|| Jai Sri Gurudev ||
Sri Adichunchanagiri Shikshana Trust (R)
SJB Institute of Technology
BGS Health and Education City, Dr. Vishnuvardhana Road, Kengeri, Bengaluru-560060
Approved by AICTE, New Delhi.
Autonomous Institute affiliated to Visvesvaraya Technological University, Belagavi
Accredited by NAAC with 'A+'grade, Certified by ISO 9001 - 2015
Recognized by UGC, New Delhi with 2(f) & 12 (B)

Semester:	**I/II**	**Course Type:**	**ESC**		
Course Title: Introduction to Building Science and Engineering Mechanics					
Course Code:	**25CVT13/23**			**Credits:**	03
Teaching Hours/Week (L: T:P:S)			3:0:0:1	**Total Hours:**	40
CIE Marks:	50	**SEE Marks:**	50	**Total Marks:**	100
SEE Type:	Theory			**Exam Hours:**	03

Course Objectives: This course aims to

- Discuss the fundamental concepts of building science, disciplines of civil engineering, construction materials, and structural elements of buildings.
- Analyse the sustainability aspects of the built environment through appropriate selection of green materials and interpretation of rating systems.
- Determine support reactions using force system and equilibrium principles.

I. Teaching-Learning Process (General Instructions)

Chalk and talk, videos, Power Point presentation, Field visits

II. COURSE CONTENT

Module-1: 8 Hours

Importance and Scope of various fields of Civil Engineering: Surveying, Structural Engineering, Geotechnical Engineering, Water Resources Engineering, Transportation Engineering, Environmental Engineering, Construction Planning and Project Management.
Basic Materials of Construction: Types and Uses of Bricks, Stones, Cement, Structural Steel, Wood and Concrete.
Structural Elements of a Building: Concept of Foundation, Plinth, Lintel, Chejja, Masonry wall, Column, Beam, Slab, Flooring and Staircase.
RBT Levels: L1 L2

Module-2: 8 Hours

Introduction to Engineering Mechanics: Concept of idealization, System of forces, Principles of transmissibility of a force, Resolution and composition of forces, Law of Parallelogram of forces, Resultant of coplanar concurrent force systems, Concepts of Moment of forces, Couple, Varignon's theorem: Resultant of coplanar non-concurrent force systems. Numerical examples**.**
RBT Levels: L2 L3

Module-3: 8 Hours

Bodies in Equilibrium
Free body diagrams, Equations of equilibrium, Lami's Theorem, Equilibrium of Coplanar Concurrent force systems: Numerical examples.
RBT Levels: L2 L3

Module-4: 8 Hours

Support Reactions in Beams: Types of loadings, beams and supports, Concept of Statically determinate and indeterminate structures (Definitions with examples only), Support reactions: Numerical examples on Statically determinate beams.
RBT Levels: L2 L3

Module-5:	8 Hours

Centroid of Plane areas: Introduction, Locating the centroid of rectangle, triangle, circle, semicircle and quadrant 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, Moment of inertia about an axis, Parallel axes theorem, Perpendicular axes theorem, Polar moment of inertia, Radius of gyration.

Moment of inertia of square, 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: L2 L3

III. COURSE OUTCOMES: At the end of the course the student will be able to

CO1	Explain the fundamental concepts of building science, disciplines of civil engineering, construction materials, and structural elements of buildings.
CO2	Determine the effect of force systems.
CO3	Analyze the bodies in equilibrium.
CO4	Locate the centroid of plane areas and compute moment of inertia of plane areas.

IV. CO-PO-PSO MAPPING (mark H=3; M=2; L=1)

PO/PSO	1	2	3	4	5	6	7	8	9	10	11	12	S1	S2	S3	S4
CO1	2	1														
CO2	2	2	1													
CO3	2	2	1													
CO4	2	1	1													
CO5	2	1	1													

V. Assessment Details (CIE & SEE)

General Rules: Refer Annexure section 1

Continuous Internal Evaluation (CIE): Refer Annexure section 1

Semester End Examination (SEE): Refer Annexure section 1

VI. Learning Resources

VII(a): Textbooks:

Sl. No.	Title of the Book	Name of the author	Edition and Year	Name of the publisher
1	Building Construction	Rangwala	33rd Edition, 2016	Chariot Publishing House Pvt. Ltd
2	Basic Civil Engineering and Engineering Mechanics	Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan	3rd Edition, 2015	Laxmi Publications, ISBN: 9789380856674.
3	Elements of Civil Engineering and Engineering Mechanics	Kolhapure B K,	11th Edition, 2018	Eastern Book Promoters Belgaum [EBPB], ISBN: 5551234003896

VII(b): Reference Books:

1	Mechanics for Engineers: Statics and Dynamics	Beer F.P. and Johnston E. R	4th Edition, 1987	McGraw Hill, ISBN: 9780070045842
2	Engineering Mechanics-Statics	Meriam J. L. and Kraige L. G	Vol I–6th Edition,2008	Wiley publication
3	Engineering Mechanics-Statics and Dynamics	Irving H. Shames	4th Edition, 2002	Prentice-Hall of India(PHI)

4	Engineering Mechanics: Principles of Statics and Dynamics	Hibbler R. C.	2017	Pearson Press, New Delhi
5	Engineering Mechanics	Timoshenko S, Young D. H., Rao J. V., Sukumar Patil	2017	McGraw Hill Publisher, ISBN: 9781259062667
6	Engineering Mechanics	Bhavikatti S S	4th Edition, 2018	New Age International Publications.

VII(c): 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&index=2
- https://www.youtube.com/watch?v=ljDIIMvxeg&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=5
- https://www.youtube.com/watch?v=3YBXteL-qY4
- https://www.youtube.com/watch?v=z95UW4wwzSc&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=10
- https://www.youtube.com/watch?v=ksmsp9OzAsI
- https://www.youtube.com/watch?v=x1ef048b3CE
- https://www.youtube.com/watch?v=l_Nck-X49qc
- https://www.youtube.com/watch?v=R8wKV0UQtlo
- https://www.youtube.com/watch?v=0RZHHgL8m_A
- https://www.youtube.com/watch?v=Bls5KnQOWkY

VIII: Activity Based Learning / Practical Based Learning/Experiential learning:

- https://www.youtube.com/watch?v=Zrc_gB1YYS0
- https://www.youtube.com/watch?v=Hn_iozUo9m4