DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

II YEAR

M SCHEME

III SEMESTER

2015 – 2016 onwards

ELECTRONIC DEVICES & CIRCUITS

CURRICULUM DEVELOPMENT CENTRE

M-SCHEME

(Implemented from the Academic year 2015 - 2016 onwards)

Course Name : DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

Subject Code : 34031

Semester : III Semester

Subject title : ELECTRONIC DEVICES & CIRCUITS

TEACHING AND SCHEME OF EXAMINATION:

Number of Weeks/ Semester : 15 weeks

Subject	Instruction		Examination			
			Marks			Duration
	Hrs./ Week	Hrs./ Semester	Internal Assessment	Board Examination	Total	
Electronic Devices and Circuits	6	90	25	75	100	3 Hrs

Topics and allocation of hours

UNIT	TOPIC	TIME (HRS)
I	Semiconductor and Diodes	16
II	Bipolar Junction Transistor	15
III	Transistor oscillators and FET and UJT	17
IV	SCR,DIAC,TRIAC and MOSFET	16
V	Opto Electronic Devices and Wave shaping Circuits	16
	Revision, Tests and Model Exam (3+4+3 Hrs)	10
Total		90

RATIONALE:

Every Electronics Engineer should have sound knowledge about the components used in Electronics Industry. This is vital in R&D Department for chip level troubleshooting. To meet the industrial needs, diploma holders must be taught about the most fundamental subject, Electronic devices and Circuits. By studying this subject, they will be skilled in handling all types of electronic devices and able to apply the skill in electronics system.

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to:

- Study the working principle of PN junction diode and transistor
- Understand the working principle of different types of rectifiers, different transistor configurations and differentiate various types of amplifiers
- Study the performance of special devices like UJT, FET
- Study the performance of different transistor oscillators
- Study the performance of SCR, DIAC, and TRIAC
- Study the performance and types of MOSFET
- Study the different modes of operations of MOSFET
- Know the construction and working principle of optoelectronic devices

- Study the performance of solar cell with principle and applications
- Explain the concept of wave shaping circuits
- Study the working principle of clippers and clampers

34031 – ELECTRONIC DEVICES AND CIRCUITS

Unit	Name of the topic	Hrs
1	**Semiconductor and Diodes:** **Semiconductor-**Definition, classification, intrinsic and extrinsic N type & p type – drift current &diffusion current diodes – PN junction diode – forward and Reverse bias characteristics – specification – zener diode construction & working Principle-characteristics - zener break down-avalanche break down- zener Diode as a voltage regulator –applications- specifications **Rectifier** – introduction-classification of rectifiers-half wave rectifier-full wave Rectifier(center tapped, bridge)-(no mathematical equations)-comparison-Applications-filters-C, LC and PI filters	10 6
2	**Bipolar junction Transistor:** **Transistor –** NPN and PNP transistor – operation-transistor as an amplifier-transistor as a switch – transistor biasing – fixed bias, collector base bias, self bias – CB,CE,CC configurations – characteristics - comparison between three configurations in terms of input impedance, output impedance, current gain, voltage gain – classification of amplifiers- RC coupled amplifier – emitter follower and its application – negative feedback Concept, effect of negative feedback – types of negative feedback connections	10 5
3	**Transistor Oscillators and FET and UJT:** **Transistor oscillator** – Classifications – Condition for oscillations (Barkhausen criterion) – General form of LC oscillator – Hartley Oscillator – Colpitts Oscillator – RC Phase shift oscillator- Crystal oscillator. **Field Effect Transistor** – construction – working principle of FET – difference Between FET and BJT – classification of FET – characteristics of FET – Applications – FET amplifier (common source amplifier). **Uni Junction Transistor** – construction – equivalent circuit – operation – Characteristics – UJT as a relaxation oscillator	11 6
4	**SCR, DIAC, TRIAC & MOSFET:** SCR – introduction – working – VI-characteristics -comparison between SCR and transistor – SCR as a switch, controlled rectifier. TRIAC working principle Characteristics – DIAC – characteristics – DIAC as bi-directional switch. MOSFET – types & characteristics of N channel MOSFET and P channel	9 7

	MOSFET- Characteristics of enhancement and depletion mode MOSFET – MOSFET as a switch. Applications of SCR,TRIAC, DIAC and MOSFET.	
5	**Opto Electronics Devices and wave shaping circuits:** Classification of opto electronic devices – symbols, Characteristics, working of LDR, LED, 7 segment LED and LCD– opto coupler - Photo transistor. Clipper, Clamper Circuits and waveforms only – Solar Cell - Principles -Applications. Astable, Monostable and Bi-stable Multivibrators using Transistors -Schmitt Trigger using Transistors.	16
	Revision , Test and Model exam	10

Text Books:

1. Electronics Devices & Circuits by Salivahanan S, N.Suresh Kumar, A.Vallavaraj

   Tata McGraw Publication 3rd Edition 2016

2. Electronics Devices and circuit theory by Boyestad & Nashelsky, PHI , New Delhi 2009

Reference Books:

1. Electronic Principles by Malvino,-Tata McGraw Hill Publication 2010.
2. Electronic Devices & Circuits by Allen Mottershed*An Introduction*, PHI
3. Electronics Devices & Circuits by Jacob Millman and Halkias3rd Edition 2010, Tata McGraw – Hill publication

   Optical Fiber Communication by GerdKeise 5th Edition, Tata McGraw – Hill Publication