Course Title:	**Engineering Mechanics**	Semester	I/II
Course Code:	**BCIVC103 /203**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:0:0	Exam Hours	03
Total Hours of Pedagogy	50 hours	Credits	03

Course Learning Objectives

CLO 1. To develop students' ability to analyze the problems involving forces, moments with their applications.

CLO 2. To analyse the member forces in trusses

CLO 3. To make students to learn the effect of friction on different planes

CLO 4. To develop the student's ability to find out the centre of gravity and moment ofinertia and their applications.

CLO 5. To make the students learn about kinematics and kinetics and their applications.

Teaching-Learning Process

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.

2. Show Video/animation films to explain the mechanism involved in the principle.

3. Encourage collaborative (Group) Learning in the class.

4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.

5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.

6. Topics will be introduced in multiple representations.

7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.

8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

9. Individual teachers can device innovative pedagogy to improve teaching-learning

Module-1: Introduction to Engineering Mechanics (10 hours)

Introduction to Engineering Mechanics-Statics-Basic principles of statics.

Resultant of coplanar force system: Basic dimensions and units, Idealisations, Classification of force system, principle of transmissibility of a force, composition of forces, resolution of a force, Free body diagrams, moment, Principle of moments, couple, Resultant of force system, Numerical examples.

(RBT Levels: L1, L2, and L3)

Module-2: Co-planar force system (10 hours)

Equilibrium of coplanar force system: Equilibrium of coplanar concurrent force system, Lami's theorem, Equilibrium of coplanar parallel force system, types of beams, types of loadings, types of supports, Equilibrium of coplanar non-concurrent force system, support reactions of statically determinate beams subjected to various types of loads, Numerical examples.

(RBT Levels: L1, L2, L3 and L4)

Module-3: Trusses & Friction (10 hours)

Analysis of Trusses: Introduction, Classification of trusses, analysis of plane perfect trusses by themethod of joints and method of sections, Numerical examples.

Friction: Introduction, laws of Coulomb friction, equilibrium of blocks on horizontal plane, equilibrium of blocks on inclined plane, ladder friction, wedge friction Numerical examples.

(RBT Levels: L1, L2, L3 and L4)

Module-4: Centroid & Moment of inertia of plane areas (10 hours)

Centroid of Plane areas: Introduction, Locating the centroid of rectangle, triangle, circle, semicircle,quadrant and sector of a circle using method of integration, centroid of composite areas and simple built-up sections, Numerical examples.

Moment of inertia of plane areas: Introduction, Rectangular moment of inertia, polar moment of inertia, product of inertia, radius of gyration, parallel axes theorem, perpendicular axis theorem, moment of inertia of rectangular, triangular and circular areas from the method of integration, moment of inertia of composite areas and simple built-up sections, Numerical examples.

(RBT Levels: L1, L2, L3 and L4)

Module-5: Kinematics & Kinetics (10 hours)

Kinematics:

Linear motion: Introduction, Displacement, speed, velocity, acceleration, acceleration due to gravity, Numerical examples on linear motion

Projectiles: Introduction, numerical examples on projectiles.

Kinetics: Introduction, D 'Alembert's principle of dynamic equilibrium and its application in-planemotion and connected bodies including pulleys, Numerical examples.

(RBT Levels: L1, L2, L3 and L4)

Course outcome

At the end of the course the student will be able to:

1. Apply the principles of force resolution to compute the resultant of a force system.
2. Understand the effects of forces, moments, and other types of loads on rigid bodies, and apply this knowledge to compute the reactive forces.
3. Analyse the frictional resistance offered by different planes and apply this analysis to solve related problems.
4. Identify the centroid of sections and apply the concept to compute the moment of inertia.
5. Analyze the behaviour of bodies in motion, considering the forces and moments acting on them.

Course Assessment and Evaluation Details (both CIE and SEE)

Continuous Internal Evaluation: 50 marks		
Theory Assessment Tool	**Marks**	**Reduced marks**
IAT-1	25	25
IAT-2	25	
Assessment -1(activity based)	25	25
Assessment-2(activity based)	25	
Semester End Examination (SEE): 50 marks		
SEE	**Marks**	**Reduced marks**
Course end examination (Answer any one question from each unit – Internal choice)	**100**	**50**

Activity Based Learning / Practical Based learning Suggested Activities are:

1. https://www.youtube.com/watch?v=Zrc_gB1YYS0
2. https://play.google.com/store/apps/details?id=vn.edu.best4u.com.bieudonoiluc
3. https://www.youtube.com/watch?v=Hn_iozUo9m4
4. https://play.google.com/store/apps/details?id=com.teobou
5. https://www.youtube.com/watch?v=WOHRp3V-QA0

Suggested Learning Resources:

Text Books

1. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, 2019, Laxmi Publications.
2. Kolhapure B K, Elements of Civil Engineering and Engineering Mechanics, 2018, EBPB

Reference Books:

1. Irving H. Shames, Engineering Mechanics, 2019, Prentice-Hall.
2. Hibbler R. C., Engineering Mechanics: Principles of Statics and Dynamics, 2017, Pearson Press.
3. Timoshenko S, Young D. H., Rao J. V., Engineering Mechanics, 5th Edition, 2017, Pearson Press.
4. Bhavikatti S S, Engineering Mechanics, 2019, New Age International
5. R. S. Khurmi, N. Khurmi, A Textbook of Engineering Mechanics, 2018, S Chand Publications

- www.youtube.com/watch?v=nGfVTNfNwnk&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT
- https://www.youtube.com/watch?v=nkg7VNW9UCc&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT &i ndex=2
- https://www.youtube.com/watch?v=ljDIIMvxeg&list=PLOSWwFV98rfKXq2KBphJz95rao7q 8PpwT&index=5
- https://www.youtube.com/watch?v=VQRcChR9IkU&list=PLOSWwFV98rfKXq2KBphJz95r ao7q8PpwT&index=18
- https://www.youtube.com/watch?v=3YBXteL-qY4
- https://www.youtube.com/watch?v=z95UW4wwzSc&list=PLOSWwFV98rfKXq2KBphJz95r ao7q8PpwT&index=10
- https://www.youtube.com/watch?v=lheoBL2QaqU&list=PLOSWwFV98rfKXq2KBphJz95rao 7q8PpwT&index=7
- https://www.youtube.com/watch?v=atoP5_DeTPE
- https://www.youtube.com/watch?v=ksmsp9OzAsI
- https://www.youtube.com/watch?v=x1ef048b3CE
- https://www.youtube.com/watch?v=l_Nck-X49qc
- https://play.google.com/store/apps/details?id=appinventor.ai_jgarc322.Resultant_Force
- https://www.youtube.com/watch?v=RIBeeW1DSZg
- https://www.youtube.com/watch?v=R8wKV0UQtlo
- https://www.youtube.com/watch?v=0RZHHgL8m_A

https://www.youtube.com/watch?v=Bls5KnQOWkY

COs	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	2					2	2	2		2		2
CO2	2	3	3	3	2	3	2	3	2	2		3
CO3	2	3	3		2	3	2	2			3	2
CO4	2	3	3		2	3	2		2			2
CO5	2	3	3		2	3	2		2			2

Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped