

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.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M. Tech – I year I Sem. (Construction Management)****QUANTITATIVE METHODS IN CONSTRUCTION MANAGEMENT
(PC-1)**

Course Objective: To impart knowledge on statistical tools, linear and dynamic programming.

Course Outcomes: The learner will be able to use effectively different decision making theories and PERT/CPM techniques.

UNIT-I

Introduction and concepts of probability and statistics-Probability theory-Statistical tools.

UNIT-II

Linear programming Transportation and assignment problems.

UNIT-III

Dynamic programming, Queuing theory, Decision theory, Games theory.

UNIT-IV

Simulations applied to construction, Study of various effects.

UNIT-V

Modifications and improvement on CPM/PERT techniques.

TEXT BOOKS:

1. Freund, J.E. and Miller, I.R., Probability and statistics for engineers, 5th edition, prentice hall of India, New Delhi, 1994.
2. Goel B.S and mittal. S. K., Operation Research, pragati Prakashan, Meerut, 2000.
3. Gupta. S.C. and Kapur, V.K., Fundamentals of mathematical statistics, sultan chand and sons New Delhi, 1999.
4. Taha, H.A., Operations research: An introduction, 8th edition, prentice hall India, New Delhi, 2010.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M. Tech – I year I Sem. (Construction Management)****CONSTRUCTION METHODS AND EQUIPMENT
(PC-2)**

Course Objectives: To impart knowledge on various equipment related to different types and stages of construction of civil engineering structures.

Course Outcomes: The learner will be able to know the different equipment required for handling different materials

UNIT-I

Selection of equipment-factors effecting-relative advantages and disadvantages-technical and economic aspects.

UNIT-II

Construction engineering fundamentals-analysis of production outputs and costs

UNIT-III

Characteristics and performance of equipment for earth moving.

UNIT-IV

Erection and material transport equipments- their performance advantages-pile driving-dewatering.

UNIT-V

Study of performance of equipment used for concrete construction including batching and mixing units-equipment used for tunneling.

TEXT BOOKS:

1. Peurifoy, R.L., Ledbetter, W.B and Schexnayder, C, construction planning and equipment methods, 5th Edition, McGraw Hill, Singapore, 1995.
2. Sharma S. C. Construction equipment and management, khanna publishers, New Delhi, 2011.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M. Tech – I year I Sem. (Construction Management)****CONSTRUCTION ENGINEERING PRACTICES
(PC-3)**

Course Objective: To impart knowledge on ready mixed concrete, economics and design of formwork, modular construction and implementation procedure.

Course Outcomes: The learner will be able to design the form work, use ready mix concrete and understands the advantages of modular construction.

UNIT-I

Reinforced and prestressed concrete construction-Prefabricated structures.

UNIT-II

Production of ready mixed concrete-productivity analysis-Economics of formwork-Design of form work and their reusability.

UNIT-III

Modular construction practices-Fibonacci series, its handling and other reliable proportioning concepts.

UNIT-IV

Modular coordination-standardization-system building-advantages.

UNIT-V

Lamination and advantages of modular construction-concepts implementation procedures.

TEXT BOOKS:

1. Allen E, Iano, J, fundamentals of building construction material and method, John Wiley and sons, 2011.
2. Cameron K. Andres. Ronald C. Smith, principals and practices of commercial construction, 8th edition, Prentice Hall, 2009.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M. Tech – I year I Sem. (Construction Management)****CONSTRUCTION PROJECT PLANNING AND ADMINISTRATION
(PE-1)**

Course Objective: To impart knowledge on project planning and management, investment decisions, risks involved and resource management.

Course Outcome: The learner will be able to plan, schedule and monitor the project effectively.

UNIT-I

Construction administration, control of quality in construction, organizational structure, responsibility for co-ordination of the trade-Introduction to Project planning and Scheduling-Processes of project planning- Project scheduling- Progress control.

UNIT-II

Project planning and scheduling techniques- Network scheduling techniques. Project planning using computer based models- Principles of project management.

UNIT-III

Certainty, risk and uncertainty, risk management, identification and nature of construction risks, contractual allocation of risk, types of risks, minimizing risks and mitigating losses, use of expected values, utility in investment decisions, decision trees, sensitivity analysis.

UNIT-IV

Resource management and inventory-Implementation of project planning management.

UNIT-V

Analysis and design of planning and control system- Disputes and claims management-Use of computer based project management tools.

TEXT BOOKS:

1. Callahan, M. T., Quackenbush, D.G., and rowing, J.E., Construction project scheduling, McGraw-Hill, New York, 1992.
2. Cleland, D.I. and Ireland, L.R., project management: Strategic design and implementation, 4th Edition, McGraw-Hill, New York, 2002.
3. Fisk, D.R. 2000 Construction Project Administration, Prentice hall International, London.
4. K Wakye, A.A 1997, Construction Project Administration: Addison Wesley Longman, London.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M. Tech – I year I Sem. (Construction Management)****INFRASTRUCTURE VALUATION
(PE-1)**

Course Objectives: To impart knowledge on value theory, value management and brain storming methods

Course Outcomes: The learner will be able to build effective team and effectively manage the time

UNIT-I

Function analysis; FAST diagramming; brain storming; criteria scoring matrices.

UNIT-II

An introduction to value theory; an introduction to value management.

UNIT-III

Value Engineering-Definition and concepts of the creative and structured phases of value engineering.

UNIT-IV

The workshop approach to achieve value- procedures- merits and demerits-detailed analysis.

UNIT-V

Teambuilding theory; target setting; time management.

TEXT BOOKS:

1. Lawrence D. Miles, Techniques of Value Analysis and Engineering, McGraw-Hill Book Company, 2009.
2. M.R.S. Murthy, Cost Analysis for Management Decisions, Tata McGraw-Hill Publishing Company Ltd., 1988.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M. Tech – I year I Sem. (Construction Management)****FORMWORK AND SCAFFOLDING DESIGN
(PE-1)**

Course Objectives: To impart knowledge on common form work and special form works, and design of form work with different materials for various structural elements.

Course Outcomes: The learner will be able to design ensuring the safety of structure.

UNIT-I

Formwork and false work - Temporary work systems, construction planning and site constraints.

UNIT-II

Materials and construction of the common formwork and false work systems; Special, and proprietary forms.

UNIT-III

Concrete pressure on forms. Design of timber and steel forms; Loading and moment of formwork.

UNIT-IV

Types of beams, decking and column formwork; Design of decking; False work design; Effects of wind load.

UNIT-V

Foundation and soil on false work design; The use and applications of special forms; Sequence of construction; Safety use of formwork and false work.

Text Books:

1. Austin, C.K., Formwork for Concrete, Cleaver, Hume Press Ltd., London, 1996.
2. Michael P. Hurst, Construction Press, London and New York, 2003.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M. Tech – I year I Sem. (Construction Management)****REPAIR & REHABILITATION OF BUILDINGS
(PE-2)**

Course Objectives: To impart knowledge on the distress in structures.

Course Outcomes: The learner will be able to understand the reasons for distress in structures and will be able to suggest suitable solutions.

UNIT – I

Introduction – Deterioration of Structures – Distress in Structures – Causes and Prevention. Mechanism of Damage – Types of Damage.

UNIT – II

Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention. Damage of Structures due to Fire – Fire Rating of Structures – Phenomena of Desiccation.

UNIT – III

Inspection and Testing – Symptoms and Diagnosis of Distress - Damage assessment – NDT.

UNIT – IV

Repair of Structure – Common Types of Repairs – Repair in Concrete Structures – Repairs in Under Water Structures – Guniting – Shotcreting – Underpinning – Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing.

UNIT – V

Health Monitoring of Structures – Use of Sensors – Building Instrumentation

REFERENCES

1. Concrete Technology by A. R. Santha kumar, Oxford University press
2. Defects and Deterioration in Buildings, E F & N Spon, London
3. Non-Destructive Evaluation of Concrete Structures by Bungey - Surrey University Press
4. Maintenance, Repair & Rehabilitation and Minor Works of Buildings by P.C. Varghese, PHI.
5. Maintenance and Repair of Civil Structures, B.L. Gupta, and Amit Gupta, Standard Publications.
6. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W. H. Ranso, (1981)
7. Building Failures: Diagnosis and Avoidance, EF & N Spon, London, B. A. Richardson, (1991).

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

GEO-TECHNICS FOR INFRASTRUCTURE (PE-2)

Course Objectives: To impart knowledge on site investigation and soil testing methods and design of different types of foundation appropriate to the type of soil for different structures.

Course Outcomes: the learner will be able to design shallow and deep foundations like piles for railway and highway bridges, harbor structures and also sheet piles.

UNIT – I

Site Investigation for Infrastructure Projects: methods of site investigation, types of soil samples and samplers- Geotechnical field testing – SPT, CPT, Plate Load Test, Pile Load Test.

UNIT – II

Shallow Foundations for Railway & Highway Bridges and Port & Harbour Structures: types of foundations, design forces, safe and allowable bearing capacity of shallow foundations, settlement computation;

UNIT – III

Pile Foundations for Railway & Highway Bridges and Port & Harbour Structures: Pile foundations – types, axial and lateral capacity of pile, pile group analysis and pile cap; Introduction to drilled piers, caissons, well foundations.

UNIT – IV

Foundations for Transmission Line, Radar Antenna, Microwave and TV Tower and Chimneys: Introduction, foundations for towers and chimneys, design forces, behaviour of pad and chimney foundations, design of chimney and pad foundations, anchor foundations (rock anchors), design of foundations for towers and chimneys, analysis of raft on pile foundations; design and construction of shallow foundations on rocks.

UNIT – V

Sheet Piles - introduction, types of sheet pile walls, cantilever sheet pile wall, anchored sheet pile wall, stability analysis of anchored bulkhead by free earth support and fixed earth support method, position of anchorage.

Expansive and Collapsible Soil: Difficult soils- loose granular soils, soft clays and shrinkable soils- identification, swell and swell pressure.

REFERENCES:

1. Soil Mechanics and foundation engineering – P. Purushottama Raj, Pearson Education.
2. Construction of marine and offshore structures – Ben C Gerwick, jr., CRC Press, Taylor and Francis Group.
3. Dynamic soil tests and applications – N S V Kameswara Rao, Wheeler Publishing.
4. Pile design and construction practice – M J Tomlinson, View point Publications, Palladian Publications Limited.
5. IS: 4091 (1979) -Design and construction of foundations for transmission line towers
6. IS: 11233 (1985) - Design and construction of foundations for Radar Antenna, Microwave and TV Tower.
7. Principle of foundation engineering – B.M.Das, CENGAGE Learning, Thomson, Brooks/Cole.
8. Foundation Engineering -Varghese, Prentice Hall of India.
9. Foundation analysis and design – J.E. Bowles, McGraw Hill Books Company

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M. Tech – I year I Sem. (Construction Management)****INTEGRATED WATER RESOURCES MANAGEMENT
(PE-2)**

Course Objectives: To impart knowledge on runoff, discharge measurement, estimation of flood, and flood disaster mitigation measures.

Course Outcomes: The learner will be able to estimate the quantum of water resources from different sources and able to implement and manage water resources effectively.

UNIT – I

Introduction: Definition, concepts of IWRM, approaches to iwrM, components, importance. **Surface water:** Evapotranspiration – Runoff – Hydrographs – Methods of discharge measurement – Estimation of flood – Flood disaster mitigation measures and damage estimation, rainfall-runoff models.

UNIT – II

Surface water: River engineering and river training works – Hydrologic routing – Hydraulic routing – Hydrology of basin management.

UNIT – III

Ground water: Steady groundwater flow towards a well in confined and unconfined aquifers – Dupit's and Theism's equations, Assumptions, Formation constants, yield of an open well interface and well tests.

UNIT – IV

Groundwater: Unsteady flow towards a well – Non equilibrium equations – Thesis solution – Jacob and Chow's simplifications, Leak aquifers, Groundwater basin management.

UNIT – V

Conjunctive use: Concepts of conjunctive use Models, Case studies for IWRM.

REFERENCES:

1. Groundwater by Bawvwr, John Wiley & sons.
2. Groundwater System Planning & Management – R. Willes & W.W.G. Yeh, Prentice Hall.
3. Applied Hydrogeology by C. W. Fetta, CBS Publishers & Distributers.
4. Hydrology by Madan mohan das & Mimi Das Saikia PHI Learning Private Limited
5. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.
6. Groundwater by H.M. Raghunath, Wiley Eastern Ltd.
7. Engineering Hydrology by K. Subramanya, TMH Publishing Company limited,

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M. Tech – I year I Sem. (Construction Management)****CONSTRUCTION ENGINEERING LAB**

Course Objectives: To impart knowledge on testing procedures for determining the properties of the materials used in concrete making.

Course Outcomes: The learner will be able to effectively use the results of different tests for recommending the materials for making good concrete.

1. Evaluation of properties of cement, fine aggregates and coarse aggregates.
2. Evaluation of properties of reinforcing steel, timber, building block and tile.
3. Variation of workability with time for different grades of concrete experimental observations.
4. Experimental observation on influence of following parameters on strength characteristics of concrete (Some of these parameters may be considered depending up on time)
 - i. Size, shape and grade of coarse aggregate.
 - ii. Grading of fine aggregate.
 - iii. Hand Mixing/ Machine Mixing.
 - iv. Aggregate- Cement Ratio.
 - v. Coarse aggregate- Fine aggregate Ratio.
 - vi. Size and shape of Test specimen.
 - vii. Admixtures.

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