

23ES1201-BASIC CIVIL AND MECHANICAL ENGINEERING

Branch	IT	Year : I	Sem: II
Course Category:	Engineering Sciences	Credits:	3
Course Type:	Theory	Lecture-Tutorial-Practical:	3-0-0
Prerequisites:	Nil	Continuous Evaluation:	30
		Semester End Evaluation:	70
		Total Marks:	100

PART A: BASIC CIVIL ENGINEERING

Course Outcomes:

On completion of the course, the student should be able to:

CO1	Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society	K2
CO2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying	K2
CO3	Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.	K2
CO4	Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.	K2
CO5	Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.	K2

Contribution of course outcomes towards Achievement of Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1			1	2	2	2	2	2		2	3	2
CO2	3	3			3	2	2	2	2	2		2	3	2
CO3	3	2			3	2	2	2	2	2		2	3	2
CO4	3	3			3	2	2	2	2	2		2	3	2
CO5	3	2			3	2	2	2	2	2		2	3	2
Avg.	3	2			2	2	2	2	2	2		2	3	2

Course Content

UNIT-1	Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geotechnical Engineering- Transportation Engineering - Hydraulics and Water Resources Engineering - Environmental Engineering-Scope of each discipline - Building Construction and Planning- Construction Materials-Cement - Aggregate -Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques	CO1, CO5
UNIT-2	Surveying: Objectives of Surveying- Horizontal Measurements- Angular Measurements Introduction to Bearings Levelling instruments used for levelling -Simple problems on levelling and bearings-Contour mapping.	CO2

UNIT-3	<p>Transportation Engineering Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering</p> <p>Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).</p>	CO3, CO4
LEARNING RESOURCES		
Textbooks	1. Basic Civil Engineering, M.S.Palanisamy, Tata Mcgraw Hill publications (India) Pvt. Ltd. Fourth Edition	
	2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 2022. First Edition. 3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.	
Reference Books	1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition. 2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016. 3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition. 4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications 2019. 10th Edition. 5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.	

Part B-Basic Mechanical Engineering

Course Outcomes: Upon successful completion of the course, the student will be able to

	Statement	Skill	Level	UNIT
CO1	Understand regarding various engineering material, different modules of Mechanical engineering and importance of Mechanical Engineering in different sectors and industries	Understand	L2	1,2,3
CO2	Explain different manufacturing and thermal engineering processes.	Understand	L2	2
CO3	Describe the concepts of a power plant, mechanical power transmission elements and robotics.	Understand	L2	3

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H: High (3), M: Medium (2), L:Low (1))

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2				3								
CO2	2	2				3								
CO3	2	2				3								

Syllabus		
UNIT	Content	Mapped CO
I	<p>Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society- Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.</p> <p>Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials</p>	CO1
II	<p>Manufacturing Processes: Principles of Casting, Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.</p> <p>Thermal Engineering – Working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.</p>	CO1, CO2
III	<p>Power plants – Working principle of Steam, Diesel, Hydro, Nuclear power plants.</p> <p>Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.</p> <p>Introduction to Robotics - Joints & links, configurations, and applications of robotics.</p>	CO1, CO3

Learning Recourse(s)**Text Book(s)**

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
2. A text book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications, (India) Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd.

Reference books

1. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata McGraw Hill publications (India) Pvt. Ltd.
2. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt.Ltd.
3. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications.