National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	**Bachelor of Technology in Electronics and Communication Engineering**	Year of Regulation	**2018-19**
Department	**Electronics and Communication Engineering**	Semester	**IV**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
EC 204	**Electronic Circuits**	**3**	**1**	**0**	**4**	**50**	**50**	**100**	**200**

Course Objectives

- To understand the fundamental concepts of semiconductor devices
- To understand the terminal characteristics of junction diodes, bipolar transistors, and field-effect transistors.
- To understand the small signal models of diodes and transistors.
- Design and analyze electronic circuits consisting of diodes and transistors.
- To analyze the frequency response of various electronic amplifier circuits.

Course Outcomes

CO1	Understand the operation, current voltage characteristics and small signal models of diodes and transistors
CO2	Design and analyze electronic circuits consisting of diodes and transistors
CO3	Draw the input and output waveforms of various diode and transistor based electronic circuits
CO4	Analyze the frequency response of various electronic amplifier circuits

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
1	CO1	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**1**	**-**	**-**
2	CO2	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**1**	**-**	**-**
3	CO3	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**1**	**-**	**-**
4	CO4	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**1**	**-**	**-**

SYLLABUS

No.	Content	Hours	COs
I	Review of basics of Semiconductors, Energy Levels, Extrinsic and Intrinsic semiconductors, Semiconductor Diode, Resistance Levels, Diode Equivalent Circuits, Transition and Diffusion Capacitance, Reverse Recovery Time, Load-Line Analysis	**8**	**CO1, CO2, CO3**
II	Bipolar Junction Transistors, Construction and Operation, Common-Base, Common-Emitter, Common-Collector Configuration, Transistor Amplifying Action, Limits Of Operation, DC Biasing of BJT, Operating Point, Fixed-Bias Circuit, Emitter-Stabilized Bias Circuit, Voltage-Divider Bias, DC Bias with Voltage Feedback, Thermal Stability	**10**	**CO1, CO2, CO3**
III	BJT Transistor Modeling, Small Signal Parameters Zi, Zo, Av, Ai, The re Transistor Model, Hybrid Equivalent Model, Graphical Determination of h-Parameters, BJT Small-Signal Analysis, Common-Emitter with Fixed-Bias, Voltage-Divider Bias and Emitter-Bias Configuration, Emitter-Follower Configuration, Common-Base Configuration, Effect of a Load and Source Impedance, Low and High Frequency Response of BJT Amplifier	**12**	**CO1, CO2, CO4**
IV	Field-Effect Transistors, Construction And Characteristics Of JFETS, Transfer Characteristics, Depletion and Enhancement-Type MOSFET, JFET Biasing, Fixed-Bias Configuration, Self-Bias Configuration, Voltage-Divider Biasing, JFET Small-Signal Analysis, Small-Signal Model, JFET Common Source Configuration, Source-Follower (Common-Drain) Configuration, Common-Gate Configuration, Effect of a Load and Source Impedance, Low and High Frequency Response of JFET Amplifier	**10**	**CO1, CO2, CO3**
V	Compound Configurations, Multi-stage Amplifiers, Cascade Connection, Cascode Connection, Darlington Connection, Feedback Pair, Current Mirror Circuits, Differential Amplifier Circuits	**8**	**CO2, CO3**
	Total Hours	**48**	

Essential Readings

1. R.L. Boylestad and L. Nashelsky, “Electronic Devices And Circuit Theory”, Prentice Hall, Tenth Edition, 2011.
2. D.A. Bell ,”Electronic Devices and Circuits”, Prentice Hall of India, 5th Edition, 2004

Supplementary Readings

1. A.S. Sedra and K.C. Smith, “Microelectronic Circuits”, Oxford, Seventh Edition, 2017.
2. D.A.Neaman, “Microelectronics: Circuit Analysis and Design”, McGraw Hill, Fourth Edition, 2010.