



SRI KRISHNA INSTITUTE OF TECHNOLOGY

(Accredited by NAAC Approved by A.I.C.T.E. New Delhi, Recognized by Govt. of Karnataka & Affiliated to V.T U., Belagavi)

#29, Chimney Hills, Hesaraghatta Main Road, Chikkabanavara Post, Bengaluru- 560090

Department of Civil Engineering

Academic Year	: 2023-24	Course Name	: Engineering Mechanics
Semester	: 2	Course Code	: BCIVC203
Scheme	: 2022	L:T:P: C	: 2:2:0:0
Total Contact hours	: 50	CIE Marks	: 50
Course Plan Author	: RAMYA B	SEE Marks	: 50
Date	: 06-02-2024	Total Marks	: 100

Course Prerequisites:

- NIL

Learning Objectives:

- To make students learn the scope of various specializations of civil engineering.
- To make students learn the concepts of sustainable infrastructure
- To develop students' ability to analyze the problems involving forces, moments with their applications.
- To develop the student's ability to find out the center of gravity and moment of inertia and their applications.
- To make the students learn about kinematics

Course Outcomes:

CO	At the end of the course, student should be able to . . .	Blooms' Level
CO1	: To develop students' ability to analyze the problems involving forces, moments with their applications.	L2
CO2	: To analyze the member forces in trusses	L2
CO3	: To make students to learn the effect of friction on different planes	L3
CO4	: To develop the student's ability to find out the centre of gravity and moment of inertia and their applications.	L3
CO5	: To make the students learn about kinematics and kinetics and their applications.	L3

Blooms' Taxonomy:

L1	L2	L3	L4	L5	L6
Remembering	Understanding	Applying	Analyzing	Evaluating	Creating



SRI KRISHNA INSTITUTE OF TECHNOLOGY

(Accredited by NAAC Approved by A.I.C.T.E. New Delhi, Recognized by Govt. of Karnataka & Affiliated to V.T U., Belagavi)

#29, Chimney Hills, Hesaraghatta Main Road, Chikkabanavara Post, Bengaluru- 560090

Program Outcomes:

PO1	:	Engineering knowledge	PO7	:	Environment and sustainability
PO2	:	Problem analysis	PO8	:	Ethics
PO3	:	Design/development of solutions	PO9	:	Individual and team work
PO4	:	Conduct investigations of complex problems	PO10	:	Communication
PO5	:	Modern tool usage	PO11	:	Project management and finance
PO6	:	The engineer and society	PO12	:	Life-long learning

Program Specific Outcomes:

PSO1:	Enhancing the employ-ability skills by making the students capable of qualifying national level competitive examinations.
PSO2:	Inculcating in students technical competencies to deal with practical aspects of civil engineering.
PSO3:	Cognizance of social awareness and environmental necessity along with ethical responsibility to have a successful career and to become an entrepreneur

CO-PO-PSO Mapping:

CO	Program Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	3	-		-	1	1	-	-	-	-	-	1	1	1
CO2	2	2	2	-	-	-	-	-	1	-	1	1	1	2	2
CO3	2	3	1	-	-	-	-	-	1	-	1	-	1	2	2
CO4	2	2	2	1	-	-	-	-	1	-	1	-	1	2	1
CO5	2	3	2	-	-	-	-	-	-	-	1	-	-	2	1
Target	80	75	70	-	-	-	10	-	20	-	20	-	10	30	30

Course Content (Syllabus)

Module 1

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 coplanar concurrent force system, Resultant of coplanar non-concurrent force system, Numerical examples.

CH



SRI KRISHNA INSTITUTE OF TECHNOLOGY

(Accredited by NAAC Approved by A.I.C.T.E. New Delhi, Recognized by Govt. of Karnataka & Affiliated to V.T U., Belagavi)

#29, Chimney Hills, Hesaraghatta Main Road, Chikkabanavara Post, Bengaluru- 560090

Textbook : Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, 2015, Laxmi Publications. RBT: L1, L2	08
Module 2 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.	
Textbook : Kolhapure B K, Elements of Civil Engineering and Engineering Mechanics, 2014, EBPB RBT: L1, L2	08
Module 3 Analysis of Trusses: Introduction, Classification of trusses, analysis of plane perfect trusses by the method 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.	
Textbook : Beer F.P. and Johnston E. R., Mechanics for Engineers, Statics and Dynamics, 1987, McGraw Hill. RBT: L1, L2	08
Module 4 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.	
Textbook : Irving H. Shames, Engineering Mechanics, 2019, Prentice-Hall. RBT: L1, L2	08
Module 5 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-plane motion and connected bodies including pulleys, Numerical examples.	
	08



SRI KRISHNA INSTITUTE OF TECHNOLOGY

(Accredited by NAAC Approved by A.I.C.T.E. New Delhi, Recognized by Govt. of Karnataka & Affiliated to V.T U., Belagavi)

#29, Chimney Hills, Hesaraghatta Main Road, Chikkabanavara Post, Bengaluru- 560090

Textbook :

Hibbler R. C., Engineering Mechanics: Principles of Statics and Dynamics, 2017, Pearson Press.

RBT: L1, L2

Schedule of Instruction:

Class No	Topic	Date	RB T	CO	Mode
Module-1					
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 coplanar concurrent force system, Resultant of coplanar non-concurrent force system, Numerical examples.					
1.	Basic dimensions and units, Idealisations		L2	CO 1	1
2.	Classification of force system		L2	CO 1	1
3.	principle of transmissibility of a force, composition of forces, resolution of a force,		L2	CO 1	1
4.	Free body diagrams		L2	CO 1	1
5.	moment, Principle of moments		L2	CO 1	1
6.	Resultant of coplanar concurrent force system		L2	CO 1	1
7.	Resultant of coplanar non-concurrent force system		L2	CO 1	1
8.	Numerical examples.		L2	CO 1	1
9.	Numerical examples.		L2	CO 1	1
10.	Numerical examples.		L2	CO 1	1

Module-2

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.



SRI KRISHNA INSTITUTE OF TECHNOLOGY

(Accredited by NAAC Approved by A.I.C.T.E. New Delhi, Recognized by Govt. of Karnataka & Affiliated to V.T U., Belagavi)

#29, Chimney Hills, Hesaraghatta Main Road, Chikkabanavara Post, Bengaluru- 560090

Class No	Topic	Date	RB T	CO	Mode
11.	Equilibrium of coplanar concurrent force system		L2	CO 2	2
12.	Lami's theorem, Equilibrium of coplanar parallel force system,		L2	CO 2	2
13.	types of beams, types of loadings, types of supports, Equilibrium of coplanar non-concurrent force system		L2	CO 2	2
14.	support reactions of statically determinate beams subjected to various types of loads		L2	CO 2	2
15.	Numerical examples		L2	CO 2	2
16.	Numerical examples		L2	CO 2	2
17.	Numerical examples		L2	CO 2	2
18.	Numerical examples		L2	CO 2	2
19.	Numerical examples		L2	CO 2	2
20.	Numerical examples		L2	CO 2	2

Module-3

Analysis of Trusses: Introduction, Classification of trusses, analysis of plane perfect trusses by the method of joints and method of sections, Numerical examples. **Friction**: Introduction, laws of Coulomb friction, , equilibrium of blocks on inclined plane, ladder friction, wedge friction equilibrium of blocks on horizontal plane Numerical examples.

21.	Classification of trusses		L3	CO 3	3
22.	analysis of plane perfect trusses by the method of joints		L3	CO 3	3
23.	method of sections		L3	CO 3	3
24.	Numerical examples		L3	CO 3	3
25.	Friction : Introduction, laws of Coulomb friction		L3	CO 3	3



SRI KRISHNA INSTITUTE OF TECHNOLOGY

(Accredited by NAAC Approved by A.I.C.T.E. New Delhi, Recognized by Govt. of Karnataka & Affiliated to V.T U., Belagavi)

#29, Chimney Hills, Hesaraghatta Main Road, Chikkabanavara Post, Bengaluru- 560090

Class No	Topic	Date	RB T	CO	Mode
26.	equilibrium of blocks on horizontal plane		L3	CO 3	3
27.	ladder friction, wedge friction		L3	CO 3	3
28.	Numerical examples.		L3	CO 3	3
29.	Numerical examples		L3	CO 3	3
30.	Numerical examples		L3	CO 3	3

Module-4

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.

31.	Introduction, Locating the centroid of rectangle, triangle		L3	CO 4	4
32.	circle, semicircle, quadrant and sector of a circle using method of integration,		L3	CO 4	4
33.	centroid of composite areas and simple built up sections		L3	CO 4	4
34.	Numerical examples		L3	CO 4	4
35.	Introduction, Rectangular moment of inertia, polar moment of inertia, product of inertia		L3	CO 4	4
36.	Introduction, Rectangular moment of inertia, polar moment of inertia, product of inertia		L3	CO 4	4
37.	triangular and circular areas from the method of integration, moment of inertia of composite areas and simple built up sections		L3	CO 4	4
38.	Numerical examples		L3	CO 4	4



SRI KRISHNA INSTITUTE OF TECHNOLOGY

(Accredited by NAAC Approved by A.I.C.T.E. New Delhi, Recognized by Govt. of Karnataka & Affiliated to V.T U., Belagavi)

#29, Chimney Hills, Hesaraghatta Main Road, Chikkabanavara Post, Bengaluru- 560090

Class No	Topic	Date	RB T	CO	Mode
39.	Numerical examples		L3	CO 4	4
40.	Numerical examples		L3	CO 4	4

Module-5

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-plane motion and connected bodies including pulleys, Numerical examples.

41.	Linear motion: Introduction, Displacement, speed, velocity, acceleration, acceleration due to gravity		L3	CO 5	5
42.	Numerical examples on linear motion Projectiles		L3	CO 5	5
43.	Introduction, numerical examples on projectiles. Kinetics: Introduction		L3	CO 5	5
44.	D 'Alembert's principle of dynamic equilibrium and its application		L3	CO 5	5
45.	motion and connected bodies including pulleys		L3	CO 5	5
46.	Numerical examples.		L3	CO 5	5
47.	Numerical examples.		L3	CO 5	5
48.	Numerical examples.		L3	CO 5	5
49.	Numerical examples.		L3	CO 5	5
50.	Numerical examples.		L3	CO 5	5

Textbooks:

T1	Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, 2015, Laxmi Publications.
T2	Kolhapure B K, Elements of Civil Engineering and Engineering Mechanics, 2014, EBPB

Reference books:



SRI KRISHNA INSTITUTE OF TECHNOLOGY

(Accredited by NAAC Approved by A.I.C.T.E. New Delhi, Recognized by Govt. of Karnataka & Affiliated to V.T U., Belagavi)

#29, Chimney Hills, Hesaraghatta Main Road, Chikkabanavara Post, Bengaluru- 560090

R1	Beer F.P. and Johnston E. R., Mechanics for Engineers, Statics and Dynamics, 1987, McGraw Hill
R2	Timoshenko S, Young D. H., Rao J. V., Engineering Mechanics, 5th Edition, 2017, Pearson Press.

Web links and Video Lectures (e-Resources):

1.	https://sites.google.com/skit.org.in/2nd-sem/



SRI KRISHNA INSTITUTE OF TECHNOLOGY

(Accredited by NAAC Approved by A.I.C.T.E. New Delhi, Recognized by Govt. of Karnataka & Affiliated to V.T U., Belagavi)

#29, Chimney Hills, Hesaraghatta Main Road, Chikkabanavara Post, Bengaluru- 560090

Assessment Schedule:

S.N	Assessment Type	Content	CO	Duration	Marks	Date
1.	CIE Test 1	M 1 & M 2	CO1,CO2 , CO3	75min	25	
2.	CIE Test 2	M 3 , M 4 & M 5	CO4, CO5	75min	25	
3.	CIE Test 3	-	-	-	-	-
4.	Assignment 1	M 1 & M 2			10	
5.	Assignment 2	M 4 & M 5			10	
6.	Model				15	
7.	Semester End Examination			3hours	50	

RB – Text Book/Reference Book, ***L** – Lecture, **V**- Videos or any other mode, ***RBT** – Revised Blooms' Taxonomy, **L: T: P: C** – Theory/Lecture: Tutorial: Practical/Drawing: Credits, **SEE**: Semester End Examination, **CIE**: Continuous Internal Evaluation, **Seminar**: Group of 6-8 students, **Module** 1,2,3,4 & 5,

****The sum of total marks of three tests, two assignments, and seminar will be out of 100 marks and will be scaled down to 50 marks. (As per the scheme), CIE + SEE = 50 + 50 = 100 marks**

Ramya B
Faculty In charge

Course Coordinator

HoD