



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

B. TECH. (SEVENTH SEMESTER) CIVIL ENGINEERING

S. No.	Board of Studies (BOS)	Courses	Category	Course Code	Period per Week			Scheme of Examination			Total Marks	Credit
					L	T	P	Theory/Lab				
								ESE	CT	TA		
1	Civil Engineering	Structural engineering Design-III	PCC	CE101701	2	1	-	100	20	30	150	3
2	Civil Engineering	Design of hydraulic structure	PCC	CE101702	2	1	-	100	20	30	150	3
3	Civil Engineering	Quantity survey and cost estimation	PCC	CE101702	2	1	-	100	20	30	150	3
4	Civil Engineering	Professional Elective– III (Refer table I)	HSM C		2	1	-	100	20	30	150	3
5	Civil Engineering	Open elective-II (Refer table II)	HSM C		2	1	-	100	20	30	150	3
6	Civil Engineering	Advance environmental engineering lab	PSI	CE101791	-	-	2	25	-	25	50	1
7	Civil Engineering	QSCE LAB	PSI	CE101792	-	-	2	25	-	25	50	1
8	Civil Engineering	Minor Project-I	PSI	CE101793	-	-	4	50	-	50	100	2
9	Civil Engineering	Internship & Assessment/Industrial Training Report	PSI	CE101701	-	-	2	-	-	25	25	1
10	Civil Engineering	Universal human value and professional ethics	NC	CE100795	-	-	-	-	-	25	25	-
Total					13	2	10	600	100	300	1000	20

L-Lecture
CT- Class Test

T- Tutorial
TA- Teachers Assessment

P-Practical
ESE- End Semester Exam

Chairman (AC)	Chairman (BoS)	October 2023	1.00	Applicable for AY 2023-24 Onwards
		Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

B. Tech. (Seventh Semester)

Civil Engineering Table – I

: Professional Elective–II

Sl. No.	Board of Studies (BOS)	Courses (Subject)	Course Code	Credit
1	Civil Engineering	Marine Geotechnics	CE105721	3
2	Civil Engineering	Air pollution control and monitoring	CE105722	3
3	Civil Engineering	Advanced transport engineering	CE105723	3
4	Civil Engineering	Project appraisal and construction finance	CE105724	3
5	Civil Engineering	Fabrication and erection	CE105725	3

B. Tech. (Seventh Semester) Civil Engineering

Table – III : Open Elective

Sl. No.	Board of Studies (BOS)	Courses (Subject)	Course Code	Credit
1	Civil Engineering	Safety in construction	CE105741	3
2	Civil Engineering	Construction equipment and technique	CE105742	3
3	Civil Engineering	Expansive soil	CE105743	3
4	Civil Engineering	Transportation planning and management	CE105744	3
5	Civil Engineering	Disaster management	CE105745	3

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code CE101701	Structural Engineering Design-III	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	4 Hours
Course Objectives		Course Outcomes			
1. Understand the behavior of plate girders. 2. Understand the behavior of members subjected to combined forces. 3. Understand the behavior of column bases and gantry girders. 4. Understand the behavior of eccentric and moment connections. 5. Understand the behavior of roof trusses under different loads.		CO1: Capable of designing Plate Girders. CO2: Capable of designing members subjected to combined forces. CO3: Capable of designing Column bases & Gantry Girders. CO4: Capable of designing eccentric and Moment connections. CO5: Capable of designing Roof trusses.			
UNIT I Plate Girders with solid webs: CO1 Components of a Plate Girder, Typical sections, Proportioning of the section, Design bending strength, Design shear strength, Stiffened Web panels, minimum web thickness, bearing stiffeners, load carrying stiffeners, intermediate stiffeners, stiffener design, Design of beams and plate girders with solid webs [8HRs]					
UNIT II Members subjected to combined forces: CO2 Combined shear & bending, combined axial force & bending moment, section strength, over all member strength, Design of members subjected to combined forces. [8HRs]					
UNIT III Column Bases and Gantry Girders: CO3 Types of column bases, slab base, gusset base, moment resisting base plates. Loads and load combinations, Typical sections, Design of gantry girders [8HRs]					
UNIT IV Eccentric and Moment Connections: CO4 Analysis of Bolt / Weld Group, Connection Configurations, Beam to Column connections, Beam to Beam connections, web splice and its connections, column splice and its connections. [8HRs]					
UNIT V Roof Trusses: CO5 Types of roof trusses, Loads - Dead , Imposed and wind loads, load combinations, Design of Purlins, Analysis & Design of roof trusses (with angle sections). [8HRs]					

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

TEXT BOOKS:

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

REFERENCE BOOKS:

S. No.	Title	Authors	Publisher
1)	Design of Steel Structures	K. S. Sai Ram	Pearson Education
2)	Structural Steel Design : LRFD Method	J. C. McCormac, J. K. Nelson	Pearson Education

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code CE101702	Design of Hydraulic Structures	L = 2	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	4 Hours
Course Objectives		Course Outcomes			
Objective of the Subject: 1. To learn the design of dams and component. 2. To learn the design of spillway and energy dissipation. 3. To learn the design of weir and barrage. 4. To learn the design of canal fall and cross drainage work.		CO1: Students is able to understand the importance of Dam and its design. CO2: Students are expected to know about spillways and its types and also design the spillways. CO3: Students has clarity about the various design philosophies used in the design of weir and barrage. CO4: The students will be able to understand design of canal falls. CO5: Learner is able to design different types of cross drainage works.			

UNIT I

CO-1

Dams: Types of Dams, Suitability of a type of dam, Gravity dams – Forces acting on dams, failure of dams and criteria for structural stability, Overturning, Compression or crushing, tension, sliding, principal and shear stress, stability analysis, Elementary profile of a gravity dam, High and low gravity dams, Design considerations, Openings in dams, Functions and Effects of opening, Joints, Keys and Water stops in gravity dams, Foundation treatment.

[8Hrs]

UNIT - II

CO-2

Spillways and Energy Dissipaters: Introduction, essential requirements of a spillway, spillway capacity, components, Types of spillways, Design of Ogee Spillway, Energy Dissipation below spillways, Types of Energy dissipater, Hydraulic jump as energy dissipater.

[7Hrs]

UNIT - III:

CO-3

Diversion Headworks: Introduction, Types of diversion works, location and components, Weir and Barrage, Effect of construction of weir on the river regime, Causes of failures of Weirs on permeable foundations, their remedies, Bligh's creep theory, Lane's Theory, Theory of seepage flow, Khosla's theory, Design of Vertical drop Weir, Design of Glacis Weir.

[7Hrs]

UNIT - IV

CO-4

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Regulation Work: Introduction, Definition of falls, necessity and location of falls, Design and comparative study of the main types of falls, Design of Cross regulator and distributary regulators. [7Hrs]

UNIT-V

CO-5

Cross Drainage Works: Introduction, types, suitability, design of various types of C-D Works, Aqueduct, Syphon Aqueduct, Super Passage, Syphon, level crossing, inlets and outlets. Design of channel transition-expansions and contractions, curves for sub-critical and super critical flows. [7Hrs]

TEXT BOOKS :

S. No.	Title	Authors	Publisher
1)	Irrigation Engineering and Hydraulic Structures	S.K. Garg	(Khanna Publications)
2)	Irrigation Engineering	B.C. Punmia	(Laxmi Publications)

REFERENCE BOOKS :

S. No.	Title	Authors	Publisher
1)	Irrigation, Water Resources and Water Power Engineering	Dr. P.N. Modi	(Standard Book House)
2)	Theory and Design of Irrigation Structures	Varshney	(Nem Chand Bros.)
3)	Irrigation Engineering	Asawa G.L	(New Age International Publications)
4)	Fundamentals of Irrigation Engineering	Bharat Singh	Nem Chand & Bros.)

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code CE101703	Quantity Survey and Cost Evaluation	L = 2	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
Objective of the Subject: 1. To provide an understanding of estimate, their types, items and units of work, and types of approximate estimate. 2. To provide an understanding of determining quantity estimate of civil engineering works. 3. To provide an understanding of rate analysis and its application to different items. 4. To provide an understanding of general requirements of contracts. 5. To provide an understanding of the concept of valuation of properties.	CO1: Students are expected to identify various items of building and able to determine approximate estimate of buildings. CO2: Students are expected to determine quantities estimate of civil engineering works from given details. CO3: Students are expected to know about determination of quantities of materials and rate analysis of any items in residential building works. CO4: Students are expected to know contract and its types. CO5: Students are expected to know concept of valuation.

UNIT– I Introduction to Estimation

CO-1

Introduction to quantity surveying, methods of measurements and units of measurements of various items of work, Principles of estimating, different types of estimates, procedure for computation of stage I estimate.

General Terms: Administrative approval, technical sanction, competent authority, Deposit works, suspense account, imprest account, indent of stores, muster roll. Measurement book, material at site account, stock account, establishment charges, contingencies. **[8Hrs]**

UNIT – II Quantity Estimate

CO-2

Methods, data required for estimation detailed estimates of residential building works of single and double story, determining quantities of actual reinforcement in building components, making bill of quantities. Calculating quantities of long & short wall method & center line method.

[7Hrs]

UNIT - III: Estimate of R.C.C. Structures & Earth Works

CO-3

Items of work in RCC structures, bar bending schedule, Estimate of slab, Estimate of beam, Estimate of RCC column, Preparation of abstract of cost above estimates with footing. Determination of earth work in road and canals. **[7Hrs]**

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code	Quantity Survey and Cost Evaluation	L = 2	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	4Hours

UNIT – IV Analysis of rates

CO4

Purpose and principles factors affecting the rates of items of works, Analysis of rates of different items such as cement concrete of different proportions, brick masonry in different mortars, flooring (tiles, mosaic, cement concrete flooring), use of Schedule of rates.

Specifications: Purpose and basic principles, types of specifications: brief and detailed specifications for various items of works. [7Hrs]

UNIT-V Contract & Valuation of property

CO5

General requirements of contract, types of contract, conditions, departmental contract, BOT projects, termination of contract, brief idea about types of tender, tender notice, earnest money, security deposit, liquidated damages.

General, object of valuation, definitions of terms related to valuation, methods of determining value of property, concept of capitalized value and year purchase, depreciation, lease, mortgage, easement.

[7Hrs]

TEXT BOOKS :

S. No.	Title	Authors	Publisher
1)	Estimating and Costing in Civil Engineering.	B.N. Dutta	(UBS Publishers, New Delhi)
2)	Estimating and Costing and specifications.	M. Chakrabarty	(UBS Publishers, New Delhi)

REFERENCE BOOKS :

S. No.	Title	Authors	Publisher
1)	Textbook of Estimating and Costing	G.S. Birdi	(Dhanpat Rai Publications)
2)	Valuation of real properties	S.C. Rangwala	(Charotar Publication)
3)	A Textbook of Estimating and Costing	Kohli & Kohli	(S. Chand & Co.)

Chairman (AC)	Chairman (BoS)	October 2023 Date of Release	1.00 Version	Applicable for AY 2023-24 Onwards
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SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code	Fabrication and Erection	L = 3	T = 1	P = 0	Credits = 4
CE105725	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
- Be familiar with techniques for fabrication and erection of structures. - Be familiar with the various types of symbol used in fabrication - Learning Code provisions for erection - Be familiar with Various stages of inspection, Quality control	CO-1: To be able to plan and handle issues related to Fabrication and erection of structures. CO 2: Able to draw fabrication drawing and detailing. CO 3: Able to understand the various types of tools and Equipments for erection. CO 4: Able to apply various types of safety & quality Control in fabrication and erection processes. Co 5: Quality Control and Safety – Various stages of inspection

UNIT-I

CO1

Various slopes, size and properties of rolled steel sections, tubes and hollow rectangular sections: Chemical composition, physical properties and weld ability of various types of structures steel, their suitability for various purposes.

Planning, Estimating and costing: Scope, components of costing for fabrication and erection, Economy and cost control, various processes for joining, forming, cutting and welding.

Fabrication Operations: Various operations like interpretation of drawings, shop-floor operations, fastenings, assembling, finishing and shipping, sub-assemblies and main assemblies, fabrication of pipes and peristocks.

Inspection of fabrication: Code provisions for tolerances and deviations, Inspection of welds, radiographic and ultrasonic techniques.
[8Hrs]

UNIT – II

CO2

Structural connections, their classification, symbols for their representation, layout of an industrial building, preparation of fabrication drawing and detailing for columns, trusses, beams and cladding, detailing of truss-joints, column bases, beam to beam and column to beam connection (Seated and framed).

Note: At least three drawing sheets on above shall be prepared as class work. The examination paper shall contain questions on above to be illustrated with sketches.

[8Hrs]

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

UNIT III

CO3

Principle of erection, Erection organization, Preparation and reading of erection drawing, Assembly marks, common types of structures to be erected, erection of tackle and false work equipments for lifting and rigging, Code provisions for erection. Methods of erection, leveling and alignment, setting out and grouting, allowable tolerances for plumbing, leveling and alignment. Tools and equipments for erection, various types of derricks, cranes and winches.

[8Hrs]

UNIT IV

CO4

Miscellaneous small tools for erection like drifts, shakles and grips, erection of shed type buildings, portal frames, multi-storeyed buildings, prefabricated tanks, towers and chimneys

[8Hrs]

UNIT V

CO5

Inspection, Quality Control and Safety – Various stages of inspection, Quality control departments, prescribed tolerances and deviations, methods of rectification of defects, Accidents and their causes, Various unsafe acts and precautions for their prevention, Rules for safety for cranes, winches, etc. Safety during electrical operations and while using X-ray equipment's, Maintenance of erected structures, surface treatment against corrosion, etc.

[8Hrs]

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Text Books:

S. No.	Title	Authors	Publisher
1	Structural Steel Fabrication and Erection	S.K. Saxena and R.B. Asthane	Somaiya Publications
2	Structural Steel Drafting and Design	David MacLaughlin and Hector Estrada	Delmar Cengage Learning

Reference Books:

S.No.	Title	Authors	Publisher
1	Structural Steel Drafting and Detailing	Shivagunde and Asthana	Somdiya Publications

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code	Air pollution and control measurement	L = 3	T = 1	P = 0	Credits = 4
CE105722	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
- Protecting the atmospheric environment involves control of atmospheric emissions as well as an understanding of pollutant dispersion, - To monitoring emission levels, i.e. concentration in ambient air.	CO-1: To be able to know different types, characteristics and sources of air pollution, and sampling methods CO 2: To study Plum behaviour. CO 3: To study effects of SO_x, NO_x on human, plants and animals CO 4: To understand methods of controlling SO_x and NO_x Co 5: To study global effects of air pollution

Unit-1

CO1

Air Pollution , Problem, Definitions, Classification of pollutants, characteristics and sources. A.P. Monitoring: Measurement of stack gases, Sampling methods, Difficulties in sampling, sampling of SPM, stack sampling techniques
[8Hrs]

Unit-2:

CO2

Air pollution metrology, stability class condition, plume behavior, topographical effects on air pollution, wind profiles, wind roses. Gaussian plume models, assumptions and limitations of GPM, problem on modeling.
[8Hrs]

Unit-3:

CO3

SOX sources, ambient concentrations, test methods, SOX control techniques, effects of SOX on human, animal health, plants and on materials. NOX sources, ambient concentrations, test method control techniques, effects of NOX on human health, animal health, plants and on materials. Particulate size distribution, collection and removal mechanics.
[8Hrs]

Unit-4:

CO4

Major air pollution disaster episodes, special diseases caused by air pollution, symptoms of chronic air pollution. Mechanisms of deterioration in polluted atmospheres, effect of air pollution on art treasures in India.
[8Hrs]

Unit-5:

CO5

Air quality criteria and emission standards, US and Indian standards, air pollution act, constitution,

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Power and functions of the boards. Global effects of air pollution – Greenhouse effect, acid rains, ozone layer depletion, etc. **[8Hrs]**

Text Books:

S. No.	Title	Authors	Publisher
1	Environmental Engineering	Peavy & Rowe	Tata McGraw Hill, New Delhi
2	Environmental Science and Engineering	Henry and Heinke	Pearson Education

Reference Books:

S.No.	Title	Authors	Publisher
1	Air Pollution	Henry C. Perkins	McGraw Hill Kogakusha Ltd., Tokyo, Japan, 1974
2	Air Pollution	Stern, Arthur C.	Academic Press, New York, USA, 1977
3	Introduction to Environmental Science	Y. Anjaneyulu	B.S. Publications
4	Waste Water Engineering	Metcalf Eddy	Tata McGraw Hill, New Delhi

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code	Advanced Transport Engineering	L = 3	T = 1	P = 0	Credits =4
CE105723	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objective	Course Outcomes
To make the students learn to deal with traffic issues including traffic safety, operation and control.	On successful completion of the course, the student will be able to: CO1:- Describe Various aspects of transportation Engineering. CO2:- Layout, Orientation, and Geometric Design. CO3:- Analysis and design of flexible pavements. CO4:- Characterizing traffic flow, Data collection techniques for traffic Parameters. CO5: Analysis of Travel Demand and Transportation Planning.

UNIT-I:

CO-1

Introduction to Transportation Engineering: Elements of Transportation Engineering (e.g.: vehicle, driver, way, terminal, and control) Transportation modes, Development and transportation, various aspects of transportation engineering (e.g., pavement design, traffic engineering, transport planning, public transportation etc.). **[8 Hours]**

UNIT-II: Layout, Orientation, and Geometric Design

CO2

Geometric Design of highways and railways (e.g., horizontal alignment, vertical alignment, etc.), geometry of hill roads, Orientation of runways, and geometry of taxiways, Curve layout. **[8 Hours]**

UNIT –III: Pavements and Rail Tracks

CO3

Types of pavements, Analysis and design of flexible pavements, Pavement drainage, Construction and maintenance of flexible pavements, Introduction to design of rail tracks. **[10 Hours]**

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

UNIT-IV: Traffic Engineering

CO-4

Characterizing traffic flow (e.g. density, speed, flow), Data collection techniques for traffic parameters and delay studies, Introduction to traffic flow theory (including description of speed density, speed-flow, and flow density relations), Introductions to concept of capacity and level of service. **[7 Hours]**

UNIT-V: Travel Demand Analysis and Transportation Planning

CO-5

The planning process, Sequential demand analysis, Models of trip generation, distribution, traffic assignment, and modal split. **[8 Hours]**

Text Books:

S.No.	Title	Authors	Publisher
1	Highway Engineering	S.K.Khanna & C.J.Juso	Nemchand & Bros., 7th Edition
2	Principles and practices of highway Engineering	Dr. L. R. Kadiyali & Dr. N. B. Lal	Khanna publishers –

Reference Books:

S. No.	Title	Authors	Publisher
1	Principles of pavement design	Yoder & wit zorac	Jhonwilley & Sons.
2	CODES: 1. IRC Code for flexible pavement – IRC – 37 -2001. 2. IRC Code for Rigid pavement – IRC – 58 –2002.	John R Jensen	- -

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code	MARINE GEOTECHNICS	L = 3	T = 1	P = 0	Credits = 4
CE105721	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
This course will enable students to 1. To study the marine sediments. 2. To study the geotechnical challenges 3. To study the in-situ testing procedures. 4. To study the behavior of marine soil deposits.	After studying this course, students will be able to: CO-1: Analyze distribution of marine sediments along the Indian coasts. CO-2: Analyze geotechnical challenges in case of marine sediments. CO-3: Implement in-situ testing procedures for determining the properties of marine clays. CO-4: Analyze behavior of marine soil deposits under repetitive loading conditions. CO-5: To study various models in geotechnics

UNIT-I

CO1

Marine soil deposits: Offshore environment, Offshore structures and foundations, Specific problems related to marine soil deposits, Physical and engineering properties of marine soils [8Hrs]

UNIT II

CO1

Behaviour of soils subjected to repeated loading: Effect of wave loading on offshore foundations, Behaviour of sands and clays under cyclic loading, Laboratory experiments including repeated loading, Cyclic behaviour of soils based on fundamental theory of mechanics, Approximate engineering methods which can be used for practical cases [8Hrs]

UNIT III

CO2

Site Investigation in the case of marine soil deposits: Challenges of site investigation in marine environment, Different site investigation techniques, sampling techniques, Geophysical methods, Recent advancements in site investigation and sampling used for marine soil deposits [8Hrs]

UNIT IV

CO3

Foundations in marine soil deposits: Different offshore and nearshore foundations, Gravity platforms, Jack-up rigs, pile foundations. cassions, spudcans [8Hrs]

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

UNIT V

CO4

Numerical modeling of marine foundations subjected to wave loading: Numerical modeling of cyclic behavior of soils, empirical models, elastic-plastic models, FEM analysis of marine foundations subjected to wave loading [8Hrs]

Text Books:

S. No.	Title	Authors	Publisher
1	“Marine Geotechnics”	H. G. Poulos	Unwin Hyman Ltd
2	“Offshore Structures”	D. V. Reddy and M. Arockiasamy	R.E. Kreiger Pub and Co., 1991

Reference Books:

S.No.	Title	Authors	Publisher
1	Handbook of Marine Geotechnical Engineering	. D. Thomson and D. J. Beasley	US Navy, 2012
2	Marine Engineering	C Venkataramaiah	New Age International Publishers

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code: CE105724	Project appraisal and construction finance	L = 2	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
1. Importance of Time Value of Money in Construction Management Scenario 2. Economic evaluation of Govt. Projects., Benefit cost ratio 3. Preparation of Site Accounting statement. 4. Capital budgeting of Construction Project. 5. Depreciation, Performance statement of Company 6. Job cost Report of a Project 7. Understanding ROCE, EVA from the Finance Statement	1. Monthly Planning of Financing of a project. 2. Determine Benefit cost ratio. 3. Determine Economic life of the Equipment's. 4. Can prepare a Job cost report of running project. 5. Can estimate Return on Cost Employed (ROCE) and Economic Value Addition (EVA)

UNIT-I

CO-1

Project appraisal, government and private project evaluators, significance of social benefit cost analysis, commercial profitability, national economic profitability, measurement of direct and indirect benefit and costs. Calculation of benefit cost ratio. [8HRs]

UNIT-II

CO-2

Engineering economics - Time value of money, discounted cash flow, decision making among the alternatives, replacement analysis, break even analysis. [8HRs]

UNIT-III

CO-3

Project capital: Cash flow of a project, estimation of minimum capital required, internal rate of return (IRR), Multiple IRR, estimation of annualized cost. [8HRs]

UNIT-IV

CO-4

Depreciation : importance, classification, types – straight line, sum of year method, double rate declining [8HRs]

UNIT-V

CO-5

balance method Capital Budgeting: element of budgeting – men, materials, equipments, overhead, profits – preparation of capital budget. Performance statement: capital gearing ratio, shares, debentures, PBT, PAT, PBIT, Earning per share, preparation of company's performance statement, Inflation. [8HRs]

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

TEXT BOOKS :

S. No.	Title	Authors	Publisher
1)	I.M Pandey, Financial Management	Peurifoy, R.L., Ledbetter, W.B. and Schexnayder	Vikas Publishing house pvt ltd
2)	Principles of Construction Management	Roy Pilcher.	McGraw Hill

REFERENCE BOOKS :

S. No.	Title	Authors	Publisher
1)	Modern Construction Management	Frank Harris & Ronald McCaffer	Management Blackwell science
2)	Financial & Cost Accounting for Management	A.H. Taylor & H Shearing	Mac Donald & Evans Ltd, London 8th .

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code: CE105741	Safety in Construction	L = 2	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
1. To learn about techniques for ensuring safety in construction.	CO1: To be able to plan and handle issues related to safety in construction. CO2: To be able to plan safety for construction projects CO3: To be able to plan about construction safety tools CO4: To be able to plan and handle Special Safety practices CO5: To be able to plan about fire hazards and preventive methods.
2. To learn about planning safety for construction projects	
3. To learn about construction safety tools	
4. To learn about Special Safety practices for Modernization Project	
5. To learn about Planning for sequential operations and emergencies first aid, fire hazards and preventive methods.	

UNIT – I:

Construction Project: a brief outline project definition, elements, relation to safety, types of projects and safety hazards.

[8Hrs]

CO-1

UNIT - II:

Construction sites and safety Tools: Electrical, Pneumatic, Grinding, Hand tools. Machinery: Earth moving, Concrete Breaker, Carpenters, Transporting, Batching Plant and Concrete Mixer, Dumpers. Material Handling: Various materials and their effects, storing materials. Common Risks and Hazards

[7Hrs]

CO-2

UNIT - III:

Planning Safety for Construction Projects Safety Construction Safety, Legal Requirements, First-Aid, and Safety Clauses in contract, Safety Policy, Safety deposit, Safety Officer, Safety Committees, and Safety of Contractors

[7Hrs]

CO-3

UNIT – IV

Safety Practices Roads and bridges, tunneling, buildings, and structures, (excavation, blasting, consent, machinery, transportation, concrete structures, piling, deep foundations, compressed air, tunneling, dewatering, structural steel erection, floors, and walk opening, demolition, use of ladders, electrical works, welding and cutting, grinding and chipping, hoisting apparatus, A.C. Roofs.

[7Hrs]

CO-4

UNIT-V:

Modern project Special Safety practices for Modernization Project. Planning for sequential operations and emergencies first aid, fire hazards and preventive methods.

[7Hrs]

CO-5

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

TEXT BOOKS:

S. No.	Title	Authors	Publisher
1)	Construction Safety, Security and Loss Prevention	B. Fulman	Tata McGraw Hill

REFERENCE BOOKS:

S. No.	Title	Authors	Publisher
1)	Fundamental of Construction Safety	P.T. Armstrong	S.K.Kataria & Sons
2)	Construction Engineering and Management	S. Seetaram	Umesh Publication

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code CE105742	Construction equipment and techniques)	L = 2	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
Objective of the Subject: 1.To Learn the various construction equipment 2.To learn the equipment for production of concrete. 3.To learn Apply various sub structure construction techniques . 4.To learn super structure construction techniques .	CO1: Understand various construction equipment CO2: Explain the equipment for production of concrete CO3: Apply various sub structure construction techniques CO4: Understand super structure construction techniques CO5: Understand Repair Construction

UNIT – I

CO-1

Introduction

Equipment for excavating, dredging, trenching, tunneling, drilling, blasting-equipment for compaction-erection equipment- types of pumps used in construction-equipment for dewatering and grouting-foundation and pile driving equipment, forklifts and related equipment-portable material-conveyors-hauling equipment. [8Hrs]

UNIT - II

CO-2

Equipment for Production of Aggregate and Concreting

Crushers-Feeders-Screening Equipment-Handling Equipment-Batching and Mixing Equipment-Hauling, Pouring and Pumping Equipment-Transporters. [7Hrs]

UNIT-III

CO-3

Equipment Required for Maintenance and Rehabilitation

Mud jacking grout through slab foundation-micro piling for strengthening floor and shallow profile-pipeline laying protecting sheet piles, screw anchors-sub grade water proofing under pining advanced techniques and sequence in demolition and dismantling. [7Hrs]

UNIT - IV

CO-4

Sub Structure Construction Techniques

Jacking, under water construction of diaphragm walls and basement, tunneling techniques, piling techniques driving well and caisson-sinking cofferdam, cable anchoring and grouting-driving diaphragm walls, sheet piles-laying operations for built up offshore system-shoring for deep cutting-large reservoir, construction with membranes and Earth system-well points, Dewatering and stand by Plant equipment for underground open excavation, trenchless construction, trenchless pipe replacement (pipe bursting), pipe ramming & impact moles & axis guided boring system. [7Hrs]

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

UNIT - V

CO-5

Super Structure Construction Techniques

Planning of Cast in situ construction ready mixed, pumped, precast flat panel system, 3d volumetric construction, tunnel boring methods, slip form work, precast foundations, fabrication of pre cast and pre stressed components, reinforcing steel: types, bending, placing, splicing and spacing, tendons- soil improvement. **[7Hrs]**

TEXT BOOKS :

S. No.	Title	Authors	Publisher
1)	Construction Planning, Equipment and Methods	Peurifoy, R.L., Ledbetter, W.B. and Schexnayder	McGraw Hill
2)	Construction Equipment and Management	Sharma S.C.	Khanna Publishers

REFERENCE BOOKS :

S. No.	Title	Authors	Publisher
1)	Construction Equipment And Methods	Leonhard E Bernold	John Wiley
2)	Construction Equipment Management	John E. Schaufelberger	Taylor & Francis
3)	Construction Equipment and Management	S C Sharma	Khanna Publishers
4)	Construction Materials & Techniques	Dr.S.Kandasamy	M.V.V.Thirumuruga Poiyamozi

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code :	Expansive Soils	L = 3	T = 1	P = 0	Credits = 4
CE105743	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
• Be familiar with techniques for Expansive Soils of structures. • Be familiar with the various types of properties of soils. • Learning Code provisions for foundation. • Be familiar with and learn about techniques related to construction in expansive soils. • Be familiar with the factor affecting on the Soils.	CO-1: Able to plan and handle issues related to construction in expansive soils. CO 2: Able to check the property of soils. CO 3: Able to understand the various types of tools and Equipments for identification of soil. CO 4: Able to apply various types of safety & techniques in construction in expansive soils. CO5: Able to know the factor affecting the soil for construction in expansive soils.

UNIT-I: Introduction and Identification

CO1

Expansive Soils of India, related civil engineering problems, formation of expansive soils in field, identification of expansive solids in laboratory by X-ray diffraction method and differential thermal analysis.

[8Hrs]

UNIT – II : Physical and Chemical Properties

CO2

Soil structure and clay mineralogy of expansive soil, atomic bond and molecular bonds, honey comb structure, base exchanges capacity, clay water relation, electrolysis processes.

[8Hrs]

UNIT – III: Foundation on Black Cotton Soil

CO3

Foundations on swelling soils, swelling potential and mechanism of volume change, chemical composition of black cotton soil, construction techniques in black cotton soil, modern method of construction in under reamed coil.

[8Hrs]

UNIT – IV: Ground Improvement Techniques

CO4

Stabilization of expansive soils with lime, slag (silica fume and aluminium sludge), cement, fly ash, chemicals, reinforced earth technique, micro reinforced vegetation, vibro floatation,

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

grouting and soil nailing.
[8Hrs]

UNIT – V: Liquefaction Hazard Mitigation

CO5

Factors affecting the expansive soil, method of assessment for liquefaction, effect instrumentation for monitoring, consolidation of marine clay deposits, expansive soil model of Bingham fluid bounded by porous beds.
[8Hrs]

Text Books:

S. No.	Title	Authors	Publisher
1	Design Aids in Soil Mechanics and Foundation Engineering	S.R. Kaniraj	Tata McGraw Hill Publications
2.	Foundation Engineering	Dr. B.J. Kasmalkar	Pune Vidyarthi Griha Prakashan

Reference Books:

S.No.	Title	Authors	Publisher
1	Basic and applied Soil Mechanics	Gopal Rajan and Rao A.S.R	New Age Publications
2.	Foundation Engineering	Peck, R.B., Hanson	W.E. and Thornburn. W.H. Johan Wiley, New York 1976

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code:	Transportation Planning and Management	L = 3	T = 1	P = 0	Credits = 4
CE105744	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
• Be familiar and learn about techniques related to transportation planning and management. • Be familiar with the various types of symbol used in transportation planning and management. • Learning Code provisions for transportation planning. • Be familiar with Various stages of inspection and control measures • Be familiar with various types of plans and cost estimation.	CO-1. Able to plan and handle issues related with transport planning and management. CO 2: Able to plan and manage the transport planning. CO 3: Able to understand the various types of tools and Equipments for transport planning. CO 4: Able to apply various types of safety & quality Control in transport planning and management. CO 5: Able to understand and evaluate the various types Of economic cost for transportation planning.

UNIT- I: Introduction

CO1

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: Trip Generation Analysis

CO2

Trip classification, multiple regression analysis, trip rate analysis, category analysis. [8Hrs]

UNIT–III: Trip Distribution Analysis

CO3

Methods of trip distribution, uniform factor method, average factor method, frator method, furness method, limitations of growth factor methods, elementary gravity model. [8Hrs]

UNIT–IV Model Choice Analysis

CO4

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

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. [8Hrs]

Assignment: Basic concepts, traffic assignment methods, all-or-nothing assignment, multiple route assignment, capacity restraint assignment, diversion curves. [8Hrs]

UNIT – V : Economic Evaluation of Transport Plans

CO5

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. [8Hrs]

Text Books:

S. No.	Title	Authors	Publisher
1.	Traffic Engineering and Transport Planning	– Kadiyali, L.R.	Khanna Publisher
2.	Transport Planning and Traffic Engineering	Flaherty, CAO	John Wiley & Sons Publisher

Reference Books:

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

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code CE105745	DISASTER MANAGEMENT	L = 2	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
1. To introduce disaster, its nature and types. 2. To understand disaster zoning and hazard assessment. 3. To know about the disaster mitigation and preparedness. 4. To understand management during disaster and construction technology for its mitigation. 5. To identify relief measures.	CO1: Students are expected to understand disaster and its nature. CO2: Students are expected to understand impact and hazard assessment. CO3: Students are expected to understand disaster preparedness and mitigation. CO4: Students are expected to understand use of construction technology for disaster management. CO5: Students are expected to identify short term and long term relief measures.

UNIT – I:

CO-1

Construction Equipment's: Introduction:- Fundamentals of earthwork operations - Earth moving operations -Types of Earthwork Equipment-Tractors, Motor Graders, Scrapers, Front end waders, Earth Movers. Equipment for Dredging, Trenching, Tunneling, Drilling, Blasting- Equipment for compaction-Erection Equipment. Types of pumps used in construction - Equipment for Dewatering and Grouting -Foundation and Pile Driving Equipment. Forklifts and Related Equipment - Portable Material Bins – Conveyors - Hauling Equipment. **[8Hrs]**

UNIT - II

CO-2

Equipment for Production of Aggregate and Concreting: Crushers-Feeders-Screening Equipment- Handling Equipment-Batching and Mixing Equipment-Hauling, Pouring and Pumping Equipment- Transporters. **[7Hrs]**

UNIT - III:

CO-3

Sub-structure Construction Techniques: Box jacking -Pipe Jacking-Under Water Construction of diaphragm walls and basement -Tunneling techniques piling techniques driving well and caisson-sinking cofferdam-cable anchoring and grouting-driving diaphragm walls, sheet piles-laying operations for built up offshore system-shoring for deep cutting-Large reservoir, construction with membranes and Earth system-well points-Dewatering and stand by Plant equipment for underground open excavation. **[7Hrs]**

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

UNIT - IV

CO-4

Super Structure Construction: Vacuum Dewatering of concrete flooring-Concrete paving technology-Techniques of construction for continuous concreting operation in Tall buildings of various shapes and Varying sections-Launching Techniques-Suspended from work-erection techniques of tall structures, Large span structures-Launching techniques for heavy decks in situ prestressing in high rise structures, aerial transporting handling erecting light weight components on tall structures-erection of lattice tower as and rigging of transmission line structures.

[7Hrs]

UNIT-V

CO-5

Repair Construction: Mud jacking grout through slab foundation-micropiling for strengthening floor and shallow profile-pipeline laying protecting sheet piles, screw anchors-sub grade water proofing under pining advanced techniques and sequence in demolition and dismantling.

[7Hrs]

TEXT BOOKS :

S. No.	Title	Authors	Publisher
1)	Manual on Disaster Management	National Disaster Management	Agency Govt of India
2)	Disaster Science and Management	T. Bhattacharya	McGraw Hill Education (India) Pvt Ltd Wiley
3)	Disaster Management	Mrinalini Pandey	Wiley

REFERENCE BOOKS :

S. No.	Title	Authors	Publisher
1)	Earth and Atmospheric Disasters Management	N. Pandharinath, CK Rajan	BS Publications
2)	National Disaster Management Plan	Ministry of Home affairs	Government of India (http://www.ndma.gov.in/images/policyplan/dmplan/draftndmp.pdf)

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code CE105742	Construction equipment and techniques)	L = 2	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
Objective of the Subject: 1.To Learn the various construction equipment 2.To learn the equipment for production of concrete. 3.To learn Apply various sub structure construction techniques . 4.To learn super structure construction techniques .	CO1: Understand various construction equipment CO2: Explain the equipment for production of concrete CO3: Apply various sub structure construction techniques CO4: Understand super structure construction techniques CO5: Understand Repair Construction

UNIT – I: Construction Equipment's: CO-1

Introduction:- - Fundamentals of earthwork operations - Earth moving operations -Types of Earthwork Equipment-Tractors, Motor Graders, Scrapers, Front end waders, Earth Movers. Equipment for Dredging, Trenching, Tunneling, Drilling, Blasting-Equipment for compaction-Erection Equipment. Types of pumps used in construction - Equipment for Dewatering and Grouting -Foundation and Pile Driving Equipment. Forklifts and Related Equipment - Portable Material Bins – Conveyors - Hauling Equipment.

[8Hrs]

UNIT - II

CO-2

Equipment for Production of Aggregate and Concreting: Crushers-Feeders-Screening Equipment-Handling Equipment-Batching and Mixing Equipment-Hauling, Pouring and Pumping Equipment-Transporters. **[7Hrs]**

UNIT - III:

CO-3

Sub-structure Construction Techniques: Box jacking -Pipe Jacking-Under Water Construction of diaphragm walls and basement -Tunneling techniques piling techniques driving well and caisson-sinking cofferdam-cable anchoring and grouting-driving diaphragm walls, sheet piles-laying operations for built up offshore system-shoring for deep cutting-Large reservoir, construction with membranes and Earth system-well points-Dewatering and stand by Plant equipment for underground open excavation. **[7Hrs]**

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

UNIT - IV

CO-4

Super Structure Construction: Vacuum Dewatering of concrete flooring-Concrete paving technology-Techniques of construction for continuous concreting operation in Tall buildings of various shapes and Varying sections-Launching Techniques-Suspended from work-erection

techniques of tall structures, Large span structures-Launching techniques for heavy decks in situ prestressing in high rise structures, aerial transporting handling erecting light weight components on tall structures-erection of lattice tower as and rigging of transmission line structures.

[7Hrs]

UNIT-V

CO-5

Repair Construction: Mud jacking grout through slab foundation-micropiling for strengthening floor and shallow profile-pipeline laying protecting sheet piles, screw anchors-sub grade water proofing under pining advanced techniques and sequence in demolition and dismantling.

[7Hrs]

TEXT BOOKS :

S. No.	Title	Authors	Edition	Publisher
1)	Construction Planning, Equipment and Methods	Peurifoy, R.L., Ledbetter, W.B. and Schexnayder	5 th	McGraw Hill
2)	Construction Equipment and Management	Sharma S.C.	2nd	Khanna Publishers

REFERENCE BOOKS :

S. No.	Title	Authors	Edition	Publisher
1)	Construction Equipment And Methods	Leonhard E Bernold		John Wiley
2)	Construction Equipment Management	John E. Schaufelberger	2 nd	Taylor & Francis
3)	Construction Equipment and Management	S C Sharma		Khanna Publishers
4)	Construction Materials & Techniques	Dr.S.Kandasamy		M.V.V.Thirumuruga Poiyamozhi

Chairman (AC)	Chairman (BoS)	October 2023 Date of Release	1.00 Version	Applicable for AY 2023-24 Onwards
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SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code CE101792	Quantity Surveying and Cost Evaluation 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. Estimating cost of a proposed building on Plinth area method, Volume area method.
2. Calculation of wall area in a building by measuring floor area for ordinary building and framed structure.
3. Preparation of approximate estimate for road projects.
4. Preparation of detailed estimate of a building.
5. Analysis of rates: Concrete work, Brick work.
6. Analysis of rates: Plaster, Flooring.
7. Estimation of quantity of reinforcement and preparing bar bending schedule from a working and drawing for a building.
8. Rate analysis: R.C.C. items, Masonry work, Plastering, Road work.
9. Determination of present value of a building valuation.
10. Development method of valuation of plots in a locality.
11. Valuation by software.
12. Quantity estimate by estimation software.

Equipment/Machines/Instruments/Tools/Software Required:

1. List of Equipments – Not Required.

Recommended Books:

S. No	Title	Authors	Edition	Publisher
1	Estimating and Costing	Rangawala		(Charotar Publications).
2	Estimating and Costing	Dutta B.N.		(UBS Publishers & Distributors).

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	



SHRI SHANKARACHARYA TECHNICAL CAMPUS BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai) **Scheme of Examination and Syllabus**

Fourth Year B. Tech. Civil Engineering 7th semester

Subject Code CE101791	Advanced Environmental Engineering Lab	L = 2	T = 1	P = 2	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	50	00	30	50	8 Hours

Experiments to be performed (Perform any 10 experiments)

1. Determination of Fluoride content in Sewage / Industrial wastewater.
2. Determination of Nitrates in Sewage / Industrial wastewater.
3. Determination of Phosphates in Sewage / Industrial wastewater.
4. Determination of Iron in Sewage / Industrial wastewater.
5. Microbiological Examination of Sewage / Industrial wastewater.
6. Determination of MPN.
7. Determination of basic parameters of sewage characteristic.
8. Determination of basic parameters and report Making on Textile Industry W/W.
9. Determination of basic parameters and report Making on Sugar Industry W/W.
10. Study of determination of particulates in air.
11. Study of Collection of particulate matter using Air sampler.
12. Study of air quality (SPM, Temperature).
13. Study of air samples for metals (using AA spectrometer).

List of Equipments / Machine Required:

1. BOD Incubar
2. Turbidity meter
3. Microscope
4. pH meter
5. Muffle Furnace
6. Hot Air Oven
7. Jar Test Apparatus
8. Spectrophotometer Text and

Reference Books:

1. Environmental Engineering Lab Manual – Dr. B. Kottaiah & N. Kumaraswamy (Charotar Publications).
2. Environmental Science and Engineering – Henry and Heinke (Pearson Education).
3. Waste Water Engineering – Metcalf Eddy (Tata McGraw Hill, New Delhi).
4. Introduction to Environmental Engineering and Science – Masters, G.M. (Prentice Hall of India Pvt. Ltd., 1991).

		October 2023	1.00	Applicable for AY 2023-24 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	