SACRAMENTO STATE

Course Change Proposal
Form A

Academic Group (*College*):	Academic Organization (*Department*):	Date:
Engineering and Computer Science	**Electrical & Electronic Engineering**	**Sep/28/2006**
Type of Course Proposal: **New ___ Change _ x __ Deletion ___**	**Department Chair:** **Suresh Vadhva**	**Submitted by:** **Patrick Isakanian**
Does this course fulfill a requirement for single-subject or multiple subject credential students? Yes ___ No _X__	**For Catalog Copy: Yes _X__ No ___** **CCE: Yes ___ No _X__**	**Semester Effective:** **Fall ___ Spring __x_, 2007_x_**

This course replaces experimental course Subject Area *(prefix)* **and Catalog Number** *(course number)*:	
This Catalog Number *(course number)* **is being replaced:**	

Change from:

Subject Area *(prefix)* & Catalog No. *(course no.)*:	Title:	Units:
EEE 110	**Advanced Analog Integrated Circuits**	**3**

Change to:

Subject Area *(prefix)* & Catalog No. *(course no.)*:	Title:	Units:

JUSTIFICATION:

EEE110 is a Senior Elective course in analog circuits intended to introduce students to operational amplifier design principles. There is significant overlap in class content between EEE110 and EEE230. A change is being proposed to remove duplication between the two classes and to provide an upper-division elective in electronics.

NEW COURSE DESCRIPTION: (Not to exceed 80 words, and language should conform to catalog copy. See http://www.csus.edu/acaf/univmanual/crspsl.htm - Guidelines for Catalog Course Description

The use of operational amplifiers in circuit designs for applications such as filtering, switched capacitor design, sample and hold design, instrumentation amplifiers, and voltage reference circuitry will be explored, as well as topics in Feedback Theory.

Note:

Prerequisite: EEE109 or instructor consent

Corequisite: none

CAN (California Articulation Number):

Graded: Letter __x___ Credit/No Credit____	**Instructor Approval Required? Yes___ No_x_**
Course Classification *(e.g., lecture, lab, seminar, discussion)*: **Lecture**	**Title for SIS+/CMS (not more than 30 characters)** **Adv Analog Integrated Cir**
Cross Listed? **Yes ___ No__x__**	**If yes, do they meet together and fulfill the same requirement, and what is the other course.**

How Many Times Can This Course be Taken for Credit? __once____

Can the course be taken for Credit more than once during the same term? Yes ___ No __x_

FOR NEW COURSE PROPOSALS OR SUBSTANTIVE CHANGES ONLY:

Description of the Expected Learning Outcomes: Describe outcomes using the following format: "Students will be able to: 1), 2), etc." See the example at http://www.csus.edu/acaf/example.htm

Students will be able to:

1) **explain the role of amplifiers in modern circuit design**
2) **use the methodology required to build filters in the continuous time domain**
3) **use the methodology required to build filters in the discrete time domain**
4) **analyze multi-amplifier designs and create SPICE simulations to verify designs**
5) **analyze circuits with the use of Feedback Theory**
6) **explain and analyze amplifier limitations and compensation methods**

**Attach a list of the required/recommended course readings and activities [Note: it is understood that these are updated and modified as needed by the instructor(s).] This attachment should be forwarded only to your Dean's office, not Academic Affairs.

Assessment Strategies: A description of the assessment strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers) which will be used by the instructor to determine the extent to which students have achieved the learning outcomes noted above:

Exams will include 2 midterms and 1 final exam. Homework will also be assigned, as will 2-3 circuit design projects using CAD tools such as PSpice.

For whom is this course being developed?
Majors in the Dept _x__ Majors of other Depts ___ Minors in the Dept ___ General Education ___ Other ___
Is this course required in a degree program (major, minor, graduate degree, certificate? Yes __ No _x__
If yes, identify program(s):

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer facilities, faculty, etc.)? Yes ___ No _X___
If yes, attach a description of resources needed and verify that resources are available.

Indicate which department or programs will be affected by the proposed course (if any). _____

The Department Chair's signature below indicates that affected programs have been sent a copy of this proposal form.

Approvals: If proposed change, new course or deletion is approved, sign and date below. If not approved, forward without signing to the next reviewing authority, and attach an explanatory memorandum to the original copy.

Signatures:	**Date**
Department Chair: Suresh Vadhva	10/13/2006
College Dean or Associate Dean:	10/10/06
CPSP *(for school personnel courses ONLY)*	
Associate Vice President and Dean for Academic Programs	

Distribution: Academic Affairs (original), Department Chair and College Dean. Dean's office to send original after approval to Academic Affairs, at mail zip 6016. An electronic copy must also be sent.

EEE 110 – Operational Amplifier Circuits and Design

Instructors : Patrick Isakanian, Perry L Heedley and Thomas W Matthews

Textbook :
"Design With Operational Amplifiers And Analog Integrated Circuits-3rd edition" by Sergio Franco, McGraw-Hill 2002 ISBN 0-07-053044-0

Additional References :
"Analysis and Design of Analog Integrated Circuits" by Paul Gray and Robert Meyer, John Wiley & Sons, Inc.
"Design of Analog CMOS Integrated Circuits" by Behzad Razavi, McGraw Hill 2001

Grading : Homework (10%), projects (30%), exams (40%), final exam (20%)

Week	Topic
1-2	Course introduction, Operational Amplifier block diagram and basic theory of operation Basic transistor stages used (current mirrors, differential pairs)
3	Operational Amplifier limitations in gain, bandwidth, and terminal characteristics, compensation with applications
4	Introduction to Continuous Time Filters
5-6	Continuous Time Filters and Signal Processing
7	Exam 1
8	Nature of Discrete-time signals and the z-transform
9-10	Discrete-time filter design (switched capacitor circuits)
11	Feedback Theory
12	Feedback Theory
13	Exam 2
14-15	Operational Amplifier building blocks and final review