KNOWLEDGE INSTITUTE OF TECHNOLOGY

(An Autonomous Institution)

Approved by AICTE, Affiliated to Anna University, Chennai.
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: 06.07.2024

CHAIRPERSON
Board of Studies
Faculty of Civil Engineering
Knowledge Institute of Technology
KIOT Campus, Kakapalayam,
Salem-637 504

	KNOWLEDGE INSTITUTE OF TECHNOLOGY(AUTONOMOUS), SALEM
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	website: www.kiot.ac.in

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Salem-637 504

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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

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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

KNOWLEDGE INSTITUTE OF TECHNOLOGY (AUTONOMOUS), SALEM - 637504
B.E. CIVIL ENGINEERING
Courses of Study and Scheme of Assessment (Regulations 2023)

Version : 1.1
Date : 06.07.24

Sl. No.	Course Code	Course Title	CAT	Periods / Week					Maximum Marks		
				CP	L	T	P	C	IA	ESE	Total
SEMESTER I											
-	-	Induction Programme	-	-	-	-	-	-	-	-	-
THEORY											
1	BE23EN101	Communicative English-I	HS	2	1	1	0	2	40	60	100
2	BE23MA201	Calculus for Engineers	BS	3	2	1	0	3	40	60	100
3	BE23CY201	Engineering Chemistry	BS	3	3	0	0	3	40	60	100
4	BE23PH203	Physics for Civil Engineers	BS	3	3	0	0	3	40	60	100
5	BE23GE301	Overview of Engineering and Technology	ES	3	3	0	0	3	40	60	100
6	BE23MC901	தமிழர் மரபு / Heritage of Tamils	MC	1	1	0	0	1	40	60	100
THEORY CUM PRACTICAL											
7	BE23GE306	Problem solving and C Programming	ES	5	3	0	2	4	50	50	100
PRACTICAL											
8	BE23BS201	Physics and Chemistry Laboratory	BS	4	0	0	4	2	60	40	100
9	BE23GE305	Engineering Practices Laboratory	ES	4	0	0	4	2	60	40	100
EMPLOYABILITY ENHANCEMENT											
10	BE23PT801	Human Excellence and Value Education -I	EEC	2	1	0	1	NC	100	-	100
Total				30	17	2	11	23	510	490	1000
SEMESTER II											
THEORY											
1	BE23EN102	Communicative English-II	HS	2	1	1	0	2	40	60	100
2	BE23MA202	Vector Calculus and Numerical Methods	BS	3	2	1	0	3	40	60	100
3	BE23CE401	Engineering Mechanics for Civil Engineers	PC	3	3	0	0	3	40	60	100
4	BE23GE302	Engineering Graphics and Building Drawings	ES	5	1	0	4	3	40	60	100
5	BE23MC902	தமிழரும் தொததொழில்நுட்பமும் / Tamils and Technology	MC	1	1	0	0	1	40	60	100
6	BE23MC903	Universal Human Values and Ethics	MC	3	2	1	0	3	40	60	100
THEORY CUM PRACTICAL											
7	BE23CE402	Construction Materials and Technology	PC	5	3	0	2	4	50	50	100
8	BE23GE308	Programming in Python	ES	5	3	0	2	4	50	50	100
EMPLOYABILITY ENHANCEMENT											
9	BE23PT802	Human Excellence and Value Education -II	EEC	2	1	0	1	NC	100	-	100
10	BE23PT804	Engineering Clinic-I	EEC	2	0	0	2	1	100	-	100
11	BE23PT806	Aptitude Skills -I	EEC	1	0	0	1	0.5	100	-	100
Total				32	17	3	12	24.5	640	460	1100

B.E./B.Tech. Regulations-2023

Sl. No.	Course Code	Course Title	CAT	Periods / Week					Maximum Marks		
				CP	L	T	P	C	IA	ESE	Total
		SEMESTER III									
	THEORY										
1	BE23MA204	Transforms and Partial DifferentialEquations	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	Fundamentals of Data Structures and Database	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
9	BE23PT807	Aptitude Skills -II	EEC	1	0	0	1	0.5	100	-	100
		Total		31	12	6	13	24.5	590	410	1000

BE23MA204	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	CP	L	T	P	C
		3	2	1	0	3
Programme & Branch	Common to B.E.(MECH) and B.E.(CIVIL)	Version 1.0				

Use of Calculator - fx991ms is Permitted

Course Objectives

1.	To familiarize individuals with the core concepts of Partial Differential Equations and facilitate the resolution of standard partial differential equations.
2.	To study the concepts of Fourier series and Boundary conditions, which will help them to model and analyze the physical attributes.
3.	To acquaint students with Fourier Series techniques for solving heat flow problems in various situations.
4.	To understand the methodologies involved in Fourier Transform.
5.	To learn the concepts of Z- transform and inverse Z-transform.

INTRODUCTION (Not for Examination)	2

Importance:

PDEs involve partial derivatives with respect to multiple variables and can describe physical phenomena such as heat conduction, fluid flow, and wave propagation. Fourier transforms are fundamental in signal processing, as they convert signals between the time and frequency domains.

Real-life Example:

Fluid Dynamics-Heat Transfer – Structural Mechanics- Optimize the control of dynamic systems.

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	6+3

Formation of Partial Differential Equations (L2) – Solutions of Standard Types of First Order Partial Differential Equations ($F(p,q)=0$ & Clairaut's Form) (L3) – Lagrange's Linear Equation (L3) – Linear Partial Differential Equations of Second and Higher order With Constant Coefficients of Homogeneous Types (L3).

UNIT–II	FOURIER SERIES	6+3

Dirichlet's Conditions (L1) – General Fourier Series (L3) – Odd and Even Functions (L3) – Half Range Sine Series and Cosine Series (L3) – Root Mean Square Value (L2) – Parseval's Identity (L3) – Harmonic Analysis(L3).

UNIT– III	APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS	6+3

Classification of PDE (L2) – Fourier Series Solution of One-Dimensional Wave Equation (L3) – One Dimensional Equation of Heat Conduction (L3).

UNIT – IV	FOURIER TRANSFORMS	6+3

Statement of Fourier Integral Theorem (L1) – Fourier Transform Pair (L2) – Fourier Sine and Cosine Transforms (L3) – Properties (L2) –Transforms of Simple Functions (L3) – Convolution Theorem(L3) – Parseval's Identity (L3).

UNIT–V	Z - TRANSFORMS AND DIFFERENCE EQUATIONS	6+3

Z-Transforms(L1) – Elementary Properties (L2) – Initial and Final Value Theorems (L3) – Inverse Z Transform Using Partial Fraction (L3) - Convolution Theorem (L3) – Formation of Difference Equations(L2) – Solution of Difference Equations Using Z Transforms (L3).

	Total: 47 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 Partial Differential Equations in Engineering Problems.	L3 – Apply
CO2	Apply Fourier Series analysis to solve the Differential Equations, given its significant importance in Engineering Applications.	L3 - Apply
CO3	Utilizing Fourier series approaches in the solution of one-dimensional wave equations.	L3 - Apply
CO4	Utilize the Mathematical concepts of Fourier Transform to address Engineering Challenges.	L3 - Apply
CO5	Apply the Z Transforms to resolve Difference Equations that occur within 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://onlinecourses.nptel.ac.in/noc24_ma85/preview
2.	NPTEL	G.K. Srinivasan, Department of Mathematics, IIT Bombay	Lecture	https://onlinecourses.nptel.ac.in/noc23_ma22/preview

B.E./B.Tech. Regulations-2023

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1												
CO2	3	2		1											
CO3	3	2		1											
CO4	3	2			1										
CO5	3	2			1										
Avg.	3	2	1	1	1										

Mapping of COs with POs and PSOs

1-Low, 2 –Medium, 3–High.

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BE23CE403	WATER SUPPLY ENGINEERING	CP	L	T	P	C
		3	2	1	0	3
Programme & Branch	**B.E. – CIVIL ENGINEERING**		**Version: 1.0**			

Course Objectives:

1.	To understand the characteristics of water and its conveyance systems.
2.	To perform unit operation and process of treatment units.
3.	To gain Knowledge on disinfection and filtration unit in secondary treatment units.
4.	To study the various components of water supply lines and distribution network.
5.	To infer the different plumbing systems used in residence service connection.

INTRODUCTION (Not for Examination)	**2**

Importance:

Broad Classification - Environmental Engineering – Source of Water – Characteristics and Water Treatment – Water Consumption – Water Demand – Quality Standards – Water Supply and Distribution – Domestic Water Consumption – Pipeline Networks.

Real Life Examples:

Sources of Water – Surface Water: Streams, Rivers – Sub Surface Water: Wells – **Intake Structures:** Exposed, Submerged - **Water Treatment Works:** Sedimentation, Filtration, Disinfection – **Distribution Systems:** Gravity Systems, Pumping Systems.

Linkages:

Pre-Requisite: Physics for Civil Engineers, Engineering Chemistry.

Future Course: Waste Water Engineering, Irrigation and Water Resource Engineering.

UNIT–I	**PLANNING FOR WATER SUPPLY**	**6+3**

Sources of Water: Surface and Groundwater (L2) - Planning, Objectives, Characteristics (L2) - **Water Demand:** Need for Potable Water Supply (L2) - Drinking Water Quality Standards (IS 10500-2012) (L1) - Design Period, Population Forecasting Methods (L3) - **Conveyance System of Water:** Intake (Types and Location), Types of River Intake, Jack Well, Pumping System, Power and Capacity of Pump (L2).

*Experiential Learning: Laboratory test on physical properties of water sample.

UNIT–II	**PRIMARY TREATMENT OF WATER**	**6+3**

Impurities in Water: Causes and Effects (L2) – Unit Operations and Process (L2) – Principles, Functions, and Design of Water Treatment Plant Units, Aerators of Flash Mixers, Coagulation and Flocculation (L2) – Clariflocculator (L2) - Plate and Tube Settlers (L2) – **Sedimentation Tank:** Types, Design of Circular Sedimentation Tank (L3).

UNIT– III	**SECONDARY TREATMENT OF WATER**	**6+3**

Filtration: Classification of Filter Media, Filter Operation, Problems in Filtration (L2) - **Disinfection**: Types, Chlorination, UV and Ozone Disinfection (L3) - **Membrane Filtration:** Types, Basic Concepts, Applications (L2) - **Adsorption:** Introduction, Basics of Carbon Adsorption (L2) - **Ion Exchange:** Theory and Principal of Softener, Concept of 24x7 Water Supply (L2).

UNIT – IV	**DISTRIBUTION SYSTEM OF WATER**	**6+3**

Requirements of Distribution System (L1) - Distribution Network Layouts (L2) - Analysis by Hardy Cross Method and Equivalent Pipe Method (L3) – Introduction to Computer Applications (L2) - Leakage Detection and Prevention (L2) - Metered and Unmetered Water Supplies (L2) - Necessity of Pumping in Water Supply (L2).

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UNIT–V	DOMESTIC WATER SUPPLY SYSTEM	6+3

Principles of Design of Water Supply in Buildings (L2) – House Service Connection(L3) – Fixtures and Fittings, Systems of Plumbing and Types of Plumbing (L2) - Service Connection to Buildings (L2) - Drainage Layout (L2) - Principles Governing Drainage (L2) - Plumbing Components: Traps and Fittings, Water Seal (L2) - Classification of Plumbing Systems (L2) - Plumbing Design, IS Code Provisions, IS 12183 1983, 2065 1983 (L2).

Total (LT): 47 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	Identify the sources and plan the water supply conveyance system based on water demand.	L3 – Apply
CO2	Apply the principles to design water treatment plant units, sedimentation tank.	L3 – Apply
CO3	Apply the working principles of filtration, disinfection in secondary treatment plant.	L3 – Apply
CO4	Select the distribution network and water supply to buildings.	L3 – Apply
CO5	Plan different plumbing systems used in service connections.	L3 – Apply

TEXTBOOKS:

1.	Garg S.K "Water Supply Engineering", Khanna Publishers, 38th Edition, New Delhi 2022.
2.	Mark J hammer "Water and Wastewater Technology" 6th 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 Tamil Nadu	http://www.groundwatertnpwd.org.in/	Real time water quality issues

VIDEO REFERENCES:

	Video Details	Name of the Expert	Type of Content	Video link
1	NPTEL	Prof C.Venkobachar, Prof. B. S. Murty IIT Madras.	Lecture Video	https://www.youtube.com/watch?v=zVZ9c6EXfTA&list=PL1BFC82F3A63B4172
2	COURSERA	Prof Dale Whittington University of Manchestor.	Lecture Video	https://www.coursera.org/learn/water

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	1	2	2	1	1	1			2	
CO2	3	2	2	2		1	1	1					2	
CO3	3	1	1	1		1	1	1		1			2	
CO4	3	2	2	2	1	2	2	1					2	
CO5	3	2	2	2		2	1	1	1	1			2	
AVG	3	1.8	1.8	1.6	1	1.8	1.4	1	1	1			2	

Mapping of COs with POs and PSOs (POS / PSOs)

1–Low, 2 –Medium, 3–High.
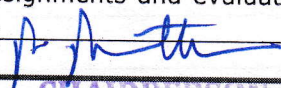
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BE23CE404	STRENGTH OF MATERIALS	CP	L	T	P	C
		3	2	1	0	3
Programme & Branch	B.E. – CIVIL ENGINEERING	Version: 1.0				

Course Objectives:

1.	To understand the fundamental concepts and principles to solve problems on indeterminate beams.
2.	To explore various methods used for computing the slopes and deflections of determinate beams.
3.	To understand and solve practical problems related to columns, cylinders, shafts and springs.
4.	To understand the methods to analyse the trusses and basic concepts of three-dimensional state of stress.
5.	To understand the concept of symmetrical and unsymmetrical bending, shear center and stresses in curved beams.

INTRODUCTION (Not for Examination)	2

Importance:
Material Properties – Material Behaviour Under Different Loading Conditions- Design of Structural Members and Mechanical Components- Load Carrying Capacity.
Real Life Examples:
Beams and Columns in Buildings, Roof Truss, Steam Boilers, Gas Cylinders, Bridges, Transmission Line Towers.
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 Concepts of Analysis(L2) - Propped Cantilever and Fixed Beams(L3) - Fixed End Moments and Reactions(L3) – Theorem of Three Moments(L2) – Analysis of Continuous Beams(L3).

UNIT–II	DEFLECTION OF BEAMS	6+3

Introduction(L2) -Method for Computation of Slopes and Deflections of Determinant Beams(L3) - DoubleIntegration Method(L3) - Macaulay's Method(L3) - Area Moment Method(L3) - Conjugate Beam Method(L3).

UNIT– III	COLUMNS, CYLINDER, SHAFTS AND SPRINGS	6+3

Introduction of Columns(L2) - Euler's Theory of Columns(L3) –End Conditions(L2); Rankine-Gordon Formula forEccentrically Loaded Long Columns & Short Columns(L3) - Thick & Thin Cylinders(L3). Torsion of Circular and Hollow Shafts(L3) – Stresses and Deflection in Shafts(L3).Introduction to Closed and Open Coiled Helical Springs(L2).

UNIT – IV	ANALYSIS OF TRUSS, PRINCIPAL STRESS, PRINCIPALPLANE	6+3

Introduction of Plane trusses(L2): Analysis of Plane Trusses(L3) - Method of Joints(L3) - Method of Sections(L3). Determination of Principal Stresses(L3) and Principal Planes(L3) – Theories of Failure(L3) – Application in Analysisof Stresses and Load Carrying Capacity(L3).

UNIT–V	ANALYSIS OF SECTIONS & CURVED BEAM	6+3

Introduction to Bending of Beams(L2) - Symmetrical and Unsymmetrical Sections of I Section, L Section & C Section(L3) – Shear Centre(L3) - Curved Beams(L3) – Winkler Bach Formula(L3).

TOTAL: 47 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	Analyze the indeterminate beams using compatibility conditions and three moments equation.	L3 - Apply
CO2	Determine the slope and deflection of determinate beams by different methods.	L3 - Apply
CO3	Analyze the long columns to determine the design loads and design of shafts and cylinders.	L3 - Apply
CO4	Analyze the pin jointed plane frames and three-dimensional state of stress using theories of failure.	L3 - Apply
CO5	Determine the stresses due to unsymmetrical bending of beams, locate the shear centre and find stresses in curved beams.	L3 - Apply

TEXTBOOKS:

1. Bansal R.K., "Strength of Materials", Laxmi Publications Pvt. Ltd, New Delhi,7th Edition, 2023.

2. Rajput R.K., "Strength of Materials", S.Chand & Company Ltd, New Delhi, 2020.

REFERENCE BOOKS:

1. Beer F.P and Johnston E.R., "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. Ramamrutham S, "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	Basic concepts and graphical explanations
2.	Engineers edge	https://www.engineersedge.com/mechanics_material_menu.shtml	Basic concepts and tools for problem solving

VIDEO REFERENCES:

S.No.	Video Details	Name of the Expert	Type of Content	Video link
1.	NPTEL	Prof. Sriman Kumar Bhattacharyya IIT Kharagpur	Lecture Video	https://archive.nptel.ac.in/courses/105/105/105105108/
2.	YouTube	Prof.K.Ramesh IIT Madras	Lecture Video	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	1			2	
CO2	3	2	2	1					2	2			2	
CO3	3	2	2	1					1	1			2	
CO4	3	2	2	1					2	2			2	
CO5	3	2	1	1					1	1			2	
Avg	3	2	1.6	1.2					1.4	1.4			2	

1–Low, 2 –Medium, 3–High

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BE23CS310	FUNDAMENTALS OF DATA STRUCTURES AND DATABASE	CP	L	T	P	C
		5	2	1	2	4
Programme & Branch	Common to B.E.(EEE, ECE, MECH and CIVIL)	Version: 1.0				

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 of Data Structures:

Efficiency in Data Management - Performance Optimization - Real World Applications - Competitive Programming and Contest and Problem-Solving Skills.

Importance of Database:

Databases are the technique of storing, maintaining and accessing any sort of data. They collect information on people, places or things. It provides organizations a complete, clear view into the way data is shared and ensuring there aren't unnecessary copies of data.

Real-life Examples:

Arrays: Online Shopping Carts - Linked Lists: Music Playlists - Stacks: Web Browser History - Queues: Customer Service Systems - Trees: File Systems - Graphs: Social Networks and Google Map - Mark sheet generation – EB bill - Library Management System – Banking System.

Linkages:

Pre-requisite: Problem Solving using C Programming.

Future courses: Coding Skills – I, Coding Skills – II.

UNIT–I	DATA STRUCTURES TYPES AND LIST ADT	6+3

Data Structure – Types(L1), Abstract Data Types (ADTs)(L1) - **List ADT:** Array implementation of List ADT and Linked List implementation of List ADT(L3) - Singly linked lists(L3) - Circularly Singly linked lists(L3) - Doubly linked lists(L3).

UNIT–II	LINEAR DATA STRUCTURES (STACK AND QUEUE)	6+3

Stack ADT: Operations – Array and Linked List implementation(L2) - **Applications:** Expression Evaluation - Infix to Postfix conversion(L3) - Evaluation of Postfix Expression(L3) - **Queue ADT:** Operations - Array and Linked List implementation(L3) - Circular Queue(L2).

UNIT– III	NON LINEAR DATA STRUCTURES (TREES AND GRAPHS)	6+3

Tree ADT: Tree Definition(L1) - Tree terminologies(L2), General tree and Binary Tree(L2) - Tree traversal(L3) - Expression tree(L3) - Binary Search Tree(L3) - **Graph ADT:** Graph Definition(L1) - Graph terminologies(L2), Representation of Graphs(L2) - Graph traversal(L3) - **Shortest Path algorithms:** Dijkstra's algorithms(L3) - **Minimum Spanning Tree:** Prim's and Kruskal's algorithms(L3).

UNIT – IV	INTRODUCTION TO DATABASE SYSTEM	4+3

Database System: Definition and Purpose of Database System(L2) - Views of data(L2) - Data Models(L2) - Database System Architecture(L2) - **Introduction to relational databases:** Relational Model(L2) - Relational Algebra(L3) - **Entity Relationship model:** ER Diagrams(L3).

UNIT–V	FUNDAMENTALS OF MySQL and SQL	8+3

MySQL: Introduction to MySQL(L2) - Environmental Setup(L2) **SQL:** Introduction to SQL(L2) - Process of SQL(L2) - Advantages and Disadvantages of SQL(L2) - SQL Syntax(L2) - SQL Data

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Types(L2) - SQL Operators(L2) – Keys(L2) **SQL Commands:** DDL(L3), DML(L3), DCL(L3), TCL(L3), DQL(L3) - Normalizations(L3) - Joins(L3) - Sub queries(L3) - Aggregate Functions(L3).

	Total (LT) : 47 Periods

	LIST OF EXPERIMENTS/EXERCISES:
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. • Create table • Alter table • Drop Table
7.	Implementation of DML commands of SQL for the following operations. • Insert • Update • Delete
8.	Implementation of different types of operators in SQL. • Arithmetic Operators • Logical Operators • Comparison Operator • Special Operator • Set Operation

	Total (P) : 30 Periods
	Total (LT+P) : 77 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	Implement linear data structure operations using List.	**L3 - Apply**
CO2	Use stack and queue data structure operations for solving a given problem.	**L3 - Apply**
CO3	Use appropriate non–linear data structure operations for solving a given problem.	**L3 - Apply**
CO4	Construct queries using relational algebra.	**L3 - Apply**
CO5	Apply SQL queries to handle SQL database.	**L3 - Apply**

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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", 9th 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:

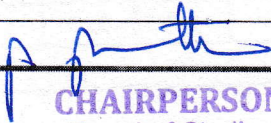|	Video Details	Name of the Expert	Type of Content	Video Link
1.	YouTube	K.Ravikumar	Lecture	https://www.youtube.com/@reachtutorravi3115
2.	YouTube	Jenny's Lectures	Lecture	https://www.mygreatlearning.com/academy/learnforfree/courses/datastructures inc
3.	NPTEL	Prof. Partha Pratim Das, Prof. Samiran 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	PSO3
CO1	3	2	2	1	1				1			2	3	1	1
CO2	3	2	2	1	1				1			2	3	1	1
CO3	3	2	2	1	1	1			1			2	3	1	1
CO4	2	2	2	1	2	1						1	1		
CO5	2	2	2	1	2	1						1			
Avg.	2.6	2.0	2.0	1.0	1.4	1.0			1.0			1.6	2.5	1.0	1.0

1–Low, 2 –Medium, 3–High.

BE23CE405	TRANSPORTATION ENGINEERING	CP	L	T	P	C
		5	2	1	2	4
Programme & Branch	B.E. – CIVIL ENGINEERING	Version: 1.0				

Course Objectives:

1.	To understand the classification of roads and its cross-sectional elements.
2.	To familiarize the various geometrical design of roads.
3.	To gain knowledge on design of pavement.
4.	To understand the elements and maintenance of railway track.
5.	To learn the layout and components of airport, docks and harbours.

INTRODUCTION (Not for Examination)	2

Importance:
Road network-Planning and design of roads, Railway track elements and its function, Layout of Airports, Ports and Harbours.
Real Life Examples:
National Highways- Horizontal curves, Median, Vertical curves in hills, Railway track and signal, Runway in Airport, Breakwaters in Harbours.
Linkage:
Prerequisite: Construction Materials and Technology.
Future Courses: Surveying.

UNIT–I	HIGHWAY PLANNING AND ALIGNMENT	6+3

Introduction to Transportation(L2)– Importance of Roads in National Development(L2)- Highway Development in India(L2)- Modes of Transportation(L1) - Roles and Responsibility of Indian Road Congress (IRC) and National Highway Authority of India (NHAI)(L2) – Classification of Roads(L3) - Cross Section of Road and its Elements(L3) – Highway Alignment(L2) -Engineering Survey for Road Construction(L2).

UNIT–II	GEOMETRIC DESIGN OF HIGHWAY	6+3

Introduction to Geometric Design(L2) - Sight Distances(L3) – Longitudinal and Traverse Gradient(L2)- Horizontal Curves and its Types(L2), Super Elevation(L3), Widening of Curves(L3)- Vertical Curves (IRC methods only) (L2).

UNIT– III	DESIGN OF PAVEMENT	6+3

Pavement of Roads-Definition and Types(L2) - Design of Flexible Pavement as per IRC method(L3)- Problems -Design of Rigid Pavement as per IRC method(L3)-Problems– Maintenance of Pavement(L2)– Failure of Flexible Pavements and its Types(L2)- Failure of Rigid Pavements and its Types(L2).

UNIT – IV	RAILWAY CONSTRUCTION, MAINTENANCE AND OPERATION	6+3

Elements of Railway Track and its Functions(L3)–Types of Gauges(L2)- Coning of Wheels(L2), Super Elevation in Railway Track(L3)– Route Alignment Surveys of Railway Route(L2) - Level Crossings and its Types. (L2), Track Drainage(L2)–Maintenance of Tracks(L2)– Railway Station and Yards(L2) - Signaling(L2).

UNIT–V	INTRODUCTION TO AIRPORT, HARBOUR AND DOCKS	6+3

Airport Classification(L2) – International Civil Aviation Organization(L1) -Components of Airport and its Function: Runway, Taxiway, Apron, Hangar- Passenger Terminals(L3) - Airport Planning: Site Selection typical Airport Layouts(L2), Windrose diagram(L2) - Problems - Definition: Harbour, Port, Satellite Port, Docks- Various Coastal Structures in Harbour/Ports(L2).

TOTAL(LT): 47 PERIODS

LIST OF EXPERIMENTS

1. Determination of Water Absorption for Coarse Aggregates.
2. Determination of Abrasion Value for Coarse Aggregates by Los Angeles Test.
3. Determination of Impact Test for Coarse Aggregates.
4. Measurement of Penetration Value for Bitumen.
5. Determination of Viscosity for Bitumen.
6. Determination of Ductility for Bitumen.
7. Estimation of Softening Point Test for Bitumen.

TOTAL(P): 30 PERIODS	
TOTAL(LT+P): 77 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 Apply the knowledge to plan and alignment the road.	L3 - Apply
CO2 Use the IRC codal provisions for geometric design of highway.	L3 - Apply
CO3 Design the thickness of the pavement.	L3 - Apply
CO4 Understand the components of railway track and its functions.	L3 - Apply
CO5 Gain knowledge on Components of airport, docks and harbour.	L3 - Apply

TEXTBOOKS:

1.	K.P.Subramanian, "Highway Railway Airport and Harbour Engineering", SCITECH publications,Chennai,2024.
2.	Dr. L.R. Kadiyali, "Transportation Engineering" Khanna Publishers, Delhi,2022.

REFERENCE BOOKS:

1.	S.K.Kanna, C.E.G Justo, A.Veeraragavan , "Highway Engineering", Nem Chand & Bros, 2024.
2.	Rangwala, "Airport Engineering", Atul Prakashan,2021.

WEB REFERENCES:

	Publisher	Website link	Type of Content
1.	Indian Road Congress	www.irc.nic.in///admnis/admin/showimg.aspx?ID=970,	Reports
2.	Airport Authority of India	www.aai.aero/en/system/files/resources/Agra_Airport_EC_letter.pdf?download=1,	Policies

VIDEO REFERENCES:

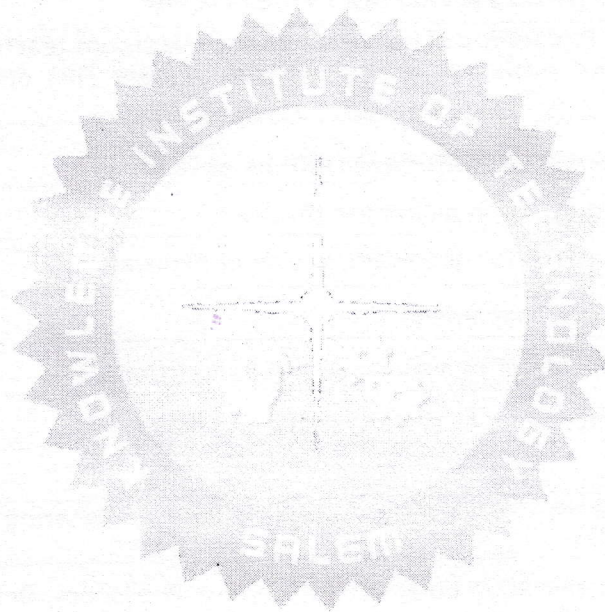|			
1.	NPTEL	https://nptel.ac.in/courses/105105107,	Video Lecture

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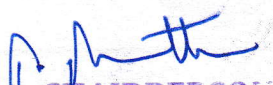Knowledge Institute of Technology
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COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PSO1	PSO2
Co1	1	2			1	1		1			1		2	
Co2	3	3	2	2		2		2					2	
Co3	3	3	2	2		2		2					2	
Co4	1	2				1		1			1		2	
Co5	1	2				1		1			1		2	
Avg.	1.8	2.4	2	2	1	1.4		1.4			1		2	

Mapping of COs with POs and PSOs

1–Low, 2 –Medium,3High

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BE23CE406	FLUID MECHANICS & HYDRAULIC MACHINERY	CP	L	T	P	C
		5	2	1	2	4
Programme & Branch	**B.E. – CIVIL ENGINEERING**	**Version: 1.0**

Course Objectives:

1.	To understand the properties of fluids under static and dynamics conditions.
2.	To study flow profiles of varied flows and dimensionless analysis.
3.	To learn the concept of boundary layers in fluids and various losses in pipes.
4.	To choose the suitable type of pumps based on its performance characteristics.
5.	To illustrate the performance and characteristics of various turbines.

INTRODUCTION (Not for Examination)	**2**

Importance:
Classification of Mechanics: Rigid bodies, Deformable bodies, Fluids.

Real Life Examples:
Hydro Electric Power Plant, Water distribution system in home, Underground storage to overhead tank using Pumps, Irrigation canals, Contour canals, Intake towers.

Linkages:
Pre-requisite: Physics for Civil Engineers.
Future courses: Waste Water Engineering, Irrigation and Water Resources Engineering.

UNIT–I	**Fluid Statics, Kinematics & Dynamics**	**6+3**

Fluid Statics: Dimensions and Units, Physical Properties of Fluids(L1) - Measurement of Pressure (L2)-Piezometer, U-Tube and Differential Manometers(L2).**Fluid Kinematics & Dynamics:** Streamline, Path Line and Streak Lines, Stream Function and Velocity Potentials (L2) – Flow Nets(L2) - Surface and Body Forces (L2) –Euler's and Bernoulli's Equations for Flow along a Streamline (L3) - Momentum Equation and its Applications. (L3).

UNIT–II	**Varied Flows & Dimensionless Analysis**	**6+3**

Varied Flows: Types of Flows (L2) -Dynamic Equations of Gradually Varied Flow (L2) - Water Surface Flow Profile Classifications: Hydraulic Slope, Hydraulic Curve (L2) - Application of the Momentum Equation for Rapid Varied Flow(L2) - Hydraulic Jumps (L2) - Types and Energy Dissipation, Positive and Negative Surges(L2).**Dimensionless Analysis:** Fundamental Dimensions(L1) – Dimensional Homogeneity(L2) – Rayleigh's Method and Buckingham Pi Theorem (L3) – Dimensionless Parameters (L2) – Similitude and Model Types(L2).

UNIT– III	**Boundary Layer and Flow Through Pipes**	**6+3**

Boundary Layer: Boundary layer (L2) –Thickness and its Classification (L2) – Development of Laminar and Turbulent Flows in Circular Pipes(L3) –Pipe Network (L2).**Closed Conduit Flow:** Reynold's Experiment (L2) - Darcy Weisbach Equation (L3) - Minor and Major losses in Pipes (L3) - Pipes in Series and Pipes in Parallel (L3).

UNIT – IV	Pumps	6+3

Centrifugal Pumps(L2) - Minimum Speed to Start the Pump(L2) - Net Positive Suction Head (NPSH)(L2) - Cavitation in Pumps(L2) - Operating Characteristics(L2) - Multistage Pumps(L2) - Reciprocating Pumps (L2) - Negative Slip(P)(L3) - Indicator Diagrams and its Variations (L2) - Classification and Working(L2) - Work Done(L2) – Monomeric Head and Static Head(P)(L3) - Losses and Efficiencies (P)(L3) - Specific Speed(L3) - Performance Characteristic Curves(L2).

UNIT–V	Turbines	6+3

Classification of Turbines (L2)- Impulse and Reaction Turbines, Pelton Wheel (P), Francis Turbine and Kaplan Turbine(L2)-Working Proportions, Work Done, Efficiencies(P)(L3)-Draft Tube(L2)– Cavitation(L1). Performance of Hydraulic Turbines: Specific Speed and Runway Speed (P) (L3).

TOTAL(LT): 47 PERIODS

LIST OF EXPERIMENTS
A. FLOW MEASUREMENT
1. Calibration of Venturimeter
2. Calibration of Orifice meter
3. Determination of coefficient of discharge for small orifice
4. Calibration of Notches.
5. Verification of Bernoulli's equation

B. LOSSES IN PIPES
3. Determination of Friction Factor in Pipes.
4. Determination of Minor Losses.

C. PUMPS
5. Characteristics of Centrifugal Pump.
6. Characteristics of Reciprocating Pump.

D. TURBINES
7. Characteristics of Pelton Wheel Turbine.

TOTAL(P): 30 PERIODS

TOTAL(LT+P): 77 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	Calculate the pressure, velocity and discharge of fluid flow.	L3 - Apply
CO2	Apply the equations for varied flows and to use dimensionless numbers for performance analysis of models.	L3 - Apply
CO3	Apply the concept of boundary layer and to estimate the losses in closed conduit flow.	L3 - Apply
CO4	Identify the types of pumps and determine the performance characteristic of pumps	L3 - Apply
CO5	Design and study the performance of turbines.	L3 - Apply

TEXTBOOKS:	
1.	Bansal R.K.," A Textbook of Fluid Mechanics and Hydraulic Machines", Laxmi Publications,11th Edition, 2023.
2.	RK Rajput.," A Textbook of Fluid Mechanics and Hydraulic Machines", S. Chand Publishing, 2018.

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REFERENCE BOOKS:

1.	Jain A. K., "Fluid Mechanics including Hydraulic Machines", Khanna Publishers, New Delhi, 2021.
2.	S K Som, Gautam Biswas and S Chakraborty, "Introduction to Fluid Mechanics and Fluid Machines", Tata McGraw Hill Education Pvt. Ltd., 2020.
3.	Pani B S, Fluid Mechanics: A Concise Introduction, Prentice Hall of India Private Ltd, 2019.

WEB REFERENCES:

	Publisher	Website link	Type of Content
1.	Gaikwad Shraddhey	https://medium.com/@shraddhey.gaikwad21/fluid-mechanics-in-everyday-life-73ce45c09875	Fluid Mechanics in Everyday Life.
2.	Toronto Metropolitan University	https://www.drdavidnaylor.net/	Reading material

VIDEO REFERENCES:

Video Details	Name of the Expert	Type of Content	Video link
NPTEL	Prof. Shamit Bakshi Prof. Dhiman Chatterjee	Lecture Video	https://archive.nptel.ac.in/courses/112/104/112104118/
NPTEL	Prof.Chak	Lecture	https://archive.nptel.ac.in/courses/112/105/112105269/
NPTEL	Prof.S.K.Som	Lecture	https://archive.nptel.ac.in/courses/112/105/112105171/

Mapping of COs with POs and PSOs													
COs	POs												PSOs	
COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	1					1	1			1	
CO2	3	2	2	1					1	1			1	
CO3	3	3	2	2					2	1			1	
CO4	3	3	2	2					2	1			1	
CO5	3	3	3	2	1				2	1			1	
Avg.	3	2.6	2	1.6	1				1.6	1			1	
1–Low, 2 –Medium,3High														

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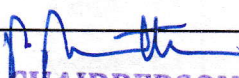Knowledge Institute of Technology
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BE23CE407	COMPUTER AIDED BUILDING DRAFTING	CP	L	T	P	C
		2	0	0	2	1
Programme & Branch	B.E. – CIVIL ENGINEERING	Version: 1.0				

Course Objectives:

1.	To practice AutoCAD software and understand the building bye-laws in planning.
2.	To draw the plan, section and elevation of residential load bearing buildings using computer software.
3.	To draw the plan, section and elevation of framed buildings using drafting software.
4.	To prepare the building approval drawings.
5.	To create the 3-D model of a residential building using a modelling software.

INTRODUCTION:	2

Importance: Construction Engineering – Building Bye-laws – Components of Buildings - Concept of Plan, Section, Elevation – Computer Aided Drawing (CAD).

Real Life Examples: Residential Building, Shopping Mall, School Building.

Linkages:
Pre-requisite: Engineering Graphics.
Future courses: Surveying, Estimation & Quantity Surveying.

LIST OF EXPERIMENTS/EXCERCISES:

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, Elevation)
7.	Building Approval Drawings of Single Storey Residential Building.
8.	3D Modelling of Residential Building.

	Total: 32 PERIODS

Course Outcomes: Upon completion of this course the students will be able to:	BLOOM'S Taxonomy
CO1	Understand the basic AutoCAD commands and planning principles using building bye-laws.	L2 - Understand
CO2	Draw and develop plan, elevation and sectional view of the residential load bearing buildings.	L3 – Apply
CO3	Utilize the software tools to draft the plan, elevation and sectional view of the framed buildings.	L3 – Apply

CO4	Prepare comprehensive building approval drawings for single-storey residential buildings.	L3 – Apply
CO5	Create 3D model residential building using modelling software.	L3 – Apply

TEXTBOOKS:

1.	Dr. Kumara Swamy N, Kameswara Rao A, "Building Planning And Drawing", Charotar Publishing House Pvt. Ltd., 9th Revised Edition: 2023
2.	Bhavikatti. S.S & Chitawadagi. M.V., "Building Planning and Drawing", Dreamtech Press, 2019.

REFERENCE BOOKS:

1.	Dr. Verma B.P., "Civil Engineering Drawing & House Planning", Khanna Publishers, 13th Edition: 2023
2.	Gopalakrishna K. R., & Sudhir Gopalakrishna, "Textbook Of Computer Aided Engineering Drawing", 39thEdition, Subash Stores, Bangalore, 2017.

WEB REFERENCES:

S.No	Publisher	Website link	Type of Content
1.	Town and Country Planning Organisation	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	Tutorial video for AutoCAD	https://youtu.be/kMUjOArzvP8?si=8HAKJRJOKrf_yzLH
2.	YouTube	Organization –Tamil CADD. Info	Tutorial video for Sketchup	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	1	2		3	2	1	2		1			2	
CO2	3	1	2		3	2	1	2		1			2	
CO3	3	1	2		3	2	1	2		1			2	
CO4	3	1	2		3	2	1	2		1			2	
CO5	3	1	2		3	2	1	2		1			2	
AVG	3	1	2		3	2	1	2		1			2	

1–Low, 2 –Medium, 3–High

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BE23EN103	PROFESSIONAL COMMUNICATION LABORATORY - I	CP	L	T	P	C
Programme & Branch	**(COMMON TO ALL BRANCHES EXCEPT B.Tech CSBS)**	2	0	0	2	1
		Version : 1.0				

Course Objectives:

1.	To use language for employment and social interaction.
2.	To help learners frame sentences in the correct context.
3.	To develop learners' confidence for presentation.
4.	To strengthen learners' communication in formal contexts.
5.	To participate confidently and appropriately in team conversations.

INTRODUCTION (Not for Examination)

Importance:

- The course provides a platform for students to enhance their language competence.
- It helps learners acquire career skills sought by industries for campus recruitment.
- It 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 (L2)
2.	Root words & Sentence formation (L3)
3.	Expressing oneself in an everyday situation (L3)
4.	Conversation and Just a minute talk (L3)
5.	Oral presentation – Long turn (L3)
6.	Group Discussion (L3)
7.	Creative writing (L3)
8.	Business Letter writing (L3)
9.	Giving constructive feedback and offering suggestions (L3)
10.	E-mail writing (L3)

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

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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. 1st 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1									1	3		1			
CO2									1	3		1			
CO3									1	3		1			
CO4									1	3		1			
CO5									1	3		1			
Avg.									1	3		1			

1-Low, 2 –Medium, 3–High.

BE23PT805		ENGINEERING CLINIC - II	CP	L	T	P	C
			2	0	0	2	1
		(COMMON TO ALL BRANCHES)					
Programme & Branch		B.E.- MECHANICAL ENGINEERING		Version: 1.0			

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.

A. 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.
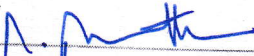
B. EXECUTION

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.	4
	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.	4
	S 6	Fabrication of 3D Printing Models.	6
3	S 7	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 Infernal Assessment is,

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Method	Review I	Review II	Review III	Review IV
Details	System description and Circuit design.	Testing, Validation and Demonstration.	Design and Fabrication of 3D Printing Models.	Final Product Demonstration / Presentation.
Marks	25	25	25	25

For Product/Application the student team can choose themselves.

Total: 30 PERIODS

Course Outcomes: Upon completion of this course the students will be able to:		BLOOM'S Taxonomy
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	PSO3
CO1	3	3	3	2	2	2	2	1	2	2	2	2	2	2	3
CO2	3	3	3	2	2	2	2	1	2	2	3	2	2	2	3
CO3	3	3	3	2	2	2	2	1	2	3	3	2	2	2	3
Average	3	3	3	2	2	2	2	1	2	2.3	2.6	2	2	2	3

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.

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BE23PT807	APTITUDE SKILLS - II		CP	L	T	P	C
			1	0	0	1	0.5
Programme & Branch	Common to all B.E. / B.Tech. Courses		Version: 1.0				

Course Objectives:

1.	To develop foundational knowledge and skills in averages, percentages, problems on ages, ratios and proportions
2.	To enhance logical reasoning skills from Venn diagrams, cubes and cuboids charts, tables and graphs

INTRODUCTION (Not for Examination)	01

Importance:

Problem-solving skills, analytical skills and logical reasoning are crucial in various aspects of an engineering education, career, and professional development. Hence, aptitude skills are needed for engineers in the following areas:

1. Engineering Design and Analysis
2. Innovation and Research
3. Project Management
4. Competitive Exams and Career Advancement

Real-Life Example(s):

a. **Budgeting and Financial Planning**: Managing personal or business finances involves calculating expenses, savings, investments, and returns. For instance, creating a monthly budget requires understanding percentages and basic arithmetic to allocate funds appropriately.

b. **Productivity:** A manager in a factory calculates the average number of units produced by employees to gauge overall productivity.

c. **Data Analysis:** In various professions, analyzing data to make informed decisions is crucial. For example, a marketing analyst uses quantitative skills to interpret sales data and forecast future trends.

d. **Shopping and Discounts**: While doing shopping, calculating discounts and comparing prices involves quantitative skills.
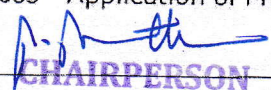
Linkages:

Previous Courses: Aptitude Skills I
Future Courses: Aptitude Skills III and Aptitude Skills IV

UNIT–I	Quantitative Aptitude	08

Number system(L3): Remainder Theorem - Unit digits - Factor and Factorial Theorem - Divisibility Rule

Averages(L3): Basic Concepts of Averages - Properties of Averages- Weighted Averages - Problems on Averages - Averages of Averages

Percentage(L3): Basic Concepts of Percentages - Percentage Increase and Decrease - Finding Percentages - Percentage Change - Successive Percentage Changes - Percentage Comparisons

Profit and Loss(L3): Basic Concepts of Profit and Loss - Profit and Loss Percentages - Selling Price and Cost Price Calculations - Mark Price and Discount - Successive Selling and Buying - Overheads and Additional Costs - Markup and Margin - Cost Variations and Impact on Profit/Loss - Application of Profit and Loss in Business Scenarios

Problems on Ages(L3): Basic Concepts of Age Problems - Formulating Equations Based on Age Statements - Solving Single-variable Age Problems - Solving Multi-variable Age Problems - Age Differences - Sum of Ages - Average Age - Age Ratios - Age Problems Involving Future and Past Scenarios - Age Problems in Competitive Exams - Age Puzzles and Riddles

Ratios & Proportions(L3): Basic Concepts of Ratios - Comparing Ratios - Proportions - Direct Proportion - Inverse Proportion - Compound Ratios - Ratio and Proportion in Real-life Applications - Ratio of Increase and Decrease - Advanced Problems on Ratios and Proportions

UNIT–II	Logical Reasoning	
		06

Venn Diagrams(L3): Basic Concepts of Venn Diagrams - Types of Venn Diagrams - Union and Intersection of Sets - Difference of Sets - Complement of a Set - Cardinality of Sets - Subset and Superset Relationships - Using Venn Diagrams for Logical Reasoning - Diagrammatic Representation of Data - Real-life Applications

Cubes & Cuboids(L3) : Basic Concepts and Definitions - Surface Area of Cubes and Cuboids - Volume of Cubes and Cuboids - Diagonal of Cubes and Cuboids - Face Diagonal of Cubes and Cuboids - Relationship Between Edge Lengths and Dimensions - Construction of Cubes and Cuboids - Applications in Real-life Scenarios

Data-Interpretation and Data-Sufficiency(L3): Introduction to Data Interpretation - Types of Charts and Graphs - Calculations and Approximations - Percentage Calculations - Comparison and Analysis – Problem Solving Techniques

	TOTAL: 15 PERIODS

Course Outcomes:

	Upon completion of this course the students will be able to:	Bloom's Taxonomy
CO1	solve quantitative problems, including averages, percentages, problems on ages, ratios and proportions	L3 – Apply
CO2	apply logical reasoning and draw conclusions from Venn diagrams, cubes and cuboids, charts, tables and graphs	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" 10th edition, McGraw-Hill Publishing, 2022
2.	Praveen R. V., "Quantitative Aptitude and Reasoning", 3rd edition, PHI Learning Pvt. Ltd., 2016

WEB REFERENCES:

	Publisher	Website link	Type of Content
1.	Indiabix	https://www.indiabix.com/online-test/aptitude-te...	...ts for Practice

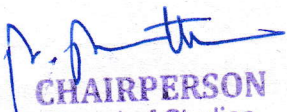| 2.	Placement preparation	https://www.placementpreparation.io/quantitative-aptitude/	Tests for Practice
3.	Geeks for geeks	https://www.geeksforgeeks.org/aptitude-for-placements/	Learning Resources and Tests for Practice

VIDEO REFERENCES:
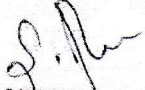
	Video Details	Name of the Expert	Type of Content	Video link
1.	YouTube	CareerRide	Video Lectures	https://www.youtube.com/playlist?list=PLpyc33gOcb VA4qXMoQ5vmhefTruk5t9lt
2.	YouTube	Freshersworld.com	Video Lectures	https://www.youtube.com/playlist?list=PLjLhUHPsq NYkcq6YOfiywbTfnvf_TN7i9

Mapping of COs with POs and PSOs															
COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2													
CO2	3	2													
Avg.	3	2													
1–Low, 2 –Medium, 3–High.															

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