

PROPOSAL NUMBER: 99-460

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: Mixed Signal Technology

SPONSOR/S: Linda M. Head, John L. Schmalzel

DEPARTMENT: ENGINEERING

C909.484

CHECK ALL THAT APPLY:

UNDERGRADUATE GRADUATE

COLLEGE: ENGINEERING

If LAS: History/Humanities

Math/Sciences

Social/Behavioral Sciences

TYPE OF PROPOSAL (Check ALL that Apply)

General Education

New Course in Bank

Existing course, Add To Bank

Multicultural/Global Designation

Writing Intensive Designation

New Course (NOT Gen. Ed.)

Name Change (Dept., School, Major)

Changes in Degree Requirements

Changes Involve Gen. Ed. requirements

Minor Changes to Existing Courses

Course is NOT General Education

Course IS General Education

New Minor/Concentration/Specialization

New Major/Degree Program

Short Term Course Proposal

DEPARTMENT

(SIGNATURE INDICATES APPROVAL)

Ravi Prabh Ramachandran 03/27/99

DEPT. CURRICULUM CHAIR / DATE

John Seiff 06 March 99

DEPT. CHAIRPERSON / DATE

COLLEGE CURRICULUM COMMITTEE

DATE OF OPEN HEARING (if necessary) 4/20/99

APPROVED

NOT APPROVED

Comments:

Robert P. Healy 4/20/99

SIGNATURE DATE

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

APPROVED

NOT APPROVED

Comments:

James Stewart 3/9/99

SIGNATURE (Academic Dean)

DATE

SIGNATURE (Graduate Dean)

DATE

UNIVERSITY CURRICULUM COMMITTEE

DATE OF OPEN HEARING (if necessary) 4/22/99 (College level)

APPROVED

NOT APPROVED

Comments:

Finalists Dec 5/7/99

SIGNATURE DATE

SENATE

Date announced at Senate 4/30/99

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 [Signature] 5/26/99

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED _____

HEGIS TAXONOMY & COURSE NUMBER ASSIGNED 0909. 484

DATE/SIGNATURE OF REGISTRAR Robert A. Kelat 7/6/99

NOTIFICATION FORWARD:

SENATE CURRICULUM COMMITTEE CHAIRPERSON

DEPARTMENT CHAIRPERSONS

ACADEMIC DEAN(S)

REGISTRAR

SPONSOR(S)

Course Proposal

1. Details:

- a) Course Title: Mixed Signal Technology (0909484)
b) Sponsor: Dr. Linda M. Head, Dr. John L. Schmalzel and Electrical Engineering curriculum committee
c) Credit Hours: 3 credit hours
d) Course Level: Senior I, II
e) Curricular Effect: Senior level elective
f) Prerequisites: Networks I, II – Electronics I, II – Digital I, II } 0909-200
g) Suggested Time/ Scale of Implementation: Fall 1999/Spring 2000 } 0909-310
h) Resources: One section } 0909-242
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.

This course will extend the student's background in circuit design to include the devices and technologies used in mixed analog-digital VLSI chips for high volume applications such as hard-disk drives, cordless telephones and TVs. The course will begin with device models, fabrication technology and layout as applied to mixed analog-digital circuits. Device modeling requirements for analog work will be covered as well as models used in most modern circuit simulators with an emphasis on the ways in which these models fail to meet the requirements of the mixed signal designer. Fabrication technologies will be examined that have been developed specifically for mixed signal VLSI chips. The techniques for layout of mixed signal circuits that emphasize a high degree of analog device matching and minimum digital-to-analog interference will be covered.

3. Essence of the Course:

a) Objectives:

The proposed course has a number of objectives:

- (i) Extend the student's background in circuit design to include the devices and technologies used in mixed analog-digital VLSI chips for high volume applications.
- (ii) Develop device modeling requirements for analog work as well as models used in most modern circuit simulators.
- (iii) Examine fabrication technologies that have been developed specifically for mixed signal VLSI chips.
- (iv) Study and develop techniques for layout of mixed signal circuits that emphasize a high degree of analog device matching and minimum digital-to-analog interference.

b) Topical Outline:

- Circuit design techniques for the devices and technologies used in mixed analog-digital VLSI chips for high volume applications
- Device modeling requirements for analog circuit design.
- Interactions among device models used for analog and digital simulations.
- Fabrication technologies developed specifically for mixed signal VLSI chips.
- Techniques for layout of mixed signal circuits.

c) Evaluation and Grading Procedures:

Student grades will be based on advanced projects, examinations, laboratory report, homework 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:

Tsividis, Yannis, *Mixed Analog-Digital VLSI Devices and Technology: An Introduction*, McGraw-Hill, 1996.

Leblebici, Y., Kang, S.M., *CMOS Digital Integrated Circuits, Analysis and Design*, McGraw-Hill, 1996.

Allen, P.E., Holberg, D.R., *CMOS Analog Circuit Design*, Holt, Rinehart and Winston, 1987.

4. Results of Consultations:

- a) Consulted Departments: None
- b) Consultants and Consultant Statements: N/A
- c) Written Consultations: N/A

5. Additional Supporting Information: N/A

6. Catalog Description: Mixed Signal Technology (0909484)

This course will extend the student's background in circuit design to include the devices and technologies used in mixed analog-digital VLSI chips for high volume applications such as hard-disk drives, cordless telephones and TVs. The course will begin with device models, fabrication technology and layout as applied to mixed analog-digital circuits. Device modeling requirements for analog work will be covered as well as models used in most modern circuit simulators. Fabrication technologies will be examined that have been developed specifically for mixed signal VLSI chips. The techniques for layout of mixed signal circuits that emphasize a high degree of analog device matching and minimum digital-to-analog interference will be covered.

Prerequisites: Networks II (0909202), Electronics II (0909312) and Digital II (0909242).