Subject Code	Subject Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW	Tutorial	Total
ETC 402	Analog Electronics II	4	--	--	4	--	--	04

Subject Code	Subject Name	Examination Scheme							
		Theory Marks				Term Work	Practical and Oral	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Avg. Of Test 1 and Test 2					
ETC 402	Analog Electronics II	20	20	20	80	-	-	--	100

Course Pre-requisite:

ETC : 302 – Analog Electronics I

Course Objective:

- To deliver the core concepts and reinforce the analytical skills learned in Analog Electronics I
- To motivate students to use MOS devices for designing and analyzing electronic Circuits which will help them to understand the fundamentals of VLSI design.

Expected Outcomes:

After completion of the course students will be able to

- Analyze and design multistage electronic Circuits.
- Differentiate between discrete and integrated biasing techniques.
- Differentiate between small signal and large signal Amplifiers.

Module No.	Unit No.	Topics	Hrs.
1.0		**Frequency Response of Amplifiers**	**14**
	1.1	**High Frequency Model:** High frequency hybrid-pi equivalent Circuits of BJT and MOSFET, Miller effect and Miller capacitance, gain bandwidth product	
	1.1	**Single Stage Amplifiers :** Effect of capacitors (coupling, bypass, load) on frequency response of single stage BJT (CE, CC,CB configurations) , MOSFET (CS,CG, CD configuration) amplifiers, low and high frequency response of BJT (CE, CB, CC) and MOSFET (CS, CG,CD) amplifiers	
	1.2	**Multistage Amplifier:** Low and high frequency response and mid – frequency analysis of multistage (CE-CE, CS-CS), cascode (CE-CB, CS-CG) Amplifiers, Darlington pair, design of two stage amplifiers	
2.0		**Differential Amplifiers**	**10**
	2.1	**BJT Differential Amplifiers:** Terminology and qualitative description, DC transfer characteristics, small signal analysis, differential and common mode gain, CMRR, differential and common mode input impedance	
	2.2	**MOSFET Differential Amplifiers:** DC transfer characteristics, small signal analysis, differential and common mode gain, CMRR, differential and common mode input impedance	
3.0		**Integrated Circuits Biasing Techniques**	**08**
	3.1	**Current Mirror:** Two transistor (BJT, MOSFET) current source, current relationship, output resistance.	
	3.2	**Improved Current Source:** Three transistor (BJT,MOSFET) current source	
	3.3	**Special Current Source:** Cascode (BJT, MOSFET) current source, Wilson and Widlar current sources	
4.0		**Power Amplifiers**	**8**
	4.1	**Power Devices:** Power BJTs, power MOSFETs, heat sinks	
	4.2	**Classification:** Class A, Class B, Class AB and Class C operation, and performance parameters	
	4.3	**Transformer and Transfomerless Amplifiers**: Transformer coupled Class A Amplifier, Class AB output stage with diode biasing, V_{BE} multiplier biasing, input buffer transistors, Darlington configuration	
5.0		**Fundamentals of Operational Amplifier**	**08**
	5.1	**Fundamentals of Op-amp:** characteristics of op-amp, high frequency effects on op-amp gain and phase, slew rate limitation,	
	5.2	**Applications of Op-amps:** Inverting and non-inverting amplifier, adder, abstractor, integrator, differentiator, active filters (first order low and high pass)	
6.0		**DC Regulated Power Supply**	**04**
	6.1	**Series and Shunt Regulator:** Regulator performance parameters, Zener shunt regulator, transistorized series and shunt regulator	
		Total	**52**

Text Books:

1. Donald A. Neamen, Electronic Circuit Analysis and Design, Tata McGraw Hill, 2nd Edition
2. Adel S. Sedra, Kenneth C. Smith and Arun N Chandorkar, Microelectronic Circuits Theory and Applications, Fifth Edition, International Version, OXFORD International Students Sixth Edition

Recommended Books:

1. S. Salivahanan, N. Suresh Kumar,*"Electronic Devices and Circuits",* Tata McGraw Hill, 3rd Edition
2. Jacob Millman, Christos C Halkias, and Satyabratatajit, *"Millman's Electronic Devices and Circuits",* McGrawHill, 3rd Edition
3. Muhammad H. Rashid, *"Microelectronics Circuits Analysis and Design",* Cengage Learning, 2nd Edition
4. Jacob Milliman and Arvin Grabel, " Microelectronics" Tata McGrawHill, 2nd Edition
5. Anil K. Maini and Varsha Agrawal*, "Electronic Devices and Circuits",* Wiley Publications

Internal Assessment (IA):
Two tests must be conducted which should cover at least 80% of syllabus. The average marks of both the tests will be considered for final Internal Assessment.

End Semester Examination:
1. Question paper will comprise of 6 questions, each carrying 20 marks.
2. The students need to solve total 4 questions.
3: Question No.1 will be compulsory and based on entire syllabus.
4: Remaining question (Q.2 to Q.6) will be selected from all the modules.