



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in Light of NEP-2020
M.Tech. Construction Technology and Management
(2024-2026)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTCE 5301(1)	DSE	Sustainable Materials and Green Buildings	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

On completion of this course, students are able to know the idea of utilizing less carbon emission materials and calculation of energy consumed for a building.

Course Outcomes (COs):

1. Understand what sustainability means and how construction materials like cement and steel affect the environment.
2. Identify eco-friendly materials like low-cement concrete and recycled aggregates and understand their benefits.
3. Calculate and compare how much energy different materials use during their life (embodied energy).
4. Learn about building energy codes and rating systems like ECBC, LEED, and GRIHA, and how materials affect building energy use.
5. Understand how energy sources like coal and oil impact the environment, and how to reduce problems like global warming and acid rain.

Syllabus:

UNIT I

08 Hrs.

Introduction and definition of Sustainability. Carbon cycle and the role of construction material such as concrete and steel, etc. CO₂ contribution from cement and other construction materials.

UNIT II

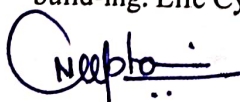
09 Hrs.

Construction materials and indoor air quality. No/Low cement concrete. Recycled and manufactured aggregate. Role of QC and durability. Life cycle and sustainability.

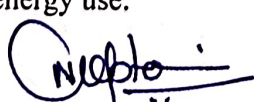
UNIT III

08 Hrs.


Components of embodied energy, calculation of embodied energy for construction materials. Energy concept and primary energy. Embodied energy via-a-vis operational energy in conditioned building. Life Cycle energy use.




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UNIT IV

08 Hrs.

Control of energy use in building, ECBC code, codes in neighboring tropical countries, OTTV concepts and calculations, features of LEED and TERI Griha ratings. Role of insulation and thermal properties of construction materials, influence of moisture content and modeling. Performance ratings of green buildings. Zero energy building.

UNIT V

8 Hrs.

Non-renewable sources of energy and Environmental aspects – energy norm, coal, oil, natural gas, nuclear energy, Global temperature, Greenhouse effects, global warming. Acid rain - Causes, effects and control methods. Regional impacts of temperature change.

Text Books:

1. Green Buildings and Sustainable Construction, R. K. Pachauri, TERI Press, 2015
2. Sustainable Construction and Green Building Design, A. K. Jain, Khanna Publishers, 2015
3. Sustainable Building Materials and Technology, B. V. Venkatarama Reddy, Universities Press (India), 2011

Reference Books:

1. Green Building: Principles and Practices in Residential Construction, Abe Kruger & Carl Seville, Cengage Learning India, 2012
2. Sustainable Building Design, K. S. Jagadish, IISc Press, 2012

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MTCE 5301(2)	DSE	Principles of Affordable Housing	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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Course Educational Objectives (CEOs):

On completion of this course, students are able to understand the concept, importance, and evolving trends of affordable housing in the Indian and global context.

Course Outcomes (COs):

Upon successful completion of this course, students will be able to:

1. Explain the key concepts, policies, and current trends related to affordable housing.
2. Analyze the feasibility and development process of affordable housing projects, considering policy issues.
3. Evaluate financing options and design strategies for affordable and nonprofit housing.
4. Identify and recommend suitable alternative building materials derived from industrial and agricultural waste.

Syllabus:

UNIT I

08 Hrs.

Introduction and overview, current trends in affordable housing, project feasibility, affordable housing policy, practice and issues, affordable housing development process.

UNIT II

09 Hrs.

Financing affordable housing, site planning, architecture and cost of new and rehabilitated affordable housing, nonprofit housing development, future of affordable housing production

UNIT III

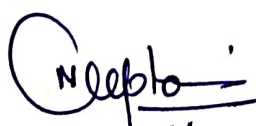
08 Hrs.

Alternative Building Materials for Low-Cost Housing: introduction, substitutes of scarce materials, industrial waste, agricultural waste, strategies for promotion of alternative building materials


UNIT IV

08 Hrs.

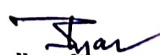
Low-Cost Infrastructural Services: introduction, present scenario, low cost sanitation, domestic waste disposal, water supply, energy



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UNIT V

08 Hrs.

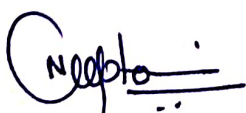
Approaches and strategies for housing urban poor, Adoption of innovative and cost-effective construction technology

Text Books:

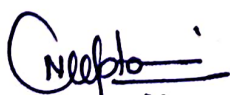
1. Low-Cost Housing in Developing Countries, B.V. Venkatarama Reddy & K.S. Jagadish, Universities Press, 2021
2. Affordable Housing in India: Challenges and Opportunities, K.P. Yadav, New Century Publications, 2015
3. Handbook of low-cost housing, Lal A.K, New Age Publications, 2020

Reference Books:

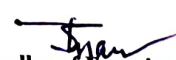
1. Principles of Low-cost housing, Sonikya Wole, Springer, 2015
2. Making more affordable: the role of intermediate tenures, Monk Sarah, Jhon Wiley Inc



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MTCE 5301(3)	DSE	Real Estate Management	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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Course Educational Objectives (CEOs):

On completion of this course, students will be equipped with a comprehensive understanding of the real estate industry, including its management principles, enabling them to effectively manage and contribute to the real estate sector.

Course Outcomes (COs):

1. Understand the definition, classification, and scope of real estate and identify key stakeholders and their roles.
2. Explain the legal and regulatory framework governing real estate in India, including land laws, RERA, and property registration.
3. Analyse real estate project planning processes, including feasibility studies, site selection, and construction management.
4. Evaluate various sources of real estate finance, perform valuation, and carry out financial modelling and risk analysis.
5. Examine emerging trends in real estate such as smart cities, sustainable development, GIS, and professional ethics.

Syllabus:

UNIT I

08 Hrs.

Introduction to Real Estate Management - Definition and Scope of Real Estate; Classification of Real Estate; Stakeholders in Real Estate; Functions of Real Estate Management; Overview of Indian Real Estate Sector

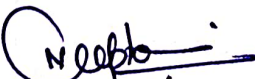
UNIT II

09 Hrs.

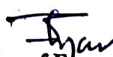
Legal and Regulatory Framework - Land Acquisition Laws and Land Use Planning; RERA – Real Estate (Regulation and Development) Act, 2016; Development Control Regulations (DCR) and Building Bye-laws; Environmental and Clearance Norms; Title Search and Legal Due Diligence; Property Registration and Taxation


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MTCE 5301(3)	DSE	Real Estate Management	60	20	20	0	0	3	0	0	3

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UNIT III

08 Hrs.

Real Estate Project Planning and Development - Feasibility Studies and Project Viability; Site Selection and Land Procurement; Master Planning and Zoning; Design and Approval Processes; Construction Management and Scheduling; Marketing Strategies and Sales Management

UNIT IV

08 Hrs.

Real Estate Finance and Investment - Sources of Finance; Real Estate Valuation Methods; Financial Modeling and Risk Analysis; Cash Flow and ROI Analysis; Mortgage, Lease, and Rental Structures.

UNIT V

08 Hrs.

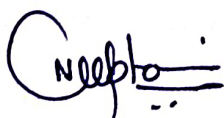
Emerging Trends and Professional Practices - Smart Cities and Urban Infrastructure; Sustainable Development and Green Buildings; GIS and PropTech in Real Estate; Portfolio and Asset Management; International Real Estate – Global Practices; Ethics and Professional Practices.

Text Books:

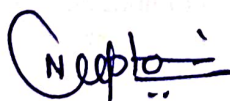
1. Real Estate Management, P.K. Gupta, Himalaya Publishing House, 2015
2. Real Estate Law and Practice, R.K. Puri, Bharat Law House, 2023
3. Real Estate Business: Principles and Management, N. Sridhar, Notion Press

Reference Books:

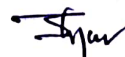
1. Infrastructure and Real Estate Financing in India, M. A. Moid, Emerald Publishing
2. RERA Act with Commentary – Bare act versions with notes (by Taxmann or Commercial Law Publishers)
3. Reports by CREDAI, NAREDCO, Knight Frank, and CBRE India – Industry insights, trends, and research papers



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MTCE 5302(1)	DSE	Pre - Engineering Construction and Technology	60	20	20	0	0	3	0	0	3

Legend: L - Lectures, T - Tutorials, P - Practicals

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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Course Educational Objectives (CEOs):

On completion of this course, students will be able to

1. Understand prefabrication principles, production and erection technologies, structural elements
2. Design and application of pre-engineered buildings, enabling them to plan and manage modern construction projects efficiently.

Course Outcomes (COs):

On completion of this course, students will be able to

1. Know what prefabrication is and how it is different from normal construction.
2. Understand how prefab parts are made, moved, and lifted into place on site.
3. Learn about special prefab panels and beams, and how to keep buildings safe in earthquakes.
4. Understand what pre-engineered buildings are, their benefits, and how they differ from regular steel buildings.

Syllabus:

UNIT I

08 Hrs.

General Principles of Pre Fabrication - Comparison with monolithic construction, Types of prefabrication, site and plant prefabrication, Economy of prefabrication, Planning for Components of prefabricated, Handling and erection stresses, Elimination of erection stresses

UNIT II

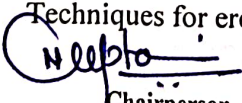
09 Hrs.

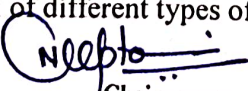
Prefabricated Elements - Roof and floor panels, ribbed floor panels, wall panels, footings, Joints for different structural Connections, Effective sealing of joints for water proofing, Provisions for non-structural fastenings, Expansion joints in pre-cast construction.


UNIT III


08 Hrs.

Production and Hoisting Technology- Choice of production setup, Manufacturing methods, Stationary and mobile production, Planning of production setup, Storage of precast elements, Dimensional tolerances, Acceleration of concrete hardening, Equipment's for hoisting and erection Techniques for erection of different types of members like Beams; Slabs; Wall panels and Columns


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MTCE 5302(1)	DSE	Pre - Engineering Construction and Technology	60	20	20	0	0	3	0	0	3

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UNIT IV

08 Hrs.

Precast sandwich Panels, Prestressed concrete solid flat slabs, Hollow core slab/panels, Prestressed concrete Double "T" Bridge, Precast segmental Box Girders, Specifications and Seismic considerations.

UNIT V

08 Hrs.

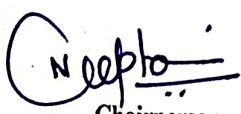
Pre-Engineered Buildings: Introduction, Advantages, difference in Pre-Engineered Buildings and Conventional Steel Buildings, Design criteria of Pre-Engineered Buildings (PEB), Applications

Text Books:

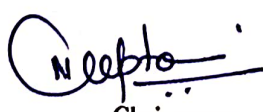
1. Prefabricated Structures, R. Ganesan & Dr. A. Latha, Sree Kamalamani Publications, 2014
2. Prefabricated Structures, Dr. R. Saravanan & R. Dinesh Kumar, Lakshmi Publications, 2021
3. Prefabricated Structures, A. Jebamalar, Magnus Publications, 2019

Reference Books:

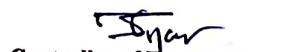
1. Prefabricated Concrete for Industrial and Public Structures, L. Mokk, Publishing House of the Hungarian Academy of Sciences, 2007
2. Manual of Precast Concrete Construction, T. Koncz.
3. Precast concrete design and Applications, Hass; A.M, Applied Science Publishers.


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MTCE 5302(2)	DSE	Mechanization in Construction	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

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Course Educational Objectives (CEOs):

On completion of this course, students will be able

1. To introduce key concepts, benefits, and applications of mechanization in construction.
2. To develop understanding of equipment and methods used in mechanized construction processes.

Course Outcomes (COs):

On completion of this course, students will be able to

1. Explain the role and scope of mechanization in construction.
2. Identify and classify various construction and earthmoving equipment.
3. Describe mechanized methods in aggregate processing and concrete works.
4. Understand mechanization in tunnelling, piling, and advanced construction methods.
5. Assess equipment selection considering safety and environmental aspects.

Syllabus:

UNIT I

08 Hrs.

Definition, advantages and limitations of mechanization, Indian scenario and Global scenario. Mechanization through construction equipment: Equipment cost, Machine Power, Production cycle, Dozers, scrapers, Excavators, finishing equipment, Trucks and Hauling equipment, Hoisting equipment, Draglines and Clamshells

UNIT II

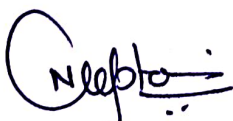
09 Hrs.

Mechanized Processing of Natural Aggregates, Site selection and geological investigations, Mechanized drilling, blasting, excavation, Crushers and screening equipment, Material handling systems: conveyors, hoppers, feeders, Dust suppression and environmental management

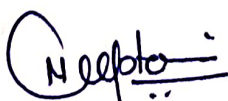
UNIT III

08 Hrs.


Mechanization in concrete production and placement, Mechanization through construction formwork and scaffolding types, materials and design principles.



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MTCE 5302(2)	DSE	Mechanization in Construction	60	20	20	0	0	3	0	0	3

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UNIT IV

08 Hrs.

Segmental construction of bridges/flyovers, box pushing technology for tunneling, trench-less technology. Pile Driving Equipment: Pile hammers, selecting a pile hammer, loss of energy due to impact, Energy losses due to causes other than impact.

UNIT V

08 Hrs.

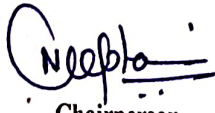
Definition of terms, bits, Jackhammers, Drifters, wagon drills, chisel drills, piston drills, blast hole drills, shot drills, diamond drills, tunneling equipment, selecting drilling method equipment, selecting drilling pattern. Safety and Environmental issues in mechanization

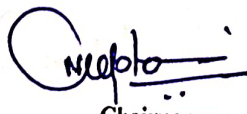
Text Books:

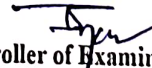
1. Construction Equipment and its Planning and Applications, Mahesh Varma, Metropolitan Book Co.(P) Ltd., New Delhi. India, 2015
2. Construction Equipment and Its Management, S.C. Sharma, Khanna Publishers, 2018
3. Construction Planning, Equipment and Methods, Peurifoy R L, Mc Graw Hill, 2019


Reference Books:

1. Construction Equipment, James F Russell, Prentice Hall
2. Handbook on Mechanized Construction by Indian Railways


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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in Light of NEP-2020
M.Tech. Construction Technology and Management
(2024-2026)

(2024-2025)											
COURSE CODE	CATEGORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MTCE 5302(3)	DSE	Forensic Engineering and Rehabilitation of Structures	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

On completion of this course, students will be able to

1. To understand the causes of structural failures and principles of forensic investigation.
2. To learn diagnostic methods and modern techniques for structural repair and rehabilitation.

Course Outcomes (COs):

On completion of this course, students will be able to

1. Identify causes of failure in structural components.
2. Use visual and non-destructive methods for distress assessment.
3. Evaluate environmental impacts on structural durability.
4. Recommend suitable retrofitting and repair techniques.

Syllabus:

UNIT I

08 Hrs.

Failure of Structures: Review of the construction theory, performance problems, responsibility and accountability, learning from failures, causes of distress in structural members, design and material deficiencies, overloading.

UNIT II

09 Hrs.

Diagnosis and Assessment of Distress: Visual inspection, non- destructive tests, ultrasonic pulse velocity method, rebound hammer technique, ASTM classifications, pullout tests, Bremor test, Windsor probe test, crack detection techniques, Environmental Problems and Natural Hazards:

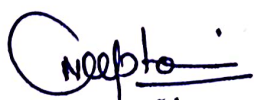
UNIT III

08 Hrs.

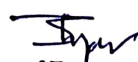
Environmental Effects: Effect of corrosive, chemical and marine environment, pollution and carbonation problems, durability of RCC structures, damage due to earthquakes and flood strengthening of buildings, provisions of IS 1893 and 4326.



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MTCE 5302(3)	DSE	Forensic Engineering and Rehabilitation of Structures	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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UNIT IV

08 Hrs.

Modern Techniques of Retrofitting: Structural first aid after a disaster, guniting, jacketing, use of chemicals in repair, application of polymers, ferrocement and fiber concretes as rehabilitation materials, rust eliminators and polymer coating for rebars, foamed concrete- mortar repair for cracks, shoring and underpinning, strengthening by pre-stressing.

UNIT V

08 Hrs.


Case studies: Case studies on failure of heritage buildings, high rise buildings, water tanks, bridges and other structures

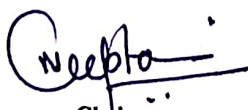
Text Books:

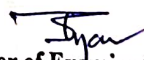
1. T.N. Subramaniam, Forensic Civil Engineering, Notion Press, 2021
2. P.C. Varghese, Building Failures and Forensic Engineering, Eastern Economy, 2020
3. P. I. Modi & C. N. Patel, Repair and Rehabilitation of Structures, Standard Book House, 2015


Reference Books:

1. R. Srinivasan, Repair and Rehabilitation of Concrete Structures, Oxford University Press, 2016
2. Peter H. Emmons, Concrete Repair and Maintenance Illustrated, RS Means Company, Inc.


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