

COURSE TITLE : GENERAL ENGINEERING
COURSE CODE :
COURSE CATEGORY : F
PERIODS/WEEK : 4
PERIODS/SEMESTER : 72
CREDITS : 4

RATIONALE:

The role of an Engineer is no longer limited to his major discipline. Multi disciplinary skills are essential to perform satisfactorily in any domain of engineering. This course is designed to develop the multi disciplinary skills required for an Engineer.

TIME SCHEDULE

Module	Topic	Periods
1	Basic Civil Engineering	18
2	Basic Mechanical Engineering	18
3	Basic Electrical Engineering	18
4	Essentials of Electronics Engineering	18
	TOTAL	72

OBJECTIVES

MODULE – 1 **Basic Civil Engineering**

1.1.0 Understand the basic building materials and their engineering purposes.

- 1.1.1 Know the different types of bricks and its characteristics.
- 1.1.2 Know the ingredients of cement.
- 1.1.3 Appreciate the different types of cement.
- 1.1.4 Understand the use of steel as building material.
- 1.1.5 Know the classification of aggregates.
- 1.1.6 Understand the property of bulking of sand.
- 1.1.7 Understand cement concrete.
- 1.1.8 Understand the factors affecting workability.

1.2.0 Understand the component parts of building.

- 1.2.1 Understand the functions of foundation.
- 1.2.2 Differentiate the types of foundation.
- 1.2.3 Know the classification of masonry.

1.3.0 Apply the principles of chain surveying to prepare survey plans.

- 1.3.1 Study the instruments used in chain surveying.
- 1.3.2 Understand the operations involved in chain surveying.

1.4.0 Apply the principles of leveling.

- 1.4.1 Understand the different types of leveling instruments.
- 1.4.2 Understand the reduction of levels of points by Height of collimation method.
- 1.4.3 Appreciate Modern survey instruments.

MODULE - II **Basic Mechanical Engineering**

1.1.0 Understand the importance of IC Engines

- 1.1.1 Define IC Engines
- 1.1.2 Classify IC Engines
- 1.1.3 Explain with line sketches construction and working of two stroke and four stroke petrol and diesel engines.
- 1.1.4 Compare two stroke and four stroke engines
- 1.1.5 Compare petrol engine and diesel engines
- 1.1.6 Explain power transmission of 4 wheel vehicle

1.2.0 Understand various power plants

- 1.2.1 Classification of power plants (Hydel, Thermal and Nuclear power plants only)
- 1.2.2 With line diagram explain the working of Hydro Electric power plant
- 1.2.3 With line diagram explain the working of Thermal (Steam and Diesel) plant
- 1.2.4 With line diagram explain the working of Nuclear power plant

MODULE III **Basic Electrical Engineering**

Presentation with discussion on Electric current, Potential difference, Power, EMF, Resistance and its laws, Ohms law and series parallel circuit, Electromagnetism, generation of AC and DC supply.

3.1.0 Basic Electrical Circuits

- 3.1.1 Draw simple Electrical circuit with source , load and switch and explain how does the circuit functions .
- 3.1.2 Show the division of current and voltage in a DC parallel and series circuit
- 3.1.3 Solve simple DC circuit to determine the voltage , current and power in different branches of series and parallel circuit .
- 3.1.4 State the VA, KVA, KW , KWH, MW
- 3.1.5 Solve DC circuit to determine the energy consumption of an installation
- 3.1.6 List various Electric supply sources – DC , Single phase AC and 3 phase AC

3.2.0 Circuit Parameters

- 3.2.1 State the different loads of Electrical circuit – Resistance , Inductance and Capacitance with examples Like Lamp, heaters , motors , Fan , etc
- 3.2.1 Explain the Simple AC circuit with Resistance , Capacitance and inductance
- 3.2.2 Solve RLC series circuit to determine the impedance, current, power and power factor

3.3.0 Electrical Circuit of an Installation.

- 3.3.1 Illustrate the Single phase circuits with cut outs, energy meter, main switch, fuses, Miniature circuit breaker (MCB) and Earth leakage circuit breaker (ELCB).
- 3.3.2 State the necessity of earthing of equipments and lightning protection of installation.

MODULE - IV Essentials of Electronics Engineering

4.1.0 Study the applications of diodes and LEDs.

- 4.1.1 Review active and passive devices with examples.
- 4.1.2 Explain the working of LED
- 4.1.3 List the applications of LED.
- 4.1.4 Compare LED lighting with CFL lighting.
- 4.1.5 Explain the application of diode as full wave bridge rectifier.
- 4.1.6 Explain 5 volt power supply using 7805.
- 4.1.7 Draw the block diagram of SMPS.
- 4.1.8 List the advantages of Switched mode power supply.

4.2.0 Understand integrated circuits

- 4.2.1 What are integrated circuits.
- 4.2.2 Advantages of SMD circuits.
- 4.2.1 Effect of static electricity on electronic circuits.
- 4.2.2 Precautions in handling electronic circuits.

4.3.0 Familiarize switches, sensors, relays.

- 4.3.1 Familiarize different switches - ON/OFF, push to ON, push to OFF, push to ON/OFF, SPST, SPDT, DPDT.
- 4.3.2 Discuss the application of limit switches in machinery.
- 4.3.3 Explain the working of proximity switch.
- 4.3.4 Explain the working of relays.

4.4.0 Understand micro controllers.

- 4.4.1 Explain any simple block diagram of 8 bit micro controller.
- 4.4.2 List the application of micro controllers.

4.5.0 Understand mobile technology

- 4.5.1 What is CDMA technology.
- 4.5.2 What is GSM technology.
- 4.5.3 Compare 2G and 3G mobile services.

4.6.0 Familiarize inverter and UPS

- 4.6.1 Draw the block diagram of inverter and explain each blocks.
- 4.6.2 Compare inverter and UPS.
- 4.6.3 Differentiate off line and on line UPS.
- 4.6.4 List the factors to be considered while selecting batteries for UPS and inverter.

4.7.0 Handling of E – waste

- 4.7.1 List the health hazards of electronic waste.

CONTENT DETAILS

MODULE – 1 Basic Civil Engineering

Materials: Brick – varieties and strength, characteristics of good brick. Cement - varieties and grade of cement and its uses. Steel – types of steel for reinforcement bars, steel structural sections. Aggregates – types & requirements of good aggregates. Concrete – grades of concrete as per IS code, water cement ratio, workability, mixing, batching, compaction and curing.

Construction: Parts of building - Foundation – types of foundations–spread footing, solated footing, combined footing, Raft, pile & well foundations. Masonry - types rubble masonry, brick masonry, English bond and Flemish bond.(one brick wall).

Surveying: Chain surveying- Principles, instruments, ranging and chaining survey lines, Field work and field book, selection of survey stations, units of land area.

Levelling: Levelling instruments , different types , bench mark, Reduced level of points, booking of field notes , reduction of levels by height of collimation method (Simple problem). Modern survey - instruments – Total station, Electronics theodolite, Distomat.

MODULE –II Basic Mechanical Engineering

The Importance of IC Engines: Definition, Classification- two stroke engines, four stroke engines, Working of two stroke engines and four stroke engines with the help of line sketches, Comparison between two stroke and four stroke engines, Comparison between petrol and diesel engines, Function of Fly wheel, clutch, gearbox, propeller shaft and differential in power transmission, Explain with sketch the working of differential, Briefly explain power transmission of 4 wheel vehicle with line diagram

The Importance of Power Plants: Introduction, Classification of power plants- Working of Hydro electric power plant with schematic sketches- Working of Thermal (Steam and Diesel) power plant with schematic sketches -- working of Nuclear power plant with schematic sketches.

MODULE – III Basic Electrical Engineering

Review with discussion of Electric current, Potential difference, Power, EMF, Resistance and its laws, Ohms law and series parallel circuit, Electromagnetism, generation of AC and DC supply.

Idea of Basic electrical circuit – Electrical Supply and Load and its functioning, Division of voltage and current in a parallel and series circuit - simple problems, Units of power and energy, Solution of DC circuit with Calculation of energy consumption in an installation.

Circuit parameters - Resistance , Capacitance and inductance . Ac circuit with R, L,C. Simple solution of typical AC circuit with resistance, impedance, power and power factor.

Electrical circuit of an installation , Earthing , Lightning protection

MODULE – IV Essentials of Electronics Engineering

Active and passive devices – review only. LED – working, applications, comparison of LED lighting and CFL lighting. Full wave rectifier – diagram and explanation, 5V power supply – with bridge rectifier and 7805. SMPS – block diagram and advantages.

Integrated circuits. SMDs – advantages. Static electricity – precautions in handling electronic circuits.

Switches - ON/OFF, push to ON, push to OFF, push to ON/OFF, SPST, SPDT, DPDT. Working and application of limit switches, proximity switches, relays.

Microcontrollers – simple block diagram of 8 bit micro controllers – application.

Mobile technology – CDMA and GSM. Compare – 2G and 3G technologies.

Inverter & UPS – block diagram. Compare – inverter and UPS. Online and off line UPS – differentiate. Battery selection for UPS and inverter

E – waste – health hazards of e waste.