



Semester: I / II						
ELEMENTS OF CIVIL ENGINEERING						
Category: Engineering Science Course						
(Common to all Programs Except CV Program)						
(Theory)						
Course Code	:	CV113ATB/CV123ATB		CIE	:	100 Marks
Credits: L: T: P	:	3:0:0		SEE	:	100 Marks
Total Hours	:	40L		SEE Duration	:	03 Hours

Unit – I	08 Hrs
Introduction to Civil Engineering: Surveying, Structural Engineering, Geotechnical Engineering, Hydraulics & Water Resources, Transportation Engineering, Environmental Engineering, Construction planning & Project management.	
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.	
Unit – II	08 Hrs
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 including geometric design. Plinth area, carpet area, floor area ratio, numerical problems, local building byelaws.	
Unit – III	08 Hrs
Environmental Engineering: Water Supply and Sanitary systems, Water quality and Security. Urban air pollution -causes and remedial measures, Solid waste management- types, sources, collection and disposal methods, Urban flood- types, causes and control.	
Built-Environment: Energy efficient buildings, recycling, Temperature and Sound control in buildings, Security systems, Smart buildings.	
Unit – IV	08 Hrs
Transportation Engineering: Importance and classification of roads and railways, types of highway pavements and its functions. Functions and types of Tunnels, Harbours, Airport. Concepts of Multimodal transportation system- relevance and integration.	
Unit – V	08 Hrs
Geotechnical Engineering: Origin and formation of soil, Foundations- Importance, Types, and Factors to be considered in selection of foundations.	
Novel areas: Concepts of Automation and Robotics in Construction, Concept of Sustainability in Civil Engineering, Introduction to sustainable development goals, Concept of Smart, Clean and Safe city.	

Course Outcomes: After completing the course, the students will be able to	
CO1	Apply the knowledge of Civil Engineering in the infrastructural development of society. (PO1, PO2, PO11)
CO2	Comprehend the importance of construction materials for Civil Engineering applications. (PO1, PO2)
CO3	Illustrate the latest technologies in Civil Engineering for sustainable practices. (PO1, PO2)
CO4	Exhibit the knowledge of Civil Engineering in interpreting engineering problems. (PO1, PO2, PO8, PO9, PO11)

Reference Books	
1	Principles of Transportation Engineering, <u>Partha Chakroborty</u> , Animesh Das, PHI Learning Pvt. Ltd., 2 nd Edition, 2003, ISBN: 9788120320840.
2	Engineering Mechanics, Bhavikatti S S, New Age International Private Limited, 8 th Edition, 2021, ISBN-13:978-9388818476.



3	Basic Civil Engineering, <u>G.K. Hiraskar</u> , Dhanpat Rai Publications, 1 st Edition, ISBN-13 978-9383182022: .
4	Basic Civil Engineering and Engineering Mechanics, R.K. Bansal, Laxmi Publications, 3rd Edition, 2015, ISBN-13:978-9380856674
5	Basic Civil Engineering, B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications; 1st Edition, 2003, ISBN-13 : 978-8170084037.

RUBRIC FOR THE CONTINUOUS INTERNAL EVALUATION (THEORY)		
#	COMPONENTS	MARKS
1	QUIZZES: Quizzes will be conducted in online/offline mode. TWO QUIZZES will be conducted & Each Quiz will be evaluated for 10 Marks. THE SUM OF TWO QUIZZES WILL BE THE FINAL QUIZ MARKS.	20
2	TESTS: Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). THREE tests will be conducted (Two regular tests and one optional improvement test). Each test will be evaluated for 50 Marks, adding upto 100 Marks. FINAL TEST MARKS WILL BE REDUCED TO 40 MARKS.	40
3	EXPERIENTIAL LEARNING: Students will be evaluated for their creativity and practical implementation of the problem. Case study-based teaching learning (10), Program specific requirements (10), Video based seminar/presentation/demonstration (20) Phase 2 will be done in the exhibition mode (Demo/Prototype/any outcome). ADDING UPTO 40 MARKS.	40
MAXIMUM MARKS FOR THE CIE THEORY		100

RUBRIC FOR SEMESTER END EXAMINATION (THEORY)		
Q. NO.	CONTENTS	MARKS
	PART A	
1	Objective type questions covering entire syllabus	20
	PART B (Maximum of TWO Sub-divisions only)	
2	Unit – I: (Compulsory)	16
3 & 4	Unit – II: Question 3 or 4	16
5 & 6	Unit – III: Question 5 or 6	16
7 & 8	Unit – IV: Question 7 or 8	16
9 & 10	Unit – V: Question 9 or 10	16
MAXIMUM MARKS FOR THE SEE THEORY		100