UNIVERSITY OF KENTUCKY
APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR

1. Submitted by College of Engineering Date 9-1-06

   Department/Division offering course Electrical and Computer Engineering

2. Changes proposed:
   (a) Present prefix & number EE421G Proposed prefix & number No change

   (b) Present Title Signals and Systems I

   New Title Signals and Systems

   (c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts:
   Signals and Systems

   (d) Present credits: 3 Proposed credits: No change

   (e) Current lecture: laboratory ratio 3:0 Proposed: No change

   (f) Effective Date of Change: (Semester & Year) 2007 Fall

3. To be Cross-listed as: _____ _____
   Prefix and Number Signature: Department Chair

4. Proposed change in Bulletin description:
   (a) Present description (including prerequisite(s):
   An introduction to the modeling and analysis of signals and systems. Topics include convolution, Fourier series, Fourier transform bandwidth, basic filter design, modulation techniques, random variables and random processes and spectral density

   (b) New description:
   An introduction to continuous and discrete signal and system models and analyses. Topics include discrete and continuous convolution, Fourier series, Fourier transforms, and Laplace transforms and Z-transforms with application examples including AM modulation and the sampling theorem

   (c) Prerequisite(s) for course as changed: MA 214 and a "C" or better in EE 221 Coreq: MA320

5. What has prompted this proposal?
   A significant portion of the random variable and probability content, required by our accreditation agency, is now obtained through the required MA320 course. Therefore, more systems content can be moved into this course and basic probability theory moved out.

6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:
   Inclusion of discrete signal analysis, z-transform, and applications of the Laplace transform. Exclusion of basic probability theory.

7. What other departments could be affected by the proposed change? None. This course is almost exclusively electrical engineering students.

8. Is this course applicable to the requirements for at least one degree or certificate at the University of Kentucky? X Yes ☐ No

9. Will changing this course change the degree requirements in one or more programs? ☐ Yes X No
   If yes, please attach an explanation of the change. (NOTE – If "yes," program change form must also be submitted.)

10. Is this course currently included in the University Studies Program? ☐ Yes X No
    If yes, please attach correspondence indicating concurrence of the University Studies Committee.

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11. If the course is 400G or 500 level, include syllabi or course statement showing differentiation for undergraduate and graduate students in assignments, grading criteria, and grading scales. X Check here if 400G-500.

12. Is this a minor change? ☐ Yes X No
(NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)

13. Within the Department, who should be consulted for further information on the proposed course change?

Name: Kevin D. Donohue Phone Extension: 7-4004

Signatures of Approval:

4/28/2006 10 in favor 0 against Date of Approval by Department Faculty	V. Cij Reported by Department Chair
Date of Approval by College Faculty	Reported by College Dean
*Date of Approval by Undergraduate Council	Reported by Undergraduate Council Chair
Jeannine Blackwell Digitally signed by Jeannine Blackwell DN: cn=Jeannine Blackwell, c=US, o=University of Kentucky, ou=Graduate School, email=jeannine.blackwell@uky.edu Date: 2007.04.02 14:25:12 -04'00' *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.

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The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:

a. change in number within the same hundred series;
b. editorial change in description which does not imply change in content or emphasis;
c. editorial change in title which does not imply change in content or emphasis;
d. change in prerequisite which does not imply change in content or emphasis;
e. cross-listing of courses under conditions set forth in item 3.0;
f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

EE 421G: Signals & Systems (Sample Syllabus)

Instructor: Dr. Robert .J. Adams
Office: 685 FPAT
Office Hours: MTWRF 3:30–5 pm
Phone: 257-1775
Email: rjadams@uky.edu

Prereq: MA 214 and a "C" or better in EE 221 Coreq: MA320
Web Page: http://www.engr.uky.edu/~rjadams/EE421

Texts:

1. ECE 421G Course Notes
2. R.E. Ziemer, W. H. Tranter and D.R. Fannin, Signals and Systems: Continuous and Discrete, 4th Edition. Prentice Hall, 1998. (ISBN 013496456X)

Course Summary

EE 421, Signals & Systems provides an introduction to essential modeling and analysis tools used by practicing engineers. The concepts covered include discrete and continuous LTI systems, convolution, Fourier series and transforms, Laplace transforms, Z-Transforms, modulation, and bandwidth concepts. This is a large number of topics to cover in a single semester. Because of this, we will move fairly quickly from one topic to another, with enough time to work only a few examples on each topic in class. Additional examples are provided through the regular homework assignments. In order to do well in this course, it is essential that a student diligently complete and ***understand*** each homework assignment.

Prerequisites

MA 214 and a "C" or better in EE 221 (Coreq: MA320). Students taking EE 421 must be able to: differentiate and integrate sums and products of polynomials, sinusoids, and natural exponentials; solve linear, constant-coefficient ODEs; perform arithmetic operations with complex numbers, and have some familiarity with random distributions to understand examples of noise signals.

Grading Policies:

Course grades will be determined from student performance on homework, in-class quizzes, and exams. The relative weight of each component to a student's course grade will be:

1. Quizzes: 8 %
2. Homework: 7 %
3. Exam 1: 20 %
4. Exam 2: 20 %
5. Exam 3: 20 %
6. Comprehensive Final: 25 %

Undergraduate Students: Grades will be assigned using a10-point scale (A: 90+% of total points assigned, B: 80+%, C: 70+%, D: 60+%, E: Less than 60%.

Graduate Students: Grades will be assigned using a10-point scale (A: 90+% of total points assigned, B: 80+%, C: 70+%, E: Less than 70%.

- **Graduate students will be given additional assignments and exam questions throughout the semester. The additional work will generally be more advanced than the material covered in class.**
- Missed exams will result in a score of zero. Make-up exams will be allowed only if a student has received permission from the instructor prior to an exam date.
- Quizzes may be given at the beginning or at the end of a class period. Some of the quizzes may be unannounced. Missed quizzes will result in a score of zero and cannot be made up.
- Homework assignments will be announced in class. Students are responsible for downloading the PDF file containing the assignment from the course web page.
- Homework is due by 5 pm on the date indicated in the PDF file. Late homework will be penalized twenty percent. Homework will not be accepted once solutions have been reviewed in class or posted on the web.
- Some of the homework assignments will require access to the software package MATLAB. We will start working with MATLAB early in the semester. Inability to access the software will not be accepted as an excuse for failing to complete homework assignments that require using MATLAB.

- Students are responsible for all business conducted during a class period. This includes quizzes, homework assignments, changes to quiz and exam dates, etc.

Expected Student Learning Outcomes for EE 421G.

After completing this course, you will be able to:

1. Classify systems based on input-output relationships.
2. Understand the relationship between sampling rate and aliasing errors.
3. Analyze and synthesize signals using Fourier series and transform definitions and properties for both continuous and discrete time.
4. Analyze practical continuous-time and discrete-time systems, such as modulators and filters.
5. Analyze continuous-time and discrete-time systems with Laplace and z-transforms.
6. Characterize input-output relationships of linear time-invariant systems using impulse response and transfer function representations for both continuous and discrete time.
7. Apply convolution to determine the output of linear time-invariant systems for both continuous and discrete time.

EE421G Topics:

1. Signal Models and Classification (1 week)
2. Continuous Time Domain System Analysis (1 week)
3. Discrete Time Domain System Analysis (1 week)
4. Continuous and discrete time Fourier series (2 weeks)
5. Continuous and discrete time Fourier transforms (2 weeks)
6. Laplace analysis (2 weeks)
7. Sampling (1 week)
8. Z-transform analysis (2 weeks)
9. modulation (1 week)
10. Testing and review (2 weeks)