

**Semester VII (Forth year)**  
**Branch/Course Civil Engineering**

S.No	Sub Code	Category	Subject Name	L	T	P	C	I	E	TM
1	1965701	HSMC	Industrial Management and Entrepreneurship	2	1	-	3	30	70	100
2	1965702	OEC	Open Elective-II	3	-	-	3	50		50
3	1965703	MOOCS	MOOCS -I	-	-	4	2			100
4	Professional Elective - IV			3	-	-	3	30	70	100
	1965704A	PEC	Pre stressed concrete structures							
	1965704B	PEC	Airport Planning							
	1965704C	PEC	Earth Retaining Structures							
	1965704D	PEC	Solid Waste Management							
5	Professional Elective - V			3	-	-	3	30	70	100
	1965705A	PEC	Industrial Waste Treatment							
	1965705B	PEC	Building Services and Maintenance							
	1965705C	PEC	Advanced Steel Structures							
	1965705D	PEC	Pavement Analysis & Design							
6	Professional Elective – VI			3	-	-	3	30	70	100
	1965706A	PEC	Project Planning and Management							
	1965706B	PEC	Geo-Environmental Engineering							
	1965706C	PEC	Traffic Engineering and Management							
	1965706D	PEC	Concrete Technology							
7	1965707P	ESC	ISDD	-	-	2	1	50	50	100
8	1965608P	PCC	Computer Applications in Civil Engineering Lab	-	-	3	1.5	50	50	100
9	1965708	PW	Industrial Training				2	50	50	100
			Total	14	1	6	20	270	380	750

**VIII Semester**

S.No	Sub Code	Category	Subject Name	L	T	P	C	I	E	TM
1	1965801	PCC	MOOCS-II	-	-	4	2			100
2	1965805	PW	Project Work	-	-	-	10	100	100	200
			Total	0	0	0	12	100	100	300

## **INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP**

<b>Subject code:</b> 1965701	<b>Credits : 3</b>
Instruction : 2 Lecture & 1 Tutorial /week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

### **Course Objectives:**

The objective of this course is to:

1. Collect and analyse data to assess the attractiveness of new business opportunities in regards to the market, the industry, and the team

### **Course Outcomes:**

At the end of the Course, the Student will be able to:

1. Evaluation of economic condition and relating them to financial decision in the organization
2. understand the characterizes an attractive business opportunity and common pitfalls during the entrepreneurial process
3. Demonstrate the ability to carry out a market research projects
4. understand the nature of entrepreneurship
5. explore entrepreneurial leadership and management style

## **SYLLABUS**

### **Unit-I**

Basic Concepts of Management Management:- Definition, Nature and Importance; Functions of the Management; Levels of Management; F.W Taylor's Scientific Management; Henry Fayol's Principles of Management;

### **Unit-II**

Forms of Business Organizations: Introduction, Types of Business Organizations: Private Sector – Individual Ownership, Partnership, Joint Stock Companies and Co-Operative Organizations; Public Sector– Departmental Organizations, Public Corporations and Government Companies; The Joint Sector Management.

### **Unit-III**

Production and Operations Management: Plant Location– Factors to be considered in the Selection of Plant Location; Break-even Analysis– Significance and Managerial Applications; Importance of Production Planning and Control and its Functions; Human Resource Management and Functions of Human Resource Manager (in brief); Functions of Marketing; Methods of Raising Finance.

### **Unit-IV**

Entrepreneurship: Definition, Characteristics and Skills, Types of Entrepreneurs, Entrepreneur vs. Professional Managers,, Growth of Entrepreneurs, Nature and Importance of Entrepreneurs, Women Entrepreneurs, Problems of Entrepreneurship.

## **Unit-V**

Entrepreneurial Development and Project Management: Institutions in aid of Entrepreneurship Development, Idea Generation: Sources and Techniques; Stages in Project formulation; Steps for starting a Small Enterprise – Incentives for Small Scale Industries by Government.

### *Text Books*

- 1. Industrial Organization and Engineering Economics by T.R.Banga and S.C.Sharma , Khanna Publishers.*
- 2. The Dynamics of Entrepreneurial Development and Management (Planning for future Sustainable growth) by Vasant Desai, Himalayan Publishing House.*

### *Reference Books*

- 1. Management Science by A.R.Aryasri, McGraw-Hill Education (India Private Limited).*
- 2. Entrepreneurship, P.Sheela and K.Jagadeswara Rao, Shree Publishing House*

## PRE STRESSED CONCRETE STRUCTURES

<b>Subject code:</b> 1965704A	<b>Credits : 3</b>
Instruction : 3 Lecture /week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

### Pre- requisites:

Strength of materials, concrete technology, reinforced concrete structures

### Course Learning Objectives:

The objective of this course is to:

1. Explain different types of pre stressing systems
2. Apply IS code provisions
3. Design of members for flexure
4. Design of end block using Guyon method

### Course Outcomes:

At the end of this course the student will be able to

1. Explain the concept of tensioning system
2. Analyse pre-stress member
3. Analyse losses in pre-stressed member
4. Design the flexural members
5. Analyse end block

### SYLLABUS:

#### UNIT-1

##### PRESTRESSING SYSTEMS:

Basic concepts of pre-stressing, need for high strength steel and concrete, advantages of pre-stressed concrete, Materials for pre-stressed concrete - high strength concrete and high strength steel.

Pre-stressing systems- Pre-tensioning and Post tensioning, Types of post tensioning system - (1) Fressinet System (2) Gifford Udall (3) Magnel Blatan System; Tensioning devices, anchoring devices

#### UNIT-2

##### ANALYSIS OF SECTION FOR FLEXURE:

Analysis of pre-stress members, assumptions, pressure, or thrust line concept of load balancing, cable profile, kern distance, stress in tendons as per IS 1343, cracking moment.

#### UNIT-3

##### LOSSES OF PRESTRESS:

Losses of pre-stress in pre tensioned and post tensioned member due to various causes like elastic shortening, shrinkage, creep, friction, relaxation of steel, slip in anchorage etc. I.S. Code provisions

#### UNIT-4

##### DESIGN OF SECTIONS FOR FLEXURE AND SHEAR:

Limit state design of flexural members, stress, I.S. code provisions, design of symmetrical beams, design of pre-stressed concrete poles, design for shear, I.S. code provisions.

#### UNIT-5

##### DESIGN OF END BLOCK:

Transfer of prestress in pre-tensioned members, Transmission length, bond stress, Transverse tensile stress, End Zone reinforcement, flexural bond stress, I.S. Code Provisions.

Anchorage zone in post tensioned members, stress distribution in end block, Guyon's method of approach of analysis of end block (Not more than 2 cables).

**Text Book:**

- 1) Prestressed Concrete by N.Krishna Raju, Mc. Graw Hill Publication, 4<sup>th</sup> Edition, 2007

**References:**

- 1) Prestressed Concrete by N.Rajagopalan, Narosa Publication, 2<sup>nd</sup> Edition, 2006
- 2) Design of reinforced concrete structures by Ramamrutham, Dhanpatrai publications, 17<sup>th</sup> Edition, 2018.

**IS Codes:**

IS 1343-2012

## AIRPORT PLANNING

<b>Subject code:</b> 1965704B	<b>Credits : 3</b>
Instruction : 3 Lecture /week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

## AIRPORT PLANNING

Pre-requisites:

### Course Learning Objectives:

The objective of this course is to:

1. To know about characteristics of airport and aircraft
2. Can be able to design runway based site conditions
3. Can design all component parts of airport
4. To know about air traffic control

Course Outcomes: At the end of the Course, the Student will be able to:

1. The requirements and characteristics of aircraft
2. Classify airport obstructions.
3. Fix the orientation of the runways
4. Carryout the geometrical design of the airport infrastructure
5. Summarise air traffic control.

Air transport: History of Air transport, structure and organisation of air transport, National Airports Authority, Airports Authority of India, International Civil Aviation Organisation.

### UNIT-I

**Airport characteristics:** Requirements of aircraft types, weight components, Aeroplane component parts, classification of flying activity, Aircraft characteristics.

### UNIT-II

**Airport planning:** Airport master plan, Regional planning, Airport site selection, Estimation of future airtraffic needs. Airport obstructions: Zoning laws, classification of obstructions.

### UNIT-III

**Runway design:** Runway orientation, Basic runway length, Corrections, Airport classification, Runway Geometry Design. Airport Capacity & Configuration, Runway intersection design,

### UNIT-IV

**Taxiway design:** Geometric design standards, Exit taxiways, Holding aprons.

Terminal area & airport layout: Building area, Terminal area, Apron, Hangar, Typical Airport Layouts. Visual aids: Airport marking, Airport lighting

### UNIT-V

**Air traffic control:** Need of air traffic control Air traffic control network, Air traffic control Aids– Enroute Aids & Landing Aids, Instrumental Landing System

### Text books:

Airport planning and design by S.K. Khanna, M.G. Arora, S.S. Jain

# Earth Retaining Structures

<b>Subject code:</b> 1965704C	<b>Credits : 3</b>
Instruction : 3 Lecture /week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

Pre-requisites: Engineering Mechanics, Fluid Mechanics, Engineering Geology.

## Course Learning Objectives:

The objective of this course is to:

1. Provide civil engineering students with a basic knowledge of earth pressure theories.
2. Ability to understand different design principles of retaining structures.
3. Ability to understand design of sheet pile walls.
4. Ability to know the importance cellular coffer dams and braced cuts.

## Course Outcomes: At the end of the Course, the Student will be able to:

1. Able to recognize different earth pressures and solve the problems accordingly.
2. Able to analyze design principles of retaining structures.
3. Able to understand design of sheet pile walls.
4. Able to understand the importance braced cuts.
5. Able to understand the importance cellular coffer

## SYLLABUS:

**UNIT I:** Earth Pressure: Basic concepts, Rankine and Coulomb earth pressure theories, Determination of active and passive pressures: Culmann's Graphical method, logarithmic spiral methods, friction circle method. Consideration of surcharge, seepage, earth quack, wave effect, stratification, type of backfill, wall friction and adhesion.

**UNIT II:** Retaining structures: Uses, types, stability and design principles of retaining walls, backfill drainage, settlement and tilting.

**UNIT III:** Sheet Pile Walls: Types, Design of cantilever sheet pile walls in granular and Cohesive soils; Design of anchored sheet pile walls by free and fixed earth support methods, Rowe's theory of moment Reduction, Design of anchors.

**UNIT IV:** Braced excavations: Types of sheeting and Bracing systems, lateral earth pressure on sheeting in sand and clay, Design components of braced cuts.

**UNIT V:** Cellular cofferdams: Types – Diaphragm and Circular type, Design by TVA method. Stability of cellular cofferdams, cellular cofferdams in rocks and soils.

## Reference books:

1. Foundation design by W. C. Teng, Prentice Hall
2. Terzaghi. K. theoretical soil mechanics, John Willey 1965
3. Terzaghi. K. and Peck R. B. Soil mechanics in engineering and practice 2nd edition, John Wiley 1968.
4. Bowles. J. W. analysis and design of foundations, McGraw Hill, 4th edition 1955.
5. Embankment dams by Bharat Shing and S. D. Sharma
6. Earth and rock fill dams by Shearard, John willey
7. Design of small dams by U. S. B. R.
8. Earth manual by U. S. B. R.

# SOLID WASTE MANAGEMENT

**Course Objective:** Reduce the volume of the solid waste stream through the implementation of waste reduction and recycling programs.

**Course Outcomes:** At the end of the Course, the Student will be able to:

1. Explain Solid Waste, its types and characteristics, problems due to improper solid waste disposal.
2. Extend the definition of SWM, its generation, collection methods of waste, list guidelines for route layout.
3. Improve the transfer and transport of wastes
4. Define Composting and Incineration, its methods, advantages and disadvantages.
5. Illustrate disposal techniques of SW.

## Unit –I

**INTRODUCTION:** Definition of solid waste, garbage, rubbish-Sources and Types of solid wastes. Characteristics of Solid Wastes: Physical, chemical and biological characteristics- Problems due to improper disposal of solid waste.

## Unit –II

**SOLID WASTE MANAGEMENT:** Definition- Reduction, reuse, recycling and recovery principles of waste management- Functional elements of Solid Waste management- Waste generation and handling at source-Collection of solid wastes- Collection methods and services- guidelines for collection route layout.

## Unit –III

**TRANSFER AND TRANSPORT OF WASTES:** Transfer station-Processing and segregation of the solid waste- various methods of material segregation.

## Unit –IV

**PROCESSING AND TRANSFORMATION OF SOLID WASTES:** Composting: definition-methods of composting-advantages of composting- Incineration: definition- methods of incineration, advantages and disadvantages of incineration.

## Unit –V

**DISPOSAL OF SOLID WASTE:** Volume reduction, Open dumping, land filling techniques. Landfills: classification-Design and Operation of landfills, Land Farming, Deep well injection.

## Text Books

1. George Tchobanoglous, Kilarity Theisen, Samuel Vigil, "Integrated Solid Waste Management", McGraw-Hill Inc, International Edition.
2. Howard Peavy, Donald Rowe, George Tchobanoglous, " Environmental Engineering", McGraw Hill Inc, International Edition.

## References

1. Frank Kreeith, "Handbook of Solid Waste Management", McGraw Hill Inc
2. Solid Waste Management in Urban Nepal: A Review
3. NPC / IUCN National Conservation Strategy Implementation Program
4. Integrated Resource Recovery in Municipal Solid Waste Management, The World Bank





## Professional Elective – V

### INDUSTRIAL WASTE TREATMENT

<b>Subject code:</b> 1965705A	<b>Credits : 3</b>
Instruction : 3 Lecture /week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

#### Course Learning Objectives:

The objective of this course is to:

1. Distinguish between the quality of domestic and industrial water requirements and Wastewater quantity generation.
2. Understand the industrial process, water utilization and wastewater generation.
3. Impart knowledge on selection of treatment methods for industrial wastewater.
4. Acquire the knowledge on operational problems of common effluent treatment plants.
5. Gain knowledge on different techniques and approaches for minimizing the generation and application of Physio chemical and biological treatment methods for recovery, reuse and disposal of industrial wastewater.

#### Course Outcomes:

At the end of this course student will be able to:

1. Summarize characteristics of wastewater.
2. Define Principles of biological waste treatment
3. Design and working principle of various treatment methods
4. Apply Environmental Management Systems to an industrial activity.
5. Propose treatment and disposal of the industrial wastewater.

#### SYLLABUS:

UNIT-1: Characteristics of waste water of specific industries, characteristics of treatment plant effluents  
Effect of waste water on self-purification capacity of streams, Primary treatment of waste water.

UNIT-2: Principles of biological waste treatment; Microbiological growth rate kinetic equations, sludge production, oxygen requirements, continuous flow treatment models. Aerobic treatment studies in continuous and semi-continuous reactors. Anaerobic treatment, studies, Nitrogen and Phosphorus removal.

UNIT-3: Biological treatment facilities : Process designs of the following units w.r.t. Industrial Wastes; Activated sludge process; trickling filter; sludge digestion units; Aerated lagoons; Stabilization ponds (oxidation ponds); oxidation ditches (Paveer ditches); Rotating Biological contactor; Anaerobic filter.

UNIT-4: Principles of Industrial waste Treatment: Waste reduction pretreatment of wastes, collection and segregation of wastes, reduction in volume and strength neutralization; equalization; proportioning.

UNIT-5: Manufacturing processes, flowsheets; Characteristics and treatment of wastes and disposal methods of the following industries – Sugar, Dairy, Distillery, Paper, Tannery, Textile, Sheet, Fertiliser Oil refinery and Petrochemicals.

Text Book:

T1:Waste Water Treatment by M.N. Rao and A. K. Datta;

## BUILDING SERVICES AND MAINTENANCE

<b>Subject code:</b> 1965705B	<b>Credits : 3</b>
Instruction : 3 Lecture /week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

### Course Objectives

The Course Objectives of this course are:

Understand the need for maintaining buildings and importance of maintenance

Acquire knowledge on various methods and materials used in building repairs

### Course Outcomes

At the end of the course, the student should be able to:

*CO1 Recognize the need for building repairs and demonstrate knowledge about historic buildings*

*CO2 Categorize and identify the repairs of major materials of super structure*

*CO3 Describe various methods used in building repair and maintenance*

*CO4 Explain repairs and maintenance needs of special cases of existing buildings*

*CO5 Knowledge of Facilities maintenance and their repair needs*

### UNIT I Need

**12 hours**

Need for building maintenance and repairs, preservation and Conservation of historic buildings. General understanding about methods and various techniques available- Integration of modern technology in understanding building repair needs

### UNIT II Maintenance I

**12 hours**

Timber: replacement of decayed timber, easing of doors and windows

Concrete: repair of any joints i.e. wall-beam joint leak, beam, column, slab-beam, etc...

Flooring: repairs to damaged part of the flooring, removal of stains from concrete and terrazzo floor, re-polishing of terrazzo and mosaic,

### UNIT III Maintenance II

**12 hours**

Extending Building life: Anti termite treatment (in building, foundations, floors and wood work),

Glazing: replacement of glass panels

Plumbing: Repairing plumbing, drain and sanitary works.

Water storage: Repair of water storage sumps and tanks

Painting: White washing, color washing and distempering, painting, cleaning of fire chimneys and gutters

### UNIT IV Special repairs

**12 hours**

Foundations: Strengthening of foundation and foundation soils

Masonry: repairs to crack in masonry wall, repairs to leakage at window sill

Floors: Repairs to ramped floors.

Roofs: rectification of leaking roof and concrete cover spalled roof, special repairs to joinery work at roof level

Damp Proofing: providing D.P.C. to the existing buildings, repairs to expansion and contraction joints

### UNIT V Facilities maintenance

**12 hours**

Electrical, Sanitary network, fire safety and others: Repair of electrical installation system, repair of septic tanks, fire services system, repair of gas supply system. Repair of broad cast reception installation system, repair of security system,

**Text Books**

Building Construction by V.N. Vazirani and S.P. Chandola, by Khanna Publishers.

**References**

1. General Specification for Building Maintenance Works in Residential Buildings, Prepared by Building Surveying Division, HKIS
2. Building Maintenance Management, Second Edition by Barrie Chanter and Peter Swallow, Balckwell publishing

## ADVANCED STEEL STRUCTURES

<b>Subject code:</b> 1965705C	<b>Credits : 3</b>
Instruction : 3 Lecture /week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

### **COURSE OBJECTIVES:**

The objective of this course is to:

1. Familiarize Students with design of plate girders and stiffeners
2. Employ the Design of gantry girder
3. Equip student with concepts of design of bridges and bearings
4. Understand Design Concepts of water tanks
5. Familiarize students with concept of plastic analysis

### **COURSE OUTCOMES:**

1. Design of Plate girders and stiffeners
2. Design of Gantry girders
3. Design of bridges and bearings
4. Design of water tanks
5. Understand the concept of plastic analysis

### **SYLLABUS:**

#### **UNIT 1: PLATE GIRDERS**

Components of a plate girder, Economical depth, proportioning of web and flanges, shear buckling resistance of web by simple post critical and tension field methods. Design of bearing stiffeners, design of End panel and intermediate stiffeners.

#### **UNIT 2: GANTRY GIRDERS**

Loading considerations, selection of gantry girder, Design considerations and Design of gantry girder

#### **UNIT 3: BRIDGES AND BEARINGS**

Classification, Loadings, Deck type and through type bridges, Plate girder bridges, design of stringers, cross girders, wind bracings. Types of bearings, plate bearing, Rocker bearing, Roller bearing, Knuckle pin bearing.

#### **UNIT 4: WATER TANKS**

Introduction, Design of elevated circular and rectangular water tanks.

#### **UNIT 5: PLASTIC ANALYSIS**

Introduction, Upper and Lower bound theorems, Uniqueness theorem, Shape factor, Load factor; Beams: Collapse load for fixed and continuous beams, Design of beams; Frames: Collapse load for a frame of single bay single storey frame.

#### **TEXT BOOKS**

1. 'Steel Structures Design and Practice' by N.Subramanian, Oxford University Press.
2. 'Design of Steel Structures' by Ramachandra, Vol – 1, Universities Press.
3. 'Design of steel structures' by S.K. Duggal, Tata Mc. Graw Hill, and New Delhi

#### **REFERENCES**

1. 'Structural Design in Steel' by Sarwar AlamRaz, New Age International Publishers, New Delhi
2. 'Design of Steel Structures' by P. Dayaratnam; S. Chand Publishers
3. 'Design of Steel Structures' by M. Raghupathi, Tata Mc. Graw-Hill
4. Design of steel structures by K.S. Sai Ram, Pearson Education India.

5. Design of steel structures by Limit State Method as per IS : 800-2007 – S.S. Bhavikatti, IK International Publishing House, Bangalore – 560 001.

**IS Codes:**

1. IS -800 – 2007
2. IS – 875
3. Bridge Rules

## PAVEMENT ANALYSIS & DESIGN

<b>Subject code:</b> 1965705D	<b>Credits : 3</b>
Instruction : 3 Lecture /week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

### Course Learning Objectives

1. To study about the types and components of pavements
2. To learn about the stresses in flexible pavements and equivalent single wheel load
3. To study the design of flexible pavements
4. To learn about the stresses in rigid pavements
5. To study the design of rigid pavements

### Course content

#### UNIT-I

Pavements - Types and Components - Factors affecting Design and Performance of Pavements, Comparison between Highway and Airport pavements - Functions and Significance of Sub grade properties.

#### UNIT-II

Stresses in Flexible Pavements - Stresses and Deflections in Homogeneous Masses - Burmister's 2-layer, 3-layer Theories - Wheel Load Stresses, ESWL of Multiple Wheels, Repeated Loads and EWL factors.

#### UNIT-III

Flexible Pavement Design - Empirical - Semi-empirical and Theoretical Approaches; Principles and procedure, Design, Advantages and applications of different Pavement Design Methods – IRC Method of Design.

#### UNIT-IV

Stresses in Rigid Pavements - Types of Stresses and Causes - Factors influencing the Stresses, General conditions in Rigid Pavement Analysis, ESWL, Wheel Load Stresses, Warping Stresses, Friction Stresses, Combined Stresses.

#### UNIT-V

Rigid Pavement Design - Types of Joints in Cement Concrete Pavements and their Functions, Joint Spacing, Design of Slab Thickness, Design of Joint Details for Longitudinal Joints, Contraction Joints and Expansion Joints, IRC Method of Design.

### References

- 1) Highway Engineering by Khanna & Justo.
- 2) Highway Engineering by Sharma & Sharma.
3. *IRC: 37 - 2012, Guidelines for the Design of Flexible Pavements*
4. *IRC: 58 - 2011, Guidelines for the Design of Plain Jointed Rigid Pavements for Highways*

**PROJECT PLANNING AND MANAGEMENT**

<b>Subject code:</b> 1965706A	<b>Credits : 3</b>
Instruction : 3 Lecture /week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

**Course Objectives:**

1. Importance of project management in civil engineering projects
2. Role and responsibilities of a project manager in construction.
3. Management of resources in construction industry.
4. Understand labour problems in construction and legislation in India

**Course Outcomes**

1. Extend the planning, scheduling & controlling of a project.
2. Categorize and Compare direct & indirect cost, operation time, process of updating of project.
3. Illustrate the importance of contract types, process of bidding.
4. Identify to manage the work , scope in constructions & quality of project manager
5. Prioritize the different Acts, Workmen compensation Act 1923, Minimum Wages Act 1948.

**UNIT 1:** PERT and CPM : Introduction to PERT and CPM, Planning, Scheduling and controlling , Bar charts, Milestone charts, weaknesses in Bar charts, PERT and CPM networks – Comparison, Event, Activity, Rules for drawing networks, Numbering the events (Fulkerson’s law : Dummy activities, Time estimate-Expected time, Earliest allowable occurrence time, Latest allowable occurrence time, slack, project duration, probability of completion, Start and Finish time estimates, Floats, Project scheduling, Critical and sub-critical path.

**UNIT 2:** Cost analysis / updating / resource scheduling: Cost Analysis, operation time, Normal and crash points, optimizing project cost, crash limit, free float limit, Optimization. Updating – Process of updating; when to update, Resource scheduling – Resource smoothening. Resource levelling.

**UNIT 3:** Contracts: Element of contract, offer acceptance and consideration, valid contract, Department execution of works, Master Roll Form 21, work order; Contract system with tenders – Definitions – Contract ,Contractor, Quotation, Earnest money, Security money, Tender, Tender notice, Tender form, Bidding procedure, Irregularities in Bidding, award, Types of contracts, Arbitration Disputes and claim settlement.

**UNIT 4:** Management – Scope of the Construction Management, Significance of Construction Management, Concept of Scientific Management, Qualities of Manager. Organization – Authority, Policy, Recruitment process and Training Development of Personnel Department.

**UNIT 5:** Labour problems, Labour legislation in India, Workmen compensation Act 1923, and Subsequent amendments, Minimum Wages Act 1948.

**TEXT BOOKS:**

1. PERT and CPM – L. S. Srinath.
2. Estimating and Costing – B.N. Dutta.
3. Nunnally, S.W. Construction Methods and Management, Prentice Hall, 2006
4. Jha, Kumar Neeraj., Construction Project management, Theory & Practice, Pearson Education



India,2015

5. Punmia, B.C., Khandelwal, K.K., Project Planning with PERT and CPM, Laxmi Publications, 2016.

References:

1. labour and industrial law P.LMalik

## GEO-ENVIRONMENTAL ENGINEERING

<b>Subject code:</b> 1965706 B	<b>Credits : 3</b>
Instruction : 3 Lecture /week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

### **Course Objectives:**

Students learn

1. Concepts and principles of Geo environmental Engineering.
2. Geotechnical aspects of planning and design of MSW and Hazardous waste Landfills
3. Geotechnical aspects of detection & monitoring of subsurface contamination and control & remediation of contaminated sites.
4. Rehabilitation of waste dumps and geotechnical re-use of waste.

### **Course Outcomes:**

At the end of the course, Students will be able to:

1. Understand the concepts of Integrated SWM & Geo environmental Engineering
2. Understand the characterization of waste
3. Explain sources and control of soil pollution,
4. Learn the Principles and Planning of Landfills
5. Learn Environmental Control Measures at Slurry Ponds, Geotechnical Reuse of Waste

## **SYLLABUS**

### **UNIT I**

Wastes: source, production and classification of wastes, soil pollution processes,

### **UNIT II**

waste characterization, physical characterization, problems due to improper disposal of wastes, Waste management strategies.

### **UNIT III**

Soil pollution, sources of soil pollution, control of soil pollution.

### **UNIT IV**

Waste disposal facilities such as landfills, configuration or types of landfill, components of landfill, layout of a landfill site, stages of decomposition of waste in a landfill, landfill planning and design.

### **UNIT V**

Barrier systems – Active Systems, Passive Systems, Vertical barriers and their types, bottom barriers, Reuse of waste materials, contaminated site remediation.

References:

1. Geotechnical practice for waste disposal, Daniel, D. E. , Chapman and Hall, London 1993
2. Clay barrier systems for waste disposal facilities, Rowe, R. K., Quigley, R. M. and Booker, J.R., E & FN Spon, London, 1995
3. Geoenvironmental Engineering – principles and applications, Reddi, L. N., and Inyang, H. F. , Marcel Dekker, 2000
4. Design, construction and monitoring of landfills, Bagchi, A. John Wiley & Sons, New York 1994
5. Waste containment systems, Waste stabilization and landfills: Design and evaluation Sharma, H. D. and Lewis, S. P., John Wiley & Sons, New York 1994

## TRAFFIC ENGINEERING AND MANAGEMENT

<b>Subject code:</b> 1965706 C	<b>Credits : 3</b>
Instruction : 3 Lecture /week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

Pre-requisites: Transportation Engineering -I

### **Course Learning Objectives:**

The objective of this course is to:

- 1.Necessity and importance of Transportation planning.
2. understand types of traffic studies .
3. Choose traffic regulations

Course Outcomes: At the end of the Course, the Student will be able to:

1. Estimate basic characteristics of traffic stream
2. Conduct traffic studies and analyze traffic data
3. Design traffic signal systems
4. Propose the traffic control devices
5. Traffic management

### UNIT-I

Introduction, Importance of Traffic Engineering under Indian conditions, Traffic characteristics, The Road user and the vehicle. Traffic Surveys: Speed, Journey Time & Delay Surveys, methods of measuring Spot speeds, methods of measurement of Running Speed and Journey Speed, moving observer method, Traffic volume studies – Types of Counts, Automatic devices, Presentation of traffic volume study data.

### UNIT-II

Origin & Destination Survey – Need for O – D surveys, Survey methods, Presentation of Results, Parking Surveys – Types of Parking surveys, Parking Space Inventory, Cordon Count, Questionnaire type parking usage Survey – Design of parking facility. Analysis and Interpretations of Traffic Studies.

### UNIT-III

Statistical methods for Traffic engineering - Mean, Standard Deviation and Variance. Traffic flow characteristics, Traffic Capacity studies – factors affecting practical capacity, Design Capacity and Level of Service, Passenger Car Unit. Accident Studies – Accident studies and records, Accident investigations, Measures for reduction in accident rates, Traffic Safety.

### UNIT-IV

Relationship between Speed, Travel time, Volume, Density and Capacity. Traffic Operations – Traffic regulation, Traffic Control Devices, Intersections – Intersection At Grade – Channelized and Unchannelized intersections, Rotary intersections, Grade – separated Intersections, Grade – separated structures.

### UNIT-V

Traffic Management – Transportation system Management, Travel Demand Management Techniques, Traffic management measures.

Text books:

- 1.Highway Engineering By S.K. Khanna & C.E.G.Justo
- 2.Traffic Engineering and Transport Planning By L.R. Kadiyali

## CONCRETE TECHNOLOGY

<b>Subject code:</b> 1965706 D	<b>Credits : 3</b>
Instruction : 3 Lecture /week	Sessional Marks : 30
End Exam : 3 Hours	End Exam Marks : 70

## ISDD

<b>Subject code:</b> 1965707P	<b>Credits : 1</b>
Instruction : 2 practical /week	Sessional Marks : 50
End Exam : 3 Hours	End Exam Marks : 50

Pre-requisites: Water Resources Engineering-I, Water Resources Engineering-II

Course Objectives:

The objective of this course is to:

1. Develop analytical and design skill of hydraulic structures. Also to provide basic understanding of heavy structures like dam have to study.

Course Outcomes

At the end of the course, Students will be able to

1. Ability to select the type of dam, design and to construct.
2. Introduce the students to professional practice and design of hydraulic structures.

### SYLLABUS

1. Tank Surplus weir
2. Glacis type of canal drop
3. Notch fall
4. Siphon Aqueduct- type III
5. Cross regulator and head regulator

Text books:

1. Water resources Engineering, by C.Satyanarayana Murty
2. Water resources engineering, by SK Garg
3. Type designs of Irrigation Structures by RSN Murthy

COMPUTER APPLICATIONS IN CIVIL ENGINEERING LAB

<b>Subject code: 1965608P</b>	<b>Credits : 1.5</b>
Instruction : 3 practical /week	Sessional Marks : 50
End Exam : 3 Hours	End Exam Marks : 50

COMPUTER APPLICATIONS IN CIVIL ENGINEERING LAB

**Pre-Requisites:** Mechanics of Solids, Structural Analysis-I, Structural Analysis-II, Reinforced Concrete Structures

**Course Objective:**

1. Develop analytical and design skill by using Staad. Pro and ETABS software.

**Course Outcomes:**

At the end of the course student would be able to:

1. Analyze and Design the elements of a structure (beams, portal frames) using Staad. Pro.
2. Analyze and Design the elements of a structure (beams, portal frames) using ETABS.

Determination of Shear Force, Bending Moment, Deflection for Different Loading Conditions for a Simply Supported Beam and Cantilever Beam. Analysis and Design of Singly and Doubly Reinforced Beams. Analysis and Design of columns, beams using STAAD. Pro

Determination of Shear Force, Bending Moment, Deflection for Different Loading Conditions for a Simply Supported Beam and Cantilever Beam. Analysis and Design of Singly and Doubly Reinforced Beams. Analysis and Design of columns, beams using ETABS

Application of STAAD Pro/ETABS for the Analysis and Design of various Structural Components of Civil Engineering and Building Frames.

**Text Books**

1. Computer aided design-Software and Analytical tools by C.S. Krishnamurthy and S. Rajesh, Alpha Science
2. Computer Aided Design in Reinforced Concrete, V.L.Shah, Standard publishers distributors

## INDUSTRIAL TRAINING

<b>Subject code:</b> 1965708	<b>Credits : 2</b>
Instruction : /week	Sessional Marks : 50
End Exam : 3 Hours	End Exam Marks : 50

Industrial Training To be held during summer vacation and evaluated@ in the 1<sup>st</sup> Semester of IV year @ Assessment as indicated along with the requirements given in the syllabus part.