GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

PRESTRESSED CONCRETE

(PROFESSIONAL ELECTIVE V)

Course Code: GR18A4062	**L**	**T**	**P**	**C**
IV Year II Semester	**3**	**0**	**0**	**3**

Course Objectives: The objectives of this course is to make the student to

1. Understand basics of prestressing
2. Understand flexure and shear in prestressed beams
3. Understand deflection in prestressed beams
4. Analyze and design of composite beams
5. Understand the concept of partial prestressing

Course Outcomes: After completion of this course, students will be able to

1. Analysis prestressed concrete members
2. Design of prestressed concrete members using IS Code
3. Calculate deflections in prestressed members
4. Analyse and design of composite beams
5. Analyse and design of partial prestressing of members

UNIT-I

Basic concepts – Advantages – Materials required – Systems and methods of prestressing – Analysis of sections – Stress concept – Strength concept – Load balancing concept – Effect of loading on the tensile stresses in tendons – Effect of tendon profile on deflections – Factors influencing deflections – Calculation of deflections – Short term and long term deflections – Losses of prestress – Estimation of crack width.

UNIT-II

Basic assumptions for calculating flexural stresses – Permissible stresses in steel and concrete as per I.S.1343 Code – Design of sections of Type I and Type II post-tensioned and pre-tensioned beams – Check for strength limit based on I.S. 1343 Code – Layout of cables in post-tensioned beams – Location of wires in pre-tensioned beams – Design for shear based on I.S. 1343 Code.

UNIT-III

Factors influencing deflections – Short term deflections of uncracked members – Prediction of long term deflections due to creep and shrinkage – Check for serviceability limit state of deflection.
Determination of anchorage zone stresses in post-tensioned beams by Magnel's method, Guyon's method and IS1343 code – design of anchorage zone reinforcement – Check for transfer bond length in pre-tensioned beams.

UNIT-IV

Analysis and design of composite beams – Methods of achieving continuity in continuous beams – Analysis for secondary moments – Concordant cable and linear transformation – Calculation of stresses – Principles of design.

UNIT-V

Design of tension and compression members – Tanks, pipes and poles – Partial prestressing – Definition, methods of achieving partial prestressing, merits and demerits of partial prestressing.

TEXT BOOKS:

1. Krishna Raju N., "Prestressed concrete", 5th Edition, Tata McGraw Hill Company, New Delhi, 2012
2. Pandit.G.S. and Gupta.S.P., "Prestressed Concrete", CBS Publishers and Distributers Pvt. Ltd, 2012.

REFERENCES:

1. Rajagopalan.N, "Prestressed Concrete", Narosa Publishing House, 2002.
2. Dayaratnam.P., "Prestressed Concrete Structures", Oxford and IBH, 2013
3. Lin T.Y. and Ned.H.Burns, "Design of prestressed Concrete Structures", Third Edition, Wiley India Pvt. Ltd., New Delhi, 2013.
4. IS 1343:2012, Code of Practice for Prestressed Concrete, Bureau of Indian Standards, New Delhi, 2012

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

GROUND IMPROVEMENT TECHNIQUES
(PROFESSIONAL ELECTIVE V)

Course Code: GR18A4063	**L**	**T**	**P**	**C**
IV Year II Semester	**3**	**0**	**0**	**3**

Course Objectives: The objectives of this course is to make the student to

1. Recognize various types of ground improvement techniques.
2. Select various ground improvement techniques like dewatering, grouting, in-situ densification methods, geo-synthetics, reinforced earth, soil stabilization, etc.
3. Educate solid foundation in terms of in-situ ground improvement methods required for different projects that come across in difficult foundation conditions.
4. Identify the aptness of best ground improvement technique.
5. Improve on in most contemporary ground modification methods to be successful in real-time projects.

Course Outcomes: After completion of this course, students will be able to

1. Identify dewatering technique for the field related problem
2. Assess the field problems related to problematic soils by adopting various ground improvement techniques.
3. Differentiate reinforced earth retaining structures.
4. Recognize the suitability and practicability required for various ground improvement methods.
5. Assess the importance of extensive research in various ground improvement techniques.

UNIT I

Introduction: Need for ground improvement, objectives, classification of ground improvement techniques.

Dewatering: Methods of dewatering - sumps, single and multistage well points, vacuum well points, electro-osmosis method, horizontal wells and drains.

UNIT II

In-situ densification methods in granular soils: Vibration at the ground surface, impact at the ground surface, vibration at depth, impact at depth.

In-situ densification methods in cohesive soils: Preloading, vertical drains, sand drains, stone and lime columns, thermal methods.

UNIT III

Grouting: Characteristics of grouts, grouting methods, grouting technology, ascending, descending and stage grouting.

Stabilization: Methods of stabilization, mechanism of cement and lime stabilization, factors effecting stabilization.

UNIT IV

Reinforced Earth: Mechanism, components of reinforced earth, types of reinforcing elements, applications, factors governing design of reinforced earth walls, design principles of reinforced earth walls, soil nailing.

UNIT V

Geosynthetics: Types of geo synthetics, functions and applications of geo synthetic materials - geotextiles, geogrids and geomembranes.

Expansive soils: Problems of expansive soils, tests for identification, swelling pressure tests, improvement of expansive soils, foundation techniques in expansive soils, under-reamed piles.

TEXT BOOKS

1. Hausmann M.R. Engineering Principles of Ground Modification, McGraw-Hill International Edition (1990).
2. Dr. P. Purushotham Raj, Ground Improvement Techniques, Laxmi Publications, NewDelhi, 1st edition (1999), Reprint (2013).

REFERENCE BOOKS

1. Moseley M.P. and K. Kirsch, Ground Improvement, Blackie Academic and Professional, Florida, 2nd edition (2007).
2. Xanthakos P.P, Abramson, L.W and Brucwe, D.A, Ground Control and Improvement, John Wiley and Sons, New York, USA (1994).
3. Robert M. Koerner, Designing with Geosynthetics, Xlibris Corporation, 6th edition (2012).
4. F.H.Chen, Foundations on Expansive soils, Elsevier Science, 2nd edition (1988).

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

DESIGN OF HYDRAULIC STRUCTURES / IRRIGATION ENGINEERING (PROFESSIONAL ELECTIVE V)

Course Code: GR18A4064	**L**	**T**	**P**	**C**
IV Year II Semester	**3**	**0**	**0**	**3**

Course Objectives: The objectives of this course is to make the student to

1. To understand practical applications of problems associated with improper usage and management of water in irrigation engineering.
2. Train the students and bring awareness in them about effective and proper usage of ground water resources and also motivate them for the research of potential natural ground water zones.
3. Train them for the estimation and interpret the data obtained from mass – curve by using Excel tools for estimating the capacity of a reservoir.
4. Train them for the effective and proper design of various types of dams and reservoirs, problems associated with those structures while handling in real scenario.
5. Train them for the design of aqueducts, weir, barrage and other important irrigation structures according to their usage and location of construction.

Course Outcomes: After completion of this course, students will be able to

1. To understand different types of irrigation structures along with their designs and analysis by using different evaluation methods.
2. Interpret performance, safety and stability of the gravity dam.
3. Calculate flow through the earthen dams and also corresponding remedial measures to prevent more seepage through dams, various irrigation structures.
4. Design various diversion head works by using Bligh's and Khosla's theory.
5. Design of various hydraulic structures like canal falls and canal regulator works along with their suitability.

UNIT I

Estimation of crop water requirement; Analysis for surface and sub-surface flow at hydraulic structures, Cross section of channels, Silt control methods in canals. Estimation of channel losses. Design of lined and unlined channels

UNIT II

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary, common profile and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of Safety -'stability Analysis, Foundation fora Gravity Dam, drainage and inspection galleries and their impact, stress analysis of a gravity dam.

UNIT III

Earth dams: Types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage through embankments and foundations. Spillways: types of spillways, Design principles of Ogee spillways – Spillway gates.

UNIT IV

Diversion Head works: Types of Diversion head works- weirs and barrages, layout of diversion head work - components. causes and failure of weirs and Barrages on permeable foundations,- Silt Ejectors and Silt Excluders weirs on Permeable Foundations - creep Theories - Bligh's, Lanet and Khosla's theories, Determination of uplift pressure- Various Correction Factors - Design principles of weirs on permeable foundations using creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron

UNIT V

Canal falls: Types of falls and their location, design principles of Notch fall and sarada type fall. Canal regulation works, principles of design of distributor and head regulators, canal cross regulators-canal outlets, types of canal modules, proportionality, sensitivity and flexibility. Cross drainage works types: selection of site, design principles of aqueduct siphon aqueduct and super passage. Design of Type II Aqueduct (Under Tunnel).

TEXT BOOKS:

1. Irrigation Engineering and Hydraulic Structures. S.K.Garg 2014- Khanna Publishers19th edition.

REFERENCE BOOKS:

1. Irrigation and water power engineering. B.C.Punmia, PandeB.B.Lal, Ashok kumarjain, Arunkumarjain- Laxmi publications 16th edition.
2. Irrigation Engineering and Hydraulic structures. S.R.Sahasrabudhe, 2013 S.K.Kataria& sons

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

CONSTRUCTION PROJECT PLANNING & SYSTEMS
(PROFESSIONAL ELECTIVE V)

Course Code: GR18A4065	**L**	**T**	**P**	**C**
IV Year II Semester	**3**	**0**	**0**	**3**

Course Objectives: The objectives of this course is to make the student to

1. Attain knowledge in Primary Construction and Project Planning
2. Identify various construction methods and equipment's and associate them with different works in the construction site
3. Ability to define fundamentals of planning and organizing in a day to day construction practices
4. Develop construction cost accounting and resource optimization techniques using knowledge acquired through Scheduling
5. Broaden the career potential of individuals through applied learning experiences in construction, management and technology.

Course Outcomes: After completion of this course, students will be able to

1. Understand how structures are built and projects are developed on the field
2. Analyze good idea of basic construction dynamics- various stakeholders, project objectives, processes, resources required and project economics
3. Plan, control and monitor construction projects with respect to time and cost, and also to Optimize construction projects based on costs
4. Remember how construction projects are administered with respect to contract structures and issues.
5. Put forward ideas and understandings to others with effective communication processes

UNIT 1: Construction Planning and Scheduling

Definition of Projects; Stages of project planning: pre-tender planning, pre-construction planning, detailed construction planning, role of client and contractor, level of detail. Process of development of plans and schedules, work break-down structure, activity lists, assessment of work content, concept of productivities, estimating durations, sequence of activities, activity utility data; Techniques of planning- Bar charts, Gantt Charts. Networks: basic terminology, types of precedence relationships, preparation of CPM networks: activity on link and activity on node representation, computation of float values, critical and semi critical paths, calendaring networks. PERT Assumptions underlying PERT analysis, determining three time estimates, analysis, slack computations, calculation of probability of completion. Allocation of Resources-materials, equipment, staff, labour and finance; resource levelling and optimal schedules; Project organisation, documentation and reporting systems.

UNIT 2: Construction Methods and Contract Management

Control & monitoring; Temporary Structures in Construction; Construction Methods for various types of Structures; Major Construction equipment; Automation & Robotics in Construction; Modern Project management Systems; Advent of Lean Construction; Importance of Contracts Management; Planning and organizing construction site and resources- Site: site layout including enabling structures, developing site organization, Documentation at site; Manpower: planning, organizing, staffing, motivation;

UNIT 3: Construction Materials and Resource Leveling

Materials: concepts of planning, procurement and inventory control; Equipment: basic concepts of planning and organizing; Funds: cash flow, sources of funds; Histograms and S-Curves. Earned Value; Resource Scheduling- Bar chart, line of balance technique, resource constraints and conflicts; resource aggregation, allocation, smoothening and levelling. Common Good Practices in Construction;

UNIT 4: Project Monitoring & Control

Project Monitoring &Control- Supervision, record keeping, periodic progress reports, periodical progress meetings. Updating of plans: purpose, frequency and methods of updating. Common causes of time and cost overruns and corrective measures. Basics of Modern Project management systems such as Lean Construction; Use of Building Information Modelling (BIM) in project management;

UNIT 5: Quality Control and Quality Assurance

Quality control: concept of quality, quality of constructed structure, use of manuals and checklists for quality control, role of inspection, basics of statistical quality control. Safety, Health and Environment on project sites: accidents; their causes, effects and preventive measures, costs of accidents, occupational health problems in construction, organizing for safety and health.

TEXT/REFERENCE BOOKS:

1. Varghese, P.C., "Building Construction", Prentice Hall India, 2007.
2. National Building Code, Bureau of Indian Standards, New Delhi, 2017.
3. Chudley, R., Construction Technology, ELBS Publishers, 2007.
4. Peurifoy, R.L. Construction Planning, Methods and Equipment, McGraw Hill, 2011
5. Nunnally, S.W. Construction Methods and Management, Prentice Hall, 2006
6. Jha, Kumar Neeraj., Construction Project management, Theory & Practice, Pearson Education India, 2015
7. Punmia, B.C., Khandelwal, K.K., Project Planning with PERT and CPM, Laxmi Publications, 2016.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

BRIDGE ENGINEERING
(PROFESSIONAL ELECTIVE VI)

	L	T	P	C
Course Code: GR18A4066				
IV Year II Semester	**3**	**0**	**0**	**3**

Course Objectives: The objectives of this course is to make the student to

1. Familiarize Students with different types of Bridges and IRC standards.
2. Equip student with concepts and design of Slab Bridges
3. Understand concepts and design of T Beam Bridges
4. Understand concepts of design of Plate Girder Bridges
5. Understand concepts of design of substructure, piers and abutments

Course Outcomes: After completion of this course, students will be able to

1. Explain different types of Bridges with diagrams and Loading standards
2. Carryout analysis and design of Slab bridges and suggest structural detailing
3. Carryout analysis and design of T Beam bridges and suggest structural detailing
4. Carryout analysis and design of Plate girder bridges
5. Carryout analysis and design of substructure, piers and abutments

UNIT-I

Introduction– Bridges- Types- Slab bridges, T Beam, Arch bridges, Cable Stayed bridges, prestressed concrete bridges, Truss Bridges, Culverts, – Nomenclature- Selection of Bridge Site- Economical span- Abutments pier and end connections- types of foundations- Open, Pile, Well Foundations, Bearings – Types- Introduction to Loading standards- Railway and IRC Loading.

UNIT-II

Slab bridges-Wheel load on slab- effective width method- slabs supported on two edges- cantilever slabs- dispersion length- Design of interior panel of slab- Guyon's – Massonet Method –Hendry-Jaegar Methods- Courbon's theory- Pigeaud's method.

UNIT-III

T-Beam bridges– Analysis and design of various elements of bridge –Design of deck slab, Longitudinal girders, Secondary beams- Reinforcement detailing.

UNIT-IV

Plate Girder Bridges: Elements of plate girder and their design-web- flange- intermediate stiffener- vertical stiffeners- bearing stiffener- Splices, Design problem with detailing.

UNIT-V

Design of piers, pier caps and Abutments, different types of bearings.

TEXT BOOKS:

1. 'Essentials of Bridge Engineering' by Johnson Victor D
2. 'Design of Bridge Structures' by T. R. Jagadeesh, M.A. Jayaram, PHI
3. 'Design of RC Structures' by B. C. Punmai, Jain & Jain, Lakshmi Publications.

REFERENCES:

1. 'Design of Concrete Bridges' by Aswini, Vazirani, Ratwani.
2. 'Design of Steel Structures' by B. C. Punmai, Jain & Jain, Lakshmi Publications.
3. 'Design of Bridges' by Krishna Raju.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

PAVEMENT DESIGN
(PROFESSIONAL ELECTIVE VI)

Course Code: GR18A4067	**L**	**T**	**P**	**C**
IV Year II Semester	**3**	**0**	**0**	**3**

Course Objectives: The objectives of this course is to make the student to

1. Give a detailed notion of methods of highway design and controlling factors
2. Provide the idea of design standards and traffic data collection for flexible and rigid pavements
3. Give the knowledge of predictability about material constraints and optimal utilization
4. Introduce the vital traffic parameters and the methods of their estimation.
5. Provide the knowledge of major failures in pavements, causes and preventive measures

Course Outcomes: After completion of this course, students will be able to

1. Illustrate highway design methods, constraints and controlling factors.
2. Apply the design standards in designing principal elements of the highway.
3. Predict the resource constraints and utilize the available materials in a sustainable way.
4. Examine the basic parameter of traffic engineering and the methods which help to estimate those parameters.
5. Recognize the major failure modes of flexible and rigid pavement and helps in maintaining them properly.

UNIT I

Introduction to pavement design: Types of Pavements-Functions of individual layers, Variables considered in Pavement Design- Factors affecting Pavement Design: Wheel loads, Tire Pressure, Contact Pressure, ESWL & ESAL concepts

UNIT II

Material characteristics: Tests on sub-grade, Tests on aggregates-Aggregate properties and their importance-Tests on Bitumen-Requirements of design mix-Marshall method of mix design.

UNIT III

Stresses in flexible and rigid pavements: Stresses in Flexible pavements-Layered systems concept-One layer system- Boussinesq two layer system-Burmister theory of Pavement design. Stresses in Rigid pavements-Importance of Joints in rigid Pavements-Types of joints-use of tie bars and dowel bars-Relative stiffness-Modulus of Subgrade Reaction-Stresses due to warping Stresses due to loads-Stresses due to friction.

UNIT IV

Flexible and rigid pavement design: Flexible Pavement Design concepts-CBR method of Flexible Pavement design-IRC method of design-Asphalt Institute method and AASTHO methods. Rigid Pavement design concepts-IRC method of Rigid pavement design-PCA method-Design of tie bars and dowel bars.

UNIT V

Highway construction and maintenance: Construction: Construction of Bituminous Pavements, construction of Cement Concrete Roads. Highway maintenance –Pavement failures: failures in flexible Pavements, Rigid Pavement failures, Pavement evaluation-Overlay design by Benkelman Beam method.

TEXT BOOKS:

1. Highway Engineering-S.K. Khanna &C.E.G. Justo, Nemchand & Bros.
2. Pavement Analysis and Design – Yang H. Huang
3. Principles of Pavement Design – E. J. Yoder, M. W. Witczak
4. Highway and traffic Engineering-Subash Saxena

REFERENCES:

2. Principles of traffic and highway engineering- Garber & Hoel.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

PHYSICO CHEMICAL PROCESSES FOR WATER AND WASTE WATER TREATMENT
(PROFESSIONAL ELECTIVE VI)

Course Code: GR18A4068	**L**	**T**	**P**	**C**
IV Year II Semester	**3**	**0**	**0**	**3**

Course Objectives: The objectives of this course is to make the student to

1. Identify opportunities in environmental engineering field.
2. Identify, formulate and solving problems on analysis of water.
3. Predict the population in a city such that design of water treatment plant and STP can be done and quantity of water required can be estimated.
4. Assess various techniques in treatment of water and wastewater.
5. Identify methods of disposal of sewage and their impact on environment

Course Outcomes: After completion of this course, students will be able to

1. Estimate water for domestic and industrial requirement.
2. Determine the quality of generated sludge by treatment of water and waste water and various methods for disposal of sludge
3. Explain methods of disinfection, chlorination – chlorine dose, chlorine demand,
4. Describe process for removal of oil, grease etc & disposal of skimming
5. Operate and maintain the sedimentation plant

UNIT I

Water purification in natural systems-variation in water flow and the steps to estimate -water for domestic and industrial requirement -waste water quantity- List the standards of potable water quality, gas flow, physical processes, chemical processes and biological processes. Primary, secondary and tertiary treatment.

UNIT II

Unit operations, unit processes. Aeration and gas transfer. Sedimentation, different types of settling, sedimentation tank design. Coagulation and flocculation, coagulation processes, stability of colloids, destabilization of colloids, destabilization in water and wastewater treatment, transport of colloidal particles, design aspects.

UNIT III

Filtration: filtration processes, Hydraulics of flow through porous media, Rate control patterns and methods, Filter effluent quality parameters, mathematical model for deep granular filters, slow sand filtration, rapid sand filtration, pre-coat filtration, design aspects.

Disinfection: Types of disinfectants, Kinetics of disinfection, chlorination and its theory, Design of Chlorinators.

UNIT IV:

Precipitation: Hardness removal, Iron, Mn, and heavy metal removal; Adsorption, adsorption equilibria and adsorption isotherm, rates of adsorption, Sorption kinetics in batch reactors, continuous reactors, factors affecting adsorption.

UNIT V

Ion Exchange-exchange processes, materials and reactions, methods of operation, Application, design aspects. Membrane Processes, Reverse osmosis, Ultrafiltration, Electrodyalisis

TEXT/REFERENCE BOOKS

2. Text book of Water supply and Sanitary Engg. S K Hussain Oxford And IBH
3. Water Supply and Sanitary Engg . G S BirdiDhanpatraj and Sons
4. A text book of Water Supply. V N Gharpure Allied Book House
5. A text book of Sanitary Engg. V N Gharpure Allied Book House
6. Water supply and Sanitary Engg. Vazirani and ChandolaKhanna Publishers
7. Wastewater Engineering, Treatment, Disposal, Reuse Metcalf and Eddy McGraw Hill International Edition.
8. Water supply and Sewerage. E W Steel and Terence J McGhee McGraw Hill BookCompany

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

REPAIRS & REHABILITATION OF STRUCTURES

(PROFESSIONAL ELECTIVE VI)

Course Code: GR18A4069	**L**	**T**	**P**	**C**
IV Year II Semester	**3**	**0**	**0**	**3**

Pre-requisite: Strength of Materials, Structural Analysis -I

Course Objectives: The objectives of this course is to discuss

1. Mechanisms for Structural distress and deterioration.
2. Causes and prevention of corrosion in concrete and steel structures
3. Inspection and Repair of distressed concrete and steel structures
4. Rehabilitation of distressed concrete and steel structures
5. Health Monitoring and assessment of concrete and steel structures

Course Outcomes: After completion of this course, students will be able to:

1. Recognize various mechanisms for Structural distress and deterioration.
2. Learn the measures to prevent corrosion in concrete and steel structures
3. Apply the Inspection and Repair methods of distressed concrete and steel structures
4. Employ the methods of Rehabilitation in distressed concrete and steel structures
5. Carry out health monitoring and conditional assessment surveys on concrete and steel Structures

UNIT I

Structural distress mechanisms- Maintenance and Repair Strategies – Inspections - Assessment procedure for evaluating a damaged structure, causes of deterioration – Cracks - causes - structural and non-structural damages- Physical deterioration due to moisture, temperature, shrinkage, freeze-thaw, abrasion, erosion, cavitation, crystallization of salts, Efflorescence, exposure to severe environment like marine exposure, Chemical deterioration due to corrosion of reinforcement (chloride induced, carbonation induced), Alkali-silica reaction, sulphate attack, Acid attack – case studies

UNIT II

Basics of corrosion phenomena- electrochemical process - Corrosion protection techniques – Corrosion inhibitors, Corrosion resistant steels, Coatings to reinforcement, cathodic protection- Case studies

UNIT III

Inspection and Testing – Damage assessment techniques– Non-Destructive testing systems – Repairs in under-water structures- -materials for repair - Repair of structures distressed due to fire, Leakage, earthquake – Demolition Techniques – Engineered demolition methods – Effects due to climate, temperature, Sustained elevated temperature- fire damaged structures - Fire rating of structures- Case studies

UNIT IV

Simple systems of rehabilitation of structures - Guniting, Epoxy injection, Shoring, Underpinning, Use of carbon fibre wrapping, FRPs and carbon composites in repairs – strengthening methods in concrete and steel structures – Retrofitting – Jacketing – Case studies

UNIT V

Structural health monitoring of structures- Sensors –Building instrumentation- smart sensing technology - strain rosette - Condition survey- Special Concretes - Quality assurance for concrete- Construction chemicals for repairs- design and construction errors- Case studies

TEXTBOOKS:

1. Denison Campbell, Allen and Harold Roper, "Concrete Structures, Materials, Maintenance and Repair", Longman Scientific and Technical UK, 1991.
2. Allen R.T. & Edwards S.C, Repair of Concrete Structures, Blakie and Sons, UK, 1987

REFERENCES:

1. Shetty M.S., "Concrete Technology – Theory and Practice", S.Chand and Company, 2008.
2. Dov Kominetzky.M.S., "Design and Construction Failures", Galgotia Publications Pvt. Ltd., 2001
3. Ravishankar.K.,Krishnamoorthy.T.S, "Structural Health Monitoring, Repair and Rehabilitation of Concrete Structures", Allied Publishers, 2004.
4. CPWD and Indian Buildings Congress, Hand book on Seismic Retrofit of Buildings, Narosa Publishers, 2008.
5. Gambhir.M.L., "Concrete Technology", McGraw Hill, 2013

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

TRANSPORTATION ENGINEERING LAB

Course Code: GR18A3072	**L**	**T**	**P**	**C**
IV Year II Semester	**0**	**0**	**2**	**1**

Course Objectives: The objectives of this course is to make the student to

1. Provide knowledge of physical and mechanical characteristics of highway materials.
2. Demonstrate various experiments on highway materials to check their suitability in road construction.
3. Illustrate design methods and test procedures for strength determination of bituminous mixes
4. Facilitate knowledge of optimum material selection for pavement layers.
5. Understand the behavior of the materials under vehicle load conditions

Course Outcomes: After completion of this course, students will be able to

1. Estimate desired characteristics of aggregates.
2. Distinguish suitable materials for road construction.
3. Categorize pavement materials by their physical and mechanical properties.
4. Demonstrate various experiments on bitumen to measure various properties.
5. Demonstrate bituminous mixes as per pavement requirement.

List of experiments:

Task 1: TESTS ON AGGREGATES

1. Crushing value
2. Impact value
3. Specific gravity and water absorption
4. Abrasion test
5. Shape test.

Task 2: TESTS ON BITUMEN

1. Penetration test
2. Ductility test
3. Softening point test
4. Flash and fire point tests

Task 3: TESTS ON BITUMINOUS MIXES

1. Specific Gravity- Demonstration
2. Marshall stability test -Demonstration

TEXT/REFERENCE BOOKS:

1. Highway Engineering – S. K. Khanna & C. E. G. Justo. New Chand & Brothers.
2. Highway Material Testing - S. K. Khanna & C. E. G. Justo.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ECONOMIC POLICIES IN INDIA

(Open Elective)

Course Code: GR18A3122 **L/T/P/C: 3/0/0/3**
IV Year II Semester

Course Objectives:

- To analyse the overall business environment and evaluate its various components in business decision making.
- To provide an analysis and examination of significant contemporary ethical issues and challenges.
- To Emphases the manager's social and environmental responsibilities to a wide variety of stakeholders.
- To know the various Government policies governing industry.
- To know economic terms and its scope.

Course Outcomes:

- Familiarize with the nature of business environment and its components.
- Understand the definition of ethics and the importance and role of ethical behaviour in the business world today.
- Explain the effects of government policy on the economic environment.
- Describe how financial information is utilized in business.
- Explain the legal framework that regulates the insurance industry

Unit 1

Business environment-factors effecting Business Environment-need for industrial policies-Overview of Indian Economy, Trends towards market economy, problems of underdevelopment – meaning, Main problems, reasons, of underdevelopment. Development-

Unit: 2

Factors and measure, Meaning of Economic development, National income, Per capital income, Quality of life, Capital Formation – Savings, Investment.

Unit 3

Planning in India, Meaning, Importance, Main reasons of adopting, planning in India, Objectives of planning, Economic development, moderation, stability, self-sufficiency, employment etc, foreign aid, Employment. Allocation of Resources,

Unit 4

Private and Public Sector, Public Sector – role and growth, Achievements of the public sector, Private Sector – Importance Problems, New foreign Trade Policy.

Unit 5

Present Economic Policy, Main feature, Globalization, Expansion of Private sector, more market orient approach. Public distribution system, Industrial policy – 1948, 1956, 1977, 1980, 1990, 1991, 2000-2001 Industrial Licensing, Monetary and Fiscal Policy.

Text books

1. Indian Economy- A. N. Agarwal
2. Indian Economy – Mishra & Puri
3. Indian Development and planning – M. L. Jhingan
4. Indian Economy – R. S. Rastogi Yozna and Kurukshetra Magazines