JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech in CONSTRUCTION MANAGEMENT

Effective from Academic Year 2017- 18 admitted batch
COURSE STRUCTURE AND SYLLABUS

I Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Quantitative Methods in Construction Management	25	75	4	0	0	4
PC-2	Construction Methods and Equipment	25	75	4	0	0	4
PC-3	Construction Engineering practices	25	75	4	0	0	4
PE-1	Construction Project planning and Administration. Infrastructure Valuation Formwork and scaffolding design.	25	75	**3**	0	0	3
PE-2	Repair & Rehabilitation of Buildings Geotechnics for Infrastructure. Integrated Water Resources Management.	25	75	**3**	0	0	3
OE-1	***Open Elective - I**	25	75	3	0	0	3
Laboratory I	Construction Engineering Lab	25	75	0	0	3	2
Seminar I	Seminar-I	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

II Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Management of quality and safety in construction	25	75	4	0	0	4
PC-5	Construction and Contract Management	25	75	4	0	0	4
PC-6	Civil Engineering Materials and Recent Advances	25	75	4	0	0	4
PE-3	Construction Economics and Finance Waste Management System Building services.	25	75	**3**	0	0	3
PE4	Under Water Construction Advanced concrete Technology. Urban/Regional Transportation Analysis and Planning Methods	25	75	**3**	0	0	3
OE-2	***Open Elective – II**	25	75	3	0	0	3
Laboratory-II	Advanced Construction Engineering Lab	25	75	0	0	3	2
Seminar II	Seminar-II	100	0	0	0	3	2
Total		**275**	**525**	**21**	**0**	**6**	**25**

III Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review II	100	0	0	0	22	8
Total	**200**	**100**	0	**3**	22	**14**

IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review III	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	100	0	0	0	16
Total	**100**	**100**	**0**	**0**	**24**	**24**

***Open Elective subjects must be chosen from the list of open electives offered by OTHER departments.**

 # For Project review I, please refer 7.10 in R17 Academic Regulations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I year II Sem. (Construction Management)

MANAGEMENT OF QUALITY AND SAFETY IN CONSTRUCTION (PC - 4)

Course Objective: To impart knowledge on quality in construction, inspection procedures, standards, and safety aspects.

Course Outcome: The learner will be able to know inspection procedures to identify the quality of construction.

UNIT - I
Quality policy in construction industry-Consumer satisfaction- Ergonomics-Time of completion-Statistical tolerance.

UNIT - II
Taguchi's concept of quality-contract and construction programming-inspection procedures.

UNIT- III
Quality assurance/Quality control programme and cost implication.

UNIT- IV
Different aspects of quality-appraisals-failure mode analysis-stability methods and tools-Influence of drawings-detailing.

UNIT- V
Specifications-standardization-Bid preparation-construction activity-Environmental safety-social and environmental factors.

TEXT BOOKS:

1. Clarkson H. Oglesby, productivity improvement in construction, McGraw Hill, 2000.
2. James, J.O Brain, construction inspection handbook-quality assurance, and quality control, Van Nostrand, New York, 1989.
3. Juran frank, J. M. and Gryana, F. M. Quality planning and Analysis, Tata McGraw Hill, 1982.
4. Kwaku A., Tenah and jose M. Guevera, fundamental of construction management and organization PHI 1995.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I year II Sem. (Construction Management)

CONSTRUCTION AND CONTRACT MANAGEMENT (PC - 5)

Course Objectives: To impart knowledge on municipal bye laws, types of construction contracts, arbitration and litigation procedures.

Courses Outcomes: The learner will be able to prepare plans and get approval from municipal or urban development authorities

UNIT - I
Introduction and concepts of Construction law-public law-government departments and local authorities.

UNIT - II
Private law-contracts-torts-property law and building law-concepts-salient features-sections.

UNIT - III
Construction contracts-contracts specifications-types of contract documents used for construction.

UNIT - IV
Contract procurement- selection of contractor-contract procedure-salient features.

UNIT - V
Arbitration and litigation procedure-preparation, settlement, evidence, price adjustment-need for the formulae-civil engineering and building formulae- practical implications.

TEXT BOOKS:

1. Gajaria G. T., laws relating to building and engineering contracts in India, M. M Tripathi private Ltd., Bombay, 1982.
2. Jimmie Hinze, construction contracts, 2nd edition. McGraw hill, 2001.
3. Joseph T. Bockrath, contracts and the legal environment for engineers and architects, 6th edition, McGraw hill, 2000.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I year II Sem. (Construction Management)

CIVIL ENGINEERING MATERIALS AND RECENT ADVANCES (PC - 6)

Course Objectives: To impart knowledge on different types of concrete and to effectively recycle and reuse waste materials.

Course Outcomes: The learner will be able to use different types of concrete for different purposes

UNIT- I
Light weight aggregate concrete - fiber reinforced concrete - High strength concrete.

UNIT- II
Changes in concrete with time, Corrosion of rebars in concrete- control measures.

UNIT- III
Different Industrial waste materials – their usage in concrete –study of properties.

UNIT- IV
Effects of temperature on Concrete- high temperature - Ferro-cement – advantages and properties and strength.

UNIT- V
Polymers - Fibre reinforced plastic in sandwich panels - Adhesives and sealants. Structural elastomeric bearings, Moisture barriers.

TEXT BOOKS:

1. Adam M. Neville, Properties of Concrete, 5th Edition, Longman Sc and Tech Publishers, 2011.
2. Kumar Mehta. P. and Paulo J. M. Monteiro, Concrete Microstructure, Properties and Materials, McGraw Hill, 2006.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I year II Sem. (Construction Management)

CONSTRUCTION ECONOMICS AND FINANCE (PE - 3)

Course Objectives: To impart knowledge on cost analysis, economics accounting, contract bidding and awards.

Course Outcomes: The learner will be able to understand different budgeting procedures

UNIT - I
Construction accounting-income statement-depreciation and amortization.

UNIT - II
Engineering economics-benefit-cost analysis-replacement analysis-break even analysis-assessment of time for arriving break even.

UNIT - III
Risks and uncertainties and management decision in capital budgeting-Uncertainties due to improper planning.

UNIT - IV
Taxation and inflation-work pricing-contract bidding and award-revision-escalation.

UNIT - V
Turnkey activities-project appraisal and yield - Working capital management-international finance-budgeting and budgetary-performance-appraisal.

TEXT BOOKS:

1. Danny myers, construction economics: A new approach, Taylor and francis publisher, 2004.
2. Ofori, G, the construction industry aspects of its economics and management, Singapore university press, 1990.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I year II Sem. (Construction Management)

WASTE MANAGEMENT SYSTEMS (PE - 3)

Course Objectives: To impart knowledge on managing solid waste and industrial waste and recycling.

Courses Outcomes: The learner will able to use different methods for recycling of different wastes and effectively reuse.

UNIT – I
Basic Theories of Industrial Waste water Management – Volume reduction – Strength reduction – Neutralization – Equalization and proportioning. Joint treatment of industrial wastes and domestic sewage – consequent problems.

UNIT - II
Solid Wastes, Collection and Transportation, Waste Disposal Systems, Land Treatment, Wastewater Management Methods, Landfilling, Incineration, Energy from Wastes, Recycling, Composting, Reuse and Recovery.

UNIT – III
Industrial waste water discharges into streams. Lakes and oceans and problems. Recirculation of Industrial Wastes – Use of Municipal Waste Water in Industries. Common Effluent Treatment Plants – Advantages and Suitability, Limitations, Effluent Disposal Methods. Combined treatement Industrial and Domestic Wastes – Advantages.

UNIT – IV
Hazardous Waste Management – types of wastes – Health effects – treatment methods – Disposal.

UNIT – V
Manufacturing Process and design origin of liquid waste from Textiles, Paper and Pulp industries Tanneries, and steel plants Characteristics, Effects and treatment methods.

REFERENCES:
1. Liquid waste of Industry by Newmerow.
2. Waste Water Treatment by Rao and Dutta.
3. Water and Waste Water technology by Mark J. Hammer and Mark J. Hammer (Jr)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I year II Sem. (Construction Management)

BUILDING SERVICES (PE - 3)

Course Objectives: To impart knowledge on providing proper ventilation, fire protection measures and vertical transportation.

Course Outcomes: The learner will be able to effectively plan for a green building.

UNIT - I
Orientation and Planning - Grouping and circulation - lighting and ventilation.

UNIT - II
Termite proofing of buildings- Lightning protection of buildings - Fire protection of buildings .

UNIT - III
Vertical transportation – Prefabrication systems in residential buildings: Planning and modules and sizes of components in prefabrication.

UNIT - IV
Shell structures - Domes - Folded plate structures - Skeletal and space frame structures- Grain storage structures

UNIT - V
Earthquake resistant structures - Air-conditioning and heating - Acoustics and Sound insulation – Plumbing services

TEXT BOOKS:

1. Arora and Bindra, Building Construction, Dhanpat Rai, 2012.
2. Hand Book of Housing Statistics, NBO, 2003.
3. National Building Code of India, Bureau of Indian Standards, 2005.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I year II Sem. (Construction Management)

UNDER WATER CONSTRUCTION (PE- 4)

Course Objectives: To impart knowledge on construction of foundation under water and also design retaining walls, sheet piling and tunneling methods.

Course Outcomes: The learner will be able to design different under water structures.

UNIT - I
Under Water construction - Site preparation, temporary roads, site drainage.

UNIT - II
Deep trench and deep basement excavations. Bulk excavation. Stability of slopes to open excavations.

UNIT - III
Support of excavation by timbering and sheet piling. Retaining walls and sheet pile design - requirements for shorting and underpinning.

UNIT - IV
Methods of shoring of Underpinning - Tunneling in touch, medium-tough and soft rocks.

UNIT - V
Tunneling by borls shield tunneling - Culverts and conduits - Design of piles, pile load tests. Foundation design for dynamic conditions.

TEXT BOOKS:

1. Ben C. Gerwick Jr., Construction of Marine and Offshore Structures, 3rd Edition, CRC Press, 2007.
2. Patrick Powers. J, Construction Dewatering: New Methods and Applications, John Wiley & Sons, 1992.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I year II Sem. (Construction Management)
ADVANCED CONCRETE TECHNOLOGY (PE - 4)

Course Objectives: To impart knowledge on concrete making materials, design for proportions and their testing.

Course Outcomes: The learner will be able to design concrete mixes of different grades and also use the special concretes.

UNIT – I
Concrete Making Materials : Cement – Bogus Compounds – Hydration Process – Types of Cement – Aggregates – Gradation Charts – Combined Aggregate – Alakali Silica Reaction – Admixtures – Chemical and Mineral Admixtures.

UNIT – II
Fresh And Hardened Concrete: Fresh Concrete – workability tests on Concrete – Setting Times of Fresh Concrete – Segregation and bleeding.
Hardened Concrete: Abrams Law, Gel space ratios, Maturity concept – Stress strain Behaviour – Creep and Shrinkage – Durability Tests on Concrete – Non Destructive Testing of Concrete.

UNIT – III
High Strength Concrete – Microstructure – Manufacturing and Properties – Design of HSC Using Erintroy Shaklok method – Ultra High Strength Concrete.
High Performance Concrete – Requirements and Properties of High Performance Concrete – Design Considerations

UNIT – IV
Special Concretes: Self Compacting concrete, Polymer Concrete, Fibre Reinforced Concrete – Reactive Powder Concrete – Requirements and Guidelines – Advantages and Applications.
Concrete Mix Design: Quality Control – Quality Assurance – Quality Audit - Mix Design Method – BIS Method – DOE Method – Light Weight Concrete, Self Compacting Concrete.

UNIT – V
Form work – materials – structural requests – form work systems – connections – specifications – design of form work – shores – removal for forms - shores – reshoring – failure of form work.

TEXT BOOKS:

1. Special Structural concretes by Rafat Siddique, Galgotia Publications 2000.
2. Design of Concrete Mixes by N. Krishna Raju, CBS Publications, 2000.
3. Concrete: Micro Structure by P. K. Mehta, ICI, Chennai.
4. Properties of Concrete by A. M. Neville, ELBS publications Oct 1996.
5. Concrete Technology by A. R. Santha kumar, Oxford University Press 2006 Oct
6. Concrete Technology by M. S. Shetty, S. Chand & Co 2009.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I year II Sem. (Construction Management)

URBAN/REGIONAL TRANSPORTATION ANALYSIS AND PLANNING METHODS
(PE - 4)

Course Objectives: To impart knowledge on traffic studies, effective transportation systems based on forecasting demand and intelligent transport systems.

Course Outcomes: The learner will be able to design suitable transportation system based on future demands

UNIT– I
Traffic studies: Background of traffic studies and surveys; Basic principles of - Speed and density, volume, headways and accidents; Road Safety auditing, Measures to increase Road safety.

UNIT– II
Statistics and Probability Concepts in Transportations Systems: Statistical Distributions – Binomial, Poisson, exponential and normal distribution, fitness tests, their apperception to transportation system; probability concepts in transportation studies.

UNIT – III
Transportation Demand Forecasting: Travel Demand Scenario; Demand Forecasting Approaches; Time Services Analysis as approach in demand assessment, Factor Analysis apparatus, Behavior modeling forms in travel demand estimation.

UNIT – IV
Pedestrian Delays And Gaps: Pedestrian Gap acceptance and delays; Concept of Blocks, Anti-blocks, Gaps and Non-Gaps; Underwood's analysis for Pedestrian Delays; Warrants for Pedestrian Crossing Facilities – Minimum Vehicular Volume Warrant, Minimum Pedestrian Volume Warrant, Maximum Pedestrian Volume Warrant;

UNIT – V
Intelligent Transport Systems: ITS Definition, Benefits of ITS, user services, Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Introduction to ITS applications; Advanced Traffic Management systems (ATMS), Advanced Traveler Information systems (ATIS), Commercial Vehicle Operations (CVO), Advanced Vehicle Control systems (AVCS), Advanced Public Transportation systems (APTS),Electronic Road Pricing (ERP).

REFERENCES:

1. **Probability Concepts in Engineering Planning and Design**, Vol. II, Decision, Risk, and Reliability, New York. John Wiley & Sons. Hinnes, W. W., and Montgomery, D. C. (1990):
2. **Probability and Statistics in Engineering and Management Science**, 3rd Edition, New York: John Wiley & Sons. Mannering, F. L. and Kilareski, W. P. (1990):

3. **Principles of Highway Engineering & Traffic Analysis**, New York: F.L Mannering & W. P Kilareski, John Wiley & Sons publications
4. **Sensor technologies and Data requirements of ITS,** Lawrence A. Klein**.**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I year II Sem. (Construction Management)

ADVANCED CONSTRUCTION ENGINEERING LAB

Course Objectives: To impart knowledge on different methods of mix design and also methods of testing hardened concrete.

Course Outcomes: The learner will be able to correlate the results of destructive and non destructive testing.

1. Concrete mix design by BIS, ACI and BS method-proportioning, batching, mixing, modeling of specimens for compression, modulus of elasticity and modulus of rupture-testing of specimens as per relevant codes of practice (Comparative study).

2. Development of correlation between Non-Destructive and Destructive tests using Rebound Hammer & UPV instruments.

3. Influence of following parameters on NDT reading-experimental observations.
   i. Aggregate Cement Ratio.
   ii. Water Cement Ration.
   iii. Excess/Deficient Cement.
   iv. Excess/Deficient Water.
   v. Aggregate type.

(Some of the above parameters may be considered depending upon time)

4. Strain and deflection measurement for a structural member under single point/ two point loading- crack propagation observation. Measurement and plotting.