Shri ShamraoPatil (Yadravkar) Educational & Charitable Trust's
Sharad Institute of Technology College of Engineering
Yadrav (Ichalkaranji)-416121, Dist. – Kolhapur
(An Autonomous Institute)

Department: Civil Engineering   **Rev:** Course Structure /01/NEP/2023-24
Class: S.Y. B. Tech   **Semester:** IV

Course Code	Course Type	Course	Teaching Scheme				Examination Scheme					Credits
			L	T	P	Total Hrs.	CAI	CAII	MSE	ESE	Total	
23CE2401	PCC	Hydraulics	02	-	-	2	10	10	30	50	100	02
23CE2402	PCC	Surveying-II	03	-	-	3	10	10	30	50	100	03
23CE2403	PCC	Concrete Technology	02	-	-	2	10	10	30	50	100	02
23CE2404	HSSM	Building Planning	01	-	-	1	25	25	-	-	50	01
23CE2405	VEC	Environmental Science	02	-	-	2	25	25	-	-	50	02
23CE2406	PCC	Hydraulics Laboratory	-	-	02	2	15	15	-	20	50	01
23CE2407	PCC	Concrete Technology Laboratory	-	-	02	2	25	25	-	-	50	01
23CE2408	VSEC	Planning Essentials Laboratory	-	-	02	2	25	25	-	-	50	01
23CE2409	EMC	Building Planning Laboratory	-	-	02	2	15	15	-	20	50	01
23CE2410	CEP	Mini Project- III	-	-	02	2	25	25	-	-	50	01
23CEMDXX	MDM	Multidisciplinary Minor-II	03	-	-	3	10	10	30	50	100	03
23OECE22	OE	Open Elective-II	03	-	-	3	10	10	30	50	100	03
23HSSM03	VEC	Aptitude skill- II	01	-	-	1	25	25	-	-	50	01
23HSSM04	VEC	Language skill-II	-	-	02	2	25	25	-	-	50	01
		TOTAL	**17**	**-**	**12**	**29**	**255**	**255**	**150**	**290**	**950**	**23**

Multidisciplinary Minor - II

Infrastructure Engineering (Basket A)	Architectural Aspect (Basket B)	Transportation Engineering (Basket C)
Construction Management (23CEMDA2)	Infrastructural Planning and Design (23CEMDB2)	Railway Engineering (23CEMDC2)

*Open Elective course will be offered to students of other programs and will not be offered to students of the same program

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Hydraulics

23CE2401	PCC	Hydraulics	2-0-0	2 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 2hrs/week	Continuous Assessment-I : 10 Marks Continuous Assessment-II : 10 Marks Mid Semester Exam : 30 Marks End Semester Exam : 50 Marks

Pre-Requisites: -

Course Outcomes: At the end of the course, students will be able to:

CO1	Analyze different physical properties of fluid.
CO2	Explain various forces acting on submerged and floating bodies.
CO3	Distinguish fluid kinematics and fluid dynamics.
CO4	Illustrate flow through pipe
CO5	Illustrate flow through open channels.
CO6	Analyze dimensional homogeneity using Buckinghams theorem

Course Contents:

Unit 1: Properties of Fluids: Introduction to Fluid mechanics, Properties of fluid (density, unit weight, specific surface, surface tension, capillarity), Pascal's law and its applications, Newton's law of viscosity, Classification of fluids	**[4]**
Unit 2: Fluid Statics: Fluid pressure: Absolute, atmospheric, gauge and vacuum pressures, Pressure head, Pressure measuring devices- Manometers, hydrostatic forces on submerged surfaces (horizontal, vertical surfaces), Buoyancy, Metacentre, metacentric height, equilibrium condition of floating and submerged body	**[4]**
Unit 3: Fluid Kinematics and Fluid Dynamics: Displacement, velocity and acceleration of fluid particles, Continuity equation, Introduction to: rotational and irrotational flow, velocity potential and stream function flow net, Euler's equation, Bernoulli's equation, practical applications of Bernoulli's theorem	**[4]**
Unit 4: Flow Through Pipes: Head loss: Concept of major and minor head loss, Darcy-Weisbach equation for determination of major loss, determination of minor losses, pipes connected in series and parallel, concept of equivalent pipe	**[4]**
Unit 5: Flow Through Open Channels: Hydraulically efficient channel cross sections :(rectangular, trapezoidal, circular) concept of specific energy, Concept of hydraulic jump, subsequent depths, subcritical and supercritical flow in rectangular channels.	**[4]**

Unit 6: Dimensional Analysis and Pumps: Dimensional homogeneity, Buckingham's theorem, important dimensional numbers and their significance, geometric, Kinematic, and dynamic similarity, Pumps, types of pumps, efficiency, engineering application of pump	**[4]**

Text Books
1. Modi, P. N. and S. N. Seth " Hydraulics and Fluid Mechanics", Standard book house, New Delhi, ISBN: 978-81-89401-26-9
2. Bansal, R. K. A textbook of fluid mechanics. Firewall Media.
3. T Bernard Massey and John Ward Smith, "Mechanics of Fluids", Taylor and Francis, 8 Edition (2006) London and New York.
4. Douglas J. F. Gaisorek J. M., Swaffield J. A., "Fluid Mechanics" Addison-Weisley Harlow 1999
5. Shames I. H., " Mehcanics of Fluids", McGraw-Hill, New York 1992.

Reference Books
1. Jain, A. K. Fluid Mechanics: Including Hydraulic Mechanics. Khanna Publishers.
2. Khurmi, R. S. "Hydraulics and Hydraulic Mechanics" S. Chand & Company Ltd New Delhi
3. J. Lal, "Fluid Mechanics and Hydraulics" Metropolitan Book Co. Ltd.
4. Y.A. Cingel L.M. Oimbala, Fluid Mechanics (S1 Units)", Tata McGraw Hill.
5. R.S. Rajput, "Hydraulic & Hydraulic Mechanics" S. Chand & Company Ltd. New Delhi.

Surveying-II

23CE2402	PCC	Surveying-II	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 3 hrs./week	Continuous Assessment-I : 10 Marks
	Continuous Assessment-II : 10 Marks
	Mid Semester Exam : 30 Marks
	End Semester Exam : 50 Marks

Pre-Requisites: Surveying-I

Course Outcomes: At the end of the course, students will be able to:

CO1	Experiment with tacheometer to calculate distance and RL as a field data
CO2	Identify systems of triangulation, and procedure involved in it
CO3	Identify procedure in hydrographic, and tunnel survey in collection of the field data
CO4	Summarize steps involved in the curve setting by linear and angular method
CO5	Identify the steps involved in photogrammetry for data collection
CO6	Identify remote sensing, GIS, and GPS technique for collection of field data

Course Content:

Unit 01 : Tacheometric Surveying Significance of tacheometry, suitability, Principle, Tacheometric constant determination, basic formula, anallatic lens, Determination of distance and elevation by stadia and tangential method; numerical problems on both methods	**[6]**
Unit 02: Triangulation: Principle and classification, system of triangulation, selection of points, use of sub- tense bar for base line measurement, signals and satellite station, concept of reduction to centre, spherical access, concept of tri-lateration	**[6]**
Unit 03: Hydrographic and Tunnel surveying Terms, hydrographic surveying –sounding equipment, methods –preliminary survey –Tunnel alignment, transfer of ground points.	**[5]**
Unit 04: Curves Introduction, types of curve, relation between degree of curve and radius, Horizontal curves: setting of curve by linear and angular method, problems on curve setting, Types of Transition and Vertical curves	**[7]**
Unit 05: Photogrammetry Terms used in photogrammetry and photographs, flight planning, concept of mosaic, concept of stereoscopic fusion, problem on vertical photograph	**[6]**
Unit 06: Modern methods of surveying Definition, relevance of Remote sensing, components, Electro-magnetic radiation and spectrum, and application in Civil Engineering, GPS –Principle, segment, GPS applications; GIS component, GIS Applications	**[6]**

Text Books:

1. Kanetkar T.P. and Kulkarni S.V. "Surveying and Levelling – Part1", Pune Vidyarthi Griha Prakashan, Pune.

2. Kanetkar T.P. and Kulkarni S.V. "Surveying and Levelling – Part2", Pune Vidyarthi Griha Prakashan, Pune.

Reference Books

1. Duggal S. K. "Surveying Volume I", Tata McGraw-Hill Publishing Company Limited.

2. Duggal S. K. "Surveying Volume II", Tata McGraw-Hill Publishing Company   Limited.

3. Bannister A, Raymond S & Baker R. "Surveying", Pearson Education Ltd.

4. Subramanium R., "Surveying & Levelling", Oxford University Press. 52

5. Clark David, "Plane and Geodetic Surveying for Engineers Volume–I", CBS, 6/E.

6. Clark David, " Plane and Geodetic Surveying for Engineers Volume –II", CBS, 6/E

7. Punmia B. C., Jain A, Jain A., "Surveying-II", Laxmi Publications (P) Ltd. New Delhi.

8. IRC:38:1988, Guidelines for design of horizontal curves for highways and design table

9. IS:11134-1984, Code of practice for setting out of buildings

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Concrete Technology

23CE2403	PCC	Concrete Technology	2-0-0	2 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 2hrs/week	Continuous Assessment-I : 10 Marks Continuous Assessment-II : 10 Marks Mid Semester Exam : 30 Marks End Semester Exam : 50 Marks

Pre-Requisites: Building Material, Construction & Maintenance

Course Outcomes: At the end of the course, students will be able to:

CO1	Explain knowledge of physical properties of ingredient of concrete and their effect on strength and durability.
CO2	Explain the fundamentals of process of making good quality concrete and its elastic properties.
CO3	Explain the factors affecting properties of concrete.
CO4	Design the concrete mix proportion as per Indian standard code of practice.
CO5	Demonstrate Non Destructive Testing (NDT) and evaluate quality of existing concrete..
CO6	Explain different types of concrete and their applications.

Course Contents:

Unit 1: Ingredient of Concrete **Cement:** Manufacturing process of cement, Chemical composition, grades of cement, hydration, different types of cement, Test for Cement: fineness, standard consistency, setting time, soundness and compressive strength. **Aggregates:** Aggregate characteristics and their significance in strength, workability, placement and compaction of concrete. Specific gravity, bulk density, porosity, absorption of aggregate, moisture content of aggregate, bulking of sand abrasion test, impact value. Alkali aggregate reaction, Artificial and Recycled aggregate	**[5]**
Unit 2: Workability **Concrete preparation process** – Batching, Mechanical mixers, automatic batching and mixing plants. Efficiency of mixing and transportation, placing, methods of compaction, curing, RMC plant. **Properties for fresh concrete** - Factors influence workability, workability test on fresh concrete by slump cone, compaction factor and vee bee consistometer test, segregation and bleeding,	**[3]**
Unit 3: Hardened concrete Strength of concrete – water cement ratio, gel space ratio, aggregate cement ratio, properties of ingredients, effect of age, maturity, aggregate cement-paste inter-face, various finishes of concrete. Introduction to aspects of elasticity, shrinkage and creep. Non Destructive Testing Rebound hammer, Ultra Sonic Pulse Velocity, Impact echo test	**[4]**
Unit 4: Concrete Mix Design Mix Design- Process, statistical relation between main and characteristic strength, Factors affecting mix proportions, methods of mix design IS (10262), Acceptance criteria for concrete as per IS specifications, numerical on mix design by ACI 211.1-1991, IS 10262-2009 and IS 456-2000.	**[4]**
Unit 5: Admixtures in Concrete **Chemical Admixtures:** Plasticizers, super plasticizers, Retarders, Air entraining agents, IS	**[4]**

9103Specifications **Mineral Admixtures:** Fly ash, silica fume, GGBS, rice husk ash, metakaolin	
Unit 6: Special Concretes and Durability of concrete **Special Concretes:** Light weight concrete, polymer modified concrete, concept of fibre reinforced concrete, high performance concrete, pumpable concrete, roller compacted concrete, self compacting concrete **Durability of concrete:** Significance, permeability and durability, chemical attack, sulphate attack, attack by seawater, acid attack, chloride attack, and carbonation of concrete	**[4]**

Text Books 1. Gambhir M. L. " Concrete Technology" , Tata Mc-Graw Hill 2015 15th edition 2. Shetty M. S. "Concrete Technology", S. Chand 2005. 3. Krishnaswamy, " Concrete Technology" , DhanapatRai and Sons
Reference Books 1. Orchard, " Concrete Technology" , Applied Science Publishers 2. Neville A. M., "Concrete Technology" , Pearson Education 3. Neville A. M., " Properties of Concrete" , Pearson Education 4. IS:10262(2009), IS:456 (2009) by Bureau of Indian Standards, New Delhi

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Building Planning

23CE2404	HSSM	Building Planning	1-0-0	1 Credit

Teaching Scheme:	Examination Scheme:
Practical: 1 hrs/week	Continuous Assessment-I : 25 Marks
	Continuous Assessment-II : 25 Marks

Pre-Requisites: Basic Civil Engineering, Introduction to Drawing
Course Outcomes: At the end of the course, students will be able to:

CO1	Interpret different building drawings
CO2	Explain principles of planning considering built environment approach
CO3	Apply building rules and byelaws and IS 962:1989 specifications for planning
CO4	Explain methods of perspective drawing for various objects

Course Contents

Unit 1: Conventions and symbols Conventions as per IS 962:1989, symbols for different materials such as earthwork, brickwork, stonework, concrete ,woodwork etc. used in civil engineering construction, graphical symbols for door and window, Abbreviations, symbols for sanitary and electrical installations .Symbols for room furnishing such as kitchen platform, sink, bed, wardrobe, door opening etc Types of scale- Monumental, Intimate, criteria for Proper Selection of scale for various types of drawing	**[3]**
Unit 2: Planning of Building and Space Management Principles of planning of Residential and Public building- Aspect, Prospect ,Orientation ,Grouping, Privacy, Elegance, Flexibility, Roominess, Circulation, Furniture requirements, Sanitation, Economy. Space requirement and norms for minimum dimension of different units in the residential and public buildings as per IS962-1989.	**[3]**
Unit 3: Rules and By Laws by sanctioning authority Rules and bye-laws of sanctioning authorities for construction. Calculation for areas such as plot area, built up area, super built up area, plinth area, carpet area, floor area, FAR (Floor Area Ratio) / FSI	**[3]**
Unit4: Perspective Drawing Definition, Types of perspective, terms used in perspective drawing, principles used in perspective drawing. Two Point Perspective of small objects such as steps, monuments, pedestals etc.	**[3]**

Text Books
1. Building Drawing M.G. Shah, CM Kale, S.Y. Patki Mc Graw Hill
2. Planning and design of Building Y.S. Sane Allied Publishers

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3. Civil Engineering Drawing Malik and Mayo New Asian Publishers

4. Principles of Perspective Drawing M. G. Shah & C. M. Kale Mc Graw Hill

5. Building Planning and Drawing Dr N Kumara Swamy and A Kameshwara Rao Charotar Publication

Reference Books

1. SP-41 (S&T) (1987) ISI Handbook of functional requirements of buildings other than industrial building

2. SP-35 (S&T) (1987) ISI Handbook water supply and drainage with special emphasis on plumbing

3. IS 962- 1989 code of practice for architectural and building drawing

4. IS 1742: 1972 Code of practice for building drainage

5. SP-27 (1987) Handbook of methods of measurements of building works

6. Data book – National Building code, CBRI Publication.

7. Sandeep Mantri , reference book, "A TO Z Practical Building construction and its Management" , Satya Prakashan, New Delhi

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Environmental Science

23CE2405	VEC	Environmental Science	2-0-0	2 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 2 hrs/week	Continuous Assessment-I : 25 Marks Continuous Assessment-II : 25 Marks

Pre-Requisites: -
Course Outcomes: At the end of the course, students will be able to:

CO1	Explain nature of environmental studies
CO2	Explain various natural resources and associated Problems
CO3	Summarize various ecosystems
CO4	Explain the importance of conservation of biodiversity and its importance in balancing the earth.
CO5	Recognize various causes of environmental pollution along with various protection acts in India to limit the pollution
CO6	Interpret the information based on field study and prepare a report.

Course Contents:

Unit 1: Nature of Environmental studies: Definition, scope and importance, Multidisciplinary nature of environmental studies. Need for public awareness.	[3]
Unit 2: Natural Resources and Associated Problems **Forest resources:** Use and over-exploitation, deforestation, dams and their effects on forests and tribal people. **Water resources:** Use and over-utilization of surface and ground water, floods, conflicts over water. **Mineral resources:** Usage and exploitation. Environmental effects of extracting and using mineral resources. **Energy resources:** Growing energy needs, renewable and nonrenewable energy resources, use of alternate energy sources. Solar energy, Biomass energy, Nuclear energy. **Land resources:** land degradation; man induced landslides, soil erosion and desertification. Role of individuals in conservation of natural resources.	[5]
Unit 3: Ecosystems Concept of an ecosystem, types of ecosystem, structure and function of an ecosystem, producers, consumer and decomposers. Energy flow in the ecosystem, food chain, food web and ecological pyramids, ecological succession. Different types of ecosystem a) Forest ecosystem b)Grassland ecosystem c)Desert ecosystem d)Aquatic ecosystem	[4]
Unit 4: Biodiversity Introduction-Definition: genetic, species and ecosystem diversity, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values, Western Ghat as a biodiversity region Hot spot of biodiversity. Threats to biodiversity, man and wildlife conflicts. Conservation of biodiversity. In-situ conservation and Ex-situ conservation.	[4]
Unit 5: Environmental Pollution and Environmental Protection Definition: Causes, effects and control measures of various types of pollution. Solid waste	[4]

Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution, Concept of sustainable development : From Unsustainable to Sustainable development. Environmental Protection Act. Air (Prevention and Control of pollution) Act. Water (Prevention and Control of pollution)Act. Forest conservation Act. Wildlife Protection Act. Human Rights.	
Unit 6: Field work Visit to a local area to document Environmental assets-River ,Forest ,Grassland Visit to local polluted site Study of common plants, insects, birds Study of ecosystem river, ponds etc	**[4]**

Text Books : 1. P. N. Wartikar & amp; J. N. Wartikar, A Text Book of Applied Mathematics (Vol I & II), Pune Vidyarthi Griha Prakashan, Pune. 2. 2. N. P. Bali, A Text Book of Engineering Mathematics, Laxmi Publications, New Delhi.
Reference Books: 1.C. R. Wylie & L. C. Barrett, Advanced Engineering Mathematics, McGraw Hill Publishing Company Ltd. 2. B. V. Ramana, Higher Engineering Mathematics, McGraw-Hill Publications, New Delhi. 3. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers. 4. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons. 5. Peter O" Neil, A Text Book of Engineering Mathematics, Thomson Asia Pvt. Ltd., Singapore.

Hydraulics Laboratory

23CE2406	PCC	Hydraulics Laboratory	0-0-2	1 Credit

Teaching Scheme:	Examination Scheme:
Practical: 2 hr/week	Continuous Assessment-I : 15 Marks
	Continuous Assessment-II : 15 Marks
	End Semester Exam : 20 Marks

Course Outcomes: At the end of the course, students will be able to:

CO1	Determine pressure of fluid
CO2	Identify type of flow through pipe and verification of Bernoulli's theorem
CO3	Experiment with calibrations of various flow measuring devices
CO4	Illustrate losses occurred in pipe flow

All experiments are compulsory

List of Experiments:

1. Study of pressure measuring devices
2. Study of stability of floating bodies
3. Study of flow in Reynolds apparatus
4. Verification of Bernoulli's theorem
5. Calibration of Venturimeter
6. Calibration of Orifice meter
7. Calibration of rectangular notch
8. Calibration of triangular notch
9. Study of major losses in pipe
10. Study of minor losses in pipe

Text Books
1. Modi, P. N. and S. N. Seth " Hydraulics and Fluid Mechanics", Standard book house,   New Delhi, ISBN: 978-81-89401-26-9
2. Bansal, R. K. A textbook of fluid mechanics. Firewall Media.
3. T Bernard Massey and John Ward Smith, "Mechanics of Fluids", Taylor and Francis, 8 Edition (2006) London and New York.
4. Douglas J. F. Gaisorek J. M., Swaffield J. A., "Fluid Mechanics" Addison-Weisley Harlow 1999
5. Shames I. H., " Mehcanics of Fluids", McGraw-Hill, New York 1992.

Reference Books
1. Jain, A. K. Fluid Mechanics: Including Hydraulic Mechanics. Khanna Publishers.
2. Khurmi, R. S. "Hydraulics and Hydraulic Mechanics" S. Chand & Company Ltd New Delhi
3. J. Lal, "Fluid Mechanics and Hydraulics" Metropolitan Book Co. Ltd.
4. Y.A. Cingel L.M. Oimbala, Fluid Mechanics (S1 Units)", Tata McGraw Hill.
5. R.S. Rajput, "Hydraulic & Hydraulic Mechanics" S. Chand & Company Ltd. New Delhi.

Concrete Technology Laboratory

23CE2407	PCC	Concrete Technology Laboratory	0-0-2	1 Credit

Teaching Scheme:	Examination Scheme:
Practical: 2 hrs/week	Continuous Assessment-I : 25 Marks Continuous Assessment-II : 25 Marks

Course Outcomes: At the end of the course, students will be able to:

CO1	Determine the quality of ingredients of concrete as per IS codes.
CO2	Design a concrete mix as per the requirement at the field using various codes.
CO3	Asses the suitability of NDT methods on field.
CO4	Apply compressive strength of concrete cubes

All experiments are compulsory

Part I

Test in Lab

1. To determine fineness of cement by Sieve analysis
2. To determine the standard consistency of cement using Vicat's apparatus.
3. To determine initial and final setting time of cement.
4. Determination of soundness of cement by Le- Chatelier's apparatus and/or Auto Clave test.
5. To determine compressive strength of cement.
6. Determination of particle size distribution of fine, coarse and all in aggregate by sieve analysis (grading of aggregate).
7. Determination of specific gravity of fine aggregates.
8. Determination of specific gravity and water absorption of coarse aggregates.
9. To determine flakiness and elongation index of coarse aggregates.
10. To determine workability of fresh concrete by using slump cone and/or Vee Bee consistometer.
11. To determine compaction factor for workability of fresh concrete.
12. Nondestructive test on concrete by: Rebound Hammer Test, Ultrasonic Pulse Velocity Test.
13. Tests for compressive strength of concrete cubes for M20 or M30 (ACI 211.1-91, IS 10262-2009 and IS 456 2000).

Part II

Site Visit

1. NDT Project (using rebound hammer and ultrasonic pulse velocity tests) on any site with a short report.
2. Site visit to study advances in Concrete Technology (like RMC, Pumped concrete etc.) with a short report.

Text Books
1. Gambhir M. L. " Concrete Technology" , Tata Mc-Graw Hill 2015 15th edition
2. Shetty M. S. "Concrete Technology", S. Chand 2005.
3. Krishnaswamy, " Concrete Technology" , DhanapatRai and Sons
Reference Books
1. Orchard, " Concrete Technology" , Applied Science Publishers
2. Neville A. M., "Concrete Technology" , Pearson Education
3. Neville A. M., " Properties of Concrete" , Pearson Education
4. IS:10262(2009), IS:456 (2009) by Bureau of Indian Standards, New Delhi

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Planning Essentials Laboratory

23CE2408	VSEC	Planning Essentials Laboratory	0-0-2	1 Credit

Teaching Scheme:	Examination Scheme:
Practical: 2 hr/week	Continuous Assessment-I : 25 Marks Continuous Assessment-II : 25 Marks

Course Outcomes: At the end of the course, students will be able to

CO1	Determination of horizontal distance and elevation of point using Tacheometer an its application in Civil Engineering
CO2	Determine and apply the data necessary for curve setting
CO3	Demonstrate use of leveling instrument for RL determination, and its use to prepare the contour map
CO4	Draw plan and sectional view of road from field measurement, and estimate the quantity of earthwork from field measurement /software

All experiments and projects are compulsory

Part-I

List of Experiments

1. Experiment on determination of tacheometric constants
2. Experiment on finding the gradient of line
3. Experimental planning to find the area of polygon
4. Experiment on total station traversing
5. Experiment on Curve setting by linear method
6. Experiment on Curve setting by angular method
7. Experiment on Setting of transition curve
8. Experiment on length calculation from GPS co-ordinates
9. Preparation of report on Topographic map
10. Demonstration of software in surveying

Part-II

Projects

1. Road Project: 300 m -600 m
2. Radial Contouring

Text Books:
1. Kanetkar T.P. and Kulkarni S.V. "Surveying and Levelling – Part1", Pune Vidyarthi Griha Prakashan, Pune.
2. Kanetkar T.P. and Kulkarni S.V. "Surveying and Levelling – Part2", Pune Vidyarthi Griha Prakashan, Pune.
Reference Books

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1. Duggal S. K. "Surveying Volume I", Tata McGraw-Hill Publishing Company Limited.
2. Duggal S. K. "Surveying Volume II", Tata McGraw-Hill Publishing Company   Limited.
3. Bannister A, Raymond S & Baker R. "Surveying", Pearson Education Ltd.
4. Subramanium R., "Surveying & Levelling", Oxford University Press. 52
5. Clark David, "Plane and Geodetic Surveying for Engineers Volume–I", CBS, 6/E.
6. Clark David, " Plane and Geodetic Surveying for Engineers Volume –II", CBS, 6/E
7. Punmia B. C., Jain A, Jain A., "Surveying-II", Laxmi Publications (P) Ltd. New Delhi.
8. IRC:38:1988, Guidelines for design of horizontal curves for highways and design table
9. IS:11134-1984, Code of practice for setting out of buildings

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Building Planning Laboratory

23CE2409	EMC	**Building Planning Laboratory**	**0-0-2**	**1 Credit**

Teaching Scheme:	Examination Scheme:
Practical :2 hrs/week	Continuous Assessment-I : 15 Marks Continuous Assessment-II : 15 Marks End Semester Exam : 20 Marks

Course Outcomes: At the end of the course, students will be able to

CO1	Identify the required space for planning.
CO2	Gain a broad understanding of planning of public buildings as per the requirements.
CO3	Prepare the drawing for building in a professional set up.
CO4	Draw perspective drawing for a building object.

All experiments are compulsory

List of Experiments:

A. Draw to a suitable scale on Full Imperial Drawing Sheet
A1.Human Body figures and its application in space design
A2. Draw line plan for Any FIVE type of Public Buildings. • Primary Health Center. • School Building. • Head Post Office. • Bank. • Super specialty Hospital. • Commercial mall. • Railway station. • Bus Station
B. Drawing to a scale on Full Imperial Drawing Sheet
B1. Planning & design of a building (Minimum G+1) drawings for Municipal submission drawing which contents:- • All Floor Plans • Minimum one Section passing through WC/Staircase • Minimum one elevation • Site plan (Water Supply and Sewer line) • Key Plan • North Direction • Construction Notes • Schedule of Openings • Area Statement • Project Title.

B2. Prepare detailed working drawing of Experiment no B1 Each sheet should be separate of the following.

- Foundation / Center Line drawing.
- Staircase design and detail drawing.
- Electrical layout drawing.
- Furniture layout drawing.
- Plumbing and Water Supply Drawing.

B3. Two Point Perspective drawings for any object like steps…..

Note: Students should be visited minimum five sites to existing or ongoing public building.

Text Books:
1. Shah, Kale, Patki, Building Drawing –Tata McGraw- Hill
2. Y. S. Sane, Building Design and Drawing – Allied Book Stall, Pune
3. Jain A.K., The Idea of Green Building Khanna Publishers, N. Dehli,
4. V.B. Sikka, A Course in Civil Engineering Drawing – S.K. Kataria and Sons
5. N. Kumara Swamy and A. Kameswara Rao,"Building Planning and Drawing", 8th Edition, Charotar Publications, 2010.

Reference Books:
1. Time Saver Standard by Dodge F. W., F. W. Dodge Corp.
2. SP 7- National Building Code Group 1 to 10- B.I.S. New Delhi
3. I.S. 962 – 1989 Code for Practice for Architectural and Building

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Mini Project

23CE2410	CEP	Mini Project- III	0-0-2	1 Credit

Teaching Scheme:	Examination Scheme:
Practical: 2hrs/week	Continuous Assessment-I : 25 Marks Continuous Assessment-II : 25 Marks

Pre-Requisites: Mini Project-I, Mini Project II

About Ideathon

The project is a part of addressing societal and industrial needs. Hackathon is one of the platforms where students will solve real world challenges. This Course focuses on the selection of methods/engineering tools/analytical techniques for problem solving.

Through this course, students will gain the understanding of engineering basics and ideas, gain practical experience, have the opportunity to display their skills and learn about teamwork, financial management, communication skills and responsibility

Course Outcomes: At the end of the course, students will be able to:

CO1	Select the appropriate method for solving the problem
CO2	Make use of various engineering techniques and tools to give a solution
CO3	Justify the methods /tools used to develop the solution
CO4	Design / simulate the model/ project work
CO5	Describe the solution with help of a project report and presentation
CO6	Conclude the outcomes of project.

Course Content:

Week 1:Survey Design-1 • Ensure case study group students have made necessary communication and done a preparatory visit. • Watch the lecture on survey design and study the notes. • Prepare a questionnaire and try it out with your group members as mock.	**[2]**
Week 2: Survey Design-2 • Review survey questionnaire prepared by case study groups. • Decide sampling strategy. • Prepare a detailed schedule for fieldwork	**[2]**
Week 3: **Fieldwork** • Data Collection:Collect quantitative data (e.g., statistics, usage metrics) and qualitative data (e.g., user stories, testimonials). • Use data collection tools like questionnaires, observation checklists, and digital analytics. • Ensure data accuracy and reliability through proper sampling and recording methods.	**[2]**

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Week 4: Trails and Experimentation-1 • Initial Setup and Configuration • Concept Validation • Feasibility Testing	**[2]**
Week 5: Trails and Experimentation-2 • Prototyping • Functionality Testing	**[2]**
Week 6: Trails and Experimentation-3 • Bug Identification and Fixing • Integration Testing • Security Testing • 75% Presentation has to be conducted by mentor/guide based on above activity.	**[2]**
Week 7: Results • Coordinator has to check and verify below points in term of result: • Functional Performance • Accuracy and Precision • Efficiency • Safety	**[2]**
Week 8: Validation • Coordinator has to check and verify below points in term of validation: • Testing and Verification • Compliancewith Standards	**[2]**
Week 9: Integration Testing • Validate that the hardware integrates seamlessly with other systems or components as intended • Perform compatibility tests with software, other hardware, and network systems.	**[2]**
Week 10:Documentation and Reporting • Maintain comprehensive documentation of design, development, testing, and validation processes • Provide detailed reports on test results, issues found, and corrective actions taken.	**[2]**
Week 11: Final Presentation • 100% Presentation has to be conducted by mentor/guide based on above activity. • Prototype/Final Software solution is mandatory at the time of final presentation along with report	**[2]**
Week 12: Exhibition • Mini project exhibition will be schedule with interdepartmental evaluation.	**[2]**

MDM - II

23CEMDA2	MDM	Construction Management	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:	
Lecture: 3hrs/week	Continuous Assessment-I	:10 Marks
	Continuous Assessment-II	:10 Marks
	Mid Semester Exam	: 30 Marks
	End Semester Exam	: 50 Marks

Pre-Requisites: Building Material, Construction & Maintenance

Course Outcomes: At the end of the course, students will be able to:

CO1	Explain the concepts of construction management and construction theories
CO2	Apply the management principles and planning
CO3	Analyze the process of project management and organization of management
CO4	Develop the schedule of activities in a construction project.
CO5	Apply management principles in construction management
CO6	Develop the concepts of construction site management

Course Contents:

Unit 1: Introduction Introduction to Construction management, Major problems in Construction Industry, History of Construction Management, Evolution of management thoughts& theories of F.W. Taylor, Henri Fayol, Max Weber, etc., SWOT Analysis in construction	**[5]**
Unit 2: Management Planning Management planning and principles, importance of planning, Nature and purpose of planning, planning process, types of planning, objectives, setting objectives, planning premises, strategic management	**[5]**
Unit 3: Project Management Basic forms of organization with emphasis on Project and matrix structures; project life cycle, planning for achieving time, cost, quality, project feasibility reports based on socio-techno-economic environmental impact analysis, project clearance procedures and necessary documentation for major works like dams, multistoried structures, ports, tunnels, Qualities, role and responsibilities of project manager, Role of Project Management Consultants, Organization of management, Organizational Hierarchy, types of organizations	**[8]**
Unit 4: Project Management through network Critical path method, early and late time calculations, Float, critical path, resource allocation, network compression. Programme evaluation & review technique (PERT), expected times and slack, probability of completion time of a project, construction safety standards.	**[6]**
Unit 5: Construction management Management Information and Control Systems, Communication, System Concepts, Need for Management Information, Design of Management Information Systems, Value of Information,	**[6]**

Management Information Systems in Construction Industry.	
Unit 6: Construction site Management: Site mobilization-demobilization aspects, various Resources management based on funds availability, coordinating, communicating & reporting Techniques, Application of MIS to construction, Training for Construction Managers ,Engineers , Supervisors.	**[5]**

Text Books
1. S. Seetharaman. Construction Engineering and Management. Umesh Publication. 2. R L Peurifoy, C J Schexnayder, A. Shapira. Construction planning, equipment and methods. Mc Graw Hill Education (India).
2. Knutson, K, Schexnayder, C J, Fiori, C. and Mayo, R E (2013) Construction Management, Fundamentals, MCGraw Hill Publishers.
Reference Books
1. CPWD Works Manual, 2019, Nirman Bhawan, New Delhi.
2. Standard operating procedure for CPWD Works Manual, 2019, Nirman Bhawan, New Delhi.
3. Fewings, P (2011) Construction Project Management - An integrated approach, Taylor and Francis.
4. Goetsch, D L (2015) Project Management for construction, Pearson publishers.
5. Ottoson, H (2013) Practical project management for building and construction, CRCPress, Taylor and Francis.

MDM - II

23CEMDB2	MDM	Infrastructural Planning and Design	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 3hrs/week	Continuous Assessment-I :10 Marks Continuous Assessment-II :10 Marks Mid Semester Exam : 30 Marks End Semester Exam : 50 Marks

Pre-Requisites: Building Material, Construction & Maintenance
Course Outcomes: At the end of the course, students will be able to:

CO1	Explain concepts related to infrastructure
CO2	Apply infrastructure economics and finance
CO3	Interpret challenges to successful infrastructure planning
CO4	Make use of policies and regulatory frameworks
CO5	Utilize phases and players in infrastructure planning and managements
CO6	Develop the design for infrastructure service life

Course Contents:

Unit 1: Basic Concepts Related To Infrastructure Introduction to Infrastructure, an overview of the Power Sector in India, Water Supply and Sanitation Sector in India, Road, Rail, Air and Port Transportation Sectors in India, Telecommunications Sector in India, Urban Infrastructure in India, Rural Infrastructure in India, an Introduction to Special Economic Zones.	**[6]**
Unit 2: Infrastructure Economics And Finance Principles of Finance, Infrastructure Economics, Developing Financial Models for Infrastructure, Introduction to Project Finance.	**[6]**
Unit 3: Challenges To Successful Infrastructure Planning Risks and Challenges in Infrastructure, Introduction to Social Environmental Risk in Infrastructure, Economic Risk in Infrastructure, Political Risk in Infrastructure.	**[6]**
Unit 4: Policy And Regulatory Frameworks Government policies and initiatives for infrastructure development, Regulatory bodies and their roles in infrastructure planning and design, Public-private partnerships (PPP) in infrastructure projects.	**[6]**
Unit 5: Phases And Players In Infrastructure Planning And Managements Introduction to the Infrastructure Process, Description of Stages, Project Lifecycle, Construction, Operation and Maintenance of Infrastructure, Infrastructure Players.	**[6]**
Unit 6: Design For Infrastructure Service Life Introduction to Design concepts, Design technology framework, design requirements, design phase, design constraints, Case study.	**[6]**

Text Books
1. Verma S.P. ed. "Infrastructure in India's Development: Power, Transport and Communication", Institute of Public Administration, New Delhi, 2004.

Reference Books
1. Goodman, Alvin S. and Makarand Hastak. Infrastructure Planning Handbook: 2006.
2. Revelle, C.S., Whitlatch, E.E. and Wright, J.R. Civil and Environmental Systems Engineering; Prentice Hall, 2004.
3. Hudson W. and Ralph H. Infrastructure Management: Integrating Design, Construction, Maintenance, Rehabilitation and Renovation, Tata Mc Graw Hills.
4. The India Infrastructure Report, Ministry of Finance, Govt. of India.

MDM - II

23CEMDC2	MDM	Railway Engineering	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:	
Lecture: 3hrs/week	Continuous Assessment-I	:10 Marks
	Continuous Assessment-II	:10 Marks
	Mid Semester Exam	: 30 Marks
	End Semester Exam	: 50 Marks

Pre-Requisites: Surveying I & II

Course Outcomes: At the end of the course, students will be able to:

CO1	Apply the knowledge on elements of permanent way in Railways, selection of gauges, route alignment surveys.
CO2	Apply the knowledge of hauling capacity, stresses in rails, ballast, sleepers, joints in rails.
CO3	Explain Flash-Butt weld, Short Welded Rail, Creep in Rails, Buckling of Rails,Cant excess, cant deficiency, Transition curves, Widening at curve.
CO4	Identify turnouts its types and Design, Crossings, Track Junctions and Design; Signals, Types of signals, Signal placements, Interlocking of tracks.
CO5	Explain track maintenance, drainage of track, high-speed rails.
CO6	Explain Location and layout of stations and yards, role of Indian Railways in Nation development, EIA.

Course Contents:

Unit 1: Introduction	
History of Railway, Indian Railways, Development of Indian Railways, Railway Survey, Reconnaissance Survey, Preliminary Survey, Location Survey, Construction of new Railway Line	**[6]**
Unit 2: Train Resistance And Rail Gauges	
Train Resistances, Rolling Stock, Locomotives, Coaches, Wagons, Train Brakes, Gauges, Gauges in different countries, Uniformity in gauges, Permanent Way and its requirement, Functions of rails, Types of rails, Sections of Rails	**[6]**
Unit 3: Railway Planning And Construction	
Elements of permanent way – Rails, Sleepers, Ballast, rail fixtures and fastenings, Selection of gauges - Track Stress, coning of wheels, creep in rails, defects in rails – Route alignment surveys, conventional and modern methods-Geometric design of railway, gradient, super elevation, widening of gauge on curves (Problems)-Railway drainage- Level Crossings-Signaling.	**[6]**
Unit 4: Welding And Curves In Railway	
Long Welded Rails, Continuous Welded Rails, Fastenings for Rails-to-Rail, Fastenings for Rail-to-Sleeper, Track Alignment – Need, Requirements, Selection factors. Speed on track – Safe, Permissible, Equilibrium, Cant excess, cant deficiency, Transition curves, Widening at curve, clearances, Gradients.EIA in Railways and case studies.	**[6]**
Unit 5: Interlocking	**[8]**
Turnouts – Types and Design, Crossings – Types and Design. Track Junctions and Design; Signals	

– Classification and functions, Types of signals, Signal placements; Interlocking of tracks – Standards, Principles, Isolation. Interlocking on tracks: Key, Mechanical, Route Reply, Electrical, Electronic interlocking; Train Control Systems: Block and non-block systems; Railway stations – Types, Yards, Level crossings.	
Unit 6: Maintenance Of Tracks General, Necessity for maintenance of track, Maintenance of railway bridges, Signaling during maintenance, Rail Inspection, Track Inspection, Drainage of Tracks – surface and subsurface.	**[4]**

Text Books
    1. Railway Engineering, Rangwala, Charotar Publishing House Pvt Limited.
    2. Rail Engineering by S. Chandra , Arora & Saxena

Reference Books
    1. Basic of Track Structure and Components, Indian Railways Center for Advanced Maintenance Technologies, IRCAMT, Maharajpur, Gwalior, 2023
    2. Basics of Railway Signal Engineering by G V Rao, ITD-2, Indian Railways Institute of Signal Engineering and Telecommunication, IRISET, Secundrabad
    3. Handbook on welding techniques, Indian Railways Center for Advanced maintenance Technologies, IRCAMT, Maharajpur, Gwalior
    4. India's Bullet Train Ride- The Journey so far, National High Speed Rail Corporation Limited, 2023
    5. Indian Railway Maintenance Manual (Works)
    6. Indian Railway Standard Specification for 10 mm thick Composite Grooved Rubber Sole Plates for placing beneath rails, M&C Directorate, RDSO, Lucknow, 2020

Aptitude Skill-II (Numerical Ability)

23HSSM01	VEC	Aptitude Skills- II	1-0-0	1 Credit

Teaching Scheme:	Examination Scheme:
Lecture: 1 hrs/week	Continuous Assessment -I : 25 Marks
	Continuous Assessment -II : 25 Marks

Pre-Requisites: Basic Mathematics

Course Outcomes: At the end of the course, students will be able to:

CO1	Make use of multiplications, squares, square roots, cubes and cube roots to solve aptitude problems
CO2	Solve questions based on Number system
CO3	Solve questions based on percentage, average, ratio, proportion, Speed, Time and Distance
CO4	Solve questions based on Profit & Loss and mensurations.

Course Content:

Unit 1: Speed Math Techniques Multiplication, Squares, Square roots, Cubes, Cube roots	**[3]**
Unit 2: Number System Types of Number System, Last Digit Method, BODMAS Calculation, HCF and LCM, Progressions	**[3]**
Unit 3: Basic Aptitude Percentage, Average, Ratio and Proportion, Fraction, Partnership **Speed- Time- Distance** Speed, Time, and Distance, Trains, Boats, Streams, Races	**[3]**
Unit 4: Business Aptitude Profit & Loss, Simple Interest, Compound Interest **Geometry and Venn Diagram** 2D and 3D Mensuration, Venn diagram	**[3]**

Text books:
1. Arun Shrama - Quantitative aptitude for CAT. 2. RS Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning, S. Chand Publisher; 2016 edition
Reference books:
1. Fast Track Objective Arithmetic Paperback, by Rajesh Verma – 2018 2. Teach Yourself Quantitative Aptitude, Arun Sharma 3. The Pearson Guide To Quantitative Aptitude For Competitive Examination by Dinesh Khattar

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Language Skill- II

23HSSM02	VEC	Language Skill- II	0-0-2	1 Credit

Teaching Scheme:	Examination Scheme:
Practical: 2 hrs/week	Continuous Assessment -I : 25 Marks Continuous Assessment -II : 25 Marks

Pre-Requisites: Language Skill- I

Course Outcomes: At the end of the course, students will be able to:

CO1	Develop programs using Functions.
CO2	Make use of Structures & Union to develop programs in C language
CO3	Make use of Pointers to develop programs in C language
CO4	Develop programs to perform various operations on files using File Handling.

Course Content:

1. Develop programs on using different built-in functions. 2. Develop programs on using function without argument and without return category. 3. Develop programs on using function with argument and without return category. 4. Develop programs on using function without argument and with return category. 5. Develop programs on using function with argument and with return category. 6. Develop programs using more than one used defined functions. 7. Develop programs on recursion. 8. Develop programs on Structure using various entities and size of structure. 9. Develop programs on array of structure. 10. Develop programs on structures and functions and compare structure and union. 11. Develop programs to display different data type of data and their addresses using pointer 12. Develop programs on pointer to array, pointer to structure, pointer to functions and pointer expressions. 13. Develop program to read, write and append data from a file.

Text books:
  1. C Programming Absolute Beginner's Guide, Que Publishing; 3rd edition (22 August 2013)
  2. C Programming Language 2nd Edition, Peasrson Publication

Reference books:
  1. Programming in C Practical Approach by Ajay Mittal, Pearson
  2. Let Us C, By Yashwat Kanetkar