Lok Jagruti Kendra University
University with a Difference

Diploma
in
Electrical Engineering

LJ Polytechnic

Subject Code:025070204
Basic Of Mechanical And Civil Engineering

Programme/ Branch Name			Diploma in Electrical Engineering			
Course Name	Basic of Mechanical and Civil Engineering				Course Code	025070204
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week / Credits				Evaluation Scheme			
L	T	P	Total Credit	CCE	SEE (Th)	SEE (Pr)	Total Marks
2	0	2	3	50	50	50	150

Legends:
L: Lectures T: Tutorial P: Practical
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisite

- ✓ Basic science and technology and basic aptitude calculations (Pre-university level)
- ✓ Measure basic mechanical quantities/parameters
- ✓ Use major electrical/mechanical machines/instrument/equipment

3. Rationale

- ✓ This subject provides an exceptional knowledge to the entire covering of topics like basics of mechanical and civil engineering related information which is a functional approach of boiler and turbine specifications and its surveying and leveling with proper measurement. With the help of this subject, the students will learn the fundamentals of mechanical and civil engineering. Also, they will go to experience the Practical implementation of fundamental theory concepts along with the learning process of different applications generally used in industries.

4. Objectives

- ✓ Impart a basic knowledge of various types of hand tools and different components, their types, and functions with specifications.
- ✓ Provide working knowledge for steam generation and prime mover with its working principles and functions and its applications.
- ✓ Highlight the importance of planning of residual and industrial building and various foundation design
- ✓ This course provides the student with the fundamental skills to understand mechanical and civil engineering-based approaches.

5. Contents

Unit No.	Topics	Sub-Topics	Learning Outcome	% Weightage	Hours
1	**Introduction of Mechanical Engineering.**	1.1 Introduction of mechanical engineering. 1.2 Use of mechanical engineering: a. In day-to-day life. b. Interdisciplinary use. 1.3 Items in general use- identification criteria, major types, and uses: such as bolts, nuts, washers, bearings, bushes, belts, springs, levers, couplings, brakes, screws, rivets, keys, oil rings, oil seals, gear pulleys, shafts, axles, etc. 1.4 Pipes and pipe fittings- Types, specifications, and uses of pipes and pipe fittings. 1.5 Hand and power tools: a. Types, specifications, and uses of spanners (such as fix, ring, box, pipe, Allen, adjustable, etc.). b. Types, specifications, and uses of hand tools (such as pliers, screwdrivers, saws, hammers, chisels, cutters, planes, etc.). c. Types, specifications, and uses of power tools (drill, chipper, etc.	• Identify Mechanical-related basic components and their uses.	10	6
2	**Steam Generation And Prime Movers**	2.1 Steam. a. Generation process. b. Properties. 2.2 Boilers. a. Classification. b. Working. c. Accessories and mountings-types and applications. d. Common troubles and remedies. 2.3 Prime movers. a. Meaning. b. Classification. c. Working. d. Steam turbine-working. e. Gas turbine-types and applications.	• Explain the working of boilers and prime movers.	30	12

		f. Common troubles and remedies.			
3	**Condenser & Cooling Tower**	3.1 Introduction 3.2 Condenser (Function, Classification) 3.3 Elements of the water-cooled condenser and cooling system 3.4 Types of condenser a. Direct contact type – Jet condenser (Parallel and counter flow) b. Surface condenser (Downflow, Central flow, Evaporative) 3.5 Cooling Tower a. Classification of cooling tower b. Natural cooling tower c. Mechanical draught cooling tower d. Cooling tower environmental effects	• To understand the construction of an air-cooled condenser, including the tubes, fins. • To learn about the air-cooled and water-cooled condensers. • To learn the function of cooling towers and spray ponds and the factors that affect their capacities. • To identify the basic types and construction of cooling towers and spray ponds. • To learn cooling-tower and spray-pond maintenance procedures.	20	8
4	**Civil Engineering Drawing**	4.1. Types of building drawings 4.2. Abbreviations, conventions & symbols in civil drawing. 4.3. Planning of simple residential and industrial Building. 4.4. Planning of Electrical Layout.	• Read and interpret the building drawing Explain the Working of Autotransformer with Its Sketches. • Plan layout of a simple building	20	8
5	**Machine Foundations**	5.1. Criteria for machine foundation 5.2. Provisions for foundation design considerations in machine foundations. Regulator 5.3. Factors to be considered while designing machine foundations such as type of soil. 5.4. Design foundations for simple machines like lathe, compression press, universal testing machine, electric power hammer, etc.	• Assess the typical requirements of foundations for medium-sized electrical and Mechanical Machines.	20	8
				Total Hours	**42**

6. LIST OF PRACTICAL / EXERCISE

The practical/exercises should be properly designed and implemented in an attempt to develop different types of skills so that students can acquire the competencies/Programme outcomes. Following is the list of practical exercises for guidance.

Sr. No	Practical / Exercises	Key Competency	Hours
1	Demonstrate use of various mechanical items, spanners, hand tools, and power tools. The student will prepare the report which will include sketches of each item demonstrated with Specifications and applications.	All hand tools	2
2	Demonstrate various machining methods on a hacksaw, lathe, drill, and milling machines.	Tools and their applications	2
3	Demonstration of different types of Boilers.	Boiler	2
4	Demonstration of different types of Boiler Mountings.	Boiler Mountings	2
5	Demonstration of different types of Boiler Accessories.	Boiler Accessories	2
6	Demonstration of different types of Steam Turbines.	Steam Turbine	2
7	Demonstrate a water-turbine.	Water Turbine	2
8	To study about different types of Condensers.	Condenser	2
9	To study about different types of Cooling towers.	Cooling Tower	2
10	To study about different types of Building Drawing and Symbols used in it.	Building Drawing and Symbols	2
11	Prepare a planning of any Residential Building.	Residential Building	2
12	Prepare a planning of any Industrial Building.	Industrial Building	2
13	Visit of the industry to observe the machine foundation and study of foundation design.	Machine Foundation	2
14	Observe and draw machine foundation for some heavy Machines.	Sketch of Machine Foundation	2
		Total Hour	**28**

7. Suggested Specification Table for Evaluation Scheme

Unit No.	Unit Name	Teaching Hours	Distribution of Topics According to Bloom's Taxonomy					
			R %	U %	Ap %	C %	E %	An %
1	Introduction of Mechanical Engineering	6	20	40	20	0	10	10
2	Steam Generation and Prime Movers	12	20	40	15	10	10	5
3	Condensers and cooling tower	8	20	25	20	10	10	15
4	Civil Engg. Drawing	8	20	30	15	10	10	15
5	Machine Foundations	8	30	30	10	0	20	10

Legends: R - Remembering; U - Understanding; App – Applying; C – Creating; E- Evaluating; An- Analyzing

8. Textbooks

1) Theory of Machines by R.S.Khurmi and, J.K.Gupta S CHAND
2) Electrical Power system by V.K. Mehta
3) Civil Engineering Drawing by Shah Kalel& Patkil

9. Reference Books

1) Power Plant Engineering by Dom Kundwar, Dhanpat Rai & Co.
2) A textbook on Surveying & leveling by T.P.Kanitkar, S.V. Kulkarni.

10. Open Sources (Website, Video, Movie)

1) http://www.animations.physics.unsw.edu.au//jw/AC.html
2) http://en.wikipedia.org/wiki/Transformer
3) http://www.alpharubicon.com/altenergy/understandingAC.htm