	GOVERNMENT POLYTECHNIC, NABARANGPUR **DEPARTMENT OF MATHEMATICS AND SCIENCE**	
Discipline: **Mechanical,civil ,electrical , automobile**	Semester: 2ND	Name of the Teaching Faculty: DEEPAK RANJAN PATTNAIK
Subject: **ENGINEERING MECHANICS** **(T.h 4)**	No. of days/per week class allotted: **4**	Semester From date: 28/04/2021 To Date:10/07/2021 No. of Weeks:15
COURSE OUTCOMES	**CO1:** Compute the force, moment & their application through solving of simple problems on coplanar forces. **CO2:** Understand the concept of equilibrium of rigid bodies. **CO3:** Know the existence of friction & its applications through solution of problems on above. **CO4:**Locate the C.G. & find M.I. of different geometrical figures. **CO5:** Know the application of simple lifting machines. C06 : Understand the principles of dynamics.	

Week	Class Day	Theory/Practical Topics
1ST	1ST	**1. FUNDAMENTALS OF ENGINEERING MECHANICS** 1.1 Fundamentals. Definitions of Mechanics, Statics, Dynamics, Rigid Bodies,
	2ND	1.2 Force Force System. Definition, Classification of force system according to plane & line of action. Characteristics of Force & effect of Force. Principles of Transmissibility & Principles of Superposition. Action & Reaction Forces & concept of Free Body Diagram.
	3RD	Characteristics of Force & effect of Force. Principles of Transmissibility & Principles of Superposition. Action & Reaction Forces & concept of Free Body Diagram.
	4TH	1.3 Resolution of a Force. Definition, Method of Resolution, Types of Component forces, Perpendicular components & non-perpendicular components. (contd…)
2ND	1ST	QUIZ & ASSIGNMENT - I

	2ND	1.3 Resolution of a Force. Definition, Method of Resolution, Types of Component forces, Perpendicular components & non-perpendicular components.
	3RD	1.4 Composition of Forces. Definition, Resultant Force, Method of composition of forces, (contd…)
	4TH	1.4 Composition of Forces. Definition, Resultant Force, Method of composition of forces,
3RD	1ST	1.4.1 Analytical Method such as Law of Parallelogram of forces & method of resolution.(contd…)
	2ND	QUIZ & ASSIGNMENT - II
	3RD	1.4.1 Analytical Method such as Law of Parallelogram of forces & method of resolution
	4TH	1.4.2. Graphical Method. Introduction, Space diagram, Vector diagram, Polygon law of forces. (contd…)
4TH	1ST	Solved numericals
	2ND	1.4.2. Graphical Method. Introduction, Space diagram, Vector diagram, Polygon law of forces.
	3RD	1.4.3 Resultant of concurrent, non-concurrent & parallel force system by Analytical & Graphical Method(contd…) .
	4TH	1.4.3 Resultant of concurrent, non-concurrent & parallel force system by Analytical & Graphical Method
5TH	1ST	1.5 Moment of Force. Definition, Geometrical meaning of moment of a force, measurement of moment of a force & its S.I units. Classification of moments according to direction of rotation, sign convention, Law of moments, Varignon's Theorem, (contd…)
	2ND	1.5 Moment of Force. Definition, Geometrical meaning of moment of a force, measurement of moment of a force & its S.I units. Classification of moments according to direction of rotation, sign convention, Law of moments, Varignon's Theorem,
	3RD	Couple – Definition, S.I. units, measurement of couple, properties of couple.
	4TH	**2. EQUILIBRIUM** 2.1 Definition, condition of equilibrium, Analytical & Graphical conditions of equilibrium for concurrent, non-concurrent & Free Body Diagram.

		(contd…)
6TH	1ST	**2. EQUILIBRIUM** 2.1 Definition, condition of equilibrium, Analytical & Graphical conditions of equilibrium for concurrent, non-concurrent & Free Body Diagram.
	2ND	2.2 Lami's Theorem – Statement, Application for solving various engineering problems. (contd…)
	3RD	2.2 Lami's Theorem – Statement, Application for solving various engineering problems.
	4TH	**3. FRICTION** 3.1 Definition of friction, Frictional forces, Limiting frictional force, Coefficient of Friction.
7TH	1ST	Angle of Friction & Repose, Laws of Friction, Advantages & Disadvantages of Friction.
	2ND	3.2 Equilibrium of bodies on level plane – Force applied on horizontal & inclined plane (up &down). (contd…)
	3RD	.3.2 Equilibrium of bodies on level plane – Force applied on horizontal & inclined plane (up &down).
	4TH	QUIZ & ASSIGNMENT - IV
8TH	1ST	3.3 Ladder, Wedge Friction.
	2ND	**4. CENTROID & MOMENT OF INERTIA** 4.1 Centroid – Definition, Moment of an area about an axis, centroid of geometrical figures such as squares, rectangles, triangles, circles, semicircles & quarter circles, centroid of composite figures.(contd…)
	3RD	**4. CENTROID & MOMENT OF INERTIA** 4.1 Centroid – Definition, Moment of an area about an axis, centroid of geometrical figures such as squares, rectangles, triangles, circles, semicircles & quarter circles, centroid of composite figures.
	4TH	4.2 Moment of Inertia – Definition, Parallel axis & Perpendicular axis Theorems. M.I. of plane lamina & different engineering sections.(contd…)
9TH	1ST	4.2 Moment of Inertia – Definition, Parallel axis & Perpendicular axis Theorems. M.I. of

		plane lamina & different engineering sections.
	2ND	SOLVED NUMERICALS
	3RD	**5. SIMPLE MACHINES** 5.1 Definition of simple machine, velocity ratio of simple and compound gear train, explain simple & compound lifting machine, define M.A, V.R. & Efficiency & State the relation between them, State Law of Machine, Reversibility of Machine, Self Locking Machine (CONTD…)
	4TH	**5. SIMPLE MACHINES** 5.1 Definition of simple machine, velocity ratio of simple and compound gear train, explain simple & compound lifting machine, define M.A, V.R. & Efficiency & State the relation between them, State Law of Machine, Reversibility of Machine, Self Locking Machine
10TH	1ST	REVISION.
	2ND	QUIZ & ASSIGNMENT - V
	3RD	5.2 Study of simple machines – simple axle & wheel, single purchase crab winch & double purchase crab winch, Worm & Worm Wheel, Screw Jack.(CONTD…)
	4TH	5.2 Study of simple machines – simple axle & wheel, single purchase crab winch & double purchase crab winch, Worm & Worm Wheel, Screw Jack
11TH	1ST	5.3 Types of hoisting machine like derricks etc, Their use and working principle. No problems.
	2ND	SOLVED NUMERICALS
	3RD	SOLVED NUMERICALS
	4TH	**6. DYNAMICS**
12TH	1ST	6.1 Kinematics & Kinetics, Principles of Dynamics, Newton's Laws of Motion, Motion of Particle acted upon by a constant force, (CONTD…)
	2ND	6.1 Kinematics & Kinetics, Principles of Dynamics, Newton's Laws of Motion, Motion of Particle acted upon by a constant force,
	3RD	Equations of motion, DeAlembert's Principle.
	4TH	QUIZ & ASSIGNMENT - VI
13TH	1ST	6.2 Work, Power, Energy & its Engineering Applications, Kinetic & Potential energy & its application.(CONTD…)

	2ND	6.2 Work, Power, Energy & its Engineering Applications, Kinetic & Potential energy & its application.
	3RD	SIMPLE NUMERICAL
	4TH	SIMPLE NUMERICAL
14TH	1ST	6.2 Work, Power, Energy & its Engineering Applications, Kinetic & Potential energy & its application
	2ND	NUMERICALS ON FREE BODY DIAGRAM
	3RD	REVISION
	4TH	6.3 Momentum & impulse, conservation of energy & linear momentum, (CONTD…)
15TH	1ST	6.3 Momentum & impulse, conservation of energy & linear momentum,
	2ND	SOLVED NUMERICALS
	3RD	collision of elastic bodies, and Coefficient of Restitution.
	4TH	REVISION

LEARNING RESOURCES:

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).

Sign. Of Faculty concerned

Sign. Of HOD I/C

Principal