

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: Principles of Management**

**Course Code: HU601**

**L-T Scheme: 2-1**

**Course Credits: 2**

### **Introduction:**

This course deals with the principles of Management within workplace. Students understand the intricacies of management that operates to extract work from the employees. Students dig into topics like:

- Basic concepts of Management
- Functions of Management
- Structure of Management
- How management and society are interlinked
- People Management
- Leadership concepts
- Quantitative methods
- Customer relations

### **Objectives:**

This course briefs students on the mode of operandi for the employees and the mechanism tool for job at a workplace. Furthermore the handling of customers is an integral part of the course. This subject deals with the growth of an individual as an employee.

### **Learning Outcomes:**

#### **Knowledge:**

1. Learning the various modes of operations for the management.
2. Customer handling and taking care of their needs and requirements keeping in mind the basic infrastructure of the company.
3. Managing people and their mode of work.
4. Understanding leadership skills that lead to growth of an individual.
5. Understanding the link between society and management and how to maintain a balance between the two.
6. Company's responsibility towards the society through CSR.
7. Quantitative Methods.

### **Course Contents:**

**Unit 1:** Basic concepts of Management: Definition, essence, Functions, Roles, Level. Functions of Management Planning: Concept, Nature, Types, Analysis, Management, objectives Structure : Concept, Structure, Principles, Centralization, Decentralization, Spn of Management, Organizational Effectiveness

**Unit 2:** Management and Society: Concept, external environment, CSR, Corporate Governance, Ethical Standards. People Management: Overview, Job design, Recruitment and Selection, Stress Management Managerial competencies: Communication, Motivation, Team Effectiveness, Conflict Management, Creativity, And Entrepreneurship.

**Unit 3:** Leadership concept: Nature, Styles, Decision Making, Process, Tools and Techniques. Economic, Financial and quantitative Analysis : Production Markets, National Income Accounting, Financial

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## **Course Description**

Function, and goals, Financial statements, Ratio Analysis. Quantitative Methods : Statistical Interference, Forecasting, Regression Analysis, Statistical Quality Control

**Unit 4:** Customer Management: Market planning and research, Market Mix, Advertising and Brand Management. Operations and Technology Management: Production and Operations Management, Logistics, & supply chain Management. TQM, Kaizen and Six Sigma, MIS.

# **UNIVERSITY OF ENGINEERING AND MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: Advanced Highway & Transportation Engineering**

**Course Code: CE601**

**L-T Scheme: 3-0**

**Course Credits: 3**

### **Introduction:**

This course provides an introduction to advance highway engineering and is designed for civil engineering students. The Topics to be covered (tentatively) include:

- Introduction to Highway Engineering
- Advance Highway Alignment
- Advance Highway Geometric Design
- Advance Traffic Engineering
- Road Materials and Testing

### **Objectives:**

This course covers Advance highway studies in city and regional perspectives such as its importance, technical studies, economic viability details, road use analysis and financial studies. The course further covers advance road design and advance construction methods, road geometry and layout designs such as the cross sectional elements, road alignments principles and aesthetics among others. It further covers highway construction materials and maintenance

### **Learning Outcomes:**

#### **Knowledge:**

On successful completion of the course students will be able to:

1. Demonstrate highway terminology and Traffic Studies .
2. Demonstrate the design requirements for roads and highways and design of flexible and rigid pavements.
3. Demonstrate the construction and inspection requirements of roads by undergoing various test.
4. Gain in depth knowledge on various types of pavement, pavement materials.
5. Demonstrate safety, traffic analyses and vehicle abilities in the design of roads.

### **Course Contents:**

**Unit 1 Traffic Studies:** Road inventories, Traffic Volume Studies, Spot Speed Studies, Travel Time and delay Studies, Origin-Destination studies, Methodology and Analysis of O-D data, Traffic capacity, Parking studies and characteristics, Accident studies and characteristics, causes and preventive measures.

**Unit 2: Statistical Methods for Traffic Engineering:** Elementary concepts and Probability, Mean, Standard Deviation and variance, Poisson and Binomial Distribution, Normal distribution, sampling Theory and Significance testing, Linear Regression and correlation.

**Unit 3: Traffic Characteristics:** Macroscopic and Microscopic Characteristics related to Volume, Speed and Density, their relationships, Road User Characteristics – Human and vehicular Characteristics.

**Traffic Engineering Design:** Principles of Road Junction design, Design of Roundabouts, Bus Stops and Parking Lots, Design of Signals.

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## **Course Description**

**Unit 4: Traffic Management:** Traffic Laws, Regulations and Ordinances for Drivers, Pedestrians and Mixed Traffic. Traffic control Measures – One Way streets, Kerb Parking Control, Intersection Control, Speed Control, Access Control. Expressways. Traffic Control Devices – Traffic Markings, Signs, Signals, Traffic Islands, their Classification, types and Sketches, Street Lighting.

**Unit 5: Traffic and Environment:** Detrimental Effects of Traffic on the environment – air pollution, noise pollution, visual intrusion, aesthetics etc.

**Road Safety:** The identification of problem, causation and Prevention, Road layout and Improvements, Safety equipment.

### **Text Books**

1. Khanna & Justo N, “High Way Engineering”, Nemchand & Brothers, Roorkee
2. P. Chakraborty & A. Das, “Principles of Transportation Engineering”, Prentice Hall India.
3. I.S Specifications on Concrete, Aggregate & Bitumen, Bureau of Indian Standard

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: Design of Steel Structures**

**Course Code: CE602**

**L-T Scheme: 3-0**

**Course Credits: 3**

**Introduction:** The course explores the various design concepts of the steel structures. It also involves the types of joints such as riveted, bolted and welded connections. It involves the following concepts: Design of tension members, design of compression members, design of beams in bending and compression and the design of plate girders.

### **Objectives:**

The students will develop a clear understanding of the various concepts of steel design. The students will be able to effectively analyze the tension members and the compression members. The students will also develop an understanding of the beam design and the analysis of the plate girders.

### **Learning Outcomes:**

#### **Knowledge:**

The students will have a clear understanding of the following concepts:

Rolled steel section, types of structural steel, specifications  
Structure connections: Riveted, welded and bolted including High strength friction grip bolted joints– types of riveted bolted joints, assumptions, failure of joints, efficiency of joints, design of bolted, riveted & welded joints for axial load. ii) Eccentric connection:- Riveted & bolted joints subjected to torsion & shear, tension & shear, design of riveted, bolted & welded connection. Design of tension members, I.S code provisions. Permissible stresses, Design rules, Examples. Effective lengths about major & minor principal axes, I.S code provisions. Permissible stresses, Design rules, Design of one component, two components and built up compression members under axial load. Examples. Built up columns under eccentric loading: Design of lacing and batten plates, Different types of Column Bases- Slab Base, Gusseted Base, Connection details. Permissible stresses in bending, compression and tension. Design of rolled steel sections, plated beams. Simple Beam end connections, beam -Column connections. I.S code provisions. Design of webs & flanges, Concepts of curtailment of flanges – Riveted & welded web stiffeners, web flange splices - Riveted, welded & bolted. Gantry Girder: Design gantry girder considering lateral buckling – I.S code provisions.

### **Course Contents:**

**Unit 1: Materials and Specification:** Rolled steel section, types of structural steel, specifications  
Structure connections: Riveted, welded and bolted including High strength friction grip bolted joints– types of riveted bolted joints, assumptions, failure of joints, efficiency of joints, design of bolted, riveted & welded joints for axial load. ii) Eccentric connection:- Riveted & bolted joints subjected to torsion & shear, tension & shear, design of riveted, bolted & welded connection.

**Unit 2: Tension members:** Design of tension members, I.S code provisions. Permissible stresses, Design rules, Examples.

**Unit 3: Compression members:** Effective lengths about major & minor principal axes, I.S code provisions. Permissible stresses, Design rules, Design of one component, two components and built up compression members under axial load. Examples. Built up columns under eccentric loading: Design of lacing and batten plates, Different types of Column Bases- Slab Base, Gusseted Base, Connection details.

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

**Unit 4: Beams:** Permissible stresses in bending, compression and tension. Design of rolled steel sections, plated beams. simple Beam end connections, beam -Column connections. I.S code provisions.

**Unit 5: Plate girders:** Design of webs & flanges, Concepts of curtailment of flanges – Riveted & welded web stiffeners, web flange splices - Riveted, welded& bolted. **Gantry Girder:** Design gantry girder considering lateral buckling – I.S code provisions.

### **Text Books**

1. S.K.Duggal Design Of Steel Structures By Tata McGraw Hill Publications.
2. Ramamrutham Design Of Steel Structures.

### **References**

1. N Subramanian Design Of Steel Structures By Oxford University Press.
2. IS 800-2007 Latest Revised Indian Standard Code By Bureau Of Indian Standards.

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: Construction Planning & Management**

**Course Code: CE603**

**L-T Scheme: 3-0**

**Course Credits: 3**

### **Introduction:**

This course has been planned as a compulsory course for undergraduates. It starts with the introduction of the special nature of civil engineering project. The course revolves around the various activities encountered during the life cycle of a civil engineering project. It introduces the basic learning requirements for the civil engineer project manager and makes the appreciation for the qualitative nature of the construction project management. The philosophy of the course is more on system approach contrary to majority of mechanics based subject. Also, need for construction industry has been emphasized.

### **Objectives:**

The objectives of Construction Planning and Management Includes:

1. General overview of civil engineering projects
2. Procurement and contract management
3. Estimation and rate analysis
4. Project planning and its implementation
5. Construction Technology

### **Learning Outcomes:**

#### **Knowledge:**

1. Various civil engineering projects
2. Life cycle of a civil engineering project
3. Requirement for construction engineers
4. Contract management
5. Project planning
6. Importance of estimation and rate analysis
7. Various construction techniques required
8. Basic concepts of information technology and its use in the construction industry.

#### **Application:**

1. Successfully apply business and management skills in positions within the construction industry.
2. Use technical skills and knowledge in mathematics, science, construction, and technology in support of planning, analyzing, and solving construction problems.
3. Use industry resources including associations and organizations, professional publications, and governmental data to analyze, evaluate, and apply current trends within the industry.
4. Practice informed decision-making in personal and professional endeavors.
5. Manage a quality construction project from start to completion while maintaining budget, schedule, and safety requirements.
6. Analyze, evaluate, and select computer applications for the purpose of efficient and effective project management.
7. Apply professional and ethical standards of behavior in dealing with all stakeholders in the construction process.

### **Course Contents:**

#### **Module-1:**

**Planning:** General consideration, Definition of aspect, prospect, roominess, grouping, circulation privacy, acclusion.

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## **Course Description**

### **Module-2:**

**Regulation and Bye laws:** Bye Laws in respect of side space, Back and front space, Covered areas, height of building etc., Lavatory blocks, ventilation, Requirements for stairs, lifts in public assembly building, offices.

### **Module-3:**

**Fire Protection:** Fire fighting arrangements in public assembly buildings, planning, offices, and auditorium.

### **Module-4:**

**Construction plants & Equipment:** Plants & equipment for earth moving, road constructions, excavators, dozers, scrapers, spreaders, rollers, their uses. Plants & Equipment for concrete construction: Batching plants, Ready Mix Concrete, concrete mixers, Vibrators etc. quality control.

### **Module-5:**

**Planning & Scheduling of constructions Projects:** Planning by CPM & PERT, Preparation of network, Determination of slacks or floats. Critical activities .Critical path, project duration. Expected mean time, probability of completion of project, Estimation of critical path, problems.

### **Module-6:**

**Management:** Professional practice, Definition, Rights and responsibilities of owner, Engineer, Contractors, types of contract.

### **Module-7:**

**Departmental Procedures:** Administration, Technical and financial sanction, operation of PWD, Tenders and its notification, EMD and SD, Acceptance of tenders, Arbitration.

**\* Serial 1, 2, 3 are as per National Building Code**

### **References Books:**

1. PRET and CPM, by L.S. Srinath
2. Project planning and control with PERT and CPM, by B.C. Punmia and K.K. Kandelwal
3. National Building code BIS



# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: Bridge Engineering**

**Course Code: CE604A**

**L-T Scheme: 3-0**

**Course Credits: 3**

**Introduction:**The subject introduces the concept of bridge engineering to the young civil engineering minds. The subject broadly covers the following topics: Reinforced Concrete Solid Slab Bridge, Beam and Slab Bridges, Steel Bridges, Composite Bridges and Cable Stayed Bridges.

**Objectives:**The students are exposed to fundamentals of bridge engineering design. They will have a clear idea of general design features, design of interior panel of slab. The students will have a clear concept of components of bridges and basic classification of bridges. They will also have a clear idea of the cable stayed bridges and plate girder bridges. They will have a clear idea of elements and design of plate girder bridges.

### **Learning Outcomes:**

#### **Knowledge:**

The students will have a clear idea of the following concepts:

Definition and Basic Forms, Component of bridge, classification of bridge, short history of bridge development. I.R.C Loads. Analysis of IRC Loads, Impact factors, Other loads to be considered, Importance of Hydraulic factors in Bridge Design. Introduction, General design features, Effective width method. Simply supported and cantilever Slab Bridge, analysis and design **Box Culvert:** Introduction, Design method and Design example. Introduction, Design of interior panel of slab. Pigeauds method, Design of longitudinal girder, Calculation of longitudinal moment, design example. **Balanced Cantilever Bridges:** General Features, Arrangement of supports, design features Articulation, Design example. General features, types of stress, Design example. **Plate Girder Bridge:** Elements, design, lateral bracing, **Box- girder Bridges.** General aspects, method of construction, analysis of composite section, shear connectors, design of composite beam. **Cable Stayed Bridge:** General features, Philosophy of design.

### **Course Contents:**

**Unit 1: Introduction:** Definition and Basic Forms, Component of bridge, classification of bridge, short history of bridge development. I.R.C Loads. Analysis of IRC Loads, Impact factors, Other loads to be considered, Importance of Hydraulic factors in Bridge Design.

**Unit 2: Reinforced concrete solid slab bridge:** Introduction, General design features, Effective width method. Simply supported and cantilever Slab Bridge, analysis and design **Box Culvert:** Introduction, Design method and Design example.

**Unit 3: Beam and Slab Bridges** Introduction, Design of interior panel of slab. Pigeauds method, Design of longitudinal girder, Calculation of longitudinal moment, design example. **Balanced Cantilever Bridges:** General Features, Arrangement of supports, design features Articulation, Design example.

**Unit 4: Steel Bridges:** General features, types of stress, Design example. **Plate Girder Bridge:** Elements, design, lateral bracing, **Box- girder Bridges.**

**Unit 5: Composite Bridges:** General aspects, method of construction, analysis of composite section, shear connectors, design of composite beam. **Cable Stayed Bridge:** General features, Philosophy of design.

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**Text Books**

1. Principle & Practice of Bridge Engineering S.P. Bindra– DhanpatRai Pub.
2. Essentials of bridge engineering D.J. Victor.
3. Bridge engineering Ponnuswamy.

**References**

1. Design of Bridge Structures T.R. Jagadesh, M.A. Jayaram.
2. Bridge engineering by Krishnaraju.
3. Design of concrete bridges by Aswani, Vizirani , Ratwani.

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: Pre Stressed Concrete**

**Course Code: CE604B**

**L-T Scheme: 3-0**

**Course Credits: 3**

**Introduction:** This subject explores the concept of Pre-Stressed Concrete which broadly covers the following aspects: Introduction to pre stressed concrete, Limit State Design Criteria, Anchorage Zone Stresses in post tensioned members, Composite construction of Pre Stressed and In Situ Concrete and also pre stressed concrete poles and sleepers.

### **Objectives:**

The students will develop a clear understanding of the Limit State Design Criteria which involves: Inadequacy of elastic and ultimate load method, criteria for limit states, strength and serviceability. Design of sections for flexure: methods by Lin and Magnel. The student will also understand the concept of Stress distribution in end block, anchorage zone reinforcement, Types, analysis of stresses. Statically Indeterminate structures: advantages of continuous member, effect of pre stressing, methods of achieving continuity and method of analysis of secondary moments and Design of sections for compression and bending.

### **Learning Outcomes:**

#### **Knowledge:**

The students will develop a clear understanding of the following concepts:

Materials, pre stressing system, analysis of pre stress and bending stress, losses Shear and torsional resistance: design of shear reinforcement, design of reinforcement for torsion shear and bending. Deflections of pre stressed concrete members: Importance, factors, short term and long term deflection. Inadequacy of elastic and ultimate load method, criteria for limit states, strength and serviceability. Design of sections for flexure: methods by Lin and Magnel. Stress distribution in end block, anchorage zone reinforcement. Types, analysis of stresses Statically Indeterminate structures: advantages of continuous member, effect of pre stressing, methods of achieving continuity and method of analysis of secondary moments. Design of sections for compression and bending.

### **Course Contents:**

**Unit 1: Introduction of Prestressed concrete:** Materials, prestressing system, analysis of prestress and bending stress, losses Shear and torsional resistance: design of shear reinforcement, design of reinforcement for torsion shear and bending. Deflections of prestressed concrete members: Importance, factors, short term and long term deflection.

**Unit 2: Limit state design criteria:** Inadequacy of elastic and ultimate load method, criteria for limit states, strength and serviceability. Design of sections for flexure: methods by Lin and Magnel.

**Unit 3: Anchorage Zone stresses in post tensioned members:** Stress distribution in end block, anchorage zone reinforcement.

**Unit 4: Composite construction of prestressed and in-situ concrete:** Types, analysis of stresses **Statically Indeterminate structures:** advantages of continuous member, effect of pre stressing, methods of achieving continuity and method of analysis of secondary moments.

**Unit 5: Prestressed concrete poles and sleepers:** Design of sections for compression and bending.

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## **Course Description**

### **Text Books**

1. Prestressed Concrete, Fourth Edition, N Krishna Raju McGraw Hill.
2. Design of Prestressed Structures, T.Y.Lin and N.H.Burns, Wiley Eastern Ltd.
3. Fundamentals of Prestressed Concrete, N.C.Sinha and S.K.Roy.
4. Prestressed Concrete, S.Ramamurthan.

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: Structural Dynamics & Earthquake Engineering**

**Course Code: CE604C**

**L-T Scheme: 3-0**

**Course Credits: 3**

**Introduction:** This course examines the basic theory of vibrations. The students are exposed to the concept of single degree freedom system, transient loading. The subject also explores the concept of seismology and principles of earthquake resistant design.

### **Objectives:**

The students will have a clear idea of the theory of vibrations, response of single degree freedom system to harmonic loading. The students will also have a clear concept of the undamped harmonic excitations and damped harmonic excitations. They will be exposed to the fundamentals of seismology and elastic rebound theory. The concept of plate tectonics will also be discussed in details. The students will be able to effectively design earthquake resistant structures as per the latest IS Code provision.

### **Learning Outcomes:**

#### **Knowledge:**

The students will have a clear idea of the following concepts:

Degrees of freedom, Undamped single degree freedom system, Damped single degree freedom system, Natural frequency, modes of vibration, Introduction to multiple degree freedom system. Undamped harmonic excitation, Damped Harmonic excitation Duhamel's Integral, Response due to constant force, Rectangular load, Introduction to numerical evaluation of Duhamel's integral of undamped system. Fundamentals: Elastic rebound theory, Plate tectonics, Definitions of magnitude, Intensity, Epicenter etc., Seismographs, Seismic zoning, Response of Simple Structural Systems. Terminology, General principles and Design criteria, Methods of Analysis, Equivalent lateral force method of Analysis for multi-storied building as per Indian Standard Code of Practice, Introduction to Response Spectrum Method, Fundamental concepts of Ductile detailing.

### **Course Contents:**

**Unit 1: Theory of vibrations:** Degrees of freedom, Undamped single degree freedom system, Damped single degree freedom system, Natural frequency, modes of vibration, Introduction to multiple degree freedom system.

**Unit 2: Response of single degree freedom system due to harmonic loading:** Undamped harmonic excitation, Damped Harmonic excitation

**Unit 3: Response due to Transient loading:** Duhamel's Integral, Response due to constant force, Rectangular load, Introduction to numerical evaluation of Duhamel's integral of undamped system.

**Unit 4: Elements of seismology:** Fundamentals: Elastic rebound theory, Plate tectonics, Definitions of magnitude, Intensity, Epicenter etc., Seismographs, Seismic zoning, Response of Simple Structural Systems.

**Unit 5: Principles of earthquake resistant design:** Terminology, General principles and Design criteria, Methods of Analysis, Equivalent lateral force method of Analysis for multistoried building as per Indian Standard Code of Practice, Introduction to Response Spectrum Method, Fundamental concepts of Ductile detailing.

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## **Course Description**

### **Text Books**

1. Structural Dynamics (Theory and Computation) Mario Paz. CBS Publishers and Distributor.
2. Dynamics of Structure (Theory and Application to Earthquake Engineering) A.K.Chopra Pearson Education.

### **References**

1. Elements of Earthquake Engineering Jai Krishna, A. R. Chandrashekar and Brijesh Chandra South Asian Publishers.
2. Earthquake Resistant Design D. J. Dowrick John Wiley & Sons.

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: Solid Waste Management**

**Course Code: CE605D**

**L-T Scheme: 3-0**

**Course Credits: 3**

**Introduction:** Solid Waste Management is defined as the discipline associated with control of generation, storage, collection, transport or transfer, processing and disposal of solid waste materials in a way that best addresses the range of public health, conservation, economics, aesthetic, engineering and other environmental considerations.

### **Objectives:**

Waste management is the precise name for the collection, transportation, disposal or recycling and monitoring of waste. This term is assigned to the material, waste material that is produced through human being activity. This material is managed to avoid its adverse effect over human health and environment.

The objectives Solid Waste Management can be represented in the Waste Management Hierarchy which includes:

- ) Prevention
- ) Preparing for Reuse
- ) Recycling
- ) Other Recovery
- ) Disposal

### **Learning Outcomes:**

#### **Knowledge:**

By the end of this course, the student should be able to:

1. Define solid waste and its management and related terminologies.
2. Explain solid waste management as a problem in developing countries and its importance in environmental health management.
3. Describe the categories, composition, sources and quantity of waste.
4. Describe different methods of waste collection and segregation, storage, transport, treatment and disposal.
5. Demonstrate ability to plan, implement and evaluate safe management of solid wastes and the disposal of the dead.
6. Explain to the communities benefits associated with proper management of refuse and the disposal of the dead.

### **Course Contents:**

**Unit 1: Generation of Solid Waste:** Goals and objectives of solid waste management, Classification of solid waste, Municipal solid waste, Municipal solid waste handling rules, 2000, Industrial solid waste, Commercial solid waste, Agricultural solid waste, Hazardous solid waste, Pathological waste, Solid waste generation, Characteristics of solid waste, Analysis of solid waste.

**Unit 2: Handling, Storage and Processing:** Public health and aesthetics, Onsite handling, Community containers, Container Locations, Numerical on container locations, On-site processing.

**Unit 3: Recovery and disposal method:** Collection systems, Equipment and labour requirement, Collection routes, Land filling, Incineration, Composting, Recycling.

**Unit 4: Solid waste management and control:** Biomedical waste, biomedical waste handling rules, 1998, Hazardous waste, Radioactive waste, Disposal of radioactive waste.

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**Text Books**

1. Textbook of Solid Wastes Management (Pb 2017), First Edition, I.H. Khan, CBS.
2. Solid Waste Management, Sasikumar and Krishna, Prentice Hall India Learning Private Limited (2009)



# **UNIVERSITY OF ENGINEERING AND MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: Operation Research**

**Course Code: CS605A**

**L-T Scheme: 3-0**

**Course Credits: 3**

### **Introduction:**

The goal of this course is to provide a very common simple intuition enables one to make right decisions and especially show how mathematics is applied to solve fundamental engineering problems. The Topics to be covered (tentatively) include:

Linear programming problems

Transportation and Assignments problems

Inventory Controls

Game Theory

Network Analysis

Queue Theory

### **Course Objectives:**

It lays the required foundation and skills that can be repeatedly employed in subsequent courses at higher levels. Students will acquire the skills and techniques of:

1. Discuss about algebraic solution of the linear problem with certain constrains.
2. Obtain the optimal solution of Transportation and Assignment problems.
3. Discuss about Network Analysis problems.
4. Discuss about six main factor of waiting line.
5. Solve the Nonlinear Programming problems.

### **Learning Outcomes:**

#### **Knowledge:**

1. Student completing the first unit of this course would be expected to find the solution of linear programming problems using Graphical method and simplex method.
2. At the end of second unit student will be able to assign different jobs to the different person to have the optimum efficiency of working and similar in transportation problems.
3. After the completion of the third unit, student will be able to calculate the shortest path of the graph by several methods and Algorithms.
4. At the end of forth unit student will be able find the optimal no. of servers such that the sum of cost of service and waiting is minimized.
5. At Student completing the fifth unit of this course would be expected to find the solution of Nonlinear programming problems using several methods.

### **Application:**

1. First unit of this course would be expected to formulate and solve the linear programming problems with the given constrains.

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## **Course Description**

2. Student will be able to assign different jobs to the different person to have the optimum efficiency of working and similar in transportation problems.
3. Third unit student will be able to calculate the shortest path of the graph by several methods and Algorithms.
4. Forth unit student will be able find the optimal no. of servers such that the sum of cost of service and waiting is minimized.

### **Course Contents:**

#### **Unit: 1 (Linear Programming Problems)**

Basic LPP and Applications, LP Problem Formulation, Simultaneous Equations and Graphical Method, Simplex Method, Big-M Method, Duality Theory, Transportation Problems and Assignment Problem

#### **Unit 2: (Network Analysis)**

Shortest Path; Floyd Algorithm, Maximal Flow Problem (Ford-Fulkerson); PERT-CPM (Cost Analysis, Crashing, Resource Allocation excluded).

#### **Unit 3: (Inventory Control):**

Introduction to EOQ Models of Deterministic and Probabilistic, Safety Stock; Buffer Stock.

#### **Unit 4: (Game Theory):**

Introduction; 2-Person Zero-sum Game; Saddle Point; Mini-Max and Maxi – Min Theorems (statement only) and problems; Games without Saddle Point; Graphical Method; Principle of Dominance.

#### **Unit 5: (Queuing Theory):**

Introduction, Axiomatic Derivation of the Arrival & Departure (Poisson Queue). Poisson Queue Models: (M/M/1: /FIFO) and (M/M/1:N/FIFO).

### **Text Books:**

1. H.A.Taha, "Operations Research", Pearson
2. P. M.Karak – "Linear Programming and Theory of Games", ABS Publishing House
3. Ghosh and Chakraborty, "Linear Programming and Theory of Games", Central Book Agency
4. Ravindran, Phillips and Solberg - "Operations Research", WILEY INDIA

### **References:**

1. Kanti Swaroop – "Operations Research", Sultan Chand & Sons
2. Rathindra P. Sen – "Operations Research: Algorithms and Applications", PHI
3. R. Panneerselvam - "Operations Research", PHI
4. A.M.Natarajan, P. Balasubramani and A. Tamilarasi - "Operations Research", Pearson
5. M.V.Durga Prasad – "Operations Research", CENGAGE Learning
6. J. K. Sharma - "Operations Research", Macmillan Publishing Company

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

### **Human Resource Management**

**Course Code: CE605B**

**Contact: 3L**

**Course Credits: 3**

### **Introduction:**

Of all the resources available to human endeavour, it is perhaps ironically the 'human resource' which most often presents the greatest perplexities to managers. Just as some business leaders might argue that it is the organization's most important resource, others may assert that it is also its most nebulous. As organizations today continuously strive to keep abreast of their rapidly changing business environments they are coming to understand that human resource management (HRM) must assume an increasingly important role within their operations and planning. This course will attempt to take a broad view on Human Resources while introducing the current theories that inform the discipline. It will introduce the student to current HRM concepts, skills, and practices and will detail both hands-on HR applications, and high level strategic thinking within the field. Topics are listed below in the calendar.

### **Learning Outcomes:**

- ) After successfully completing this course, students will be able to:
- ) Develop the knowledge, skills and concepts needed to resolve actual human resource management problems or issues.
- ) Manage the employment relationship, which is a shared responsibility between employers, management, human resources specialists, and employees. Investigate how HRM is responding to current business trends, opportunities, and challenges.
- ) Identify the human resources needs of an organization or department.
- ) Conduct a job analysis and produce a job description from the job analysis.
- ) Evaluate the procedures and practices used for recruiting and selecting suitable employees.
- ) Assess training requirements and design a successful orientation and training program.
- ) Discuss workplace health and safety programs and the roles of the employer and the employee in enforcing health and safety policies and procedures.
- ) Explain the responsibilities of management, HRM specialists, managers, and employees in managing the employment relationship in a unionized or a non-unionized environment.

### **Course Content:**

#### **Unit-1:**

**Introduction :** HR Role and Functions, Concept and Significance of HR, Changing role of HR managers - HR functions and Global Environment, role of a HR Manager.

#### **Unit-2:**

**Human Resources Planning :** HR Planning and Recruitment: Planning Process - planning at different levels - Job Analysis - Recruitment and selection processes - Restructuring strategies - Recruitment-Sources of Recruitment-Selection Process-Placement and Induction-Retention of Employees.

#### **Unit-3:**

**Training and Development :** need for skill upgradation - Assessment of training needs - Retraining and Redeployment methods and techniques of training employees and executives - performance appraisal systems.

#### **Unit-4:**

**Performance Management System :** Definition, Concepts and Ethics-Different methods of Performance Appraisal- Rating Errors-Competency management.

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

### **Unit-5:**

**Industrial Relations :** Factors influencing industrial relations - State Interventions and Legal Framework - Role of Trade unions -

Collective Bargaining - Workers' participation in management.

**Case study.**

### **Books :**

1. Gary Dessler, Human Resource Management - (8th ed.,) Pearson Education, Delhi
2. Decenzo & Robbins, Personnel / Human Resource Management, 3rd ed., John Wiley & Sons (Pvt.) Ltd.
3. Biswajeet Patanayak, Human Resource Management, PHI, New Delhi
4. Luis R. Gomez, Mejia, Balkin and Cardy, Managing Human Resources PHI, New Delhi.

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: Materials Handling**

**Course Code: CE605C**

**L-T Scheme: 3-0**

**Course Credits: 3**

**Introduction:** This course examines the various techniques and methods used in the handling of heavy machines and equipments in the industries. The subject introduces the concept of unit load, advantages and disadvantages of unitization and unitization by the use of the platforms. The subject also explores in details the constructional features of industrial trucks and vehicles. The subject also explores in details the characteristics and features of belt conveyors.

### **Objectives:**

The students will have a clear understanding of the unit load, unitization by the use of platforms. They will also have a clear concept of conveyors, hoisting equipments, robotic handling systems and auxiliary equipments. The students will have a clear concept of constructional features and use of the wheeled hand truck, hand pallet truck, fork lift truck which involves major specifications, capacity rating and attachment of fork lift truck. The students will develop the idea of constructional features, applications and conveyor capacity. They will have detailed knowledge of use and constructional features of (i) hand operated trolley hoist, (ii) winch; (iii) bucket elevator, (iv) Jib crane, (v) overhead traveling crane and (vi) wharf crane; Level luffing system of a wharf crane; Utility of truck mounted and crawler crane.

### **Learning Outcomes:**

#### **Knowledge:**

The students will have a clear understanding of the following concepts:

Definition, importance and scope of materials handling (MH); classification of materials; codification of bulk materials; utility of following principles of MH – (i) materials flow, (ii) simplification, (iii) gravity, (iv) space utilization, (v) unit size, (vi) safety, (vii) standardization, (viii) dead weight, (ix) idle time, (x) motion. Definition; advantages & disadvantages of unitization; unitization by use of platform, container, rack, sheet, bag and self-contained unit load; descriptive specification and use of pallets, skids, containers, boxes, crates and cartons; shrink and stretch wrapping. Types of equipment – (i) industrial trucks & vehicles, (ii) conveyors, (iii) hoisting equipment, (iv) robotic handling system and (v) auxiliary equipment; Independent equipment wise sub classification of each of above type of equipment. Constructional features and use of the following equipment – (i) wheeled hand truck, (ii) hand pallet truck, (iii) fork lift truck; Major specifications, capacity rating and attachments of fork lift truck. Use and characteristics of belt conveyor, constructional features of flat and troughed belt conveyor; Use and constructional features of types of chain conveyors – (i) apron, car and trolley type; Construction of link-plate chains; Dynamic phenomena in chain drive; Use and constructional features of roller conveyors; Gravity and powered roller conveyor; Pneumatic conveyor-use and advantages; Positive, negative and combination system of pneumatic conveyors; constructional feature, application and conveying capacity of screw conveyor. Advantage of using steel wire rope over chain; constructional features of wire ropes; Rope drum design; Pulley system-simple vs. multiple pulley; Load handling attachments: hooks, grabs, tongs, grab bucket; Arrangement of hook suspension with cross piece and pulleys (sheaves); Use and constructional features of (i) hand operated trolley hoist, (ii) winch; (iii) bucket elevator, (iv) Jib crane, (v) overhead traveling crane and (vi) wharf crane; Level luffing system of a wharf crane; Utility of truck mounted and crawler crane.

### **Course Contents:**

**Unit 1: Introduction:** Definition, importance and scope of materials handling (MH); classification of materials; codification of bulk materials; utility of following principles of MH – (i) materials flow, (ii)

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

simplification, (iii) gravity, (iv) space utilization, (v) unit size, (vi) safety, (vii) standardization, (viii) dead weight, (ix) idle time, (x) motion.

**Unit 2: Unit load:** Definition; advantages & disadvantages of unitization; unitization by use of platform, container, rack, sheet, bag and self contained unit load; descriptive specification and use of pallets, skids, containers, boxes, crates and cartons; shrink and stretch wrapping.

**Classification of MH Equipment :** Types of equipment –(i) industrial trucks & vehicles, (ii) conveyors, (iii) hoisting equipment, (iv) robotic handling system and(v) auxiliary equipment; Independent equipment wise sub classification of each of above type of equipment.

**Unit 3: Industrial trucks & vehicles :** Constructional features and use of the following equipment – (i) wheeled hand truck, (ii) hand pallet truck, (iii) fork lift truck; Major specifications, capacity rating and attachments of fork lift truck.

**Unit 4: Conveyors:** Use and characteristics of belt conveyor, constructional features of flat and troughedbelt conveyor; Use and constructional features of Flg. types of chain conveyors – (i) apron, car and trolley type; Construction of link-plate chains; Dynamic phenomena in chain drive; Use and constructional features of roller conveyors; Gravity and powered roller conveyor; Pneumatic conveyor-use and advantages; Positive, negative and combination system of pneumatic conveyors; constructional feature, application and conveying capacity of screw conveyor.

**Unit 5: Hoisting Equipment :** Advantage of using steel wire rope over chain; constructional features of wire ropes; Rope drum design; Pulley system-simple vs. multiple pulley; Load handling attachments : hooks, grabs, tongs, grab bucket; Arrangement of hook suspension with cross piece and pulleys (sheaves); Use and constructional features of (i) hand operated trolley hoist , (ii) winch; (iii) bucket elevator, (iv) Jib crane, (v) overhead traveling crane and (vi) wharf crane; Level luffing system of a wharf crane; Utility of truck mounted and crawler crane.

### **Text Books**

1. S Ray Introduction To Materials Handling By New Age International Publishers.
2. T.K. Ray Mechanical Handling Of Materials By Asian Books Private Limited.

### **References**

1. T.H. Allegri, Materials Handling: Principles and Practices, CBS Publishers and Distributors.
2. J.A. Apple, Material Handling System Design, John Wiley & Sons.

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: Highway & Transportation Engineering Lab**

**Course Code: CE 691**

**L-T-P scheme: 0-0-3**

**Course Credit: 2**

### **Objectives:**

1. The students will be able to perform different tests on highway materials and develop a clear understanding of Impact Value, Los Angeles Abrasion Test, Elongation and Flakiness Index.
2. The students will be able to conduct basic tests to determine the properties of bitumen and bituminous materials like specific gravity, penetration value and softening point.
3. The students will be able to develop the concept of California Bearing Ratio test.

**Learning Outcomes:** The students will be able to understand the basic tests conducted on highway materials like Impact Value, Los Angeles Test, Abrasion Value, Water Absorption. The students will also develop an understanding of Elongation Index And Flakiness Index. They will also develop a clear understanding of Bitumen and Bituminous materials and the various tests conducted on them like penetration value, softening point and Flash And Fire Point Test. The students will also develop a clear understanding of California Bearing Ratio test.

### **Course Contents:**

**Practical that must be done in this course are listed below:**

1. Tests on highway materials – Aggregates- Impact value, Los-Angeles Abrasion value water absorption, Elongation & Flakiness Index.
2. Bitumen & bituminous materials: Specific gravity, penetration value, softening point, loss on heating. 3. Flash & Fire point test.
4. Stripping value test.
5. Design of B.C. & S.D.B.C. Mix
6. CBR Test.
7. Marshal Stability Test
8. Benkelman beam Test.

### **Text Book:**

1. BIS codes on Aggregates & Bituminous materials.
2. Highway material testing (Laboratory Manual)by S.K. Khanna and CE.G. Justo.
3. Relevant IS & I.R.C. codes.

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: Detailing of RC & Steel Structures Lab**

**Course Code: CE 692**

**L-T-P scheme: 0-0-3**

**Course Credit: 2**

### **Objectives:**

1. The students will be able to develop the concept of the design principle of RCC Sections.
2. They will be exposed to the different types of loads and the corresponding stresses to be considered in the design as per the IS Code provision.
3. The students will be able to design different components such as slabs, beam columns, roofing and staircase from floor plan of multistoried frame building.
4. The students will be able to understand the typical detailing of a two way floor slab.

**Learning Outcomes:** The students will be able to develop the basic concepts of design of RCC and Steel structures as per IS Code. They will be able to develop the concepts of design and detailing of simply supported RCC beam and continuous T Beam. They will also have an understanding of design and detailing of columns and isolated and combined footings. The students will also be able to understand the concept of Limit State Method of Design Loads and the stresses to be considered in the design as per the IS Code provision. The students will be able to design the different components of a roof truss. The students will also develop an understanding of column base plate and column foundation.

### **Course Contents:**

**Exercises that must be done in this course are listed below:**

#### **RCC structures**

1. General considerations: Design principle of R.C.C. sections. Limit state method of design Loads and stresses to be considered in the design as per I.S. code provision.
2. Design & detailing of a i) simply supported R.C.C Beam ii) Continuous T- Beam.
3. Design & Detailing of columns, isolated and combined footing
4. Design & detailing of a i) simply supported one way slabii) One way Continuous slab.
5. Design of different units: Slab, beam column, roofing and staircase from floor plan of a multi-storied frame building, typical detailing of a two way floor slab.

#### **Steel structures**

Problems on general consideration and basic concepts.

Discussion on different loads (i.e. wind load, Dead load, live load and others) as per IS875.

Design & drawing of the following components of a roof truss:

1. Members of the roof truss.
2. Joints of the roof truss members
3. Purlins
4. Gable bracings
5. Column with bracings
6. Column base plate
7. Column foundation

#### **Text Book:**

1.I.S- 456-2000, SP 34, SP 16,I.S. 875, I.S. Code 800 – 2007, Standard text books on RCC & Steel Design



# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: CAD Lab**

**Course Code: CE693**

**L-T-P scheme: 0-0-3**

**Course Credit: 2**

### **Objectives:**

1. The students will be able to develop the concepts of Computer Aided Design of Structures.
2. They will be exposed to latest CAD CAM software environment and will be able to develop efficiently the detailed design and drawings including the floor plans of different kinds of structures.
3. The students will be able to prepare the detailed drawings of different structural elements including the ductility detailing of RCC slab, beam, column and footing design.

**Learning Outcomes:** The students will be able to develop the understanding of CAD software and develop a clear understanding of the analysis and design of multistoried buildings using software. The students will be able to prepare the detailed drawings of different structural elements including the ductility detailing of RCC slab, beam, column and footing design.

### **Course Contents:**

**Exercises that must be done in this course are listed below:**

1. Introduction and important features of software dealing with analysis and design of structures.
2. Analysis and design of a multi-storeyed building using software, Preparation of detailed drawings of different structural elements including ductility detailing RCC Slab, beam, column and footing design.

### **Text Book:**

1. CAD CAM Standard Manual.

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

**Title of Course: Seminar**  
**L-T –P Scheme: 0-0-3**

**Course Code: CE681**  
**Course Credits: 2**

### **Course Description & Objectives:**

1. Understand the diverse social and economic, racial and gender contexts within which Henrietta Lacks lived and died. Understand the themes of this seminar. Appreciate the legacy and implications of these medical, ethical and social understandings on today's society.
2. **Identify**, understand and discuss current, real-world issues.
3. **Distinguish** and **integrate** differing forms of knowledge and academic disciplinary approaches (e.g., humanities and sciences) with that of the student's own academic discipline (e.g., in agriculture, architecture, art, business, economics, education, engineering, natural resources, etc.). And apply a **multidisciplinary strategy** to address current, real-world **issues**.
4. Improve oral and written **communication** skills.
5. Explore an appreciation of the **self** in relation to its larger diverse social and academic contexts.
6. Apply principles of **ethics** and **respect** in interaction with others.

### **Course Outcomes:**

After the completion of this course, the student should be able to:

1. **Learn and integrate.** *Through independent learning and collaborative study, attain, use, and develop knowledge in the arts, humanities, sciences, and social sciences, with disciplinary specialization and the ability to integrate information across disciplines.*
2. *Use multiple thinking strategies to examine real-world issues, explore creative avenues of expression, solve problems, and make consequential decisions*
3. **Learn and integrate.** *Communicate. Acquire, articulate, create and convey intended meaning using verbal and non-verbal method of communication that demonstrates respect and understanding in a complex society.*
4. *Use multiple thinking strategies to examine real-world issues, explore creative avenues of expression, solve problems, and make consequential decisions.*
5. **Clarify purpose and perspective.** *Explore one's life purpose and meaning through transformational experiences that foster an understanding of self, relationships, and diverse global perspectives.*

# **UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR**

## **Course Description**

6. **Practice citizenship.** *Apply principles of ethical leadership, collaborative engagement, socially responsible behavior, respect for diversity in an interdependent world, and a service-oriented commitment to advance and sustain local and global communities.*