APPLICATION FOR NEW COURSE

1. Submitted by the College of Engineering Date: 10/9/08

   Department/Division proposing course: Electrical & Computer Engineering

2. Proposed designation and Bulletin description of this course:

   a. Prefix and Number EE 491

   b. Title* Electrical Engineering Capstone Design II

   *If title is longer than 24 characters, offer a sensible title of 24 characters or less: EE Capstone Design II

   c. Courses must be described by at least one of the categories below. Include number of actual contact hours per week..

   (___) CLINICAL (___) COLLOQUIUM (___) DISCUSSION (4) LABORATORY (1) LECTURE

   (___) INDEPEND. STUDY (___) PRACTICUM (___) RECITATION (___) RESEARCH (___) RESIDENCY

   (___) SEMINAR (___) STUDIO (___) OTHER – Please explain: _____

   d. Please choose a grading system: ☐ Letter (A, B, C, etc.) ☐ Pass/Fail

   e. Number of credit hours: 3

   f. Is this course repeatable? YES ☐ NO ☐ If YES, maximum number of credit hours: _____

   g. Course description:

   The second semester of a two-semester design sequence for senior students in electrical engineering with an emphasis on the engineering processes. Students to work in teams to develop and complete the designs. Topics to include engineering ethics, design, documentation, and communication.

   h. Prerequisite(s), if any:

   EE 490 completed in the previous semester and Engineering standing.

   i. Will this course also be offered through Distance Learning? YES ☐ NO ☐

   If YES, please check one of the methods below that reflects how the majority of the course content will be delivered:

   Internet/Web-based ☐ Interactive video ☐ Extended campus ☐

3. Supplementary teaching component: ☐ N/A or ☐ Community-Based Experience ☐ Service Learning ☐ Both

4. To be cross-listed as: _____ (Prefix and Number) _____ / _____ (printed name / Cross-listing Department Chair signature)

5. Requested effective date (term/year): Spring / 2010

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6. Course to be offered (please check all that apply): ☐ Fall ☑ Spring ☐ Summer

7. Will the course be offered every year? ☑ YES ☐ NO

   If NO, please explain: _____

8. Why is this course needed?

   Trend in other ECE departments to have 2 semester capstone design sequences.
   Will improve students' design experience.

9. a. By whom will the course be taught? Dr. R. Hannemann

   b. Are facilities for teaching the course now available? ☑ YES ☐ NO

   If NO, what plans have been made for providing them?

   _____

10. What yearly enrollment may be reasonably anticipated?

    40-50

11. a. Will this course serve students primarily within the department? ☑ Yes ☐ No

    b. Will it be of interest to a significant number of students outside the department? ☐ YES ☑ NO

    If YES, please explain.

12. Will the course serve as a University Studies Program course†? ☐ YES ☑ NO

    If YES, under what Area? _____

    †AS OF SPRING 2007, THERE IS A MORTORIUM ON APPROVAL OF NEW COURSES FOR USP.

13. Check the category most applicable to this course:

    ☐ traditional – offered in corresponding departments at universities elsewhere

    ☑ relatively new – now being widely established

    ☐ not yet to be found in many (or any) other universities

14. Is this course applicable to the requirements for at least one degree or certificate at UK? ☑ Yes ☐ No

15. Is this course part of a proposed new program? ☐ YES ☑ NO

    If YES, please name: _____

16. Will adding this course change the degree requirements for ANY program on campus? ☑ YES ☐ NO

    If YES‡, list below the programs that will require this course:

    1 semester course and technical elective will be replaced by 2 semester design sequence.

    ‡In order to change the program(s), a program change form(s) must also be submitted.

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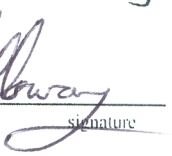
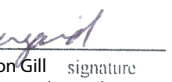
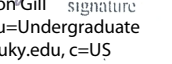
17. ☑ The major teaching objectives of the proposed course, syllabus and/or reference list to be used are attached.

18. ☐ Check box if course is 400G or 500. If the course is 400G- or 500-level, *you must include a syllabus showing differentiation* for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See *SR 3.1.4)*

19. Within the department, who should be contacted for further information about the proposed new course?

Name: Regina Hannemann Phone: 257-5156 Email: r.hannemann@ieee.org

20. Signatures to report approvals:

1/10/2009 DATE of Approval by Department Faculty	Lawrence Holloway,  printed name	Reported by Department Chair signature
3-11-09 DATE of Approval by College Faculty	RICHARD J. SWEIGARD /  printed name	Reported by College Dean signature
4/07/2009 * DATE of Approval by Undergraduate Council	Sharon Gill /  printed name	Reported by Undergraduate Council Chair signature
* DATE of Approval by Graduate Council	/  printed name	Reported by Graduate Council Chair signature
* DATE of Approval by Health Care Colleges Council (HCCC)	/  printed name	Reported by Health Care Colleges Council Chair signature
* DATE of Approval by Senate Council		Reported by Office of the Senate Council
* DATE of Approval by University Senate		Reported by Office of the Senate Council

Digitally signed by Sharon Gill
DN: cn=Sharon Gill, o, ou=Undergraduate Education, email=sgill@uky.edu, c=US
Date: 2009.04.13 08:33:19 -04'00'

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

EE491 – Spring 2010
Electrical Engineering Capstone Design II
Syllabus

Instructor

Dr.-Ing. Regina Hannemann
Office: 467C F. Paul Anderson Tower
Phone: 257-5156
E-Mail: r.hannemann@ieee.org
Office Hours:
TBA
or by appointment

Text

David Beer & David McMurrey, *A Guide to Writing as an Engineer*, 2nd Edition, Wiley, 2005 (ISBN: 0-471-43074-9)

Lectures

TBD

Course Description

The second semester of a two–semester capstone design sequence for senior students in electrical engineering with an emphasis on the engineering design processes. Students work in teams to develop and complete the designs. Topics include engineering ethics, design, documentation, and communication. Lecture, one hour, laboratory, four hours per week. Prereq: EE491 completed in the previous semester and Engineering standing.

Topics

Professional Ethics
Documentation
Prototyping
Technical Communication

Learning Outcomes

The students will be able to:

1. Demonstrate good engineering judgment in the design process
2. Test/Verify design against specifications
3. Identify and describe aspects of environment, safety, quality, cost, and contemporary issues in design.
4. Articulate principles of engineering ethics.
5. Write relevant and clear documentation associated with an engineering project suited for the designated reader (engineering colleagues, end user, etc.)
6. Solve openended engineering problems, such as those where information is under specified or overspecified, and where methodologies are not specified.
7. Use project management tools to document progress on design activities.

Class Content and Objective:

The content of "Senior Design" has two aspects (1) Engineering Design Theory and (2) Design Experience. A lecture series, coupled with sub-tasks and class discussion, covering Design Theory will be provided twice a week for most of the semester. The theory will detail the individual processes involved in going from a "problem to be solved" to a final "Solution." Examples will be given and the design theory will be relevant to the project tasks. Another aspect of the design theory will cover group dynamics, which include brainstorming and mind mapping techniques. The Design Experience will be the goal of the students to implement their ideas into an operational system. System performance and its impact on society will also be part of the student's experience.

Students enrolled in EE 490 will be grouped in teams of 3-4 students each. Each team will submit a design proposal to the coordinator and will execute the design project after the proposal has been evaluated and accepted by the faculty coordinator in consultation with a faculty advisor and a team of Industrial Advisors.

Group Responsibilities: The class will be subdivided teams. Each group will submit a proposal for approval. The groups will define the test protocol that their projects will be tested with. The groups will define performance measures on which the projects will be graded. Each group will submit a design review report and present the status of the project at midterm. Each group will submit a final report and present the project. Individual members will be graded on their contribution, meeting their deadlines and individual subtasks. The group size must be 3 to 4 members.

Individual Responsibilities: Each individual is responsible for designing, building and debugging their component of the project and for preparing a section of the group's reports. Projects will be graded on creativity, innovation, quality of construction and performance.

Presentation: Each student will present, test and demonstrate their contribution to the design. As part of the subtasks, they will also present and demonstrate the design at an

organized competition or conference. For example, most designs will be entered into the ECE Senior Design Day competition which is held the Friday before Finals Week, every semester.

Design Journal or Lab Notebook*

A design journal is the "diary" of intellectual contributions to your project. The purpose of the Journal is to follow the required practices of industrial or academic research and development laboratories, where complete and accurate records of laboratory work are vital. The lab journal is a legally recognized paper that is essential in documenting project progress, discoveries, billable work time, and patent disclosures. Some companies require lab notebooks to be officially notarized and filed so that any legal questions later on can refer directly to the original, unaltered notebook entries. Even if you end up working for a company that does not require a notebook or journal, it is worth getting in the habit as a way to document your own work and to organize your development activities.

Required form: The pages of the Journal must be bound (not loose leaf or spiral) and should be numbered consecutively. The notebook entries must be in ink, and no pages should be left blank between entries. Begin the entries for each work day on a new page, giving the date and time, your name, the topic, and in the case of a meeting, the names of all of the people present. The entries themselves can be full of written comments, calculations, sketches, data tables, speculative ideas, brainstorms, design alternatives, contact information (email, phone, URLs, etc.), references to electronic files, schematic diagrams, and so forth.

In case some of the data or calculations written in the Journal turn out to be in error, do not tear out the page or completely obliterate the entries: a single line through the error is preferred. This way there is no question regarding the legitimacy and completeness of the notebook material. Furthermore, you will not be penalized in this course for having lined-out errors and corrections in your notebook.

Each student's Journal will be collected two times during the semester. There might be unannounced checks of the notebook throughout the semester. The Journals will be evaluated on the following criteria:

- *Overall Form:* Notebook bound, pages numbered, entries in ink, no blank pages between entries, entries for a new date start on a new page; writing legible; dates, times, topics, and names indicated clearly.
- *Thoroughness:* Cogent sequence of activities and meetings; presence of design ideas, data collection, data analysis, and schedule planning; examples of design results and conclusions.
- *Creativity and Insight:* Journal entries show a connection between initial ideas, preliminary activities and the resulting design and implementation decisions.

Self/Peer Reviews*

Personnel reviews are a part of project management responsibilities. You will be having regular reviews with your boss and will need to provide reviews of those you supervise. This is often a difficult — but necessary — thing to do. To give you some practice we are asking you to complete an evaluation form for yourself and your project partners. The letter grades you give to yourself and your project partners will be confidential and used solely by the course instructor. There will be two evaluations performed: one at midterm and one at the end of the semester.

Individual "Time Budgets"

All students will set up a planned time budget for the semester. That means they will estimate how much time it will take them and how much time each of them will spend on a weekly basis on the Senior Design Project. The planned time budget for each student is part of the proposal.

All students are required to keep track of how much time they spend on the different tasks for the project. At midterm and at the end of the semester each student will hand in a comparison of the planned time versa the actual spent time with a short explanation of any differences and (at midterm) how the student wants to make up for any negative balance.

Homework

The class advisor will assign homework throughout the semester. The homework will check on students comprehension of the lectures.

Report Format

The format of the reports and proposals will be discussed in class. The final form will be an amendment to this syllabus and handed out to the students in class and will be published on the class' webpage.

Attendance

Attendance of all class lectures is highly recommended to assure maximum course performance. You are responsible for all business conducted during the class period.

For all presentations attendance is required. Failing to attend a presentation will result in a reduced attendance grade for the student.

If we have external speakers invited for external presentations, attendance is also required. I will inform you in time on any invited speakers.

Any other meeting with attendance required will also be announced.

Grade

	Team grade	Individual grade
Design Review: Presentation (oral)		6%
Design Review: Executive Summary (written) + Timeline	6%	
Self/Peer Evaluation		10%
Design Journal		6%
Design Review: Executive summary (written) + Timeline	8%	
Design Review: Presentation (oral)		10%
Capstone Design Report (Final Report, written)	15%	
Final Presentation (oral)		10%
Final Demonstration	15%	
Attendance		5%
Individual Time Budget		2%
Homework		5%
Total	Team 44%	Individual 54%

The final letter grade will be:

A: 90%–100%

B: 80%–89%

C: 70%–79%

D: 60%–69%

E: 59% or below

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 media.*

Cheating and plagiarism will not be tolerated at this university. Please check out the new (effective since Fall 2006) Academic Offenses Policy at
`http://www.chem.uky.edu/research/grossman/acadoffenses/index.htm` .

Classroom and Learning Accomodations

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 in this course, 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.

Announcements

Announcements such as homework assignments, required attendance, class cancellations, etc. will be made in class and via the class mailing list. You are encouraged to use the list as a discussion forum for the class topics. The class website provides additional information. Check regularly for updates.

* Ideas and text from: http://www.coe.montana.edu/ee/rmaher/EE492/syllabus.htm