

**SCHEME OF TEACHING AND EXAMINATION  
M.TECH. - CONSTRUCTION TECHNOLOGY**

**II SEMESTER**

SI No.	Subject Code	Subject	Teaching Hrs/week		Duration of the exam in Hours	Marks for		Total Marks
			Lectures	Practical/Fieldwork/Assignment		IA	Exam	
1	10CCT 21	Construction Economics and Finance	4		3	50	100	150
2	10CCT22	Mechanization in Construction	4	2	3	50	100	150
3	10CCT23	Construction Quality and Safety.	4	2	3	50	100	150
4	10CCT24	Advanced Reinforced Concrete Design	4	2	3	50	100	150
5	10CCT25x	Elective-II	4		3	50	100	150
6		*Project Phase –I (6 week duration)	---					
7	10CCT 26	Seminar	---	3	---	50	---	50
<b>Total</b>			<b>20</b>	<b>09</b>	<b>15</b>	<b>300</b>	<b>500</b>	<b>800</b>

**ELECTIVE II**

SI No.	Subject Code	Subject
1.	10CCT251	Remedial Engineering
2.	10CCT252	Pavement Design & Construction
3.	10CCT253	Soil Exploration & Ground Improvement Techniques

\* Between the II semester and III semester after availing a vacation of 2 weeks

**II SEMESTER  
CONSTRUCTION ECONOMICS AND FINANCE.**

Subject Code	: <b>10CCT 21</b>	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

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Engineering economics, Time value of money, discounted cash flow, NPV, ROR, Bases of comparison, Incremental analysis, Benefit-Cost analysis, Replacement analysis, Breakeven analysis, Capital budgeting, Taxation and Inflation, Working capital management, Construction accounting, Income statement, Financial statements, Appraisal through financial statements-ratio's analysis, Long term Financing, Practical problems and case studies.

**REFERENCE BOOKS:**

1. Courtland A. Collier and William B. Ledbetter, "**Engineering Economics and Cost Analysis**"- Harper & Row.
2. Kuchal S.C, "**Financial Management**"
3. Van Horne J.C, "**Fundamentals of Financial Management**" Prentice Hall.

**MECHANISATION IN CONSTRUCTION**

Subject Code	: <b>10CCT 22</b>	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

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Introduction to mechanisation, Mechanisation through construction equipment: earth excavation, moving and hauling, aggregate manufacturing; rebar fabrication, concrete production and placement- types of equipment, process, production outputs and costs. Mechanisation through construction, formwork and scaffolding- types, materials and design principles.

Mechanisation through construction methods/technologies: segmental construction of bridges, box pushing technology for tunnelling, trench-less technology.

Precast/Prefab construction.

Safety and Environmental issues in mechanisation.

**REFERENCE BOOKS:**

1. Peurifoy R L, "**Construction Planning, Equipment and Methods**", Mc Graw Hill
2. James F. Russell, "**Construction Equipment**", Prentice Hall.
3. "**Current Literature**".

**CONSTRUCTION QUALITY & SAFETY**

Subject Code	: <b>10CCT 23</b>	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

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Construction Quality, Inspection and Testing, Quality Control, Quality Assurance, Total Quality Management, Critical Factors of TQM; TQM in Projects, Benchmarking, concepts of quality policy, standards, manual, third party certification.

Safety laws and standards. Safety Hazards and cost effectiveness. Safety Management in Construction Industry- Safety rules in construction, Equipment Reliability considerations. Safety Budgeting.

#### REFERENCE BOOKS:

1. N. Logothetis, "**Managing for Total Quality**"-Prentice Hall.
2. David Gold Smith, "**Safety Management in Construction and Industry**", Mc Graw Hill.
3. K.N.Vaid, "**Construction Safety Management**"- NICMAR, Bombay.

#### ADVANCED REINFORCED CONCRETE DESIGN

Subject Code	: 10CCT 24	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

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1. Yield line method of design of slabs.
2. Design of grid floors.
3. Design of continuous beams.
4. Design of portal frames.
5. Design of silos and bunkers.
6. Design of flat slabs.
7. Art of detailing earthquake resistant construction – expansion and construction joints

#### REFERENCE BOOKS:

1. A Park and Paulay, "**Reinforced Reinforced and Prestressed Concrete**"-John Wiley & Sons
2. Lin TY and Burns N H, "**Reinforced Concrete Design**". John Wiley & Sons
3. Kong KF and Evans T H "**Design of Prestressed Concrete Structures**"
4. P.C.Varghese, "**Advanced Reinforced Concrete Design**"- Prentice-Hall of India, New Delhi, 2005.
5. Dr.B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, "**Comprehensive RCC Design**"

#### ELECTIVES REMEDIAL ENGINEERING

Subject Code	: 10CCT 251	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03

Total no. of Lecture Hrs. : 52

Exam Marks : 100

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**General :** Introduction, Cause of deterioration of concrete structures, Diagnostic methods & analysis, preliminary investigations, experimental investigations using NDT, load testing, corrosion mapping, core drilling and other instrumental methods Quality assurance for concrete construction as built concrete properties strength, permeability, thermal properties and cracking

**Influence on Serviceability And Durability:** Effects due to climate, temperature, chemicals, wear and erosion, Design and construction errors, corrosion mechanism, Effects of cover thickness and cracking, methods of corrosion protection, corrosion inhibitors, corrosion resistant steels, coatings, cathodic protection.

#### **Materials for Repair**

Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, sulphur infiltrated concrete, Ferro cement, Fiber reinforced concrete.

#### **Techniques for Repair**

Rust eliminators and polymers coating for rebar during repair foamed concrete, mortar and dry pack, vacuum concrete, Guniting and Shotcrete Epoxy injection, Mortar repair for cracks, shoring and underpinning.

#### **Examples of Repair To Structures**

Repairs to overcome low member strength, Deflection, Cracking, Chemical disruption, weathering wear, fire, leakage, marine exposure, engineered demolition techniques for dilapidated structures - case studies

#### **REFERENCE BOOKS:**

1. Sidney., M. Johnson "**Deterioration Maintenance and Repair of Structures**"
2. R.N. Raikar "**Rehabilitation of Structures**"- Edited by, Vol. 1, 2 and 3, Proc., Int. Symposium, Maharashtra Indian Chapter of ACI, Bombay
3. Denison Campbell, Allen & Harold Roper, "**Concrete Structures– Materials, Maintenance and Repair**"- Longman Scientific and Technical
4. R.T.Allen and S.C. Edwards, "**Repair of Concrete Structures**"-Blakie and Sons
5. Raiker R.N. "**Learning for failure from Deficiencies in Design, Construction and Service**"- R&D Center (SDCPL)
6. Santhakumar A.R. "**Training Course notes on Damage Assessment and Repair in Low Cost Housing**"- Anna University

### **PAVEMENT DESIGN AND CONSTRUCTION**

Subject Code	: <b>10CCT 252</b>	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

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**Introduction:** Highway and airport pavements, Types and component parts of pavements, their differences - Factors affecting design and performance of pavements.

**Stresses and Deflections In Flexible Pavements:** Stresses and deflections in homogeneous masses. wheel load stresses, various factors in traffic wheel loads; ESWL and EWL factors.

**Flexible Pavement Design Methods For Highways :** CBR method-Principle –Testing as per IRC, AASHTO and Asphalt Institute and Shell Method. Problems on above

**Stresses in Rigid Pavements:** Factors affecting design and performance of pavements. Types of stresses and causes, factors influencing the stresses; general considerations in rigid pavement analysis, EWL , wheel load stresses, warping stresses, frictional stresses, combined stresses. Problems on above

**Rigid Pavement Design:** Types of joints in cement concrete pavements and their functions, joint spacing; design of CC pavement for roads and runways, design of joint details for longitudinal joints, contraction joints and expansion joints. IRC method of design by stress ratio method. Design of continuously reinforced concrete pavements, Problems on above

**Equipment in Highway Construction:** Various types of equipment for excavation, grading and compaction - their working principle, advantages and limitations. Special equipment for bituminous and cement concrete pavement and stabilized soil road construction

**Subgrade:** Earthwork grading and construction of embankments and cuts for roads. Preparation of subgrade, quality control tests

**Flexible Pavements:** Specifications of materials, construction method and field control checks for various types of flexible pavement layers – WBM-BM- SDBC-BC

**Cement Concrete Pavements:** Specifications and method of cement concrete pavement construction; Quality control tests; Construction of various types of joints.

#### REFERENCE BOOKS:

1. Yoder, E.J., and Witczak, “**Principles of Pavement Design**”- 2nd ed. John Wiley and Sons, 1975.
2. Yang, “**Design of Functional Pavements**”- McGraw Hill Book Co.
3. Khanna and Justo, “**Test Book of Highway Engineering**”- Nemchand brothers, Roorke-2004.
4. Huang, “**Pavement Analysis**”- Elsevier Publications
5. HRB/TRB/IRC/International Conference on “**Structural Design of Asphalt Pavements**”.
6. “**Relevant IRC Publications**”
7. “**CMA Hand Book**”
8. Sharma, S.C.”**Construction Equipment and its Management**” - Khanna Publishers

## SOIL EXPLORATION AND GROUND IMPROVEMENT TECHNIQUES

Subject Code	: 10CCT 253	IA Marks	: 50
No. of Lecture Hrs/ Week	: 04	Exam Hrs	: 03
Total no. of Lecture Hrs.	: 52	Exam Marks	: 100

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**Principles of exploration;** Geophysical and sounding methods, Modern methods of boring and sampling ; Preservation and transportation of samples; Sampling records, Soil profiles, Various types of field tests; Instrumentation; Investigation below sea/river bed; offshore investigation; investigation; interpretation of exploration data and report preparation; economics of field testing & lab testing. Engineering properties of soft & weak and compressible deposits; principles of treatment; Methods of soil improvement-lime stabilization and injection; thermal, electrical and chemical methods; Dynamic consolidation; vibroflotation; compaction by blasting; pre-consolidation with vertical drains; Granular piles; soil nailing; Anchors; Grouting; Electro-osmosis; Soil freezing; Vacuum consolidation; Case histories Soil confinement.

### REFERENCE BOOKS:

1. Hvorslev MJ, "**Subsurface Exploration and Sampling of Soils for Civil Engg. Purposes**". Elsevier Pub. Co
2. Manfredd RH, "**Engineering Principles of Ground Modification**", Mc Graw Hill
3. Head KH, "**Manual of Soil Laboratory Testing**".
4. Purushotham Raj, "**Ground Improvement Techniques**".
5. "**Current Literature**", Laxmi Pub.