

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OUTLINE TEMPLATE			
Course Title	INTEGRATED CIRCUITS LABORATORY		
Course Code	EELR13	No. of Credits	2
Department	Electrical and Electronics Engineering	Faculty	Dr.G.Saravana Ilango
Pre-requisite Course	Knowledge on the electronic circuits, circuit theory and mathematics are essential.		
Course Coordinator	Dr.G.Saravana Ilango		
E-mail	gsilango@nitt.edu	Telephone No.	0431-2503259
Course Type	Core course		

COURSE OVERVIEW

A linear integrated circuit (linear IC) is a solid-state analog device characterized by a theoretically infinite number of possible operating states. The linear integrated circuits gained a tremendous growth in most of the application because of the significant advantages like low power consumption, possibility for high speed communication, flexibility, low cost, miniaturization of hardware has led to greater processing standards & higher memory capacities with lesser area & more access speed. Hence it is vital to know about the basic operation of linear integrated circuits.

Thus the remarkable development and application of integrated circuits in rising technology motivates to frame this course as core course for electrical engineering students. The course is designed such that the initial experiments are to understand the basic operation and imperfections in op-amp ICs. The subsequent experiments are to design and implement various applications of op-amp. Thus on the completion of the course, the students will be able to design and implement several real time applications using op-amp. This course also aims to apply the mathematical skills to a number of practical applications.

COURSE OBJECTIVES

The main objective of the course is to give the students an insight into the desing details of the basic linear integrated circuits. The course also equips the students to test and evaluate the various experiments to understand the operation of operational amplifier, Wave generators, Timer, Filter circuits, ADC, DAC.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
Upon completion of the course, the students will be able to	PO ₁ , PO ₂ , PO ₈ – PO ₁₄
1. Understand the basic operation and imperfection characteristics of op-amp in real time application circuits	PO ₁ , PO ₂ , PO ₈ – PO ₁₄
2. Design Low and High pass filter for filtering applications	PO ₁ , PO ₂ , PO ₈ – PO ₁₄
3. Understand the significance of precision rectifier and generate square and triangular wave.	PO ₁ , PO ₂ , PO ₈ – PO ₁₄
4. Implement counter circuits, analog and digital conversion in various applications	PO ₁ , PO ₂ , PO ₈ – PO ₁₄
5. Implement timing circuits using IC555 timer	PO ₁ , PO ₂ , PO ₈ – PO ₁₄

COURSE TEACHING AND LEARNING ACTIVITIES

S. No.	Week	Topic	Mode of Delivery
1.	III week of July (10 th – 11 th) 1 hr	Introduction to Linear Integrated Circuits	Discussion in class
2.	IV week of July (17 th – 18 th)	Basic operation of op-amp	Experimental analysis
3.	V week of July (24 th – 25 th)	Imperfections in op-amp	Experimental analysis

4.	VI week of July & I week of August (31 st – 1 st)	Precision rectifier	Experimental analysis
5.	II week of August (7 th – 8 th)	Square and triangular wave generation	Experimental analysis
6.	III week of August (14 th – 15 th)	Assessment - II	Written/Oral viva on experiment – 1 to 4
7.	IV week of August (21 st – 22 nd)	Assessment - III	Project demo by students (Simulation)
8.	II week of September (4 th – 5 th)	Design of Low pass and high pass filter	Experimental analysis
9.	II week of September (11 th – 12 th)	Timing circuits using timer IC555	Experimental analysis
10.	III week of September (18 th – 19 th)	Digital to analog conversion using IC0808	Experimental analysis
11.	II week of October (2 nd – 3 st)	Analog to digital conversion using IC0809	Experimental analysis
12.	III week of October (9 th – 10 th)	Assessment - III	Project demo by students (Hardware)
13.	IV week of October (16 th – 17 th)	Assessment - IV	Written/Oral viva on experiment – 5 to 8

COURSE ASSESSMENT METHODS

S. No.	Assessment	Type of assessment	Duration	% Weightage
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1.	Assessment 1	Evaluation of experiment and VIVA on every lab session	Nine session	50%
2.	Assessment 2	Oral / written viva examination on experiment 1-4	One hour	10%
3.	Assessment 3	Mini – project – group activity – simulation, hardware & Report	One session	30%
4.	Assessment 4	Oral / written viva examination on experiment 5-8	One hour	10%

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc

1. Gayakwad R.A., 'Op-amps & Linear Integrated Circuits', Prentice Hall of India, New Delhi, 4th Edition, 2009.
2. Roy Choudhury and Shail Jain, 'Linear Integrated Circuits', 4th Edition, New Age International Publishers, 2010.
3. Sergio Franco, 'Design with Operational Amplifiers and Analog Integrated Circuits', Tata McGraw Hill, 3rd Edition, 2002.
4. Sedra Smith, 'Microelectronic Circuits', Oxford University Press, 6th Edition, 2009.
5. R P Jain, 'Modern Digital Electronics', Tata McGraw-Hill Education, 3rd Edition, 2003

COURSE EXIT SURVEY

1. Students' feedback through class committee meetings
2. Feedback questionnaire from students – twice during the semester
3. Feedback from students on Course Outcomes at the end of the semester

COURSE POLICY

1. All the students are expected to attend all the laboratory sessions.
2. Students who are absent for regular laboratory sessions have to take steps to redo the particular experiments by their own efforts and no extra laboratory sessions would be arranged

3. Relative grading with a passing minimum is as per our institute norms.

ADDITIONAL COURSE INFORMATION

1. The Course Coordinator is available for consultation during the time intimated to the students then and there.
2. All correspondence will be sent to the webmail id of the students alone. Hence all students are advised to check their webmail ids regularly.
3. The students will communicated through the email id: gsilango@nitt.edu for any academic related issues (including sharing of study materials) with respect to this course.

FOR SENATE'S CONSIDERATION


[Dr. G. Saravana Ilango, AP/EEE]
Course Faculty


CC-Chairperson


HoD/Dept. of EEE