SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU,Bhilai)**Scheme of Examination and Syllabus 2022 Third Year B. Tech. Civil Engineering 6thsemester**

B. TECH. (SIXTH SEMESTER) CIVIL ENGINEERING

Sl. No.	Board of Studies (BOS)	Courses	Category	Course Code	Period per Week			Scheme of Examination			Total Marks	Credit
								Theory/Lab				
					L	T	P	ESE	CT	TA		
1	Civil Engineering	Structural Engineering Design-II	PCC	CE101601	3	1	-	100	20	30	150	4
2	Civil Engineering	Geotechnical Engineering-II	PCC	CE101602	2	1	-	100	20	30	150	3
3	Civil Engineering	Environmental Engineering-I	PCC	CE101603	3	-	-	100	20	30	150	3
4	Civil Engineering	Professional Elective-II	PEC	CE	3	-	-	100	20	30	150	3
5	Civil Engineering	Open Elective Elective-I	OEC	CE	3	-	-	100	20	30	150	3
6	Civil Engineering	Structural Engineering Lab	PCC	CE101691	-	-	2	25	-	25	50	1
7	Civil Engineering	Environmental Engineering Lab	PCC	CE101692	-	-	2	25	-	25	50	1
8	Civil Engineering	Concrete Technology Lab	PCC	CE101693	-	-	2	25	-	25	50	1
9	Civil Engineering	Minor Project – II	PSI	CE101694	-	-	2	50	-	25	75	1
10	Humanities	Essence of Indian Knowledge Tradition	MNC		-	-	-	-	-	25	25	-
Total					**14**	**2**	**8**	**625**	**100**	**275**	**1000**	**20**

L-Lecture T- Tutorial P-Practical
CT- Class Test TA- Teachers Assessment ESE- End Semester Exam

		July 2022	2.00	Applicable for AY 2022-23 Onwards
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B. Tech. (Sixth Semester) Civil Engineering

Table – II : Professional Elective–II

Sl. No.	*Board of Studies (BOS)*	*Courses (Subject)*	*Course Code*	*Credit*
1	*Civil Engineering*	***Concrete Technology***		*3*
2	*Civil Engineering*	*Introduction to Earthquake Engineering*		*3*
3	*Civil Engineering*	*Composite Material*		*3*
4	*Civil Engineering*	*Planning and Design of Airport*		*3*
5	*Civil Engineering*	*Transportation Planning & Management*		*3*
6	*Civil Engineering*	*Modern Surveying Techniques*		

B. Tech. (Sixth Semester) Civil Engineering

Table – III : Open Elective–I

Sl. No.	*Board of Studies (BOS)*	*Courses (Subject)*	*Course Code*	*Credit*
1	*Civil Engineering*	***Construction Planning***		*3*
3	*Civil Engineering*	*Metro system and engineering*		*3*
4	*Civil Engineering*	*Infrastructure Engineering & Construction Technology*		*3*
5	Computer Science Engg	*Artificial Intelligence*		*3*
6	Computer Science Engg	*Cyber Security*		*3*
7	Agriculture Engg	*Disaster Management*		*3*
8	*Civil Engineering*	Ground Improvement Technique		*3*

SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU,Bhilai)**Scheme of Examination and Syllabus 2022 Third Year B. Tech. Civil Engineering 6th semester**

Subject Code CE101601	Structural Engineering Design -II	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme		CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
Objective of the Subject: 1. To know about the merits of steel structures. 2. To know about shapes and grades of structural steel available. 3. To know about the different methods of design and the advantages of limit state design over other methods. 4. To understand the behavior of structural steel under tension, compression and flexure.	**CO1:** Leaner is able to understand the difference between plastic and elastic analysis. **CO2:** Learner has clarity about the various design philosophies used in structure engineering design **CO3:** Learner is able analyze and design simple bolted and welded connections subjected to axial load. **CO4:** Leaner is able to analyze and design axially loaded Tension member and compression member using limit state method. **CO5:** Leaner is able to analyze and design Laterally Supported and Laterally Unsupported Beams using limit state method.

UNIT – I: **CO-1**

Materials and Methods: Review of Methods of design: Limitations of Working stress, Advantages of Limit State Design, Limit States of Strength and Serviceability, Partial Safety Factors, Loads and Load Combinations,

Design specifications as per IS: 800: 2007: Types of Structural Steel, Physical and Mechanical Properties, Convention for Member Axes.

Steel as a structural material, Rolled Sections: Tapered Flange and Parallel Flange, Built up sections,

Plastic Theory: Shape factor, Plastic Hinge Mechanism, Length of plastic hinge, Fully Plastic Moment of section, Collapse mechanism, plastic analysis of simple beams and frames. **[10Hrs]**

UNIT - II **CO-2**

Structural Steel Fasteners: Introduction: Location details of fasteners, simple, semi-rigid and rigid connections, Lap and Butt Joints, Bearing type bolts, Friction Grip type Bolting, Welds and Welding, Advantages and Disadvantages of Welded Connections, Behavior of bolted and welded connections (types, designations, properties, permissible stresses), failure of bolted and welded joints. Strength of bolt and strength of weld, Efficiency of joints, Design of simple, bolted and welded joint subjected to axial loads. Truss Joint Connections by bolts and welds. [**10Hrs]**

UNIT - III: **CO-3**

Tension Members: Geometrical Properties considerations for tension members, Maximum effective slenderness ratio, Terms: Shear-lag, Tension Splice, Gusset plate and Lug angles. Design Strength due to Yielding of Gross Section, Rupture of Critical Section, Block Shear. Design of Axially Loaded Tension Members, Steel Angles under Tension. **[10Hrs]**

Subject Code CE101601	Structural Engineering Design – II	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme		CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

UNIT - IV **CO-4**

Compression Members: Considerations for compression members as per IS: 800: 2007: Geometrical Properties, Effective length, Classification of Cross Sections (buckling), Imperfection factor, Maximum effective slenderness ratio. Column splice, Encased Columns. Design Strength, Design of Axially loaded compression members, Steel Angles under Compression, Design of built-up column with Lacing, Battened columns. Column Bases& Column cap.: Introduction, slab base, gusseted base, column cap, Design of Column bases under axial load. **[10Hrs]**

UNIT-V **CO-5**

Flexural Members: Plastic behavior of beam in flexure, section modulus, Classification of Cross Sections (flexure), Limit state safety – Flexure and shear, Limit state serviceability – Deflection, Design Strength in Bending (Flexure), Effective length for lateral torsional buckling, Shear, web buckling, web crippling, built up beams, Design of Laterally Supported beams and Laterally Unsupported Beams with unstiffened webs. **[8Hrs]**

TEXT BOOKS :

S. No.	Title	Authors	Edition	Publisher
1)	Design of Steel Structures	N. Subramanian	3rd Edition	Oxford University Press
2)	Limit State Design of Steel Structures	S. K. Duggal	3rd Edition	Tata McGraw Hill

REFERENCE BOOKS :

S. No.	Title	Authors	Edition	Publisher
1)	Indian Standard – General Construction in Steel –Code of Practice (IS:800 – 2007)		3rd Revision	BIS
2)	Design of Steel Structures	K. S. Sai Ram	3rd Edition	Pearson Education
3)	Structural Steel Design : LRFD Method	J. C. McCormac, J. K. Nelson	5th Edition	Pearson Education
4)	Limit State design in Structural Steel	M. R. Shiyekar	3rd Edition	PHI Learning

SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU,Bhilai)**Scheme of Examination and Syllabus 2022 Third Year B. Tech. Civil Engineering 6th semester**

Subject Code CE101602	Geotech Engineering – II	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
1. This course will enable students to know about the stability of slopes and stability analysis. 2. To study about the earth pressure in different condition of soil, Coulomb earth pressure theories, earthquake Loading. 3. To study about the types of shallow foundation basic for design, bearing capacity of soil and settlement of Foundation. 4. The knowledge about another types of foundation like well and pile foundation and their design criterion. 5. Know about problems associated with expansive soils and contaminated soils and their remedial measures.	After studying this course, students will be able to: **CO-1:** To know how to achieve stability of soil against gravitational force and seepage of water infinite slope concept of factor of safety **CO-2:** Design of earth structure and their stability against soil pressure. **CO**-3: Design of shallow foundation and their failure how to measure bearing capacity of soil, effect of settlement of Foundation **CO-4:** Design of deep foundation selection of type of deep foundation design criterion for pile foundation. **CO-5:** To learn about the effects of expansive soils and contaminated soils on foundation.

UNIT- I **CO1**

Stability of Slopes: Embankment slopes, examples of embankment, road and earth dams, stability analysis for finite and infinite slopes concept of factor of safety, friction circle method, method of slices, Bishop's simplified method, limiting values of factor of safety; critical conditions for the Stability of earth dams.

[8Hrs]

UNIT – II **CO2**

Earth Pressure: Earth Pressure at rest, active and passive earth pressure, computations using Rankine's and Coulomb's earth pressure theories, Rabhann's and Coleman's graphical method, additional earth pressure due to surcharge and earthquake loading **.** **[7Hrs]**

UNIT –III **CO3**

Shallow Foundations and Settlements: Common types of foundations with examples, brief illustration of situations where each one of them is adopted, basis for design, review of major soil parameters used in proportioning of shallow foundations, types and their selection bearing capacity, various method of determination of bearing capacity, computation of bearing capacity in cohesion less and cohesive soils, effect of various factors on bearing capacity, use of field test data, limits of Settlement, differential and permissible settlement of footing, rafts on sand using penetration and load test data, estimation of settlement of footing for rigid and flexible, proportioning of footings. **[10Hrs]**

Subject Code CE101602	Geotech Engineering – II	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

UNIT – IV **CO4**

Well and Pile Foundations: Situations where adopted, elements of wells, types, method of construction, tilt and shift, remedial measures, bearing capacity and settlement, Terzaghi's lateral stability analysis, Pile Foundation, their types, criteria of selection of piles, outline of steps involved in proportioning, bearing capacity and settlement of single and group of piles, design of pile groups and Settlement of pile group in clay, negative skin friction. **[10Hrs]**

UNIT – V **CO5**

Expansive Soil and Contaminated Soil: Foundations on expansive soil, identification of expansive soil, problems associated with expansive soil, design consideration of foundation on expansive soil, Types and sources of sub surface contamination, contaminant transport, effects of sub surface contamination, detection of polluted zones. **[10Hrs]**

TEXT BOOKS:

S. No.	Title	Authors	Edition	Publisher
1	Soil Mechanics and Foundations	B.C. Punmia	Tenth	Laxmi Publication)
2	Basic and Applied Soil Mechanics	Gopal Ranjan and Rao A.S.R	fourth	New Age Internationa

REFERENCE BOOKS :

S. No.	Title	Authors	Edition	Publisher
1	Soil Mechanics and Foundation Engineering	S K Garg	Tenth	Khanna Publications
2	Geotechnical Engineering	C Venkataramaiah	fourth	New Age International Publishers

SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

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Subject Code CE101603	Environmental Engineering	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
1. To provide fundamental awareness about the water sources, population forecasting, water quality. 2. To develop skills of designing a water treatment plant. 3. Developing a professional skill for design of water distribution system and environmental problems related to civil engineering. 4. To introduce the students the estimation of domestic sewage and other sewer appurtenances. 5. To give an overview of importance of various sewage treatment processes and proper sewage disposal.	**CO1:** The students must be able to apply the knowledge to plan, design, construct and monitor a water/wastewater treatment plant as per a city's water demand. **CO2:** Students must be able to summarize complexities in the characteristics(s) of water/wastewater that is available and the correct treatment methods to be adopted. **CO3:** Students must be able to justify the patterns of water storage and recommend the correct distribution methods suitable for the city under consideration. **CO4:** The student must be able to analyze the wastes coming in for treatment and decide upon the techniques of treatment to be given. **CO5:** Students must be able to apply the knowledge reused to develop a positive attitude to earth, environment and its protection against pollution and adopt safer methods of waste disposal.

UNIT- I **CO1**

Introduction to Water demand: Necessity and importance of water supply schemes. Sources of water. Classification of water demands, Per capita demand, factors affecting per capita demand, Population Forecasting Techniques.

Quality of water: Common impurities, physical, chemical and biological characteristics of water/wastewater, Drinking water quality standards for municipal and domestic supplies **[8Hrs]**

UNIT – II **CO2**

Water Treatment: Objects of water processing Theory of sedimentation, Design of sedimentation tanks, Sedimentation with coagulations, Theory of filtration, Design of slow sand and rapid sand filters, Methods of disinfection, Methods of Softening, Miscellaneous treatment methods**.** **[7Hrs]**

UNIT –III **CO3**

Distribution System: Methods of distribution, layouts of distribution system, functions and its types of distribution reservoirs, storage capacity of distribution reservoir.

Sewage and Sewerage Systems: System of sanitation, Estimation of domestic and storm sewage, Design of circular sewers, Sewer appurtenances. **[7Hrs]**

UNIT – IV **CO4**

Sewage Treatment: Preliminary treatment systems, Screens, grit chamber, detritus tanks. Primary treatment systemsPlain Sedimentation Process, Design of Septic Tank.

Subject Code CE101603	Environmental Engineering	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Secondary treatment Systems: Trickling filters, Design of standard and high rates, Activated Sludge Process, Aeration and Mixing Techniques. **[7Hrs]**

UNIT – V **CO5**

Sewage sludge Treatment: Importance, amount and characteristics of sludge, Sludge digestion process, Design of sludge digestion tank.

Sewage disposal: Disposal by dilution, self-purification of polluted streams, Oxygen Sag curve, Disposal on land surfaces. Stream standards and Effluent standards. **[7Hrs]**

TEXT BOOKS:

S. No.	Title	Authors	Edition	Publisher
1	Water Supply Engineering	S.K. Garg		Khanna Publication
2	Water Supply Engineering	B.C. Punmia		Laxmi Publication, New Delhi

REFERENCE BOOKS :

S. No.	Title	Authors	Edition	Publisher
1	Environmental Engineering	Peavy& Rowe		Tata McGraw Hill, New Delhi
2	Water Supply and Sanitary Engineering	G.S. Birdi		Dhanpat Rai Publications
3	Introduction to Environmental Science	Y. Anjaneyulu		B.S. Publications

SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

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Subject Code CE101621	Concrete Technology	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
1. To provide fundamental awareness about the water sources, population forecasting, water quality. 2. To develop skills of designing a water treatment plant. 3. Developing a professional skill for design of water distribution system and environmental problems related to civil engineering. 4. To introduce the students the estimation of domestic sewage and other sewer appurtenances. 5. To give an overview of importance of various sewage treatment processes and proper sewage disposal.	**CO1:** The students must be able to apply the knowledge to plan, design, construct and monitor a water/wastewater treatment plant as per a city's water demand. **CO2:** Students must be able to summarize complexities in the characteristics(s) of water/wastewater that is available and the correct treatment methods to be adopted. **CO3:** Students must be able to justify the patterns of water storage and recommend the correct distribution methods suitable for the city under consideration. **CO4:** The student must be able to analyze the wastes coming in for treatment and decide upon the techniques of treatment to be given. **CO5:** Students must be able to apply the knowledge reused to develop a positive attitude to earth, environment and its protection against pollution and adopt safer methods of waste disposal.

UNIT- I **CO1**

Concrete Making Materials: Review of Hydration and structure of hydrated cement, Classification of Aggregates, Properties, grading requirements, Methods of combining aggregates, Surface index, specified grading, Alkali aggregate reaction, Quality of mixing and curing water. Sustainability issues in concrete marking materials **[8Hrs]**

UNIT – II **CO2**

Admixtures and Fresh Concrete: Chemical admixtures – Functions of Admixtures, Classification of Admixtures. Mineral Admixture – (Flyash, Silica fumes, GGBS, Rice husk ash) sources ad utilization. Effects of use of chemical and mineral admixtures on the properties of fresh concrete, Rheology, Workability, Factors affecting workability, Measurement of Workability, Requirements of Workability, Segregation, Bleeding and terms related to fresh concrete **[7Hrs]**

UNIT –III **CO3**

Hardened Concrete and Durability: Compressive strength and parameters affecting it: water cement ratio, compaction, curing. Gain of strength with age, Shrinkage and its Types, Maturity Concept, Time dependent behavior of concrete -creep, shrinkage and fatigue. Elasticity, porosity, Durability of Concrete, Permeability of Concrete relation between durability and permeability, Corrosion of steel rebars, Carbonation of concrete. Quality control in concrete. Effects of use of chemical and mineral admixtures on the properties of hardened concrete. **[7Hrs]**

Subject Code CE101621	Concrete Technology	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

UNIT – IV **CO4**

Concrete Mix Design: Principles of Concrete mix design, Target strength, nominal mix, design mix, sampling, statistical interpretation of cube results, understanding of normal distribution curve, characteristic strength of concrete, factors in the choice of mix proportion. Concrete mix design using OPC, PPC, PSC as per Indian standard Code 10262 :2019, study of IS 10262: 2019, American & British methods, Non-destructive tests on concrete. **[7Hrs]**

UNIT – V **CO5**

Special Concrete & Concreting Methods: Behavior of concrete in extreme environment; temperature problem in concreting, hot weather, cold weather and under water conditions, Resistance to freezing, Need of special concrete, properties, ingredients, method of development and applications of Light weight concrete, Fibre reinforced concrete, Polymer Concrete, self-compacted concrete, High performance concrete, Ready mix concrete, special concreting methods, Vacuum dewatering -underwater concrete, special from work. **[7Hrs]**

TEXT BOOKS:

S. No.	Title	Authors	Edition	Publisher
1	Concrete Technology	M.L. Gambhir		Tata McGraw Hill
2	Concrete Technology Theory and Practice	M. S. Shetty		S.Chand and Company Ltd. Delhi

REFERENCE BOOKS :

S. No.	Title	Authors	Edition	Publisher
1	Concrete Technology	A. M. Neville, J. J. Brooks,		Pearson Education
2	Concrete Technology	R.S. Varshney		Oxford, IBH Publishers
3	Light Weight Concrete	Academic Kiado – Rudhani G.		Publishing Home of Hungarian Academy of Sciences

SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

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Subject Code CE101622	Introduction to Earthquake Engineering	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
To learn about the causes of earthquakes and its effect on structures.	**CO1:** To know about the ways of analyzing for earthquake forces and ways of minimizing the damages because of earthquake.

UNIT- I **CO1**

Definitions of basic problems in dynamics, static versus dynamic loads, different types of dynamic loads, undamped vibration of SDoF system, natural frequency and period of vibration, damping in structure. **[8Hrs]**

UNIT – II **CO2**

Seismological background, seismicity of a region, earthquake faults and waves, structure of earth, plate tectonics, elastic – rebound theory of earthquake, Richter scale, measurement of ground motion, Seismogram **[7Hrs]**

UNIT –III **CO3**

Direct determination of frequencies and mode shape, orthogonality principle, approximate methods for determination of frequencies and mode shape model error of forced vibration of MDoF **[7Hrs]**

UNIT – IV **CO4**

Characterization of ground motion, earthquake response spectra, factors influencing response spectra, design response spectra for elastic system, peak ground acceleration, response spectrum shapes. **[7Hrs]**

UNIT – V **CO5**

Review of damage during past earthquakes and remedial measures, seismic design consideration, ductility demand, reinforcement detailing for member and joints. **[7Hrs]**

TEXT BOOKS:

S. No.	Title	Authors	Edition	Publisher
1	Earthquake Resistant Design of Structures	P. Agrawal & M. Srikhande		Prentice Hall
2	Earthquake Resistant Design of Structures	S. K. Duggal		Oxford University Press

				July 2022	2.00	
Chairman (AC)	**Chairman (BoS)**	**Expert Member by CSVTU**	**Expert Member by Outside University**	**Date of Release**	**Version**	Applicable for AY 2022-23 Onwards

SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

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Subject Code CE101622	**Introduction to Earthquake Engineering**	**L = 3**	**T = 0**	**P = 0**	**Credits = 3**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

REFERENCE BOOKS :

S. No.	**Title**	**Authors**	**Edition**	**Publisher**
1	Dynamics of Structures Theory & Applications to Earthquake Engineering	A. K. Chopra		Pearson Education
2	Structural Dynamics- Theory & Computation	Mario Paz		CBS Publishers
3	Basics of Structural Dynamics and Asesismic Design	S. R. Damodarasamy, S. Kavitha		PHI Learning

SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

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Subject Code CE101623	Composite Material	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
Course Objectives: • To learn about various properties of Composite Materials.	**On successful completion of the course, the student will be able to:** **CO1:** To know the importance and areas of application of Composite Materials

UNIT- I **CO1**

Introduction, Historical background, Technological Applications, Composites – various reinforcement and matrix materials, Classification of composites. **[8Hrs]**

UNIT – II **CO2**

Forms of fibre reinforcement, Comparisons of composites with R.C.C. and metals, Strength and stiffness properties, Effective moduli. **[7Hrs]**

UNIT –III **CO3**

Fibre reinforced composite materials, Manufacturing Technique, Cost and Weight advantages. **[7Hrs]**

UNIT – IV **CO4**

Behaviour of uni-directional, cross-ply, angle-ply and other composites-strength and stiffness, anisotropy, Generalized Hooks law. Laminates-Laminated Plates, Analysis, Strength and design with composites, Fibre reinforced Pressure vessels. **[7Hrs]**

UNIT – V **CO5**

Laminates-Laminated Plates, Analysis, Strength and design with composites, Fibre reinforced Pressure vessels. **[7Hrs]**

TEXT BOOKS:

S. No.	Title	Authors	Edition	Publisher
1	Mechanics of Composite Materials –	Robert M.Jones	2nd	Taylor & Francis, Philadelphia, 1998
2	Fibre Reinforced Composites	P.K. Mallick	2nd , Revised	Marcel Dekker, Inc., New York, 1993

				July 2022	2.00	Applicable for AY 2022-23 Onwards
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Subject Code CE101623	**Introduction to Earthquake Engineering**	**L = 3**	**T = 0**	**P = 0**	**Credits = 3**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

REFERENCE BOOKS :

S. No.	**Title**	**Authors**	**Edition**	**Publisher**
1	Introduction to Design and Analysis with Advanced Composite Materials	Stephen R. Swanson	2nd	Prentice Hall, New Jersey, 1997
2	Stress Analysis of Fiber-Reinforced Composite Materials	M.W. Hyer	Revised . updated	WCB McGrawHill, NewYork, 1998

SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

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Subject Code CE101624	Planning and Design of Airport	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
• To assure the effective use of airport resources in order to satisfy aviation demand in a financially feasible manner with consideration to the environment. • To develop an attainable phased development plan concept that will satisfy the needs of the airport in a safe, efficient, economical and environmentally sound manner. • To enable the students to plan for the orientation of airport and different airport elements. • To train the students with Design of airport pavements	**On successful completion of the course, the student will be able to:** • Knowledge of planning and orientation of airport elements. • Finding practical solution to planning of an airport. • Finding practical solution to Design of an airport pavement

UNIT- I **CO1**

Airport Planning: Airport – Accessibility – Transport Connections – Road and Rail, Expansion – Feasibility Studies – Environmental and Social Issues – Forecasting Future Traffic – Airfield Capacity and Delay - Aircraft characteristics – Airport Site Selection. **[8Hrs]**

UNIT – II **CO2**

Airport Components: Airport classification, Planning of Airfield Components – Runway, Taxiway, Apron, Hanger, Passenger Terminals. **[7Hrs]**

UNIT –III **CO3**

Air route Planning & Evaluation: Demand Driven Dispatch – Airline Fleet Planning Models – Network Revenue Management- Airport Performance, Slot Issues, Hub Operation, Demand Management, Multi airport systems. **[7Hrs]**

UNIT – IV **CO4**

Passenger Choice , Scheduling And Flet Assignment: Load Factor Analysis, Airline Schedule Development, Introduction to PODS Passenger Choice Models, Decision Window Model, Fleet Assignment. **[7Hrs]**

UNIT – V **CO5**

Airlines Economics: Pricing- Privatization and Deregulation, Willingness to pay and Competitive Revenue Management. **[7Hrs]**

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Subject Code CE101624	**Planning and Design of Airport**	**L = 3**	**T = 0**	**P = 0**	**Credits = 3**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

TEXT BOOKS:

S. No.	**Title**	**Authors**	**Edition**	**Publisher**
1	Airport Planning and Design	S.K.Khanna and M.G.Arora	1999	Nem Chand and Bros,
2	Richard De Neufille and Amedeo Odoni	Airport Systems Planning and Design	2003	McGraw Hill,New York,

REFERENCE BOOKS :

S. No.	**Title**	**Authors**	**Edition**	**Publisher**
1	Planning and Design of Airports	Robert Honjeff and Francis X.Mckelvey	1996	McGraw Hill, New York
2	Airport Engineering Planning Design and Development of 21st Century Airports	Norman.J.Ashford, Sakleh.A Mumayiz and Paul.H.Wright	2011	John Wiley and sons, New Jersey

				July 2022	2.00	
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SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU,Bhilai)**Scheme of Examination and Syllabus 2022 Third Year B. Tech. Civil Engineering 6th semester**

Subject Code CE101625	Transportation Planning and Management	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes

UNIT- I **CO1**

Introduction: Urbanization and transportation problems, transportation sector in five year plans, regional transportation plans, comprehensive transportation planning, goals and objectives, principles of transport planning, process of urban transport planning **[8Hrs]**

UNIT – II **CO2**

Trip Generation Analysis: Trip classification, multiple regression analysis, trip rate analysis, category analysis. **[7Hrs]**

UNIT –III **CO3**

Trip Distribution Analysis: Methods of trip distribution, uniform factor method, average factor method, frator method, furness method, limitations of growth factor methods, elementary gravity model. **[7Hrs]**

UNIT – IV **CO4**

Model Choice Analysis: Determinants of mode choice, theoretical framework for discrete choice model, binomial and multinomial logit model, choice-set determination, model specification, functional form, statistical estimation, validation.

Assignment: Basic concepts, traffic assignment methods, all-or-nothing assignment, multiple route assignment, capacity restraint assignment, diversion curves. **[7Hrs]**

UNIT – V **CO5**

Economic Evaluation of Transport Plans: Need, costs and benefits of transport projects, methods of economic evaluation, benefit-cost ratio method, first year rate of return, net present value methods, internal rate of return method.

Major Issues: Public transport policy, intermediate public transport, non motorized transport, transport facility for elderly population, women and children. **[7Hrs]**

SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU,Bhilai)**Scheme of Examination and Syllabus 2022 Third Year B. Tech. Civil Engineering 6th semester**

Subject Code CE101625	**Transportation Planning and Management**	**L = 3**	**T = 0**	**P = 0**	**Credits = 3**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

TEXT BOOKS:

S. No.	**Title**	**Authors**	**Edition**	**Publisher**
1	Traffic Engineering and Transport Planning	Kadiyali, L.R		Khanna Publishers, Delhi, 1996
2	Transport Planning and Traffic Engineering	Flaherty, CAO		John Wiley & Sons, Inc., New York1997

REFERENCE BOOKS :

S. No.	**Title**	**Authors**	**Edition**	**Publisher**
1	Principles of Urban Transport Systems Planning	Hutchinson, B.G		Scripta Book Company, Washington, D.C. 1974
2	Modelling Transport	Ortuzar, title D. and Willumson, L.G		John Wiley & Sons, New York, 1995

SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU,Bhilai)**Scheme of Examination and Syllabus 2022 Third Year B. Tech. Civil Engineering 6thsemester**

Subject Code CE101641	Modern Surveying Techniques	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
• To learn in depth about modern surveying techniques	**On successful completion of the course, the student will be able to:** • To know the importance and areas of application of modern surveying instruments

UNIT- I **CO1**

Modern Surveying Equipment: E.D.M. Instruments – Geodimeter, Tellurometer, Distomat, TotalStation, Applications of Lasers in distance and angular measurements, Introduction of Electronic navigation and Position Fixing – different systems and their Characteristics. **[8Hrs]**

UNIT – II **CO2**

Global Positioning System: Global Positioning System – working principle and methods, Different Approaches to use GPS and their accuracies, Advantages of GPS in Navigation, Survey, Planning and Mapping. **[7Hrs]**

UNIT –III **CO3**

Geographic Information System: Geographic Information System – data requirement and database creation; Use of field data, maps, aerial and satellite data; Advantages of GIS. **[7Hrs]**

UNIT – IV **CO4**

GIS Analysis: Types of GIS analysis, map topology, map feature elements, queries, features in a topographic base map, base map accuracy standards. **[7Hrs]**

UNIT – V **CO5**

Surveying Mapping through Software: Introduction of ARC Info, ARC View, ARC Gms, Intergraph, MGE, Modular GIS Environment, Map Info and Geomedia web map, etc. **[7Hrs]**

TEXT BOOKS:

S. No.	Title	Authors	Edition	Publisher
1	Surveying (Vol - I, II & III)	Arora, K.R		Standard Book House, Delhi
2	Elements of Photogrammetry	Wolf, P.R.		McGraw Hill Book Company, New Delhi

				July 2022	2.00	
Chairman (AC)	**Chairman (BoS)**	**Expert Member by CSVTU**	**Expert Member by Outside University**	**Date of Release**	**Version**	Applicable for AY 2022-23 Onwards

SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU,Bhilai)**Scheme of Examination and Syllabus 2022 Third Year B. Tech. Civil Engineering 6th semester**

Subject Code CE101641	**Modern Surveying Techniques**	**L = 3**	**T = 0**	**P = 0**	**Credits = 3**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

REFERENCE BOOKS :

S. No.	**Title**	**Authors**	**Edition**	**Publisher**
1	Solving Problems in Surveying	Bannister, A. and Baker, R.		Longman Scientific Technical, U.K.
2	Electronic Distance Measurement	Burnside, C.D.		Oxford, BSP Professional Books, London
3	Engineering Surveying Technology	Kennie, T.J.M. and Petrie, G.		Blackie & Sons Ltd., London
4	Electronic Surveying in Practice	Laurilla, S.H.		John Wiley & Sons, New York

SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU,Bhilai)**Scheme of Examination and Syllabus 2022 Third Year B. Tech. Civil Engineering 6th semester**

Subject Code CE101642	Construction planning	L = 3	T = 0	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
• To develop fundamental knowledge of project management and cost control. • To learn about various techniques for project planning, scheduling and monitoring. • To develop awareness of safety and quality control. • To imparts basic knowledge, skill, tools and techniques involved in the planning of the construction project. • To control a projects time, delivery, cost and quality.	**On successful completion of the course, the student will be able to:** **CO1.** To understand objective of construction planning. **CO2.** Ability to develop construction schedule. **CO3.** To understand the application of safety and quality control in construction. **CO4.** To make them understand the concepts of project management. **CO5.** To understand the knowledge of management, cost and quality control also.

UNIT- I **CO1**

Introduction: Objectives and functions of construction management, stages in construction, stages of planning, bar charts and milestone charts, project feasibility reports, scheduling job layout and line of balance technique, applications. **[8Hrs]**

UNIT – II **CO2**

Construction Scheduling: PERT: Necessity for good scheduling, Elements of Network, Development of Network, PERT: Time estimates, Time computation, Network Analysis – slack, critical path. **[7Hrs]**

UNIT –III **CO3**

Construction Scheduling: CPM - Steps in CPM Project Planning, Network Analysis, Activity times and floats, Critical activities and Critical Path Determination . **[7Hrs]**

UNIT – IV **CO4**

Cost Control & Resource Allocation: Cost control in construction-importance, objectives of cost control, cost control systems. Economic analysis of engineering projects, economic studies, Resources allocation, Resources leveling, Project updating, Construction cost monitoring. **[7Hrs]**

UNIT – V **CO5**

Construction Safety and Quality Control: Importance, Causes of Accidents, Safety measures, Responsibility for safety, Safety benefits to various parties, Safety clauses in contract, Safety policy, Safety hazards. Quality control in construction: Importance, Elements of Quality, Quality Assurance Techniques, Quality Control Circles. **[7Hrs]**

SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU,Bhilai)**Scheme of Examination and Syllabus 2022 Third Year B. Tech. Civil Engineering 6th semester**

Subject Code CE101642	**Construction planning**	**L = 3**	**T = 0**	**P = 0**	**Credits = 3**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**3 Hours**

TEXT BOOKS:

S. No.	**Title**	**Authors**	**Edition**	**Publisher**
1	Project Planning and Control with PERT and CPM	B. C. Punmia, K. k. Khandelwal	5th Edition	Laxmi Publications
2	Construction Planning and Management	P. S.Gahlot and B. M. Dhir	2nd Edition	New Age International

REFERENCE BOOKS :

S. No.	**Title**	**Authors**	**Edition**	**Publisher**
1	Construction Planning, Equipment and Methods	R. Peurify, C. J. Schexnayder, A. Shapira,	9th Edition	Tata. McGraw Hill
2	PERT and CPM: Principles and Applications	L. S. Sreenath	3rd Edition	Affiliated East West Press

Subject Code CE101691	**Structural Engineering Lab**	**L = 0**	**T = 0**	**P = 1**	**Credits = 1**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**2 Hours**

List of Experiments: (At least Ten experiments are to be performed by each student)

Experiments to be performed using latest version of a Standard Structural Engineering Design Package such as STAAD Pro or ETABS:

1. Introduction to latest version of a Standard Structural Engineering Design Package such as STAAD Pro, STAAD. or ETABS etc

RCC Design Using Design Package:

2. Geometrical Modelling of RCC Frame.

3. Modelling of loads and load combinations on RCC Frame.

4. Analysis and Interpretation of Results of Analysis of RCC Frame.

5. Design of RCC Frame.

6. Interpretation of Results of Design of RCC Frame.

7. Design of R.C.C. Column (STAAD or ETABS)

8. Design of R.C.C. Isolated Footing (STAAD or ETABS)

9. Case Study of design of a RCC Multistory Building

Steel Design Using Design Package:

10. Geometrical Modelling of Steel Frame.

11. Modelling of loads and load combinations on Steel Frame.

12. Analysis and Interpretation of Results of Analysis of Steel Frame

13. Design of Steel Frame.

14. Interpretation of Results of Design of Steel Frame.

15. Case Study of design of a Steel Industrial Building.

Equipment/Machines/Instruments/Tools/Software Required:

1. Latest Release of Software Package STAAD Pro

2. Latest Release of Software Package ETABS.

Recommended Books:

S. No	Title	Authors	Edition	Publisher
1	Reference Manual for Respective Software			
2	Verification Manual of Respective Software			

Subject Code CE101692	**Environmental Engineering Lab**	**L = 0**	**T = 0**	**P = 1**	**Credits = 1**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**2 Hours**

List of Experiments: (At least Ten experiments are to be performed by each student)

1. To determine acidity of water/wastewater sample.

2. To determine alkalinity of water/wastewater sample.

3. To determine hardness of water/wastewater sample.

4. To determine chloride content of water/wastewater sample.

5. To determine D.O. content of water/wastewater sample.

6. To estimate the quantity of BOD from water/wastewater sample.

7. To determine the availability of chlorine in bleaching powder for drinking water.

8. To determine the residual Cl2 Content in drinking water.

9. To determine the quantity of Optimum Coagulant Dose and pH of water sample.

10. To determine the Total Solids in water/wastewater sample.

11. To determine the COD in Sewage / Industrial wastewater.

12. To determine the MPN in Sewage / Industrial wastewater.

13. To determine the Fluoride content in Sewage / Industrial wastewater.

14. To determine the Nitrates in Sewage / Industrial wastewater.

15. To determine the Phosphates in Sewage / Industrial wastewater.

16. To determine the Iron in Sewage / Industrial wastewater.

17. Microbiological Examination of Sewage / Industrial wastewater

Equipment/Machines/Instruments/Tools/Software Required:

1. BOD Incubator
2. Dust Sampler
3. Turbidity meter
4. Microscope
5. pH meter

6. Muffle Furnace
7. Hot Air Oven
8. Jar Test Apparatus

Recommended Books:

S. No	Title	Authors	Edition	Publisher
1	Environmental Engineering Lab Manual	Dr. B. Kottaiah& N. Kumaraswamy		Charotar Publications
2	Water Supply Engineering	S.K. Garg		Khanna Publication
3	Water Supply Engineering	B.C. Punmia		Laxmi Publication, New Delhi
4	Environmental Science and Engineering	Henry and Heinke		Pearson Education

Subject Code CE101693	**Concrete Technology Lab**	**L = 0**	**T = 0**	**P = 1**	**Credits = 1**
Evaluation Scheme	**ESE**	**CT**	**TA**	**Total**	**ESE Duration**
	100	**20**	**30**	**150**	**2 Hours**

List of Experiments: (At least Ten experiments are to be performed by each student)

Test on Aggregates:

1. Determination of Soundness test on aggregate
2. Determination of Deleterious materials in fine aggregate
3. Determination of Grading curve of Mix aggregate & sieve analysis

Properties of Fresh Concrete:

4. To study the effect of use of mineral admixture and chemical admixture on the workability of fresh concrete using Slump Cone test.
5. To study the effect of use of mineral admixture and chemical admixture on the workability of fresh concrete using Compaction Factor Test.
6. To study the effect of use of mineral admixture and chemical admixture on the workability of fresh concrete using Vee-bee test
7. To study the effect of use of mineral admixture and chemical admixture on the workability of fresh concrete using Flow table test

Properties of Hardened Concrete:

8. Determination of Compressive Strength (3d, 7d and 28d) of concrete
9. Determination of Compressive strength of concrete by non-destructive test – Rebound Hammer
10. Determination of flexural strength of concrete (28d)
11. Determination of Modulus of elasticity of concrete and strain measurement by longitudinal compressometer

Mix Design:

12. Mix Design by I.S. Code method (with OPC Cement)
13. Mix Design by I.S. Code method (with Slag Cement)
14. Mix Design by I.S. Code method (with Admixtures Cement)

Self Compacting Concrete:

15. Parametric study of self-compacting concrete.

Equipment/Machines/Instruments/Tools/Software Required:

- Slump Cone with Tamping Rod
- Concrete Cubes (15 x 15 x 15) cm3
- Tray (45 x 60) cm2, (60 x 60) cm2, (30 x 45) cm2
- Trowel (6 Nos.)
- I.S. Sieves for Coarse and Fine Aggregate
- Compression Testing Machine (200 T)
- Weighing Balance
- Sieve Shaker
- Compaction Factor Test Apparatus
- Vee-Bee Consistometer
- Flow Table
- Longitudinal Compressometer
- Cylindrical Mould
- Concrete Test Hammer
- Graduated Glass Cylinder (500 ml, 1000 ml)
- Beaker (500 ml)
- Rebound Hammer

Recommended Books:

S. No	Title	Authors	Edition	Publisher
1	Lab Manual Concrete	M.L. Gambhir		Tata McGraw Hill
2	Concrete Technology	M.S. Shetty		S. Chand & Co.)