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ताळगांव पठार,
गोंय - ४०३ २०६
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(Accredited by NAAC with Grade A+)

GU/Acad –PG/BoS -NEP/2026-27/265 Date: 31.07.2026

CIRCULAR

Ref. No.: GU/Acad –PG/BoS -NEP/2025/381 dated 08.09.2025

In supersession to the above referred Circular, the syllabus for the Courses offered under specialization **Construction Technology** of **Bachelor of Engineering in Civil Engineering** Programme for Semester V to VII, as approved by the Academic Council in its meeting held on 20th February 2026, is attached.

The syllabus for Semester III & IV approved earlier by the Standing Committee of the Academic Council in its meeting held on 24th & 25th July 2025 is also attached.

The Dean, Faculty of Engineering and Principals of affiliated Engineering Colleges are requested to take note of the above and bring the contents of the Circular to the notice of all concerned.

ASHWIN V LAWANDE
Digitally signed by ASHWIN V LAWANDE
Date: 2026.07.31 16:37:09 +05'30'

(Ashwin V. Lawande)
Deputy Registrar – Academic

To,
1. The Dean, Faculty of Engineering, Goa University.
2. The Principals of Affiliated Engineering Colleges.

Copy to:
1. Chairperson, BoS in Civil Engineering, Goa University.
2. Controller of Examinations, Goa University.
3. Assistant Registrar Examinations (Technical and Allied), Goa University
4. Directorate of Internal Quality Assurance, Goa University for uploading the Syllabus on the University website.

Civil Engineering

Specialization: Construction Technology

Sr No	Semester	Course Code	Title of the Course	L	T	P	TCr
1	III	CIV-283	Construction Economics, Finance and Budgeting	3	0	0	3
		CIV-284	Construction Economics, Finance and Budgeting Lab	0	0	1	1
2	IV	CIV-281	Construction Contracts Management and Specifications	3	0	0	3
		CIV-282	Construction Contracts Management and Specifications Lab	0	0	1	1
3	V	CIV-381	Infrastructure Planning and Quality & Safety Management in Construction	3	0	0	3
		CIV-382	Infrastructure Planning and Quality & Safety Management in Construction Lab	0	0	1	1
4	VI	CIV-383	Advanced Construction Techniques, Equipment and Materials	3	0	0	3
		CIV-384	Advanced Construction Techniques, Equipment and Materials Lab	0	0	1	1
5	VII	CIV-481	Corporate Laws and Arbitration	4	0	0	4
			TOTAL	**16**	**0**	**4**	**20**

SEMESTER III

Name of the Programme	**: Civil Engineering (Construction Technology)**
Course Code	**: CIV-283**
Title of the Course	**: Construction Economics, Finance and Budgeting**
Number of Credits	**: 03**
Effective from AY	**: 2024-25**

Pre-requisites for the Course:	Knowledge of Fundamentals of Civil Engineering	
Course Objectives:	This course will enable students to: • Understand the fundamental concepts of financial management, economics, supply-demand mechanisms, and financial statements. • Apply production, cost, and pricing theories to analyze various costing techniques and financial strategies. • Analyze construction finance systems, including project appraisal, risk management, and working capital needs. • Evaluate investment opportunities using capital budgeting techniques and engineering economic analysis tools.	
Content:		**No. of hours**
Unit - 1	Financial Management: Meaning and Scope, Economics and Scope, Supply and Demand Mechanism, analysis and forecasting. Balance sheet, profit & loss account, fund flow statement. GST and its implications.	**12**
Unit - 2	Production and Cost theory, analysis. Pricing, objectives, determinants, absorption, marginal costing. Financial analysis, Decisions. Capital Budgeting, budgetary control, standard costing and variance, investment appraisal.	**11**
Unit - 3	Engineering economics, Time value of money, discounted cash flow, NPV, ROR, Bases of comparison, Incremental analysis, Benefit-Cost analysis, Replacement analysis, Break-even analysis.	**12**
Unit - 4	Construction Finance: Accounting information and application, project appraisal. Project yield, risk and uncertainty, Turnkey activities, finance and working capital, cost control, equipment rentals.	**10**
Pedagogy:	Interactive learning, reflective thinking, critical analysis, and problem-solving.	

References/ Readings:	**Text Books** 1. Chandra, P., "Financial Management: Theory and Practice", 10th edition, McGraw-Hill Education, New Delhi, 2019, ISBN: 9789353166526. 2. de Valence, G., "Modern Construction Economics: Theory and Application", Routledge, London, 2015, ISBN: 9781138861336. **Reference Books** 3. Myers, D., "Construction Economics: A New Approach", 3rd edition, Routledge, London, 2013, ISBN: 9780415527798. 4. Ofori, G., "The Construction Industry: Aspects of Its Economics and Management", Singapore University Press, Singapore, 1990, ISBN: 9789971691486. 5. Parkin, M., & Bade, R., "Foundations of Macroeconomics", 4th edition, Pearson, Boston, 2008, ISBN: 9780321522528.
Course Outcomes:	**After going through this course, students will be able to:** CO 1. Prepare income, profit and loss statements and implement construction accounting CO 2. Evaluate construction project economics, cost-benefit analysis and breakeven analysis. CO 3. Analyse and evaluate construction risks and uncertainties. CO 4. Understand the importance of working capital management, budgeting and control.

Name of the Programme : **Civil Engineering (Construction Technology)**

Course Code : **CIV-284**

Title of the Course : **Construction Economics, Finance and Budgeting Lab**

Number of Credits : **01**

Effective from AY : **2024-25**

Pre-requisites for the Course:	Knowledge of Fundamentals of Civil Engineering	
Course Objectives:	This course will enable students to: • Prepare and analyze financial statements for construction firms. • Apply financial analysis techniques (cost-benefit and break-even analysis). • Calculate and manage equipment rental costs for construction projects. • Create and manage budgets for construction projects.	
Content:		**No. of hours**
	List of experiments 1. To prepare basic financial statements for a construction firm. 2. To analyze fund movements using a fund flow statement. 3. To compute GST and prepare a tax invoice. 4. To forecast material demand using supply-demand analysis. 5. To find the break-even point for a project. 6. To evaluate project viability using Net Present Value (NPR) and Internal Rate of Return (IRR). 7. To assess cost deviations through variance analysis. 8. To price services using marginal and absorption costing. 9. To compare projects using benefit-cost and incremental analysis. 10. To estimate working capital and equipment rental costs.	**30**
Pedagogy:	Instructional learning, Inquiry based learning, Constructive learning, Collaborative learning and problem solving	
References/ Readings:	**Text Books** 1. Chandra, P., "Financial Management: Theory and Practice", 10th edition, McGraw-Hill Education, New Delhi, 2019, ISBN: 9789353166526. 2. de Valence, G., "Modern Construction Economics: Theory and Application", Routledge, London, 2015, ISBN: 9781138861336.	

	Reference Books 3. Myers, D., "Construction Economics: A New Approach", 3rd edition, Routledge, London, 2013, ISBN: 9780415527798. 4. Ofori, G., "The Construction Industry: Aspects of Its Economics and Management", Singapore University Press, Singapore, 1990, ISBN: 9789971691486. 5. Parkin, M., & Bade, R., "Foundations of Macroeconomics", 4th edition, Pearson, Boston, 2008, ISBN: 9780321522528.
Course Outcomes:	After going through this course, students will be able to: CO 1. Prepare and analyze financial statements and fund flow reports for construction projects. CO 2. Evaluate project feasibility using capital budgeting techniques such as NPV and IRR. CO 3. Apply pricing, costing, and forecasting methods to real-world construction scenarios. CO 4. Analyze cost deviations and estimate working capital for effective financial control.

SEMESTER IV

Name of the Programme	**: Civil Engineering (Construction Technology)**
Course Code	**: CIV-281**
Title of the Course	**: Construction Contracts Management and Specifications**
Number of Credits	**: 03**
Effective from AY	**: 2024-25**

Pre-requisites for the Course:	Knowledge of Fundamentals of Civil Engineering	
Course Objectives:	This course will enable students to: • Understand the fundamental principles of the Indian Contract Act (1872), including the classification and legal validity of contracts. • Interpret standard contract forms and conditions used in public and private sector projects. • Analyse the requirements for formation, execution and breach of construction contracts and relevant legal frameworks. • Draft specifications and project documentation required for regulatory frameworks like RERA impacting construction contracts.	
Content:		**No. of hours**
Unit-1	**Construction Contracts Overview**: a) Indian Contract Act (1872): Definition of the contract as per the ACT. Valid, Voidable, Void contracts, Objectives of the act. b) Brief introduction to Clauses of Contract - its performance and valid reasons for non-performance. Breach of contract, effects of breach- understanding the clauses and applying them to situations/scenarios on construction projects. Importance of the Workmen's Compensation Act on construction projects.	**12**
Unit-2	**Overview of Contract Formation**: a) Standard forms of contracts, methods of inviting tenders, pre-bid meetings, pre-qualification system, scrutiny of tenders and comparative statement. b) Conditions of contracts, contracts with various stakeholders on a major construction project, contract pricing by the client, project management consultants and the contractor, contract correspondence and contract closure.	**11**
Unit-3	**Overview of Contract Conditions**: a) General, Special and Particular conditions	**12**

	b) Conditions of Ministry of Statistics and Program Implementation–Government of India. Model forms of contract. c) Standard Forms of Contracts in MES, CPWD, NHAI (EPC contract). Design Build (Own) Operate and Transfer contract. d) FIDIC Form of Contracts: Introduction, FIDIC conditions–evolution of FIDIC document, types based on whether design is of employer or contractor, Colour Code. Various conditions of Red Book.	
Unit-4	**Specifications for building works**: Detailed Project Reports, Preparation of specifications, types, organization of specifications, examples of wordings, planning specification for workmanship and material discretionary powers of engineer, specification of special items. **RERA:** Establishment and incorporation of RERA, offences, penalties and Adjudication.	**10**
Pedagogy:	Interactive learning, reflective thinking, critical analysis, and problem-solving. .	
References/ Readings:	**Reference Books** 1. Bangia, R. K.**,** *"Law of Contract: Part I and Part II"*, Latest Edition, Allahabad Law Agency, Faridabad, ISBN: 9788189530129. 2. Bockrath, J. T., & Plotnick, F. L**.**, *"Contracts and the Legal Environment for Engineers and Architects"*, 7th edition, McGraw-Hill Education, New York, 2013, ISBN: 9780073397849 3. Central Public Works Department (CPWD), *"Specifications, Analysis of Rates, Forms of Contracts, Works Manual & SOP"*, 2024, Government of India, New Delhi. 4. Government of Goa, *"Goa Schedule of Rates"*, latest edition, Public Works Department, Government of Goa, Panaji. 5. Government of India, *"Contract Labour and Minimum Wages Act"*, Latest Edition, Ministry of Labour and Employment, New Delhi. 6. Government of India, *"RERA User Manual"*, Latest Edition, Ministry of Housing and Urban Affairs, New Delhi. 7. Markanda, P. C**.**, *"Building and Engineering Contracts: Law and Practice"*, 5th edition, LexisNexis, Gurgaon, 2015, ISBN: 9788131251669. 8. Ministry of Statistics and Programme Implementation, Government of India, *"Standard General Conditions for Domestic Contracts"*, Latest edition, New Delhi. 9. Professional Book Publishers, *"The Indian Contract Act, 1872 (Bare Act)"*, New Delhi, ISBN: 9789352470624. 10. Patil, B. S.**,** *"Civil Engineering Contracts and Estimates"*, 4th edition, Universities Press, Hyderabad, 2010, ISBN: 9788173719578	

	11. Professional Book Publishers, *"The Workmen's Compensation Act, 1923 (Bare Act)"*, New Delhi, ISBN: 9789381270424.
Course Outcomes:	**After going through this course, students will be able to:** CO 1. Explain key provisions of the Indian Contract Act and distinguish between valid, void, and voidable contracts in the context of construction CO 2. Apply contract clauses to real-life construction scenarios and assess reasons for non-performance or breach, including implications under the Workmen's Compensation Act CO 3. Analyze and compare standard forms of contracts and interpret their applicability in construction project delivery models CO 4. Prepare and evaluate building work specifications, DPRs, and understand the legal implications of RERA on construction activities.

Name of the Programme: **: Civil Engineering (Construction Technology)**

Course Code: **: CIV-282**

Title of the Course: **: Construction Contracts Management and Specifications Lab**

Number of Credits: **: 01**

Effective from AY: **: 2024-25**

Pre-requisites for the Course:	Knowledge of Fundamentals of Civil Engineering	
Course Objectives:	This course will enable students to: • Understand various types of construction contracts under Indian law • Draft key construction documents like tender notices, contract forms, and specifications. • Apply standard contract conditions in real-world projects. • Analyse the implications of legal frameworks such as the Workmen's Compensation Act and RERA on construction practices.	
Content:		**No. of hours**
	List of Experiments 1. To identify and classify types of contracts under the Indian Contract Act, 1872. 2. To analyze breach of contract scenarios and their legal consequences. 3. To draft a tender notice and describe the tendering procedure using a sample. 4. To prepare a standard contract document as per CPWD guidelines. 5. To draft a construction contract based on FIDIC conditions. 6. To develop material and workmanship specifications for major building items. 7. To interpret general, special, and particular conditions of contract using model forms. 8. To study legal and technical interpretation of common contract clauses. 9. To understand the Workmen's Compensation Act and its relevance to construction safety. 10. To analyze RERA provisions related to offences, penalties, and adjudication in construction projects.	**30**
Pedagogy:	Instructional learning, Inquiry based learning, Constructive learning, Collaborative learning and problem solving	
References/ Readings:	**Reference Books**	

	1. Bangia, R. K.**,** *"Law of Contract: Part I and Part II"*, Latest Edition, Allahabad Law Agency, Faridabad, ISBN: 9788189530129. 2. Bockrath, J. T., & Plotnick, F. L**.**, *"Contracts and the Legal Environment for Engineers and Architects"*, 7th edition, McGraw-Hill Education, New York, 2013, ISBN: 9780073397849 3. Central Public Works Department (CPWD), *"Specifications, Analysis of Rates, Forms of Contracts, Works Manual & SOP"*, 2024, Government of India, New Delhi. 4. Government of Goa, *"Goa Schedule of Rates"*, latest edition, Public Works Department, Government of Goa, Panaji. 5. Government of India, *"Contract Labour and Minimum Wages Act"*, Latest Edition, Ministry of Labour and Employment, New Delhi. 6. Government of India, *"RERA User Manual"*, Latest Edition, Ministry of Housing and Urban Affairs, New Delhi. 7. Markanda, P. C**.**, *"Building and Engineering Contracts: Law and Practice"*, 5th edition, LexisNexis, Gurgaon, 2015, ISBN: 9788131251669. 8. Ministry of Statistics and Programme Implementation, Government of India, *"Standard General Conditions for Domestic Contracts"*, Latest edition, New Delhi. 9. Professional Book Publishers, *"The Indian Contract Act, 1872 (Bare Act)"*, New Delhi, ISBN: 9789352470624. 10. Patil, B. S.**,** *"Civil Engineering Contracts and Estimates"*, 4th edition, Universities Press, Hyderabad, 2010, ISBN: 9788173719578 11. Professional Book Publishers, *"The Workmen's Compensation Act, 1923 (Bare Act)"*, New Delhi, ISBN: 9789381270424.
Course Outcomes:	After going through this course, students will be able to: CO 1. Classify types of contracts and identify legal elements under the Indian Contract Act, 1872 CO 2. Draft essential construction documents including tender notices, CPWD contract forms, and FIDIC-based contracts. CO 3. Analyze contract clauses, conditions, and specifications for applicability and compliance in construction projects. CO 4. Evaluate the impact of legal regulations such as the Workmen's Compensation Act and RERA on project execution.

SEMESTER V

Name of the Programme	**: Civil Engineering (Construction Technology)**
Course Code	**: CIV-381**
Title of the Course	**: Infrastructure Planning and Quality & Safety Management in Construction**
Number of Credits	**: 03**
Effective from AY:	**: 2024-25**

Pre-requisites for the Course:	Knowledge of Fundamentals of Civil Engineering	
Course Objectives:	**This course will enable students to:** • Introduce students to the structure and scope of infrastructure sectors in India. • Familiarize students with infrastructure project life cycles, institutions, and privatization concepts. • Expose students to risk, quality, safety, and sustainability issues in infrastructure development. • Provide a foundation in planning, management, and stakeholder coordination for infrastructure projects.	
Content:		**No. of hours**
Unit - 1	Introduction to Infrastructure, an overview of the Power Sector, Water Supply and Sanitation Sector, Road, Rail, Air and Port Transportation Sectors, Telecommunications Sector, Urban Infrastructure, Rural Infrastructure in India. Introduction to Special Economic Zones, Organizations and layers in the field of Infrastructure, The Stages of an Infrastructure Project Life cycle. Private Involvement in Infrastructure: A Historical overview, benefits and problems of Infrastructure Privatization. Challenges in Privatization of Water Supply, Power and road transportation infrastructure in India with case studies. Strategies For Successful Infrastructure Project Implementation: Planning, Scheduling and control of Infrastructure projects. Challenges To Successful Infrastructure Planning and Implementation.	**10**
Unit - 2	Mapping and Facing the Risks in Infrastructure Projects, Economic and Demand Risks: The Case study for Political Risks, Socio-Environmental Risks, Cultural Risks in International Infrastructure Projects, Risk Management Framework for Infrastructure Projects, Shaping the Planning Phase of	**10**

	Infrastructure Projects to mitigate risks, Designing Sustainable Contracts, Introduction to Fair Process and Negotiation, Negotiating with multiple Stakeholders on Infrastructure Projects. Sustainable Infrastructure Development: Information Technology and Systems for Successful Infrastructure Management, Infrastructure Modelling and Life Cycle Analysis Techniques, Capacity Building and Improving the Governments Role in Infrastructure Implementation.	
Unit - 3	Introduction to quality; Importance of quality; Quality transition - quality control and inspection, quality assurance, total quality management; Evolution of quality management. Planning and control of quality during design of structures; Inspection of materials and machinery. Quality assurance in construction; Quality standards/codes in design and construction; (ISO:9000), Total quality management (TQM) - principles, tools and techniques.	**10**
Unit - 4	Introduction to safety; Safety and health programs in construction industry; Planning for safety provisions; Analysis of construction hazards and accidents; Construction hazards and safety guidelines; Prevention techniques for construction accidents; Site management with regard to safety recommendations, Training for safety awareness and implementation; Construction safety and health manual.	**10**
Pedagogy:	The teaching–learning pedagogy will emphasize on interactive learning, reflective thinking, critical analysis, and problem-solving	
References/ Readings:	**Textbooks** 1. Knutson, K., Schexnayder, C. J., Fiori, C. M., and Mayo, R.; *Construction Management Fundamentals*, 2nd Edition, McGraw-Hill Education India, New Delhi, 2011. ISBN-10: 0071321187; ISBN-13: 978-0071321181. 2. Hudson, W. R., Haas, R., and Uddin, W.; *Infrastructure Management: Integrating Design, Construction, Maintenance, Rehabilitation, and Renovation*, McGraw-Hill Education, New York, 1997. ISBN-10: 0070308950; ISBN-13: 978-0070308954. 3. Neil, G.; *Infrastructure Engineering and Management*, Wiley, New York, 1988. ISBN-10: 047184974X; ISBN-13: 978-0471849742. **Reference Books** 1. Dale, B. G.; *Managing Quality*, 4th Edition, Blackwell Publishing, Oxford, 2003. ISBN-10: 0631236147; ISBN-13: 978-0631236146.	

Course Outcomes:	**After going through this course, students will be able to:** **CO1** Identify and classify major infrastructure sectors and related organizations in India. **CO2** Explain the infrastructure project life cycle stages and the challenges of privatization using examples. **CO3** Analyze risks, quality practices, and safety issues in infrastructure projects. **CO4** Apply planning, risk mitigation, quality, and safety measures in infrastructure project scenarios.

Name of the Programme	**: Civil Engineering (Construction Technology)**
Course Code	**: CIV-382**
Title of the Course	**: Infrastructure Planning and Quality & Safety Management in Construction Lab**
Number of Credits	**: 01**
Effective from AY	**: 2024-25**

Pre-requisites for the Course:	Knowledge of Fundamentals of Civil Engineering	
Course Objectives:	**This course will enable students to:** • Understand material quality requirements and laboratory equipment verification methods used in construction practice. • Apply basic project planning and scheduling techniques in construction projects. • Understand and apply quality control, safety practices, and testing methods in construction works. • Analyze real-world construction projects to distinguish factors leading to project success or failure.	
Content:	A minimum of 8 practical are to be performed from the list.	**No. of hours**
	1. Conduct field inspection tests of materials such as cement, bricks, steel etc. and prepare a material inspection report using calipers, weighing scale, visual guides to check the material quality against given specifications (e.g., rebar diameter, weight of brick) 2. Conduct Verification/Correctness tests of In-house laboratory equipment's such as Cube moulds, Sieves, pan balance etc. 3. Conduct quality control and inspection in construction site. 4. Preparation of Work Breakdown structure of a sub-Project 5. Drawing a Network and identifying critical path 6. Preparation of Line of balance chart for Repetitive works in a project 7. Conduct a study on safety signs, PPE and first aid Procedures on a Construction Site. 8. Non-Destructive testing for check the quality of structures. 9. Case study analysis of failed vs. successful projects.	**30**
Pedagogy:	The teaching–learning pedagogy will emphasize on Instructional learning, Inquiry based learning, Constructive learning, Collaborative learning and problem solving.	
References/ Readings:	**Textbooks** 1. Knutson, K., Schexnayder, C. J., Fiori, C. M., and Mayo, R.; Construction Management Fundamentals, 2nd Edition, McGraw-Hill Education	

	India, New Delhi, 2011. ISBN-10: 0071321187; ISBN-13: 978-0071321181. 2. Hudson, W. R., Haas, R., and Uddin, W.; Infrastructure Management: Integrating Design, Construction, Maintenance, Rehabilitation, and Renovation, McGraw-Hill Education, New York, 1997. ISBN-10: 0070308950; ISBN-13: 978-0070308954. 3. Neil, G.; Infrastructure Engineering and Management, Wiley, New York, 1988. ISBN-10: 047184974X; ISBN-13: 978-0471849742. 4. Kavanagh, D. P., and Cooke, B.; Construction Management, Wiley-Blackwell, Oxford, 2015. ISBN-13: 978-1118838167. **Reference Books** 1. Dale, B. G.; Managing Quality, 4th Edition, Blackwell Publishing, Oxford, 2003. ISBN-10: 0631236147; ISBN-13: 978-0631236146. 2. Halpin, D. W., and Senior, B. A.; Construction Management, 4th Edition, Wiley, New York, 2010. ISBN-13: 978-0470447239. 3. Harris, F., McCaffer, R., and Edum-Fotwe, F.; Modern Construction Management, 7th Edition, Wiley-Blackwell, Oxford, 2013. ISBN-13: 978-1118346648.
Course Outcomes:	**After going through this course, students will be able to:** **CO1** Apply material inspection procedures and verify laboratory equipment to assess construction quality. **CO2** Develop project planning tools such as WBS, network diagrams, critical path, and line of balance. **CO3** Implement quality control measures, safety practices, and non-destructive testing techniques at construction sites. **CO4** Analyze case studies of construction projects to identify technical and managerial causes of success or failure.

SEMESTER VI

Name of the Programme	**: Civil Engineering (Construction Technology)**
Course Code	**: CIV-383**
Title of the Course	**: Advanced Construction Techniques, Equipment and Materials**
Number of Credits	**: 03**
Effective from AY	**: 2024-25**

Pre-requisites for the Course:	Knowledge of Fundamentals of Civil Engineering	
Course Objectives:	**This course will enable students to:** • **Understand** the principles and applications of modern construction methods • **Explain** the functioning, selection, and operational characteristics of advanced construction equipment and machinery. • **Apply** knowledge of advanced construction materials. • **Analyze** construction scenarios to **evaluate** suitable construction techniques, equipment, and materials.	
Content:		**No. of hours**
Unit - 1	Introduction to Prefabricated structures, Modular Construction, Dewatering techniques for trenches and tunnels. Grouting and Guniting, 3D Concrete Printing, Ready Mix Concrete Plant, Pile driving, Hot Mix Plant, Insulating Concrete Formwork, Sensor-Enabled Construction (IoT, Monitoring Systems), Green Building Practices, Twin Wall Technology, Mivan construction.	**10**
Unit - 2	Introduction to Advanced Equipment and machinery, such as Earth moving Vehicles: Tractors, Boulders, Graders, Scrapers, Rippers Hauling equipment: Trucks, Wagon, Dumpers, Scrapers and rippers., Drilling and blasting equipment, Pile driving equipment, Pumping equipment (for water as well as concrete), applications of air compressor, Hoisting equipment such as Derrick Pole, Gin Pole, Crane, Power-driven scotch derrick crane, Hand-operated crane, Locomotive crane, Gentry crane, Tower crane, Lattice Girder, Winches, Elevators, ladders,	**10**
Unit - 3	Introduction to Advanced Equipment and machinery, such as	**10**

	Excavation Machinery: Power Shovel, Drag line, Calm Shell, Scoop, Trenching equipment, Wheel mounted belt loaders. Compacting equipment: Rollers (earth compaction), smooth-surface roller, sheep foot roller, pneumatic rollers, tamping roller, vibrating roller, and compactors. Conveying equipment: Belt conveyors, Buckets, Chutes Pumping equipment: Water pumps and concrete pumps. Advanced Equipment used for special constructions: Pile Driving Equipment including types of hammer driving, drilling equipment with types of drill. Bituminous road construction Equipment, Equipment for large concrete works, Dredging equipment	
Unit - 4	Fibers and Plastics- Types of fibres- Steel, Carbon, glass fibres, Use of fibres as construction material, properties of Fibers. Types of plastics- PVC, RPVC, HDPE, FRP, GRP etc. Coloured plastic sheets. Use of plastic as construction material. Artificial Timbers – Properties and uses of artificial timber. Types of artificial timber available in market, strength of artificial timber. Miscellaneous materials – Properties and uses of acoustics materials, wall claddings, plaster boards, micro-silica, artificial sand, bonding agents, adhesives etc. Polymer materials, Thermo-Plastic, Polymer Concrete, High volume fly ash concrete, geo-polymer concrete, Composite, materials, Ferro cement, Ferro-concrete, Building materials from Agricultural, and Industrial wastes, M Sand, Glass, Cladding, Light Weight Concrete. Materials used for false ceilings. Cross-Laminated Timber,	**10**
Pedagogy:	The teaching–learning pedagogy will emphasize on interactive learning, reflective thinking, critical analysis, and problem-solving	
References/ Readings:	**Textbooks** 1. Sankar, S. K., and Saraswati, S.; Construction Technology, Oxford University Press, New Delhi, 2008, ISBN-13- 9780195694833 2. Arora, S. P., and Bindra, S. P.; The Text Book of Building Construction, 5th Edition, Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 2015. ISBN-13: 978-8189928803. 3. Rangwala, S. C.; Engineering Materials, Charotar Publishing House, Ahmedabad, 2015. ISBN-13: 978-9385039171. **Reference Books** 1. Powers, J. P.; Construction Dewatering: New Methods and Applications, John Wiley & Sons, New York, 1992, ISBN-13- 978-0-471-47943-7. 2. Irvine, J.; Advanced Construction Techniques, CA Rocketr, California, 1984, ISBN-13: 978-0912468228	

Course Outcomes:	**After going through this course, students will be able to:** **CO1** Explain the working principles and applications of construction equipment. **CO2** Select suitable excavation, compaction, conveying, and concreting equipment for construction activities. **CO3** Explain properties and uses of fibres, plastics, polymers, composites, and artificial construction materials. **CO4** Apply knowledge of modern, sustainable construction materials in infrastructure projects.

Name of the Programme	**: Civil Engineering (Construction Technology)**
Course Code	**: CIV-384**
Title of the Course	**: Advanced Construction Techniques, Equipment and Materials Lab**
Number of Credits	**: 01**
Effective from AY:	**: 2024-25**

Pre-requisites for the Course:	**Knowledge of Fundamentals of Civil Engineering**	
Course Objectives:	**This course will enable students to:** • **Provide knowledge** of advanced construction techniques, modern concreting methods, and sustainable construction practices used in contemporary civil engineering projects. • **Familiarize students** with advanced construction equipment and machinery, including their working principles, selection criteria, operation, and maintenance requirements. • **Develop the ability** to apply and analyze modern construction materials such as polymers, fibers, composites, industrial and agricultural waste–based materials for appropriate construction applications. • **Enhance analytical skills** to evaluate construction techniques, equipment, and materials with respect to performance, economy, safety, and environmental sustainability.	
Content:		**No. of hours**
	1. To prepare a site visit report on an ongoing construction project using advanced equipment and machinery, including identification of equipment, selection criteria, and advantages. 2. To study the operation and maintenance aspects of advanced construction equipment and machinery through a site visit to an active construction site. 3. To prepare a site visit report on an ongoing construction project employing advanced construction techniques, including their selection criteria and advantages. 4. To carry out mix design and casting of any one type of modern concrete such as Polymer Concrete, High Volume Fly Ash Concrete, Geo-polymer Concrete, or Composite Concrete. 5. To study basic specification and conformity-related properties such as aspect ratio, mean fibre length, and moisture content of any one type of construction fibre.	**30**

	6. To determine basic physical properties such as specific gravity and fineness of building materials derived from agricultural or industrial wastes like GGBFS, Fly Ash, or Rice Husk Ash. 7. To conduct inspection and testing of basic specification and conformity-related properties such as uniformity of thickness, density, visual defects, and moisture absorption of wall claddings, plaster boards, or false ceiling materials. 8. To study physical properties such as moisture content, density, and dimensions of different types of artificial timber available in the market.	
Pedagogy:	The teaching–learning pedagogy will emphasize on Instructional learning, Inquiry based learning, Constructive learning, Collaborative learning and problem solving.	
References/ Readings:	**Textbooks** 1. Sankar, S. K., and Saraswati, S.; Construction Technology, Oxford University Press, New Delhi, 2008, ISBN-13- 9780195694833 2. Arora, S. P., and Bindra, S. P.; The Text Book of Building Construction, 5th Edition, Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 2015. ISBN-13: 978-8189928803. 3. Rangwala, S. C.; Engineering Materials, Charotar Publishing House, Ahmedabad, 2015. ISBN-13: 978-9385039171. **Reference Books** 4. Powers, J. P.; Construction Dewatering: New Methods and Applications, John Wiley & Sons, New York, 1992, ISBN-13- 978-0-471-47943-7. 5. Irvine, J.; Advanced Construction Techniques, CA Rocketr, California, 1984, ISBN-13: 978-0912468228.	
Course Outcomes:	**After going through this course, students will be able to:** **CO1** Prepare site visit reports documenting advanced equipment, construction techniques, and associated selection criteria. **CO2** Perform mix design and casting of modern concretes such as polymer, geopolymer, or HVFA concrete. **CO3** Determine physical and conformity-related properties of fibres, artificial timber, and waste-based construction materials. **CO4** Inspect and assess the conformity and quality of wall claddings, plaster boards, and false ceiling materials available in the market.	

SEMESTER VII

Name of the Programme : **Civil Engineering (Construction Technology)**

Course Code : **CIV-481**

Title of the Course : **Corporate Laws and Arbitration**

Number of Credits : **04**

Effective from AY : **2024-25**

Pre-requisites for the Course:	Knowledge of Fundamentals of Civil Engineering	
Course Objectives:	**This course will enable students to:** 1. **Introduce** the concepts of Corporate Social Responsibility, business ethics, and corporate governance. 2. **Provide fundamental knowledge** of Company Law, Partnership Law, and Labour Laws. 3. **Develop understanding** of Intellectual Property Rights, including patents, trademarks, and copyrights. 4. **Familiarize students** with mechanisms of Alternative Dispute Resolution, consumer protection laws, competition policy, and MSME development legislation	
Content:		**No. of hours**
Unit - 1	Corporate Social Responsibility: Introduction to CSR- Concept of Corporate Social Responsibilities- Government Initiatives and CSR- Business Ethics- Corporate Governance Company Law and The Partnership Act: Introduction- Procedure for Incorporation of Companies- Indian Partnership Act 1932- Rights and Duties of Partners- Relation of Partners to Third Parties- Dissolution of a Firm.	**15**
Unit - 2	Intellectual Property Rights and Patent Law: Concept and importance of Intellectual Property - Need, Development and Essentials of Patent Law, Procedures for Grant of Patent Application- Drafting of Patent Specifications. Trademark and Copyright Law: Introduction to Trademark Law- The Trademark Act 1999- Introduction to Copyright Law- The Norms of International Copyrights- Indian Copyright Act 1957 and Rules.	**15**
Unit - 3	Alternative Dispute Resolution: Methods - pros and cons over litigation. Amicably resolving the disputes: Expert determination, mediation / conciliation and relevant laws. The Arbitration and Conciliation Act 1996. History of Law of Arbitration and process of evolution of Act 1996 and amendments till date.	**15**

	Introduction to UNCITRAL 1996 and its importance. Arbitration- Important aspects of process of Arbitration leading to Award and subsequent scenario.	
Unit - 4	Consumer Protection and Competition Policy/Act: Introduction and Overview of Competition Act 2002- Important terms and its interpretation- The Consumer Protection Act 1996 Micro, Small and Medium Enterprises Development Act: Objectives, Necessity and Significance of MSMED Act 2006. An introduction to Labour Law, laws related to wages and social security,	**15**
Pedagogy:	The teaching–learning pedagogy will emphasize on interactive learning, reflective thinking, critical analysis, and problem-solving	
References/ Readings:	**Textbooks** 1. Werther, W. B. Jr., and Chandler, D.; Strategic Corporate Social Responsibility: Stakeholders in a Global Environment, 2nd Edition, SAGE Publications, New Delhi, 2011. ISBN-13: 978-1412991410. 2. Reddy, G. B.; Intellectual Property Rights and the Law, Eastern Book Company, Lucknow, 2020. ISBN-13: 978-9389999998. **Reference Books** 1. Cornish, W. R., and Aplin, T.; Intellectual Property: Patents, Copyrights, Trade Marks and Allied Rights, 8th Edition, Sweet & Maxwell, London, 2013. ISBN-13: 978-0414024126. 2. Chakraborty, A.; Law and Practice of Alternative Dispute Resolution in India, LexisNexis, New Delhi, 2016. ISBN-13: 978-9386516815. 3. Malhotra, O. P., and Malhotra, I.; The Law and Practice of Arbitration and Conciliation, 3rd Edition, LexisNexis, New Delhi, **ISBN-13:** 978-9381082744	
Course Outcomes:	**After going through this course, students will be able to:** **CO1** Understand the key characteristics of Corporate Social Responsibility (CSR), company law and the partnership act **CO2** Comprehend IPR, patent, trademark and copyright law **CO3** Identify techno-legal-commercial linkages in contracts and draft contract clauses **CO4** Acknowledge the significance of consumer, competition law and MSMED Act	