GANPAT UNIVERSITY
B.Tech FIRST YEAR (CE/IT/EC/BM/MC/ME)

105: Engineering Mechanics

Teaching Scheme (Hrs.)			Examination Scheme (Marks)						
			Theory				Practical		
L	P	Total	Int. Assess	Sem. End		Total	Int. Assess	Sem. End	Total
				Marks	Hrs				
2	1	3	30	70	3	100	25	25	50

1. **Introduction:-**

   Scalar and vector quantities, absolute and derived units, the science of mechanics, fundamental principles, SI units.

2. **Forces & Force Systems:-**

   Force and force systems, composition and resolution of forces, moment of a force, law of parallelogram, resultant of different force systems, Varignon's principle.

3. **Centre of gravity:-**

   Center of gravity of curves, plane areas and bodies, Pappus Guldinus theorem I & II, method of integration.

4. **Moment of Inertia**:-

Area moment of inertia, mass moment of inertia, M.I. of flywheel, different methods of M.I., law of parallel axis, law of perpendicular axis.

5. **Support Reaction:-**

Types of supports, Types of beams, Types of loads, determinate and indeterminate beams.

6. **Equilibrium:**-

   Equilibrium of a particle, resultant and equilibrant, free body and free body diagram, Lami's theorem, equilibrium of human body joints.

7. **Friction:-**

   Theory of friction, Types of friction, inclined plane friction, ladder friction, wedge friction, belt and rope friction.

8. **Simple Lifting Machines:-**

Velocity ratio, mechanical advantage, efficiency, reversibility, law of machines, simple wheel & axle, differential wheel & axle, single purchase crab winch, differential wheel & axle, pulley & pulley block.

9. **Kinematics:-**

Rectilinear, motion of rotation, relative motion & dependent motion, simple harmonic motion, single degree free vibration, instantaneous center.

10. **Kinetics:-**

Newton's law of motion, mass inertia, De-Alembert's principle, motion of connected bodies, motion along inclined planes, impulse and momentum, work, power & energy, conservation of energy.

11. **Stresses & Strains:-**

Classification of materials, types of stresses, relation between stress & strain.

Reference Books:

(1) Engineering Mechanics by Beer & Johnston

(2) Engineering Mechanics by H. J. Shah & Junarker

(3) Engineering Mechanics by P.J.Shah

(4) Engineering Mechanics by A. K. Tayal

(5) Engineering Mechanics by S. Ramamrutham

(6) Engineering Mechanics by Kumar

(7) Strength of Materials by Timo Shenko

(8) Strength of Materials by S. Ramamrutham