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PROPOSAL NUMBER: 99- 437

CURRICULUM PROPOSAL FORM

***DEADLINES:**

REGULAR COURSE PROPOSALS: OCTOBER 23, 1998 FOR FALL, 1999 AND FEBRUARY 19, 1999 FOR SPRING, 2000
SHORT-TERM COURSE PROPOSALS: DECEMBER 11, 1998 FOR FALL, 1999 AND MARCH 26, 1998 FOR SPRING 2000

PROPOSAL TITLE: Electrical Communication Systems (0909.331)

SPONSOR/S: R. Ramachandran, J. Schmalzel

DEPARTMENT: Electrical Engineering 0909.331

CHECK ALL THAT APPLY:
 UNDERGRADUATE GRADUATE

COLLEGE: _____
 If LAS: History/Humanities
 Math/Sciences
 Social/Behavioral Sciences

TYPE OF PROPOSAL (Check ALL that Apply)

<input type="checkbox"/> General Education	<input checked="" type="checkbox"/> New Course (NOT Gen. Ed.)
<input type="checkbox"/> New Course in _____ Bank	<input type="checkbox"/> Name Change (Dept., School, Major)
<input type="checkbox"/> Existing course, Add To _____ Bank	<input type="checkbox"/> Changes in Degree Requirements
<input type="checkbox"/> Multicultural/Global Designation	<input type="checkbox"/> Changes Involve Gen. Ed. requirements
<input type="checkbox"/> Writing Intensive Designation	<input type="checkbox"/> Minor Changes to Existing Courses
<input type="checkbox"/> New Minor/Concentration/Specialization	<input type="checkbox"/> Course is NOT General Education
<input type="checkbox"/> New Major/Degree Program	<input type="checkbox"/> Course IS General Education
<input type="checkbox"/> Short Term Course Proposal	

DEPARTMENT (SIGNATURE INDICATES APPROVAL)

Ravi R. Ramachandran 10/23/98 John Self

DEPT. CURRICULUM CHAIR / DATE DEPT. CHAIRPERSON / DATE

COLLEGE CURRICULUM COMMITTEE

DATE OF OPEN HEARING (if necessary) 11/5/98

APPROVED

NOT APPROVED

Comments:

P. Red R. Hestrich 11/5/98

SIGNATURE DATE

ACADEMIC DEAN (& GRADUATE DEAN, for New Graduate Programs Only)

APPROVED

NOT APPROVED

Comments:

[Signature] 10/23/98

SIGNATURE (Academic Dean) DATE

SIGNATURE (Graduate Dean) DATE

UNIVERSITY CURRICULUM COMMITTEE

DATE OF OPEN HEARING (if necessary) College level only

APPROVED

NOT APPROVED

Comments:

Reviewed 11/6/98
SIGNATURE DATE

SENATE

Date announced at Senate 11/6/98

Voted upon at Senate: _____ Approved _____ Not Approved _____ Date: _____

EXECUTIVE VICE PRESIDENT/PROVOST

APPROVED

NOT APPROVED If no, reasons are as follows:

STUDENT CREDIT HOURS _____ FACULTY LOAD HOURS _____ EQUALIZED CREDIT HOURS _____

OFFICIAL COPY & APPROVAL SHEET FILED (DATE): _____

DATE/SIGNATURE EXECUTIVE VICE PRESIDENT/PROVOST 11/9/98

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED 11/9/98

HEGIS TAXONOMY & COURSE NUMBER ASSIGNED 6909.331

DATE/SIGNATURE OF REGISTRAR Robert A. Lulat 11/9/98

NOTIFICATION FORWARD:

SENATE CURRICULUM COMMITTEE CHAIRPERSON

DEPARTMENT CHAIRPERSONS

ACADEMIC DEAN(S)

REGISTRAR

SPONSOR(S)

1. Details:

- a) Course Title: Electrical Communications Systems (0909 331)
- b) Sponsor: Dr. Ravi P. Ramachandran, Dr. John L. Schmalzel and Electrical Engineering Curriculum Committee
- c) Credit Hours: 4 credit hours
- d) Course Level: Junior 2
- e) Curricular Effect: Required course for electrical engineering majors
- f) Prerequisites: Networks II (0909 202) and Mathematics for Engineering Analysis II (1701 335)
- g) Suggested Time/Scale of Implementation: Spring 1999
One section
- h) Resources: Faculty will be hired and laboratory equipment obtained consistent with Engineering School multi-year budget. Library acquisitions will be required.

2. Rationale:

The proposed course is a revision to part of the Engineering Curriculum Proposal approved by the College Senate in December, 1994. The proposed course is consistent with the establishment of the School of Engineering approved by the Board of Trustees in February, 1995.

The impact on communications technology in today's world is rather awesome. The word 'communication' is the act of conveying information between two points in an efficient and cost effective manner and is hence, vital in today's marketplace. Examples of communication systems include satellite communication, mobile radio, optical communication and the integrated services digital network (ISDN). This course provides the fundamental framework to allow the student to further expand into one or more of these 'communication' application areas by introducing the basic concepts of communication theory and practice. A mathematical problem-solving perspective, software simulation perspective and a perspective into special purpose laboratory design are provided for.

3. Essence of the Course:

a) Objectives:

The proposed course has a number of objectives:

- (i) Provide an overview of Fourier transforms, Hilbert transforms, probability and random variables.
- (ii) Provide a working knowledge of a variety of modulation techniques including amplitude, frequency, angle and pulse modulation.
- (iii) Provide a working knowledge of digital transmission, optimal receivers, matched filters and intersymbol interference.
- (iv) Develop the ability to simulate communication systems using C, MATLAB and special purpose hardware in the laboratory.

b) Topical Outline:

- Representation of signals and systems: Fourier transform; Hilbert transform.
- Analog modulation: amplitude frequency and angle modulation.
- Probability and random variables: probability theory, random variables and their transformation, stationarity, ergodicity, covariance functions.
- Pulse modulation: pulse amplitude, pulse position and pulse code modulation; delta modulation; differential pulse code modulation;
- Pulse transmission: matched filter; error rate; intersymbol interference
- Digital transmission: optimal receivers; amplitude, frequency, phase and minimum shift keying; power spectrum and bandwidth efficiency.

c) Evaluation and Grading Procedures:

Student grades will be based on projects, examinations, homework, laboratory reports and written and oral technical communication.

d) Course Evaluation:

The proposed course will be evaluated based on student evaluations and critical review by engineering faculty.

e) Texts:

S. Haykin, *Communication Systems*, John Wiley and Sons, 1994.

F. G. Stremler, *Introduction to Communication Systems*, Addison-Wesley, 1990.

J. D. Gibson, *Principles of Digital and Analog Communications*, Macmillan Publishing Company, 1989.

4. Results of Consultations:

a) Consulted Departments: College of Communications

b) Consultants and Consultant Statements: None

c) Written Consultations: See e-mail attachment

5. Additional Supporting Information: N/A

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6. Catalog Description:

Electrical Communications Systems (0909.331): 4 credits

This is a junior level undergraduate course that covers the fundamentals of analog and digital communication systems. Analog and digital modulation techniques are covered along with optimal receivers, concept of a matched filter, error rate and intersymbol interference. Appropriate mathematical background in Fourier transforms, probability and random variables are taught. The student is exposed to software and hardware designs.

Prerequisite: Networks II (0909 202) and Mathematics for Engineering Analysis II (1701 335)