



**Gyanmanjari**  
Innovative University

Course Syllabus  
Gyanmanjari Diploma Engineering College  
Semester-1

**Subject :** Engineering Mechanics – DETCV11202

**Type of course:** Engineering Science

**Prerequisite:** NIL

**Rationale:** Engineering mechanics is a branch of applied mechanics that deals with the study of motion, forces, and energy in engineering systems. It involves the analysis of the behavior of materials and structures under different loading conditions, and the development of mathematical models to describe these behaviors.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
04	00	02	05	60	30	10	20	30	150

*Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.*

**Continuous Assessment:**

(For each activity maximum-minimum range is 5 to 10 marks)

Sr. No	Active Learning Activities	Marks
01	<b>Support of Beam</b> Prepare various types of support and loading conditions.	10
02	<b>Effect of loading on Beam</b> Prepare model and apply shear in beam models.	10
03	<b>Model of Lami's Theorem</b> On model applying various unknown forces through Lami's theorem.	10
Total		30



**Course Content:**

Sr. No	Course content	Hr.	% Weightage
1	<b>Basic Mechanics and Force System</b> <ul style="list-style-type: none"> <li>• Definition: Mechanics and Engineering Mechanics - Scope of Engineering Mechanics, Static &amp; Dynamic, and Kinetics &amp; Kinematics, Classify Scalar &amp; Vector Quantity</li> <li>• Differentiate the systems of Units, Unit conversion - List S.I and M.K.S units of physical quantities used in Civil Engineering.</li> </ul>	08	20
2	<b>Fundamentals of Statics</b> <ul style="list-style-type: none"> <li>• Definition: Forces, system of forces, Resultant and Equilibrium of forces.</li> <li>• Principles of superposition &amp; principles of transmissibility.</li> <li>• Conditions of equilibrium, Law of parallelogram of forces, Lami's theorem, law of polygon. Related Problems of above laws.</li> </ul>	14	30
3	<b>Support Reaction</b> <ul style="list-style-type: none"> <li>• Introduction: Moment, couples, Types of beam, Types of load, Types of support.</li> <li>• Determination of support reactions for simply supported beams with point loads and uniformly distributed loading, How to take moment of different types of load.</li> </ul>	08	20
4	<b>Centroid and Centre of Gravity in India</b> <ul style="list-style-type: none"> <li>• Definition: Centre of Gravity, Centroid, Centroid of Standard shape &amp; solids, Reference axis, Axis of symmetry.</li> <li>• Problems to find Centroid T, L, I, Channel Section.</li> </ul>	06	15
5	<b>Friction</b> <ul style="list-style-type: none"> <li>• Friction, Types of friction, Coefficient of friction, Angle of friction, Angle of Repose, Laws of friction.</li> <li>• Problems on friction for a block resting on horizontal plane, Simple Machine.</li> <li>• Definitions of different types Machine and terms related to machine, Reversible and non-reversible machines, conditions for reversibility, Law of machine, maximum Mechanical advantage and efficiency, sketch of different systems of pulley, Simple problems on simple machines.</li> </ul>	06	15





**Suggested Specification table with Marks (Theory):60**

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	15	25	15	15	20	10

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.

**Course Outcome:**

After learning the course, the students should be able to:	
CO1	Identify the force systems for given conditions by applying the basics of mechanics.
CO2	Compute the resultant force of the concurrent force system by using principles of engineering mechanics.
CO3	Find unknown forces and support reactions of beam by using basic principles of mechanics.
CO4	Determine centroid and centre of gravity of standard shape used in engineering system.
CO5	Apply the principles of friction in various conditions for useful purposes.

**List of Practical**

(Minimum-10 practical):

Sr. No	Descriptions	Unit No	Hrs
01	Verify and calculate the value of unknown force through Lami's Theorem.	02	02
02	Verify and calculate resultant force through Law of Parallelogram using analytical and graphical methods.	02	04
03	Verify and calculate resultant force through Polygon Law of Forces using analytical and graphical methods.	02	02



04	Calculate centroid of a lamina having regular and irregular shapes.	04	04
05	Verify and calculate support reactions of a simply supported beam using analytical and graphical methods.	03	04
		Total	16

**Instructional Method:**

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

**Reference Books:**

1. Engineering Mechanics by R. S. Khurmi
2. Engineering Mechanics by D. S. Kumar
3. Applied Mechanics by Dr. H. J. Shah & S.B. Junnarkar
4. Engineering Mechanics by D.S. Bedi

