GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Bachelor of Vocation (B.Voc), 1st Semester
Branch: Production Technology
Subject Name: General Mechanical Engineering
Subject Code: 21110302

With effective from academic year 2021-22

Type of course: Engineering Science

Prerequisite: Zeal to learn the subject

Rationale: Understanding of basic principles of Mechanical Engineering is required in various field of engineering.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks			Practical Marks			
L	T	P	C	ESE (E)	PA (M)		PA(V)		PA (I)	
					PA	ALA	ESE	OEP		
03	00	00	03	50	00	00	00	00	00	50

L- Lectures; P- Practical; OJT- On Job Training; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

Sr. No.	Topic	No. of Hours	% Weightage
01	**Basics of Thermodynamics** Basic definition of heat, work, Thermodynamic process, parameters of working body and their units, Equation of state, Universal gas constant, Relation between heat capacity and temperature. Determination of quantity of heat	6	15
02	**Laws of Thermodynamics** Elementary concept of laws of thermodynamics, first law and second law, Graphical representation of process, The work of expansion and compression of a gas, Change in the state of ideal gas-Isochoric, Isothermal and Adiabatic process, Carnot-cycle	8	20
03	**Engineering Materials** Types and applications of Ferrous & Nonferrous metals, Timber, Abrasive material, silica, ceramics, glass, graphite, diamond, plastic and polymer	6	15
04	**Fundamentals of Statics** Force, types of forces, Characteristics of a force, System of forces, Composition and resolution of forces, Newton's Laws of Motion, Coplanar concurrent and non-concurrent force system: Resultant, Equilibrant, Free body diagrams, Coplanar concurrent forces: Resultant of coplanar concurrent force system by analytical and graphical method, Law of triangle of forces, Law of polygon of forces, Equilibrium conditions for coplanar concurrent forces, Lami's theorem. Application of these principles, Coplanar non-concurrent forces: Moments & couples, Characteristics of moment and couple, Equivalent couples, Force couple system, Varignon's theorem, Resultant of non-concurrent forces by analytical method	12	30

	and graphical method, Equilibrium conditions of coplanar non-concurrent force system		
05	**Simple stresses & strains** Basics of stress and strain, Normal/axial stresses: Tensile & compressive, Tangential Stresses :Shear and complementary shear, Strains: Linear, shear, lateral, thermal and volumetric, Hooke's law, Elastic Constants: Modulus of elasticity, Poisson's ratio, Modulus of rigidity and bulk modulus and relations between them, Application of normal stress & strains	8	20

Distribution of marks weightage for cognitive level:

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	20	20	-	-	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books

1. Mechanical Engineering: Khurmi & Gupta
2. General Mechanical Engineering: JK Kapoor
3. A Textbook of Applied Mechanics: R.K. Rajput
4. strength of materials: Ramamrutham

Course Outcome:

Students will be able to:

Sr. No.	**CO statement**	**Marks % weightage**
CO 1	Discuss the various sources of energy and basic terminology of Mechanical engineering.	15
CO 2	Understand law of thermodynamics and analyze various heat engine cycles.	20
CO 3	Discuss the properties of various engineering materials with their applications.	15
CO 4	Understand apply fundamental principles of mechanics & principles of equilibrium.	30
CO 5	Understand the different types of stresses and strains developed in the member.	20

List of Open Source Software/learning website:

https://nptel.ac.in,