

SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

COURSE CONTENTS

Fourth Year (I semester) Batch: 2008-2012

L T P C

3 0 1 4

Course Code: CE 415 (Elective-II)

Course Name: **Advanced Solid Mechanics**

Objective : This course discusses the various advanced characteristics of soil including the variation of stress properties of soil.

Introduction to elasticity theory; Simple 2D/3D problems and their solutions; Pure bending of beams with unsymmetrical section; Shear Center; Thermal stresses; Torsion of noncircular members; Curved Beams; Beams on elastic foundation; Plasticity; failure theories; Energy methods; Thermal stresses; Introduction to viscoplasticity and viscoplasticity; Numerical methods; Coupled axial force and bending moment problems; coupled torsion and bending moment problems.

Texts/References

A.P. Boresi and O.M. Sidebottom, Advanced Mechanics of Materials, Fifth Edition, Wiley, Singapore, 1992.

S.P. Timoshenko-Strength of Materials Vol. 2 - third Edition - CBS Publishers Delhi, 1991.

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Course Code: CE 416 (Elective-II)

Course Name: **MASS TRANSPORTATION SYSTEM**

Course Objective:

This course will help students understand urban mass transportation planning, its functions and evaluation including operational and management issues.

Course Contents :

History and role of Transit, Recent Trends Mass Transportation Characteristics. Demand Characteristics, Spatial, Temporal and Behavioral Characteristics of Transportation Demand. Urban Mass Transportation Planning, Demand Surveys, Estimation and Demand Projection, Four Stages of Planning. Performance Evaluation of Mass Transport System, Structure of Decision Making, Evaluation and Selection Methods, Selection Procedures, Economic Evaluation Methods. Terminals and their Functions. Design, Typical Characteristics. Scheduling, Service Analysis, Vehicle Dispatch Policy, Vehicle Requirements, Spacing of Bus Tropos, Route Spacing and Performance. Operational and Management Issues, Reserved Bus Lanes, Signal Preemption, Dial-a-Bus, Vehicle Monitoring and Control System, Modal Coordination, Special Studies, Underground Transportation, Para transit, Rail Transit, Case Studies.

Reference Books :

1. Vuchic V.R., "Urban Public Transportation System and Technology", Prentice Hall, Inc. Englewood Cliffs, New Jersey, 1981.
2. Agarwal M.K., "Urban Transportation in India", INAE, Allied Publishers Ltd., 1996.
3. Grey G.E. & Hoel, LA, "Public Transportation" Prentice Hall, Englewood Cliffs, N.J.

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Course Code: CE 417 (Elective-II)

Course Name: AIR POLLUTION CONTROL

Objective: This course will impart knowledge about sources, types and effects of air pollutions; control and transportation of air pollutants.

- 1 **Air Pollution** : Natural and Anthropogenic Sources, Types, Effects of air pollutions.
- 2 **Methods of Measurements of Air Pollutants**: Sampling modes, Sampling system, Sampling analysis for Grit and Dust, Smoke, Sulphur oxide, Carbon monoxide, Hydrocarbon, Oxides of nitrogen, Ozone and other air pollutants.
- 3 **Ambient Air Quality Standards** : International and Indian Standards, Specifications and methods.
- 4 **Transport of Air Pollutants**: Meteorology and topography affecting Pollutant dispersion, Models of pollutant dispersion.
- 5 **Height and Design of Chimney** : Height, Flue gas quality and temperature, Thermal shocks, Lateral dimension, Reduction of heat losses, Choice of materials
- 6 **Control equipments** : Theory of control for particulate and gaseous pollutants. Types, features and operations, Selection and application.
- 7 **Control of Gaseous Pollutants** : Absorption, Adsorption, Combustion, and catalytic processes.
- 8 **Control of Particulate Matters** : Types, Features, Operations, Selection of Equipments and applications.
- 9 **Vehicular Pollution and Control** : Types Sources of Automobile Air Pollution. Control of Air Pollution by Automobiles Vehicle emission standards and fuel quality, Inspection and certification programme.

Reference Books:

1. Air Pollution by Perkins H.C. - Tokyo, McGraw Hill
2. Air Pollution and its Origin & Control by Wark & Warner C.F. - New York, IEP, A Dun Donnelley Publication - 1976
3. Air Pollution Control Theory by Crawford - Tata McGraw Hill
4. Industrial Air Pollution Hand Book by Albert Parker - McGraw Hill Book Co.
5. Air Pollution by M.N. Rao McGraw Hill

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Course Code: CE-418 (Elective-II)

Course Name: DESIGN OF HYDRAULIC STRUCTURES

Objective: This course discusses the design of hydraulic structures used in canal networks for water distribution.

Design and drawing of the following hydraulic structures.

1. Sloping glacis weir.
2. Tank sluice with tower head
3. Type III Syphon aqueduct.
4. Surplus weir.
5. Trapezoidal notch fall.
6. Canal regulator.

TEXT BOOKS:

1. Design of minor irrigation and canal structures by C.Satyanarayana Murthy, Wiley eastern Ltd.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

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Course Code: CE 419 (Elective-II)

Course Name: MACHINE FOUNDATION VIBRATIONS

Objective: This course discusses machine foundation dynamics.

1. Terminology used in study of vibrations: Accelerating bodies (acceleration, velocity, displacement), amplitude (displacement, vibration) Static and Dynamic Balancing of a rotating body, phenomenon of beat, damping, different types of excitation- impulse, inertial, harmonic, periodic, transient, Type of machine foundation structure- block type, Frame type, mat type, Overturned & under turned machine Foundation.

2. Frequency: Angular, damped, natural, operating, fundamental, Magnification or Amplification Factor.

3. Mass: Continuous and equivalent lumped mass

4. Motion: Periodic, aperiodic, simple harmonic, sub-harmonic, super harmonic.

5. Modes of vibration: Coupled, un coupled, First mode of vibration, normal mode of vibration. Phases angle, resonance, spring stiffness, degree of freedom. Fundamentals of theory of vibrations, single degree of freedom system- calculation of parameters for mathematical model: Equivalent mass, equivalent spring constant, Equivalent forcing function.

6. Formulation of Mathematical Model: Transient or free vibrations, steady state solution of forced vibration. Dynamic system subjected to rotating mass type Excitation. Two degree of freedom system without and with damping, multi degree of freedom system. Vibration of block foundation. Induced Vibrations due to Vehicular traffic and blast waves, vibration of structures due to earth quake and man made ground vibration, structural damage and human sensitivity to the vibration. Vibration isolation- active and passive, various methods of vibration isolation.

Suggested Text Books and References:

1. Swami saran Soil dynamics and machine foundation
2. Shamsar Prasad Soil dynamics
3. Grover Mechanical Vibration

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Course Code: ME 419 (Elective-II)

Course Name: Atmospheric Fluid Dynamics

Objective :This course discusses fluid dynamics of the atmosphere and its effects on industrial effluents.

General structure of the atmosphere; elements of meteorology - lapse rate of temperature, temperature inversions, isotherms & isobars.

Atmospheric circulation, vertical convection, centrifugal effects, stability of the atmosphere.

Effect of earth's rotation, effect of friction.

Atmospheric motions; wind scales.

Atmospheric boundary layer, governing equations; Ekman spiral; logarithmic and power laws; atmospheric turbulence.

Effect of wind on smoke dispersion; determination of chimney height.

Basic similarity requirements; dimensional analysis; basic scaling considerations; wind tunnel simulations of atmospheric flows; wind tunnel testing.

References:

1. Wind Effects on Structures – E. Simiu & R. Scanlan

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Course Code: CE 400 A

Course Name: **Minor Projects**

Objective :Students will work on a project related to industry and/or society.

In minor projects individual student can select their own topics as per their elective subject. The project will be supervised by concerned Faculty. The presentation for the same will be at the end of semester.

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Course Code: CE 400

Course Name: **Industrial Training**

Objective :Students will undergo industrial training at the end of the seventh semester for a period of 6-8 weeks and submit a comprehensive report.

At the end of VII semester students will go to different industries for industrial training, prepare the “Industrial Training Report” (ITR) and submit it in VIII semester.