ELECTRICAL & ELECTRONICS ENGINEERING

Subject Code 00204	Theory			No of Period in one session : 60		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	80
	06	-	-	Internal Exam.	:	20

Rationale & Objective:

The subject forms the foundation of electrical and electronics engineering. It prepares the students to familiarize with basic concepts and principles of electrical and electronics as these are encountered in every large and small installations of each type of industries. The diploma holders will be using machines and systems extensively which have electronics and electrical circuits inside. To understand their basic functioning, the students will be required to study the working principles, construction, characteristics, specifications and uses of basic devices and circuits.

Keeping in view the importance and relevance, this course has been developed and incorporated in the curriculum. The content has been divided into the following topics:-

PART-A

Electrical Engineering (Annual Exam : 40 marks)

S. No.	Topics	Periods
1.	Electro-magnetism	04
2.	D.C. Circuits	04
3	D.C Machines	04
4.	A.C. Fundamentals	03
5.	A.C Machines	04
6.	Storage Batteries	03
7.	Measuring Instruments	02
8.	Electrical House Wiring	02
9.	Safety Devices	02
10.	Safety Procedure	02
	Total	**30**

PART-B

Electronics Engineering (Annual Exam : 40 marks)

S. No.	Topics	Periods
1.	Resistor & Colour Code	05
2.	Semiconductor & Diodes	08
3.	Transistors	06
4.	Field effect transistor	06
5.	Digital Electronics	05
	Total	**30**

PART-A

Electrical Engineering

Contents :

Topic 1. -Electro-Magnetism **(04)**

01.01 Magnetic field due to current carrying straight conductor. Circuit loop and solenoid, Magnetic flux, Flux density

01.02 Force between two current carrying parallel conductors.

01.03 Magnetic circuit, seies and parallel, Reluctance. Analog between magnetic and electiric circuits.

01.04 Faraday's Laws of Electromagnetic induction. Lenz's law. Fleming Right hand rule.

01.05 Eddy current, its concept. Eddy current loss.

01.06 Induce e.m.f. dynamically and statically induced e.m.f.

01.07 Selft and mutual inductance.

01.08 Energy storaged in a magnetic field.

01.09 Related problems.

Topic 02. -D. C. Circuits **(04)**

02.01 Ohm's law and Laws of resistance. Concept of resistivity and conductivity, their units and dependence on temperature in a conductor.

02.02 Kirchoff's Voltage and current laws and their application in simple circuits. (Simple idea only).

02.03 Star-delta transformation.

02.04 Thevenin's theorem, Norton's theorem, Super position theorem, Maximum power transfer theorem. (Simple idea only).

02.05 Related problems.

Topic 03. -D. C. Machines **(04)**

03.01 D.C. Generator construction, principle, types.

03.02 D.C.Motors- working principle, Type

03.03 Starter- necessity and types.

Topic 04. - A.C. Fundamentals **(03)**

04.01 Concept of Alternating current and voltage. Difference between A.C. and D.C. concept of cycle, Frequency, period, amplitude, instantaneous value. Average value, I.M.S. value and peak value. Form factor, (Definition only)

04.02 Power in A.C. circuits and power factors. (Basic idea only)

04.03 Alternating voltage applied to pure resistance, pure inductance and pure capacitance. (Simple idea only)

04.04 Poly phase and 3 phase circuits. Concept of line voltage and current in 3 phse star and delta system.

Topic 05. - A.C Machines **(04)**

05.01 Transformer- principle construction.

05.02 Transformer Ratio, efficiency and rating.

05.03 Induction Motor- Principle, construction and types. (Simple idea)

05.04 Alternators- working principle. Brief idea.

Topic 06. - Storage Batteries **(03)**

06.01 Cell - Primary and Secondary Cell.

06.02 Construction of Lead Acid battery (Brief idea only)

06.03 Methods of charging circuits on D.C. and A.C. Application.

06.04 Maintenance of Battery.

06.05 Study of Battery charges.

Topic 07. –Measuring Instruments **(02)**

07.01 Classification of Instuments.

07.02 Watt Meter, Ammeter, Voltmeter, Frequency Meter and energy meter (Simple idea only).

Topic 08. –Electrical House Wiring **(02)**

08.01 Switches, Socket and other itmes used in House wiring.

08.02 Types of House wiring (Brief idea only).

Topic 09. –Safety devices **(02)**

09.01 Fuse- Introduction, Use of fuse, Idea about relay and circuit breakes.

Topic 10. –Safety Procedure **(02)**

10.01 Effects of shocks and burns.

10.02 Procedures to be adopted in case of electrical shocks.

PART-B

Electronics

Topic: 01 – Resistor & Colour Code **[05]**

01.01 Definition, Introduction, connection of Resistors, Condenser,Colour Code, Value calculation of resistors through colour code.

Topic: 02 - Semiconductor and Diodes **[08]**

02.01 Conductors, Semiconductors, insulators, differences between them.

02.02 Conduction in intrinsic and extrinsic semiconductors. Concept of electrons and holes, Donor and acceptor impurities. P and N type semiconductors and their conductivity, drift and diffusion currents.

02.03 P-N Junction diode, Forward and Reverse bias, characteristics of P-N Junction and effect of Temperature, breakdown voltage.

02.04 Introduction - Zener Diode (Simple idea only)

02.05 Photo diodes.

02.06 Light Emitting diode.

Topic: 03 – Transistors **[06]**

03.01 Concept of Bipolar Transistor, PNP and NPN Transistors, Transistor action, Transistor configurations

03.02 Transistor as an amplifier. Classification of Amplifiers, CB, CC and CE amplifiers.

Topic: 04 - Field Effect Transistor **[06]**

04.01 Introduction, Classification, its application (Simple idea only)

Topic: 05 - Digital Electronics **[05]**

05.01 Number System, Binary number, Decimal number and Hexadecimal number, Conversion of each other.

05.02 Basic idea about Gates.

05.03 Introductory Concept of Memories.

Recommended Books

SL	Title		Author / Publisher
1.	Electrical Technology	-	B. L. Threja-S. Chand & Co.
2.	Electrical Technology	-	Edward Hyghes
3.	Basic Electrical Engineering	-	P.S. Dhogal-McGraw Hill Publisher
4.	Basic Electrical Engineering	-	J. B. Gupta-S. K. Kataria & Sons
5.	Basic Electricity	-	B. R. Sharma-Staya Prakashan, N. Delhi
6.	Electronic Principles	-	Malvino-Tata McGraw Hill
7.	Electronics & Radio Engineering	-	M. L. Gupta
8.	Basic Electronics	-	V.K. Mehta- S.Chand & Co. , New Delhi.
9.	Electronics Devices & Circuits	-	Millman & Halkias-McGraw Hill
10.	Basic Electronics & Linear Circuits	-	N. N. Bhargava & Kulshreshta-Tata McGraw Hills, New Delhi
11.	Basic Electronics	-	Grob-Tata McGraw Hill, New Delhi
12.	Digital Electronics and Application	-	Malvino Leach-McGraw Hills, New Delhi
13.	Introduction to Microprocessor	-	Dr. B. Ram, Fhanpat Ray & Sons