

Course Number and Name	
BEC 402 - ELECTRONIC CIRCUITS	
Credits and Contact Hours	
3 and 45	
Course Coordinator's Name	
Ms K.Subbulakshmi	
Text Books and References	
TextBook	
1. RobertL.Boylestad and Louis Nasheresky, "Electronic Devices and Circuit Theory", 10thEdition, PearsonEducation/ PHI,2008	
2.David A.Bell, "Electronic Devices and Circuits", FifthEdition, Oxford University Press,2000	
3.Donald .A. Neamen, Electronic Circuit Analysis and Design –2nd Edition,Tata Mc Graw Hill, 2009.	
4. Millman.J. and Halkias C.C, "Integrated Electronics", Mc Graw Hill, 2001.	
References:	
1. MillmanJ.andTaub H., "Pulse Digital and SwitchingWaveforms", TMH,2000.	
2. Adel .S. Sedra, Kenneth C. Smith, "Micro Electronic Circuits", 6th Edition, Oxford University.	
3 .David A., "Bell Electronic Devices and Circuits", Oxford Higher Education Press, 5th Edition.	
4. Behzad Razavi, "Design of Analog CMOS Integrated Circuits", Tata Mc Graw Hill, 2007.	
5. Paul Gray, Hurst, Lewis, Meyer "Analysis and Design of Analog Integrated Circuits"	
Course Description	
<ul style="list-style-type: none"> • Develop the fundamental knowledge about the need for biasing and its various methods. • Analyze the small signal equivalent circuits and high frequency analysis of Bipolar Junction Transistor and Field Effect Transistor. • Analyze the methods of constructing feedback amplifiers, oscillators and tuned amplifiers. • Outline the performance of wave shaping circuits, multivibrators and time base generators. • Construction of power supplies. 	
Prerequisites	Co-requisites
BEE301-Circuit theory & BEE101-Basic Electrical & Electronics Engineering.	Nil
required, elective, or selected elective (as per Table 5-1)	
required	
Course Outcomes (COs)	
CO1: Discuss the concepts of various biasing methods for BJT. Analyze the BJT configurations and BJT Amplifiers using small signal model.	
CO2 : To learn about the large signal amplifiers.	
CO3 : To learn about the various feedback amplifier	
CO4 : Understand the basic principles of different types of tuned amplifiers and learn the Neutralization techniques.	
CO5: Describe the operation of multivibrator circuits, time base generators, and their Applications.	
CO6 : Discuss the working and characteristics of regulated power supply and SMPS.	

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k
CO1	M	M		H		M			M		
CO2	H		H	H			M			M	
CO3	H		H	H			M		M	M	
CO4	M	M	H	H	H						
CO5	M	L		H							
CO6	H	H	H	L					M		

List of Topics Covered**UNIT I BASIC DEVICE STABILIZATION AND LOW FREQUENCY DESIGN ANALYSIS 9**

Circuits for BJT, DC and AC Load lines, Stability factor analysis, Temperature compensation methods, biasing circuits for FET's and MOSFET's. Transistor, FET and MOSFET Amplifiers, Equivalent circuit, input and output characteristics, calculation of midband gain, input and output impedance of various amplifiers, cascode amplifier, Darlington Bootstrapping, Differential amplifier, CMRR measurement, Use of current source in Emitter.

UNIT II LARGE SIGNAL AMPLIFIERS 9

Class A, AB, B, C and D type of operation, efficiency of Class A amplifier with resistive and transformer coupled load, efficiency of Class B, Complementary Symmetry amplifiers, MOSFET Power amplifiers, Thermal stability of Power amplifiers, heat sink design.

UNIT III FEEDBACK AMPLIFIERS 9

Types of feedback, Effect of feedback on noise, distortion, gain, input and output impedance of the amplifiers, Analysis of Voltage and Current feedback amplifiers, Negative Resistance Oscillator, Barkhausen Criterion for oscillation in feedback oscillator, Mechanism for start of oscillation and stabilization of amplitude, Analysis of RC Oscillators using Cascade connection of Lowpass and Highpass filters, Wein Phase shift and twin-T network, Analysis of LC Oscillators, Colpitts, Hartley, Clapp, Franklin, Armstrong and Miller Oscillator, Quartz Crystal Oscillator circuits.

UNIT IV TUNED AMPLIFIERS & MULTIVIBRATOR CIRCUITS 9

Tank circuits, Analysis of single tuned amplifier, Double tuned, stagger tuned amplifiers, instability of tuned amplifiers, stabilization techniques, Narrow band neutralization using coil, Broad banding using Hazeltine neutralization, Class C tuned amplifiers and their applications. Efficiency of Class C tuned Amplifier. Astable multivibrators, monostable and bistable multivibrator using similar and complementary transistors, speed up capacitors, Schmitt trigger circuits.

UNIT V RECTIFIERS, BLOCK OSCILLATORS AND TIMEBASE GENERATORS 9

Half Wave Rectifier - Full Wave Rectifier – Bridge Rectifier – Performance of Rectifiers – Filters – Types of Filters – L, C, LC, π Filters – Ripple Factor Calculation for C, L, LC and π Filter – Regulators – Shunt and Series Voltage Regulator – IC Regulator – SMPS – Power Control using SCR. RC and RL wave shaping circuits, UJT sawtooth generators, Linearization using constant current circuit, Bootstrap and Miller saw tooth generators, current time base generators, Time base circuits - Voltage-Time base circuit, Current-Time base circuit