

**GOVERNMENT POLYTECHNIC COLLEGE, NABARANGPUR  
DEPARTMENT OF MECHANICAL ENGINEERING**

**COURSE PLAN**

Subject: **ENGINEERING MECHANICS**

Semester, Academic Year: 2<sup>nd</sup> Semester, 2022

Course Faculty: **Mr. Aurobinda Biswas**

Theory: 4 Periods per Week

Total Periods: 60 Periods

Examination: 3 Hours

I.A: 20 Marks

End Sem Exam: 80 Marks

Total Marks: 100 Marks

**Course Outcomes:**

**On completion of the subject, the student will be able to do:**

1. Compute the force, moment & their application through solving of simple problems on coplanar forces.
2. Understand the concept of equilibrium of rigid bodies.
3. Know the existence of friction & its applications through solution of problems on above.
4. Locate the C.G. & find M.I. of different geometrical figures.
5. Know the application of simple lifting machines.
6. Understand the principles of dynamics.

**Lesson Plan Duration: 15 weeks (from March 2022 to June 2022)**

Week	Class Day	Theory Topics	Remarks
1st	1 to 4	<b>FUNDAMENTALS OF ENGINEERING MECHANICS</b>	
		<ul style="list-style-type: none"><li>• Fundamentals</li><li>• Force</li></ul>	
2nd	5 to 8	<ul style="list-style-type: none"><li>• Resolution of a Force.</li><li>• Composition of Forces.</li></ul>	
3rd	9 to 12	<ul style="list-style-type: none"><li>• Graphical Method</li><li>• Resultant of concurrent</li></ul>	

4th	13 and 14	<ul style="list-style-type: none"> <li>• Moment of Force</li> </ul>	
	15 and 16	<p style="text-align: center;"><b>EQUILIBRIUM</b></p> <ul style="list-style-type: none"> <li>• Definition, condition of equilibrium</li> <li>• Analytical &amp; Graphical conditions for concurrent</li> </ul>	
5th	17 to 20	<ul style="list-style-type: none"> <li>• Analytical &amp; Graphical conditions for non-concurrent</li> <li>• Free Body Diagram</li> </ul>	
6th	21 and 22	<ul style="list-style-type: none"> <li>• Lami's Theorem</li> </ul>	
	23 and 24	<p style="text-align: center;"><b>FRICTION</b></p> <ul style="list-style-type: none"> <li>• Definition of friction, Frictional forces</li> </ul>	
7th	25 to 28	<ul style="list-style-type: none"> <li>• Limiting frictional force, Coefficient of Friction.</li> <li>• Angle of Friction &amp; Repose, Laws of Friction</li> <li>• Advantages &amp; Disadvantages of friction</li> </ul>	
8th	29 to 32	<ul style="list-style-type: none"> <li>• Equilibrium of bodies</li> <li>• Force applied on horizontal &amp; inclined plane</li> <li>• Ladder, Wedge Friction</li> </ul>	
9th	33 to 36	<p style="text-align: center;"><b>CENTROID &amp; MOMENT OF INERTIA</b></p>	
		<ul style="list-style-type: none"> <li>• Centroid</li> <li>• Moment of an area about an axis</li> </ul>	
10th	37 to 40	<ul style="list-style-type: none"> <li>• Centroid of geometrical</li> <li>• Centroid of composite figures</li> </ul>	

11th	41 to 44	<ul style="list-style-type: none"> <li>• Moment of Inertia</li> <li>• Parallel axis &amp; Perpendicular axis Theorems</li> </ul>	
12th	45 and 46	<ul style="list-style-type: none"> <li>• M.I. of plane lamina &amp; different engineering sections</li> </ul>	
	47 and 48	<p style="text-align: center;"><b>SIMPLE MACHINES</b></p> <ul style="list-style-type: none"> <li>• Definition of simple machine</li> <li>• Velocity ratio of simple and compound gear train</li> </ul>	
13th	49 to 52	<ul style="list-style-type: none"> <li>• Simple &amp; compound lifting machine</li> <li>• M.A, V.R. &amp; Efficiency</li> <li>• Law and Reversibility of Machine</li> <li>• Study of simple machines</li> </ul>	
14th	53 and 54	<ul style="list-style-type: none"> <li>• Types of hoisting machine</li> <li>• Uses and working principle</li> </ul>	
	55 and 56	<p style="text-align: center;"><b>DYNAMICS</b></p> <ul style="list-style-type: none"> <li>• Kinematics &amp; Kinetics</li> <li>• Principles of Dynamics</li> <li>• Newton's Laws of Motion, Equations of motion and De-Alembert's Principle</li> </ul>	
15th	57 to 60	<ul style="list-style-type: none"> <li>• Work, Power, Energy</li> <li>• Momentum &amp; impulse, conservation of energy and linear momentum,</li> <li>• Collision of elastic bodies and Coefficient of restitutio.</li> </ul>	

### **Books Recommended**

1. Engineering Mechanics – by A.R. Basu (TMH Publication Delhi)
2. Engineering Machines – Basudev Bhattacharya (Oxford University Press).
3. Text Book of Engineering Mechanics – R.S Khurmi (S. Chand).
4. Applied Mechanics & Strength of Material – By I.B. Prasad.
5. Engineering Mechanics – By Timosheenko, Young & Rao.
6. Engineering Mechanics – Beer & Johnson (TMH Publication).