

GOPALAN COLLEGE OF ENGINEERING AND MANAGEMENT

Department of Electronics and Communication Engineering

Academic Year: **2016-17**Semester: **EVEN**

COURSE PLAN

Semester: **VI**Subject Code& Name: **10EC63 & MICROELECTRONIC CIRCUITS**Name of Subject Teacher: **Pavan V S**Name of Subject Expert (Reviewer): **Kavitha M V**

For the Period: From: 6-02-17 to 2-06-17

Details of Book to be referred:

Text Books	Microelectronic Circuits , Adel Sedra and K.C. Smith, 5 th Edition, Oxford University Press, Interantional Version, 2009.
Reference Books	1. Fundamentals of Microelectronics , Behzad Razavi, John Wiley India Pvt. Ltd, 2008. 2. Microelectronics – Analysis and Design , Sundaram Natarajan, Tata McGraw-Hill, 2007

Lecture NO	Topic Planned	Practical Applications & Brief objectives	Book referred with Pg No.	Planned Date	Executed Date	Deviation Reasons thereof	How Made Good / Reciprocate arrangement	Remarks by HOD
1.	UNIT-1 Introduction	Objective: To further understand the MOSFET operation, analysis and its biasing methods	325	6-2-17				
2.	Device structure and physical operation		326	7-2-17				
3.	V-I characteristics		338	9-2-17				

4.	MOSFET circuit at DC	Application: Cell phone Television Processors(CPU) OUTCOME: Able to understand basic function and overview of MOSFET	352	10-2-17					
5.	Biasing in MOS amplifiers		370	10-2-17					
6.	Biasing using constant current source in MOS amplifiers		375	13-2-17					
7.	The MOSFET as an amplifier		360	14-2-17					
8.	MOSFET as a switch		364	16-2-17					
9.	Small signal operation and models		377	17-2-17					
10.	Small signal equivalent circuits models		380	17-2-17					
11.	Modeling the body effect		386	20-2-17					
12.	Single stage MOS amplifier		389	21-2-17					
13.	Characterizing the amplifier		391	23-2-17					
14.	UNIT 2 IC design Philosophy, and types of scaling		Objective: To further understand problems with reduced channel length in MOSFET and also its frequency response Application: RAM ROM Pendrive OUTCOME: Able to understand differentiate the advantages and disadvantages of	566	27-2-17				
15.	Short channel effects and recent scaling trend			567	28-2-17				
16.	Comparison between BJT and MOSFET			572	2-3-17				
17.	Basic MOSFET current source	587		3-3-17					
18.	Basic MOSFET current mirror	592		3-3-17					
19.	MOS current steering circuits	590		6-3-17					
20.	High frequency response general considerations	596		7-3-17					

21.	3dB frequency drop	MOSFET over BJT for specific applications	598	13-3-17					
22.	Test on Unit 1 and 2			14-3-17					
23.	UNIT 5 FEEDBACK - General feedback structure and properties of feedback	Objective: To get constant voltage gain with suppressed noise for MOSFET for the changing input, to be used in amplifier circuit. Application: Encryption and Decryption devices, Synchronous circuits OUTCOME: Able to understand the advantages of stable MOSFET with fixed gain, design fixed loop gain for specific applications and requirement of compensation	712	16-3-17					
24.	Noise margin		717	17-3-17					
25.	Four basic topologies		718	17-3-17					
26.	Determining the loop gain		751	20-3-17					
27.	Stability problem		754	21-3-17					
28.	Effect of feedback on amplifier poles		756	23-3-17					
29.	Stability study using bode plots		765	24-3-17					
30.	Frequency compensation		769	24-3-17					
31.	UNIT – 6 Operational amplifiers The ideal OP amp		Objective: To understand how MOSFET's can be used to build amplifier, by proper analysis and its specific biasing methods	474	27-3-17				
32.	The inverting configuration			478	30-3-17				
33.	Noninverting configuration	487		31-3-17					
34.	Effect of finite open loop gain and bandwidth on circuit performance	503		31-3-17					

35.	Difference amplifier	Application: Earphones Hearing aid Speakers OUTCOME: Will be able to select among the available MOS amplifier based on the required conditions	491	3-4-17				
36.	Large signal operation of op amp		508	4-4-17				
37.	DC imperfections		512	6-4-17				
38.	Analog multipliers		533	7-4-17				
39.	Sample and hold circuits		534	7-4-17				
40.	Differentiators		526	10-4-17				
41.	Integrators		521	11-4-17				
42.	Logarithmic amplifiers		528	13-4-17				
43.	Antilogarithmic amplifiers		532	13-4-17				
44.	Test on Unit 5& 6			20-4-17				
45.	UNIT – 7 & 8 Digital CMOS circuits. Overview.	Objective: To understand the MOSFET operation, analysis and its biasing methods Application: Camera CMOS sensor R F circuits Transmitter and	896	21-4-17				
46.	Voltage transfer characteristic and Noise margin		898	21-4-17				
47.	Design and performance analysis of CMOS inverter		901	25-4-17				

48.	Static characteristics of CMOS inverter	receiver	902	27-4-17				
49.	Dynamic operation of CMOS inverter	OUTCOME: Will be able to understand the exact requirement of digital CMOS circuits which gives the advantage of pMOS and nMOS, also the clocking for device operation	904	28-4-17				
50.	Logic gate circuits		909	28-4-17				
51.	Types of CMOS logic gates		912	2-5-17				
52.	Pass-transistor logic		914	4-5-17				
53.	Charging with nMOS		915	5-5-17				
54.	Dynamic Logic Circuits, CMOS logic circuits		918	5-5-17				
55.	UNIT 4 Differential and Multistage amplifier - The MOS differential pair operation		Objective: To understand how MOSFET behaves for same input and how it can be implemented for multistage networks Application: Internet Wired/Wireless communication Cascaded circuits OUTCOME: Will be able to understand the small	792	8-5-17			
56.	Qualitative analysis of MOS differential pair operation	795		9-5-17				
57.	Small signal model, Small signal behavior of differential pair	800		11-5-17				
58.	Common mode inputs to differential pair	804		12-5-17				
59.	The BJT differences pair	808		12-5-17				

60.	Differential pair with active loads	signal behavior and common mode input behavior of MOSFET (amplifiers).	831	18-5-17				
61.	Differential amplifier with active loads, Multistage amplifier		833	19-5-17				
62.	UNIT – 3 Single Stage IC amplifiers CS and CF amplifiers with loads,	Objective: To further understand the MOSFET operation, analyze its frequency response for different combinations of amplifier circuits Application: MOS amplifiers Speakers Transmitters and receivers OUTCOME: Able to select compare between different combinations of MOSFET circuits with respect to Gain, Bandwidth load effects, impedance matching	607	19-5-17				
63.	high frequency response of CS and CF amplifiers		613	22-5-17				
64.	CG and CB amplifiers with active loads		625	23-5-17				
65.	high frequency response of CG and CB amplifiers, Cascade amplifiers		638	25-5-17				
66.	CS and CE amplifiers with source (emitter) degeneration source and emitter followers		654	26-5-17				
67.	Current mirrors with Improved performance.		674	26-5-17				
68.					29-5-17			
69.	Revision and QP solving			30-5-17				
70.	Revision and QP solving			31-5-17				

71.	Revision and QP solving			1-6-17				
72.	Revision and QP solving			2-6-17				
73.	Revision and QP solving			2-6-17				

Prepared By: _____
 (Faculty)
 Date & Sign _____

Reviewed by: _____
 (Sub. expert)
 Date & Sign _____

Approved by: _____
 (HOD)
 Date & Sign _____

Approved by: _____
 (Principal/ Acad. Co)
 Date & Sign _____