UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Economics for Engineers
Course Code: HU802
L-T Scheme: 2-0 **Course Credits: 2**

Module-I

1. Economic Decisions Making – Overview, Problems, Role, Decision making process.

2.EngineeringCosts&Estimation– Fixed, Variable, Marginal & Average Costs, Sunk Costs ,Opportunity Costs, Recurring And Non recurring Costs, Incremental Costs, Cash Costs vs Book Costs, Life-Cycle Costs; Types Of Estimate, Estimating Models-Per-Unit Model, Segmenting Model, Cost Indexes, Power-Sizing Model, Improvement &Learning Curve, Benefits.

Module-II

3. Cash Flow, Interest and Equivalence: Cash Flow Diagrams, Categories & Computation, Time Value of Money, Debtre payment, Nominal & Effective Interest.

4. Cash Flow & Rate Of Return Analysis–Calculations, Treatment of Salvage Value, Annual Cash Flow Analysis, Analysis Periods; Internal Rate Of Return, Calculating Rate of Return, Incremental Analysis; Best Alternative Choosing An Analysis Method, Future Worth Analysis, Benefit-Cost Ratio Analysis, Sensitivity And Break even Analysis. Economic Analysis In The Public Sector – Quantifying And Valuing Benefits & drawbacks.

Module-III

5.Inflation And Price Change Definition, Effects, Causes, Price Change with Indexes, Types of Index, Composite vs Commodity Indexes, Use of Price Indexes In Engineering Economic Analysis, Cash Flows that inflate at different Rates.

6. Present Worth Analysis: End-Of Year Convention, View point Of Economic Analysis Studies, Borrowed Money View point, Effect Of Inflation & Deflation, Taxes, Economic Criteria, Applying Present Worth Techniques, Multiple Alternatives.

7. Uncertainty In Future Events-Estimates and Their Use in Economic Analysis, Range Of Estimates, Probability, Joint Probability Distributions, Expected Value, Economic Decision Trees, Risk, Risk vs Return, Simulation, Real Options.

Module-IV

8. Depreciation - Basic Aspects, Deterioration & Obsolescence, Depreciation And Expenses, Types Of Property, Depreciation Calculation Fundamentals, Depreciation And Capital Allowance Methods,

Straight-Line Depreciation Declining Balance Depreciation, Common Elements Of Tax Regulations For Depreciation And Capital Allowances.

9. Replacement Analysis- Replacement Analysis Decision Map, Minimum Cost Life of a New Asset, Marginal Cost, Minimum Cost Life Problems.

10. Accounting–Function, Balance Sheet, Income Statement, Financial Ratios Capital Transactions, Cost Accounting, Direct and Indirect Costs, Indirect Cost Allocation.

Books:

1. James L. Riggs, David D. Bedworth, Sabah U. Randhawa: Economics for Engineers 4e, Tata Mc Graw-Hill

2. Donald Newnan, Ted Eschembach, Jerome Lavelle: Engineering Economics Analysis, OUP

3. John A. White, Kenneth E. Case, David B. Pratt: Principle of Engineering Economic Analysis, John Wiley

4. Sulliv anand Wicks: Engineering Economy, Pearson

5. R. Paneer Seelvan: Engineering Economics, PHI

6. Michael RLindeburg : Engineering Economics Analysis, Professional Pub***Readings***

1. JamesL.Riggs,DavidD.Bedworth,SabahU.Randhawa:Economicsfor Engineers 4e,TataMcGraw-Hill

2.DonaldNewnan,TedEschembach,JeromeLavelle:Engineering EconomicsAnalysis,OUP

3.JohnA.White,KennethE.Case,DavidB.Pratt: Principle of Engineering EconomicAnalysis,JohnWiley

4.Sullivanand Wicks:EngineeringEconomy,Pearson

5.R.Paneer Seelvan:Engineering Economics, PHI

6.MichaelRLindeburg :Engineering EconomicsAnalysis,Professional Pub

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Environmental Pollution & Control
Course Code: CE 801A
L-T Scheme: 3-0 **Course Credits: 3**

Introduction: The subject will explore the basic concepts of Environmental Pollution and Control. The students will have a clear idea of the various types of pollution, their sources and effects. The concept of Air Pollution Meteorology will also be discussed in details. This subject also addresses the global environmental issues like ozone depletion, acid rain and Global Warming Green House Effects.

Objectives: The students will develop a clear concept of the types of pollution like air pollution, their sources and effects. They will have a clear understanding of the sources of air pollution, control of particulates and control of gaseous pollutants. The concept of noise measurement will also be discussed and the students will be able to develop a clear understanding of the relationship between pressure, power and intensity involved in noise measurement.

Learning Outcomes:
Knowledge:
The students will have a clear concept of the following topics:
Environment. Pollution, Pollution control Air Pollution: Air Pollutants: Types, Sources, Effects; Air Pollution Meteorology: Lapse Rate, Inversion, Plume Pattern; Air Pollution Dispersion Model: Point Source Gaussian Plume Model, Stability Classes, Stability Charts, Design of Stack Height.Self cleansing properties of the environment; Dilution method; Engineered Control of Air Pollutants: Control of the particulates, Control of Gaseous Pollutants, Control of Air pollution from Automobiles.Definition; Sound Pressure, Power and Intensity; Noise Measurement: Relationships among Pressure, Power and Intensity, Levels, Frequency Band, Decibel Addition, Measures of community Noise i.e. LN, Leq, Ldn,, LNP; Sources, ; Effects; Control.Pollution Characteristics of Typical Industries, Suggested Treatments. Global Environmental Issues: Ozone Depletion, Acid Rain, Global Warming-Green House Effects.Functions of Central and State Pollution Control Boards; Environmental Clearance Process for Industries and Infrastructural Projects Environmental Laws: Water Act, Air Act, Motor Vehicle Act.

Course Contents:
Unit 1: **Introduction**: Environment. Pollution, Pollution control Air Pollution: Air Pollutants: Types, Sources, Effects; Air Pollution Meteorology: Lapse Rate, Inversion, Plume Pattern; Air Pollution Dispersion Model: Point Source Gaussian Plume Model, Stability Classes, Stability Charts, Design of Stack Height.

Unit 2:Air pollution Control: Self cleansing properties of the environment; Dilution method;Engineered Control of Air Pollutants: Control of the particulates, Control of Gaseous Pollutants, Control of Air pollution from Automobiles.

Noise Pollution: Definition; Sound Pressure, Power and Intensity; Noise Measurement: Relationships among Pressure, Power and Intensity, Levels, Frequency Band, Decibel Addition, Measures of community Noise i.e. LN, Leq, Ldn,, LNP; Sources, ; Effects;Control.

Unit 3: Water pollution: Pollution Characteristics of Typical Industries, Suggested Treatments. Global Environmental Issues: Ozone Depletion, Acid Rain, Global Warming-Green House Effects.

Unit 4: Administrative Control on Environment: Functions of Central and State PollutionControl Boards; Environmental Clearance Process for Industries and Infrastructural Projects Environmental Laws: Water Act, Air Act, Motor Vehicle Act

Text Books

1. Introduction to Environmental Engineering and Science G. Masters, W. Ela PHI.
2. Environmental Engineering: A Design Approach A. Sincero, G. Sincero PHI.
3. Environmental Engineering P. V. Rowe TMH.

References

1. Environmental Engineering, S.K .Garg, Khanna Publishers.
2. Air Polution Rao and Rao TMH.
3. Water Supply, Waste Disposal and EnvironmentaPollution Engineering A.K.Chatterjee Khanna Publishers.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Water Resource Management & Planning
Course Code: CE 801B
L-T Scheme: 3-0 **Course Credits: 3**

Introduction: The subject introduces the concept of Water Resource Management And Planning. The topics which are covered in this course are as follows: Planning and analysis of water resource systems, Reservoir operation, and Water resource planning under uncertainty and Stochastic river basin planning model.

Objectives: The students will have a clear understanding of the basic ideas of water resource management and planning with efficiency. They will develop a clear concept of the reservoir operation and sequential process. The deterministic approach to multi-reservoir problems will also be discussed in details. The students will also understand the stochastic river basin planning model which involves the following:Introduction, Reservoir operation, Stochastic,Dynamic programming, Operating Model, Probability Distribution of Storage volumes and Releases, examples Water quality Management:Prediction and Simulation, Water quality Management Modelling.

Learning Outcomes:
Knowledge:
The students will have a clear understanding of the following concepts:
Introduction, System Analysis, Engineers and Policymakers Methods of Analysis: Introduction, Evaluation of Time streams of Benefits and Costs. Plan formulation, Planning models and solution procedures, Lagranges Multipliers, Dynamic Programming, Recursive equations, Bellmans' principle of optimality. Curse of dimensionality of discrete dynamic programming. Examples.Sequential process, single Reservoir problem - with release as decision variable, with storage as decision variable (deterministic approach). Examples, Related Computer Programming. Multi–reservoir problems (Deterministic approach).Introduction, probability concepts and Methods – Random variable and Distributions, Univariate probability Distributions ,properties of Random variable – Moment and Expectation (Univariate Distributions) , Moment Generating Functions, Measures of Central tendency, Measures of Dispersion, Measures of symmetry (Skewness), measures of peakedness (kurtosis), examples.Introduction, Reservoir operation, Stochastic, Dynamic programming, Operating Model, Probability Distribution of Storage volumes and Releases, examples Water quality Management: Prediction and Simulation, Water quality Management Modelling.

Course Contents:

Unit 1: **Planning and analysis of Water Resource Systems**: Introduction, System Analysis, Engineers and Policymakers **Methods of Analysis:** Introduction, Evaluation of Time streams of Benefits and Costs. Plan formulation, Planning models and solution procedures,Lagranges Multipliers, Dynamic Programming, Recursive equations, Bellmans' principle of optimality. Curse of dimensionality of discrete dynamic programming. Examples.

Unit 2: Reservoir Operation: Sequential process, single Reservoir problem - with release as decisionvariable, with storage as decision variable (deterministic approach). Examples, RelatedComputer Programming. Multi–reservoir problems (Deterministic approach).

Unit 3:Water Resources Planning under Uncertainty: Introduction, probability concepts andMethods – Random variable and Distributions, Univariate probability Distributions ,properties of Random variable

– Moment and Expectation (Univariate Distributions) , Moment Generating Functions, Measures of Central

tendency, Measures of Dispersion, Measures of symmetry (Skewness), measures of peakedness (kurtosis), examples.

Unit 4: Stochastic River Basin Planning Model: Introduction, Reservoir operation, Stochastic,Dynamic programming, Operating Model, Probability Distribution of Storage volumes and Releases, examples **Water quality Management:** Prediction and Simulation, Water quality Management Modelling.

Text Books

1. Applied Hydrology V.T. Chow.
2. Hydrology Raudkivi.
3. Stochastic Hydrology Jayarami Reddy.

References

1. Water Resources Engg. M.C. Chaturvedi.
2. Water Resources Systems Planning & Analysis Ddenice P Loucks, Jery R Stedinger& Douglas A Heinth
Prentice Hall, Inc New Jersy.
3. Water Resources Engineering Larry W Mays John Wiley &Sons(Asia).

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Finite Element Method
Course Code: CE 802A
L-T Scheme: 3-0 **Course Credits: 3**

Introduction: This course examines the basic concepts of Finite Element Method. It also discusses the concept of virtual work and variational principle which also involves Galerkin Approach, Displacement Approach, Stiffness Matrix and Boundary Conditions. The subject broadly covers the following topics: Introduction to Finite Element Analysis, Element Properties, Formation of Stiffness Matrices and Analysis of trusses.

Objectives: The students will develop a clear understanding of the basic concepts of Finite Element Analyis which involves: Fundamental concepts of Elasticity Finite Element Formulation Techniques: Virtual Work and Variational Principle. The student will also understand the concepts of Constant Strain Triangle, Linear Strain Triangle, Rectangular Elements, Numerical Evaluation of Element Stiffness.

Learning Outcomes:
Knowledge:
The students will have a clear understanding of the following topics:
Introduction, Basic Concepts of Finite Element Analysis,Steps in Finite Element Analysis, Fundamental concepts of Elasticity Finite Element Formulation Techniques: Virtual Work and Variational Principle, Galerkin Approach, Displacement Approach, Stiffness Matrix and Boundary Conditions.Concepts of shape functions: Natural Coordinates, one dimensional, Triangular,Rectangular Elements, Lagrange and Serendipity Elements Isoparametric Formulation: Isoparametric Elements, Stiffness Matrix of Isoparametric Elements,Numerical Integration: One Dimensional, Two Dimensional.Continuous Beam and Simple Plane Frame 6FEM for two dimensional analysis**:** Constant Strain Triangle, Linear Strain Triangle, Rectangular Elements, Numerical Evaluation of Element Stiffness, Computation of Stresses FEM for Plates: Introduction to Plate Bending Problems, Finite Element Analysis of Thin Plate Introduction to application of standard FEM software in civil Engineering.

Course Contents:

Unit 1: **Introduction to Finite ElementAnalysis**: Introduction, Basic Concepts of Finite Element Analysis,Steps in Finite Element Analysis, Fundamental concepts of Elasticity Finite Element Formulation Techniques: Virtual Work and Variational Principle, GalerkinApproach, Displacement Approach, Stiffness Matrix and Boundary Conditions.

Unit 2: Element properties: Concepts of shape functions: Natural Coordinates, one dimensional, Triangular,Rectangular Elements, Lagrange and Serendipity Elements Isoparametric Formulation: Isoparametric Elements, Stiffness Matrix of Isoparametric Elements,Numerical Integration: One Dimensional, Two Dimensional.

Unit 3: Formation of stiffness matrices and analysisofTruss: Continuous Beam and Simple Plane Frame 6FEM for two dimensional analysis**:** Constant Strain Triangle, Linear Strain Triangle, Rectangular Elements, Numerical Evaluation of Element Stiffness, Computation of Stresses FEM for Plates: Introduction to Plate Bending Problems, Finite Element Analysis of Thin Plate Introduction to application of standard FEM software in civil Engineering.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Text Books

1. Finite Element Method with Applications in Engineering Y. Desai et. al Pearson.
2. Introduction to Finite Element in Engineering Chandrapatla&Belegundu Pearson Education.
3. A First Course in Finite Element Method D. L. Logan Thomson.

References

1. Finite Element Analysis – Theory and Programming C. S. Krishnamoorthy Tata Mcgraw Hill.
2. Matrix, Finite Element,Computer and Structural Analysis M. Mukhopadhyay Oxford and IBH Publishing Co. Pvt.Ltd., New Delhi, India.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Dynamics of Soils & Foundations
Course Code: CE802B
L-T Scheme: 3-1 **Course Credits: 3**

Introduction:

This course covers the response and properties of soil under dynamic loading along with design of machine foundations. The Topics to be covered (tentatively) include:

- Fundamental of vibrations
- Introduction to machine foundation
- Dynamic properties of Soil
- Analysis and design of Block type Machine Foundation
- Liquefaction of soils
- Propagation of elastic waves in soils

Objectives:
This course on "Soil Dynamics and foundations" discusses about the behavior and properties/response of soil as a material which is subjected to various types of dynamic or cyclic time-dependent loadings. Also the design and analysis for machine foundations come along with this course to consider the dynamic properties of both soil and foundation as combined mass. Also in depth knowledge of various types seismic waves and their behavior in propagation are aimed.

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

1. Understand the damped and undamped system.

2. Understand the concept of dynamic characteristics of soil.

3. Sizing of reinforced concrete members.

4. Understand the basic principle of machine foundation

5. Understand how elastic wave propagate

Course Contents:

Unit 1: Fundamental of vibrations: Degrees of freedom, Natural frequency, Undamped single degree freedom system, Damped single degree freedom system, Transmissibility, Response to ground motion, Introduction to multiple degree freedom system
Book: Dr. Swami Saran, "Soil Dynamics & Machine Foundation"– Chapter 2

Unit 2: Introduction to machine foundation: Types of Machine Foundations, General requirement of Machine foundations,
Dimensional criteria, Design data, Permissible amplitude, Permissible Bearing pressure.
Book: Dr. Swami Saran, "Soil Dynamics & Machine Foundation"– Chapter 8

Unit 3: Dynamic properties of Soil, Laboratory and field evaluation of soil properties as per IS codes;
Book: Dr. Swami Saran, "Soil Dynamics & Machine Foundation"– Chapter 4

Unit 4: Analysis and design of Block type Machine Foundation: Modes of Vibrations, Methods of Dynamic Analysis, Design considerations for dynamically loaded foundations and constructional

features; Design procedures for foundations for hammers, reciprocating engines, Vibration Isolation and damping.
Book: Dr. Swami Saran, "Soil Dynamics & Machine Foundation"– Chapter 9, Chapter 12

Unit 5: Liquefaction of soils: Definition, Causes and effects of Liquefaction, Evaluation of Liquefaction potential, mitigation of Liquefaction Hazards.
Book: Dr. Swami Saran, "Soil Dynamics & Machine Foundation"– Chapter 7

Unit 6: Propagation of elastic waves in soils: Mechanism of wave propagation, Body waves, Surface waves, Rayleigh waves.
Book: Dr. Swami Saran, "Soil Dynamics & Machine Foundation"– Chapter 1, Chapter 3

Text Books

1. Dr. Swami Saran, "Soil Dynamics & Machine Foundation", Galgotia Publications Ltd.
2. Steven L. Kramer, "Geotechnical Earthquake Engineering", Tata Mcgraw Hill
3. B. B. Prasad, "Fundamentals of Soil Dynamics & Earthquake Engineering", PHI
4. Deepankar Choudhury, "Soil Dynamics", NPTEL Video Course, available free online: http://www.nptel.iitm.ac.in/courses/105101005/

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Design of Tall Buildings
Course Code: CE 802C
L-T Scheme: 3-0 **Course Credits: 3**

Introduction: The subject discusses in details the structural aspects of the design of tall buildings and analysis. The subject broadly covers the following concepts: Introduction to the analysis and design of tall buildings and Structural Forms which includes Braced-Frame Structures, Rigid Frame Structures, Infilled-Frame Structures,Shear Wall Structures, Wall Frame Structures, Tubular Structures, Core Structures, Floor Systems Reinforced Concrete : One-Way slab, Two-way slab, Floor Systems – Steel Framing, One-way Beam System, Two-Way Beam System, Three-Way Beam System, Composite Steel-Concrete Floor Systems.

Objectives:
The student will develop a clear understanding of the Necessity of Tall Buildings, Design Philosophy, Strength and Stability, Creep,Shrinkage and Temperature Effects, Fire, Foundation Settlement and Soil-Structure Interaction Loadings: Gravity loading, Wind loading, Earthquake Loading, Combination of Loadings. In the modelling for analysis the students will develop the concepts of Approaches to analysis, Highrise behaviour, Modeling for approximateanalysis, Modelling for Accurate Analysis Stability of High-rise buildings, Buckling analysis of FramesDynamic Analysis: Dynamic Response to Wind Loading, Dynamic Response to Earthquake Loading.

Learning Outcomes:
Knowledge:
The students will have a clear understanding of the following concepts:
Necessity of Tall Buildings, Design Philosophy, Strength and Stability, Creep,Shrinkage and Temperature Effects, Fire, Foundation Settlement and Soil-Structure Interaction Loadings : Gravity loading, Wind loading, Earthquake Loading, Combination of Loadings.Braced-Frame Structures, Rigid Frame Structures, Infilled-Frame Structures,Shear Wall Structures, Wall Frame Structures, Tubular Structures, Core Structures, Floor Systems Reinforced Concrete : One-Way slab, Two-way slab, Floor Systems – Steel Framing, One-way Beam System, Two-Way Beam System, Three-Way Beam System, Composite Steel-Concrete Floor Systems.Approaches to analysis, Highrise behaviour, Modelling for approximateanalysis, Modelling for Accurate Analysis Stability of High-rise buildings, Buckling analysis of FramesDynamic Analysis: Dynamic Response to Wind Loading, Dynamic Response to Earthquake Loading.

Course Contents:
Unit 1: **Introduction :** Necessity of Tall Buildings, Design Philosophy, Strength and Stability, Creep,Shrinkage and Temperature Effects, Fire, Foundation Settlement and Soil-Structure Interaction Loadings : Gravity loading, Wind loading, Earthquake Loading, Combination of Loadings.

Unit 2:Structural Forms : Braced-Frame Structures, Rigid Frame Structures, Infilled-Frame Structures,Shear Wall Structures, Wall Frame Structures, Tubular Structures, Core Structures, Floor Systems Reinforced Concrete : One-Way slab, Two-way slab, Floor Systems – Steel Framing, One-way Beam System, Two-Way Beam System, Three-Way Beam System, Composite Steel-Concrete Floor Systems.

Unit 3: Modelling for Analysis : Approaches to analysis, Highrise behaviour, Modeling for approximateanalysis, Modelling for Accurate Analysis Stability of High-rise buildings, Buckling analysis

of FramesDynamic Analysis : Dynamic Response to Wind Loading, Dynamic Response to Earthquake Loading.

Text Books

1. Tall Building Structures: Analysis and Design Bryan S. Smith and Alex Coull John Wiley & Sons, Inc, New York, 1991.

References

1. Designing Tall Buildings Mark Sarkinsian, Routledge, New York, 2012.
2. Structural Frameworks Clyde T. Morris and Samuel T. Carpenter John Wiley.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Pavement Design
Course Code: CE 802D
L-T Scheme: 3-0 **Course Credits: 3**

Introduction: The subject explores the concept of pavement design and pavement material characterization which broadly covers the following topics Identification of different type of materials Field andlaboratory methods for characterization of pavement materialsAnalysis and Design of Flexible Pavements : Selection of appropriate theoretical model for flexible pavements, Analysis of different layers of flexible pavements based on linear elastic theory, Different methods of design of flexible pavements, IRC guidelines(IRC-37). The subject also takes into account the analysis and design of rigid pavements.

Objectives:
In this subject students will have a clear understanding of the principles of pavement design which involves Types of Pavements, Concept of pavement performance, Structuraland functional failure of pavement, Different types of pavement performance, Different pavement design approaches Traffic Consideration in Pavement Design : Vehicle types, Axle configurations, Contact shapes and contact stress distribution, Concept of standard axle load, Vehicle damage factor, Axle load surveys, Estimation of design traffic.

Learning Outcomes:
Knowledge:
The students will develop clear understanding of the following concepts:
Types of Pavements, Concept of pavement performance, Structuraland functional failure of pavement, Different types of pavement performance, Different pavement design approaches Traffic Consideration in Pavement Design : Vehicle types, Axle configurations, Contact shapes and contact stress distribution, Concept of standard axle load, Vehicle damage factor, Axle load surveys, Estimation of design traffic.Identification of different type of materials Field andlaboratory methods for characterization of pavement materialsAnalysis and Design of Flexible Pavements: Selection of appropriate theoretical model for flexible pavements, Analysis of different layers of flexible pavements based on linear elastic theory, Different methods of design of flexible pavements, IRC guidelines(IRC-37).Selection of appropriate theoretical models for rigidpavements, Analysis of wheel load stresses, curling, temperature differential, Critical stress combinations, Different methods of design of rigid pavements, IRC guidelines (IRC-58) Pavement Overlay Designs : Overlay design as per Indian Roads Congress guidelines (IRC-81) Overlay design as per AASHTO-1993 guidelines.

Course Contents:

Unit 1: **Principles of Pavement Design** : Types of Pavements, Concept of pavement performance, Structuraland functional failure of pavement, Different types of pavement performance, Different pavement design approaches Traffic Consideration in Pavement Design : Vehicle types, Axle configurations, Contact shapes and contact stress distribution, Concept of standard axle load, Vehicle damage factor, Axle load surveys, Estimation of design traffic.

Unit 2: Pavement Material Characterization: Identification of different type of materials Field andlaboratory methods for characterization of pavement materialsAnalysis and Design of Flexible Pavements : Selection of appropriate theoretical model for flexible pavements, Analysis of different

layers of flexible pavements based on linear elastic theory, Different methods of design of flexible pavements, IRC guidelines(IRC-37).

Unit 3: Analysis and Design of Rigid Pavements : Selection of appropriate theoretical models for rigidpavements, Analysis of wheel load stresses, curling, temperature differential, Critical stress combinations, Different methods of design of rigid pavements, IRC guidelines (IRC-58) Pavement Overlay Designs : Overlay design as per Indian Roads Congress guidelines (IRC-81) Overlay design as per AASHTO-1993 guidelines.

Text Books

1. Principles of Pavement Design E.J.Yoder and M.W.WitczakWiley.
2. Pavement Analysis and Design Y. H. Huang Prentice- Hall.

References

1. Principles of Pavement Design E.J.Yoder and M.W.WitczakWiley.
2. Pavement Analysis and Design Y. H. Huang Prentice- Hall.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Structural Engineering Design Lab
Course Code: CE891
L-T-P scheme: 0-0-3 **Course Credit: 2**

Objectives:
1. The students will develop a clear understanding of the advanced structural design and drawings of different components.
2. They will be able to develop the design concepts of steel bridges and plate girder bridges.
3. They will be able to design the plate girders which involves the design of web, design of flanges, intermediate vertical stiffners, horizontal stiffners and bearing stiffners.

Learning Outcomes: The students will be exposed to various advanced structural designs and drawings like beams curved in plan, domes and circular tanks, rectangular tanks and underground tanks. The students will develop the concepts of aqueducts and box culverts. They will also develop the concepts of concrete bridges and design of T Beam bridge. The students will develop the understanding of steel bridges and plate girder bridges.

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

1. Water Tanks: Beams curved in plan, Domes, Circular and Intze Tanks, Rectangular Tanks, Underground Tanks.
2. Pipes, Silos & Chimneys: Reinforced concrete pipes, Bunkers and Silos, Chimeneys.
3. Aqueducts and Box Culverts, Concrete Bridges: Type of load, Impact Effect, Design of T-beam Bridge.
4. Plate Girders: Design of Web, Design of flanges, Intermediate Vertical Stiffners, Horizontal Stiffners, Bearing Stiffners, Horizontal Stiffners.
5. Roof trusses: General, Roof and Side Coverings, Design Loads, Purlins, Members, End Bearings, Industrial Building Frames, Framing, Bracing, Crane Girders and Columns.
6. Steel Bridges: Plate girder bridges.

Text Book:
1. Advanced Reinforced Concrete Design By N.Krishnaraju.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Remote Sensing and GIS
Course Code: CE801C
L-T Scheme: 3-1 **Course Credits: 4**

Introduction:

This course helps to understand the principles of modern surveying techniques with the help of the technology of remote sensing. It also discusses about the remote sensing data and the processes of analysis. The Topics to be covered (tentatively) include:

- Photogrammetry
- Satellite Survey
- Astronomy
- Geoinformatics

Objectives:

In this course we will study the basics of Remote Sensing and GIS. We will understand the methods of different types of remote sensing data. We will learn the application of GIS, for modern Surveying techniques used in civil engineering fieldwork.

Learning Outcomes:

Knowledge:

1. To introduce the application of remote sensing.
2. To familiarize the students with Global positioning system.
3. To enable the students to understand the methods to analyze remote sensing data.
4. To familiarize the students with technical problems and errors related to GPS.

Application:

1. To understand the fundamentals of sensors.
2. To familiarize with GPS methods.
3. To understand the GIS data models.
4. To understand the GPS errors and the methods to eliminate those errors.

Course Contents:

Unit 1: Introduction: Definition and types of remote sensing, Tacheometry (Planimetry/altimetry), Triangulation (Frame work / adjustment), Trilateration (EDM/ Total Station), Geodetics (physical/ geometrical geodesy), Error Analysis (causes / law of weights).

Unit 2: Photogrammetry: Camera System (phototheodolite/ aircraft), Ground photograph (oblique/orthogonal streophoto), Aerial photograph (perspective scale/ flight planning), distortion (relief / tilt), Geometrix (parallax / mapping), application (topographics / interpretation),

Unit 3: Satellite survey: Satellite Sensing (Sensors / platforms), energy sources (electromagnetic / atmospheric interaction), visual interpretation (Band width), digital processing (imageries / enhancement), data integration (multi-approach / GIS), microwave imaging (active system / radars), applications.

Unit 4: Astronomy: Celestial sphere (star-coordinates / transformation), field astronomy (azimuth, solar and polar method), 3D computation (local vs global), spherical trigonometry, Multilateration, Observation, Corrections in astronomy, Correlation of low, medium, remote objects, Global Positioning Systems.

Unit 5: Geoinformatics: GIS concept (Introduction/ definition), planning and management, spatial data model, database and DBMS, linking of attributes, geospatial analysis, modern trends

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Text Books

1. Kanetker.& Kulkarni, Surveying (Volume 2)

References

1. S.K.Duggal, Surveying:-Vol- II, Tata McGraw Hill

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UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Grand Viva **Course Code: CE881**
L-T –P Scheme: 0P **Course Credits: 4**

Aims and Objectives

1. To compare the traditional viva examination (TVE) with OSVE (Objective Structured Viva Examination).

2. To obtain the students' opinion regarding OSVE as an assessment tool.

3. A suggestion to include OSVE as a part of university examination.

Materials and Methods

The study was carried out in November 2012, at K.J. Somaiya Medical College, in the department of Anatomy. 50 students were exposed to different stations of viva as well as OSVE. A comparison was made of the student's performance and a feedback was taken from the students regarding the same.

As the OSVE was being conducted for the first time, the students were notified in advance regarding the plan for conducting the part ending practical assessment – by both the TVE and OSVE. The OSVE was planned for 20 marks, viva voce of 20 marks.

Purpose and Format of the Viva Voce Examination

Literally, "viva voce" means by or with the living voice - i.e., by word of mouth as opposed to writing. So the viva examination is where you will give a verbal defence of your thesis.

Put simply, you should think of it as a verbal counterpart to your written thesis. Your thesis demonstrates your skill at presenting your research in writing. In the viva examination, you will demonstrate your ability to participate in academic discussion with research colleagues.

Purpose of the Exam

The purpose of the viva examination is to:

- demonstrate that the thesis is your own work
- confirm that you understand what you have written and can defend it verbally
- investigate your awareness of where your original work sits in relation to the wider research field
- establish whether the thesis is of sufficiently high standard to merit the award of the degree for which it is submitted

- allow you to clarify and develop the written thesis in response to the examiners' questions

The Examiners and Exam Chair

You will normally have two examiners:

- an internal examiner who will be a member of academic staff of the University, usually from your School/Department but not one of your supervisors
- an external examiner who will normally be a member of academic staff of another institution or occasionally a professional in another field with expertise in your area of research (candidates who are also members of University staff will normally have two external examiners in place of an internal and an external examiner)

Your supervisor should let you know who your examiners will be as it is important that you ensure you are familiar with their work and any particular approach that they may take when examining your thesis.

In some cases there may also be a Chair person for the examination. A Chair is appointed if the Graduate Dean or either of the examiners feels this is appropriate, for example where the examining team has relatively little experience of examining UK research degrees. The Chair is there to ensure the examination is conducted in line with University regulations and is not there to examine your thesis. If there is a Chair person, it will usually be a senior member of the academic staff of your School/Department.

Normally no one else is present in the exam.

Exam Venue and Arrangements

Your internal examiner is responsible for arranging your viva exam and they will contact you with the relevant details - date, time, venue, etc.

Usually the viva exam will take place in your School/Department, though occasionally another University location may be used. If you are unsure where you need to go, make sure you check this before the day of your exam.

If you returned your Notice of Intention to Submit Your Thesis three months before your submission date, your viva exam should normally take place quite soon after submission. Almost

all viva exams take place within three months of thesis submission and in many cases it is within one month.

Format of the Exam

All viva examinations are different, so it is not possible to describe exactly what will happen - but there are general points which can be made which may be helpful, and you should have the opportunity before your examination to discuss what will happen with your supervisor or to attend the University's pre-viva examination workshop.

The purpose of the viva is to establish that your work is of a sufficiently high standard to merit the award of the degree for which it is submitted. In order to be awarded a research degree, the thesis should demonstrate an original contribution to knowledge and contain work which is deemed worthy of publication.

In order to do this, examiners may:

- ask you to justify your arguments
- ask you to justify not only things which you have included in your thesis but also things which you may have left out
- ask you questions about the wider research context in which the work has been undertaken
- argue certain points with you
- expect you to discuss any developments which may flow from your work in the future

Inevitably, your thesis will have strengths and weaknesses and the examiners will want to discuss these. It is considered a positive thing, indeed an essential thing, that you can discuss both the strengths and the weaknesses. You can think of the weaknesses as an opportunity to demonstrate your skill at critical appraisal.

Remember that examiners seek to find and discuss weaknesses in all theses - you should not interpret criticism as an indication that the examination will not end successfully.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Project Part-II **Course Code: CE882**
L-T –P Scheme: 12P **Course Credits: 12**

Project: an activity where the participants have some degree of *choice* in the outcome. The result is complete and functional, that is, it has a beginning, middle and end. Usually, it spans multiple lab periods and requires work outside scheduled lab periods. Since there are choices in implementation, *design* is inherently a component of a project. A project is inherently different from an *analysis* or *exercise*, in which the solution has a predictable form. Projects span a wide variety of possibilities: design and build, identify a system, do a forensic analysis, evaluate a product or assess some environmental situation.

Program Objective 1
Graduates shall make their way to the society with proper scientific and technical knowledge in mechanical engineering.

Program Objective 2
Graduates shall work in design and analysis of mechanical systems with strong fundamentals and methods of synthesis.

Program Objective 3
Graduates shall adapt to the rapidly changing environment in the areas of mechanical engineering and scale new heights in their profession through lifelong learning.

Program Objective 4
Graduates shall excel in career by their ability to work and communicate effectively as a team member and/or leader to complete the task with minimal resources, meeting deadlines.

Program Outcomes:

1. Ability to apply knowledge of mathematics, science and mechanical engineering fundamentals for solving problems.
2. Ability to Identify, formulate and analyze mechanical engineering problems arriving at meaningful conclusions involving mathematical inferences.
3. Ability to design and develop mechanical components and processes to meet desired needs considering public health, safety, cultural, social, and environmental aspects.
4. Ability to understand and investigate complex mechanical engineering problems experimentally.
5. Ability to apply modern engineering tools, techniques and resources to solve complex mechanical engineering activities with an understanding of the limitations.
6. Ability to understand the effect of mechanical engineering solutions on legal, cultural, social, public health and safety aspects./li>

Course Description

7. Ability to develop sustainable solutions and understand their impact on society and environment.
8. Ability to apply ethical principles to engineering practices and professional responsibilities.
9. Ability to function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
10. Ability to comprehend, design documentation, write effective reports, make effective presentations to the engineering community and society at large.
11. Ability to apply knowledge of engineering and management principles to lead teams and manage projects in multidisciplinary environments.
12. Ability to engage in independent and life-long learning in the broad context of technological changes and advancements.