

# **SARDAR RAJA COLLEGE OF ENGINEERING, ALANGULAM**

**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING**

## **MICRO LESSON PLAN**



**SUBJECT : ELECTRONIC DEVICES AND CIRCUITS**

**CODE : EC6202**

**CLASS : II yr / III SEM**

**STAFF: Mrs. S. IDA EVANGELINE, AP/EEE,**

**DEPT. OF EEE.**

**OBJECTIVES:**

**The student should be made to:**

- ☐ Be familiar with the structure of basic electronic devices.
- ☐ Be exposed to the operation and applications of electronic devices.

**UNIT I PN JUNCTION DEVICES****9**

PN junction diode –structure, operation and V-I characteristics, diffusion and transient capacitance -Rectifiers – Half Wave and Full Wave Rectifier,– Display devices- LED, Laser diodes- Zener diode characteristics-Zener Reverse characteristics – Zener as regulator

**UNIT II TRANSISTORS****9**

BJT, JFET, MOSFET- structure, operation, characteristics and Biasing UJT, Thyristor and IGBT -Structure and characteristics.

**UNIT III AMPLIFIER****9**

BJT small signal model – Analysis of CE, CB, CC amplifiers- Gain and frequency response –MOSFET small signal model– Analysis of CS and Source follower – Gain and frequency response-High frequency analysis.

**UNIT IV MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER****9**

BIMOS cascade amplifier, Differential amplifier – Common mode and Difference mode analysis – FET input stages – Single tuned amplifiers – Gain and frequency response – Neutralization methods, power amplifiers –Types (Qualitative analysis).

**UNIT V FEEDBACK AMPLIFIERS AND OSCILLATORS****9**

Advantages of negative feedback – voltage / current, series, Shunt feedback –positive feedback –Condition for oscillations, phase shift – Wien bridge, Hartley, Colpitts and Crystal oscillators.

**TOTAL (L:45+T:15): 60 PERIODS****OUTCOMES:**

- ☐ To explain the structure of the basic electronic devices.
- ☐ To design applications using the basic electronic devices.

**TEXT BOOKS:**

1. David A. Bell ,”Electronic Devices and Circuits”, Prentice Hall of India, 2004.
2. Sedra and smith, “Microelectronic Circuits “Oxford University Press, 2004.

**REFERENCES:**

1. Rashid, “Micro Electronic Circuits” Thomson publications, 1999.
2. Floyd, “Electron Devices” Pearson Asia 5th Edition, 2001.
3. Donald A Neamen, “Electronic Circuit Analysis and Design” Tata McGraw Hill, 3rd Edition, 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”, CRC Press, 2004.

## **SUBJECT DESCRIPTION AND OBJECTIVES**

### **DESCRIPTION**

An electronic device depending on the principles of electronics and using the manipulation of electron flow for its operation. An electronic component is any physical entity in an electronic system used to affect the electrons or their associated fields in a manner consistent with the intended function of the electronic system. Components are generally intended to be connected together, usually by being soldered to a printed circuit board (PCB), to create an electronic circuit with a particular function (for example an amplifier, radio receiver, or oscillator). Components may be packaged singly, or in more complex groups as integrated circuits. Some common electronic components are capacitors, inductors, resistors, diodes, transistors, etc. Components are often categorized as active (e.g. transistors and thyristors) or **passive** (e.g. resistors and capacitors). Analog circuits are sometimes called linear circuits although many non-linear effects are used in analog circuits. Good examples of analog circuits include vacuum tube and transistor amplifiers, multivibrators and oscillators.

### **OBJECTIVES:**

- To discuss the importance of Electronic devices and circuits.
- To study about the PN junction diode, Bipolar transistor.
- To study about the Field Effect Transistor, LED, LCD and other photo electronic devices

## **MICRO LESSON PLAN**

<b>Weeks</b>	<b>Hours</b>	<b>LECTURE TOPICS</b>	<b>READING</b>
<b>UNIT I - PN JUNCTION DEVICES</b>			
<b>I</b>	1	PN junction diode –Structure, Operation	T1
	2	PN junction diode –V-I characteristics	T1
	3	Tutorial	T1
	4	Diffusion and Transient Capacitance	T1
	5	Rectifiers- Half Wave Rectifier(AV Class)	T1
	6	Rectifiers: Full Wave Rectifier	T1
<b>II</b>	7	Tutorial	T1
	8	Display devices- LED	T1
	9	Laser diodes	T1
	10	Zener diode characteristics, Zener Reverse characteristics	T1
	11	Zener as regulator	T1
<b>III</b>	12	Tutorial	T1

		<b>UNIT II - TRANSISTORS</b>	
III	13	BJT- Structure, Operation	T1
III	14	BJT- Characteristics	T1
	15	Tutorial	T1
	16	JFET- Structure, Operation	T1
	17	JFET- Characteristics(AV Class)	T1
IV	18	Tutorial	T1
	19	MOSFET- Structure, Operation	T1
	20	MOSFET- Characteristics	T1
	21	Tutorial	T1
	22	Biasing UJT	T1
V	23	Thyristor- Structure and characteristics	T1
	24	IGBT -Structure and characteristics	T1
		<b>UNIT III - AMPLIFIER</b>	
V	25	BJT small signal model	T1
	26	Analysis of CE amplifiers	T1
	27	Analysis of CB amplifiers	T1
	28	Analysis of CC amplifiers	T1
VI	29	Tutorial	T1
	30	Gain and frequency response	T1
	31	MOSFET small signal model(AV Class)	T1
	32	Analysis of CS amplifier	T1
	33	Analysis of Source Follower	T1
VII	34	Tutorial	T1
	35	Gain and frequency response, High frequency analysis	T1
	36	Tutorial	T1
		<b>UNIT IV - MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER</b>	
VII	37	BIMOS cascade amplifier	T1
	38	Differential amplifier – Common mode analysis	T1
	39	Differential amplifier –Difference mode analysis	T1
VIII	40	Tutorial	T1
	41	FET input stages	T1
	42	Single tuned amplifiers(AV Class)	T1
	43	Gain and frequency response	T1
	44	Tutorial	T1
IX	45	Neutralization methods	T1
	46	Power amplifiers –Types (Qualitative analysis)	T1
	47	Power amplifiers –Types (Qualitative analysis)	T1
	48	Tutorial	T1
		<b>UNIT V - FEEDBACK AMPLIFIERS AND OSCILLATORS</b>	

IX	49	Advantages of negative feedback	T1
	50	Voltage / Current, Series feedback	T1
X	51	Voltage / Current, Shunt feedback	T1
	52	Tutorial	T1
	53	Positive feedback, Condition for oscillations	T1
	54	Phase Shift Oscillator(AV Class)	T1
	55	Wien bridge Oscillator	T1
XI	56	Hartley Oscillator	T1
	57	Tutorial	T1
	58	Colpitts oscillators	T1
	59	Crystal oscillators	T1
	60	Tutorial	T1

**Prepared by**

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