BASIC CIVIL AND MECHANICAL ENGINEERING
(Common to CSE, ECE, EEE)

Course Code	23ES1101	Year	I	Semester	I
Course Category	Engineering science	Branch	EEE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

PART A- BASIC CIVIL ENGINEERING

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	**Understand** various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society (L2)
CO2	**Know** the concepts of surveying and to understand the measurement of distances, angles and levels through surveying (L2)
CO3	**Realize** the importance of Transportation in nation's economy and the engineering measures related to Transportation. (L2)
CO4	**Understand** the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated. (L2)
CO5	**Understand** the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology. (L2)

Contribution of course outcomes towards Achievement of Program Outcomes													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	1			1	2	2		1		2		
CO2	3	3			3	2	2		1		2		
CO3	3	2			3	2	2		2		2		
CO4	3	3			3	2	2		2		2		
CO5	3	2			3	2	2	3	2		2		
Avg.	3	2			2	2	2	3	2		2		

Course Content		
I	**Basics of Civil Engineering**: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-technical 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**
II	**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**

III	**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 **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).	**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	
CO1	Understand regarding various engineering material, different modules of Mechanical engineering and importance of Mechanical Engineering in different sectors and industries(L2)
CO2	Explain different manufacturing and thermal engineering processes. (L2)
CO3	Describe the concepts of a power plant, mechanical power transmission elements and robotics. (L2)

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**	**PSO1**	**PSO2**
CO1	**2**	**2**				**3**							
CO2	**2**	**2**				**3**							
CO3	**2**	**2**				**3**							

Syllabus		
UNIT	**Content**	**Mapped CO**
I	**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. **Engineering Materials** - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials	**CO1**
II	**Manufacturing Processes:** Principles of Casting**,** Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing. **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.	**CO1, CO2**
III	**Power plants** – Working principle of Steam, Diesel, Hydro, Nuclear power plants. **Mechanical Power Transmission -** Belt Drives, Chain, Rope drives, Gear Drives and their applications. **Introduction to Robotics -** Joints & links, configurations, and applications of robotics.	**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.