23CS1101-BASIC CIVIL AND MECHANICAL ENGINEERING

(Common to all branches)

Coursecategory:	Program Core	**Credits:**	3
Course Type:	Theory	**Lecture–Tutorial –Practical:**	3-0-0
Pre-requisite:	Knowledge ofcomputer fundamentals and basic mathematics	**Sessional Evaluation:**	30
		Univ.Exam Evaluation:	70
		Total Marks:	100

Course Objectives	Students undergoing this course are expected to:	
	1. Get familiarized with the scope and importance of Civil and Mechanical Engineering in different sectors and industries. 2. Introduce the preliminary concepts of Building Planning, Building Construction, Materials and the related tests 3. Acquire preliminary knowledge of surveying and understand the importance of the quality of the drinking water. 4. Explain different engineering materials and manufacturing processes 5. Provide an overview of different thermal and mechanical systems, introduce basics of robotics and its applications.	
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
	CO2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
	CO3	Realize the importance of Transportation in nation's economy and the engineering measures related to highways in terms of geometrics.
	CO4	Understand the importance of water resources and storage structures so that the social responsibilities of water conservation will be appreciated.
	CO5	Understand the different manufacturing processes and explain the basics of thermal engineering and its applications.
	CO6	Describe the working of different mechanical power transmission systems and power plants; learn basics of robotics.
	PART A: BASIC CIVIL ENGINEERING	
Course	**UNIT 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-Tests on these materials. Factors to be considered in Building Planning- Nature of Buildings- Typical Layouts of a Residential Building- Industrial Building- Commercial Building like a Supermarket / Hotel / Theatre. **UNIT II** **Surveying:** Objectives of Surveying- Horizontal Measurements- Vertical	

Content	Measurements- Angular Measurements- Levelling instruments used for levelling Introduction to Bearings- Simple problems on levelling and bearings-Contour mapping. **UNIT III** **Transportation Engineering, Water Resources and Environmental Engineering:** Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences - Basic geometric design elements of a highway- Camber- Stopping Sight Distance- Super elevation- Introduction. Water Resources and Environmental Engineering: Sources of water- Quality of water- Specifications and Tests- Introduction to Hydrology- Hydrograph –Rain water Harvesting- Rain water runoff- Water Storage Structures (Simple introduction to Dams and Reservoirs).
Text Books & Reference Books	**Textbooks:** 1. G. Shanmugam and M.S.Palanisamy, sic Civil and the Mechanical Engineering, Tata Mcgraw Hill publications (India) Pvt. Ltd. 2. Basic Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 3. Engineering Materials, Dr. S.C. Rangwala, Charotor Publishing House. 4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications. 5. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi. 6. Building Construction, Dr. B. C. Punmia, Lakshmi Publications, Delhi.
	Reference Books: 1.Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers. 2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi.
	PART B: BASIC MECHANICAL ENGINEERING
Course Content	**UNIT IV** **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. **UNITV** **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**.** **UNITVI** **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. (Note: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject).
Text Books & Reference Books	**TEXTBOOKS:** 1. Internal Combustion Engines by V.Ganesan,ByTata McGraw Hill publications (India) Pvt. Ltd. 2. A Tear 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. **REFERENCEBOOKS:** 1. AppuuKuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I 2. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications 3. Thermal Engineering by Mahesh M RathoreTataMcgraw Hill publications (India) Pvt. Ltd. 4. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata Mcgraw Hill publications (India) Pvt. Ltd..

Contribution of Course Outcomes towards achievement of Program Outcomes (3-High, 2-Medium, 1-Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	3	3	3	-	-	-	2	-	-
CO2	3	-	-	-	-	3	3	3	-	-	-	2	-	-
CO3	3	-	-	-	-	3	3	3	-	-	-	2	-	-
CO4	3	-	-	-	-	3	3	3	-	-	-	2	-	-
CO5	3	-	-	-	-	3	3	3	-	-	-	2	-	-
CO6	3	-	-	-	-	3	3	3	-	-	-	2	-	-