

Course code	Course Name	L-T-P - Credits	Year of Introduction
EC212	Linear Integrated Circuits and Digital Electronics	4-0-0 -4	2016
Prerequisites :Nil			
Course Objectives <ul style="list-style-type: none"> To introduce the concepts for realizing functional building blocks in ICs and applications of IC. To know the fundamentals of combinational and sequential digital circuits. 			
Syllabus <p>Ideal OP-AMP characteristics, DC characteristics- AC characteristics- offset voltage and current: voltage series feedback - shunt feedback amplifiers, differential amplifier- frequency response of OP-AMP- Basic applications of OP-AMP – summer, differentiator ,integrator, V/I &I/V converter-Instrumentation amplifier-Basic Comparators- regenerative comparators-multivibrators- waveform Generators- clippers- clampers- peak detector- S/H circuit- First and Second order active filter-, D/A converter (R-2R ladder and weighted resistor types)- A/D converter - Dual slope- successive approximation and flash types- 555 Timer circuit – Functional block- characteristics & applications:- IC 566-voltage controlled oscillator circuit- OP-AMP- Voltage regulator-Series- Shunt and Switching regulator- Review of number system:- types and conversion- codes- Boolean algebra: De-Morgan’s theorem- Minimization of Boolean function using K-maps & Quine McCluskey method- Combinational circuits: -Adder- subtractors- code converters- encoders- decoders- multiplexers and demultiplexers- Combinational Logic by using Multiplexers- ROM- PLA and PAL-Memories - ROM, Static and Dynamic RAM- Read/Write Memory- EPROM, EEPROM-Flip flops – SR- D- JK - T and Master Slave FF- Shift registers- Counters-Asynchronous and Synchronous Counters- Up-Down Counter- Modulo Counter- Ring Counter-Analysis of Asynchronous Counters</p>			
Expected outcome: <ul style="list-style-type: none"> The students will learn to know about the IC'S and their application, digital circuits, combinational and sequential circuits. 			
Text Book: <ol style="list-style-type: none"> Ramakant A.Gayakward, Op-amps and Linear Integrated Circuits, IV edition, Pearson Education, 2003 / PHI. D.Roy Choudhary, Sheil B.Jani, Linear Integrated Circuits, II edition, New Age, 2003. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India, 2002 			
References: <ol style="list-style-type: none"> Robert F.Coughlin, Fredrick F.Driscoll, Op-amp and Linear ICs, Pearson Education, 4th edition, 2002 /PHI. David A.Bell, Op-amp & Linear ICs, Prentice Hall of India, 2nd edition, 1997. Charles H.Roth, Fundamentals Logic Design, Jaico Publishing, IV edition, 2002. Floyd, Digital Fundamentals, 8th edition, Pearson Education, 2003. 			

Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	OP-AMP-Ideal OP-AMP characteristic-offset voltage and current: voltage series feedback and shunt feedback amplifiers, differential amplifier- frequency response of OP-AMP- Basic applications of op-amp – differentiator and integrator, V/I & I/V converter.	9	15%
II	Instrumentation amplifier- Basic Comparators- regenerative comparators- multivibrators- waveform generators- clippers, clampers- peak detector- S/H circuit- isolation amplifier - log and antilog amplifiers analog multipliers	9	15%
FIRST INTERNAL EXAMINATION			
III	D/A converter (R-2R ladder and weighted resistor types)- A/D converter - Dual slope, successive approximation and flash types Active filters-filter transfer function-Butterworth and Chebyshev filters-First order and second order function for low-pass, high-pass, band –pass, band-stop and all –pass filters	9	15%
IV	Review of number system- types and conversion- codes- one's complement and two's complement-Arithmetic operations of Binary Boolean algebra: De-Morgan's theorem- Minimization of Boolean function using K-maps & QuineMcCluskey method.	9	15%
SECOND INTERNAL EXAMINATION			
V	Combinational circuits: Adder- subtractor- code converters, encoders, decoders, multiplexers and demultiplexers. Implementation of Combinational Logic by using Multiplexers, ROM, PLA and PAL. Memories – ROM- Static and Dynamic RAM- Read/Write Memory- EPROM- EEPROM	10	20%
VI	Flip flops - SR, D, JK , T and Master Slave Flip Flop -Shift registers -Counters-Asynchronous and Synchronous Counters-Up-Down Counter- Modulo Counter- Ring Counter-Analysis of Asynchronous Counters-sequence detector.	10	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN

Maximum Marks : 100

Exam Duration: 3 hours

PART A: FIVE MARK QUESTIONS

8 compulsory questions –1 question each from first four modules and 2 questions each from last two modules (8 x 5= 40 marks)

PART B: 10 MARK QUESTIONS

5 questions uniformly covering the first four modules. Each question can have maximum of three sub questions, if needed. Student has to answer any 3 questions (3 x 10 = 30 marks)

PART C: 15 MARK QUESTIONS

4 questions uniformly covering the last two modules. Each question can have maximum of four sub questions, if needed. Student has to answer any two questions

(2 x 15 = 30 marks)