visit the Office of the Associate Dean for Undergraduate Programs, 206 Engineering Hall.

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Department of Computer Science
201 North Goodwin Avenue
Urbana, IL 61801-2302 USA

April 25, 2011

To whom it may concern,

The Computer Science Department has considered the proposed ECE minor, and gives its full endorsement. The minor will provide an opportunity for interested students on campus to explore this field. Any additional load on CS courses will be minimal, and we do not anticipate any need for additional resources due to the inclusion of several CS courses as options in the minor.

We will note that "option B – Computer Engineering Option", would not be appropriate for Computer Science majors, due to the overlap with their existing curriculum. Consequently, we shall request that this option not be made available to CS majors.

Sincerely,

Leonard Pitt
Professor and Director of Undergraduate Programs
Department of Computer Science
University of Illinois
pitt@illinois.edu

Present:

D. Abrams (CEE)	B. Heuser (NPRE)	H. Reis (ISE)
M. Bragg (Admin)**	D. Jones (ECE)	C. Tucker (Admin)
D. Ceperley (Phys)	P. Kalita (ABE)	J. Weaver (MatSE)
J. Freund (MechSE)	S. Kamin (CS)	
J. Hart (CS)**	D. Pack (ChBE)	

Absent

I. Adesida (Admin)	V. Coverstone (Admin)
S.-L. Chuang (MNTL)	B. Cunningham (BioE)
B. Conway (AE)	M. Wong (CSL)

* = alternate, ** = guest

The meeting was called to order at 1:00 pm.

1. Welcome to New EC Members by Executive Associate Dean Bragg.

2. Importance of the EC Activities by Executive Associate Dean Bragg.

3. Annual Budget Overview by Executive Associate Dean Bragg.

4. Approval of the draft minutes, April 19, 2011

    The minutes were approved unanimously.

5. Old Business

    —Review of the policy concerning internship courses. This policy was discussed extensively, with a new issue related to the approval of the work product (written report) identified in the previous policy statement (April 19, 2011 minutes). Specifically, the question was raised as to whether a member of the graduate college should be the only person allowed to sign these reports. This issue will have an impact on the MSE 585 and ENG 572 courses as they are currently described in the respective course proposals.

    A motion to add the requirement of graduate college member approval to the written work product(s) to the internship course to the COE EC policy was approved.

    —Review of MSE 585 proposal.

6. Course and Program Proposals/Reports

    a. New/Revised Course Outlines and Program Proposals

    —B.S in Agricultural and Biological Engineering
        New Courses

        —ABE 223 "ABE Principles: Machine Syst"

1

—ABE 224 "ABE Principles: Soil & Water"
—ABE 225 "ABE Principles: Bioenviron"
—ABE 226 "ABE Principles: Bioprocessing"

The COE EC unanimously approved the revision to the B.S curriculum and the associated new courses without forwarding for review to an ad hoc committee.

—CEE 445 "Air Quality Modeling"

The CEE department is requested to provide clarification of the 1 additional course credit hour based on one contact hour per week of laboratory. COE policy is 2 to 3 contact hours per course credit hour. Alternatively, other work products such as laboratory reports outside of lab/lecture meeting time is required to meet the COE policy. The current CEE 445 appears to be deficient with regard to this policy and further information is required before the COE EC will consider the proposal.

—CEE 553 "River Morphodynamics"

The review of this course has been assigned to the following ad hoc committee: P. Kumar (CEE), R. Cooke (ABE), M. Matalon (MechSE), chair.

—ENG 572 "Energy Systems Practicum"
—ENG 573 "Energy Systems Project"

b. Subcommittee Reports

— CEE 411 "RR Project Design & Constr"
— CS 528 "Obj-Oriented Progrmg & Design"
— Undergraduate Minor in Electrical and Computer Engineering
— ECE 526 "Distributed Algorithms"

The above subcommittee reports were all unanimously approved.

7.   A resolution recognizing Dean Pleck's contribution to the COE was read aloud and is hereby entered into the EC minutes.

8.   Adjournment: The meeting adjourned at 2:30 pm.

The minutes have not yet been approved.
Respectfully submitted,

Brent J. Heuser

Brent J. Heuser, Secretary

cc: Samuel Kamin
        Jean Hanks
        Michael Pleck