



March 28, 2011

Thomas Lester
Dean, College of Engineering
Ralph G. Anderson Building
University of Kentucky

College of Engineering
Department of Electrical and
Computer Engineering
101 Ralph G. Anderson Bldg.
Lexington, KY 40506-0010
606/257-3217
606/257-3218
606/257-3219

Dear Dean Lester,

Attached is a proposal for modifications to the EE101 freshman course for electrical and computer engineering students. The proposal has three main changes:

1. The course moves from a 1 credit to a 3 credit course
2. The course is restructured and is now intended to satisfy the University's General Education requirements under the "Inquiry into Creativity and the Arts" category.
3. The course will be renamed "Creativity and Design in Electrical and Computer Engineering"

The attached proposal also includes an application for recognition of the GenEd course "Inquiry into Creativity and the Arts" status. The GenEd template (<http://www.uky.edu/GenEd/templates.html>) for the "Inquiry into Creativity and the Arts" states the following:

"Creativity is pertinent to all disciplines. . . . The creative process and its products and results are the focus on this course; while they may be taught from the traditional fine arts perspectives, it is expected that courses will also be based on an exploration of the creative and aesthetic aspects of "rational", "scientific" or quantitative disciplines, e.g., the "elegance" of certain scientific/mathematical proofs or the beauty inherent in a well-articulated design. "

The new course structure is intended to specifically explore creativity in the context of engineering design and problem solving. Students will learn several ways to enhance their creativity in considering engineering problems. They then will have a variety of lab activities where they are required to practice these approaches as they create their own designs. More information about the course structure and the ways it addresses the GenEd template are in the attached application.

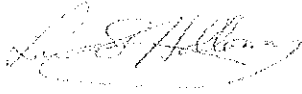
A trial version of this course was taught in a preliminary version in Fall 2010 as EGR199 section 8, "Creativity and Design in ECE". The initial response from students in this course was very positive, and retention in the course was higher than in the traditional version EE101 (also taught during Fall 2010). Based on the experience of this preliminary offering, the course has been further improved. It is now scheduled for three sections for Fall 2011 (currently listed as EE101-001, EE101-002, and EGR199-008, but we expect to change all to the same listing for consistency once the course is approved.)

We are excited about this course. We feel that the emphasis on creativity in problem solving and design will be a great benefit to our students, building a foundation for them for their other classes and their career.

see blue.

Please let me know if you have any questions, or if there is anything that we can do to assist in the review and approval process.

Sincerely,

A handwritten signature in cursive script, appearing to read "Larry Holloway".

Larry Holloway
Professor and Chair, Electrical and Computer Engineering
TVA Professor of Electrical Engineering

General Education Course Approval Cover Sheet

Date of Submission 3/16/2011

1. Check which area(s) this course applies to

- | | | | |
|----------------------------------|-------------------------------------|--|--------------------------|
| Inquiry - Arts & Creativity | <input checked="" type="checkbox"/> | Composition & Communications - II | <input type="checkbox"/> |
| Inquiry - Humanities | <input type="checkbox"/> | Quantitative Foundations | <input type="checkbox"/> |
| Inquiry - Nat/Math/Phys Sci | <input type="checkbox"/> | Statistical Inferential Reasoning | <input type="checkbox"/> |
| Inquiry - Social Sciences | <input type="checkbox"/> | U.S. Citizenship, Community, Diversity | <input type="checkbox"/> |
| Composition & Communications - I | <input type="checkbox"/> | Global Dynamics | <input type="checkbox"/> |

2. Provide Course and Department Information

Department: Electrical & Computer Engineering

Course Prefix and Number: EE 101 Credit hours: 3

Course Title: Creativity and Design in Electrical and Computer Engineering

Expected # of Students per Calendar Yr: 160 Course Required for Majors in your Program (check one)? Yes No

Prerequisite(s) for Course? none

This request is for (check one) A New Course An Existing Course

Departmental Contact Information

Name: Robert J. Adams Email: rjadams@uky.edu

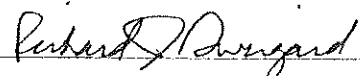
Office Address: 685 FPAT Phone: 257-1775

3. In addition to this form, the following must be submitted for consideration:

- A syllabus that conforms to the Senate Syllabi Guidelines, including a mapping of the stated learning outcomes to those presented on the corresponding Course Template.
- A completed Course Review Form. See the Gen Ed website <http://www.uky.edu/gened/forms.html> for these forms. Proposals prepared prior to September 15th, 2010 are allowed to use a narrative instead of the Course Review Form.
- If applicable, a major course change form for revision of an existing course, or a new course form for a new course.

4. Signatures

Department Chair: Lawrence Holloway Do not sign until you have received approval from the Dean's Office. If you are submitting a proposal for a new course, you must also submit a proposal for a new course to the Dean's Office. Do not sign until you have received approval from the Dean's Office. Date: 3-29-2011

Dean:  Date: 5/2/11

All proposals are to be submitted from the College Dean's Office
Submission is by way of the General Education website <http://www.uky.edu/gened>

**Course Review Form
Intellectual Inquiry in Arts & Creativity**

Reviewer Recommendation

Accept Revisions Needed

Course: EE 101

Using the course syllabus as reference, identify when and how the following learning outcomes are addressed in the course. Since learning outcomes will likely be addressed multiple ways within the same syllabus, please identify a representative example (or examples) for each outcome.

An artifact (e.g. an object, product, installation, presentation, record of a performance etc.) that demonstrates personal engagement with the creative process either as an individual or as part of a collaborative.

Example(s) from syllabus:

The proposed 3 credit course includes 1.5 hours/wk of laboratory time. The laboratory portion of the course is further divided into four modules drawn from different areas of ECE:

1. AM Radio
2. Embedded Computing
3. Signal Processing
4. Student Creation

Each of these modules will provide significant opportunity for students to create novel artifacts with varying degrees of constraints.

Brief Description:

Each of the first three laboratory modules provides significant opportunity for students working in teams (3-4 students/team) to creatively solve a design challenge within a given set of constraints. For example, in the AM Radio module, students will build a simple AM Radio receiver, which will include an audio speaker. The design of the speaker provides abundant opportunity for students to work creatively. For example, students can choose a simple, single (mono) standalone speaker design made from a wide variety of materials (cups, cans, CDs, playing cards, etc.). Alternatively, students could choose to build an earphone style speaker. The only constraint will be that the resulting artifact produce audible signals.

The final laboratory module (Student Creation) will require students to propose and complete a project of their own choosing. Student groups will be asked to refine and/or expand on one of the projects done earlier in the semester. The primary constraint will be that (1) the groups' proposal should begin from a critical assessment of their previous laboratory projects, and (2) the proposed final project should be feasible given available resources.

Evidence that students utilize readings, lectures, presentations or other resources to define and distinguish approaches (historical, theoretical, and methodological issues) to "creativity" as appropriate to the disciplinary practices specific to the subject, medium, or approach of this course.

Example(s) from syllabus:

Different approaches to creativity will be discussed in Lecture during Weeks 3 to 8 (see syllabu). Students will have an opportunity to discuss this material in class during their case study presentations (Weeks 10-12).

Brief Description:

Students will be required to submit homework assignments (written and oral reports) detailing a specific case study in creativity (during Weeks 10-12). As part of their homework, students will be asked to discuss the type of creativity encountered (case studies will require instructor approval).

The processes and assignments where students apply the logic, laws, and/or constraints of the area of study, (e.g, "out of the box" thinking or application of given rules or forms).

Example(s) from syllabus:

Each of the first three laboratory modules will provide students with a set of constraints (e.g., build a working AM Radio, create an embedded computing device using an Arduino® microcontroller, develop a novel audio or image filter using MATLAB®).

Brief Description:

Each of these laboratory projects will provide important constraints on how certain aspects of the final artifact/design will function. However, each project also provides significant latitude for creative, out-of-the-box expression. For example, students will be taught the basics of how the Arduino microcontroller works. They will then be asked to come up with and implement their own embedded computing application using this microcontroller.

At the end of each laboratory module, students will present their project (artifact) to the class, and the grade for each module will be determined by instructor and peer review, each of which will include an evaluation of the project's creativity.

Assignments or exercises that require students to demonstrate the ability to critically analyze work produced by other students in this course and in co-curricular events using appropriate tools.

Example(s) from syllabus:

Laboratory modules; Homework to attend ECE Senior Design Day.

Brief Description:

At the end of each laboratory module, student teams are required to present the results of their project to the rest of the laboratory section. The other students in the section are asked to evaluate both the presenting groups' artifact and the quality of the presentation.

Students will also be given a homework assignment requiring that they attend the ECE Senior Design Day, pick one of the student projects, talk with that team, and write a report analyzing the different types of creative content expressed in the project.

The process whereby students evaluate the process and results of their own creative endeavors and, using that evaluation, reassess and refine their work.

Example(s) from syllabus:

The final laboratory module, Student Creation, will ask that students improve and expand on one or more of their previous efforts in the course.

Brief Description:

The final laboratory module will ask that students improve and expand on one or more of their previous laboratory efforts. Although requiring instructor approval, the direction for this final project will largely be up to the student groups. For example, groups might want to more deeply explore one of the previous modules, combine elements of multiple prior modules, or bring in techniques/ideas from other areas to combine with some of their previous laboratory work.

Describe how students demonstrate the use of information literacy resources:

Students will have a homework assignment requiring them to submit written and oral reports detailing a specific case study in creativity. As part of their written reports, students will be required to include five references related to their case study. These references must include at least one of each of the following types: A peer-reviewed journal article, an issued patent, and an article from the popular press.

Information literacy is discussed in lecture during Week 9.

Reviewer's Comments:

COURSE CHANGE FORM

Complete 1a – 1f & 2a – 2c. Fill out the remainder of the form as applicable for items being changed.

1. General Information.						
a.	Submitted by the College of: <u>Engineering</u>	Today's Date: <u>3-17-2011</u>				
b.	Department/Division: <u>Electrical & Computer Engineering</u>					
c.	Is there a change in "ownership" of the course?				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
	If YES, what college/department will offer the course instead? _____					
d.	What type of change is being proposed? <input checked="" type="checkbox"/> Major <input type="checkbox"/> Minor ¹ (place cursor here for minor change definition)					
e.	Contact Person Name: <u>Robert J. Adams</u>	Email: <u>rjadams@uky.edu</u>	Phone: <u>257-1775</u>			
f.	Requested Effective Date: <input checked="" type="checkbox"/> Semester Following Approval OR <input type="checkbox"/> Specific Term ² : _____					
2. Designation and Description of Proposed Course.						
a.	Current Prefix and Number: <u>EE 101</u>	Proposed Prefix & Number: <u>EE 101</u>				
b.	Full Title: <u>Electrical Engineering Professions Seminar</u>	Proposed Title: <u>Creativity and Design in Electrical and Computer Engineering</u>				
c.	Current Transcript Title (if full title is more than 40 characters): <u>EE Professions Seminar</u>					
c.	Proposed Transcript Title (if full title is more than 40 characters): <u>Creativity and Design in ECE</u>					
d.	Current Cross-listing: <input checked="" type="checkbox"/> N/A	OR	Currently ³ Cross-listed with (Prefix & Number): _____			
	Proposed – <input type="checkbox"/> ADD ³ Cross-listing (Prefix & Number): _____					
	Proposed – <input type="checkbox"/> REMOVE ^{3,4} Cross-listing (Prefix & Number): _____					
e.	Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours⁵ for each meeting pattern type.					
Current:	<u>1</u> Lecture	_____ Laboratory ⁵	_____ Recitation	_____ Discussion	_____ Indep. Study	
	_____ Clinical	_____ Colloquium	_____ Practicum	_____ Research	_____ Residency	
	_____ Seminar	_____ Studio	_____ Other – Please explain: _____			
Proposed:	<u>1.5</u> Lecture	<u>1.5</u> Laboratory	_____ Recitation	_____ Discussion	_____ Indep. Study	
	_____ Clinical	_____ Colloquium	_____ Practicum	_____ Research	_____ Residency	
	_____ Seminar	_____ Studio	_____ Other – Please explain: _____			
f.	Current Grading System: <input type="checkbox"/> Letter (A, B, C, etc.)		<input checked="" type="checkbox"/> Pass/Fail			
	Proposed Grading System: <input checked="" type="checkbox"/> Letter (A, B, C, etc.)		<input type="checkbox"/> Pass/Fail			
g.	Current number of credit hours: <u>1</u>		Proposed number of credit hours: <u>3</u>			

¹ See comment description regarding minor course change. *Minor changes are sent directly from dean's office to Senate Council Chair.* If Chair deems the change as "not minor," the form will be sent to appropriate academic Council for normal processing and contact person is informed.

² Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.

³ Signature of the chair of the cross-listing department is required on the Signature Routing Log.

⁴ Removing a cross-listing does not drop the other course – it merely unlinks the two courses.

⁵ Generally, undergrad courses are developed such that one semester hr of credit represents 1 hr of classroom meeting per wk for a semester, exclusive of any lab meeting. Lab meeting generally represents at least two hrs per wk for a semester for 1 credit hour. (See SR 5.2.1.)

COURSE CHANGE FORM

h. Currently, is this course repeatable for additional credit? YES NO

Proposed to be repeatable for additional credit? YES NO

If YES: Maximum number of credit hours: _____

If YES: Will this course allow multiple registrations during the same semester? YES NO

i. Current Course Description for Bulletin: Introductory seminar on professional practice, growth, conduct and ethics. Presentations on computers in electrical engineering and the University computer system. Presentations from career engineers and professional societies and reading assignments in professional journals.

Proposed Course Description for Bulletin: This course provides an introduction to the process and application of creative design and problem solving within science and engineering. Emphasis is placed on applications and case studies in the areas of electrical and computer engineering. Several laboratory-based engineering problems are used to provide practical settings in which to apply and evaluate constraint- and product-focused strategies for creative design and problem solving. In addition to technical and aesthetic considerations, ethical and cultural influences on the creative process will also be discussed.

j. Current Prerequisites, if any: none

Proposed Prerequisites, if any: none

k. Current Distance Learning (DL) Status: N/A Already approved for DL* Please Add⁶ Please Drop

*If already approved for DL, the Distance Learning Form must also be submitted unless the department affirms (by checking this box) that the proposed changes do not affect DL delivery.

l. Current Supplementary Teaching Component, if any: Community-Based Experience Service Learning Both

Proposed Supplementary Teaching Component: Community-Based Experience Service Learning Both

3. Currently, is this course taught off campus? YES NO

Proposed to be taught off campus? YES NO

4. Are significant changes in content/teaching objectives of the course being proposed? YES NO

If YES, explain and offer brief rationale:

Please see associated cover letter. This course change is being proposed as part of an effort to significantly enrich the education of our students in their first year of the ECE curriculum. The proposed change to EE101 has been organized to also satisfy the GenEd requirement in Intellectual Inquiry in Arts & Creativity.

5. Course Relationship to Program(s).

a. Are there other depts and/or pgms that could be affected by the proposed change? YES NO

If YES, identify the depts. and/or pgms: _____

b. Will modifying this course result in a new requirement⁷ for ANY program? YES NO

If YES⁷, list the program(s) here: _____

⁶ You must also submit the Distance Learning Form in order for the course to be considered for DL delivery.

⁷ In order to change a program, a program change form must also be submitted.

COURSE CHANGE FORM

6. Information to be Placed on Syllabus.

- a. Check box if
changed to
400G or 500.

If changed to 400G- or 500-level course you must send in a syllabus and *you must include the differentiation* between undergraduate and graduate students by: (i) requiring additional assignments by the graduate students; and/or (ii) establishing different grading criteria in the course for graduate students. (See *SR 3.1.4.*)

SIGNATURE ROUTING LOG

General Information:

Proposal Type: Course . Program Other
 Proposal Name¹ (course prefix & number, pgm major & degree, etc.): EE 101
 Proposal Contact Person Name: Robert J. Adams Phone: 7-1775 Email: rjadams@uky.edu

INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
ECE Faculty	3-24-2011	Holloway, 257-8042, holloway@engr.uky.edu	Lawrence Holloway
<i>engineering faculty</i>	<i>5/2/11</i>	<i>Richard Sweigard / 188271 / newswig@engr.uky.edu</i>	<i>Richard Sweigard</i>
		/ /	
		/ /	
		/ /	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision ²
Undergraduate Council	9/20/2011	Sharon Gill	
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

¹ Proposal name used here must match name entered on corresponding course or program form.
² Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

EE 101: Creativity and Design in Electrical & Comp. Eng. (Syllabus for proposed GenEd course)

Faculty Coordinator: Dr. Robert .J. Adams

Office: 685 FPAT

Office Hours: MWF 10–11, 2–3

Phone: 257-1775

Email: rjadams@uky.edu

Meeting Times: Tues (lecture), Thurs (lab)

Location: TBD

Lab Instructor: TBD

Web page: <http://www.engr.uky.edu/~rjadams/EE101>

Course Summary

This course provides an introduction to the process and application of creative design and problem solving within science and engineering. Emphasis is placed on applications and case studies in the areas of electrical and computer engineering. Several laboratory-based engineering problems are used to provide practical settings in which to apply and evaluate constraint- and product-focused strategies for creative design and problem solving. In addition to technical and aesthetic considerations, ethical and cultural influences on the creative process will also be discussed.

Textbook

- The primary source for this course will be notes provided by the faculty coordinator and lab instructor. Electronic copies of all notes will be available on the course web page.
- Supplementary texts that students may wish to consider (some of the course notes draw from these sources):
 - Jacques Hadamard, The Psychology of Invention in the Mathematical Field, Princeton University Press, 1945. Reprinted by Dover Press.
 - Robert J. Sternberg and Todd I. Lubart, Defying the Crowd: Cultivating Creativity in a Culture of Conformity, The Free Press, 1995.
 - Mihaly Csikszentmihalyi, Creativity: Flow and the Psychology of Discovery and Invention, Harper Perennial, 1997.
 - James L. Adams, Conceptual Blockbusting: A Guide to Better Ideas, Basic Books, 2001.
 - <http://en.wikipedia.org/wiki/Creativity>

Office Hours

Students are encouraged to stop by my office or e-mail when questions arise. In addition to my regular office hours listed above, students are welcome to stop by at other times of the day. If you plan to visit outside my scheduled office hours, it might be a good idea to call ahead to make sure I am available when you arrive. You can also contact the TA for help (the TA's contact info will be provided during the second week of class).

Web Address

The web page for this course is <http://www.engr.uky.edu/~rjadams/EE101>. Students are responsible for all material posted to the course web page, so check it regularly.

Learning Outcomes

The course is designed to be an introductory seminar on professional practice, growth, conduct, and ethics. Presentations on campus resources, computer usage and applications, career options, and professional societies are incorporated into the course.

Upon completion of the course, students will have demonstrated the ability to:

1. Define and distinguish different approaches to creativity and creative inquiry.
2. Investigate the significance and impact of creatively working within a set of externally imposed constraints (i.e., out-of-the-box thinking), both from an historical and working perspective.
3. Evaluate and incorporate ethical, professional, and cultural issues in the creative process.
4. Critically analyze the creative work of others using appropriate tools and criteria.
5. Evaluate results of their own creative endeavors and, using that evaluation, reassess and refine their work
6. Work and communicate collaboratively in peer groups.

Grading Policies:

This course uses a standard grading option (>90% is an A, 80-90% is a B, 70-80 is a C, 60-70% is a D, and below 60% is an E). Course grades will be determined from student performance on in-class assignments, homework, laboratory work, and a final exam. The relative weight of each component to a student's course grade will be:

1. Homework and in-class assignments: 40%
2. Final Exam: 20%
3. Laboratory work: 40%

Related course policies:

- Some in-class assignments will be unannounced.
- Homework assignments are due at the beginning of the indicated class period.
- No late assignments will be accepted for grading unless the student has an excused absence, defined below.
- Students will be expected to present some of their work orally, both individually and within a group.
- The instructor will submit midterm grades based on the course material completed to date, and the grading scale indicated above will be applied. The instructor will remind the students of how their grades were computed at the midterm date.

Exam Makeup Policy

If a student misses an exam and has a legitimate excuse, the student must contact the instructor within one week of the date of the missed exam in order to schedule a makeup exam. Legitimate excuses in this case include a serious illness or the death of a family member. In the case of other, foreseeable absences, the student must contact the instructor at least one week prior to the scheduled exam date.

Attendance

Students are expected to be on time and to attend every lecture class.

- Homework assignments will be distributed in the classroom and on the course website.
- If a student must miss class, the student is still responsible for any assignments made during class.
- Assignments are due at the beginning of a class period.
- In-class assignments cannot be made-up unless a student has an excused absence.

The following are acceptable reasons for excused absences:

1. Serious illness,
2. Illness or death of a family member
3. University-related trips
4. Major religious holiday

If a student must be absent for one of these reasons, the student should notify the instructor as soon as possible, but no later than the second absence. Appropriate documentation regarding the nature of the absence will be required. Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences. See <http://www.uky.edu/StudentAffairs/Code/> for additional information.

Classroom Behavior, Decorum and Civility

Students and faculty are expected to treat everyone present in the classroom with respect and civility.

- Disparate treatment will not be tolerated.
- Disparate treatment occurs when one or more persons treat an individual less favorably on the basis of their actual or perceived race, sex, age, color, national origin, religion, disability, veteran status, and/or sexual orientation.
- All interactions should be characterized by respect for, and consideration of, others present in the classroom.

Cheating and Plagiarism

Cheating: claiming another individual's work as your own or permitting another person to claim your work.

Plagiarism: claiming another person's work, writing, or ideas as your own. This includes material from the internet or other digital sources.

Students are encouraged to discuss the material in this course, including homework problems, with other students. But you cannot simply copy another student's homework and hand it in.

- Working together is important, and it is encouraged.
- Copying, however, is cheating and both the student who copies and the student who provides the solution will be punished.
- Students are encouraged to review the University Senate rules in regard to penalties for academic offenses, which became effective with the Fall 2006 semester.

Classroom and Learning Accommodations

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, jkarnes@uky.edu) for coordination of campus disability services available to students with disabilities.

Course Content

The following table provides an approximate schedule for the material to be covered in this class. Lecture meets on Tuesday of each week, and lab meetings are on Thursdays. Some of the lab meetings will be held in on-campus computer labs. Students will be notified of the location and dates for these meetings both in lecture and on the course web page.

Week	Lecture (date/topic)	Lab modules
1 (8/24 – 8/26)	No lecture	AM radio
2 (8/29 – 9/2)	Intro to ECE	AM radio
3 (9/5 – 9/9)	Intro to creativity in science and eng.	AM radio
4 (9/12 – 9/16)	The creative process I	AM radio*
5 (9/19 – 9/23)	The creative process II	Signal processing
6 (9/26 – 9/30)	The creative process III	Signal processing
7 (10/3 – 10/7)	Case studies in creativity I	Signal processing*
8 (10/10 – 10/14)	Case studies in creativity II	Embedded computing
9 (10/17 – 10/21)	Information literacy	Embedded computing
10 (10/24 – 10/28)	Case studies - Student presentations I (written and oral reports due)	Embedded computing
11 (10/31 – 11/4)	Case studies - Student presentations II (written and oral reports due)	Embedded computing*
12 (11/7 – 11/11)	Case studies - Student presentations III (written and oral reports due)	Student creations
13 (11/14 – 11/18)	Ethical and cultural considerations	Student creations
14 (11/21 – 11/25)	In-class creative process exercises I	No lab (Thanksgiving)
15 (11/28 – 12/2)	In-class creative process exercises II	Student creations
16 (12/5 – 12/9)	Comprehensive review (creative analysis homework due)	Student presentations*
17 (12/12 – 12/16)	Final Exam on 12/13 at 10:30 am – No Lab	

* In-lab group presentations and reports are due for the indicated modules on these dates.