

BE SCHEME & SYLLABUS

FOURTH YEAR (VII and VIII Semester)

With effect from 2022-23



Civil Engineering



ST JOSEPH ENGINEERING COLLEGE

AN AUTONOMOUS INSTITUTION

Vamanjoor, Mangaluru - 575028

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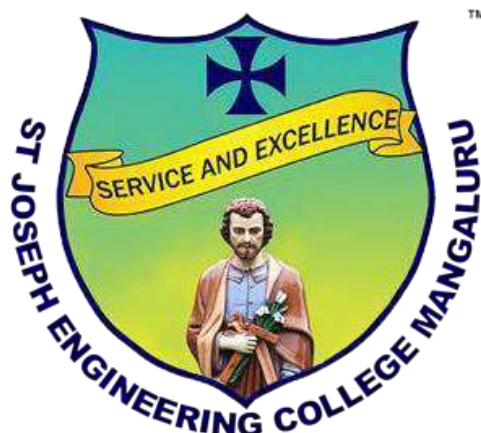
Service & Excellence

VISION

To be a global premier Institution of professional education and research.

MISSION

- Provide opportunities to deserving students of all communities, the Christian students in particular for quality professional education.
- Design and deliver curricula to meet the national and global changing needs through student-centric learning methodologies.
- Attract, nurture and retain the best faculty and technical manpower.
- Consolidate the state-of-art infrastructure and equipment for teaching and research activities.
- Promote all round personality development of the students through interaction with alumni, academia and industry.
- Strengthen the Educational Social Responsibilities (ESR) of the institution.



ST JOSEPH ENGINEERING COLLEGE

An Autonomous Institution Vamanjoor, Mangaluru - 575028

Affiliated to VTU – Belagavi & Recognized by AICTE New Delhi
NBA – Accredited: B.E. (ECE, EEE, ME and CIV) & PG (MBA and MCA)
NAAC – Accredited with A+

B.E. SCHEME & SYLLABUS

(With effect from 2022-23)

Civil Engineering

FOURTH YEAR

(VII and VIII Semester)

AUTONOMY AND ACCREDITATION

St Joseph Engineering College (SJEC) is an Autonomous Institute under Visvesvaraya Technological University (VTU), Belagavi, Karnataka State, and is recognized by the All-India Council for Technical Education (AICTE), New Delhi. SJEC is registered under the trust “Diocese of Mangalore, Social Action Department”.

The SJEC has been conferred Fresh Autonomous Status from the Academic Year 2021-22. The college was granted autonomy by the University Grants Commission (UGC) under the UGC Scheme for Autonomous Colleges 2018 and conferred by VTU. The UGC Expert Team visited the college on 28-29 November 2021 and rigorously assessed the college on multiple parameters. The fact that only a handful of engineering colleges in the state have attained Autonomous Status adds to the college’s credibility that has been on a constant upswing. Autonomy will make it convenient for the college to design curricula by recognizing the needs of the industry, offering elective courses of choice and conducting the continuous assessment of its students.

At SJEC, the Outcome-Based Education (OBE) system has been implemented since 2011. Owing to OBE practiced at the college, SJEC has already been accredited by the National Board of Accreditation (NBA). Four of the UG programs, namely Mechanical Engineering, Electronics and Communication Engineering, Electrical & Electronics Engineering and Civil Engineering and two of the PG programs, namely MBA and MCA programs, have accreditation from the NBA.

Also, SJEC has been awarded the prestigious A+ grade by the National Assessment and Accreditation Council (NAAC) for five years. With a Cumulative Grade Point Average (CGPA) of 3.39 on a 4-point scale, SJEC has joined the elite list of colleges accredited with an A+ grade by NAAC in its first cycle. The fact that only a small percentage of the Higher Education Institutions in India have bagged A+ or higher grades by NAAC adds to the college’s credibility that has been on a constant upswing.

The college is committed to offering quality education to all its students, and the accreditation by NAAC and NBA reassures this fact. True to its motto of “Service and Excellence”, the college’s hard work has resulted in getting this recognition, which has endorsed the academic framework and policies that the college has been practicing since its inception. The college has been leveraging a flexible choice-based academic model that gives students the freedom to undergo learning in respective disciplines and a transparent and continuous evaluation process that helps in their holistic development.

CONTENTS

Sl No	SUBJECTS	Page No
1	Department Vision, Mission, Program Educational Objectives (PEOs)	4
2	Program Outcomes POs and Program Specific Outcomes PSOs	5
3	Scheme – VII Semester Civil Engineering	6
4	Scheme – VIII Semester Civil Engineering	7
	VII Semester	
5	22CIV71 - Quantity Surveying and Contract Management	9
6	22CIV72 - Advanced Design of Structures	12
7	22CIV73 - Prestressed Concrete Structures	14
8	22CIV741- Ground Improvement Techniques	16
9	22CIV742 - Road Safety Engineering	19
10	22CIV743 - Conservation of Natural Resources	21
11	22CIV744 - Sustainability Concepts in Engineering	23
12	22CIV75 – Major Project Phase - II	25
	VIII Semester	
13	22CIV81- Professional Elective IV (Online Course)	29
14	22CIV82 - Open Elective -II (Online Course)	32
15	22CIV83 - Research / Industry Internship (14 to 16 weeks)	35

ABOUT THE DEPARTMENT

A vibrant Department, established in 2012, aims at contributing graduate engineers equipped for careers in the public and private sectors. The Department is NBA accredited and has got a highly qualified team of faculty members having rich experience within academia and industry. Spacious and well – equipped state-of-the-art-laboratories and computing facilities are the mainstays of the Department. Frequent visits by guest faculty and professionals from academia and industry help in sharing their valuable experiences and keeping students abreast of the latest advancements. The Department also offers consultancy and testing services catering to the needs of the public in and around Mangaluru.

DEPARTMENT VISION

To impart technical education and nurture research in Civil Engineering to meet the needs of society.

DEPARTMENT MISSION

- Deliver curricula for students to meet the local, national and global demands of industry, society and research.
- Strengthening the skills of students through interaction with industry.
- Promote research and consultancy in all aspects of Civil engineering.
- Provide skilled training in emerging aspects of design and construction.
- Develop in students and staff the spirit of innovation and professional ethics.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PE0 1: To impart to students in depth knowledge of Civil Engineering subjects to solve practical problems using modern techniques.

PE0 2: To develop in students the ability to plan, analyze, design and construct structures from the foundation to the superstructure level with cost-effective design methods.

PE0 3: To develop in students the ability for successful careers as entrepreneurs and to pursue research.

PE0 4: To enable students to identify issues related to the environment and find suitable solutions.

PE0 5: To train students to understand the ethical responsibility of Civil Engineering profession and apply relevant code for engineering practice while delivering service to the nation.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

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

PROGRAM SPECIFIC OUTCOMES (PSOs)

Graduates of the Civil Engineering program are able to

- PSO1:** Explore domain knowledge in order to solve real-time field challenges, and to pursue research in novel areas of Civil Engineering.
- PSO2:** Qualify in the competitive examinations and succeed in obtaining opportunities in the public and private sectors.

VII Semester (B.E. - CIVIL Engineering)													
Sl. No.	Course and Course Code		Course Title	Teaching Department	Paper Setting Board	Teaching Hours/Week			Examination				Credits
						Theory Lecture	Tutorial	Practical	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	IPCC	22CIV71	Quantity Surveying and Contract Management	CIV	CIV	3	-	2	03	50	50	100	4
2	IPCC	22CIV72	Advanced Design of Structures	CIV	CIV	3	-	2	03	50	50	100	4
3	PCC	22CIV73	Prestressed Concrete Structures	CIV	CIV	3	-	-	03	50	50	100	3
4	PEC	22CIV74X	Professional Elective -III	CIV	CIV	3	-	-	03	50	50	100	3
5	PRJ	22CIV75	Major Project - Phase II	CIV	CIV	-	-	6	03	50	50	100	6
Total						12	-	10	15	250	250	500	20

22CIV74X: Professional Elective III			
22CIV741	Ground Improvement Techniques	22CIV743	Conservation of Natural Resources
22CIV742	Road Safety Engineering	22CIV744	Sustainability Concepts in Engineering

VIII Semester (B.E. - Civil Engineering)													
SI. No.	Course and Course Code		Course Title	Teaching Department	Paper Setting Board	Teaching Hours/Week			Examination				Credits
						Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	PEC	22CIV81	Professional Elective IV (Online Course)	Any MOOC topic (Choices are given by respective Department) with minimum 12 weeks to be completed before the end of 8 th semester.							100	3	
2	OEC	22CIV82	Open Elective -II (Online Course)	Any MOOC topic (Choices are given by respective Department) with minimum 12 weeks to be completed before the end of 8 th semester.							100	3	
3	INT	22CIV83	Research / Industry Internship (14 to 16 weeks)			-	-	-	03	100	100	200	10
Total						-	-	-	03	100	100	400	16

Note: a. Professional Elective IV: These are ONLINE courses suggested by the Board of Studies (Department).

b. Open Elective -II: These are ONLINE courses suggested by the Board of Studies (Department).

c. During 4th year of the program i.e., after VII semester, students shall take up the **Research Internship /Industrial Internship for 14-16 weeks**. Research/Industrial Internship shall be carried out at an Industry, NGO, MSME, Innovation centre, Incubation centre, Start-up, Centre of Excellence (CoE), Study Centre established in the parent institute and /or at reputed research organizations/institutes.

VII Semester

QUANTITY SURVEYING AND CONTRACT MANAGEMENT			
Course Code	22CIV71	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P)	3:0:2	SEE	3 Hours
Total Hours	40 hours Theory +10 hours practical	Credits	04
Course Learning Objectives: The objective of the course is to • Estimate the quantities of different items of work by using Centre line method and Long wall and Short wall method to know the approximate construction cost of buildings. • Able to read and understand the specifications. To carry out bar bending schedule and calculate the quantity of steel for RCC structures. Estimate the quantities of items of work and cost of manhole, septic tank, and RCC culvert. • Should know the rates of materials and able to analyze the rates of different items of work of buildings. • To know the contract and tendering systems from the point of contractor's interest to avoid conflicts between client and contractors. • To apply the concept of Valuation for Properties			
Module-1 Quantity Estimation for Building (8 hours)			
Different type of estimates, study of various drawing attached with estimates, important terms, units of measurements, abstract, approximate methods of estimating buildings, cost from materials and labour, equations recommended by CBRI-examples. Building estimate: Methods of taking out quantities and cost, center line method, long and short wall method or crossing method, preparation of detailed and abstract estimates for the basic masonry structures. Road, canal, RCC slab culverts, manhole and septic tanks.			
Module-2 Specifications (8 hours)			
Specification: Objective of writing specifications, essentials in specifications, general and detailed specifications of item of works in buildings, specifications of aluminum and wooden partitions, false ceiling, aluminum and fiber doors and windows, various types of claddings.			
Module-3 Rate Analysis (8 hours)			
Working out quantities and rates for following standard items of work - earth work in different types of soils, cement concrete of different mixes, bricks and stone masonry, flooring, plastering, RCC works, centering and form work for different RCC items, wood and steel works for doors, windows and ventilators.			
Module-4 Contract Management-Pre - Process (8 hours)			
Types of contracts, essentials of contract agreement-legal aspects, penal provisions on breach of contract, Definition of the terms: tender, earnest money deposit, security deposit, tender forms. Process- Administrative approval & Technical sanction, Invitation to tender, Prequalification, Bid submission, evaluation and negotiation process. Contract Formulation: Letter of intent, letter of acceptance, signing/award of contract and notice to proceed. Features / elements of standard Tender document (source: PWD / CPWD / International Competitive Bidding – NHAI / NHEPC / NPC). Law of Contract as per Indian contract act 1872, Types of Contracts, Joint venture. Contract Forms: FIDIC contract Forms, CPWD, NHAI, NTPC, NHEPC.			
Module-5 Contract Management-Post award (8 hours)			
Essentials of contract agreement-legal aspects, penal provisions on breach of contract Termination of contract, completion certificate, quality control, right of contractor, refund of deposit, administrative approval, technical sanction, nominal muster roll, measurements-preparation of			

bills. Documents and types, comparative statements, acceptance of contract documents and issue of work orders, duties and liabilities Tenders – TTT Act – e-tender –Document – Contracts – Drafting of contract documents – Arbitration and legal requirements.

Valuation: Definitions of terms used in valuation process, Purpose of valuation, Cost, Estimate, Value and its relationship, Capitalized value. Freehold and lease hold and easement, Sinking fund, depreciation–methods of estimating depreciation, Outgoings, Process and methods of valuation: Rent fixation, valuation for mortgage, valuation of land.

PRACTICALMODULE

Quantity calculation using Software.

- Building project
- Road project
- Valuation of Property

Course Outcomes: At the end of the course, the student will be able to:	
22CIV71.1	Arrive approximate quantities of different items of work and cost of buildings.
22CIV71.2	Write the different specifications of items of work of buildings. Able to prepare the schedule of bar and arrive quantity of steel.
22CIV71.3	Calculate the quantities of dry materials and analyze the rates of different items of work by using rates of dry materials.
22CIV71.4	Interpret contract and tender documents of domestic and international construction works
22CIV71.5	To study the tender process and other legal aspects
22CIV71.6	Evaluate immovable assets and properties of public and private buildings

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textbooks				
1	Estimating, Costing, specification and valuation in Civil Engineering	N. Chakraborti	Charotar Publishing House Pvt. Ltd.,	17 th Edition 2014
2	Estimating & specification	Dutta.B.N	UBS publishers and distributors, New Delhi	19 th Edition , 2018
3	Estimating, Costing and Valuation, Charotar Publishing House Pvt. Ltd., 2015.	Rangwala, C.	Charotar Publishing House Pvt. Ltd., 2015.	28 th Edition, 2015
Reference Books				
1	Estimating & specification	Rangwala.S.C	Charotar Publishing House Anand	2014
2	Text book of Estimating & Costing	Birde.G.S	Dhanpath Rai and Sons, New Delhi	2014
3	A text book of Estimating, Costing and Accounts	Kohli D.D. and Kohli R.C	Chand Co., New Delhi.	2004

4	Estimating and Tendering for construction work	Martin Brook	Butter worth-Heinemann Ltd, Oxford	2008
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Web links and Video Lectures (e-Resources):

- <http://nptel.ac.in/courses/105103093/14>

Course Articulation Matrix

Course Outcomes (COs)	Program Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
22CIV71.1	-	2	-	-	-	2	-	1	-	-	-	-	-	-
22CIV71.2	-	2	-	-	-	2	-	1	-	-	-	2	-	-
22CIV71.3	-	-	-	-		2	-	-	-	-	1	-	-	-
22CIV71.4	-	2	-	-	-	-	-	1	-	-	-	2	-	-
22CIV71.5	-	2	-	-	-	-	-	1	-	-	-	-	-	-
22CIV71.6		2						2				2		

1: Low 2: Medium 3: High

Advanced Design of Structures			
Course Code	22CIV72	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P)	3:0:2	SEE	3 Hours
Total Hours	40 Hours	Credits	04
Course Learning Objectives: The objective of the course is to • Provide basic knowledge in the areas of limit state method and concept of design of RC and Steel structures. • Identify, formulate and solve engineering problems in RC and Steel Structures. • Give procedural knowledge to design a system, component or process as per needs and specifications of RC Structures like Retaining wall, Footing, Water tanks, Portal Frames and Steel Structures like Roof Truss, Plate Girder and Gantry Girder. • Imbibe the culture of professional and ethical responsibilities by following codal provisions in the analysis, design of RC and Steel Structures. • Provide factual knowledge on analysis and design of RC Structural elements.			
Module-1 Advanced Concrete Structures (20 hours)			
Footings: Design of rectangular slab type combined footing. Retaining Walls: Design of cantilever Retaining wall and counter fort retaining wall. Portal frames: Design of portal frame with fixed and hinged based supports. Self-Learning: Water Tanks: Design of circular water tanks resting on ground (Rigid and Flexible base). Design of rectangular water tanks resting on ground. As per IS: 3370 (Part IV)			
Module-2 Advanced Steel Structures (20 hours)			
Plate Girder: Design of welded plate girder with intermediate stiffener, bearing stiffener and necessary checks. Gantry Girder: Design of gantry girder with all necessary checks.			
PRACTICALMODULE Manual Detailing and using 2D Software. • Slab type combined footing. • Retaining walls. • Portal frames. • Plate Girder. • Gantry Girder.			

Course Outcomes: At the end of the course the student will be able to:	
22CIV72.1	Design of combined footing as per IS standards
22CIV72.2	Make use of the codal provisions to calculate steel required for retaining wall.
22CIV72.3	Estimate the reinforcement required for water tank as per IS standards.
22CIV72.4	Design of gantry girder as per IS standards.
22CIV72.5	Design of welded plate girder as per IS standards.
22CIV72.6	Preparing of execution drawings by using industry standard software.

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textbooks				
1	Structural Design and Drawing of Reinforced Concrete and Steel	N Krishna Raju	University Press	4th Edition 2022
2	Design of Steel Structures	S K Duggal	Tata McGraw Hill, New Delhi	3 rd Edition 2019
3	Design of Steel Structures	Subramanian N	Oxford university Press, New Delhi	2 nd Edition 2017
Reference Books				
1	Steel Structure Design and Behaviour	Charles E Salman, Johnson & Mathas	Pearson Publications	2 nd Edition 2006
2	The Behaviour and Design of Steel Structures to EC3	Nick Trahair, et.al	CRC Press	4 th edition, 2008
3	Limit State Design of Reinforced Concrete	P C Varghese	PHI Publications, New Delhi	2 nd Edition, 2008
4	Reinforced Concrete Design	S N Sinha	McGraw Hill Publication	3 rd Edition, 2014
5	Code books – IS 456, IS 800, IS 3370 (Part IV), SP-16, SP (6) – Steel Tables, shall be referred for designing. The same will be provided during examination			

Web links and Video Lectures (e-Resources):

- Design of steel structures <http://www.nptelvideos.in/2012/11/design-of-steel-structures.html>
- Worked out Example for Gantry Girder <http://nptel.ac.in/courses/105105162/>

Course Articulation Matrix

Course Outcomes (COs)	Program Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
22CIV72.1		2	2		3		2						1	
22CIV72.2		3	2				2						1	
22CIV72.3		3	2				2						1	
22CIV72.4		2	2				2						1	
22CIV72.5		2	2				2						1	
22CIV72.6					3		2						1	

1: Low 2: Medium 3: High

PRE-STRESSED CONCRETE STRUCTURES			
Course Code	22CIV73	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P)	3:0:0	SEE	3 Hours
Total Hours	40 hours	Credits	03
Course Learning Objectives: The objective of the course is to • Understand the concept, materials and types of pre-stressing. • Analyze the member due to stress and losses in concrete under various loading conditions. • Interpret deflections in a pre-stressed concrete member. • Analyze the section for flexure, shear for pre-stressed concrete member. • Design end blocks as per limit state method			
Module-1 Introduction and Analysis of Members (8 hours)			
Concept of Pre-stressing - Types of Pre stressing - Advantages - Limitations – Pre stressing systems - Anchoring devices - Materials - Mechanical Properties of high strength concrete - high strength steel -Stress-Strain curve for High strength concrete. Pre-tensioning of slabs (Theory only) Analysis of members at transfer - Stress concept - Comparison of behavior of reinforced concrete & prestressed concrete - Force concept - Load balancing concept - Kern point - Pressure line – Centre of thrust, cable profiles Applications: Manufacturing of Pre-tensioned and Post-tensioned members, Evaluation of stresses, Anchoring devices			
Module-2 Losses in Pre-Stress and Deflection Evaluation (8 hours)			
Losses in Prestress: Loss of Pre stress due to Elastic shortening, Friction, Anchorage slip, Creep of concrete, Shrinkage of concrete and Relaxation of steel - Total Loss, Determination of jacking force. Deflections in Prestressed Concrete Beams: Deflection due to gravity loads - Deflection due to prestressing force - Total deflection - Limits of deflection - Limits of span-to-effective depth ratio - Effect of creep on deflection - Load verses deflection curve - Methods of reducing deflection, Calculation of Crack Width - Limits of crack width, Control of cracking. Applications: Evaluation of Jacking force or Design force, Evaluation of Serviceability criteria in the design of long span girders for gravity loads in prestressed concrete structures			
Module-3 Analysis and Design for Flexure (8 hours)			
Analysis of members at ultimate strength - Preliminary Design - Final Design for Type 1 members. Applications: Evaluation of ultimate strength of rectangular and T section, Design of tension free girders Software application: Analysis of PSC beams in ETABS			
Module-4 Design for Shear (8 hours)			
Analysis for shear - Components of shear resistance - Modes of Failure - Limit State of collapse for shear - Design of transverse reinforcement Applications: To evaluate different types of failures in beams, evaluate ultimate shear carrying capacity of the beam.			
Module-5 Anchorage Systems and End Block (8 hours)			
Different anchorage systems, Transmission of prestress in post-tensioned members, Transmission length, Anchorage stress in post-tensioned members. Stresses in end blocks - Bearing stress and bursting tensile force - Methods and design of end block by latest IS codes. PSC structural elements (pipes, beams, and slabs). Applications: Design of anchorage systems Self-learning: Design of Type 1 post tensioned beams for flexure, shear with End Block. AI Application: Introduction on predicting flexural capacity of PSC beams using AI tool (Additional Activity)			

Course Outcomes: At the end of the course the student will be able to:	
22CIV73.1	Describe the materials and basic properties of prestressed concrete structures.
22CIV73.2	Analyze the concrete members at transfer of prestress by using different concepts.
22CIV73.3	Describe and estimate the Immediate and Time dependent losses in prestressed concrete structures as current code recommendation.
22CIV73.4	Evaluate the short term and long-term deflections in the pre stressed concrete structures for safety.
22CIV73.5	Analyze the flexural and shear behavior of simple prestressed concrete structures.
22CIV73.6	Interpret different Anchorage systems and design of end blocks.

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textbooks				
1	Pre stressed Concrete	Krishna Raju N	Tata McGraw Hill Publishing Company, New Delhi	5 th Edition, 2014
2	Pre stressed Concrete	Rajagopalan N	Narosa Publishing House, New Delhi	2 nd Edition ,2013
Reference Books				
1	Fundamentals of Prestressed Concrete	Sinha N C;Roy S K	S.Chand and Co	2011
2	Design of Prestressed Concrete Structures	Lin T Y;Burns Ned H	Wiley India	3 rd Edition,2010
3	Prestressed Concrete Structures	Dayaratnam Pasala	Oxford and IBH	5 th Edition,2024
4	IS: 1343: Indian Standard code of practice for Pre stressed concrete, BIS, New Delhi			

Web links and Video Lectures (e-Resources):

- Design of Pre stressed Concrete Structures- <http://nptel.ac.in/courses/105106118/>

Course Articulation Matrix

Course Outcomes (COs)	Program Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
22CIV73.1	2	3												2
22CIV73.2	2	3												2
22CIV73.3	2	3												2
22CIV73.4		3	2		2									
22CIV73.5			2					2						
22CIV73.6			2					2						

1: Low 2: Medium 3: High

Ground Improvement Techniques			
Course Code	22CIV741	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P)	3:0:0	SEE	3 Hours
Total Hours	40 hours Theory	Credits	03
Course Learning Objectives: This course will enable students ➤ Understand the fundamental concepts and need for ground improvement techniques in geotechnical engineering. ➤ Explain the principles and methods of soil compaction, including field and laboratory practices. ➤ Describe hydraulic modification techniques such as dewatering, drainage, and preloading for improving soil behaviour. ➤ Analyze the role of chemical admixtures and grouting methods in stabilizing weak soils. ➤ Examine the principles, materials, and applications of soil reinforcement techniques for enhancing ground performance.			
Module-1 Introduction (08 Hours)			
Formation and Development of Ground: Introduction, Formation of Rock, soil and soil profile, Soil distribution in India, Alterations of ground after formation, Reclaimed soils, Natural offshore deposits; Ground Improvement Potential Hazardous ground conditions, poor ground conditions, favorable ground conditions, Alternative Approaches, Geotechnical processes. Compaction: Introduction, compaction mechanics, Field procedure, surface compaction, Dynamic Compaction, selection of field compaction procedures, compaction quality control, Shallow surface compaction-Rollers operational aspects. Deep Compaction Explosion- heavy tamping- vibro-compaction and vibro replacement. Properties of compacted soil, Compaction control tests.			
Module-2 Drainage and Dewatering (08 Hours)			
Drainage Methods: Introduction, Seepage, filter requirements, ground water and seepage control, methods of dewatering systems- open sumps and ditches, Well point systems, deep well drainage, Vacuum dewatering, Electro osmosis. Design of dewatering for excavations, Design of dewatering system including pipe line effects of dewatering, Drains, different types of drains. Pre-compression and Vertical Drains: Importance, Vertical drains, Sand drains, Drainage of slopes, Electro kinetic dewatering, Preloading.			
Module-3 Stabilization of Soil (08 Hours)			
Cement stabilization, sandwich technique, admixtures. Hydration effect of cement stabilization on permeability, Swelling and shrinkage and strength and deformation characteristics. Criteria for cement stabilization. Stabilization using Flyash. Lime stabilization suitability, process, criteria for lime stabilization. Other chemicals like chlorides, hydroxides, lignin and hydrofluoric acid. Properties of chemical components, reactions and effects. Bitumen, tar or asphalt in stabilization.			
Module-4 Grouting (08 Hours)			
Grouting and Injection: Introduction, Effect of grouting. Chemicals and materials used. Types of grouting. Grouting procedure, Applications of grouting.			
Module-5 Soil Reinforcement (08 Hours)			
Soil improvement using reinforcing elements: introduction to geosynthetics, concept of reinforced earth, load transfer mechanism and strength development soil anchors, reinforced earth retaining walls, Geotextiles polymer type geotextiles, woven and non-woven geotextiles, geogrids-physical and strength properties, behavior of soils on reinforcing with geotextiles - effect on strength, bearing capacity, compaction and permeability - design aspects.			

Course Outcomes: At the end of the course the student will be able to:	
22CIV741.1	Apply solutions to mitigate problems associated with soil formations exhibiting inadequate strength.
22CIV741.2	Analyze and apply compaction techniques, quality control in soil engineering.
22CIV741.3	Evaluate drainage, seepage and dewatering methods adopted for ground improvement.
22CIV741.4	Apply grouting techniques in geotechnical engineering for soil improvement.
22CIV741.5	Assess soil stabilization using lime and cement for geotechnical applications.
22CIV741.6	Implement geosynthetics for soil reinforcement and analyze their influence on soil properties.

Sl No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textbooks:				
1	Ground Improvement Techniques	Purushothama Raj P	Laxmi Publications, NewDelhi.	2007
2	Ground Improvement Techniques	Bikash Chandra Chattopadhyay Joyanta	PHI learning, Eastern Economy Edition	2017
Reference Books:				
1	Ground and soil improvement	C.A.Raison	Thomas Telford Publishing, London	2004
2	Ground control and improvement	Petros P. Xanthakos Lee W. Abramson Donald A. Bruce	Wiley-Interscience Publication John Wiley & Sons, Inc.	1994
3	Ground Improvement — Case Histories	Buddhima Indraratna Jian Chu John A. Hudson	Elsevier Geo-Engineering Book Series	2005
4	Ground Improvement by Deep Vibratory Methods	Klaus Kirsch Fabian Kirsch	Taylor & Francis	2010
5	Ground Improvement	Klaus Kirsch Alan Bell	CRC Press Taylor & Francis Group	2013
6	Ground Improvement	M.P. Moseley K. Kirsch	Spon Press Taylor & Francis Group	2004
7	The Deep Mixing Method	Masaki Kitazume Masaaki Terashi	CRC Press Taylor & Francis Group	2013

Course Articulation Matrix:

Course Outcomes (CO)	Program Outcomes (PO)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
22CIV741.1	2	2	-	-	-	2	-	-	-	-	-	-	-	-
22CIV741.2	2	-	-	-	-	2	-	-	-	-	-	-	-	-
22CIV741.3	2	-	2	-	-	-		-	-	-	-	-	-	-
22CIV741.4	2	-	-	-	-	2	-	-	-	-	-	-	-	-
22CIV741.5	2	-	-	-	-	-	-	-	2	2	-	-	-	-
22CIV741.6	2	-	-	-	-	-	-	-	2	2	-	-	-	-

1: Low 2: Medium 3: High

Road Safety Engineering			
Course Code	22CIV742	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P)	3:0:0	SEE	3 Hours
Total Hours	40 hours	Credits	03
Course Learning Objectives: The objective of the course is to • Provide students with a comprehensive understanding of the principles, strategies, and techniques related to ensuring safety on roadways. • Equip students with the knowledge and skills necessary to analyse road safety issues • Design effective road safety measures and contribute to the improvement of road safety practices.			
Module-1 Traffic Engineering Studies (8 hours)			
Statistical Methods in Traffic Safety Analysis – Regression Methods, Poisson Distribution, Chi-Squared Distribution, Statistical Comparisons- Traffic Management Measures and Their Influence on Accident Prevention.			
Module-2 Road Safety and Geometric Design (8 hours)			
Vehicle and Human Characteristics, Road Design and Safety Elements, Redesigning Junctions, Cross Section Improvements, Traffic Control, Traffic Calming Measures, Road Safety Furniture.			
Module-3 Role of Signs and Markings in Safety (8 hours)			
Types of Signs, Design Specifications, Guidelines for Installation, Role of Signs in Safety; Types of Road Markings, Design Specifications, Role of Road Markings in Safety.			
Module-4 Accident Investigations and Risk Management (8 hours)			
Collection of Accident Data, Assessment of Road Safety, Methods to Identify and Prioritize Hazardous Locations and Elements, Determine Possible Causes of Crashes, Crash Reduction Capabilities and Countermeasures, Effectiveness of Safety Design Features			
Machine Learning for Road Safety Analysis: Predictive modeling for accident prediction and prevention, Classification techniques for identifying high-risk areas, Clustering methods for analyzing traffic patterns and incident hotspots.			
Module-5 Traffic Management Systems for Safety: (8 hours)			
Road Safety Audits and Tools for Safety Management Systems, Road Safety Audit Process, Road Safety Improvement Strategies, ITS And Safety.			

Course Outcomes: At the end of the course the student will be able to:	
22CIV742.1	Utilize modelling and simulation techniques to predict and assess the impact of road safety measures
22CIV742.2	Analyze road safety data, identify hazardous locations, and assess safety risks on roadways
22CIV742.3	Evaluate the effectiveness of road safety interventions and conduct post-implementation analysis
22CIV742.4	Organize framework related to road safety engineering for the safeguard of road users.
22CIV742.5	Comprehend the legal issues related to road safety engineering and contribute to policy development.
22CIV742.6	Demonstrate knowledge of traffic control devices, traffic management strategies and their role

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textbooks				
1	Highway Engineering	S K Khanna, C E G Justo, and A Veeraragavan	Nem Chand & Brothers	10 th edition, 2010
2	Traffic Engineering and Transportation Planning	L.R.Kadiyali	Khanna publishers	7 th edition, 2009
Reference Books				
1	Highway Engineering	Rangawala	Charotar publishing house pvt.ltd	12 th edition, 2022
2	Transportation Engineering	K.P.Subramaniam	SciTech Publications, Chennai.	6 th edition, 2015

Web links and Video Lectures (e-Resources):

- <https://www.youtube.com/watch?v=-FmJX7kPX00&list=PLROvODCYkEM9-iRF8xGQCd0mpfVOjz0ww>
- <https://www.youtube.com/watch?v=-FmJX7kPX00&list=PLROvODCYkEM9-iRF8xGQCd0mpfVOjz0ww&index=1>

Course Articulation Matrix

Course Outcomes (COs)	Program Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
22CIV742.1	3													
22CIV742.2		2												
22CIV742.3		2												
22CIV742.4		2												
22CIV742.5		2							3	3				
22CIV742.6		2												

1: Low 2: Medium 3: High

Conservation of Natural Resources			
Course Code	22CIV743	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P)	3:0:0	SEE	3 Hours
Total Hours	40 hours	Credits	03
Course Learning Objectives: The objective of the course is to • Learn types of landforms, soil conservation, and sustainable land use planning. • Apprehend water resources, types, distribution, planning, and conservation. Water pollution and types of uses. • Know the types of minerals and rocks. • Know the atmospheric composition of air, pollution, and effects on human beings, animals, and plants. Air pollution control. • Apprehend the basics of biodiversity and ecosystems.			
Module 1 Landforms (8 hours)			
Land: Land as a resource, types of lands, conservation of landforms, deforestation, effect of land use changes. Soil health, the ecological and economic importance of soil, impact of soil degradation on agriculture and food security, need for soil conservation, sustainable land use planning.			
Module 2 Global water resources (8 hours)			
Global water resources, Indian water resources, Resources system planning. Water use sectors-domestic, industrial, agriculture. Water deficit and water surplus basins in India, equitable distribution, Inter-basin water transfers, interlinking of rivers – Himalayan component, peninsular component, issues involved. Groundwater, its potential in India, conjunctive use, recharge of groundwater. Contamination of groundwater, seawater ingress, problems and solutions			
Module 3 Air (8 hours)			
Introduction, composition, sources, and classification of air pollutants, National Ambient Air Quality Standards (NAAQS), Air quality index, effects of air pollution on human health. Economic effects of air pollution. Control of air pollution by equipment, smoke, and its control. Ozone depletion – impacts, photochemical changes.			
Module 4 Biodiversity (8 hours)			
Introduction, Flora and Fauna, Importance of biodiversity, Economic values-medicinal plants, drugs, fisheries biogeochemical cycling. Threat to biodiversity, natural & anthropogenic disturbance, habitat loss. Conservation of biodiversity, National parks, wildlife sanctuaries, zoological gardens, gene banks, pollen culture, ecological restoration, and social forestry. Ecosystem: Definition, Types: forest, grassland, marine, desert, wetlands, estuarine, lotic, lentic. Abiotic & biotic components of the ecosystem.			
Module-5 Global warming (8 hours)			
Concept, indicators, factors, and effects. Global climate change indicators, health impacts, effect on biodiversity. Introduction to global efforts in the conservation of biodiversity. EIA regulations in India, the status of EIA in India, list of projects needing environmental clearance under EIA notifications. Case study of hydropower/ thermal power projects			

Course Outcomes: At the end of the course the student will be able to:	
22CIV743.1	Apprehend various components of land as a natural resource and land use planning.
22CIV743.2	Know the availability and demand for water resources as applied to India.
22CIV743.3	Analyze the components of air as a resource and its pollution.
22CIV743.4	Discuss biodiversity & its role in ecosystem functioning.

22CIV743.5	Critically identify the environmental concerns.
22CIV743.6	Application of EIA in monitoring various impacts of the projects

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Year
Textbooks				
1	A Textbook of Hydrology	P. Jaya Rami Reddy	University Science Press, New Delhi & Brothers	2011
2	An advanced textbook of Biodiversity-principle & practices.	Krishnamurthy K. V	Oxford and IBH Publications Co. Pvt ltd, New Delhi	2004
Reference Books				
1	Fundamentals of Ecology	Odum, E. P	W.B Sounders, Philadelphia, USA	1971
2	Ecology, environment and resource conservation	Singh J.S, Singh S.P & Gupta, S.R	Anamaya publications	2006

Web links and Video Lectures (e-Resources):

- https://onlinecourses.nptel.ac.in/noc22_ag10/preview
- https://onlinecourses.swayam2.ac.in/cec21_ge31/preview
- <https://archive.nptel.ac.in/courses/102/104/102104068/>
- <https://archive.nptel.ac.in/courses/129/106/129106002/>

Course Articulation Matrix

Course Outcomes (COs)	Program Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
22CIV743.1	2					2	2							
22CIV743.2	2					2	2							
22CIV743.3	2					2	2							
22CIV743.4	2					2	2							
22CIV743.5	2					2	2							
22CIV743.6	2					2	2							

1: Low 2: Medium 3: High

Sustainability Concepts in Engineering			
Course Code	22CIV744	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P)	3:0:0	SEE	3 Hours
Total Hours	40 hours Theory	Credits	03
Course Learning Objectives: • Learn about the principles, indicators, and general concepts of sustainability. • Apprehend the local, regional, and global impacts of unsustainable designs, products, and processes. • Students shall be able to apply the sustainability concepts in engineering • Know built environment frameworks and their use • Understand how building and design are judged and valued by clients and stakeholders and how to implement sustainability.			
Module – 1 Introduction to Sustainability (8 Hours)			
Introduction, Need and concept of sustainability, Social-environmental and economic sustainability concepts. Sustainable development, Nexus between Technology and Sustainable development, Challenges for Sustainable Development. Multilateral environmental agreements and Protocols - Clean Development Mechanism (CDM), Environmental legislations in India - Water Act, Air Act.			
Module-2 Global Environmental Issue (8 hours)			
Resource degradation, Climate change, Regional and Local Environmental Issues. Carbon credits and carbon trading, carbon foot print Carbon sequestration – Carbon capture and storage (CCS). Environmental management standards, ISO 14000 series, Life Cycle Analysis (LCA) - Scope and Goal, Bio-mimicking.			
Module-3 Sustainable Design (8 hours)			
Basic concepts of sustainable habitat, green buildings, green materials for building construction, material selection for sustainable design, green building certification- GRIHA & IGBC Certification for buildings, Energy efficient building design- Passive solar design technique, Thermal storage, Cooling strategies, high performance insulation. Sustainable cities, Sustainable transport.			
Module-4 Clean Technology and Energy (8 hours)			
Energy sources: Basic Concepts-Conventional and non-conventional, solar energy, Fuel cells, Wind energy, Small hydro plants, bio-fuels, Energy derived from oceans, Geothermal energy. Rainwater harvesting.			
Module- 5 Green Engineering (8 hours)			
Green Engineering concepts, Sustainable Urbanization, Industrialization, and poverty reduction; Social and technological change, Industrial Processes: Material selection, Pollution Prevention, Industrial Ecology, Industrial symbiosis. Blue economy.			

Course Outcomes: At the end of the course the student will be able to:	
22CIV744.1	Explain the concept of sustainability and its three pillars: social, environmental, and economic.
22CIV744.2	Discuss the relationship between technology and sustainable development, including the challenges faced.
22CIV744.3	Understand the purpose and significance of multilateral environmental agreements and protocols, such as the Clean Development Mechanism (CDM).
22CIV744.4	Analyze the key environmental legislations in India, including the Water Act and Air Act.
22CIV744.5	Analyze the key environmental legislations in India, including the Water Act and Air Act.

22CIV744.6	Evaluate the nexus between technology, sustainable development, and the challenges associated with achieving sustainability goals.
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Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textbooks				
1	Introduction to Sustainability for Engineers	Ramjeawon Toolssram	Boca Raton, C R C Press	1 st Edition 2020
Reference Books				
1	Systems Analysis for Sustainable Engineering: Theory and Applications	Ni bin Chang	McGraw-Hill Professional.	Edition 2010
2	Basic Concepts in Environmental Management	Mackenthun, K. M	Lewis Publication.	Edition 1999
3	Engineering applications in sustainable design and development	Bradley Striebig, Adebayo Ogundipe, Maria Papadakis	Cengage learning	Edition 2015

Web links and Video Lectures (e-Resources):

Strategies for Sustainable Design: https://onlinecourses.nptel.ac.in/noc24_de01/preview

Sustainable Engineering Concepts and LCA: https://onlinecourses.nptel.ac.in/noc21_ce47/preview

Course Articulation Matrix

Course Outcomes (COs)	Program Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
22CIV744.1	3					2			2			1		
22CIV744.2	3					2			2			1		
22CIV744.3	3					2			2			1		
22CIV744.4	3					2			2			1		
22CIV744.5	3					2			2			1		
22CIV744.6	3					2			2			1		

1: Low 2: Medium 3: High

Major Project Phase II			
Course Code	22CIV75	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Practical	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P)	(0:0:6)	SEE	3 Hours
Total Hours	72 hours	Credits	06
Course Learning Objectives:			
- Utilize fundamental principles of engineering and interdisciplinary knowledge to identify, analyse, and solve complex problems in the project domain. - Develop and execute a comprehensive project plan that includes designing, prototyping, testing, and evaluating a system, component, or process to meet specific needs and constraints. - Conduct in-depth research, critically review literature, and integrate innovative solutions or techniques within the project framework. - Demonstrate effective teamwork, communication, and collaboration skills in a multidisciplinary environment to achieve project objectives. - Incorporate ethical considerations, societal impact, and sustainable practices in the project development, while adhering to professional engineering standards. - Prepare and present a well-structured project report, supported by technical documentation and visual aids, and confidently defend the work during project viva-voce or presentations.			
1. Project Execution			
Regular Meetings: Students should meet regularly with their project-guide to discuss progress, challenges, and next steps. Documentation: Maintain detailed documentation throughout the project in a project work-dairy, including design decisions, experiments, and testing results. Milestones: Set clear milestones and deadlines to ensure steady progress. These could include design completion, initial prototype, testing, etc.			
2. Mid-term Review			
Progress Presentation: DPEC shall conduct a mid-term review where students present their progress to a panel of faculty members. Feedback: Provide constructive feedback and guidance to help students refine their projects.			
3. Final Submission			
Report: The project report should include an abstract, introduction, literature review, methodology, implementation, results, discussion, conclusion, and references. Code and Data: If applicable, students should submit their code, datasets, and any other relevant materials.			
4. Project Presentations			
Oral Presentation: Students should present their projects to a panel, explaining their work, findings, and contributions. Demonstration: If possible, include a live demonstration of the project or show relevant simulations and results. Q&A: Be prepared to answer questions from the panel and justify the project's methodology and conclusions.			
5. Evaluation Criteria			
Originality and Innovation: Assess the novelty and creativity of the project. Technical Competence: Evaluate the depth of technical knowledge and problem-solving ability demonstrated. Project Execution: Consider the effectiveness of project planning, adherence to timelines, and quality of implementation. Presentation and Communication: Judge the clarity and coherence of the final report, presentation, and the ability to answer questions.			

6. Plagiarism Check
• Academic Integrity: Ensure that the work submitted is original and properly cites all references and sources. • Plagiarism Check: Run all reports through plagiarism detection software and ensure that similarity index is less than the threshold value (25%).
7. Mentorship and Feedback
• Feedback: Students are required to consult with their project guide regularly throughout the project work to seek guidance and feedback. • Weekly Meetings: At least one mentorship meeting every week shall be held and recorded in the project work-dairy.
8. Post Submission
• Publication: DPEC shall encourage students to publish their work in conferences or journals, especially if it contributes significantly to their field. • Project Archive: Store all projects in the department's digital archive for future reference.

Continuous Internal Evaluation (CIE)		
Description	Proposed Dates	CIE Weightage (Max 100 marks)
1. Project Progress Evaluation -I	Beginning of the 7 th Semester	20 marks
2. Project Progress Evaluation -II	Middle of the 7 th Semester	30 marks
3. Project Report Evaluation (Phase II)	End of the 7 th Semester	50 marks
Semester End Examinations (SEE)		
SEE will be conducted for 100 marks (after the last working day of the 7 th semester) in the presence of the external examiner with the weightage as Project Report: 50 marks, Project Presentation: 25 marks and Question & Answer Session: 25 marks. Marks awarded for Project Report is same for all batch-mates.		

Course Outcomes: At the end of the course the student will be able to :	
22CIV75.1	Demonstrate the ability to identify, define, and solve complex engineering problems using appropriate methodologies and modern tools.
22CIV75.2	Successfully design, develop, and test an engineering solution that meets specified requirements, addressing technical, economic, environmental, and social constraints.
22CIV75.3	Apply research skills to review existing literature, gather and analyze data, and incorporate innovative or state-of-the-art technologies in the project
22CIV75.4	Collaborate effectively within a team, taking on leadership or supportive roles as needed, while ensuring clear communication and efficient project management.
22CIV75.5	Demonstrate awareness of professional ethics, societal impact, and sustainability in the design and implementation of engineering solutions.
22CIV75.6	Exhibit strong written and oral communication skills by preparing technical reports, project documentation, and delivering persuasive project presentations.

Course Articulation Matrix

Course Outcomes (COs)	Program Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
22CIV75.1	2	3	-	-	1	-	-	-	-	-	-	-	-	-
22CIV75.2	-	-	3	-	-	2	1	-	-	-	-	-	-	-
22CIV75.3	1	2	-	3	-	-	-	-	-	-	-	-	-	-
22CIV75.4	-	-	-	-	-	1	-	-	3	2	2	-	-	-
22CIV75.5	-	-	1	-	-	-	2	3	-	-	-	-	-	-
22CIV75.6	-	-	-	-	-	-	-	-	-	3	2	1	-	-

1: Low 2: Medium 3: High

VIII Semester

Professional Elective – IV (Online Course)			
Course Code	22CIV81	CIE Marks	50 *
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50 *
		Total Marks	100
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE	3 Hrs
Total Hours	36 hours	Credits	03
Course Learning Objectives:			
1. Understand and apply foundational concepts and principles of the chosen elective domain to real-world engineering problems. 2. Develop the ability to learn independently and navigate MOOC platforms effectively to acquire domain-specific knowledge and skills. 3. Demonstrate analytical and problem-solving abilities by engaging in course assessments, simulations, case studies, or project-based activities. 4. Interpret and evaluate course content critically from multiple sources including video lectures, reading materials, and peer discussions. 5. Integrate interdisciplinary knowledge gained from the MOOC into core engineering subjects for innovative applications or design thinking. 6. Communicate technical ideas and solutions effectively, both in written and oral form, based on the knowledge acquired through the online course.			
*Note: In case of MOOCs certificates submitted by the students, the marks/grade shall be awarded based on the percentage of marks/grade reflected in the certificates.			
1. Selection of MOOCs			
1.1 Accredited Platforms: Students shall select MOOCs from accredited platforms such as Coursera, edX, SWAYAM/NPTEL, Udacity, or any online learning platform recognized by the respective Engineering Department / Board of Studies (BoS). Engineering Departments with the approval of BoS shall publish a list of MOOCs courses in the beginning of every semester/academic session. 1.2 Prerequisites: Students shall ensure that he/she has completed any foundational courses or prerequisites required for the chosen MOOCs. 1.3 Relevant Courses: Students shall choose courses that are relevant to the Student's Engineering discipline and career goals. Students shall NOT opt for the course which is part of their curriculum (I to VIII semester B.E program) and Honors Degree/Minor Degree courses. In case of any overlapping in the contents of the MOOC Course with that in the curriculum or other courses, the maximum permitted overlapping in the course contents (syllabus) is 20-25%. 1.4 Credit Value: Students shall ensure that the selected MOOCs collectively account for 3 credits. Typically, a 3-credit MOOC will require around 35-40 hours of study, a 2-credit MOOC will require around 20-25 hours of study and a 1-credit MOOC will require 10-12 hours of study. 1.5 Duration of Course: A 4-weeks MOOCs is eligible for 1-credit. Students are advised to enroll for <u>one 12-weeks MOOCs</u> course to earn 3 credits. However, Students can also take <u>one 8-weeks MOOCs + one 4-weeks MOOCs</u> instead of one course. In each case, the number of hours of study mentioned shall be satisfied. The total performance in the MOOCs will be average of performances considering both MOOCs courses.			
2. Approval Process			
2.1 Pre-Approval: Students must seek pre-approval from the Department MOOCs Coordinator before enrolling in MOOCs. 2.2 Submission of Proposal: Students can submit a detailed proposal to Department MOOCs Coordinator including the name of the MOOCs, the platforms, course duration, credit value, and relevance to their field of study. If a Student has already completed any MOOCs course/s from the beginning of the III semester B.E, that satisfies the criteria mentioned in the clause 1. Selection of MOOCs, such course/s can			

be considered by the Department for credit transfer, provided the student has NOT already claimed the benefit of completing the MOOCs under any assessment in any of the subject. 2.3 Evaluation: The Department will evaluate the proposal for relevance, academic rigor, and credit equivalence and will communicate the decision to the Students.	
3. Registration and Enrollment	
3.1 Official Enrollment: Students shall register for the approved MOOCs on the respective platforms. 3.2 Documentation: Students shall keep documentation of registration and course details for future reference and provide the same when asked by the Department.	
4. Course Completion	
4.1 Active Participation: Students shall engage actively in all course activities including lectures, assignments, quizzes, and discussion forums. 4.2 Completion Certificate: Students shall obtain a verified certificate of completion for MOOC Course. Free versions without certificates are NOT eligible for credit.	
5. Assessment and Evaluation	
5.1 Performance Tracking: Students shall maintain records of performance in all assessments throughout the course. 5.2 Final Assessment: The Department may conduct a final assessment (proctored exam) to ensure that the knowledge gained aligns with the academic standards. This summative assessment (proctored exam) by the Engineering Department is mandatory in the absence of such assessment in the MOOC course/s by the online platform.	
6. Credit Transfer	
6.1 Submission of Certificates: Students shall submit the completion certificate/s and performance records to the Department MOOCs Coordinator. 6.2 Credit Evaluation: The Department will evaluate the certificates and performance records to approve the credit transfer. 6.3 Grade Conversion: College will take care to convert the grades from the MOOCs into the grading system as per established Academic Rules and Regulations.	
7. Integration into Academic Record	
7.1 Transcript Update: Upon approval, the credits and grades will be integrated into the student's academic transcript. 7.2 Grade Point Average (GPA) Calculation: The MOOC grades are included in the calculation of the student's GPA.	
8. Support and Resources	
8.1 Academic Advising: The Department MOOCs Coordinator shall provide guidance and support to the students throughout the process. 8. 2 Technical Support: The Department MOOCs Coordinator shall ensure that students have access to the necessary technical resources to complete MOOCs courses.	
9. Feedback and Improvement	
9.1 Student Feedback: Department MOOCs Coordinator shall collect feedback from students on their MOOC experiences to improve future implementations. 9.2 Continuous Improvement: MOOCs guidelines and processes will be updated based on student feedback, Department feedback and evolving educational standards.	
Course Outcomes: At the end of the course the student will be able to:	
22CIV81.1	Demonstrate comprehensive understanding of the key concepts, tools, and techniques in the chosen elective domain.
22CIV81.2	Apply the acquired knowledge to solve domain-specific engineering problems using appropriate methods and tools.

22CIV81.3	Analyze and interpret information from MOOC resources to support decision-making and problem-solving.
22CIV81.4	Exhibit self-directed learning skills and effective time management to complete the MOOC as per defined timelines.
22CIV81.5	Collaborate and communicate effectively in online learning environments through discussions, peer reviews, and group tasks (if applicable).
22CIV81.6	Integrate the knowledge gained from the MOOC into interdisciplinary engineering contexts and reflect on its professional relevance.

Course Articulation Matrix

Course Outcomes (COs)	Program Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
22CIV81.1	3	2	-	-	1	-	-	-	-	-	-	-	-	-
22CIV81.2	3	-	2	-	-	-	-	-	-	-	-	2	-	-
22CIV81.3	-	-	-	-	3	-	-	-	-	-	-	2	-	-
22CIV81.4	3	-	-	-	2	-	-	-	-	-	-	1	-	-
22CIV81.5	-	-	-	-	-	-	-	-	2	3	-	1	-	-
22CIV81.6	3	-	-	-	-	2	-	-	-	-	-	1	-	-

1: Low 2: Medium 3: High

Open Elective – II (Online Course)			
Course Code	22CIV82	CIE Marks	50*
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50*
		Total Marks	100
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE	3 Hours
Total Hours	36 hours	Credits	03

Course Learning Objectives:

1. Gain foundational and interdisciplinary knowledge in a subject outside the core engineering specialization to promote broader intellectual development.
2. Understand key theories, models, and practices related to the open elective topic, as delivered through MOOC lectures, readings, and assessments.
3. Develop the ability to learn independently and manage learning schedules, leveraging the flexibility of the MOOC platform.
4. Apply the acquired knowledge to real-world contexts, demonstrating the relevance of interdisciplinary learning to personal, professional, or societal challenges.
5. Enhance digital learning competencies, including navigating online resources, participating in online discussions, and completing online assessments effectively.
6. Foster critical thinking, creativity, and lifelong learning mindset by exploring new domains and expanding personal and professional interests.

*Note: In case of MOOCs certificates submitted by the students, the marks/grade shall be awarded based on the percentage of marks/grade reflected in the certificates.

1. Selection of MOOCs

1.1 Accredited Platforms: Students shall select MOOCs from accredited platforms such as Coursera, edX, SWAYAM/NPTEL, Udacity, or any online learning platform recognized by the respective Engineering Department / Board of Studies (BoS). Engineering Departments with the approval of BoS shall publish a list of MOOCs courses in the beginning of every semester.

1.2 Prerequisites: Students shall ensure that he/she has completed any foundational courses or prerequisites required for the chosen MOOCs.

1.3 Relevant Courses: Students shall choose courses that are relevant to the Student's Engineering discipline and career goals. Students shall NOT opt for the course which is part of their curriculum (I to VIII semester B.E program) and Honors Degree/Minor Degree courses. In case of any overlapping in the contents of the MOOC Course with that in the curriculum or other courses, the maximum permitted overlapping in the course contents (syllabus) is 20-25%.

1.4 Credit Value: Students shall ensure that the selected MOOCs collectively account for 3 credits. Typically, a 3-credit MOOC will require around 35-40 hours of study, a 2-credit MOOC will require around 20-25 hours of study and a 1-credit MOOC will require 10-12 hours of study.

1.5 Duration of Course: A 4-weeks MOOCs is eligible for 1-credit. Students are advised to enroll for one 12-weeks MOOCs course to earn 3 credits. However, Students can also take one 8-weeks MOOCs + one 4-weeks MOOCs instead of one course. In each case, the number of hours of study mentioned shall be satisfied. The total performance in the MOOCs will be average of performances considering both MOOCs courses.

2. Approval Process

2.1 Pre-Approval: Students must seek pre-approval from the Department MOOCs Coordinator before enrolling in MOOCs.

2.2 Submission of Proposal: Students can submit a detailed proposal to Department MOOCs Coordinator including the name of the MOOCs, the platforms, course duration, credit value, and relevance to their field of study.

If a Student has already completed any MOOCs course/s from the beginning of the III semester B.E, that satisfies the criteria mentioned in the clause 1. Selection of MOOCs, such

course/s can be considered by the Department for credit transfer, provided the student has NOT already claimed the benefit of completing the MOOCs under any assessment in any of the subject. 2.3 Evaluation: The Department will evaluate the proposal for relevance, academic rigor, and credit equivalence and will communicate the decision to the Students.	
3. Registration and Enrollment	
3.1 Official Enrollment: Students shall register for the approved MOOCs on the respective platforms. 3.2 Documentation: Students shall keep documentation of registration and course details for future reference and provide the same when asked by the Department.	
4. Course Completion	
4.1 Active Participation: Students shall engage actively in all course activities including lectures, assignments, quizzes, and discussion forums. 4.2 Completion Certificate: Students shall obtain a verified certificate of completion for MOOC Course. Free versions without certificates are NOT eligible for credit.	
5. Assessment and Evaluation	
5.1 Performance Tracking: Students shall maintain records of performance in all assessments throughout the course. 5.2 Final Assessment: The Department may conduct a final assessment (proctored exam) to ensure that the knowledge gained aligns with the academic standards. This summative assessment (proctored exam) by the Engineering Department is mandatory in the absence of such assessment in the MOOC course/s by the online platform.	
6. Credit Transfer	
6.1 Submission of Certificates: Students shall submit the completion certificate/s and performance records to the Department MOOCs Coordinator. 6.2 Credit Evaluation: The Department will evaluate the certificates and performance records to approve the credit transfer. 6.3 Grade Conversion: College will take care to convert the grades from the MOOCs into the grading system as per established Academic Rules and Regulations.	
7. Integration into Academic Record	
7.1 Transcript Update: Upon approval, the credits and grades will be integrated into the student's academic transcript. 7.2 Grade Point Average (GPA) Calculation: The MOOC grades are included in the calculation of the student's GPA.	
8. Support and Resources	
8.1 Academic Advising: The Department MOOCs Coordinator shall provide guidance and support to the students throughout the process. 8.2 Technical Support: The Department MOOCs Coordinator shall ensure that students have access to the necessary technical resources to complete MOOCs courses.	
9. Feedback and Improvement	
9.1 Student Feedback: Department MOOCs Coordinator shall collect feedback from students on their MOOC experiences to improve future implementations. 9.2 Continuous Improvement: MOOCs guidelines and processes will be updated based on student feedback, Department feedback and evolving educational standards.	
Course Outcomes: At the end of the course the student will be able to :	
22CIV82.1	Demonstrate a clear understanding of the fundamental concepts and frameworks in the selected open elective domain.
22CIV82.2	Apply interdisciplinary knowledge gained from the MOOC to analyze and address real-life or cross-domain problems.
22CIV82.3	Exhibit the ability to learn independently, manage time effectively, and complete

	the online course requirements within the stipulated duration.
22CIV82.4	Interpret and evaluate information from diverse MOOC resources (videos, readings, forums) to support critical analysis and decision-making.
22CIV82.5	Communicate insights, reflections, and applications of the course content effectively in written or multimedia formats.
22CIV82.6	Integrate the learning from the MOOC to enhance personal, academic, or professional development beyond the engineering curriculum.

Course Articulation Matrix

Course Outcomes (COs)	Program Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
22CIV82.1	3	-	-	-	1	-	-	-	-	-	-	2	-	-
22CIV82.2	3	2	-	-	-	-	-	-	-	-	-	1	-	-
22CIV82.3	-	-	-	-	3	-	-	-	-	-	-	2	-	-
22CIV82.4	3	-	-	-	2	-	-	-	-	-	-	1	-	-
22CIV82.5	-	-	-	-	-	-	-	-	2	3	-	1	-	-
22CIV82.6	3	-	-	-	-	2	-	-	-	-	-	1	-	-

1: Low 2: Medium 3: High

Research/Industry Internship			
Course Code	22CIV83	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Practical	SEE Marks	50
		Total Marks	100
Number of Weeks	14-16 Weeks	SEE	3 Hours
		Credits	10
Research Internship			
Course Learning Objectives: 1. To equip students with the knowledge of fundamental research principles, methodologies, and techniques applicable to their engineering discipline. 2. To enable students to formulate research questions, design experiments or studies, and use appropriate data collection and analysis tools. 3. To foster the ability to think critically and innovatively while solving complex engineering problems during the research process. 4. To guide students in developing the skills necessary for writing clear and well-structured research reports, papers, and presentations. 5. To instill an understanding of ethical practices in research, including integrity, responsible data handling, and respect for intellectual property. 6. To prepare students to work effectively in research teams, communicate their ideas clearly, and present their findings to both technical and non-technical audiences.			
Pre-Internship Preparation			
1. Orientation Session: Attend an orientation session with the academic mentor (allotted from the Department) and the Research Supervisor to understand the research goals, expectations, and assessment criteria. 2. Documentation: Complete necessary documentation, including the approval from the Department, processing of the internship request application, research agreements and confidentiality agreements, if applicable. 3. Research Proposal: Develop a research proposal in consultation with the Research Supervisor and academic mentor outlining the objectives, methodology, and expected outcomes.			
During the Internship			
1. Work Plan: Follow a structured research plan provided by the supervising researcher or mentor. 2. Literature Review: Conduct a comprehensive literature review to understand the current state of research in the chosen area. 3. Regular Meetings: Participate in regular meetings with academic and research mentors to discuss progress, challenges, and next steps. 4. Lab Work/Field Work: Engage in experimental work, simulations, or field studies as required by the research project. 5. Data Collection and Analysis: Collect, analyze, and interpret data using appropriate tools and techniques. 6. Documentation: Maintain detailed records of research activities, experiments, and findings.			
Deliverables			
1. Weekly Reports: Submit weekly progress reports to academic and research mentors. 2. Monthly Reports: Submit monthly progress reports to academic and research mentors. 3. Mid-Term Review: Participate in a mid-term review meeting to assess progress and realign research goals if necessary. 4. Report and Research Paper: Prepare a draft report and a research paper detailing the research problem, methodology, results and discussions, and conclusions.			

5. **Presentation:** Deliver a presentation summarizing the research work to faculty, peers, and other stakeholders upon completion of the internship.

Assessment Criteria	
1. Research Quality: Evaluate the quality and rigor of the research conducted.	
2. Report Quality: Assess the clarity, organization, and thoroughness of the report and the research paper.	
3. Presentation: Evaluate the effectiveness and clarity of the final presentation.	
4. Innovation and Creativity: Consider the originality and innovative aspects of the research.	
5. Self-Reflection: Review the student's ability to critically reflect on their research experience and identify areas for future growth.	
Post-Internship	
1. Feedback Session: Attend a feedback session with academic mentors to discuss the research experience and areas of improvement.	
2. Publication: Explore opportunities to publish the research findings in academic journals or conferences.	
3. Networking: Maintain professional relationships established during the internship for future research collaborations.	
Additional Tips	
• Curiosity: Cultivate a curious mindset and a willingness to explore new ideas. • Collaboration: Work collaboratively with other researchers and team members. • Adaptability: Be open to modifying research approaches based on findings and feedback. • Communication: Develop strong written and oral communication skills to effectively present research findings. • Time Management: Prioritize tasks and manage time efficiently to meet research deadlines.	

Evaluation Scheme	
Continuous Internal Evaluation (CIE): I (Only OFFLINE)	Will be conducted during the 7 th semester BE. Students shall submit the Research Internship Proposal and make a presentation and answer questions raised by the Departmental Internship Evaluation Committee (DIEC). Marks split-up: Research Internship Proposal – 50 marks + Oral Presentation-25 marks + Question and Answer-25 marks.
Continuous Internal Evaluation (CIE): II (ONLINE/OFFLINE)	Will be conducted during the middle of the 8 th semester BE. Students shall submit the Reports (daily/weekly/monthly reports), make a presentation on progress done so far and answer questions raised by the Departmental Internship Evaluation Committee. Marks split-up: Reports – 50 marks + Oral Presentation-25 marks + Question and Answer-25 marks.
Continuous Internal Evaluation (CIE): III (Only OFFLINE)	Will be conducted at the end of the 8 th semester BE. Students shall submit the Reports (daily/weekly/monthly reports) and the final internship report, make a presentation on work completed and answer questions raised by the Departmental Internship Evaluation Committee. Marks split-up: Reports – 50 marks + Oral Presentation-25 marks + Question and Answer-25 marks.
CIE Marks (Max 100)	Average of the CIE:I , CIE-II and CIE:III marks
Semester-End-Examinations (SEE)	Will be conducted within a week of the last working day of the 8 th semester BE. Student shall submit the internship report approved by

(Only OFFLINE)	all the concerned, make a presentation and answer the questions raised by the internal and external examiners. Marks split-up: Reports – 50 marks + Oral Presentation-25 marks + Question and Answer-25 marks.
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Course Outcomes: At the end of the course the student will be able to:

22CIV83.1	Apply appropriate research methodologies and tools to design and conduct experiments, analyze data, and draw conclusions.
22CIV83.2	Demonstrate the ability to identify and solve complex engineering problems through innovative and systematic research approaches.
22CIV83.3	Acquire proficiency in using advanced technologies, tools, and techniques relevant to their field of research.
22CIV83.4	Develop skills in writing comprehensive research reports, documentation, and effectively presenting research findings.
22CIV83.5	Understand and apply ethical standards in research, including plagiarism avoidance, proper citations, and data integrity.
22CIV83.6	Gain experience in working collaboratively within a research team and contributing effectively to the shared goals of the project.

References

- AICTE Internship Policy : Guidelines and Procedures 2019.**
Available at <https://aicte-india.org/sites/default/files/AICTE%20Internship%20Policy.pdf>
- UGC Guidelines for Internship/Research Internship for Under Graduate Students 2023.**
Available at https://www.ugc.gov.in/pdfnews/0063650_Draft-Guidelines-for-Internship-and-Research-Internship-for-Under-Graduate-Students.pdf
- VTU Mandatory Internship Guidelines 2021.**
Available at <https://vtu.ac.in/pdf/regulations2021/anex4.pdf>

Course Articulation Matrix

Course Outcomes (COs)	Program Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
22CIV83.1	1	-	2	3	-	-	-	-	-	-	-	-	-	-
22CIV83.2	3	2	-	-	-	-	-	-	-	-	-	-	-	-
22CIV83.3	-	-	-	-	3	2	-	-	-	-	-	1	-	-
22CIV83.4	-	-	-	-	-	-	-	-	-	3	-	1	-	-
22CIV83.5	-	-	-	-	-	2	-	3	-	-	-	1	-	-
22CIV83.6	-	-	-	-	-	-	-	-	3	2	1	-	-	-

1: Low 2: Medium 3: High

Research/Industry Internship			
Course Code	22CIV83	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Practical	SEE Marks	50
		Total Marks	100
Number of Weeks	14-16 Weeks	SEE	3 Hours
		Credits	10
Industry Internship			
Course Learning Objectives:			
1. To develop practical engineering skills through hands-on experience in a real-world industrial environment. 2. To enhance the ability to identify, analyze, and solve complex engineering problems encountered during the internship. 3. To gain an understanding of the functioning of the industry, including exposure to its standards, practices, and emerging technologies. 4. To improve communication, collaboration, and teamwork skills by working with professionals in a multidisciplinary team setting. 5. To foster adaptability by learning to work in dynamic and fast-paced industrial environments while embracing lifelong learning. 6. To instill a sense of professional ethics, responsibility, and accountability in engineering practice by adhering to industry-specific codes of conduct.			
Pre-Internship Preparation			
1. Orientation Session: Attend an orientation session with the academic mentor (allotted from the Department) to understand the internship goals, expectations, and assessment criteria. 2. Documentation: Complete necessary documentation, including the approval from the Department, processing of the internship request application, internship agreements if applicable etc. 3. Goal Setting: Define specific, measurable, achievable, relevant, and time-bound (SMART) goals in consultation with academic and industry mentors.			
During the Internship			
1. Work Plan: Follow a structured work plan provided by the host organization. 2. Mentorship: Regularly meet with assigned industry and academic mentors to review progress and seek guidance. 3. Work Diary/Daily Report/Learning Diary: Maintain a diary/logbook documenting daily activities, learnings, challenges, and reflections. 4. Professional Conduct: Adhere to the professional and ethical standards of the host organization, including dress code, punctuality, and communication protocols. 5. Skill Application: Actively participate in projects and tasks assigned, applying theoretical knowledge to practical situations.			
Deliverables			
1. Weekly Reports: Submit the weekly progress reports to academic and industry mentors. 2. Monthly Reports: Submit the monthly progress reports to academic and industry mentors. 3. Mid-Term Review/Evaluation: Participate in a mid-term review meeting/evaluation to assess progress and realign goals if necessary. 4. Final Report: Prepare a comprehensive final report in the specified format detailing the projects undertaken, skills acquired, challenges faced, and overall learning experience. 5. Presentation: Deliver a presentation summarizing the internship experience to faculty evaluators and peers upon completion of the internship.			

Assessment Criteria	
1. Performance Evaluation:	Receive feedback from the industry mentor based on work performance, technical skills, and professional behaviour.
2. Report Quality:	Evaluate the quality, clarity, and comprehensiveness of the final report.
3. Presentation:	Assess the effectiveness and clarity of the final presentation.
4. Self-Reflection:	Review the student's ability to critically reflect on their learning experience and identify areas for future growth.
Post-Internship	
1. Feedback Session:	Attend a feedback session with academic mentors to discuss the internship experience and areas of improvement.
2. Certification:	Obtain an internship completion certificate from the host organization.
3. Networking:	Maintain professional relationships established during the internship for future opportunities.
Additional Tips	
• Professionalism: Demonstrate a professional attitude and work ethic at all times. • Adaptability: Be open to learning and adapting to new environments and technologies. • Communication: Develop strong communication skills to effectively collaborate with colleagues and mentors. • Time Management: Prioritize tasks and manage time efficiently to meet deadlines.	

Evaluation Scheme	
Continuous Internal Evaluation (CIE): I (ONLINE/OFFLINE)	Will be conducted during the middle of the 8 th semester BE. Students shall submit the Reports (daily/weekly/monthly reports), make a presentation on work done so far and answer questions raised by the Departmental Internship Evaluation Committee. Marks split-up: Reports – 50 marks + Oral Presentation 25 marks + Question and Answer 25 marks.
Continuous Internal Evaluation (CIE): II (Only OFFLINE)	Will be conducted at the end of the 8 th semester BE. Students shall submit the Reports (daily/weekly/monthly reports) and the final report, make a presentation on work completed and answer questions raised by the Departmental Internship Evaluation Committee. Marks split-up: Reports – 50 marks + Oral Presentation 25 marks + Question and Answer 25 marks.
CIE Marks (Max 100)	Average of the CIE:I and CIE:II marks
Semester-End-Examinations (SEE) (Only OFFLINE)	Will be conducted within a week of the last working day of the 8 th semester BE. Student shall submit the internship report approved by all the concerned, make a presentation and answer the questions raised by the internal and external examiners. Marks split-up: Reports – 50 marks + Oral Presentation 25 marks + Question and Answer 25 marks.

Course Outcomes: At the end of the course the student will be able to:	
22CIV83.1	Apply engineering concepts and theoretical knowledge to solve real-world industry problems.
22CIV83.2	Enhance their problem-solving abilities by identifying, analyzing, and providing innovative solutions to engineering challenges in the industry.
22CIV83.3	Develop key professional skills such as teamwork, communication, and time management in a corporate or industrial environment.
22CIV83.4	Gain exposure to industry-standard tools, technologies, methodologies, and regulatory standards relevant to their field of study.

22CIV83.5	Demonstrate understanding and adherence to professional ethics, safety regulations, and responsibilities in an industrial setting.
22CIV83.6	Build a network of industry professionals and gain insights into career opportunities, preparing them for future employment in the engineering sector.

References

1. AICTE Internship Policy : Guidelines and Procedures 2019.

Available at <https://aicte-india.org/sites/default/files/AICTE%20Internship%20Policy.pdf>

2. UGC Guidelines for Internship/Research Internship for Under Graduate Students 2023.

Available at https://www.ugc.gov.in/pdfnews/0063650_Draft-Guidelines-for-Internship-and-Research-Internship-for-Under-Graduate-Students.pdf

3. VTU Mandatory Internship Guidelines 2021.

Available at <https://vtu.ac.in/pdf/regulations2021/anex4.pdf>

Course Articulation Matrix

Course Outcomes (COs)	Program Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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22CIV83.2	-	3	2	1	-	-	-	-	-	-	1	-	-	-
22CIV83.3	-	-	-	-	-	-	-	-	3	2	-	-	-	-
22CIV83.4	-	-	-	-	3	2	-	-	-	-	-	1	-	-
22CIV83.5	-	-	-	-	-	2	-	3	-	-	-	-	-	-
22CIV83.6	-	-	-	-	-	-	-	-	2	3	-	1	-	-

1: Low 2: Medium 3: High

Core Values of the Institution

SERVICE

A Josephite will keep service as the prime goal in everything that is undertaken. Meeting the needs of the stakeholders will be the prime focus of all our endeavors.

EXCELLENCE

A Josephite will not only endeavor to serve, but serve with excellence. Preparing rigorously to excel in whatever we do will be our hallmark.

ACCOUNTABILITY

Every member of the SJEC Family will be guided to deliver on assurances given within the constraints set. A Josephite will always keep budgets and deadlines in mind when delivering a service.

CONTINUOUS ADAPTATION

Every member of the SJEC Family will strive to provide reliable and continuous service by adapting to the changing environment.

COLLABORATION

A Josephite will always seek to collaborate with others and be a team-player in the service of the stakeholders.

Objectives

- Provide Quality Technical Education facilities to every student admitted to the College and facilitate the development of all round personality of the students.
- Provide most competent staff and excellent support facilities like laboratory, library and internet required for good education on a continuous basis.
- Encourage organizing and participation of staff and students in in-house and outside Training programmes, seminars, conferences and workshops on continuous basis.
- Provide incentives and encouragement to motivate staff and students to actively involve in research-innovative projects in collaboration with industry and R & D centres on continuous basis
- Invite more and more number of persons from industry from India and abroad for collaboration and promote Industry-Institute Partnership.
- Encourage consultancy and testing and respond to the needs of the immediate neighbourhood.



St Joseph Engineering College

AN AUTONOMOUS INSTITUTION

Affiliated to VTU, Belagavi | Recognised by AICTE, New Delhi

Accredited by NAAC with A+ Grade

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