

19BM203

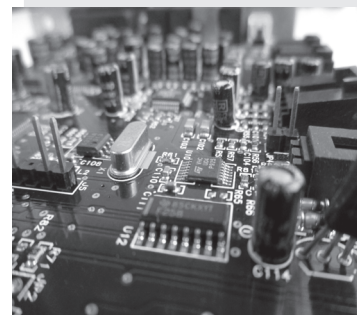
ANALOG ELECTRONIC CIRCUITS

Hours Per Week :

L	T	P	C
3	-	2	4

Total Hours :

L	T	P	WARA	SSH/HSB	CS	SA	S	BS
45	-	30	10	8	-	6	3	-



SOURCE:

https://www.analogictips.com/wp-content/uploads/2016/11/circuit-board-973311_1920.jpg

PREREQUISITE COURSES: Engineering Mathematics, Basics of Electronics, Knowledge on semiconductors.

COURSE DESCRIPTION AND OBJECTIVES:

This course is aimed at offering fundamental concepts of semiconductor devices and circuits. It starts with the physics concepts that form the basis for semiconductor material formation, then it introduces the Junction Diode, Transistor, FET and other basic devices that are designed with semiconductor materials. It also includes the concepts of simple circuits that are designed with the help of these basic devices. As a first-level course in electronics, it forms the basis to understand advanced electronic courses that will be studied in subsequent semesters.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes.

COs	Course Outcomes	POs
1	Analyzing the circuits with nonlinear device like diodes.	2
2	Modeling of BJT/FET for analysis.	3
3	Design single stage, multistage amplifier, with and without feedback.	3, 5
4	Apply the knowledge gained in the design of BJT/FET circuits in oscillators to generate different frequency signals.	1

SKILLS :

- ✓ Identify a semiconductor diode for a specific application and power handling capacity.
- ✓ Identify the transistor type for a given application (switch/amplifier).
- ✓ Recognize the require specifications of the transistor.
- ✓ Identify the amplification factor required.
- ✓ Test the working condition of the transistor.

UNIT - I	L-9
PN JUNCTION DEVICES: Construction and working of PN Junction diode, Volt ampere characteristics, Temperature dependence on V-I characteristics of PN junction diode, Zener diode, Zener as voltage regulator - LED, photo diode, laser.	
RECTIFIERS: Classification - half wave, centre tapped full wave and bridge rectifiers; Comparison of all rectifiers.	
UNIT - II	L-9
TRANSISTORS: Construction, Working and characteristics of BJT (CE, CB and CC), JFET and MOSFET, Comparison of BJT, FET and MOSFET.	
UNIT - III	L-9
SINGLE STAGE BJT AND FET AMPLIFIERS: Classification of amplifiers - small signal and low frequency model of CE amplifier; Expressions for voltage gain, Current gain input and output resistances, Comparison of CE, CB and CC amplifiers, Small signal and low frequency model of JFET, Expressions for voltage gain, Input and output impedances of common source amplifier.	
UNIT - IV	L-9
MULTISTAGE AMPLIFIERS AND POWER AMPLIFIERS: Methods of inter stage coupling, Need for cascading, Concept of gain, Two stage RC coupled BJT and FET amplifier, Differential amplifier, Common mode and difference mode analysis, Power amplifiers, Classification, Single ended and transformer coupled class A power amplifier, Class B push pull amplifiers, Crossover distortion, Complementary symmetry push pull amplifier.	
UNIT - V	L-9
FEEDBACK AMPLIFIERS AND OSCILLATORS: Advantages of negative feedback, Voltage, Current, Series, Shunt feedback, Positive feedback, Condition for oscillations, Phase shift, Wien bridge, Hartley, Colpitts and crystal oscillators.	

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS	TOTAL HOURS: 30
<ol style="list-style-type: none"> 1. Characteristics of PN junction diode. 2. Zener diode characteristics and regulator using zener diode. 3. Half wave rectifier. 4. Full wave rectifier (using centre tapping transformer). 5. Full wave rectifier (using diodes). 6. Common emitter input-output characteristics. 7. Common collector input-output characteristics. 8. Common base input-output characteristics. 9. FET characteristics. 10. Common source amplifier. 11. Wien bridge oscillator using transistors. 	

TEXT BOOKS:

1. Sedra and Smith, "Microelectronic Circuits", 2nd edition, Oxford University Press, 2004
2. David A. Bell, "Electronic devices and circuits", 2nd edition, Prentice Hall of India, 2004.
3. Robert L. Boylestad, "Electronic devices and circuit theory", 2002.

REFERENCE BOOKS:

1. Rashid, "Microelectronic Circuits", 1st edition, Thomson Publications, 1999.
2. Floyd, "Electron devices", 5th edition, Pearson Asia, 2001.
3. Donald A. Neamen, "Electronic Circuit Analysis and Design", 3rd Edition, Tata McGraw Hill, 2003.
4. Robert L. Boylestad, "Electronic Devices and Circuit Theory", 2002.
5. Robert B. Northrop, "Analysis and Application of Analog Electronic Circuits to Biomedical Instrumentation", 1st edition, CRC Press, 2004.