

**VII SEMESTER, B.Tech.-Civil**

<b>Sr.No</b>	<b>Course Code</b>	<b>Subject</b>	<b>L-T-P</b>	<b>Credits</b>
1	CE 401	Foundation Engineering	3-0-0	3
2	CE 402	Transportation Engineering-II	3-0-1	4
3	CE 403	Design of Structure Lab-II	0-0-2	2
4	CE404	Estimation, Costing and Construction Management	3-0-0	3
5	CE405	Concrete Technology Lab	0-0-1	1
6	CE XXX	Elective-I	3-0-0	3
7	CE XXX	Elective-II	3-0-0	3
8	CE 400 A	Minor Project	0-0-2	2
9	CE 400	Industrial Training	0-0-0	2
10	MB 401	Corporate Ethics and Management Science	3-0-0	3
<i>Total Contact Hrs=18 hrs. Lectures+0 hrs. tutorials+12 hrs. Lab= 30Hrs</i>			<b>TOTAL</b>	<b>26</b>

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-401

Course Name: **Foundation Engineering**

**Objective: This course discusses the current practices of foundation engineering used in the selection, design and construction of foundations.**

**1. Introduction:**

**Role of civil engineer in the selection, design and construction of foundation of civil engineering structures, brief review of soil mechanics principles used in foundation engineering.**

**2. Soil Exploration:**

**Methods of soil exploration; boring, sampling, penetration tests, correlations between penetration resistance and soil design parameters.**

**3. Earth Pressure and Retaining Walls:**

**Earth pressure at rest, active and passive earth pressure, Rankine and Coulomb's earth pressure theories, earth pressure due to surcharge, retaining walls, stability analysis of retaining walls, proportioning and design of retaining walls.**

**4. Foundations:**

**Types of foundations, mechanism of load transfer in shallow and deep foundations, shallow foundations, Terzaghi's bearing capacity theory, computation of bearing capacity in soils, effect of various factors, use of field test data in design of shallow foundations, stresses below the foundations, settlement of footings and rafts, proportioning of footings and rafts, sheeting and bracing of foundation excavation.**

**5. Pile Foundation: Types and methods of construction, estimation of pile capacity, capacity and settlement of group of piles, proportioning of piles.**

**6. Well foundations: Methods of construction, tilt and shift, remedial measures, bearing capacity, settlement and lateral stability of well foundation.**

**7. Slopes: Mode of failure – mechanism, stability analysis of infinite slopes, methods of slices, Bishop's simplified method.**

**8. Machine Foundations: Types of machine foundations, mathematical models, response of foundation – soil system to machine excitation, cyclic plate load test, block resonance test, criteria for design.**

**Reference Books:**

**1. Ranjan, G. and Rao, A.S.R., "Basic and Applied Soil Mechanics", New Age. 2000**

**2. Das, B.M., "Principles of Foundation Engineering", PWS. 2004**

**3. Som, N.N. and Das, S.C., "Theory and Practice of Foundation Design", Prentice-Hall. 2003**

**4. Couduto, Donald P., "Geotechnical Engineering – Principles and Practices", Prentice-Hall. 1999**

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COURSE CONTENTS

Third Year (II Semester) Batch: 2008-2012

L T P C

3 0 1 4

Course Code: CE-402

Course Name: **Transportation Engineering II**

**Objective:.**

**Railway Engineering**

**Indian Railway Track - different gauges, cross sections, coning of wheels; Tractive resistances; Track components - rails, rail failures, sleepers, rail fixtures and fastenings and ballast; Geometric design of the track; Points and crossings Track junctions; Stations and yards; Signalling and interlocking; Track stresses; Track construction and maintenance**

**Airport Planning and Design**

**Aircraft characteristics related to airport design; Airport configuration - runway configurations, relation of terminal area to runways, runway orientation; Geometric design of the airfield - ICAO and FAA design standards, runways, taxiways, holding aprons and aprons; Planning and design of the terminal area - apron-gate system, size and number of gates, aircraft parking configurations, the passenger terminal system; airport lighting and marking; air traffic control; airport planning and air travel demand forecasting; Structural design of airfield pavements.**

**Transportation Engineering Lab.**

**Laboratory testing of subgrade soils, aggregates, bituminous binders and mixes for their suitability in road construction with reference to BIS; Traffic studies; Pavement evaluation tests.**

**Text Books and References:**

**Horonjeff, R. Mckelvey, F. X. (1994). Planning & Design of airports, Mc Graw Hill, New York.**

**Khanna, S. K. Arora, M. G. and Jain, S. S. (1994). Airport Planning and Design, Nemchand Bros., Roorkee.**

**Ashford, N. and Wright, P. H. (1979). Airport engineering, John Wiley, New York.**

**Sexena, S.C. Arora, S. P. (1990). A text Book of Railway Engineering, Dhanpat Rai & Sons, New Delhi.**

**Munday, J.S. Railway Track Engineering, Tata McGraw Hill, New Delhi.**

# SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

## COURSE CONTENTS

Fourth Year (I semester) Batch: 2008-2012

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Course Code: CE 403

Course Name: Design of structure lab-II

Objective: This course will help the students to understand the detailing of steel structures.

**Roof Trusses: Different types of trusses – Design loads – Load combinations IS Code recommendations, structural details – Design of simple roof trusses involving the design**

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

**Books:**

- 1.Design of steel structure – L S Negi(Tata Mccrawhill Publication)
2. Design of steel structures- Arya and Ajmami (Nem Chand & Brs; Roorkee ,U.P.)
- 3.Design of Streeel Structures- Duggal(Tata Mc graw hill)
- 4.I.S. Code 800
- 5.I.S. SP-6
- 6.Handbook on Design and Detailing of Structures-Dayaratnam P.(Wheeler)
7. Design of steel Structure-P. Dayaratnam
8. Structural Design in steel- S.A. Roy (NewAge Int. Pvt. Ltd.)

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COURSE CONTENTS

Fourth Year (I semester) Batch: 2008-2012

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3	0	0	3

Course Code: CE-404

Course Name: Estimation, Costing and Construction Management

Objective: This course discusses construction estimating techniques, rate analysis, various methods used in valuation of buildings with standard specifications for different construction materials and management techniques such as CPM and PERT.

UNIT – I

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating.

UNIT – II

Detailed Estimates of Buildings.

UNIT – III

Earthwork for roads and canals.

UNIT – IV

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT-V

Reinforcement bar bending and bar requirement schedules.

UNIT – VI

Valuation of buildings.

UNIT – VII

Standard specifications for different items of building construction.

UNIT-VIII

Introduction to network techniques; Use of computer aided CPM and PERT for planning, scheduling and control of construction works; bar charts; Error in networks; Types of nodes and node numbering systems

UNIT-IX

Planning for construction and site facilities using networks; Preparation of construction schedules for jobs, materials, equipment, labour and budgets using CPM

## UNIT X

Construction quality control and inspection; Significance of variability and estimation of risk; Construction cost control; Crashing of networks

### Text Books:

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie
3. Srivastava, U.K., Construction, Planning Management, Galgotia. 1999
4. Peurifoy, R.L., Construction Planning, Equipments and Methods, McGraw Hill. 1996
5. Ahuja, H.N., Construction Performance Control by Networks, Wiley Interscience. 1976
6. Moder and Philipese, Project Management with CPM and PERT, Van No Strand. 1970

SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

COURSE CONTENTS

Fourth Year (I semester) Batch: 2008-2012

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0 0 1 1

Course Code: CE-405

Course Name: Concrete Technology Lab

Objective: This course helps the students to testing of cement, concrete, aggregate with IS specification Standards.

**Tests on Cement**

- 1 Standard consistency of cement using Vicat's apparatus.
- 2 Fineness of cement by Sieve analysis and Blaine's air permeability method.
- 3 Soundness of cement by Le-Chatelier's apparatus.
- 4 Setting time of cement, initial and final.
- 5 Compressive strength of cement.
- 6 Measurement of specific gravity of cement.
- 7 Measurement of Heat of Hydration of cement.

**Tests on Aggregate**

- 1 Moisture content and bulking of fine aggregate.
- 2 Fineness modulus of coarse and fine aggregates.

**Tests on Concrete**

- 1 Workability of cement concrete by (a) Slump test, (b) Compaction factor test, (c) Flow table test,.
- 2 Compressive strength of concrete by (a) Cube test, (b) Cylinder test
- 3 Indirect tensile strength of concrete-split cylinder test.
- 4 Modules of rupture of concrete by flexure test
- 5 Bond strength between steel bar and concrete by pull-out test
- 6 Non-destructive testing of concrete

**Books Recommended:**

- 1 Concrete Manual-M.L.Gambhir, Dhanpat Rai & Sons, N.Delhi.

# SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

## COURSE CONTENTS

Fourth Year (I semester) Batch: 2008-2012

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Course Code: MB-401

Course Name: Corporate Ethics & Management Science

**Objective:** This course familiarizes students with the Indian ethos and values and sensitizes students on the importance of ethics and values in business.

**Course Outline:**

Model of Management in the Indian Socio-political Environment: work ethos; Indian heritage in production and consumption; Indian insight into TQM; Problems relating to stress in corporate

Management – Indian perspective; teaching ethics; trans-cultural human values in management education; relevance of values in management.

Need for values in global change – Indian perspective; values for managers; holistic approach for managers in decision making; secular versus spiritual values in management.

Personal growth and lessons from ancient Indian educational system; science and human values.

Management: science, theory and practice. Evolution of management thought (contribution of F.W. Taylor, Fayol, Elton Mayo and Max Weber), Management and society.

Teamwork and leadership, communication – process, barriers, types. Effective communication.

Brief study of functional areas of management & planning, organization, coordination, controlling and decision-making.

### **Text / Reference Books:**

1. Chakraborty, S.K.; Foundations of Managerial Work – Contributions from Indian Thought, Himalaya Publishing House, Delhi 1998.
2. Management Effectiveness and quality of work-life-Indian Insights, Tata McGrawHill Publishing Company, New Delhi 1987.
3. Management by Values, Oxford University Press, 1991.
4. Drucker, P: Managing in Turbulent Times, Pan Books London 1983
5. Kumar, S and N.K. Uberoi: Managing Secularism in the New Millenium, Excel Books 2000.
6. Griffiths, B.: The Marriage of East and West, Coiling, London 1985.
7. Gandhi, M.K.: The Story of My Experiment with Truth, Navjivan Publishing House, Ahmedabad, 1972.
8. Weirich and Koontz – Management: A Global Perspective, McGrawHill.
9. Ivoncevich, Donnely – Management: Principles and Functions, Richard D. Irwin.
10. J.S. Chandan – Management: Concepts and Strategies, Vikas Publishing.
11. Samual C. Certo & S. Trawis Certo – Modern Management, Pearson Publishing.

# SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

## COURSE CONTENTS

Fourth year (I Semester) Batch: 2008-2012

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3 0 0 3

Course Code: CE 410

Course Name: Finite Element Methods ( Elective-I)

Objective: This course discusses different finite element methods used in analyzing indeterminate structures.

Introduction: Concepts of FEM – Steps involved – merits & demerits – energy principles – Discretization – Rayleigh –Ritz method of functional approximation.

### **UNIT -II**

Principles of Elasticity: Equilibrium equations – strain displacement relationships in matrix form – Constitutive relationships for plane stress, plane strain and Axi-symmetric bodies of revolution with axi-symmetric loading.

### **UNIT -III**

One Dimensional FEM : Stiffness matrix for bar element - shape functions for one dimensional elements – one dimensional problems.

### **UNIT –IV**

Two Dimensional FEM : Different types of elements for plane stress and plane strain analysis – Displacement models – generalized coordinates – shape functions – convergent and compatibility requirements – Geometric invariance – Natural coordinate system – area and volume coordinates

### **UNIT –V**

Generation of element stiffness and nodal load matrices for 3-node triangular element and four node rectangular elements.

### **UNIT –VI**

Isoparametric formulation – Concepts of, isoparametric elements for 2D analysis -formulation of CST element, 4 –noded and 8-noded iso-parametric quadrilateral elements –Lagrangian and Serendipity elements.

**UNIT-VII**

Axi-symmetric analysis- Basic principles-Formulation of 4-node iso-parametric axi-symmetric element

**UNIT-VIII**

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

**TEXT BOOK:**

1. Finite Elements Methods in Engineering by Tirupati.R. Chandrepatta and Ashok D. Belegundu - Pearson Education Publications.
2. Finite element analysis by S.S. Bhavakatti-New age international publishers
3. Finite element analysis by David V Hutton, Tata Mcgraw Hill, New Delhi

**REFERENCES:**

1. Concepts and Applications of Finite Element Analysis by Robert D.Cook, David S. Malkus and Michael E.Plesha. Jhon Wiley & Sons.
2. Finite Element analysis – Theory & Programming by C.S.Krishna Murthy- Tata Mc.Graw Hill Publishers.
3. Text book of Finite Element analysis by P.Seshu – Prentice Hall of India.

# SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

## COURSE CONTENTS

Fourth Year (I semester) Batch: 2008-2012

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3 0 0 3

Course Code: CE 411 ( Elective-I)

Course Name: Transport and Environment

Objective:

This course discusses the various factors responsible for noise and air pollution, and the methods used for the measurement, analysis, prediction and control of pollution levels.

Course Contents :

Modes of Transportation, Mixed traffic flow, Transport related pollution, Technology Vision– 2020. Urban and non-urban traffic noise sources, Noise level factors, Effects of traffic noise, Measurement and prediction, Control measures, Noise studies, Noise standards, Road transport related air pollution, Sources of air pollution, Effects of weather conditions, Vehicular emission parameters, Pollution standards, Measurement and analysis of vehicular emission, Mitigative measures. EIA requirements of highway projects, rocedures, MOEF/World Bank/IRC/UK Guidelines, EIA practices in India.

Reference Books :

1. Salter, R. J. "Highway Traffic Analysis and Design", Macmillan Press Limited, London, 1974.
2. Wilson, C.E. "Noise Control Measurement, Analysis and Control of Sound and Vibration", Harper and Row Publishers, New York, 1989.
4. Grand Jean, E. Gilgen A., "Environmental Factors in Urban Planning", Taylor and Francis Limited, London, 1976.

# SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

## COURSE CONTENTS

Fourth Year (I semester) Batch: 2008-2012

L T P C

3 0 0 3

Course Code: CE 412 ( Elective-I)

Course Name: **Noise Pollution and Thermal Pollution**

**Objective: This course discusses the effects of noise on human beings, the various methods for monitoring and controlling noise levels and also the sources, effects and methods of controlling thermal pollution.**

**1 Physics and effects of noise :-** Frequency and Sound Levels, Units of Noise based power ratio , Contours of Loudness . Effects on Human, Environment and properties

**2 Sources and Monitoring of Noise Pollution :-** Natural and Anthropogenic Noise Sources , Measuring Instruments for Frequency and Noise levels , Masking of sound

**3 Reactor Design :**Types, Kinetics, Selection of different reactors used for waste water treatment.

**4 Control Of Noise Pollution :-** Treatment of noise at source, Path and receptors..

**5 Basics of Thermal Pollution:** waste heats into Water and other environments

**6 Sources and , Effects and control, :-** Effects on Environment , Macro and Micro aquatic organisms . Effects case studies ,Methods of Control: Cooling towers and nuclear reactor cooling systems

Reference Books:

- 1.Environmental Engineering Hand Book Lee and Liptak Chiltan Book Co., Philadelphia.
- 2.Environmental Protection by Chanlett - McGraw Hill
- 3.Energy its physical Impact on Environment by Delbert W. Devins

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 413 (Elective-I)

Course Name: **Principles of Reinforced Soil Structures**

Objective: This course discusses methods for designing reinforced soil structures and the latest reinforcement products.

**Fundamental principles; Conventional and modern reinforcement products; Various functions of geotextiles, geo grids, geo membranes and geocomposites; Laboratory tests for determining their properties; Design of reinforced soil structures like retaining walls, embankments, pavements; Case histories of reinforced soil structures.**

References:

- 1. Clayton, C.R.I., Milititsky, J. and woods, R.I. (1993) Earth Pressure and Earth Retaining Structures, Blackie Academic & Professional, London, U.K.**
- 2. Dynamic of Structures (2nd Edition) – Ray W. Clough, Joseph Penzien, McGraw Hill International Editions.**

# SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

## COURSE CONTENTS

Fourth Year (I semester) Batch: 2008-2012

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3 0 0 3

Course Code: CE-414 ( Elective-I)

Course Name: GROUND WATER DEVELOPMENT AND MANAGEMENT

Objective: This course discusses ground water hydrology, methods for surface and subsurface investigation, ground water recharging, salt water intrusion and ground water basin management.

### **UNIT – I**

Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention.

### **UNIT – II**

Ground Water Movement: Permeability, Darcy's law, storage coefficient. Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system. Ground water flow contours their applications.

### **UNIT – III**

Analysis of Pumping Test Data – I: Steady flow groundwater flow towards a well in confined and unconfined aquifers – Dupit's and Theism's equations, Assumptions, Formation constants, yield of an open well interface and well tests.

### **UNIT – IV**

Analysis of Pumping Test Data – II: Unsteady flow towards a well – Non equilibrium equations – Thesis solution – Jacob and Chow's simplifications, Leak aquifers.

### **UNIT – V**

Surface and Subsurface Investigation: Surface methods of exploration – Electrical resistivity and Seismic refraction methods. Subsurface methods –

Geophysical logging and resistivity logging. Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

**UNIT – VI**

Artificial Recharge of Ground Water: Concept of artificial recharge – recharge methods, relative merits, Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

**UNIT – VII**

Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben-Herzberg relation, Shape of interface, control of seawater intrusion.

**UNIT – VIII**

Groundwater Basin Management: Concepts of conjunction use, Case studies.

**TEXT BOOKS:**

1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.
2. Groundwater by H.M.Raghunath, Wiley Eastern Ltd.

**REFERENCES :**

1. Groundwater by Bawvwr, John Wiley & sons.
2. Groundwater Syatem Planning & Managemnet – R.Willes & W.W.G.Yeh, Printice Hall.
3. Applied Hydrogeology by C.W.Fetta, CBS Publishers & Distributers.

# SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

## COURSE CONTENTS

Fourth Year (I semester) Batch: 2008-2012

L T P C

3 0 0 3

Course Code: ME-410 ( Elective-I)

Course Name: **Advanced Fluid Mechanics**

Objective : This course discusses the various statistical characteristics of open channels and normal fluid flow

### **Boundary Layer Theory** **14**

Introduction, Boundary Layer Growth.

Boundary Layer Thickness, Displacement Thickness, Momentum Thickness, Shape Factor or Form Factor.

Laminar Boundary Layer Velocity Distributions.

Von Karman Momentum Integral Equation.

Analysis of Laminar Boundary Layer Flow: Local Friction Coefficient, Overall Friction Coefficient.

Turbulent Boundary Layer Velocity Distribution, Analysis of Turbulent Boundary Layer.

Boundary Layer Separation: Pressure Drag, D'Alembert's Paradox, Stokes Law, Lift and Drag.

### **Compressible Fluid Flow** **8**

Effects of Compressibility.

Speed of Sound : Mach Number, Mach cone.

Isentropic Relationships of Perfect Gases.

Shock waves, Normal Shock Waves.

### **Ideal Fluid Flow** **10**

Introduction to Ideal Fluid Flow, Source and Sink, Rectilinear Flow, Free or Irrotational Vortex.

Combination of basic flows: Rankine Technique.

Rankine Half-Body, Rankine Oval, Doublet.

Flow Past a Circular Cylinder, Flow Past a Rotating Circular Cylinder, Magnus Effect, Kutta-Joukowski Law.

**References:**

1. Mechanics of Fluids – B.S. Massey
2. Fluid Mechanics including Machines by S.K. Som and G. Biswas
3. Fluid Mechanics by V.L. Streeter and E.B. Wylie
4. Fluid Mechanics by R.K. Bansal

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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 CONTENTS

Fourth Year (I semester) Batch: 2008-2012

L T P C

3 0 1 4

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.

# 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 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

# 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-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.

# 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 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

# SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

## COURSE CONTENTS

Fourth Year (I semester) Batch: 2008-2012

L T P C

3 0 0 3

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:

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

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COURSE CONTENTS

Fourth Year (I semester) Batch:2008-2012

L T P C

0 0 2 2

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 CONTENTS

Fourth Year (I semester) Batch:2008-2012

L T P C

0 0 0 2

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.**