



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

(Established by Andhra Pradesh Act No.30 of 2008)

Kukatpally, Hyderabad – 500 085, Andhra Pradesh (India)

### B.TECH. CIVIL ENGINEERING

#### IV YEAR II SEMESTER

| Code | Subject                                       | L         | T/P/D     | C         |
|------|---|-----------|-----------|-----------|
|      | <b>Elective-IV</b>                            | 4         | -         | 4         |
|      | Rehabilitation and Retrofitting of Structures |           |           |           |
|      | Geo-Environmental Engineering                 |           |           |           |
|      | Design and Drawing of Irrigation Structures   |           |           |           |
|      | Solid Waste Management                        |           |           |           |
|      | Prestressed Concrete Structures               | 4         | -         | 4         |
|      | Construction Management                       | 4         | -         | 4         |
|      | Industry Oriented Mini project                | -         | -         | 2         |
|      | Seminar                                       | -         | 6         | 2         |
|      | Project                                       | -         | 15        | 10        |
|      | Comprehensive viva                            | -         | -         | 2         |
|      | <b>Total</b>                                  | <b>12</b> | <b>21</b> | <b>28</b> |

**Note:**All End Examinations (Theory and Practical) are of three hours duration.

T-Tutorial      L – Theory      P – Practical/Drawing      C – Credits

| L | T/P/D | C |
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| 4 | -/-   | 4 |

**(A80151) REHABILITATION AND RETROFITING OF STRUCTURES**

(Elective -IV)

**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 – Shot Create – Underpinning. Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing.

**UNIT – V**

Health Monitoring of Structures – Use of Sensors – Building Instrumentation.

**TEXT BOOKS:**

1. Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.
2. Concrete Technology by A.R. Santakumar, Oxford University press.

**REFERENCES**

1. Defects and Deterioration in Buildings, EF & N Spon, London.
2. Non-Destructive Evaluation of Concrete Structures by Bungey – Surrey University Press.
3. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W.H. Ranso, (1981).
4. Building Failures : Diagnosis and Avoidance, EF & N Spon, London, B.A. Richardson, (1991).

| L | T/P/D | C |
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**(A80148) GEOENVIRONMENTAL ENGINEERING**

(Elective-IV)

**UNIT-I**

**Sources and Site Characterization:** Scope of Geo-environmental Engineering, Various Sources of Contaminations, Need for contaminated site characterization; and Characterization methods.

**UNIT-II**

**Solid and Hazardous Waste Management:** Classification of waste, Characterization solid wastes, Environmental Concerns with waste, waste management strategies.

**UNIT-III**

**Contaminant Transport:** Transport process, Mass-transfer process, Modeling, NAPL

**UNIT-IV**

**Remediation Techniques:** Objectives of site remediation, various active and passive methods, Bioremediation, Phytoremediation, Remediation of NAPL sites.

**UNIT-V**

**Landfills:** Types of landfills, Site Selection, Waste Containment Liners, Leachate collection system, Cover system, Gas collection system.

**TEXT BOOKS:**

1. Phillip B. Bedient, Refai, H. S. & Newell C. J. - Ground Water Contamination - Prentice Hall Publications, 4<sup>th</sup> Edition, 2008.
2. Sharma, H. D. and Reddy, K. R. - Geoenvironmental Engineering, John Wiley & Sons (2004).

**REFERENCES:**

1. Rowe, R. K. - Geotechnical & Geoenvironmental Engineering Handbook, Kluwer Academic, 2001.
2. Reddi, L. N. and Inyang, H. I. - Geoenvironmental Engineering Principles and Applications, Marcel. Dekker, Inc., New York (2000).
3. LaGrega, M. D., Buckingham, P. L. and Evans, J. C. - Hazardous Waste Management, New York: McGraw-Hill, 2001.

**(A80147) DESIGN AND DRAWING OF IRRIGATION STRUCTURES**

(Elective-IV)

Design and drawing of the following hydraulic structures.

Group A

1. Surplus weir.
2. Syphon Well Drop
3. Trapezoidal notch fall.
4. Tank sluice with tower head

Group B

1. Sloping glacis weir.
2. Canal regulator
3. Under Tunnel.
4. Type III Syphon aqueduct

**Final Examination pattern:**

The Question paper is divided into two parts with two questions in each part. The student has to answer ONE question from each part. Part I should cover the designs and drawings from Group A for 45 marks and Part II should cover only designs from group B carrying 30 marks.

The duration of examination will be FOUR hours.

However, the students are supposed to practise the drawings for Group B structures also for internal evaluation.

**TEXT BOOKS:**

1. Water Resources Engineering – Principles and Practice by Challa Satyanarayana Murthy, New Age International Publishers.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

**(A80141) SOLID WASTE MANAGEMENT**

(Elective-IV)

**UNIT I:**

Solid Waste and their Handling: Definition of solid wastes – types of solid wastes – Sources - Industrial, mining, agricultural and domestic – Characteristics. Solid waste Problems - impact on environmental health

**UNIT II:**

Collection, Segregation and Transport AND Management of Municipal Solid Wastes: Handling and segregation, Collection and storage of municipal solid wastes; analysis of Collection systems. Transfer stations – labeling and handling of hazardous wastes. Solid waste processing technologies. Mechanical and thermal volume reduction. Biological and chemical techniques for energy and other resource recovery: composting - types, vermicomposting, termigradation, fermentation. Incineration of solid wastes. Disposal in landfills: site selection, design, and operation of sanitary landfills; Leachate and landfill gas management; landfill closure and post-closure environmental monitoring; landfill remediation. Regulatory aspects of municipal solid waste management.

**UNIT III:**

Hazardous Waste and Management: Hazardous waste definition. Physical and biological routes of transport of hazardous substances – sources and characterization. Sampling and analysis of hazardous wastes –proximate analysis – survey analysis – directed analysis handling, collection, storage and transport. Hazardous waste treatment technologies TSDF concept - Physical, chemical and thermal treatment of hazardous waste: solidification, chemical fixation, encapsulation, pyrolysis and incineration. Hazardous waste land fills - Site selections, design and operation. HW reduction, recycling and reuse, Regulatory aspects of HWM/HWM rules.

**UNIT IV:**

Biomedical Waste Management: Classification, collection, segregation Treatment and disposal. Radioactive waste: Definition, Low level and high level radioactive wastes and their management, Radiation standards.

**UNIT V:**

E-Waste Management: Waste characteristics, generation, collection, transport and disposal, regulatory aspects of e waste, global strategy, recycling.

## TEXT BOOKS:

1. Hazardous waste management Charles A. Wentz. Second edition 1995. McGraw Hill International.
2. Integrated solid waste management George Tchobanoglous, Hilary Theisen & Samuel A. Vigil.

## REFERENCES:

1. Hazardous waste management by Prof. Anjaneyulu.
2. Criteria for hazardous waste landfills – CPCB guidelines 2000.
3. Standard handbook of Hazardous waste treatment and disposal by Harry M. Freeman, McGraw Hill 1997.
4. Management of Solid waste in developing countries by Frank Flintoff, WHO regional publications 1976.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

### IV Year B.Tech. CE-II Sem

| L | T/P/D | C |
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| 4 | -/-/- | 4 |

### (A80150) PRESTRESSED CONCRETE STRUCTURES

#### UNIT I:

**Introduction:** Historic development- General principles of prestressing pretensioning and post tensioning- Advantages and limitations of Prestressed concrete- General principles of PSC- Classification and types of prestressing- Materials- high strength concrete and high tensile steel their characteristics. **Methods and Systems of prestressing:** Pretensioning and Posttensioning methods and systems of prestressing like Hoyer system, Magnel Blaton system, Freyssinet system and Gifford- Udall System- Lee McCall system.

#### UNIT II:

**Losses of Prestress:** Loss of prestress in pretensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, slip in anchorage, frictional losses.

#### UNIT III:

**Flexure:** Analysis of sections for flexure- beams prestressed with straight, concentric, eccentric, bent and parabolic tendons- stress diagrams- Elastic design of PSC beams of rectangular and I sections- Kern line – Cable profile and cable layout.

**Shear:** General Considerations- Principal tension and compression- Improving shear resistance of concrete by horizontal and vertical prestressing and by using inclined or parabolic cables- Analysis of rectangular and I beams for shear – Design of shear reinforcements- Bureau of Indian Standards (BIS) Code provisions.

#### UNIT IV:

**Transfer of Prestress in Pretensioned Members :** Transmission of prestressing force by bond – Transmission length – Flexural bond stresses – IS code provisions – Anchorage zone stresses in post tensioned members – stress distribution in End block – Analysis by Guyon, Magnel, Zielinski and Rowe's methods – Anchorage zone reinforcement- BIS Provisions

#### UNIT V

**Composite Beams:** Different Types- Propped and Unpropped- stress distribution- Differential shrinkage- Analysis of composite beams- General design considerations.

**Deflections:** Importance of control of deflections- Factors influencing deflections – Short term deflections of uncracked beams- prediction of long



time deflections- BIS code requirements.

### TEXT BOOK:

- 1) Prestressed concrete by N.Krishna Raju, 5<sup>th</sup> Edition, Tata McGraw Hill Book Education Pvt. Ltd.

### REFERENCES :

- 1) Design of prestress concrete structures by T.Y. Lin and Burn, John Wiley, New York.
- 2) Prestressed concrete by S. Ramamrutham, Dhanpat Rai & Sons, Delhi.
- 3) Prestressed Concrete by N. Rajagopalan, Narosa Publishing House.

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|---|-------|---|
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### (A80146) CONSTRUCTION MANAGEMENT

#### UNIT-I

Management process- Roles . management theories . Social responsibilities. planning and strategic management . strategy implementation . Decision making: tools and techniques – Organizational structure . Human resource management- motivation performance- leadership.

#### UNIT-II

Classification of Construction projects, Construction stages, Resources- Functions of Construction Management and its Applications .Preliminary Planning- Collection of Data-Contract Planning – Scientific Methods of Management: Network Techniques in construction management - Bar chart, Gant chart, CPM, PERT- Cost & Time optimization.

#### UNIT-III

Resource planning - planning for manpower, materials, costs, equipment. Labour, -Scheduling .Forms of scheduling - Resource allocation . budget and budgetary control methods.

#### UNIT-IV

Contract - types of contract, contract document, specification, important conditions of contract – tender and tender document - Deposits by the contractor - Arbitration . negotiation - M.Book - Muster roll -stores.

#### UNIT-V

Management Information System - Labour Regulations: Social Security - welfare Legislation - Laws relating to Wages, Bonus and Industrial disputes, Labour Administration - Insurance and Safety Regulations - Workmen's Compensation Act -other labour Laws - Safety in construction : legal and financial aspects of accidents in construction . occupational and safety hazard assessment. Human factors in safety . legal and financial aspects of accidents in construction . occupational and safety hazard assessment

#### TEXT BOOKS

1. Ghalot, P.S., Dhir,D.M., Construction Planning and Management, Wiley Eastern Limited,1992.
2. Chitkara,K.K., Construction Project Management, Tata McGraw Hill Publishing Co, Ltd., New Delhi, 1998.
3. Punmia,B.C., Project Planning and Control with PERT and CPM, Laxmi Publications, new delhi,1987.

#### REFERENCE:

1. Construction Management And Planning by: sengupta, b. /guha, h. tata mcgraw-hill publications.

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**IV Year B.Tech. CE-II Sem**

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**(A80087) INDUSTRY ORIENTED MINI PROJECT**

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**L T/P/D C**  
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**(A80089) SEMINAR**

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**(A80088) PROJECT WORK**

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**IV Year B.Tech. CE-II Sem**

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**(A80090) COMPREHENSIVE VIVA**