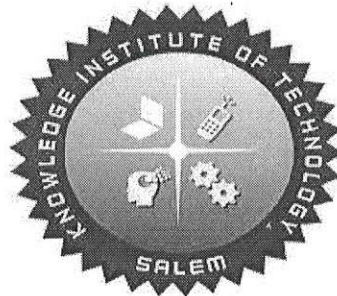


KNOWLEDGE INSTITUTE OF TECHNOLOGY

(An Autonomous Institution)

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Accredited by NBA (CSE, ECE, EEE & MECH), Accredited by NAAC with "A" Grade KIOT
Campus, Kakapalayam (PO), Salem – 637 504, Tamil Nadu, India.



Beyond Knowledge

B.E. / B.Tech. Regulations 2023


B.E. – Civil Engineering

Curriculum and Syllabi

(For the Students Admitted from the Academic Year 2023-24 Onwards)

Version: 1.0

Date: 09.09.2023


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KIOT Campus, Kakapalayam.
Salem-637 504



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website: www.kiot.ac.in

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B.E. / B.Tech. REGULATIONS 2023 (R 2023)

CHOICE BASED CREDIT SYSTEM AND OUTCOME BASED EDUCATION

B.E. CIVIL ENGINEERING

VISION OF THE INSTITUTE

- To be a world class institution to impart value and need based professional education to the aspiring youth and carving them into disciplined world class professional who have the quest for excellence, achievement orientation and social responsibilities.

MISSION OF THE INSTITUTE

- | | |
|----------|---|
| A | To promote academic growth by offering state-of-art undergraduate, postgraduate and doctoral programs and to generate new knowledge by engaging in cutting – edge research. |
| B | To nurture talent, Innovation, entrepreneurship, all-round personality and value system among the students and to foster competitiveness among students. |
| C | To undertake collaborative projects which offer opportunities for long-term interaction with academia and industry. |
| D | To pursue global standards of excellence in all our endeavors namely teaching, research, consultancy, continuing education and support functions. |

VISION OF THE DEPARTMENT

To be a leader to impart quality Civil Engineering education to the young minds and make them into competent professionals with social and ethical values.

MISSION OF THE DEPARTMENT

- | | |
|-----------|--|
| M1 | To generate new knowledge in Civil Engineering through innovative teaching and research by using the state-of-the art facilities. |
| M2 | To nurture technical and entrepreneurship skills, ethics and social values among the students and to develop them into globally competitive engineering graduates. |
| M3 | To create a spirit of Involvement in research by developing center of excellence in the field of Civil Engineering and allied research by long term interaction with industry. |
| M4 | To provide knowledge based consultancy services to the community in all areas of Civil Engineering. |

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- | | |
|--------------|---|
| PEO 1 | Graduates will design, simulate, and execute the Civil Engineering projects using fundamental knowledge and modern engineering tools. |
| PEO 2 | Graduates will analyze, solve, and deliver the appropriate solutions for construction industry problems using professional knowledge. |
| PEO 3 | Graduates will work in multidisciplinary projects with administrative skills, communication skills and exhibit professional ethics in their workplace |

PROGRAM OUTCOMES (POs)	
Engineering Graduates will be able to:	
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)	
After the successful completion of B.E. Programme in Computer Science and Engineering, the graduates will able to	
PSO 1	Design a cost effective and optimized solution for Civil Engineering problems by using modern techniques.
PSO 2	Plan, Analyze, Design and execute the Civil Engineering projects using eco-friendly construction materials with technical knowledge

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B.E. CIVIL ENGINEERING

Courses of Study and Scheme of Assessment (Regulations 2023)

Sl. No.	Course Code	Course Title	Periods / Week						Maximum Marks		
			CAT	CP	L	T	P	C	IA	ESE	Total
SEMESTER III											
THEORY											
1	BE23MA204	Transforms and partial differential Equations	BS	3	2	1	0	3	40	60	100
2	BE23CE403	Water Supply Engineering	PC	3	2	1	0	3	40	60	100
3	BE23CE404	Strength of Materials	PC	3	2	1	0	3	40	60	100
THEORY CUM PRACTICAL											
4	BE23CS310	Data Structures and SQL	ES	5	2	1	2	4	50	50	100
5	BE23CE405	Transportation Engineering	PC	5	2	1	2	4	50	50	100
6	BE23CE406	Fluid Mechanics & Hydraulic Machinery	PC	5	2	1	2	4	50	50	100
PRACTICAL											
7	BE23CE407	Computer Aided Building Drafting	PC	2	0	0	2	1	60	40	100
8	BE23EN103	Professional Communication Laboratory -I	HS	2	0	0	2	1	60	40	100
EMPLOYABILITY ENHANCEMENT											
9	BE23PT805	Engineering Clinic-II	EEC	2	0	0	2	1	100	-	100
10	BE23PT807	Aptitude Skills -II	EEC	1	0	0	1	0.5	100	-	100
Total				31	12	6	13	24.5	590	410	1000
SEMESTER IV											
THEORY											
1	BE23MA206	Mathematics for Business Analytics	BS	3	2	1	0	3	40	60	100
2	BE23CE408	Structural Analysis	PC	3	2	1	0	3	40	60	100
3	BE23CE409	Design of Steel Structural Elements	PC	3	2	1	0	3	40	60	100
4	BE23MC904	Environmental Science and Sustainability	MC	2	1.5	0.5	0	NC	-	-	-
THEORY CUM PRACTICAL											
5	BE23CS311	Object oriented programming using C++, JAVA	ES	5	2	1	2	4	50	50	100
6	BE23CE410	Waste Water Engineering	PC	5	2	1	2	4	50	50	100
7	BE23CE411	Surveying	PC	5	2	1	2	4	50	50	100
PRACTICAL											
8	BE23EN104	Professional Communication Laboratory -II	HS	2	0	0	2	1	60	40	100
EMPLOYABILITY ENHANCEMENT											
9	BE23PT808	Aptitude Skills -III	EEC	1	0	0	1	0.5	100	-	100
Total				29	13.5	6.5	9	22.5	430	370	800


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BE23MA204	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	Version: 1.0				
Programme & Branch	Common to B.E.(MECH) and B.E.(CIVIL)	CP	L	T	P	C
		3	2	1	0	3
Course Objectives:						
1.	To classify partial differential equations and solution techniques.					
2.	To expand the periodic function using Fourier series.					
3.	To apply Fourier series for solving boundary value problems.					
4.	To express non-periodic function using Fourier Transforms.					
5.	To apply Z Transforms for solving discrete-time systems.					
INTRODUCTION (Not for Examination)					2	
Importance:						
PDEs involve partial derivatives with respect to multiple variables. They can describe physical phenomena like heat conduction, fluid flow, and wave propagation. Fourier transforms are fundamental in signal processing, converting signals between time and frequency domains.						
Real-life Example(s):						
Digital Filters – Fourier Transform Infrared Spectroscopy – ECG – Seismograph.						
Linkages:						
Pre-requisite: Calculus for Engineers.						
Future courses: Heat and Mass Transfer, Engineering Thermodynamics, Fluid Mechanics, Structural Dynamics, Strength of Materials.						
UNIT-I	PARTIAL DIFFERENTIAL EQUATIONS	5+3				
Formation of partial differential equations – Solutions of standard types of first order partial differential equations – Lagrange's linear equation – Linear partial differential equations of second and higher order with constant coefficients of homogeneous types.						
UNIT-II	FOURIER SERIES	5+3				
Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series and cosine series – Root mean square value – Parseval's identity – Harmonic Analysis.						
UNIT- III	APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS	6+3				
Classification of PDE – Fourier series solutions of one-dimensional wave equation – One dimensional equation of heat conduction.						
UNIT – IV	FOURIER TRANSFORMS	6+3				
Statement of Fourier integral theorem – Fourier transform pair – Fourier sine and cosine Transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.						
UNIT-V	Z - TRANSFORMS AND DIFFERENCE EQUATIONS	6+3				
Z-transforms – Elementary properties – Initial and final value theorems – Inverse Z-transform using partial Fraction and convolution theorem – Formation of difference equations – Solution of difference equations using Z – transforms.						
						Total: 45 Periods
OPEN-ENDED PROBLEMS / QUESTIONS						
Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment only and not for the End semester Examinations.						

Course Outcomes: Upon completion of this course, the students will be able to:		BLOOM'S Taxonomy
CO1	Solve the given standard partial differential equations	L3 – Apply
CO2	Expand the periodic functions in the form of Fourier series along with different cases	L3 - Apply
CO3	Solve boundary value problems using Fourier series	L3 - Apply
CO4	Apply Fourier transforms to solve non-periodic functions	L3 - Apply
CO5	Solve difference equations using Z transforms that arise in discrete time systems	L3 - Apply

TEXTBOOKS:

1.	R.K. Jain, S.R.K. Iyengar, "Advanced Engineering Mathematics", Fifth Edition, Narosa Publishing House, New Delhi, 2020.
2.	Kreyzig E., "Advanced Engineering Mathematics", Tenth Edition, John Wiley and sons, 2020.

REFERENCE BOOKS:

1.	Srimanta pal, Subodh Chandra Bhunia., "Engineering Mathematics", First Edition, Oxford University Press, 2015.
2.	T. Veerarajan, "Transforms and Partial Differential Equations", Third Edition, McGraw hill Education, New Delhi, 2016.
3.	Glyn James, "Advanced Engineering Mathematics", Fourth Edition, Pearson Education, 2010.

WEB REFERENCES:

	Publisher	Website link	Type of Content
1.	IJAERS	https://www.researchgate.net/publication/350973707 A study about Fourier series Mathematical and graphical models and application in electric current and square Oscillations	Journal
2.	IJACSA	https://www.researchgate.net/publication/339020331 Towards an Improvement of Fourier Transform	Journal

VIDEO REFERENCES:

	Video Details	Name of the Expert	Type of Content	Video Link
1.	NPTEL	Dr. Srinivasa Rao Manam, Department of Mathematics, IIT Madras	Lecture	https://www.youtube.com/watch?v=ClvFwUpi3ZA
2.	NPTEL	G.K. Srinivasan, Department of Mathematics, IIT Bombay	Lecture	https://www.youtube.com/watch?v=r77LqzMK5-E


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Mapping of COs with POs and PSOs														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2
CO1	3	2												
CO2	3	2												
CO3	3	2												
CO4	3	2												
CO5	3	2												
Avg.	3	2												

1-Low, 2 -Medium, 3-High.




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BE23CE403	WATER SUPPLY ENGINEERING	Version: 1.0				
Programme & Branch	B.E. - CIVIL ENGINEERING	CP	L	T	P	C
		3	2	1	0	3
Course Objectives:						
1.	To Understand the characteristics of water and its source.					
2.	To Perform the design of unit operation and process of treatment units.					
3.	To Design the disinfection and filtration unit in secondary treatment units.					
4.	To Understand the components of water supply lines and distribution network.					
5.	To Gain Knowledge on different plumbing system used in service connections.					
INTRODUCTION (Not for Examination)					2	
Importance: Environmental Engineering – Water Supply engineering Source of water and water demand calculation -Testing of drinking water quality standards and design of treatment units - Domestic water distribution and supply.						
Real Life Example(s): Water treatment design in municipal water treatment unit - Filtration and Disinfection of water in municipal water supply - Water distribution network followed in cities and townships.						
Linkages: Pre-requisite: Overview of Engineering and Technology. Future Course: Waste water Engineering, Ground water Engineering, Hydrology.						
UNIT-I	PLANNING FOR WATER SUPPLY					5+3
Sources of water: Surface and Groundwater - Planning, Objectives, Characteristics Water Demand: Need for Potable water supply - Drinking Water quality standards (IS 10500-2012) - Design period, Population forecasting methods. Conveyance system of water: Intake (types and location), types of river intake, jack well, pumping system, power and capacity of pump.						
UNIT-II	PRIMARY TREATMENT OF WATER					5+3
Impurities in water: Causes and effects - Unit operations and process - Principles, functions, and design of water treatment plant units, aerators of flash mixers, coagulation and flocculation- Clariflocculator-Plate and tube settlers - Sedimentation tank: types and design of circular sedimentation tank.						
UNIT- III	SECONDARY TREATMENT OF WATER					6+3
Filtration: Classification of filter media, filter operation, problems in filtration- Disinfection: Types, chlorination, UV and Ozone disinfection - Membrane filtration: Types, basic concepts, applications - Adsorption: Introduction, basics of carbon adsorption - Ion Exchange: Theory and principal of softener, concept of 24x7 water supply.						
UNIT - IV	DISTRIBUTION SYSTEM OF WATER					6+3
Requirements of distribution system - Distribution network layouts - Analysis by Hardy Cross method and Equivalent Pipe method- Introduction to computer applications - Leakage detection and prevention - metered and unmetered water supplies - Necessity of pumping in water supply.						
UNIT-V	DOMESTIC WATER SUPPLY SYSTEM					6+3
Principles of design of water supply in buildings - House service connection - Fixtures and fittings, systems of plumbing and types of plumbing. Service connection to buildings- drainage layout - principles governing drainage - plumbing components and design - traps and fittings - water seal - classification of plumbing systems - plumbing design, IS Code provisions-IS 12183 1983 , 2065 1983.						
						TOTAL: 45 PERIODS


OPEN ENDED PROBLEMS / QUESTIONS				
Course Specific Open-Ended Problems will be solved during classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End Semester Examinations.				
Course Outcomes: Upon completion of this course the students will be able to:			BLOOM'S Taxonomy	
CO1	Identify the sources to calculate the total water demand required for a Town/city.		L3 – Apply	
CO2	Classify the different treatment processes associated with characteristics of water.		L3 – Apply	
CO3	Analyze the various methods of disinfection and filtration followed in treatment plant.		L3 – Apply	
CO4	Explain the distribution network and water supply to buildings.		L3 – Apply	
CO5	Relate different plumbing systems used in service connections.		L3 – Apply	
TEXTBOOKS:				
1.	Garg S.K "Water Supply Engineering", Khanna Publishers, 12 th Edition, New Delhi 2022.			
2.	Mark J hammer "Water and wastewater Technology" 7 th Edition , Pearson Education., USA 2014.			
REFERENCE BOOKS:				
1.	Manual on Water supply and Treatment – CPHEEO, 1999.. 4. Birdie, G. S. and Birdie, Water Supply and Sanitary Engineering, Dhanpat Rai & Sons, 2014. IS10500:2012 Water Quality Standards ,New Delhi 2022.			
2.	Punmia B. C., Ashok Jain & Arun Jain, Water Supply Engineering, Laxmi Publication Pvt., Ltd., New Delhi, 2016.			
3.	Peavy H. S., Rowe D. R. and Tchobanoglous G. , Environmental Engineering, McGraw Hill, New York, 2017.			
WEB REFERENCES:				
	Publisher	Website link	Type of Content	
1.	Govt of India	https://jalshakti-ddws.gov.in/	Recent advancements in treatment process.	
2.	Govt of Tamilnadu	http://www.groundwatertnpwd.org.in/	Real time water quality issues.	
VIDEO REFERENCES:				
	Video Details	Name of the Expert	Type of Content	Video link
1.	NPTTEL	Prof C.Venkobachar, Prof. Ligy Philip, Prof. B. S. Murty IIT Madras	Lecture	https://www.youtube.com/watch?v=zVZ9c6EXfTA&list=PL1BFC82F3A63B4172
2.	Coursera	Prof Dale Whittington University of Manchester	Lecture and Animation	https://www.coursera.org/learn/water


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Mapping of COs with POs and PSOs														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2				3					1	2	1
CO2	3	3	2				3					1	2	1
CO3	3	3	3				2					1	2	2
CO4	3	3	2			3	3	2			2	1	1	1
CO5	3	3	3				3	2			2	1	2	2
Avg.	3	3	2.4			3	2.8	2		2	0.8	1	1.8	1.4
1-Low, 2 -Medium, 3-High.														


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BE23CE404	STRENGTH OF MATERIALS	Version: 1.0				
Programme & Branch	B.E. – CIVIL ENGINEERING	CP	L	T	P	C
		3	2	1	0	3
Course Objectives:						
1.	To know the method of finding the slope and deflection of Indeterminate beams and to know the concept of analyzing indeterminate beams.					
2.	To calculate the deflection of beams under the application of external forces.					
3.	To evaluate the performance of columns and the behavior of shaft, cylinders, and springs.					
4.	To analyze a complex two-dimensional state of stress and plane trusses.					
5.	To estimate the load carrying capacity of columns, stresses due to unsymmetrical bending, and various theories for failure of material.					
INTRODUCTION (Not for Examination)					2	
Importance: Structural Engineering – Strength of materials – Behaviour of beams and columns under given loads -indeterminate beams – shafts and cylinders – analysis of truss members.						
Real Life Example(s): Roof Truss, Steam boilers, gas cylinders, penstocks, oil & refinery pressure vessels.						
Linkages: Pre-requisite: Engineering Mechanics. Future courses: Structural Analysis, Design of RC Elements, Design of Steel Structural Elements.						
UNIT-I	INDETERMINATE BEAMS					6+3
Introduction of Indeterminate beams and Concept of Analysis - Propped cantilever and Fixed beams -Fixed end moments and reactions – Theorem of three moments – Analysis of continuous beams.						
UNIT-II	DEFLECTION OF BEAMS					6+3
Introduction -method for computation of slopes and deflections of determinant beams -Double integration method - Macaulay's methods - Area moment method - conjugate beam.						
UNIT- III	COLUMNS, CYLINDER, SHAFTS AND SPRINGS					5+3
Introduction of columns - Euler's theory of columns –End conditions; Rankine-Gordon formula for eccentrically loaded long columns & short columns - Thick & Thin cylinders. Torsion of Circular and Hollow Shafts – Stresses and Deflection in Shafts. Introduction to closed and Open Coiled helical springs.						
UNIT – IV	ANALYSIS OF TRUSS, PRINCIPAL OF STRESS, PRINCIPAL PLANE					5+3
Introduction of Plane trusses: Analysis of plane trusses - method of joints - method of sections. Determination of principal stresses and principal planes–Theories of failure – Application in analysis of stress and load carrying capacity.						
UNIT-V	ANALYSIS OF SECTIONS & CURVED BEAM					6+3
Introduction to Bending of beams - symmetrical and unsymmetrical sections of I Section Section Section & C section – Shear Centre - curved beams – Winkler Bach formula.						
						TOTAL: 45 PERIODS
OPEN ENDED PROBLEMS / QUESTIONS						
Course Specific Open-Ended Problems will be solved during classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End Semester Examinations.						


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Course Outcomes: Upon completion of this course, the students will be able to:		BLOOM'S Taxonomy
CO1	Identify the behaviour of indeterminate beams.	L3 - Apply
CO2	choose any method to find the deflection of beams.	L3 - Apply
CO3	Solve different end conditions of columns and stresses in shafts and cylinders.	L3 - Apply
CO4	Determine the stresses induced in principal planes, principal stress and analyze the truss members by different methods.	L3 - Apply
CO5	Choose and assess the behavior of beams and the failure of materials.	L3 - Apply

TEXTBOOKS:

1.	Bansal R.K., "Strength of Materials", Laxmi Publications Pvt. Ltd, New Delhi, 7 th Edition, 2023.
2.	Rajput R.K., "Strength of Materials", S.Chand & Company Ltd, New Delhi, 2020.

REFERENCE BOOKS:

1.	F P Beer and E R Johnston, "Mechanics of Materials", Tata McGraw Hill, New Delhi, 2020
2.	Egor P Popov, "Engineering Mechanics of Solids", Prentice Hall of India, New Delhi, 2021.
3.	S Ramamrutham, "Strength of materials", DhanpatRai Publishing Company, New Delhi, 2020.

WEB REFERENCES:

S.No.	Publisher	Website link	Type of Content
1.	Mechanicalc	https://mechanicalc.com/reference/strength-of-materials	Articles on recent advancements / Reports / Policies / Others

VIDEO REFERENCES:

S.No.	Video Details	Name of the Expert	Type of Content	Video link
1.	NPTEL	Prof. Sriman Kumar Bhattacharyya IIT Kharagpur	Lecture	https://archive.nptel.ac.in/courses/105/105/105105108/
2.	YouTube	Prof.K.Ramesh IIT Madras	Lecture	https://www.youtube.com/watch?v=afbf7s2H25Y

Mapping of COs with POs and PSOs

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2				1		2				1	2	
CO2	3	2				1		2				1	2	
CO3	3	2				1		2				1	2	
CO4	3	2				1		2				1	2	
CO5	3	2				1		2		1		1	2	
Avg.	3	2				1		2		1		1	2	

1-Low, 2 -Medium, 3-High

BE23CS310	DATA STRUCTURES AND SQL	Version: 1.0				
Programme & Branch	Common to B.E.(EEE), (ECE), (MECH) AND (CIVIL)	CP	L	T	P	C
		5	2	1	2	4
Course Objectives:						
1.	To understand the concepts of ADTs and to learn linear data structure - list ADT.					
2.	To learn linear data structures - stacks, and queues.					
3.	To understand nonlinear data structures - trees and graphs.					
4.	To learn the fundamentals of database system, relational database and ER Model.					
5.	To understand the basic concepts of SQL database, SQL comments and normalizations.					
INTRODUCTION (Not for Examination)					2	
Importance: Efficiency in Data Management - Performance Optimization - Real World Applications - Competitive Programming and Contest and Problem Solving Skills.						
Real-life Example(s): Arrays - Online Shopping Carts - Linked Lists - Music Playlists - Stacks - Web Browser History - Queues - Customer Service Systems - Trees - File Systems - Graphs - Social Networks and Google Maps.						
Linkages: Pre-requisite: Problem Solving using C Programming, Computer Organization, Design Thinking. Future courses: Design and Analysis of Algorithms, Coding Skills - I, Coding Skills - II.						
UNIT-I	DATA STRUCTURES TYPES AND LIST ADT	6+3				
Data Structure - Types, Abstract Data Types (ADTs) - List ADT: Array implementation of List ADT and Linked List implementation of List ADT - Singly linked lists - Circularly Singly linked lists - Doubly linked lists.						
UNIT-II	LINEAR DATA STRUCTURES (STACK AND QUEUE)	6+3				
Stack ADT: Operations Array and Linked List implementation - Applications: Expression Evaluation Infix to Postfix conversion - Evaluation of Postfix Expression - Queue ADT: Operations Array and Linked List implementation - Circular Queue.						
UNIT- III	NON LINEAR DATA STRUCTURES (TREES AND GRAPHS)	6+3				
Tree ADT: Tree Definition - Tree terminologies, General tree and Binary Tree - Tree traversal - Expression tree - Binary Search Tree - Graph ADT: Graph Definition - Graph terminologies, Representation of Graphs - Graph traversal - Shortest Path algorithms: Dijkstra's algorithms - Minimum Spanning Tree: Prim's and Kruskal's algorithms.						
UNIT - IV	INTRODUCTION TO DATABASE SYSTEM	5+3				
Database System: Definition and Purpose of Database System - Views of data - Data Models - Database System Architecture - Introduction to relational databases: Relational Model - Relational Algebra - Entity Relationship model: ER Diagrams.						
UNIT-V		5+3				
MySQL: Introduction to MySQL - Environmental Setup SQL: What is SQL? Process of SQL Advantages and Disadvantages of SQL, SQL Syntax, SQL Data Types, SQL Operators - Keys, SQL Commands: DLL, DML, DCL, TCL, DQL - Normalizations - Joins Sub queries - Aggregate Functions.						
Total (LT) : 45 Periods						
LIST OF EXPERIMENTS/EXCERCISES:						

1.	Implement array and pointer based list.	
2.	Implement array and pointer based stack.	
3.	Implement array and pointer based queue.	
4.	Implement binary tree traversals.	
5.	Implement Shortest path and Minimum Spanning Tree algorithm.	
6.	Implementation of DDL commands of SQL for the following operations. <ul style="list-style-type: none"> • Create table • Alter table • Drop Table 	
7.	Implementation of DML commands of SQL for the following operations. <ul style="list-style-type: none"> • Insert • Update • Delete 	
8.	Implementation of different types of operators in SQL. <ul style="list-style-type: none"> • Arithmetic Operators • Logical Operators • Comparison Operator • Special Operator • Set Operation 	
Total (P) : 30 Periods		
Total (LT+P) : 75 Periods		
OPEN-ENDED PROBLEMS / QUESTIONS		
Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment only and not for the End semester Examinations.		
Course Outcomes: Upon completion of this course, the students will be able to:		
BLOOM'S Taxonomy		
CO1	Define linear and nonlinear data structures.	L1 Remember
CO2	Implement linear and non-linear data structure operations.	L2 Understand
CO3	Use appropriate non-linear data structure operations for solving a given problem.	L3 Apply
CO4	Construct SQL Queries using relational algebra.	L2 Understand
CO5	Apply SQL queries to handle SQL database.	L3 Apply
TEXTBOOKS:		
1.	Reema Thareja, "Data Structures Using C", Third Edition, Oxford University Press, 2023.	
2.	Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 9 th Edition, McGraw Hill, 2022.	
REFERENCE BOOKS:		
1.	Ritika Mehra, "Data Structures using C", 1st Edition, Pearson Education, 2021.	

2.	Langsam, Augenstein and Tanenbaum, "Data Structures Using C and C++", 4th Edition, Pearson Education, 2022.
3.	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms", Fourth Edition, Mcgraw Hill/ MIT Press, 2022.
4.	Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft, "Data Structures and Algorithms", 4th edition, Pearson, 2020.
5.	Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", 8th Edition, Pearson Education, 2020.

WEB REFERENCES:

	Publisher	Website link	Type of Content
1.	Tutorialspoint	https://www.tutorialspoint.com/dsa_using_c/dsa_using_c_useful_resources.htm	Online Course
2.	Hackerrank	https://www.hackerrank.com/domains/datastructures	Online Course
3.	Geeksforgeeks	https://www.geeksforgeeks.org/introductionofdbmsdatabasemanagementsystemset1/	Online Course


VIDEO REFERENCES:

	Video Details	Name of the Expert	Type of Content	Video Link
1.	YouTube	K.Ravikumar	Lecture	https://www.youtube.com/@rechtutorravi3115
2.	YouTube	Jenny's Lectures	Lecture	https://www.youtube.com/watch?v=AT14ICXuMKI&list=PLdo5W4Nhv31bbKJzrsKfMpo_grxuLl8LU&index=1
3.	NPTEL	Prof. Partha Pratim Das, Prof. Samiran Chattopadhyay	Lecture	https://onlinecourses.nptel.ac.in/noc22_cs91/preview

Mapping of COs with POs and PSOs

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	2	2							3	2	3
CO2	1	2	1	2	2							2	2	2
CO3	2	3	1	2	3							2	2	2
CO4	2	2	3	2	1							1	2	3
CO5	3	1	1	1	1							3	3	2
Avg.	2	2.2	1.4	1.8	1.8							2.2	2.2	2.4

1-Low, 2 -Medium, 3-High.


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BE23CE405	TRANSPORTATION ENGINEERING	Version: 1.0				
Programme & Branch	B.E. - CIVIL ENGINEERING	CP	L	T	P	C
		5	2	1	2	4
Course Objectives:						
1.	To understand the classification of roads and their cross-sectional elements.					
2.	To familiarize the various geometrical designs of roads.					
3.	To gain knowledge on the design of pavement.					
4.	To understand the elements and maintenance of railway tracks.					
5.	To learn the layout and components of the airport, harbour, docks and ports.					
INTRODUCTION: (Not for examination)					2	
Importance: Transportation Engineering – Highways, Railways, Airways, Waterways – Highway – Cross Sectional Elements, Design of Pavement- Railway – Components, Signals, Layouts-Airways – Layouts- functions.						
Real Life Example(s): Horizontal curve- vertical curve-super elevation in roads and railway tracks.						
Linkages: Pre-requisite: Overview of Engineering and Technology, Construction Materials and Technology. Future courses: Surveying.						
UNIT-I	HIGHWAY PLANNING AND ALIGNMENT	5+3				
Introduction to transportation – Importance of roads in national development - Highway development in India- Modes of transportation - Roles and responsibility of IRC and NHAI – Classification of roads - Cross section of road and its elements – Highway alignment -Engineering survey for road construction.						
UNIT-II	GEOMETRIC DESIGN OF HIGHWAY	6+3				
Introduction to Geometric design - Sight distances – Longitudinal and Traverse gradient-Horizontal curves and its types, Super elevation, Widening of curves - Vertical curves (IRC methods only).						
UNIT- III	DESIGN OF PAVEMENT	6+3				
Pavement of roads-definition and types - Design of Flexible pavement as per IRC method-problems -Design of Rigid pavement as per IRC method-problems- Maintenance of pavement- Failure of Flexible pavements and its types- Failure of Rigid pavements and its types.						
UNIT - IV	RAILWAY CONSTRUCTION, MAINTENANCE AND OPERATION	5+3				
Elements of Railway track and its functions-Types of gauges- Coning of wheels, Super elevation in railway track- Route alignment surveys of railway route - Level Crossings and its types. Track drainage-Maintenance of tracks – Railway station and yards -Signaling.						
UNIT-V	INTRODUCTION TO AIRPORT, HARBOUR AND DOCKS	6+3				
Airport classification – ICAO -Components of airport and its function: Runway, Taxiway, Apron, Hangar-Passenger terminals - Airport planning: Site selection typical Airport Layouts, Windrose diagram - Problems - Definition: Harbour, Port, Satellite Port, Docks- Various coastal structures in harbour/ports.						
TOTAL (LT): 45 PERIODS						

LIST OF EXPERIMENTS/EXERCISES:

1.	Water absorption test for aggregates.
2.	Los Angeles Abrasion test for aggregates.
3.	Impact test for aggregates.
4.	Penetration test for bitumen.

5.	Viscosity test for bitumen.
6.	Ductility test for bitumen.
7.	Softening point test for bitumen.

Total(P): 30 PERIODS

Total (LT+P):75 PERIODS

OPEN ENDED PROBLEMS / QUESTIONS

Course Specific Open-Ended Problems will be solved during classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End Semester Examinations.

Course Outcomes: Upon completion of this course the students will be able to:		BLOOM'S Taxonomy
CO1	Illustrate the cross section of road and alignment of road.	L3 -Apply
CO2	Apply the IRC codal provisions in geometric design of highway.	L3 -Apply
CO3	Make use of geometric design of road pavement.	L3 -Apply
CO4	Construct the components of railway track.	L3 -Apply
CO5	Plan the site layout of airport, docks and harbour.	L3 -Apply

TEXTBOOKS:

1.	K.P.Subramanian, "Highway Railway Airport and Harbour Engineering", SCITECH publications, Chennai,2023.
2.	S.P. Chandola, "Transportation Engineering" S. Chand publications, Noida,2016.

REFERENCE BOOKS:


1.	S.K.Kanna, C.E.G Justo, A.Veeraragavan , "Highway Engineering", Nem Chand & Bros, 2024.
2.	Satish Chandra and M.M.Agarwal, "Railway Engineering ",Oxford publication,2013.
3.	Rangwala, "Airport Engineering", Atul Prakashan,2021.

WEB REFERENCES:

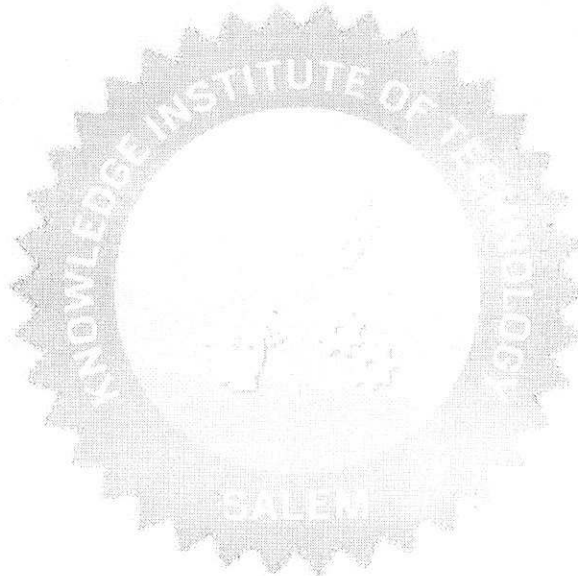
S.No.	Publisher	Website link	Type of Content
1.	Indian Road Congress	https://www.irc.nic.in///admnis/admin/showimg.aspx?ID=970	Reports
2.	Airport Authority of India	https://www.aai.aero/en/airports/chennai	Reports

VIDEO REFERENCES:

S.No.	Video Details	Name of the Expert	Type of Content	Video link
1.	NPTEL	Dr.Rajat Rastogi IIT Roorkee	Lecture	https://www.youtube.com/watch?v=Edl-EiIsf_8


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Mapping of COs with POs and PSOs														
Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3					3	1	3	2			1	1	3
CO2	3	3	3		1		2	2	2		2	1	1	2
CO3	3	3	3		2	1	2	3	2		2	3	1	2
CO4	3					3		1	2	1		2		2
CO5	3		2		3	2	2	2	2		1	2		2
Avg.	3	3	2.6		2	2.2	1.7	2.2	2	1	1.6	1.8	1	2.2



Beyond Knowledge

A. J. J.
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BE23CE406	FLUID MECHANICS & HYDRAULIC MACHINERY	Version: 1.0				
Programme & Branch	B.E. – CIVIL ENGINEERING	CP	L	T	P	C
		5	2	1	2	4
Course Objectives:						
1.	To understand the properties and behavior of the fluids under static conditions and to impart basic knowledge of the dynamics of fluids.					
2.	To gain knowledge about the concepts of specific energy, critical flow, and their applications.					
3.	To study open channel flow and description of different types of flows.					
4.	To learn the working principles of pumps.					
5.	To impart the knowledge on turbines.					
INTRODUCTION (Not for Examination)					2	
<p>Importance: Fluid Physics - Units and Dimensions, Natural source of energy, environmental energy conservation, Concepts of Newton law of viscosity, Hydrostatic law, Head Loss, Boundary layer concepts, Prototypes and similitude, Principles of Turbo machinery.</p> <p>Real Life Example(s): Hydraulic structures – Water Supply and pipe networks -Water Distribution and pressure difference in residential, commercial, and industry buildings-Oil Refinery: Determining the friction losses and mass flow rate of gasoline through pipelines.</p> <p>Linkages: Pre-requisite: Engineering Mechanics for Civil Engineers Future courses: Irrigation and Water Resources Engineering</p>						
UNIT-I	Fluid Statics, Kinematics & Dynamics					5+3
<p>Fluid Statics: Dimensions and units: Physical properties of fluids - Measurement of pressure - Piezometer, U-tube, and differential manometers. Fluid Kinematics & Dynamics: streamline, Path line and streak lines, Stream function and velocity potentials – Flow nets - surface and body forces –Euler’s and Bernoulli’s equations for flow along a stream line - Momentum equation and its application .</p>						
UNIT-II	Varied Flows & Dimensionless Analysis					6+3
<p>Varied Flows: Types of flows -Dynamic equations of gradually varied - Water surface flow profile classifications: Hydraulic Slope, Hydraulic Curve - Application of the momentum equation for Rapid Varied Flow - Hydraulic jumps - Types and Energy dissipation – Positive and Negative surges. Dimensionless Analysis: Fundamental dimensions – Dimensional homogeneity – Rayleigh’s method and Buckingham Pi theorem – Dimensionless parameters – Similitude and model Types.</p>						
UNIT- III	Boundary Layer and Flow Through Pipes					6+3
<p>Boundary Layer: Boundary layer – Thickness and its classification – Development of laminar and turbulent flows in circular pipes – pipe network. Closed conduit flow: Reynold’s experiment - Darcy Weisbach equation - Minor and Major losses in pipes - pipes in series and pipes in parallel .</p>						
UNIT – IV	Pumps					5+3
<p>Centrifugal pumps - Minimum speed to start the pump - NPSH - Cavitation in pumps - Operating characteristics - Multistage pumps - Reciprocating pumps - Negative slip - Indicator diagrams and its variations - Classification and working - Work done – Monomeric head and static head - losses and efficiencies - specific speed - Performance characteristic curves.</p>						
UNIT-V	Turbines					6+3
<p>Classification of turbines - Impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine - Working proportions, Work done, Efficiencies - Draft tube – Cavitation. Performance of hydraulic turbines: Specific speed and runaway speed.</p>						
TOTAL(LT): 45 PERIODS						


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LIST OF EXPERIMENTS	
A. FLOW MEASUREMENT	
1. Flow through Orifice meter / Mouthpiece, Venturi meter, and Notches	
2. Bernoulli's Experiment	
B. LOSSES IN PIPES	
3. Determination of friction factor in pipes.	
4. Determination of minor losses	
C. PUMPS	
5. Characteristics of Centrifugal pumps	
6. Characteristics of Reciprocating pump	
D. TURBINES	
7. Characteristics of Pelton wheel turbine.	
TOTAL(P): 30 PERIODS	
TOTAL(LT+P): 75 PERIODS	
OPEN ENDED PROBLEMS / QUESTIONS	
Course Specific Open-Ended Problems will be solved during classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End Semester Examinations.	
Course Outcomes:	
Upon completion of this course, the students will be able to:	
	BLOOM'S Taxonomy
CO1	Make use of the properties of fluids to develop a model. L3 - Apply
CO2	Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies. L3 - Apply
CO3	Apply boundary layer theory and momentum principles. L3 - Apply
CO4	Construct and design various components of pumps. L3 - Apply
CO5	Identify various turbines and analyzing its performance. L3 - Apply
TEXTBOOKS:	
1.	Bansal R.K., " A Textbook of Fluid Mechanics and Hydraulic Machines", Laxmi Publications, 11 th Edition, 2023.
2.	RK Rajput., " A Textbook of Fluid Mechanics and Hydraulic Machines", S. Chand Publishing, 2018.


REFERENCE BOOKS:			
1.	Jain A. K.	Fluid Mechanics including Hydraulic Machines,	Khanna Publishers, New Delhi, 2014.
2.	S K Som;	Gautam Biswas and S Chakraborty,	Introduction to Fluid Mechanics and Fluid Machines, Tata McGraw Hill Education Pvt. Ltd., 2012.
3.	Pani B S,	Fluid Mechanics: A Concise Introduction,	Prentice Hall of India Private Ltd, 2016.
WEB REFERENCES:			
	Publisher	Website link	Type of Content
1.	Cambridge University	https://www.cambridge.org/core/journals/journal-of-fluid-mechanics	e-Journal
2.	Toronto Metropolitan University	https://www.drdavidnaylor.net/	Reading material


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VIDEO REFERENCES:				
	Video Details	Name of the Expert	Type of Content	Video link
1.	YouTube	Prof. Brendan Macdonald	Lecture	https://www.youtube.com/watch?v=BNrYw_plJIU
2.	NPTEL	Prof.T.I.Eldho, IIT Bombay.	Lecture	https://www.youtube.com/watch?v=F_7OhKUYV5c&t=6s

Mapping of COs with POs and PSOs														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2				1	2	2				1	2	
CO2	3	2			2	1	2	2				1	2	
CO3	3	2			2	1	2	2				1	2	
CO4	3	2			2	1	2	2				1	2	
CO5	3	2				1	2	2				1	2	
Avg.	3	2			2	1	2	2				1	2	
1-Low, 2 -Medium,3High														

Beyond Knowledge


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BE23CE407	COMPUTER AIDED BUILDING DRAFTING	Version: 1.0				
Programme & Branch	B.E. – CIVIL ENGINEERING	CP	L	T	P	C
		2	0	0	2	1
Course Objectives:						
1.	To impart knowledge of building planning by using building bye-laws.					
2.	To practice the drafting software and enable the students to draw the residential and commercial building drawings.					
3.	To practice the modelling software and enable the students to model the residential building.					
INTRODUCTION:						2
Importance: Construction Engineering – CAD – Building Bye-laws – Components of Buildings – Concept of Plan, Section, Elevation.						
Real Life Example(s): Residential Building, Shopping Mall, School Building.						
Linkages:						
Pre-requisite: Engineering Graphics.						
Future courses: Surveying, Estimation and Quantity Surveying.						
LIST OF EXPERIMENTS/EXERCISES:						
1.	Introduction to AutoCAD, commands and tools.					
2.	Principles of planning using building bye-laws.					
3.	Residential building drawings with load bearing walls and RCC roof (Plan, section, elevation)					
4.	Residential building drawings with framed structures (Plan, section, elevation)					
5.	Commercial building drawings with framed structures (Plan, section, elevation)					
6.	Industrial building drawings with steel roof truss – (Plan, section)					
7.	Building approval drawings of single storey residential building.					
8.	3D modelling of residential building.					
						Total: 30 PERIODS
Course Outcomes: Upon completion of this course the students will be able to:						BLOOM'S Taxonomy
CO1	Understand the planning principles using building bye-laws					L2 - Understand
CO2	Draft the plan, elevation and sectional view of the load bearing building					L3 – Apply
CO3	Draft the plan, elevation and sectional view of the framed building					L3 – Apply
CO4	Draw the industrial roof truss building					L3 – Apply
CO5	Create the 3D model of residential building					L3 – Apply
TEXTBOOKS:						
1.	Dr. N. Kumara Swamy, A. Kameswara Rao, "Building Planning And Drawing", Charotar Publishing House Pvt. Ltd., 9th Revised Edition: 2023					
2.	S.S Bhavikatti & M.V. Chitawadagi, "Building Planning and Drawing", Dreamtech Press, 2019.					
REFERENCE BOOKS:						
1.	Dr. B.P. Verma, "Civil Engineering Drawing & House Planning", Khanna Publishers, 13th Edition: 2023					

2. K. R. Gopalakrishna, & Sudhir Gopalakrishna: Textbook Of Computer Aided Engineering Drawing, 39th Edition, Subash Stores, Bangalore, 2017.

WEB REFERENCES:


S.No	Publisher	Website link	Type of Content
1.	Town and Country Planning Organization	http://tcpo.gov.in/sites/default/files/TCPO/schemes/MODEL-BUILDING-BYE-LAWS-2016.pdf	Model Building Bye Laws
2.	CAD-Blocks.net	https://cad-blocks.net/index.html	Others - CAD-Blocks

VIDEO REFERENCES:

S.No	Video Details	Name of the Expert	Type of Content	Video link
1.	YouTube	Organization – Tamil Cadd Solutions	Real -time applications	https://youtu.be/kMUjOArzvP8?si=8HAKJRJOKrf_yzLH
2.	YouTube	Organization –Tamil CADD. Info	Real -time applications	https://youtube.com/playlist?list=PL-ZDjZ8cfkaNQxe84qbEM-xmoIIFOCiIS&si=ZChWXwTfL--6ZZuD

Mapping of COs with POs and PSOs

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3				3	2		1				2	3	
CO2	3	2			3	2		1				2	3	
CO3	3	2			3	2		1				2	3	
CO4	3	2			3	2		1				2	3	
CO5	3	2			3	2		1				2	3	
Avg.	3	2			3	2		1				2	3	


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BE23EN103	PROFESSIONAL COMMUNICATION LABORATORY - I	Version : 1.0				
Programme & Branch	(COMMON TO ALL BRANCHES EXCEPT B.Tech CSBS)	CP	L	T	P	C
		2	0	0	2	1
Course Objectives:						
1.	To use language for employment and social interaction.					
2.	To help learners frame sentences in correct context.					
3.	To develop students' confidence for presentation.					
4.	To strengthen students' business communication.					
5.	To participate confidently and appropriately in a team conversation.					
INTRODUCTION (Not for Examination)						
Importance: Provides a platform where students can enhance their language competence - helps students to acquire career skills sought by the industry for campus recruitment - Improves communication skills in formal and informal situations.						
Real-life Example(s): Writing letters - drafting e-mails - blog writing - writing abstracts - public speaking- presentation						
Linkages: Pre-requisite: Communicative English - I, Communicative English - II.						
LIST OF EXPERIMENTS						
1.	Listening & Reading Comprehension					
2.	Root words & Sentence formation					
3.	Expressing oneself in everyday situation					
4.	Conversation and Just a minutes talk					
5.	Oral presentation - Long turn					
6.	Group Discussion					
7.	Creative Writing					
8.	Business Letter Writing					
9.	Giving constructive feedback and offering suggestions					
10.	E-mail writing					
						Total: 30 Periods
Course Outcomes: Upon completion of this course, the students will be able to:						BLOOM'S Taxonomy
CO1	Use language effectively for employment.					L3 - Apply
CO2	Enhance writing skills for better communication.					L3 - Apply
CO3	Present ideas in public forum.					L3 - Apply
CO4	Write business letters in a comprehensive manner.					L3 - Apply
CO5	Express opinions assertively in group discussions.					L3 - Apply

TEXTBOOKS:				
1.	Richardson, Mathew. Advanced Communication Skills. Charlie CReative Lab, 2020			
2.	Rizvi, Ashrif. Effective Technical Communication, Tata Mc Grahill, 2011.			
REFERENCE BOOKS:				
1.	Comfort, Jeremy, et al. Speaking Effectively: Developing Speaking Skills for Business English. Cambridge University Press, Cambridge: Reprint 2011			
2.	Terk, Natasha. Reports, Proposals and Procedures: A write It well Guide. Gildan Media, 2015.			
3.	Carnegie, Dale. The Art of Public Speaking. Prabhat Prakashan Pvt. Ltd. 1 st Edition: New Delhi, 2016			
WEB REFERENCES:				
	Publisher	Website link	Type of Content	
1.	Leverageedu	https://leverageedu.com/blog/group-discussion-topics/	others	
2.	Forbes	https://www.forbes.com/advisor/in/business/business-letter-format/	others	
VIDEO REFERENCES:				
	Video Details	Name of the Expert	Type of Content	Video Link
1.	NPTEL	Dr.T.Ravichandran IIT, Kanpur	Lecture	https://nptel.ac.in/courses/109104031
2.	NPTEL	Dr.Binod Mishra IIT, Roorkee	Lecture	https://onlinecourses.nptel.ac.in/noc21_hs76/preview

Mapping of COs with POs and PSOs														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1										3		1		
CO2										3		1		
CO3										3		1		
CO4										3		1		
CO5										3		1		
Avg.										3		1		

1-Low, 2 -Medium, 3-High.


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BE23PT805	ENGINEERING CLINIC - II	Version: 02				
Programme & Branch	COMMON TO ALL BRANCHES	CP	L	T	P	C
		2	0	0	2	1

Course Objectives:

1	To provide a platform for hands-on learning experiences in order to build relevant engineering skills.
2	To enable students to learn and develop skills on designing of new product for real world application using 3D Printer and IOT.
3	To take entrepreneurship, product development, startup-related activities and problem-solving skills in higher semesters and final semester project work.

INTRODUCTION (Not for Examination)	2
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Importance:

This course aims to enhance engineering knowledge and enabling students to become more creative and innovative. Students are actively involved in solving real-time problems as part of their curriculum and take part in extracurricular projects.

Real-life Examples:

Smart home automation, smart Healthcare, smart irrigation system, digital printing, Industrial Automation and vehicle tracking system.

Linkage:

Pre-requisites: Engineering Physics, Engineering Clinic – I.

The Engineering Clinic I & II course will provides the hands-on experience to develop the miniature model of doing by learning.

CONCEPT

Engineering Clinic laboratory provides hands-on training for students to develop certain simple real-world products or applications with the help of faculty. It is a team activity consisting of maximum 3 students per team. A list of products or applications will be given. Engineering Clinic - II focus on product development involving interdisciplinary Engineering courses. Each team can choose one or more products for a given application. The students have to design, fabricate and demonstrate the working of the product.

B. EXECUTION

Day	Session	Course content / Activity	No. of Periods
1	S 1	Introduction to Embedded Systems and IoT.	2
	S 2	Hands-on Training to write a code for IOT Circuit design using open-source software.	3
	S 3	Demonstration and explanation of real-time IoT application circuits in various sectors.	6
2	S 4	Introduction to 3D Printing Technology.	2
	S 5	Hands-on Training to design 3D Printing model using open-source software.	3
	S 6	Fabrication of 3D Printing Models.	6
3	S7	Demonstration of Sublimation and Vinyl cutter Machine.	3
	S 8	Demonstration of Wood router Machine.	3

	Total	30 Periods		
A list of sample applications/products is attached.				
C. ASSESSMENT				
i. Assessment is done by Internal mode only and there is no End Semester Examination. ii. Sessions (S7 & S8) are intended for demonstration purposes only, not for assessment. iii. Marks distribution for Internal Assessment is,				
Method	Review I	Review II	Review III	Review IV
Details	System description and Circuit design.	Testing, Validation and Demonstration.	Design of 3D Printing models.	Fabrication of 3D Printing models.
Marks	25	25	25	25
For Product/Application the student team can choose themselves.				
				Total: 30 Periods


Course Outcomes:		BLOOM'S Taxonomy
Upon completion of this course the students will be able to:		
CO1	Understand the Basics of IOT components.	L2- Understand
CO2	Design and Demonstrate the prototype of expedient product using 3D Printer.	L4 -Analyze
CO3	Practice the culture of Innovation and Product Development towards Start-ups in an Institution.	L4 - Analyze

Mapping of COs with POs and PSOs														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	2	2	-	2	2	2	2		
CO2	3	3	3	2	2	2	2	-	2	2	3	2		
CO3	3	3	3	2	2	2	2	-	2	3	3	2		
Avg.	3	3	3	2	2	2	2	-	2	2.3	2.6	2		
1-Low, 2 -Medium, 3-High.														

List of sample Applications / Products for Engineering Clinic II

1. Automated Irrigation System
2. Smart Home Automation
3. AI based Image Capturing Robot
4. Vehicle Tracking System
5. IoT based Smart Traffic Management
6. IoT based Smart Hybrid Energy Management System
7. IoT based Garbage Monitoring System
8. Miniature of Home / Buildings / Bridges
9. Miniature of Robot /Quad copter/Motor and Drives
10. Development of Wood Wall Art/logo pendant /Door design.

BE23PT807		Aptitude Skills - II			Version: 1.0				
Programme & Branch		COMMON TO ALL BRANCHES			CP	L	T	P	C
					1	0	0	1	0.5
Course Objectives:									
1.	To acquire skills required to solve quantitative aptitude problems.								
2.	To enhance logical reasoning skills and help them improve problem-solving abilities.								
INTRODUCTION: (Not for Examination)								01	
Importance:									
Logical thinking and Problem-solving skills are very important for solving engineering problems									
Linkages:									
Pre-Requisite: Aptitude Skills I Future courses: Aptitude Skills III and Aptitude Skills IV									
UNIT-I		Quantitative Aptitude						08	
Number Systems–Averages–Percentage–Profit & Loss–Problems on Ages– Ratios & Proportions									
UNIT-II		Logical Reasoning						06	
Venn Diagrams– Cubes & Cuboids– Data-Interpretation and Data-Sufficiency									
TOTAL: 15 PERIODS									
Course Outcomes:								BLOOM'S Taxonomy	
Upon completion of this course, the students will be able to:									
CO1	Exhibit sound knowledge to solve problems of quantitative aptitude.							L3 - Apply	
CO2	Demonstrate ability to solve problems using logical reasoning.							L3 - Apply	
TEXTBOOKS:									
1.	Dr. R.S. Aggarwal, "Quantitative Aptitude for Competitive Examinations", S.Chand and Company Ltd., 2022								
2.	Dr. R.S. Aggarwal, "A Modern Approach to Logical Reasoning", S.Chand and Company Ltd., 2022								
3.	FACE, "Aptipedia: Aptitude Encyclopedia", 2nd edition, Wiley India Pvt. Ltd., 2017								
REFERENCE BOOKS:									
1.	Arun Sharma, "Quantitative Aptitude for the CAT" 10 th edition, McGraw-Hill Publishing, 2022								
2.	Praveen R. V., "Quantitative Aptitude and Reasoning", 3 rd edition, PHI Learning Pvt. Ltd., 2016								
WEB REFERENCES:									
	Publisher	Website link					Type of Content		
1.	Indiabix	https://www.indiabix.com/online-test/aptitude-test/					Tests for Practice		
2.	Placement preparation	https://www.placementpreparation.io/quantitative-aptitude/					Tests for Practice		


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3.	Geeks for geeks	https://www.geeksforgeeks.org/aptitude-for-placements/	Learning Resources and Tests for Practice
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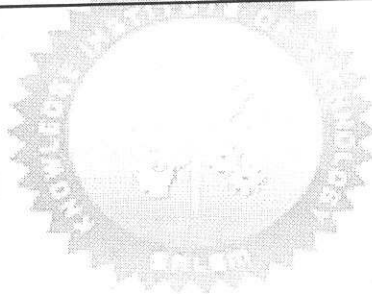
VIDEO REFERENCES:

	Video Details	Name of the Expert	Type of Content	Video link
1.	YouTube	Career Ride	Video Lectures	https://www.youtube.com/playlist?list=PLpyc33gOcbVA4qXMoQ5vmhefTruk5t9lt
2.	YouTube	Freshersworld.com	Video Lectures	https://www.youtube.com/playlist?list=PLjLhUHPsqNYkcq6YOfiywbTfnvf_TN7i9

Mapping of COs with POs and PSOs

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	3													
Avg.	3													

1-Low, 2 -Medium, 3-High.



Acquire with Passion and Dedication

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 Salem - 637 005

BE23MA206	MATHEMATICS FOR BUSINESS ANALYTICS	Version: 1.0				
Programme & Branch	COMMON TO ALL BRANCHES	CP	L	T	P	C
		3	2	1	0	3
Course Objectives:						
1.	To learn the Foundation of Data Science.					
2.	To understand the Concepts of Probability Distributions.					
3.	To apply Statistical Techniques for Decision Making.					
4.	To apply Design of Experiments in Business Problem.					
5.	To introduce basic concepts of Correlation and regression for business data Analysis.					
INTRODUCTION (Not for Examination)					2	
Importance:						
Business analytics has become one of the most important skills that every student of management and engineering must acquire to become a successful in the career. The analytics across industries for decision making, problem solving and for driving innovations makes analytics and essential skill for every student from management and engineering disciplines.						
Real-life Example(s):						
Amazon – festival offer, Flipkart – special offer (Data collection).						
Linkages:						
Pre-Requisite: Calculus for Engineers.						
UNIT-I	FOUNDATION OF DATA SCIENCE	6+3				
Introduction to Business Analytics – Foundation of Data Science - Axioms of probability – Conditional probability – Baye’s theorem.						
UNIT-II	DISTRIBUTIONS	6+3				
Discrete and continuous random variables - Types of Distributions –Discrete Distributions: Binomial, Poisson, Geometric – Continuous Distribution: Uniform, Exponential and Normal distributions.						
UNIT- III	TESTING OF HYPOTHESIS	5+3				
Essential of Testing of Hypothesis -Sampling distribution - Tests for single mean, proportion and difference of means (Large and small samples) – Tests for single variance and equality of variances – Chi Square test for goodness of fit – Independence of attributes.						
UNIT - IV	DESIGN OF EXPERIMENTS	5+3				
Introduction of Design of Experiments - One-way and two-way classifications - Completely randomized design – Randomized block design – Latin square design - 2^2 factorial designs.						
UNIT-V	CORRELATION AND REGRESSION	6+3				
Correlations – Pearson correlation coefficient - Spearman Rank Correlation – Regression Simple Linear Regression – SLR Models.						
						Total: 45 Periods

OPEN-ENDED PROBLEMS / QUESTIONS				
Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment only and not for the End semester Examinations.				
Course Outcomes: Upon completion of this course, the students will be able to:	BLOOM'S Taxonomy			
CO1 Apply the probability concepts in business problems.	L3 - Apply			
CO2 Apply the Probability Distribution Function in Engineering Problems.	L3 - Apply			
CO3 Apply hypothesis-testing techniques to interpret results.	L3 - Apply			
CO4 Choose the appropriate test by various methods of Parametric tests.	L3 - Apply			
CO5 Apply the Correlation and regression in Engineering and business Problems.	L3 - Apply			
TEXTBOOKS:				
1.	Dr.U.Dineshkumar IIM-B, " Business Analytics", Second Edition, Wiley India Edition, 2022.			
2.	Douglasc.Montgomery, Georgec.Runger, "Applied Statistics and Probability for Engineers", Seventh Edition, Wiley India Edition, 2018. J.K. Sharma			
REFERENCE BOOKS:				
1.	J.K. Sharma, " Business Statistics", 5 th Edition, S. Chand, 2020.			
2.	Ken Black, Business Statistics for contemporary decision making, 5 th Edition, Wiley India Edition, 2010.			
3.	T.Veerarajan, "Probability -Statistics and Random variables", Third Edition, Mc Graw Hill Education, 2017.			
WEB REFERENCES:				
	Publisher	Website link	Type of Content	
1.	Wikipedia	https://en.wikipedia.org/wiki/Probability	Article - Probability	
2.	Wikipedia	https://en.wikipedia.org/wiki/Statistics	Article - Statistics	
VIDEO REFERENCES:				
	Video Details	Name of the Expert	Type of Content	Video Link
1.	NPTL	Prof. Saji K Mathew - IIT Madras	Lecture	https://www.youtube.com/watch?v=cWWc97wxS20
2.	NPTL	Prof. Rudra P Pradhan - IIT Kharagpur	Lecture	https://onlinecourses.nptel.ac.in/noc20_mg11/p_review

Mapping of COs with POs and PSOs														
COs	Pos												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	3	2												
CO3	3	2												
CO4	3	2												
CO5	3	2												
Avg.	3	2												

1-Low, 2 -Medium, 3-High.



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BE23CE408	STRUCTURAL ANALYSIS	Version: 1.0				
Programme & Branch	B.E. – CIVIL ENGINEERING	CP	L	T	P	C
		3	2	1	0	3

Course Objectives:

- To gain knowledge on displacement methods of analysis.
- To analyze determinate structures using matrix flexibility and stiffness method.
- To learn and use the concept of influence lines in the analysis of determinate structures.
- To understand the effect of arch action and cables over conventional beams and other structures.
- To identify the mechanism of collapse and the theory of plasticity of structures.

INTRODUCTION (Not for Examination)

2

Importance:

Structural Engineering- Structural Analysis – Historical Development -Key issues in Stability of Structures- Structural response to given load conditions-equilibrium-compatibility-redundancy– Degrees of freedom- Stiffness-carryover moment- Slope Deflection & Moment Distribution-Influence lines– Cables & Arches -Plastic Analysis of Design-Structures fit for use under estimated loads-Software tools used for Analysis.

Real Life Example(s):

Analysis of residential buildings, Apartments, bridges, water tanks, Multi-storeyed buildings, tall buildings, skyscrapers, etc.-Finite element Analysis of Structural elements.

Linkages:

Pre-requisite: Overview of Engineering & Technology-Engineering Mechanics-Strength of Materials
Future courses: Design of RC Elements- Design of Steel Structural Elements-Dynamics & Earthquake Resistant structures.

UNIT-I

DISPLACEMENT METHOD

6+3

Overview-Broad classification of Structural Analysis-Introduction to Force methods and Displacement methods - **Slope and Deflection method:** Introduction - Formation of Slope Deflection Equations(L2) –Conditions of Equilibrium -Analysis of continuous beams. **Moment Distribution Method:** Introduction-Definition of Stiffness, distribution and carry over factors-Analysis of continuous Beams-Introduction to Analysis of Plane frames- Few Practical Applications.

UNIT-II

MATRIX METHOD OF STRUCTURAL ANALYSIS

6+3

Flexibility method: Introduction - Primary Structures-Compatibility conditions– Formation of flexibility matrices- Analysis of indeterminate Structures -continuous beams-Introduction to Analysis of Rigid Jointed Plane Frames.**Stiffness method:** Restrained structure-Formation of stiffness matrices-equilibrium condition- Analysis of Continuous Beams- Introduction to Analysis of rigid jointed plane frames.

UNIT- III

INFLUENCE LINES FOR DETERMINATE & INDETERMINATE STRUCTURES

5+3

Introduction to moving loads- Concept of Influence Lines, Influence lines for reactions in statically determinate structures-Influence lines for shear force and bending moment in beam section- Introduction to Influence lines for Indeterminate structures– Muller Breslau Principle(L3) – Few Practical Applications.

UNIT - IV

ARCHES & CABLES

5+3

Introduction to Arches: Significance of Arches over beam- Eddy's Theorem- Types of arches– Analysis of three-hinged, two-hinged Parabolic Arches and Circular Arches.Introduction to Cables and Suspension Bridges-Analysis of Three Hinged suspension bridges.


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UNIT-V	PLASTIC ANALYSIS	6+3		
Introduction to Plastic Analysis: Plastic theory, statically indeterminate structures, Plastic moment of resistance- Plastic modulus, Shape factor, Load factor-Plastic hinge and mechanism - collapse load - Upper and lower bound theorems- Plastic analysis of indeterminate beams.				
TOTAL: 45 PERIODS				
OPEN ENDED PROBLEMS / QUESTIONS				
Course Specific Open-Ended Problems will be solved during classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End Semester Examinations.				
Course Outcomes: Upon completion of this course, the students will be able to:		BLOOM'S Taxonomy		
CO1	Solve determinate beams and frames using Force methods.	L3 - Apply		
CO2	Apply the matrix approach using the Flexibility matrix and Stiffness to analyze determinate structures.	L3 - Apply		
CO3	Use of Influence lines Analyze Determinate beams and Indeterminate beams.	L3 - Apply		
CO4	Analyze Three Hinged and Two Hinged Arches and Suspension Cables.	L3 - Apply		
CO5	Analyze the Continuous beams and Frames using Plastic Theory to find the shape factor.	L3 - Apply		
TEXTBOOKS:				
1.	Vaidyanadhan R and Perumal, P, "Structural Analysis-Vol.1", Laxmi Publications Pvt.Ltd, New Delhi,4th Edition 2018.			
2.	Vaidyanadhan R and Perumal, P, "Structural Analysis-Vol.2", Laxmi Publications Pvt.Ltd, New Delhi,3rd Edition 2019.			
REFERENCE BOOKS:				
1.	Punmia B.C, Ashok Kumar Jain and Arun Kumar Jain, "Theory of structures", Laxmi Publications Pvt. Ltd., New Delhi, 13 th Edition 2017.			
2.	Wang C.K., "Indeterminate Structural Analysis", Tata McGraw Hill Education Pvt. Ltd., New Delhi, 3 rd Edition 2014.			
3.	Bhavikatti S.S, "Structural Analysis-Vol.1 & Vol.2", Vikas Publishing Pvt Ltd., New Delhi. 4 th Edition 2014.			
WEB REFERENCES:				
	Publisher	Website link	Type of Content	
1.	Science Direct	https://www.sciencedirect.com/book/9781856175500/structural-analysis	Articles on recent advancements	
2.	struct Ville	https://structville.com/2022/05/introduction-to-theory-of-structures-structural-analysis.html	HTML	
VIDEO REFERENCES:				
	Video Details	Name of the Expert	Type of Content	Video link
1.	NPTEL	Prof. Amit shaw IIT-Kharagpur	Lecture	https://archive.nptel.ac.in/courses/105/105/105105166/
2.	YouTube	Dr.P.Perumal PSG i-Tech	Lecture	https://www.youtube.com/watch?v=FHT5LSmIqPM

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Mapping of COs with POs and PSOs														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	2										2
CO2	3	2	3	2										2
CO3	3	2	3	2										2
CO4	3	2	3	2										2
CO5	3	2	3	2										2
Avg.	3	2	3	2										2
1-Low, 2 -Medium,3High														


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 KIOT Campus, Kakapalayam.
 Phone: 047 504

BE23CE409	DESIGN OF STEEL STRUCTURAL ELEMENTS	Version: 1.0				
Programme & Branch	B.E. – CIVIL ENGINEERING	CP	L	T	P	C
		3	2	1	0	3
Course Objectives:						
1.	To gain the knowledge of design philosophy of steel structures, design concepts of bolted and welded connections.					
2.	To understand the design concepts of various types of tension members, lug angles and its connections.					
3.	To understand the design concepts of axially loaded columns and column base connections.					
4.	To understand the design concept of laterally restrained and unrestrained steel beams.					
5.	To identify and compute the design loads on Industrial structures and understand the purlin design concepts.					
INTRODUCTION (Not for Examination)					2	
<p>Importance: Structural Engineering – Design of steel structures - Designing of Steel structural elements and connections - Importance of IS Codebook in steel building design - Roles and responsibilities of structural design Engineers - Advantages of steel buildings over concrete buildings - Software tools used for structural design.</p> <p>Real Life Example(s): The Howrah Bridge in Kolkata, Infosys Building in Pune, Burj Khalifa in Dubai, The Eiffel Tower in Paris, National Stadium in Beijing.</p> <p>Linkages: Pre-requisite: Overview of Engineering and Technology - Engineering Mechanics - Strength of Materials – Structural Analysis Future courses: Pre-Engineered Buildings.</p>						
UNIT-I	INTRODUCTION TO STRUCTURAL STEEL AND DESIGN OF CONNECTIONS					6+2
Types of Structural Steel -Properties of structural steel – Indian Standard rolled steel sections - Limit State Method of Design - Design of Simple Bolted connections - HSFG Bolts- Types of failure and efficiency of joint – Prying action. Design of Welded Connections.						
UNIT-II	DESIGN OF TENSION MEMBERS					7+2
Introduction to Tension Members - Types of Tension members and sections – Gross area and Net area – Net effective sections for Plates, Angles - Design of plate and angle tension members - Design of built-up tension Members - Connections in tension members – Use of lug angles – Design of tension splice.						
UNIT- III	DESIGN OF COMPRESSION MEMBERS					7+2
Introduction to compression members and types of sections - Current code provisions for compression members – Buckling Class - Effective Length – Design of Axially Loaded solid section Columns - Design of Built-up Laced Columns – Design of Battened columns – Design of column bases.						
UNIT - IV	DESIGN OF FLEXURAL MEMBERS					6+2
Classification of cross sections - Design of laterally supported beams - Design of laterally unsupported beams - Design of built-up beams - Factors affecting lateral stability - Design of plate girders.						
UNIT-V	INDUSTRIAL STRUCTURES					7+2
Roof trusses types – Components of Trusses - Loads on trusses – Wind load calculations - Purlin design using angle and channel sections – Introduction to pre-engineered buildings - Design of truss using software tool (Not for Examination).						
						TOTAL: 45 PERIODS

OPEN ENDED PROBLEMS / QUESTIONS			
Course Specific Open-Ended Problems will be solved during classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End Semester Examinations.			
Course Outcomes: Upon completion of this course the students will be able to:		BLOOM'S Taxonomy	
CO1	Design the bolted and welded connections by the Limit state method of design.	L3 – Apply	
CO2	Design tension members and its connections by using IS 800:2007.	L3 – Apply	
CO3	Design of axially loaded columns and column base using IS 800:2007.	L3 – Apply	
CO4	Design of laterally restrained, unrestrained steel beams and plate girders by using IS 800:2007.	L3 – Apply	
CO5	Calculate the loads on Industrial structures and design the purlin.	L3 – Apply	
TEXTBOOKS:			
1.	Subramanian.N, "Design of Steel Structures", Oxford University Press, New Delhi, 2017.		
2.	Duggal. S.K, "Limit State Design of Steel Structures", Tata McGraw Hill Publishing Company, 2023.		
REFERENCE BOOKS:			
1.	Gambhir. M.L., "Fundamentals of Structural Steel Design", McGraw Hill Education India Pvt. Ltd., 2017.		
2.	Bhavikatti.S.S, "Design of Steel Structures" By Limit State Method as per IS:800- 2007, IK International Publishing House Pvt. Ltd., 2017		
3.	Sai Ram. K.S. "Design of Steel Structures "Dorling Kindersley (India) Pvt. Ltd., New Delhi, 2nd Edition, 2015		
WEB REFERENCES:			
S.No	Publisher	Website link	Type of Content
1.	Bureau of Indian Standards - IS 800:2007	https://dn790009.ca.archive.org/0/items/gov.in.is.800.2007/is.800.2007.pdf	Indian Standards
2.	Bureau of Indian Standards - Handbook for Structural Engineers	https://law.resource.org/pub/in/bis/S03/is.sp.6.1.1964.pdf	Indian Standards
3.	Bureau of Indian Standards - IS 875 (Part 1)	https://ia801405.us.archive.org/17/items/gov.law.is.875.1.1987/is.875.1.1987.pdf	Indian Standards
4.	Bureau of Indian Standards - IS 875 (Part 2)	https://archive.org/details/gov.law.is.875.2.1987/page/n1/mode/2up	Indian Standards
5.	Bureau of Indian Standards - IS 875 (Part 3)	https://ia600307.us.archive.org/13/items/gov.in.is.875.3.1987/is.875.3.1987.pdf	Indian Standards

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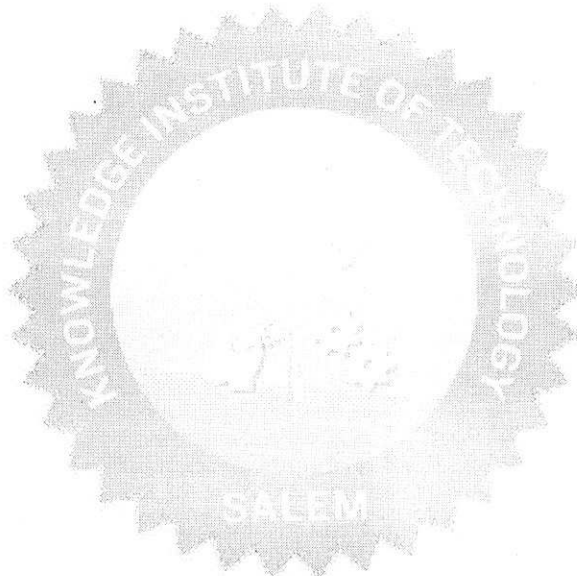
VIDEO REFERENCES:

S.No	Video Details	Name of the Expert	Type of Content	Video link
1.	NPTEL	Prof. Damodar Maity IIT Kharagpur	Lecture	https://nptel.ac.in/courses/105105162
2.	You Tube	Dr. Srinivasan Chandrasekaran IIT Madras	Lecture	https://www.youtube.com/watch?v=5eZneS83pBg

Mapping of COs with POs and PSOs

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2				2					2	3	
CO2	3	2	2			2	2				2	2	3	
CO3	3	2	2			2	2				2	2	3	
CO4	3	2	2				2				2	2	3	
CO5	3	2	2		2		2				2	2	3	
Avg.	3	2	2		2	2	2				2	2	3	

1-Low, 2 -Medium, 3-High



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BE23MC904	ENVIRONMENTAL SCIENCE AND SUSTAINABILITY	Version: 1.0				
Programme & Branch	COMMON TO ALL BRANCHES	CP	L	T	P	C
		2	1.5	0.5	0	0
Course Objectives:						
1.	To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.					
2.	To impart knowledge on the causes, effects and control or prevention measures of environmental pollution.					
3.	To facilitate the understanding of global and Indian scenario of energy resources, causes of their degradation and measures to preserve them.					
4.	To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyze climate changes, concept of carbon credit and the challenges of environmental management.					
5.	To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyzes the role of sustainable urbanization.					
INTRODUCTION (Not for Examination)					1	
Importance: Engineering students studying environmental science explore the significance of ecosystems, human-nature dynamics, and global environmental challenges like climate change and biodiversity loss. They also grasp concepts of sustainable management and socio - economic goals such as carbon emission reduction and equitable resource access.						
Real-life Example(s): Sewage water treatment plant – Solar panel – Wildlife sanctuary						
Linkages: To all processes that generate pollution.						
UNIT-I	ENVIRONMENT AND BIODIVERSITY	5 + 2				
Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow – ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ. Case study on Ecosystem at local level.						
UNIT-II	ENVIRONMENTAL POLLUTION	5 + 2				
Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, and Hazardous pollution management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts. Case study – Sources and remedy of water pollution, air pollution at industry level.						
UNIT-III	ENERGY SCENARIO OF WORLD AND INDIA	4 + 1				
Presents sources and distributions, related energy issues, future growth aspects and anticipated energy consequences – Need to form on environment friendly and renewable sources their potential and impact – Hardness in execution. Case study on available new energy resources in India.						


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UNIT-IV	SUSTAINABILITY AND MANAGEMENT	4 + 1	
Development, GDP, Sustainability- concept, needs and challenges -economic, social and aspects of sustainability-from unsustainability to sustainability - millennium development goals, and protocols - Sustainable Development Goals-targets, indicators and intervention areas Climate change - Global, Regional and local environmental issues and possible solutions- Concept of Carbon Credit, Carbon Footprint. Case study – Environmental issues and possible solutions for climate change.			
UNIT-V	SUSTAINABILITY PRACTICES	4 + 1	
Zero waste and R concept, Circular economy, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Green Engineering - Sustainable urbanization Case study - Socio economical and technological change.			
Total: 30 Periods			
OPEN-ENDED PROBLEMS / QUESTIONS			
Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment only and not for the End semester Examinations.			
Course Outcomes: Upon completion of this course, the students will be able to:		BLOOM'S Taxonomy	
CO 1	Understand the functions of environment, ecosystems and biodiversity and their conservation.	L2 – Understand	
CO 2	Measure causes of water, air, noise and soil pollutions and provide preventive solutions.	L3 – Apply	
CO 3	Understand the global and Indian scenario of energy resources and causes of their degradation.	L2 – Understand	
CO 4	Select suitable strategies for sustainable environment management.	L3 – Apply	
CO 5	Understand sustainability practices and green materials.	L2 – Understand	
TEXTBOOKS:			
1.	Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers, 2018.		
2.	Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.		
REFERENCE BOOKS:			
1.	R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38.		
2.	Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007		
3.	Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.		
4.	Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013.		
WEB REFERENCES:			
	Publisher	Website link	Type of Content
1.	National Bureau of Animal Genetic Resources, Haryana	https://nbagr.icar.gov.in/en/home/	Database and policies

2.	International Federation of the National Standardizing Associations	https://www.iso.org/standard/	Policies
3.	Ministry of Environment, Forest and Climate Change, Govt. of India	https://cpcb.nic.in/	Standards and Polices


VIDEO REFERENCES:

	Video Details	Name of the Expert	Type of Content	Video Link
1.	NPTTEL	Dr. Samik Chowdhury, Dr. Sudha Goel, IIT Kharagpur	Lecture	https://nptel.ac.in/courses/109105203
2.	NPTTEL	Dr. Deepu Philip, Dr. Amandeep Singh, IIT Kanpur	Lecture	https://nptel.ac.in/courses/112104225
3.	YouTube	Prof. Prasenjit Mondal, IIT Roorkee	Discussion	https://www.youtube.com/watch?v=NRoFvz8Ugeo&list=PLLy_2iUCG87Cr__rs9sS1zSaR62imd0uB&index=1

Mapping of COs with POs and PSOs

COs	Pos												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1				2	3					2		
CO2	3	2				3	3					2		
CO3	3		1			2	2					2		
CO4	3	2	1	1		2	2					2		
CO5	3	2	1			2	2					1		
Avg.	3	2	1	1		2	2.4					1.8		

1-Low, 2 -Medium, 3-High.


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BE23CS311	OBJECT ORIENTED PROGRAMMING USING C++ AND JAVA	Version: 1.0				
		CP	L	T	P	C
Programme & Branch	(COMMON TO MECH, ECE, EEE AND CIVIL)	5	2	1	2	4
Course Objectives:						
1.	To understand OOPs concepts and basics of C++ programming language.					
2.	To know the principles of class, objects and encapsulation.					
3.	To explore the inheritance, polymorphism and abstract classes using C++.					
4.	To understand the basics of Java programming language.					
5.	To know the principles of inheritance, packages and interfaces using Java.					
INTRODUCTION (Not for Examination)					2	
Importance: Object-Oriented and Procedural Programming - Hybrid Approach Rich Collection of Libraries - Widely Used in Systems Programming - Large Community and Legacy Code.						
Real-life Example(s): Video Game Development - Operating Systems -Web Browsers-Enterprise Applications-Android Development- Web Applications- E-commerce Platforms.						
Linkages: Pre-requisite: Data Structures and SQL Future courses: Advanced C++, Core Java Programming, Java FullStack Development.						
UNIT-I	BASICS OF C++ PROGRAMMING					6+2
Limitation of Structure Oriented Programming- Need of Object-Oriented Programming- C++ Introduction - Structure of C++ Programming - Compiling - Executing and Debugging - Character Set - Tokens: Keywords - Identifiers - Constants - Strings - Operators - Special Symbols - Data Types. Expression : Precedence and Associativity - Evaluating Expression - Type Conversion - Input and Output - Control Flow Statements - Arrays - Functions - Inline Functions - Default Arguments.						
UNIT-II	CLASS, OBJECTS AND ENCAPSULATION					6+2
Class Definition - Access Specifiers - Object Creation - Array of Objects - Constructor - Destructor - this Pointer - Static variables and Member Functions - Encapsulation: Introduction - types - friend function and friend class.						
UNIT- III	INHERITANCE AND POLYMORPHISM					6+3
Inheritance: Needs - types of inheritance - Constructors and Destructors in Inheritance - Constraints of Multiple Inheritance - Abstract Base Class - Pure Virtual function. Polymorphism: Introduction - Compile Time polymorphism - Function Overloading - Operator Overloading - Run Time Polymorphism - Function Overriding- Virtual Function.						
UNIT - IV	INTRODUCTION TO JAVA					6+3
Introduction to Java - Compiling and executing using command line - Datatypes, Variables, Operators, Expression, and Type Conversion - Control flow statements- Array, Compiling and executing using Eclipse IDE - Functions - Describing Objects and Classes - Constructors - Methods - Access Specifiers - Static members - Nested and Inner Classes.						
UNIT-V	INHERITANCE, PACKAGES AND INTERFACES					6+3
Inheritance: Basics - Types of Inheritance - Super keyword - Method Overriding - Dynamic Method Dispatch - Abstract Classes - Interfaces - Packages - Packages and Member Access - Types - Importing Packages.						
						TOTAL(LT): 45 Periods

LIST OF EXPERIMENTS/EXERCISES:		
1.	Write a C++ program to sort an array of elements using functions.	
2.	Write a C++ program to demonstrate call by value and call by reference.	
3.	Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.	
4.	Write a Program to illustrate default constructor, parameterized constructor and copy constructors.	
5.	Write a Java program to develop stack and queue data structures using classes and objects.	
6.	Develop a Java application that includes an Employee class to generate pay slips.	
7.	Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea() that prints the area of the given shape.	
8.	Solve the above problem using an interface.	
9.	Write a Java program to develop stack and queue data structures using classes and objects.	
		TOTAL(P): 30 Periods
		TOTAL(LT+P): 75 Periods
OPEN-ENDED PROBLEMS / QUESTIONS		
Course specific Open Ended Problems will be solved during the classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment only and not for the End semester Examinations.		
Course Outcomes: Upon completion of this course, the students will be able to:		BLOOM'S Taxonomy
CO1	Use the concepts of object oriented programming with C++.	L2 - Understand
CO2	Describe the class, objects and encapsulation to solve the real-world problems.	L3 - Apply
CO3	Develop programs using inheritance and polymorphism using C++	L3 - Apply
CO4	Build Java applications with object oriented programming Concept	L3 - Apply
CO5	Develop programs using inheritance, packages and interfaces	L3 - Apply
TEXTBOOKS:		
1.	Bjarne Stroustrup, "The C++ Programming Language" 4 th Edition, Addison-Wesley, 2013.	
2.	Herbert Schildt, "Java: The Complete Reference", 11 th Edition, McGraw Hill Education, New Delhi, 2019.	
REFERENCE BOOKS:		
1.	Balagurusamy, E, "Object Oriented Programming with C++", McGraw Hill; Eighth edition, 2020.	
2.	Herbert Schildt, "C++: The Complete Reference", 5 th Edition, McGraw Hill Education, 2012.	
3.	Balagurusamy, E, "Object Oriented Programming with C++", 8 th Edition, Tata McGraw-Hill, New Delhi, 2019.	
4.	Cay S. Horstmann, "Core Java Fundamentals", Volume 1, 11 th Edition, Prentice Hall, 2018.	
5.	Herbert Schildt, "Introducing JavaFX 8 Programming", 1 st Edition, McGraw Hill Education, New Delhi, 2015.	

WEB REFERENCES:			
	Publisher	Website link	Type of Content
1.	Web reference	https://www.tutorialspoint.com/	Reading Material
2.	w3schools	https://www.w3schools.com/	Reading Material
3.	javatpoint	https://www.javatpoint.com/	Reading Material

VIDEO REFERENCES:				
	Video Details	Name of the Expert	Type of Content	Video Link
1.	NPTEL	Prof. Partha Pratim Das IIT Kharagpur	Lecture	http://www.digimat.in/nptel/courses/video/106105151/106105151.html
2.	NPTEL	Prof. Debasis Samanta IIT Kharagpur	Lecture	https://archive.nptel.ac.in/courses/106/105/106105191/
3.	NPTEL	Prof. Debasis Samanta IIT Kharagpur	Lecture	https://www.youtube.com/playlist?list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho

Mapping of COs with POs and PSOs														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2					1				2	2
CO2	3	2	2	2					1				2	2
CO3	3	2	2	2					1				2	2
CO4	3	2	2	2					1				2	2
CO5	3	2	2	2					1				2	2
Avg.	3	2	2	2					1.0				2.0	2.0

1-Low, 2 -Medium, 3-High.


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BE23CE410	WASTE WATER ENGINEERING	Version: 1.0				
Programme & Branch	B.E. – CIVIL ENGINEERING	CP	L	T	P	C
		5	2	1	2	4
Course Objectives:						
1.	To estimate sewage generation and design sewer system including sewage pumping stations.					
2.	To perform basic design of the unit operations and processes that are used in sewage treatment.					
3.	To classify the waste water treatment methods and its maintenance aspects.					
4.	To understand the standard methods for disposal of sewage.					
5.	To gain knowledge on sludge treatment and disposal.					
INTRODUCTION (Not for Examination)					2	
Importance: Environmental Engineering- Waste water Engineering - Manage sewerage systems that treat wastewater -Managing Sludge deposition and Disposal						
Real Life Example(s): Treatment unit design for a sewage treatment plant -Septic tank design and Sludge digestion tank for a residential building -Municipal solid waste management						
Linkages: Pre-requisite: Water Supply Engineering. Future courses: Water Resource Engineering, Hydrology						
UNIT-I	PLANNING AND DESIGN OF SEWERAGE SYSTEM				5+3	
Importance and scope of sanitary engineering - Characteristics and composition of sewage – population equivalent -Sanitary sewage flow estimation – Sewer materials – Hydraulics of flow in sanitary sewers – Sewer design – Storm drainage-Storm runoff estimation – corrosion in sewers– prevention and control – Laying, jointing and testing of sewers - Sewer appurtenances						
UNIT-II	PRIMARY TREATMENT OF SEWAGE				5+3	
Objectives – Biochemical Oxygen Demand – Test for 5 day BOD -Selection of unit operation and process – significance and limitations – Selection of treatment processes – Septic tank– Primary treatment – Principles, functions and design of sewage treatment units Screens, skimming tank – grit chamber - proportional flow weir - Sedimentation types						
UNIT- III	SECONDARY TREATMENT OF SEWAGE				6+3	
Objectives – Selection of Treatment Methods – Principles, Functions, – Activated Sludge Process and Extended aeration systems -Trickling filters - Sequencing Batch Reactor(SBR) – Membrane Bioreactor – UASB – Waste Stabilization Ponds – Oxidation / stabilization ponds – aerobic and facultative ponds – Recent Advances in Sewage Treatment – Construction, Operation and Maintenance aspects						
UNIT – IV	DISPOSAL OF SEWAGE				6+3	
Standards for Disposal – Methods – dilution – Mass balance principle – Self purification of river- Oxygen sag curve – deoxygenation and reaeration – Streeter-Phelps model – Land disposal – Disposal on land - criteria methods of broad irrigation -subsurface irrigation -sewage sickness of soil						
UNIT-V	ADVANCED SLUDGE TREATMENT				6+3	
Need for advanced treatment – Methods – Sludge characterization – Thickening – Design of gravity thickener- Sludge digestion – Standard rate and High rate digester design- Biogas recovery – Sludge Conditioning and Dewatering – Sludge drying beds- ultimate residue disposal – ECOSAN, Introduction to DEWATS.						

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Total (LT) : 45 PERIODS			
LIST OF EXPERIMENTS/EXERCISES:			
1.	Determination of pH, Turbidity and conductivity in water		
2.	Determination of fluoride for the given sample using Spectrophotometer.		
3.	Determination of Chlorides in given samples		
4.	Determination of Optimum Coagulant dosage in waste water sample		
5.	Determination of suspended, settleable, volatile and fixed solids in waste water.		
6.	Determination of Dissolved Oxygen and BOD for the given sample.		
7.	Determination of COD for given sample.		
8.	Determination of SVI of Biological sludge and microscopic examination.		
Total(P): 30 PERIODS			
Total(LT+P): 75 PERIODS			
OPEN ENDED PROBLEMS / QUESTIONS			
Course Specific Open-Ended Problems will be solved during classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End Semester Examinations.			
Course Outcomes:		BLOOM'S Taxonomy	
Upon completion of this course the students will be able to:			
CO1	Calculate the Storm waste water generated for a town/City	L3 - Apply	
CO2	Design the unit operations and processes that are used in sewage treatment.	L3 - Apply	
CO3	Understand the waste water treatment methods and its maintenance aspects	L3 - Apply	
CO4	Identify the suitable mode of disposal for the treated wastewater	L3 - Apply	
CO5	Explain the sludge conditioning methods and disposal of sewage.	L3 - Apply	
TEXTBOOKS:			
1.	Garg, S.K , "Environmental Engineering Vol. II", Khanna Publishers, New Delhi, 2022.		
2.	Metcalf & Eddy M C, "Wastewater Engineering –Treatment & Reuse", Tata McGraw Hill Publications, New Delhi, 2017.		
REFERENCE BOOKS:			
1.	Birdi G S and Birdie J S, "Water Supply and Sanitary Engineering", 5 th Edition, Dhanpat Rai and Sons, New Delhi, 2013.		
2.	Karia G.L & Christian RA, "Wastewater Treatment: Concepts and Design Approach", 2 nd Edition, Prentice Hall India		
3.	CPHEEO, "Manual on Sewerage and Sewage Treatment Systems", Central Public Health And Environmental Engineering Organization (CPHEEO), Ministry of Urban Development, New Delhi, 2013.		
WEB REFERENCES:			
	Publisher	Website link	Type of Content
1.	Mc Graw Hill access engineering	https://www.accessengineeringlibrary.com/content/book/9781260132274	Articles on recent advancements
2.	International water Association	https://iwa-network.org/learn/water-and-wastewater-engineering/	Policies


VIDEO REFERENCES:

	Video Details	Name of the Expert	Type of Content	Video link
1.	NPTEL	Prof C.Venkobachar, Prof. Ligy Philip, Prof. B. S. Murty	Lecture	https://archive.nptel.ac.in/courses/105/106/105106119/
2.	You Tube	Prof. Bhanu Prakash Vellanki IIT Roorkee	Lecture	https://www.youtube.com/watch?v=4-SRMmqH2s4&list=PLLy_2iUCG87AZvtaiuD3r4HATrBKhb90P

Mapping of COs with POs and PSOs


COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2		2	3					1	2	
CO2	3	3	2	2		2			2	2		1	2	
CO3	2	2	3	3		3	2		3	3		1	2	
CO4	3	2			2	1	2	2				1	2	
CO5	3	3	3	3		3	3	3	3	3		1	2	
Avg.	2.8	2.6	2.5	2.5	2	2.2	2.5	2.5	2.6	2.6		1	2	

1-Low, 2 -Medium, 3-High


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BE23CE411	SURVEYING	Version: 1.0				
Programme & Branch	B.E. – CIVIL ENGINEERING	CP	L	T	P	C
		5	2	1	2	4
Course Objectives:						
1.	To apply chain and compass survey to determine area.					
2.	To calculate the level difference, distance between two points.					
3.	To understand the principle, components and procedure of total station, GPS.					
4.	To learn and use the concept of remote sensing and GIS.					
5.	To understand the concept of photogrammetry and drone survey.					
INTRODUCTION (Not for examination)					2	
Importance: Surveying – location of points on or below the earth’s surface – Chain – Compass – Level – Contour – Curves – Total station – GPS – Remote sensing – GIS - ArcGIS - Photogrammetry – Drone – Aerial survey - Development of urban areas.						
Real Life Example(s): Construction of road – Levelling, Longitudinal & Cross sectioning.-Boundary Marking – Chaining & Compass surveying.-Column orientation – Total station.						
Linkages: Pre-requisite: Transportation Engineering Future courses: Survey Camp						
UNIT-I	INTRODUCTION TO CHAIN AND COMPASS SURVEYING					5+3
Introduction: Broad classifications – Basic Principles – Field work & office work. Ranging and chaining: Equipment and accessories – Methods – Traversing – Calculation of area by simpson and trapezoidal rule. Compass: Principles – Sources of errors and local attraction – Magnetic declination – Dip – Traversing.						
UNIT-II	LEVELLING, CONTOURING AND CURVES					6+3
Levelling: Notations – Benchmarks– Levels and staves – Temporary and permanent adjustments – Methods of leveling – Fly leveling – Check leveling – Procedure in leveling – Booking – Reduction – Curvature and refraction. Contour: Contouring – Characteristics – Methods of locating contour – Uses. Curves: Introduction – Types – Simple curve.						
UNIT- III	TOTAL STATION, GPS					5+3
Total Station: Introduction - Principle and function - REM, RDM - Use of total station for data processing and analysis - Field work: Data collection. GPS: System components – Signals and receivers - Positioning modes - Selective availability - satellite receiver and clock error – Applications – Advantages.						
UNIT - IV	REMOTE SENSING AND GIS					6+3
Remote sensing: Classification – Principle – Methods – Image interpretation techniques - visual interpretation - Digital image processing. GIS: Maps - Classification of Maps - Historical development of GIS - Components of GIS - Types of Data – Applications: Cartography using ArcGIS (not for examination).						
UNIT-V	PHOTOGRAMMETRIC SURVEY AND DRONE					6+3
Photogrammetry: Introduction – Basic principles – Aerial camera – Scale of vertical photograph and tilted photograph – Measurement of parallax bar – Mosaics. Drone Survey: Introduction to mapping and modeling concepts - Components - Applications.						
						TOTAL(LT): 45 PERIODS

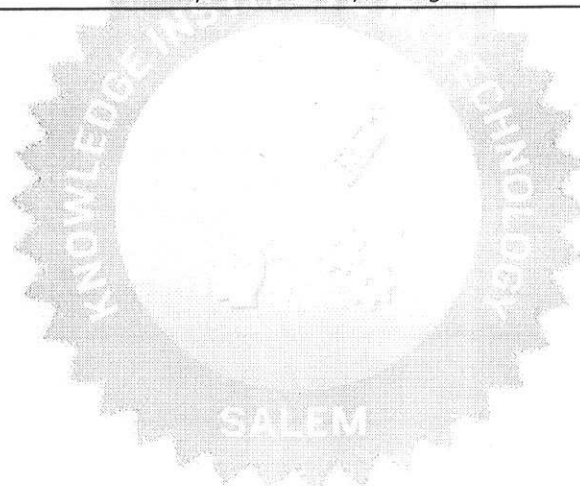
LIST OF EXPERIMENTS/EXERCISES:			
1.	Study of chains and its accessories, aligning, ranging, chaining and marking perpendicular offset.		
2.	Setting out works – Foundation marking of a residential building.		
3.	Compass Traversing – Measuring Bearings & arriving included angles.		
4.	Fly levelling & check leveling using Dumpy level.		
5.	Locate physical and geological features using ArcGIS.		
6.	Traverse using total station and area of traverse.		
7.	Determination of coordinates of a point and route using GPS.		
Total(P): 30 PERIODS			
Total (LT+P): 75 PERIODS			
OPEN ENDED PROBLEMS / QUESTIONS			
Course Specific Open-Ended Problems will be solved during classroom teaching. Such problems can be given as Assignments and evaluated as Internal Assessment (IA) only and not for the End Semester Examinations.			
Course Outcomes: Upon completion of this course the students will be able to:			BLOOM'S Taxonomy
CO1	Make use of chain and compass calculate the area of the given plot.		L3 - Apply
CO2	Apply the concept of horizontal and vertical distance to plot contours.		L3 - Apply
CO3	Experiment with GPS and Total station and locate the RL points.		L3 - Apply
CO4	Organize maps using remote sensing and GIS.		L3 - Apply
CO5	Apply photogrammetry and drone for aerial survey.		L3 - Apply
TEXTBOOKS:			
1.	Dr. B. C. Punmia, Ashok K. Jain and Arun K Jain, Surveying Vol. I, Lakshmi Publications Pvt Ltd, New Delhi, 2024.		
2.	Duggal S K , "Surveying",Tata McGraw Hill Publishing Company Ltd., New Delhi, 5 th Edition, 2019.		
REFERENCE BOOKS:			
1.	K. R. Arora, Surveying Vol I & II, Standard Book house, 17 th Edition 2019.		
3.	R. Subramanian, Surveying and Levelling, Oxford University Press, 2 nd Edition, 2012.		
WEB REFERENCES:			
S.No.	Publisher	Website link	Type of Content
1.	Journal of Surveying Engineering. Volume 150, Issue 2	https://ascelibrary.org/doi/10.1061/JSUED2.SUENG-1458	Articles on recent advancements
2.	Directorate of Town and Country Planning	https://tcp.tn.gov.in/detaileddevelopmentplans	Policies


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VIDEO REFERENCES:				
S.No.	Video Details	Name of the Expert	Type of Content	Video link
1.	NPTEL	Dr. Bharat Lohani IIT Kanpur	Lecture	https://nptel.ac.in/courses/105104101
2.	NPTEL	Dr. jayanta kumar ghosh IIT Roorkee	Lecture	https://archive.nptel.ac.in/courses/105/107/105107157/

Mapping of COs with POs and PSOs														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3		1	1		1	2		1		3	
CO2	3	3	2		1	1		1	2		1		3	
CO3	3	3	3		1	1		1	2		1		3	
CO4	3	3	3		1	1		1	3		1		3	
CO5	3	3	3		1	1		1	2		1		3	
Avg.	2.8	2.8	2.8		1	1		1	2.2		1		3	


1-Low, 2 -Medium, 3-High.



Beyond Knowledge


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BE23EN104	PROFESSIONAL COMMUNICATION LABORATORY - II	Version : 1.0				
Programme & Branch	(COMMON TO ALL BRANCHES EXCEPT B.Tech CSBS)	CP	L	T	P	C
		2	0	0	2	1
Course Objectives:						
1.	To train the students to gain proficiency in communication.					
2.	To orient the students towards grooming as a professional					
3.	To develop analytical thinking skills for problem-solving in communicative contexts.					
4.	To make students employable graduates.					
5.	To make presentation on a given topic in a formal context.					
INTRODUCTION (Not for Examination)						
Importance:						
Enhances students' language competence - trains students to acquire career skills sought by the industry for campus recruitment - Improves communication skills in formal and informal situations.						
Real-life Example(s):						
Job Application & Resume - writing minutes - role play - presentation - writing case study						
Linkages:						
Pre-requisite: Communicative English - I, Communicative English - II.						
LIST OF EXPERIMENTS						
1.	Oral and visual presentation					
2.	Interview skills					
3.	Drafting Job application & Resume					
4.	Mock Interview					
5.	Writing minutes					
6.	Speaking about specifications of a product (E.g., Home appliances)					
7.	Persuasive Talk – Role play activity					
8.	Verbal analogies					
9.	Spotting errors					
10.	Writing case study for given problem					
Total: 30 Periods						
Course Outcomes:						BLOOM'S Taxonomy
Upon completion of this course, the students will be able to:						
CO1	Use language effectively for presentation.					L3 - Apply
CO2	Utilize writing skills for better communication.					L3 - Apply
CO3	Construct ideas in both formal and informal conversation.					L3 - Apply
CO4	Develop writing skills for report writing.					L3 - Apply
CO5	Express opinions assertively in group discussions.					L3 - Apply


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TEXTBOOKS:				
1.	Richardson, Mathew. Advanced Communication Skills. Charlie CReative Lab, 2020			
2.	Rizvi, Ashrif. Effective Technical Communication, Tata Mc Grahill, 2011.			
REFERENCE BOOKS:				
1.	Comfort, Jeremy, et al. Speaking Effectively: Developing Speaking Skills for Business English. Cambridge University Press, Cambridge: Reprint 2011			
2.	Terk, Natasha. Reports, Proposals and Procedures: A write It well Guide. Gildan Media, 2015.			
3.	Carnegie, Dale. The Art of Public Speaking. Prabhat Prakashan Pvt. Ltd. 1 st Edition: New Delhi, 2016			
WEB REFERENCES:				
	Publisher	Website link	Type of Content	
1.	Mindtools	https://www.mindtools.com/a99xl9o/interview-skills	others	
2.	Ecampusontario	https://ecampusontario.pressbooks.pub/writingcorrections/chapter/sample-chapter/	others	
VIDEO REFERENCES:				
	Video Details	Name of the Expert	Type of Content	Video Link
1.	SWAYAM	Dr. Vibhuti Gaur Indira Gandhi National Open University (IGNOU)	English at the Workplace	https://onlinecourses.swayam2.ac.in/nou24_lg67/preview
2.	COURSERA	Brian McManus Language Specialist University of Pennsylvania	Writing Covering Letter, Resume	https://www.coursera.org/learn/careerdevelopment

Mapping of COs with POs and PSOs														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1										3		1		
CO2										3		1		
CO3										3		1		
CO4										3		1		
CO5										3		1		
Avg.										3		1		

1-Low, 2 -Medium, 3-High.


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 Saurashtra University

BE23PT808	Aptitude Skills - III		Version: 1.0				
Programme & Branch	COMMON TO ALL BRANCHES		CP	L	T	P	C
			1	0	0	1	0.5
Course Objectives:							
1.	To acquire skills required to solve quantitative aptitude problems.						
2.	To enhance logical reasoning skills and help them improve problem-solving abilities.						
INTRODUCTION: (Not for Examination)						01	
Importance: Logical thinking and Problem-solving skills are very important for solving engineering problems							
Linkages: Pre-Requisite : Aptitude Skills I and Aptitude Skills II Future course : Aptitude Skills IV							
UNIT-I	Quantitative Aptitude		08				
Time & Work, Chain Rule, Permutations & Combinations, Probability, Boats & Streams and Pipes & Cisterns							
UNIT-II	Logical Reasoning		06				
Non-verbal reasoning, Syllogisms, Critical Thinking and Statement & Conclusion							
						TOTAL: 15 PERIODS	
Course Outcomes: Upon completion of this course, the students will be able to:						BLOOM'S Taxonomy	
CO1	Exhibit sound knowledge to solve problems of quantitative aptitude.					L3 - Apply	
CO2	Demonstrate ability to solve problems using logical reasoning.					L3 - Apply	
TEXTBOOKS:							
1.	Dr. R.S. Aggarwal., "Quantitative Aptitude for Competitive Examinations", S.Chand and Company Ltd., 2022						
2.	Dr. R.S. Aggarwal, "A Modern Approach to Logical Reasoning", S.Chand and Company Ltd., 2022						
3.	FACE, "Aptipedia: Aptitude Encyclopedia", 2 nd edition, Wiley India Pvt. Ltd., 2017						
REFERENCE BOOKS:							
1.	Arun Sharma, "Quantitative Aptitude for the CAT" 10 th edition, McGraw-Hill Publishing, 2022						
2.	Praveen R. V., "Quantitative Aptitude and Reasoning", 3 rd edition, PHI Learning Pvt. Ltd., 2016						
WEB REFERENCES:							
	Publisher	Website link	Type of Content				
1.	Indiabix	https://www.indiabix.com/online-test/aptitude-test/	Tests for Practice				
2	Placement preparation	https://www.placementpreparation.io/quantitative-aptitude/	Tests for Practice				
3	Geeks for geeks	https://www.geeksforgeeks.org/aptitude-for-placements/	Content for Learning and Tests for Practice				

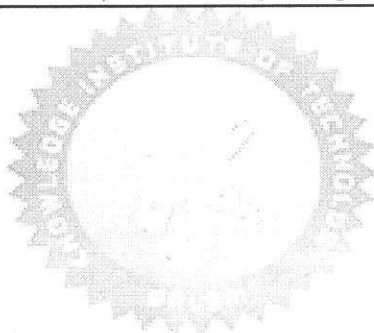
VIDEO REFERENCES:

	Video Details	Name of the Expert	Type of Content	Video link
1.	YouTube	CareerRide	Video Lectures	https://www.youtube.com/playlist?list=PLpyc33gOcbVA4qXMoQ5vmhefTruk5t9lt
2	YouTube	Freshersworld.com	Video Lectures	https://www.youtube.com/playlist?list=PLjLhUHPsqNYkcq6YOfiywbTfnvf_TN7i9

Mapping of COs with POs and PSOs

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	3													
Avg.	3													

1-Low, 2 -Medium, 3-High.



WISDOM BEGETS KNOWLEDGE

A. J. S.
CHAIRPERSON
 Board of Studies
 Faculty of Civil Engineering
 Knowledge Institute of Technology
 KIOT Campus, Kakapalayam