Course Title:	**Introduction to Civil Engineering**	Semester	I / II
Course Code:	**BESCK104A /204A**	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 make students learn the scope of various specializations of civil engineering.
CLO 2. To make students learn the concepts of sustainable infrastructure.
CLO 3. To develop students' ability to analyse the problems involving forces, moments with their applications.
CLO 4. To develop the student's ability to find out the center of gravity .
CLO 5 . To develop the student's ability to find out moment of inertia 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. Arrange visits to nearby sites to give brief information about the Civil Engineering structures.
3. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
4. Encourage collaborative (Group) Learning in the class.
5. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
6. 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.
7. Topics will be introduced in multiple representations.
8. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
9. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
10. Individual teachers can device innovative pedagogy to improve teaching-learning.

Module-1 Civil Engineering Disciplines and Building Science (10 hours)

Self-study: Construction materials and their different types, elements of residential building.

Introduction to Civil Engineering: Surveying, Structural Engineering, Geotechnical Engineering, Hydraulics & Water Resources, Transportation Engineering, Environmental Engineering, Construction planning &Project management.

Basic Materials of Construction: Bricks, Cement & mortars, Plain, Reinforced &Pre-stressed Concrete, Structural steel, Construction Chemicals.

Structural elements of a building: foundation, plinth, lintel, chejja, Masonry wall, column, beam, slab and staircase

Applications: Quality of Construction materials, Identification of components involved in construction.

Module-2 Societal and Global Impact of Infrastructure (10 hours)

Self-study: Global issues and Consequences

Infrastructure: Introduction to sustainable development goals, Smart city concept, clean city concept, Safe city concept

Environment: Water Supply and Sanitary systems, urban air pollution management, Solid waste management, identification of Landfill sites, urban flood control

Applications: Current affairs across the globe. Idea of sanitation and sewage management

(RBT Levels: L1, L2 and L3)

Module-3 Concepts involved in Force and force systems (10 hours)

Analysis of force systems: Concept of idealization, system of forces, principles of superposition and transmissibility, Resolution and composition of forces, Law of Parallelogram of forces, Resultant of concurrent and non-concurrent coplanar force systems, moment of forces, couple, Varignon's theorem, free body diagram, equations of equilibrium, equilibrium of concurrent and non-concurrent coplanar force systems

(RBT Levels: L1, L2 and L3)

Module-4 Centroid (10 hours)

Centroid: Importance of centroid and centre of gravity, methods of determining the centroid, locating the centroid of plane laminae from first principles, centroid of built-up sections. Numerical examples **(RBT Levels: L1, L2 and L3)**

Module-5 Moment of inertia (10 hours)

Moment of inertia: Importance of Moment of Inertia, method of determining the second moment of area (moment of inertia) of plane sections from first principles, parallel axis theorem and perpendicular axis theorem, section modulus, radius of gyration, moment of inertia of built-up sections, Numerical Examples. **(RBT Levels: L1, L2 and L3)**

Course outcome

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

CO1: Understand the various disciplines of civil engineering

CO2: Understand the infrastructure requirement for sustainable development

CO3: Compute the resultant and equilibrium of force systems.

CO4: Locate the centroid of plane and built-up sections

C05: Compute the moment of inertia of plane and built-up sections.

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:

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

- **Suggested Learning Resources:**

Text books

1. Beer F.P. and Johnston E. R., Mechanics for Engineers, Statics and Dynamics, 2017, McGraw Hill.
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.

Reference books

1. Bhavikatti S S, Engineering Mechanics, 2019, New Age International
2. Reddy Vijaykumar K and Suresh Kumar K, Engineering Mechanics, 2011, BS publication.
3. H J sawan and S P Nitsure, Elements of Civil Engineering& Engineering Mechanics,2018, Tech Publication.

Web links and Video Lectures (e-Resources):

- https://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 and POs Mapping (CO-PO mappings are only Indicative)

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					1	2	2		3		3

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