NPTEL : Advanced Geotechnical Engineering (Civil Engineering)

Co-ordinators : Dr. B.V.S. Viswanadham

Lecture 1

Lecture 2

Lecture 3

Lecture 4

Lecture 5

Lecture 6

Lecture 7

Lecture 8

Lecture 9

Lecture 10

Lecture 11

Lecture 12

Lecture 13

Lecture 14

Lecture 15

Lecture 16

Lecture 17

Lecture 18

Lecture 19

Lecture 20

Lecture 21

Lecture 22

Lecture 23

Lecture 24

Lecture 25

Lecture 26

Lecture 27

Lecture 28

Lecture 29

Lecture 30

Lecture 31

Lecture 32

Lecture 33

Lecture 34

Lecture 35

Lecture 36

Lecture 37

Lecture 38

Lecture 39

Lecture 40

Lecture 41

Lecture 42

Lecture 43

Lecture 44

Lecture 45

Lecture 46

Lecture 47

Lecture 48

Lecture 49

Lecture 50

Lecture 51

Lecture 52

Lecture 53

Lecture 54

Lecture 55

Lecture 56

Lecture 57

Lecture 58

Lecture 59

Lecture 60

NPTEL : Soil Dynamics (Civil Engineering)

Co-ordinators : Dr. Deepankar Choudhury

Lecture 1 - Introduction

Lecture 2 - Degrees of Freedom, SDOF System, Types of Vibrations

Lecture 3 - SDOF System, Types of Vibrations, Free Vibration

Lecture 4 - Problems on Tortional Motion

Lecture 5 - Damped Free Vibrations

Lecture 6 - Damped Free Vibrations, Definition of Critical Damping and problems

Lecture 7 - Decay of Motion

Lecture 8 - Forced Vibrations, Dynamic Magnification Factor

Lecture 9 - Maxwells Diagram of DMF, Discussion on Phase

Lecture 10 - Transmissibility Ratio, Response to Arbitrary, Step and Pulse Excitations

Lecture 11 - Response to Arbitrary, Step and Pulse Excitations, Response to Impact Load

Lecture 12 - Vibration Isolation, Vibrations Measuring Instruments

Lecture 13 - Solutions of Quiz Questions, Multi-Degree of Freedom (MDOF) Systems

Lecture 14 - (MDOF) System : Equation of Motion, Longitudinal Waves in an Infinitely long rod

Lecture 15 - 3 Dimensional Wave Propagation, Waves in semi-infinite media, Rayleigh Wave

Lecture 16 - Love Wave, Waves in layered medium, 3D case-Inclined wave, Earthquake Waves

Lecture 17 - Earthquake Waves; P-waves, S-waves, 3 circle method, Estimation of Earthquake Epicentre

Lecture 18 - Stresses in Soil Element, Field Tests, Seismic Reflection Test

Lecture 19 - Seismic Refraction Test, SASW Test, Laboratory & Model Tests

Lecture 20 - Centrifuge Tests Stress Strain Behavior of Cyclically Loaded Soils

Lecture 21 - Estimation of Gmax, Modulus Reduction Curves, Variation of Damping Ratio, Cyclic Plate load Test

Lecture 22 - Liquefaction, Preliminary sceening, Simplified Procedure for Liquefaction

Lecture 23 - Cyclic Stress Ratio, Evaluation of CRR, Correction Factors, Corrections for SPT

Lecture 24 - Becker Penetrometer Test (BPT), Cone Penetrometer Test (CPT), SPT v BPT, SASW Test

Lecture 25 - Types of Machine Foundations, Methods of Analysis, Design of Machine Foundations as per IS:2974 (Part-1)-1969

Lecture 26 - Tschebotarioff's

Lecture 27 - Problem on Tschebotarioff's method contd., Mass-Spring-Dashpot (MSD) Model

Lecture 28 - MSD Model- Yawing mode of Vibration, Use of MSD model for analysis

Lecture 29 - Problems on Use of MSD Model for Analysis, Rocking mode of Vibrations

Lecture 30 - Torsional Mode/Yawing Mode, Constant Force type excitation, EHS Theory

Lecture 31 - EHS Theory, Vibrational Control

Lecture 32 - Use of EHS Theory for analysis

Lecture 33 - Use of EHS Theory for analysis II

Lecture 34 - Liquefaction mitigation methods,Vibro Compaction,Densification Techniques

Lecture 35 - Soil Improvement methods,Dynamic Compaction,Reinforcement Techniques

Lecture 36 - Force-based Analysis,Dynamic analysis using MSD model

Lecture 37 - Behaviour of Subgrade Soil below Rail Track

Lecture 38 - Quiz

NPTEL : Structural Dynamics (Civil Engineering)

Co-ordinators : Dr. P. Banerji

Lecture 1 - Introduction

Lecture 2 - Inverse Power Method

Lecture 3 - Dynamics of SDOF Structure

Lecture 4 - SDOF Response to Harmonic Loads

Lecture 5 - Response of SDOF Structure to Harmonic Loading

Lecture 6 - Response to Harmonic Loading

Lecture 7 - Response to Harmonic Loading (Continue...)

Lecture 8 - Transmissibility & Base Isolation

Lecture 9 - Dynamic Characteristics & Periodic Loading

Lecture 10 - Pulse Loading

Lecture 11 - Pulse Load Response Characteristics & Impulse Loading

Lecture 12 - Frequency Domain Response Analysis

Lecture 13 - Methods of Analysis for General Loading

Lecture 14 - Numerical Analysis of Response of Single Degree of Freedom Structure & Time Domain Approaches

Lecture 15 - Response Analysis of Single Degree of Freedom System for Earthquake Loads

Lecture 16 - Earthquake Response Analysis for Single Degree of Freedom Structures

Lecture 17 - Generalized Single Degree of Freedom Systems Equations of Motions

Lecture 18 - Generalized Single Degree of Freedom Systems Equations of Motions

Lecture 19 - Generalized Single Degree of Freedom Systems Equations of Motions

Lecture 20 - Generalized Single Degree of Freedom Systems Equations of Motion & Free Vibrations

Lecture 21 - Equations of Motion for Multi Degree of Freedom Structures

Lecture 22 - Equations of Motion for Multi Degree of Freedom Systems

Lecture 23 - Multi Degree of Freedom Structure Equations of Motions

Lecture 24 - Multi Degree of Freedom Structure Equations of Motions & Free Vibration

Lecture 25 - Free Vibration for Multi Degree of Freedom Structures

Lecture 26 - Free Vibration for Multi Degree of Freedom Structures

Lecture 27 - Practical Free Vibration Analysis

Lecture 28 - Dynamic Response of Multi Degree of Freedom Systems

Lecture 29 - Dynamic Response of Multi Degree of Freedom Structures

Lecture 30 - Damping for Multi Degree of Freedom Structures

Lecture 31 - Earthquake Response of Multi Degree of Freedom Structures

Lecture 32 - Earthquake Response of Multi Degree of Freedom Structures

Lecture 33 - Dynamic Analysis of Buildings

Lecture 34 - Introduction to Dynamics of Continuous Systems

Lecture 35 - Free Vibration Response of Continuous Systems

Lecture 36 - Free Vibration & Dynamic Response of Continuous Systems

Lecture 37 - Dynamic Response of Continuous Systems

Lecture 38 - Examples for Dynamic Response of Continuous Systems

NPTEL : Watershed Management (Civil Engineering)

Co-ordinators : Dr. T.I. Eldho

Lecture 1 - Introduction to Watershed Management

Lecture 2 - Watershed Management & Stakeholder Analysis

Lecture 3 - Watershed Management Policies

Lecture 4 - Sustainable Watershed Management

Lecture 5 - Agricultural Practices & Watershed Management

Lecture 6 - Soil Erosion & Conservation

Lecture 7 - Watershed Management in Arid Regions & Strategic Planning

Lecture 8 - Integrated Water Resources Management

Lecture 9 - Conjuctive Use of Water Resources

Lecture 10 - Rainwater Harvesting System

Lecture 11 - Rainwater Harvesting & Roof Catchment System

Lecture 12 - Watershed Characteristics

Lecture 13 - Watershed Delineation & Modeling

Lecture 14 - Hydrologic Processes

Lecture 15 - Watershed Modeling

Lecture 16 - Hydrologic Modeling

Lecture 17 - Numerical Watershed Modeling

Lecture 18 - Subsurface & Groundwater Flows

Lecture 19 - Social & Community Aspects of Watershed Management

Lecture 20 - Socio-economy, Private Sector Participation & Gender Issues

Lecture 21 - Integrated Development, Water Legislation & Implementation Issues

Lecture 22 - GIS & Applications in Watershed Management

Lecture 23 - Remote Sensing & Applications in Watershed Management

Lecture 24 - Decision Support Systems & Applications in Watershed Management

Lecture 25 - Integrated Watershed Modeling Using Numerical Methods, GIS & Remote Sensing

Lecture 26 - Applications of Knowledge Based Models in Watershed Management

Lecture 27 - Surface Water Quality & Pollution Issues

Lecture 28 - Groundwater Pollution Problems & Transport Processes

Lecture 29 - Water Quality Modeling

Lecture 30 - Environmental Guidelines for Water Quality Management

Lecture 31 - Storm Water Management

Lecture 32 - Urban Drainage System

Lecture 33 - Flood Routing

Lecture 34 - Flood Control & Management

Lecture 35 - Drought Assessment

Lecture 36 - Drought Analysis

Lecture 37 - Drought Mitigation

Lecture 38 - Water Conservation

Lecture 39 - Water Recycling

Lecture 40 - Water Reclaimation & Reuse

NPTEL : Fluid Mechanics (Civil Engineering)

Co-ordinators : Dr. T.I. Eldho

Lecture 1 - Fluid Mechanics

Lecture 2 - Fundamental Concepts of Fluid Flow & Fluid Statics

Lecture 3 - Fluid Statics

Lecture 4 - Fluid Statics

Lecture 5 - Fluid Statics

Lecture 6 - Kinematics of Fluid Flow

Lecture 7 - Kinematics of Fluid Flow

Lecture 8 - Kinematics of Fluid Flow

Lecture 9 - Kinematics of Fluid Flow

Lecture 10 - Kinematics of Fluid Flow

Lecture 11 - Kinematics & Dynamics of Fluid Flow

Lecture 12 - Dynamics of Fluid Flow

Lecture 13 - Dynamics of Fluid Flow

Lecture 14 - Dynamics of Fluid Flow

Lecture 15 - Dynamics of Fluid Flow

Lecture 16 - Dynamics of Fluid Flow

Lecture 17 - Laminar and Turbulent Flows

Lecture 18 - Laminar and Turbulent Flows

Lecture 19 - Laminar and Turbulent Flows

Lecture 20 - Laminar and Turbulent Flows

Lecture 21 - Laminar and Turbulent Flows

Lecture 22 - Laminar and Turbulent Flows

Lecture 23 - Dimensional Analysis

Lecture 24 - Dimensional Analysis

Lecture 25 - Dimensional Analysis

Lecture 26 - Navier-Stocks Equations and Applications

Lecture 27 - Navier-Stocks Equations and Applications

Lecture 28 - Navier-Stocks Equations and Applications

Lecture 29 - Navier-Stocks Equations and Applications

Lecture 30 - Boundary Layer Theory and Applications

Lecture 31 - Boundary Layer Theory and Applications

Lecture 32 - Boundary Layer Theory and Applications

Lecture 33 - Boundary Layer Theory and Applications

Lecture 34 - Boundary Layer Theory and Applications

Lecture 35 - Boundary Layer Theory and Applications

Lecture 36 - Pipe Flow Systems

Lecture 37 - Pipe Flow Systems

Lecture 38 - Pipe Flow Systems

Lecture 39 - Pipe Flow Systems

Lecture 40 - Pipe Flow Systems

Lecture 41 - Pipe Flow Systems

Lecture 42 - Pipe Flow Systems

NPTEL : Soil Mechanics (Civil Engineering)

Co-ordinators : Dr. B.V.S. Viswanadham

Lecture 1 - Soil Mechanics

Lecture 2 - Soil Mechanics

Lecture 3 - Soil Mechanics

Lecture 4 - Soil Mechanics

Lecture 5 - Soil Mechanics

Lecture 6 - Soil Mechanics

Lecture 7 - Soil Mechanics

Lecture 8 - Soil Mechanics

Lecture 9 - Soil Mechanics

Lecture 10 - Soil Mechanics

Lecture 11 - Compaction of Soils - I

Lecture 12 - Soil Mechanics

Lecture 13 - Soil Mechanics

Lecture 14 - Compaction of Soils - IV

Lecture 15 - Compaction of Soils - V

Lecture 16 - Compaction of Soils - VI

Lecture 17 - Effective Stress - I

Lecture 18 - Effective Stress - II

Lecture 19 - Effective Stress - III

Lecture 20 - Flow of water through soils - I

Lecture 21 - Flow of water through soils - II

Lecture 22 - Flow of water through soils - III

Lecture 23 - Flow of water through soils - IV

Lecture 24 - Flow of water through soils - V

Lecture 25 - Flow of water through soils - VI

Lecture 26 - Flow of water through soils - VII

Lecture 27 - Flow of water through soils - VIII

Lecture 28 - Soil Mechanics

Lecture 29 - Soil Mechanics

Lecture 30 - Soil Mechanics

Lecture 31 - Soil Mechanics

Lecture 32 - Soil Mechanics

Lecture 33 - Soil Mechanics

Lecture 34 - Soil Mechanics

Lecture 35 - Soil Mechanics

Lecture 36 - Soil Mechanics

Lecture 37 - Soil Mechanics

Lecture 38 - Soil Mechanics

Lecture 39 - Soil Mechanics

Lecture 40 - Soil Mechanics

Lecture 41 - Soil Mechanics

Lecture 42 - Soil Mechanics

Lecture 43 - Soil Mechanics

Lecture 44 - Soil Mechanics

Lecture 45 - Soil Mechanics

Lecture 46 - Soil Mechanics

Lecture 47 - Soil Mechanics

Lecture 48 - Soil Mechanics

Lecture 49 - Soil Mechanics

Lecture 50 - Soil Mechanics

Lecture 51 - Soil Mechanics

Lecture 52 - Soil Mechanics

Lecture 53 - Soil Mechanics

Lecture 54 - Soil Mechanics

Lecture 55 - Soil Mechanics

Lecture 56 - Soil Mechanics

Lecture 57 - Soil Mechanics

NPTEL : Structural Analysis II (Civil Engineering)

Co-ordinators : Dr. P. Banerji

Lecture 1

Lecture 2

Lecture 3

Lecture 4

Lecture 5

Lecture 6

Lecture 7

Lecture 8

Lecture 9

Lecture 10

Lecture 11

Lecture 12

Lecture 13

Lecture 14

Lecture 15

Lecture 16

Lecture 17

Lecture 18

Lecture 19

Lecture 20

Lecture 21

Lecture 22

Lecture 23

Lecture 24

Lecture 25

Lecture 26

Lecture 27

Lecture 28

Lecture 29

Lecture 30

Lecture 31

Lecture 32

Lecture 33

Lecture 34

Lecture 35

Lecture 36

Lecture 37

Lecture 38

Lecture 39

Lecture 40

NPTEL : Geotechnical Earthquake Engineering (Civil Engineering)

Co-ordinators : Dr. Deepankar Choudhury

Lecture 1 - Introduction to Geotechnical Earthquake Engineering - Part I

Lecture 2 - Introduction to Geotechnical Earthquake Engineering - Part II

Lecture 3 - Basics of Vibration Theory

Lecture 4 - Engineering Seismology - Part - I

Lecture 5 - Engineering Seismology - Part - II

Lecture 6 - Engineering Seismology - Part - III

Lecture 7 - Engineering Seismology - Part - IV

Lecture 8 - Engineering Seismology - Part - V

Lecture 9 - Engineering Seismology - Part - VI

Lecture 10 - Strong Ground Motion - Part I

Lecture 11 - Strong Ground Motion - Part II

Lecture 12 - Strong Ground Motion - Part III

Lecture 13 - Strong Ground Motion - Part IV

Lecture 14 - Strong Ground Motion - Part V

Lecture 15 - Strong Ground Motion - Part VI

Lecture 16 - Strong Ground Motion - Part VII

Lecture 17 - Wave Propagation - Part I

Lecture 18 - Wave Propagation - Part II

Lecture 19 - Wave Propagation - Part III

Lecture 20 - Wave Propagation - Part IV

Lecture 21 - Dynamic Soil Properties - Part I

Lecture 22 - Dynamic Soil Properties - Part II

Lecture 23 - Seismic Hazard Analysis - Part I

Lecture 24 - Seismic Hazard Analysis - Part II

Lecture 25 - Seismic Hazard Analysis - Part III

Lecture 26 - Seismic Hazard Analysis - Part IV

Lecture 27 - Seismic Hazard Analysis - Part V

Lecture 28 - Seismic Hazard Analysis - Part VI

Lecture 29 - Seismic Hazard Analysis - Part VII

Lecture 30 - Seismic Hazard Analysis - Part VIII

Lecture 31 - Site Response Analysis - Part I

Lecture 32 - Site Response Analysis - Part II

Lecture 33 - Site Response Analysis - Part III

Lecture 34 - Seismic Analysis and Design of Various Geotechnical Structures - Part I

Lecture 35 - Seismic Analysis and Design of Various Geotechnical Structures - Part II

Lecture 36 - Seismic Analysis and Design of Various Geotechnical Structures - Part III

Lecture 37 - Seismic Analysis and Design of Various Geotechnical Structures - Part IV

Lecture 38 - Seismic Analysis and Design of Various Geotechnical Structures - Part V

Lecture 39 - Seismic Analysis and Design of Various Geotechnical Structures - Part VI

Lecture 40 - Seismic Analysis and Design of Various Geotechnical Structures - Part VII

Lecture 41 - Seismic Analysis and Design of Various Geotechnical Structures - Part VIII

Lecture 42 - Quiz

Lecture 43 - Seismic Analysis and Design of Various Geotechnical Structures - Part IX

NPTEL : Geosynthetics Engineering: In Theory and Practice (Civil Engineering)

Co-ordinators : Prof. J.N. Mandal

Lecture 1 - Introduction

Lecture 2 - Introduction to Reinforced Earth

Lecture 3 - Introduction to Reinforced Earth

Lecture 4 - Introduction to Reinforced Earth

Lecture 5 - Introduction to Reinforced Earth

Lecture 6 - An Overview of Geosynthetics - Part I

Lecture 7 - An Overview of Geosynthetics - Part II

Lecture 8 - An Overview of Geosynthetics - Part III

Lecture 9 - An Overview of Gosynthetics

Lecture 10 - Geosynthetic Properties and Test Methods

Lecture 11 - Geosynthetic Properties and Test Methods

Lecture 12 - Geosynthetic Properties and Test Methods

Lecture 13 - Geosynthetic Properties and Test Methods

Lecture 14 - Geosynthetic Properties and Test Methods

Lecture 15 - Geosynthetic in Filtration, Drainage and Erosion Control

Lecture 16 - Geosynthetic in Filtration, Drainage and Erosion Control

Lecture 17 - Geosynthetic in Filtration, Drainage and Erosion Control

Lecture 18 - Geosynthetic in Filtration, Drainage and Erosion Control

Lecture 19 - Geosynthetic in Filtration, Drainage and Erosion Control

Lecture 20 - Geosynthetic in pavements

Lecture 21 - Geosynthetic in pavements

Lecture 22 - Geosynthetic in pavements

Lecture 23 - Geosynthetic in pavements

Lecture 24 - Geosynthetic in pavements

Lecture 25 - Geosynthetic in pavements

Lecture 26 - Geosynthetics for Reinforced Soil Retaining Walls

Lecture 27 - Geosynthetics for Reinforced Soil Retaining Walls

Lecture 28 - Geosynthetics for Reinfroced Soil Retaining Walls

Lecture 29 - Geosynthetics for Reinforced Soil Retaining Walls

Lecture 30 - Geosynthetics for Reinforced Soil Retaining Walls

Lecture 31 - Geosynthetics for Reinforced Soil Retaining Walls

Lecture 32 - Geosynthetics for Reinforced Soil Retaining Walls

Lecture 33 - Geosynthetics for Reinforced Soil Retaining Walls

Lecture 34 - Geosynthetics for Reinforced Soil Retaining Walls

Lecture 35 - Geosynthetics for Reinforced Soil Retaining Walls

Lecture 36 - Geosynthetic for Steep Slopes

Lecture 37 - Geosynthetic for Steep Slopes

Lecture 38 - Geosynthetic for Steep Slopes

Lecture 39 - Geosynthetic for Steep Slopes

Lecture 40 - Geosynthetic for Embankments on Soft Foundations

Lecture 41 - Geosynthetic for Embankments on Soft Foundations

Lecture 42 - Geosynthetic for Embankments on Soft Foundations

Lecture 43 - Geosynthetic for Ground Improvement

Lecture 44 - Geosynthetic for Ground Improvement

Lecture 45 - Geosynthetic for Ground Improvement

Lecture 46 - Geosynthetic for Ground Improvement

Lecture 47 - Geosynthetic for Ground Improvement

Lecture 48 - Geosynthetic for Ground Improvement

Lecture 49 - Geosynthetic for Ground Improvement

Lecture 50 - Geosynthetic for Improvement in Bearing Capacity

Lecture 51 - Designing with Geotextile Tube

Lecture 52 - Designing with Geotextile Tube

Lecture 53 - Design of Geosynthetic for Landfills

Lecture 54 - Design of Geosynthetic for Landfills

Lecture 55 - Design of Geosynthetic for Landfill

Lecture 56 - Design of Geosynthetic for Landfill

Lecture 57 - Design of Geosynthetic for Landfill

Lecture 58 - Designing With Geofoam

Lecture 59 - Designing With Geofoam

Lecture 60 - Designing With Geofoam

Lecture 61 - Designing With Geofoam

Lecture 62 - Designing With Geofoam

Lecture 63 - Designing With Geofoam

NPTEL : NOC:Geotechnical Engineering Laboratory (Civil Engineering)

Co-ordinators : Prof. J. N. Mandal

Lecture 1 - Soil Processing

Lecture 2 - Specific Gravity and Field Density

Lecture 3 - Field Density

Lecture 4 - Grain Size Analysis

Lecture 5 - Grain Size Analysis (Continued...)

Lecture 6 - Grain Size Analysis (Continued...)

Lecture 7 - Atterberg Limit

Lecture 8 - Compaction

Lecture 9 - Compaction (Continued...)

Lecture 10 - Compaction (Continued...)

Lecture 11 - Compaction and Permeability

Lecture 12 - Permeability

Lecture 13 - Permeability and Shear Strength

Lecture 14 - Shear Strength

Lecture 15 - Shear Strength (Continued...)

Lecture 16 - Shear Strength (Continued...)

Lecture 17 - Shear Strength (Continued...)

Lecture 18 - Shear Strength (Continued...)

Lecture 19 - Shear Strength (Continued...)

Lecture 20 - Consolidation

Lecture 21 - Consolidation (Continued...)

Lecture 22 - Consolidation (Continued...)

NPTEL : NOC:Geosynthetics Testing Laboratory (Civil Engineering)

Co-ordinators : Prof. J. N. Mandal

Lecture 1 - Introduction

Lecture 2 - Types of Geosynthetics

Lecture 3 - Functions

Lecture 4 - Tests for Physical Properties and tensile strength of geosynthetics

Lecture 5 - Tensile Modulus

Lecture 6 - Drop Cone Test

Lecture 7 - Puncture Resistance Test

Lecture 8 - Puncture Resistance Test and Burst Strength Test

Lecture 9 - Grab Tensile Test

Lecture 10 - Grab Tensile Test and Triaxial Test

Lecture 11 - Triaxial and Pullout Test

Lecture 12 - Pullout Test

Lecture 13 - Sewn Seam Strength, Permittivity and Transmissivity

Lecture 14 - Hydraulic Properties and abrasion Test of geosynthetics

Lecture 15 - Endurance properties of Geosynthetics

Lecture 16 - Density, Water Absorption and Compressive Properties tests of Geofoam

Lecture 17 - Compressive Properties of Geofoam

Lecture 18 - Compressive and Tensile Properties of Geofoam

Lecture 19 - Tensile and Shear Properties of Geofoam

Lecture 20 - Shear and Flexural Properties of Geofoam

Lecture 21 - Flexural Properties and Flammability Test of Geofoam

NPTEL : NOC:Environmental Geotechnics (Civil Engineering)

Co-ordinators : Prof. Devendra Narain Singh

Lecture 1 - Overview - 1

Lecture 2 - Overview - 2

Lecture 3 - Overview - 3

Lecture 4 - Civil Engineering

Lecture 5 - Recent Trends in civil engineering

Lecture 6 - Recent Trends and Subject organization

Lecture 7 - Civil Engineering and Soil Mechanics

Lecture 8 - Soil mechanics

Lecture 9 - Recent Trends in Soil mechanics

Lecture 10 - Soil contamination

Lecture 11 - Soil Improvement and wastes

Lecture 12 - Contaminant transport in soils

Lecture 13 - Soil- water- Environment Interaction

Lecture 14 - Basic concepts of analysis

Lecture 15 - Particle Energy Field Theory

Lecture 16 - Waste and types

Lecture 17 - Municipal and Industrial solid waste

Lecture 18 - Industrial non-hazardous and Hazardous wastes

Lecture 19 - Application of Industrial by-products

Lecture 20 - Introduction to Characterization of waste

Lecture 21 - Geomaterial characterization - 1

Lecture 22 - Geomaterial characterization - 2 (Morphological and physical characterization)

Lecture 23 - Geomaterial characterization - 3 (Chemical characterization)

Lecture 24 - Geomaterial characterization - 4 (Mercury Intrusive Porosimeter)

Lecture 25 - Geomaterial characterization - 5 (Specific Surface Area - I)

Lecture 26 - Geomaterial characterization - 6 (Specific surface area - II)

Lecture 27 - Geomaterial characterization - 7

Lecture 28 - Geomaterial characterization - 8 (Pore solution studies - I)

Lecture 29 - Geomaterial characterization - 9 (Pore solution studies - II)

Lecture 30 - Geomaterial characterization - 10 (Assessing soil contamination)

Lecture 31 - Geomaterial characterization - 11

Lecture 32 - Contaminant transport through porous media - 1

Lecture 33 - Contaminant transport through porous media - 2

Lecture 34 - Contaminant transport through porous media - 3

Lecture 35 - Contaminant transport through porous media - 4

Lecture 36 - Contaminant transport through porous media - 5

Lecture 37 - Sorption and Desorption characteristics of geomaterials - 1

Lecture 38 - Sorption and Desorption characteristics of geomaterials - 2

Lecture 39 - Sorption and Desorption characteristics of geomaterials - 3

Lecture 40 - Thermal Characterisation - 1

Lecture 41 - Thermal characterization - 2

Lecture 42 - Thermal characterisation - 3

Lecture 43 - Electrical characterization - 1

Lecture 44 - Electrical characterization - 2

Lecture 45 - Electrical characterization - 3

Lecture 46 - Electrical characterization - 4

Lecture 47 - Electrical characterization - 5

Lecture 48 - Swelling, shrinkage and cracking characteristics of soil - 1

Lecture 49 - Swelling, shrinkage and cracking characteristics of soil - 2

Lecture 50 - Swelling, shrinkage and cracking characteristics of soil - 3

Lecture 51 - Swelling, shrinkage and cracking characteristics of soil - 4

Lecture 52 - Swelling, shrinkage and cracking characteristics of soil - 5

Lecture 53 - Swelling, shrinkage and cracking characteristics of soil - 6

NPTEL : NOC:Environmental Geomechanics (Civil Engineering)

Co-ordinators : Prof. Devendra Narain Singh

Lecture 1 - Introduction - I

Lecture 2 - Introduction - II

Lecture 3 - Overview

Lecture 4 - Civil Engineering and Soil Mechanics

Lecture 5 - Soil mechanics

Lecture 6 - Environmental Geomechanics

Lecture 7 - Scope of Environmental Geomechanics - I

Lecture 8 - Scope of Environmental Geomechanics - II

Lecture 9 - Scope of Environmental Geomechanics - III

Lecture 10 - Recent trends - I

Lecture 11 - Recent trends - II

Lecture 12 - Energy Geotechnics

Lecture 13 - Soil: A living entity

Lecture 14 - Soil- water- environment interaction - I

Lecture 15 - Soil- water- environment interaction - II

Lecture 16 - Soil- water- environment interaction - III

Lecture 17 - Particle energy field theory - I

Lecture 18 - Particle energy field theory - II

Lecture 19 - Particle energy field theory - III

Lecture 20 - Waste: A manmade resource - I

Lecture 21 - Waste: A manmade resource - II

Lecture 22 - Waste: A manmade resource - III

Lecture 23 - Application of industrial by-products - I

Lecture 24 - Application of industrial by-products - II

Lecture 25 - Geomaterial characterization - I (Mineralogical characterization)

Lecture 26 - Geomaterial characterization - II (Mineralogical characterization)

Lecture 27 - Geomaterial characterization - III (Morphological characterization)

Lecture 28 - Geomaterial characterization - IV (Morphological characterization)

Lecture 29 - Geomaterial characterization - V (Specific surface area)

Lecture 30 - Geomaterial characterization - VI (Chemical characterization)

Lecture 31 - Geomaterial characterization - VII (Chemical characterization)

Lecture 32 - Geomaterial characterization - VIII (Chemical characterization)

Lecture 33 - Geomaterial characterization - IX (Chemical characterization)

Lecture 34 - Geomaterial characterization - X (Chemical characterization)

Lecture 35 - Geomaterial characterization - XI (Chemical characterization)

Lecture 36 - Geomaterial characterization - XII (Corrosion potential of soils)

Lecture 37 - Soil characteristics and environmental variables

Lecture 38 - Corrosion potential of soils

Lecture 39 - Contaminant transport through porous media - I

Lecture 40 - Contaminant transport through porous media - II

Lecture 41 - Contaminant transport through porous media - III

Lecture 42 - Sorption â€“ desorption characteristics - I

Lecture 43 - Sorption â€“ desorption characteristics - II

Lecture 44 - Sorption â€“ desorption characteristics - III

Lecture 45 - Thermal characterization - I

Lecture 46 - Thermal characterization - II

Lecture 47 - Thermal characterization - III

Lecture 48 - Cracking characteristics of fine-grained soils - I

Lecture 49 - Cracking characteristics of fine-grained soils - II

Lecture 50 - Cracking characteristics of fine-grained soils - III

Lecture 51 - Electrical characterization - I

Lecture 52 - Electrical characterization - II

Lecture 53 - Electrical characterization - III

Lecture 54 - Magnetic characterization

Lecture 55 - Pore-structure characterization - I

Lecture 56 - Pore-structure characterization - II

NPTEL : NOC:Geotechnical Engineering - 1 (Civil Engineering)

Co-ordinators : Prof. Devendra Narain Singh

Lecture 1 - Introduction

Lecture 2 - Origin and Definition of Soils

Lecture 3 - Classification of Soils - I

Lecture 4 - Classification of Soils - II

Lecture 5 - Classification of Soils - III and Challenging Situations

Lecture 6 - Soil constituents - I

Lecture 7 - Soil constituents - II

Lecture 8 - Particulate Nature of the Soils

Lecture 9 - Soil Aggregate and Phase Relations

Lecture 10 - Classification of Soils and Sieve Analysis

Lecture 11 - Particle Size Analysis of Finegrained Soils

Lecture 12 - Soil-water Interaction - I

Lecture 13 - Soil-water Interaction - II

Lecture 14 - Compaction Characteristics of Soil - I

Lecture 15 - Compaction Characteristics of Soil - II

Lecture 16 - Permeability of Soil and Ground Water Flow - I

Lecture 17 - Permeability of Soil and Ground Water Flow - II

Lecture 18 - Coefficient of Permeability

Lecture 19 - Seepage Theory

Lecture 20 - Applications of Seepage Theory

Lecture 21 - Flow Net in the Earthen Dam - I

Lecture 22 - Flow Net in the Earthen Dam - II

Lecture 23 - Stresses in the Soil Mass due to External Loadings - I

Lecture 24 - Stresses in the Soil Mass due to External Loadings - II

Lecture 25 - Compression Characteristics of Soils - I

Lecture 26 - Compression Characteristics of Soils - II

Lecture 27 - Consolidation of soils

Lecture 28 - Coefficient of consolidation

NPTEL : NOC:Remote Sensing: Principles and Applications (Civil Engineering)

Co-ordinators : Prof. Eswar Rajasekaran

Lecture 1 - Introduction to RS and EMR

Lecture 2 - Introduction to EMR

Lecture 3 - Basic Laws of RS

Lecture 4 - Properties of EMR - Part 1

Lecture 5 - Properties of EMR - Part 2

Lecture 6 - Interaction of EMR with atmosphere

Lecture 7 - Radiometry - Part 1

Lecture 8 - Radiometry - Part 2

Lecture 9 - Radiometry - Part 3

Lecture 10 - Reflectance, albedo and related quantities

Lecture 11 - Interaction of EMR with terrain features - Part 1

Lecture 12 - Interaction of EMR with terrain features - Part 2

Lecture 13 - Radiation reaching sensor - Part 1

Lecture 14 - Radiation reaching sensor - Part 2

Lecture 15 - RS data: From Radiance to reflectance - Part 1

Lecture 16 - RS data: From Radiance to reflectance - Part 2

Lecture 17 - RS data: From Radiance to reflectance - Part 3

Lecture 18 - RS image acquisition and RS systems - Part 1

Lecture 19 - RS image acquisition and RS systems - Part 2

Lecture 20 - RS image acquisition and RS systems - Part 3

Lecture 21 - RS image acquisition and RS systems - Part 4

Lecture 22 - RS image acquisition and RS systems - Part 5

Lecture 23 - RS image acquisition and RS systems - Part 6

Lecture 24 - RS image acquisition and RS systems - Part 7

Lecture 25 - RS image acquisition and RS systems - Part 8

Lecture 26 - RS image acquisition and RS systems - Part 9

Lecture 27 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 1

Lecture 28 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 2

Lecture 29 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 3

Lecture 30 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 4

Lecture 31 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 5

Lecture 32 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 6

Lecture 33 - Spectral Properties of few common earth features in the Visible, NIR and SWIR bands - Part 7

Lecture 34 - Spectral Indices

Lecture 35 - Thermal Infrared Remote Sensing - Part 1

Lecture 36 - Thermal Infrared Remote Sensing - Part 2

Lecture 37 - Thermal Infrared Remote Sensing - Part 3

Lecture 38 - Thermal Infrared Remote Sensing - Part 4

Lecture 39 - Thermal Infrared Remote Sensing - Part 5

Lecture 40 - Passive Microwave Remote Sensing - Part 1

Lecture 41 - Passive Microwave Remote Sensing - Part 2

Lecture 42 - Passive Microwave Remote Sensing - Part 3

Lecture 43 - Passive Microwave Remote Sensing - Part 4

Lecture 44 - Active microwave Remote Sensing - Radar - Part 1

Lecture 45 - Active microwave Remote Sensing - Radar - Part 2

Lecture 46 - Active microwave Remote Sensing - Radar - Part 3

Lecture 47 - Active microwave Remote Sensing - Radar - Part 4

Lecture 48 - Active microwave Remote Sensing - Radar - Part 5

Lecture 49 - Active microwave Remote Sensing - Radar - Part 6

Lecture 50 - Platforms for remote sensing observations - Part 1

Lecture 51 - Platforms for remote sensing observations - Part 2

Lecture 52 - Platforms for remote sensing observations - Part 3

Lecture 53 - Platforms for remote sensing observations - Part 4

Lecture 54 - Platforms for remote sensing observations - Part 5

Lecture 55 - Platforms for remote sensing observations - Part 6

Lecture 56 - LIDAR - Part 1

Lecture 57 - LIDAR - Part 2

Lecture 58 - LIDAR - Part 3

Lecture 59 - RS data, data portals and processing tools - Part 1

Lecture 60 - RS data, data portals and processing tools - Part 2

Lecture 61 - RS data, data portals and processing tools - Part 3

Lecture 62 - Land use, land cover monitoring and change detection - Part 1

Lecture 63 - Land use, land cover monitoring and change detection - Part 2

Lecture 64 - Application of RS in water resources management - Part 1

Lecture 65 - Application of RS in water resources management - Part 2

Lecture 66 - Application of RS in water resources management - Part 3

Lecture 67 - Application of RS in water resources management - Part 4

NPTEL : NOC:Dynamics of Structures (Civil Engineering)

Co-ordinators : Prof. Manish Kumar

Lecture 1 - Introduction to Structural Dynamics

Lecture 2 - Idealization of Structures

Lecture 3 - Components of Dynamic System

Lecture 4 - Equation of Motion

Lecture 5 - Free Vibration

Lecture 6 - Damped Free Vibration - Part 1

Lecture 7 - Damped Free Vibration - Part 2

Lecture 8 - Undamped Harmonic Excitations

Lecture 9 - Damped Harmonic Excitations

Lecture 10 - Frequency response curves

Lecture 11 - Transmissibility

Lecture 12 - Energy in Forced Vibrations

Lecture 13 - Unit impulse Functions

Lecture 14 - Step and Ramp Forces

Lecture 15 - Pulse Excitations

Lecture 16 - Numerical Response Methods

Lecture 17 - Seismic Response Spectra

Lecture 18 - Continuous systems

Lecture 19 - Lumped mass systems

Lecture 20 - Equation of motion

Lecture 21 - Equation of motion - examples

Lecture 22 - Mode shapes and frequencies

Lecture 23 - Free vibration - Undamped and Damped

Lecture 24 - Damping in MDOF Systems

Lecture 25 - Forced response of MDOF systems

Lecture 26 - Modal superposition Analysis

Lecture 27 - Response Spectrum Analysis

Lecture 28 - Concept of Seismic Isolation

Lecture 29 - Dynamics of Base-isolation Systems

NPTEL : NOC:Microwave Remote Sensing in Hydrology (Civil Engineering)

Co-ordinators : Prof. J. Indu

Lecture 1 - Syllabus

Lecture 2 - History Of Microwave Remote Sensing

Lecture 3 - Overview Of Active and Passive Microwave Remote Sensing

Lecture 4 - Fundamentals Laws Of Remote Sensing

Lecture 5 - Tutorial 1: Python Programming From Beginner Perspective

Lecture 6 - Scattering Of Microwaves

Lecture 7 - Synthetic Aperture Radars - Basics

Lecture 8 - Sar Image Processing - Fundamental Terminologies

Lecture 9 - Working With Sar Imagery

Lecture 10 - Understanding Radar Equation

Lecture 11 - Tutorial 2 : Exploring Alos Palsar Data In Python

Lecture 12 - Understanding Radar Imagery

Lecture 13 - Tutorial 3: Introduction To SNAP

Lecture 14 - Doppler Shift

Lecture 15 - Speckle

Lecture 16 - Speckle - How To Handle

Lecture 17 - Tutorial 4 Part 1: Plotting In 1 D Using Python

Lecture 18 - Tutorial 4 Part 2: Plotting In 2 D Using Python

Lecture 19 - Tutorial 4 Part 3: Statistics Using Python

Lecture 20 - Tutorial 4 Part 4: Hypothesis Tesing Using Python

Lecture 21 - Sar Image Pre Processing

Lecture 22 - Sar Image Texture

Lecture 23 - Texture For Image Classification

Lecture 24 - Polarization

Lecture 25 - Tutorial 5 Part 1: Speckle Filtering Using Python

Lecture 26 - Tutorial 5 Part 2: Speckle Filtering Using Python Using Gaussian Filter

Lecture 27 - Numerical On Radar Remote Sensing

Lecture 28 - Numerical On Radar Remote Sensing

Lecture 29 - Image Classification - Basics

Lecture 30 - Supervised Classification

Lecture 31 - Maximum Likelihood Classification

Lecture 32 - Tutorial 6 Part 1: Sar Image Pre-processing

Lecture 33 - Tutorial 6 Part 2: Maximum Likelihood Classification In Snap

Lecture 34 - Unsupervised Classification And Accuracy Assessment

Lecture 35 - Fuzzy Classification

Lecture 36 - Tutorial 7 Part 1: Working With Grace Data In Python

Lecture 37 - Tutorial 7 Part 2: Altimetry Data In Python

Lecture 38 - Tutorial 7 Part 3: Swot Mission For Altimetry

Lecture 39 - Radars In Hydrology

Lecture 40 - Applications Of Radar Remote Sensing In Hydrology

Lecture 41 - Doppler Weather Radar

Lecture 42 - Tutorial 8 Part 1: Doppler Weather Radar Data Visualization And Precipitation Estimation

Lecture 43 - Tutorial 8 Part 2: Doppler Weather Radar Data Visualization And Precipitation Estimation

Lecture 44 - Radar Altimetry

Lecture 45 - Measuring Soil Moisture And Terrestrial Water Storage Using Radar Remote Sensing

Lecture 46 - Tutorial 9: Handling Passive Microwave Obsevations

Lecture 47 - Fundamentals Of Passive Microwave Remote Sensing - Part 1

Lecture 48 - Fundamentals Of Passive Microwave Remote Sensing - Part 2

Lecture 49 - Applications Of Passive Microwave Remote Sensing In Hydrology

Lecture 50 - Passive Microwave Radiometers And Their Applications

Lecture 51 - Tutorial 10: Processing Satellite Precipitation Data Using Python

Lecture 52 - Introduction To The Basics Of Sar Intereferometry

Lecture 53 - Sar Interferometry (Insar) And Applications

Lecture 54 - Introduction To Other Modes Of Sar Interferometry And Applications - DInSAR, PSInSAR and DEM's

Lecture 55 - Tutorial 11: Sar Interferometry Processing Using Snaphu

Lecture 56 - Tutorial 12 Part 1: Hydrologic Modelling Using Microwave Remote Sensing

Lecture 57 - Tutorial 12 Part 2: Introduction To Swat+ Hydrological Model

Lecture 58 - Tutorial 12 Part 3: Introductory Tutorial On Vic Hydrological Model

NPTEL : NOC:Groundwater Hydrology and Management (Civil Engineering)

Co-ordinators : Prof. Pennan Chinnasamy

Lecture 1 - Introduction to Groundwater - Part 1

Lecture 2 - Introduction to Groundwater - Part 2

Lecture 3 - Introduction to Groundwater - Part 3

Lecture 4 - Introduction to Groundwater - Part 4

Lecture 5 - Introduction to Groundwater - Part 5

Lecture 6 - International importance of groundwater and India - Part 1

Lecture 7 - International importance of groundwater and India - Part 2

Lecture 8 - International importance of groundwater and India - Part 3

Lecture 9 - International importance of groundwater and India - Part 4

Lecture 10 - International importance of groundwater and India - Part 5

Lecture 11 - Physics and hydrology of Groundwater - Part 1

Lecture 12 - Physics and hydrology of Groundwater - Part 2

Lecture 13 - Physics and hydrology of Groundwater - Part 3

Lecture 14 - Physics and hydrology of Groundwater - Part 4

Lecture 15 - Physics and hydrology of Groundwater - Part 5

Lecture 16 - Groundwater governing equations 1 - Part 1

Lecture 17 - Groundwater governing equations 1 - Part 2

Lecture 18 - Groundwater governing equations 1 - Part 3

Lecture 19 - Groundwater governing equations 1 - Part 4

Lecture 20 - Groundwater governing equations 1 - Part 5

Lecture 21 - Groundwater governing equations 2 - Part 1

Lecture 22 - Groundwater governing equations 2 - Part 2

Lecture 23 - Groundwater governing equations 2 - Part 3

Lecture 24 - Groundwater governing equations 2 - Part 4

Lecture 25 - Groundwater governing equations 2 - Part 5

Lecture 26 - Groundwater recharge and discharge - Part 1

Lecture 27 - Groundwater recharge and discharge - Part 2

Lecture 28 - Groundwater recharge and discharge - Part 3

Lecture 29 - Groundwater recharge and discharge - Part 4

Lecture 30 - Groundwater recharge and discharge - Part 5

Lecture 31 - Constructing aquifers using groundwater data - Part 1

Lecture 32 - Constructing aquifers using groundwater data - Part 2

Lecture 33 - Constructing aquifers using groundwater data - Part 3

Lecture 34 - Constructing aquifers using groundwater data - Part 4

Lecture 35 - Constructing aquifers using groundwater data - Part 5

Lecture 36 - Conceptual model for groundwater - Part 1

Lecture 37 - Conceptual model for groundwater - Part 2

Lecture 38 - Conceptual model for groundwater - Part 3

Lecture 39 - Conceptual model for groundwater - Part 4

Lecture 40 - Conceptual model for groundwater - Part 5

Lecture 41 - Groundwater data in India - Part 1

Lecture 42 - Groundwater data in India - Part 2

Lecture 43 - Groundwater data in India - Part 3

Lecture 44 - Groundwater data in India - Part 4

Lecture 45 - Groundwater data in India - Part 5

Lecture 46 - Application of Groundwater data in India - Part 1

Lecture 47 - Application of Groundwater data in India - Part 2

Lecture 48 - Application of Groundwater data in India - Part 2

Lecture 49 - Application of Groundwater data in India - Part 3

Lecture 50 - Application of Groundwater data in India - Part 3

Lecture 51 - Introduction to Groundwater modeling - Part 1

Lecture 52 - Introduction to Groundwater modeling - Part 2

Lecture 53 - Introduction to Groundwater modeling - Part 3

Lecture 54 - Introduction to Groundwater modeling - Part 4

Lecture 55 - Introduction to Groundwater modeling - Part 5

Lecture 56 - Case studies of Groundwater in India - Part 1

Lecture 57 - Case studies of Groundwater in India - Part 2

Lecture 58 - Case studies of Groundwater in India - Part 3

Lecture 59 - Case studies of Groundwater in India - Part 4

Lecture 60 - Case studies of Groundwater in India - Part 5

NPTEL : NOC:Rural Water Resources Management (Civil Engineering)

Co-ordinators : Prof. Pennan Chinnasamy

Lecture 1 - Importance of water resource management and Hydrological Cycle and representations - Part 1

Lecture 2 - Importance of water resource management and Hydrological Cycle and representations - Part 2

Lecture 3 - Importance of water resource management and Hydrological Cycle and representations - Part 3

Lecture 4 - Importance of water resource management and Hydrological Cycle and representations - Part 4

Lecture 5 - Importance of water resource management and Hydrological Cycle and representations - Part 5

Lecture 6 - Key Hydrological Parameters 1 - Part 1

Lecture 7 - Key Hydrological Parameters 1 - Part 2

Lecture 8 - Key Hydrological Parameters 1 - Part 3

Lecture 9 - Key Hydrological Parameters 1 - Part 4

Lecture 10 - Key Hydrological Parameters 1 - Part 5

Lecture 11 - Key Hydrological Parameters 2 - Part 1

Lecture 12 - Key Hydrological Parameters 2 - Part 2

Lecture 13 - Key Hydrological Parameters 2 - Part 3

Lecture 14 - Key Hydrological Parameters 2 - Part 4

Lecture 15 - Key Hydrological Parameters 2 - Part 5

Lecture 16 - Introduction to Groundwater hydrology - Part 1

Lecture 17 - Introduction to Groundwater hydrology - Part 2

Lecture 18 - Introduction to Groundwater hydrology - Part 3

Lecture 19 - Introduction to Groundwater hydrology - Part 4

Lecture 20 - Introduction to Groundwater hydrology - Part 5

Lecture 21 - Groundwater components - Part 1

Lecture 22 - Groundwater components - Part 2

Lecture 23 - Groundwater components - Part 3

Lecture 24 - Groundwater components - Part 4

Lecture 25 - Groundwater components - Part 5

Lecture 26 - Surface water hydrology - Part 1

Lecture 27 - Surface water hydrology - Part 2

Lecture 28 - Surface water hydrology - Part 3

Lecture 29 - Surface water hydrology - Part 4

Lecture 30 - Surface water hydrology - Part 5

Lecture 31 - Water Mass Balance Equation - Part 1

Lecture 32 - Water Mass Balance Equation - Part 2

Lecture 33 - Water Mass Balance Equation - Part 3

Lecture 34 - Water Mass Balance Equation - Part 4

Lecture 35 - Water Mass Balance Equation - Part 5

Lecture 36 - Rural water management issues, data challenges and observation records - Part 1

Lecture 37 - Rural water management issues, data challenges and observation records - Part 2

Lecture 38 - Rural water management issues, data challenges and observation records - Part 3

Lecture 39 - Rural water management issues, data challenges and observation records - Part 4

Lecture 40 - Rural water management issues, data challenges and observation records - Part 5

Lecture 41 - Rural water resource management infrastructure (engineered) - Part 1

Lecture 42 - Rural water resource management infrastructure (engineered) - Part 2

Lecture 43 - Rural water resource management infrastructure (engineered) - Part 3

Lecture 44 - Rural water resource management infrastructure (engineered) - Part 4

Lecture 45 - Rural water resource management infrastructure (engineered) - Part 5

Lecture 46 - Rural water resource management infrastructure (nature based) - Part 1

Lecture 47 - Rural water resource management infrastructure (nature based) - Part 2

Lecture 48 - Rural water resource management infrastructure (nature based) - Part 3

Lecture 49 - Rural water resource management infrastructure (nature based) - Part 4

Lecture 50 - Rural water resource management infrastructure (nature based) - Part 5

Lecture 51 - Solving case studies in rural water resource management - Part 1

Lecture 52 - Solving case studies in rural water resource management - Part 2

Lecture 53 - Solving case studies in rural water resource management - Part 3

Lecture 54 - Solving case studies in rural water resource management - Part 4

Lecture 55 - Solving case studies in rural water resource management - Part 5

Lecture 56 - Rural hydrological databases for India - Part 1

Lecture 57 - Rural hydrological databases for India - Part 2

Lecture 58 - Rural hydrological databases for India - Part 3

Lecture 59 - Rural hydrological databases for India - Part 4

Lecture 60 - Rural hydrological databases for India - Part 5

NPTEL : NOC:Geotechnical Engineering-II (Civil Engineering)

Co-ordinators : Prof. Devendra Narain Singh

Lecture 1 - Introduction

Lecture 2 - Shear Strength of Soils - I

Lecture 3 - Shear Strength of Soils - II

Lecture 4 - Shear Strength of Soils - III

Lecture 5 - Shear Strength of Soils - IV

Lecture 6 - Testing for shear strength parameters: Introduction

Lecture 7 - Direct shear box test

Lecture 8 - Direct Shear Interpretation of Test Results - I

Lecture 9 - Direct Shear Interpretation of Test Results - II

Lecture 10 - Kf line

Lecture 11 - Selection of Parameter (Shear Strength,SS) - I

Lecture 12 - Selection of Parameter (Shear Strength,SS) - II

Lecture 13 - Shear Strength of Cohesive Soils - I

Lecture 14 - Shear Strength of Cohesive Soils - II

Lecture 15 - Triaxial Test - I

Lecture 16 - Triaxial Test - II

Lecture 17 - Triaxial Test - III

Lecture 18 - Interpretation of Triaxial test Results - I

Lecture 19 - Interpretation of Triaxial test Results - II

Lecture 20 - Interpretation of Triaxial test Results - III

Lecture 21 - Pore Pressure Parameters - I

Lecture 22 - Pore Pressure Parameters - II

Lecture 23 - Stress Paths - I

Lecture 24 - Stress Paths - II

Lecture 25 - Plastic Equilibrium in Soils

Lecture 26 - Mechanisms of Development of Plastic Equilibrium in Soils - I

Lecture 27 - Mechanisms of Development of Plastic Equilibrium in Soils - II

Lecture 28 - Earth Pressure Analysis (Trial Wedge) - I

Lecture 29 - Earth Pressure Analysis (Trial Wedge) - II

Lecture 30 - Earth Pressure Analysis (Trial Wedge) - III

Lecture 31 - Analysis of Completely Submerged Retaining wall

Lecture 32 - Gravity Walls Supporting Cohesive Soil Mass (Backfill)

Lecture 33 - Sloping Backfill

Lecture 34 - Earth Pressure Analysis - I

Lecture 35 - Earth Pressure Analysis - II

Lecture 36 - Sheet Pile Wall Introduction - I

Lecture 37 - Sheet Pile Wall Introduction - II

Lecture 38 - Sheet pile wall Introduction - III

Lecture 39 - Analysis of sheet piles - I

Lecture 40 - Analysis of sheet piles - II

Lecture 41 - Anchored Bulkheads

Lecture 42 - Cantilever Sheet Piles

Lecture 43 - Lateral Earth Pressure Braced Sheet Pile Walls

Lecture 44 - Slope Stability - I

Lecture 45 - Slope Stability - II

Lecture 46 - Slope Instability - I

Lecture 47 - Slope Instability - II

Lecture 48 - Slope Instability - III

Lecture 49 - Analysis of Finite Slopes - I Planar Failure Surface

Lecture 50 - Analysis of Finite Slopes - II Circular Failure Surface

Lecture 51 - Finite Slopes Friction Circle Method

Lecture 52 - Slip Circle Method

NPTEL : NOC:Remote Sensing and GIS for Rural Development (Civil Engineering)

Co-ordinators : Prof. Pennan Chinnasamy

Lecture 1 - Introduction to course - Rural development (RD)

Lecture 2 - Water security (SF) and Water security (GW) and issues

Lecture 3 - Food security and issues

Lecture 4 - Agriculture and rural infrastructure issues

Lecture 5 - Rural Development

Lecture 6 - Data and mapping issues for Rural regions

Lecture 7 - Introduction to Remote Sensing and need

Lecture 8 - Remote Sensing for Water and Food Security

Lecture 9 - Remote Sensing for Rural infrastructures

Lecture 10 - Remote Sensing for Rural Development

Lecture 11 - Intro to Remote Sensing Data for Rural Development

Lecture 12 - Intro to Remote Sensing Data for Rural Development : Water

Lecture 13 - Intro to Remote Sessing Data for Rural Development : Soil and Climate

Lecture 14 - Intro to Remote Sensing Data for Rural Development : NASA datasets for water

Lecture 15 - Intro to Remote Sensing Data for Rural Development

Lecture 16 - Intro to GIS and QGIS

Lecture 17 - Intro to GIS data types and download

Lecture 18 - Intro to GIS vector data type and QGIS panel

Lecture 19 - Vector Tools in QGIS

Lecture 20 - QGIS tutorials for vector analysis and data searching

Lecture 21 - Intro to Raster Data type in GIS

Lecture 22 - Raster data type formats and uses

Lecture 23 - Raster data and Vector data quality issues

Lecture 24 - Raster data tools: Raster calculator and Raster Align

Lecture 25 - Raster data tools: Clip and Masking tools

Lecture 26 - Intro to GIS Projections and Co-ordinate systems

Lecture 27 - Intro to digitization of images for raster data

Lecture 28 - Digitization of scanned maps into raster data

Lecture 29 - Extracting point and line features from georeferenced data

Lecture 30 - Extracting polygon features from georeferenced data

Lecture 31 - Creating shapefiles from georefrenced maps

Lecture 32 - Google Earth Pro introduction for extracting data

Lecture 33 - Ground Control points from Google Earth Pro and Basemaps

Lecture 34 - Digital Elevation models and sources

Lecture 35 - Digital Elevation models (hands on example)

Lecture 36 - Introduction to Land Use Land Cover

Lecture 37 - Data for LULC and proxy data

Lecture 38 - Analyzing Bhuvan LULC data - Part 1

Lecture 39 - Analyzing Bhuvan LULC data - Part 2

Lecture 40 - Analyzing USGS LULC data

Lecture 41 - Different types of LULC classifications

Lecture 42 - Different types of LULC classifications

Lecture 43 - Remote Sensing for irrigation assessments

Lecture 44 - Remote Sensing for Groundwater irrigation assessments

Lecture 45 - Methods for Crop Statistics using Remote Sensing data

Lecture 46 - Remote Sensing based indicators for rural development

Lecture 47 - Remote Sensing methods for crop area and health assessments

Lecture 48 - NDVI data access

Lecture 49 - NDVI data from NASA platforms

Lecture 50 - NDVI data from Sentinel and NASA platforms

Lecture 51 - Remote Sensing based indicators database

Lecture 52 - Synergized mapping using Remote Sensing and Crowd Sourced data for rural infrastructures

Lecture 53 - RS and OSM for mapping rural infrastructures: Schools

Lecture 54 - RS and OSM for mapping rural infrastructures: Hospitals

Lecture 55 - RS and OSM for mapping rural infrastructures: Adding data, crops and water bodies

Lecture 56 - RS and GIS application for Rural Development: Moniotring and Evaluation

Lecture 57 - RS and GIS application for Rural Development: Monitoring and Evaluation using NDVI and NDWI

Lecture 58 - RS and GIS application for Rural Development: Water Quality Assessment

Lecture 59 - RS and GIS application for Rural Development: Indicators and Dashboards

Lecture 60 - RS and GIS for Rural Development - Summary, Wrap and Ways Forward

NPTEL : Concrete Technology (Civil Engineering)

Co-ordinators : Dr. B. Bhattacharjee

Lecture 1 - Production and Composition

Lecture 2 - Structure and Hydration

Lecture 3 - Structure and Hydration

Lecture 4 - Properties and Tests

Lecture 5 - Types and Use

Lecture 6 - Aggregates (Size, Shape)

Lecture 7 - Packing, FM, SM

Lecture 8 - Properties

Lecture 9 - Chemical Admixtures

Lecture 10 - Chemical Admixtures

Lecture 11 - Mineral Admixtures

Lecture 12 - Mineral Admixtures

Lecture 13 - Mineral Admixtures

Lecture 14 - Mix Proportioning of Concrete: General Principles

Lecture 15 - Mix design of Concrete: General and IS Method

Lecture 16 - Mix Design of Concrete: Is Example and British (DOE) Method

Lecture 17 - Mix Design of concrete: ACI 211 Method

Lecture 18 - Mix Design of concrete: Packing Density, Rheology

Lecture 19 - Batching and Mixing of concrete: General Principles

Lecture 20 - RMC and Transporting Concrete

Lecture 21 - Workability and Pumping of Concrete

Lecture 22 - Compaction and Curing Concrete

Lecture 23 - Strength of Concrete: Factors Affecting

Lecture 24 - Strength of Concrete: Aggregate Contribution

Lecture 25 - Strength of Concrete: Factors Affecting Test Results

Lecture 26 - Mechanical Properties of Concrete:Elastic Moduls, Poision'Ratio, Fatigue, Impact

Lecture 27 - Creep of Concrete

Lecture 28 - Creep and Shrinkage of Concrete

Lecture 29 - Shrinkage of Concrete

Lecture 30 - Shrinkage of Concrete

Lecture 31 - Fundamental Concepts, Degradation Process, Attacks

Lecture 32 - Frost Action and Rebar Corrosion

Lecture 33 - Carbonation and Chloride Affect

Lecture 34 - Rebar Corrosion

Lecture 35 - Rebar Corrosion and General Strateggy

Lecture 36 - High Strength Concrete

Lecture 37 - High Strength Matrics and SCC

Lecture 38 - Self Compacting Concrete

Lecture 39 - Fiber Concrete

Lecture 40 - Fiber and Roller Compacted Concrete

Lecture 41 - Special Concrete and Sustainability

NPTEL : Seismic Analysis of Structures (Civil Engineering)

Co-ordinators : Dr. T.K. Datta, Dr. Ashok Gupta

Lecture 1 - Seismology

Lecture 2 - Seismology (Continued...)

Lecture 3 - Seismology (Continued...)

Lecture 4 - Seismology (Continued...)

Lecture 5 - Seismic Inputs

Lecture 6 - Seismic Inputs (Continued...)

Lecture 7 - Seismic Inputs (Continued...)

Lecture 8 - Seismic Inputs (Continued...)

Lecture 9 - Response Analysis for Specified Ground Motion

Lecture 10 - Response Analysis for Specified Ground Motion (Continued...)

Lecture 11 - Response Analysis for Specified Ground Motion (Continued...)

Lecture 12 - Response Analysis for Specified Ground Motion (Continued...)

Lecture 13 - Response Analysis for Specified Ground Motion (Continued...)

Lecture 14 - Response Analysis for Specified Ground Motion (Continued...)

Lecture 15 - Frequency Domain Spectral Analysis

Lecture 16 - Frequency Domain Spectral Analysis.

Lecture 17 - Frequency Domain Spectral Analysis (Continued...)

Lecture 18 - Frequency Domain Spectral Analysis (Continued...)

Lecture 19 - Frequency Domain Spectral Analysis (Continued...)

Lecture 20 - Response Spectrum Method of Analysis

Lecture 21 - Response Spectrum Method of Analysis.

Lecture 22 - Response Spectrum Method of Analysis (Continued...)

Lecture 23 - Response Spectrum Method of Analysis (Continued...)

Lecture 24 - Response Spectrum Method of Analysis (Continued...)

Lecture 25 - Inelastic Seismic Response of Structures

Lecture 26 - Inelastic Seismic Response of Structures (Continued...)

Lecture 27 - Inelastic Seismic Response of Structures (Continued...)

Lecture 28 - Inelastic Seismic Response of Structures (Continued...)

Lecture 29 - Inelastic Seismic Response of Structures (Continued...)

Lecture 30 - Inelastic Seismic Response of Structures (Continued...)

NPTEL : Building materials and Construction (Civil Engineering)

Co-ordinators : Dr. B. Bhattacharjee

Lecture 1 - Functions Of Buildings

Lecture 2 - Role Of Material In Construction

Lecture 3 - Concrete:Material

Lecture 4 - Concrete Production (Continued...)

Lecture 5 - Concrete Production (Continued...)

Lecture 6 - Concrete:Production Pumping, Placing

Lecture 7 - Concrete:Production Curing

Lecture 8 - Cement: Hydration

Lecture 9 - Cement and Cementitious Material

Lecture 10 - Fresh Concrete

Lecture 11 - Fresh Concrete : Role of Mix Parameters

Lecture 12 - Fresh Concrete : Role of Admixtures

Lecture 13 - Fresh Concrete : Segregation Bleeding

Lecture 14 - Strength of Concrete - I

Lecture 15 - Strength of Concrete - II

Lecture 16 - Strength of Concrete - III

Lecture 17 - Mechanical Properties of Concrete - I

Lecture 18 - Mechanical Properties of Concrete - II

Lecture 19 - Strength of Concrete : Non Destructive

Lecture 20 - Durability of Concrete - I

Lecture 21 - Durability of Concrete - II

Lecture 22 - Durability of Concrete - III

Lecture 23 - Cement Aggregate and Water Selection

Lecture 24 - Mix Design of Concrete

Lecture 25 - Mix Design Of concrete IS Method

Lecture 26 - Mix Design Of Concrete: British

Lecture 27 - Masonry : Materials

Lecture 28 - Masonry : Walls

Lecture 29 - Masonry : Walls; Resistance - I

Lecture 30 - Masonry : Walls; Resistance - II

Lecture 31 - Walls : Functional Performances

Lecture 32 - Walls : Defects and Durability

Lecture 33 - Metals Fundamentals

Lecture 34 - Metals and Iron Systems

Lecture 35 - Steel : Uses in Construction

Lecture 36 - Steel : Uses in Rebar

Lecture 37 - Polymer in Construction

Lecture 38 - Polymer in Construction : Uses

Lecture 39 - Glass and Timber : Glass

Lecture 40 - Glass and Timber : Timber

Lecture 41 - Roof and Floor Construction

NPTEL : Water Management (Civil Engineering)

Co-ordinators : Dr. A.K. Gosain

Lecture 1 - Introduction to Irrigation Water Management

Lecture 2 - Soil - Water - Plant Relationships

Lecture 3 - Soil - Water - Plant Relationships (Continued...)

Lecture 4 - Soil - Water - Plant Relationships (Continued...)

Lecture 5 - Soil - Water - Plant Relationships (Continued...)

Lecture 6 - Soil - Water - Plant Relationships (Continued...) and Infiltration

Lecture 7 - Crop Water Requirements

Lecture 8 - Crop Water Requirements (Continued...)

Lecture 9 - Crop Water Requirements (Continued...)

Lecture 10 - Crop Water Requirements (Continued...)

Lecture 11 - Crop Water Requirements (Continued...)

Lecture 12 - Crop Water Requirements (Continued...)

Lecture 13 - Crop Water Requirements (continued...)

Lecture 14 - Irrigation Efficiencies - Part I

Lecture 15 - Irrigation Efficiencies - Part II and Irrigation Methods and their Suitability

Lecture 16 - Irrigation Methods - III

Lecture 17 - Irrigation Methods - IV

Lecture 18 - Irrigation Methods - V

Lecture 19 - Irrigation Methods - VI

Lecture 20 - Irrigation Methods and their Suitability

Lecture 21 - Border Irrigation System - I

Lecture 22 - Border Irrigation System - II

Lecture 23 - Border Irrigation System - III

Lecture 24 - Border Irrigation System - IV

Lecture 25 - Furrow Irrigation System - I

Lecture 26 - Furrow Irrigation System - II

Lecture 27 - Furrow Irrigation System - III

Lecture 28 - Furrow Irrigation System - IV

Lecture 29 - Sprinkler Irrigation System - I

Lecture 30 - Sprinkler Irrigation System - II

Lecture 31 - Sprinkler Irrigation System - III

Lecture 32 - Sprinkler Irrigation System - IV

Lecture 33 - Sprinkler Irrigation System - V

Lecture 34 - Sprinkler Irrigation System - VI

Lecture 35 - Sprinkler Irrigation System - VII

Lecture 36 - Sprinkler Irrigation System - VIII

Lecture 37 - Drip Irrigation System - I

Lecture 38 - Drip Irrigation System - II

Lecture 39 - Drip Irrigation System - III

Lecture 40 - Drip Irrigation System - IV

NPTEL : NOC:Geoenvironmental Engineering (Environmental Geotechnology) Landfills, Slurry Ponds and Contaminated Sites (Civil Engineering)

Co-ordinators : Prof. Manoj Datta

Lecture 1 - Introduction to Geoenvironmental Engineering

Lecture 2 - Sources and Impact of Contamination

Lecture 3 - Waste-Soil Interaction

Lecture 4 - Solid Waste Generation and Disposal

Lecture 5 - Waste Minimization by Integrated Solid Waste Management (ISWM)

Lecture 6 - Integrated Solid Waste Management (ISWM) - Case Studies

Lecture 7 - Principles of Landfilling

Lecture 8 - Planning of Landfills - Part 1

Lecture 9 - Planning of Landfills - Part 2

Lecture 10 - Liners for Landfills - Part 1

Lecture 11 - Liners for Landfills - Part 2

Lecture 12 - Liners for Landfills - Part 3

Lecture 13 - Liners for Landfills - Part 4

Lecture 14 - Covers for Landfills - Part 1

Lecture 15 - Covers for Landfills - Part 2

Lecture 16 - Generation and Control of Leachate

Lecture 17 - Generation and Control of Landfill Gas

Lecture 18 - Stability of Slopes - Part 1

Lecture 19 - Stability of Slopes - Part 2

Lecture 20 - Stability of Slopes - Part 3

Lecture 21 - (Lecture Missing)

Lecture 22 - Some Solved Examples

Lecture 23 - Subsurface Monitoring Around Landfills - Part 1

Lecture 24 - Subsurface Monitoring Around Landfills - Part 2

Lecture 25 - Cost of Geotechnical Components of Landfills

Lecture 26 - Construction and Operation of Landfills

Lecture 27 - Site Selection for Landfills

Lecture 28 - Closure, Rehabilitation and Expansion of MSW Landfills

Lecture 29 - Control and Remedial Measures at Contaminated Sites - Part 1

Lecture 30 - Control and Remedial Measures at Contaminated Sites - Part 2

Lecture 31 - Slurry Disposal on Land

Lecture 32 - Disposal of Slurry Waste in Ponds and Impoundments and Dry Waste in Mounds

Lecture 33 - Geotechnical Properties of Coal Ash and Mine Tailings - Part 1

Lecture 34 - Geotechnical Properties of Coal Ash and Mine Tailings - Part 2

Lecture 35 - Planning and Design of Slurry Ponds

Lecture 36 - Stability of Incrementally Raised Embankments - Part 1

Lecture 37 - Stability of Incrementally Raised Embankments - Part 2

Lecture 38 - Remedial Measures for Slope Failures in Embankments / Dykes of Slurry Ponds

Lecture 39 - Environmental Control at Slurry Ponds

Lecture 40 - Geotechnical Reuse of Waste Materials - Part 1

Lecture 41 - Geotechnical Reuse of Waste Materials - Part 2

Lecture 42 - End-of-the-Course Review

NPTEL : NOC:Energy Efficiency, Acoustics and Daylighting in Building (Civil Engineering)

Co-ordinators : Dr. B. Bhattacharjee

Lecture 1 - Introduction to Environmental Factors - 1

Lecture 2 - Introduction to Environmental Factors - 2

Lecture 3 - Introduction to Environmental Factors - 3

Lecture 4 - Introduction to Environmental Factors - 4

Lecture 5 - Introduction to Environmental Factors - 5

Lecture 6 - Introduction to Environmental Factors - 6

Lecture 7 - Introduction to Environmental Factors - 7

Lecture 8 - Comfort and Heat Transfer Concepts

Lecture 9 - Heat Flow in Buildings - 1

Lecture 10 - Heat Flow in buildings - 2

Lecture 11 - Heat Flow in buildings - 3

Lecture 12 - Admittance Method - 1

Lecture 13 - Admittance Method - 2

Lecture 14 - Heat Flow in buildings - 1 (Frequency Domain)

Lecture 15 - Heat Flow in buildings - 2 (Frequency Domain)

Lecture 16 - Heat Flow in buildings - 2 (Frequency Domain)

Lecture 17 - Heat flow in buildings

Lecture 18 - Admittance Method

Lecture 19 - Comfort - 1

Lecture 20 - Comfort - 2

Lecture 21 - Comfort and Thermal Design of Buildings - 1

Lecture 22 - Comfort and Thermal Design of Buildings - 2

Lecture 23 - Comfort and Thermal Design of Buildings - 3

Lecture 24 - Thermal Design of Unconditioned Building

Lecture 25 - External Shading Multipliers for external suns shading

Lecture 26 - Passive Concepts

Lecture 27 - Design for Thermal Efficiency

Lecture 28 - Ventilation - 1

Lecture 29 - Ventilation - 2

Lecture 30 - Natural ventilation design

Lecture 31 - Noise and Acoustic Fundamentals - 1

Lecture 32 - Noise and Acoustic Fundamentals - 2

Lecture 33 - Noise and Acoustic Fundamentals - 3

Lecture 34 - Noise and Acoustic Fundamentals, Noise Outdoors

Lecture 35 - Noise outdoors

Lecture 36 - Sound within enclosure - 1

Lecture 37 - Sound within enclosure - 2

Lecture 38 - Sound within enclosure - 3

Lecture 39 - Sound within enclosure - 4

Lecture 40 - Sound within enclosure - 5

Lecture 41 - Sound within enclosure - 6

Lecture 42 - Sound within enclosure, isolation

Lecture 43 - Isolation - 1

Lecture 44 - Isolation - 2

Lecture 45 - Auditorium - 1

Lecture 46 - Auditorium - 2

Lecture 47 - Daylighting - 1

Lecture 48 - Daylighting - 2

Lecture 49 - Daylighting - 3

Lecture 50 - Daylighting - 4

Lecture 51 - Daylighting - 5

Lecture 52 - Daylighting - 6

Lecture 53 - Artificial Lighting

Lecture 54 - Design Sky models

Lecture 55 - Live Session

NPTEL : NOC:Fire Protection, Services and Maintenance Management of Building (Civil Engineering)

Co-ordinators : Dr. B. Bhattacharjee

Lecture 1 - Basic concepts of Fire Protection - I

Lecture 2 - Basic concepts of Fire Protection - II

Lecture 3 - Fire Resistance

Lecture 4 - Introduction Process of Combustion

Lecture 5 - ventilation and fuel Process of Combustion controlled fire

Lecture 6 - Process of Combustion: Flashover condition

Lecture 7 - Effect of Fire on Construction Materials

Lecture 8 - Design for Fire Resistance: Steel

Lecture 9 - Design for Fire Resistance: Steel

Lecture 10 - Design for Fire Resistance: Concrete

Lecture 11 - Fire Safety: Urban Planning

Lecture 12 - Fire Safety: Escape and Refuge

Lecture 13 - Fire safety: Internal planning, Detection and Suppression

Lecture 14 - Fire Safety: Detection and Suppression

Lecture 15 - Introduction to Lift Design

Lecture 16 - Design of Lift systems

Lecture 17 - Design of Lift systems: expected stops and floor of reversal

Lecture 18 - Design of Lift systems: Different cases

Lecture 19 - Design of Lift systems: Simulation and arrangement and Escalators

Lecture 20 - Introduction to System and Flow Systems

Lecture 21 - Water Supply System: Constant Demand

Lecture 22 - Water Supply System: Variable Demand and Diversity Factor

Lecture 23 - Diversity factor (Continued...)

Lecture 24 - Control Systems

Lecture 25 - Introduction to HVAC

Lecture 26 - Governing Equations for HVAC Process

Lecture 27 - Numerical Problem on HVAC System

Lecture 28 - Numerical Problem on HVAC System (Continued...)

Lecture 29 - Psychrometric Chart: Equation based Approach

Lecture 30 - Flow in Pipe Networks and Fixture Units

Lecture 31 - Flow in Pipe Networks (Continued...) and Design of Water Supply Distribution System

Lecture 32 - Design of Water Supply Distribution System (Continued...) and Flow in Waste Water pipes

Lecture 33 - Electrical Systems (introduction)

Lecture 34 - Design of Electrical Systems

Lecture 35 - Intelligent Building

Lecture 36 - Life cycle cost and basics of building maintenance

Lecture 37 - Stages of maintenance management

Lecture 38 - Planning for building maintenance

Lecture 39 - Periodicity of maintenance management

Lecture 40 - Estimation of repair cycle

Lecture 41 - Cost profile of maintenance

Lecture 42 - Lamp replacement

Lecture 43 - Building inspection, Planned and Ad-hoc maintenance

Lecture 44 - Condition survey and health evaluation of buildings

Lecture 45 - Diagnosis of building by visual survey

Lecture 46 - Case studies of visual survey

Lecture 47 - Effect of corrosion and Alkali Aggregate Reaction

Lecture 48 - Sampling and choice of test location

Lecture 49 - Non Destructive Testing - 1

Lecture 50 - Non Destructive Testing - 2

Lecture 51 - Core strength test

Lecture 52 - Carbonation and Chloride measurement

Lecture 53 - Electrical methods of progress measurement

Lecture 54 - Repair, Rehabilitation and Retrofit

Lecture 55 - Periodicity and economics of condition survey

Lecture 56 - Interpretation of test results

NPTEL : NOC:Sustainable Materials and Green Buildings (Civil Engineering)

Co-ordinators : Dr. B. Bhattacharjee

Lecture 1 - Introduction and Planet Equivalent

Lecture 2 - Basics of Carbon Cycle

Lecture 3 - Factors Affecting carbon Cycle

Lecture 4 - Fundamentals of Sustainability

Lecture 5 - Role of Materials and Embodied Energy

Lecture 6 - Case Study for Energy in Building

Lecture 7 - Calculation of Ecological Footprint

Lecture 8 - Role of Cement in Sustainability and Calculation of Chemical Exergy

Lecture 9 - Fuel for Cement

Lecture 10 - Cemebtitious/Supplementary Cementitious Materials and Their Characterization

Lecture 11 - Strength of Concrete With Supplementary Cementitious Materials and Composite Cements

Lecture 12 - Types of Composite Cements

Lecture 13 - Alternative Fuel for cement and Embodied Energy

Lecture 14 - Life Cycle Embodied Energy and Concrete Sustainability

Lecture 15 - Strength of Concrete and Use of Admixtures

Lecture 16 - Curing Methods and Use of Waste Water for Mixing and Curing

Lecture 17 - Modern Composite Concrete

Lecture 18 - Recycled Aggregate-ITZ and Proessing

Lecture 19 - Classification of Recycled Aggregate: Crushing and Grinding of Aggregates

Lecture 20 - Crushing and Grinding: Bond's Law+Operational Energy: U-Value

Lecture 21 - Operational Energy: Thermal Conductivity Models

Lecture 22 - Operational Energy: Thermal Conductivity Models (Continued...)

Lecture 23 - Operational Energy: Estimation of Thermal Conductivity

Lecture 24 - Thermal Diffusivity and Clay Bricks

Lecture 25 - Types of Bricks Kilns and Carbon Balance

Lecture 26 - Carbon Balance, Comparison of Various Types of Brick Kilns and Sealants, Paints, Adhesive

Lecture 27 - Sealants, Health Hazards of Building Materials and Emission Models

Lecture 28 - Emission Models and Testing

Lecture 29 - Energy Efficient Design of Buildings

Lecture 30 - Design Optimization of Buildings

Lecture 31 - Building Design Optimization Using Genetic Algorithm

Lecture 32 - Urban Heat Island: Radiation Concepts

Lecture 33 - Urban Heat Island: Urban Canopy Layer

Lecture 34 - Evapotranspiration: Theory and Models

Lecture 35 - Evapotranspiration: Case Study and Surface Water Balance

Lecture 36 - Energy Conservation Building Code (ECBC2007)

Lecture 37 - Energy Conservation Building Code (ECBC2007) (Continued...)

Lecture 38 - ECBC Compliant Methodology

Lecture 39 - OTTV Methodology

Lecture 40 - Solar Energy and Solar Cells

Lecture 41 - Solar Photo Volatic Cells

Lecture 42 - Solar Water Heating

Lecture 43 - Design Strategies and the Green Design Process

Lecture 44 - Green Building Rating Systems

Lecture 45 - Autoclaved Aerated Concrete, Insulated Precast System and Insulated Precast Forms

Lecture 46 - Insulated Concrete Form and Tunnel Form

Lecture 47 - Modular Construction

NPTEL : NOC:Scheduling Techniques in Projects (Civil Engineering)

Co-ordinators : Prof. J. Uma Maheswari

Lecture 1 - Introduction to Projects

Lecture 2 - Inputs to Scheduling

Lecture 3 - Critical Path Method

Lecture 4 - Precedence Diagramming Method

Lecture 5 - Line of Balance Method

Lecture 6 - Resource-driven Scheduling

Lecture 7 - Information-driven Scheduling

Lecture 8 - Dependency Structure Matrix - I

Lecture 9 - Dependency Structure Matrix - II

Lecture 10 - Dependency Structure Matrix - III

Lecture 11 - Beeline Diagramming Method

Lecture 12 - Other Scheduling Techniques

NPTEL : NOC:Safety in Construction (Civil Engineering)

Co-ordinators : Prof. J. Uma Maheswari

Lecture 1 - Introduction to Safety in Construction

Lecture 2 - Introduction to Safety Standards; Signs, Signals in Construction

Lecture 3 - Role of Stakeholders in Construction safety

Lecture 4 - Cost of Injury Vs Investment in Safety

Lecture 5 - Safety Program Accident/Incident Investigation

Lecture 6 - PPE in Construction

Lecture 7 - A Case Study on Construction Safety

Lecture 8 - Introduction to Fatal Falls

Lecture 9 - Fall hazard in Concerting

Lecture 10 - Fall hazard in Demolition Works

Lecture 11 - Safety in Demolttion Work Practical Examples

Lecture 12 - Trench Cav-ins

Lecture 13 - Tunneling Safety

Lecture 14 - Struck by and Caught-inbetween

Lecture 15 - Crane Safety

Lecture 16 - A case Study on Construction Safety - Jigar-Crane

Lecture 17 - A case Study on Construction Safety - Safety Talk

Lecture 18 - Fire Safety and Steel Construction

Lecture 19 - Electrical Safety

Lecture 20 - A case Study on Construction Safety - Contractual Provision on Construction Zone Safety

Lecture 21 - Health Issues in Construction

Lecture 22 - Ergonomics and Health Issues with Concerting

Lecture 23 - General Safety Precautions

Lecture 24 - Safety in MEP Services

Lecture 25 - Managing Hazards in Construction

Lecture 26 - BIM for Construction

Lecture 27 - BIM for Safety

NPTEL : Advanced Hydraulics (Civil Engineering)

Co-ordinators : Dr. Suresh A Kartha

Lecture 1 - Introduction - advanced hydraulics & course structure

Lecture 2 - Various classifications of open channel flows

Lecture 3 - Flow classifications & velocity distribution

Lecture 4 - Pressure distribution

Lecture 5 - Equation of continuity & energy

Lecture 6 - Specific energy & critical flow

Lecture 7 - Energy, momentum & specific force

Lecture 8 - Computation of critical flow - Part 1

Lecture 9 - Critical flow computations

Lecture 10 - Introduction to uniform flow

Lecture 11 - Manning's equation and normal depth

Lecture 12 - Uniform Flow Computations - Part 1

Lecture 13 - Uniform flow in compound sections, concept of normal slope

Lecture 14 - Uniform flow approximation for flood discharge

Lecture 15 - Design of channels for uniform flow

Lecture 16 - Design of channels using uniform flow

Lecture 17 - Design of erodible channels

Lecture 18 - Introduction to gradually varied flows

Lecture 19 - Gradually varied flow equations

Lecture 20 - Classification of gradually varied flow - Part 1

Lecture 21 - Classification of gradually varied flow - Part 2

Lecture 22 - Gradually varied flow profiles with change in bed slopes

Lecture 23 - GVF profile properties and transitional depths

Lecture 24 - Gradually varied flow computations - Part 1

Lecture 25 - Gradually varied flow computations RK method - Part 2

Lecture 26 - Standard step method for gradually varied flow computations

Lecture 27 - Spatially varied flow

Lecture 28 - Features on spatially varied flow

Lecture 29 - Rapidly varied flow - introduction

Lecture 30 - Theoretical aspects of hydraulic jump

Lecture 31 - Characteristics of jumps in rectangular channel

Lecture 32 - Features of hydraulic jumps

Lecture 33 - Jumps as energy dissipators

Lecture 34 - Jump controls

Lecture 35 - Surges - Part 1

Lecture 36 - Surges - Part 2

Lecture 37 - Channel transitions - Part 1

Lecture 38 - Channel transitions - Part 2

Lecture 39 - Channel transitions - Part 3

Lecture 40 - Application of momentum principles

Lecture 41 - Pumps - 1

Lecture 42 - Turbines - Part 3 (pumps, turbines)

Lecture 43 - Turbines, cavitation

NPTEL : Design of Steel Structures (Civil Engineering)

Co-ordinators : Prof. Damodar Maity

Lecture 1 - Introduction to Design of Steel Structures

Lecture 2 - Connections

Lecture 3 - Riveted Connections

Lecture 4 - Design of Rivet Joint

Lecture 5 - Welding

Lecture 6 - Design of Fillet and Butt Welds

Lecture 7 - Bolted Connection

Lecture 8 - Eccentric Connections: Rivet Joints

Lecture 9 - Design of Eccentric Connection With Load Lying in Plane of Joint Rivet Bolt

Lecture 10 - Eccentric Connection With Load Perpendicular to Plane of Riveted Joint

Lecture 11 - Analysis and Design of Join with Seat Connection

Lecture 12 - Eccentric Connection

Lecture 13 - Load Lying Perpendicular to the Plane of Weld Joint

Lecture 14 - Tension Member

Lecture 15 - Design of Tension Member

Lecture 16 - Design of Tension Member: Gusset Plates. Lug Angles and Tension Splices

Lecture 17 - Design of Tension Member: Subjected to Axial and Bending

Lecture 18 - Compression Member

Lecture 19 - Design of Compression Member

Lecture 20 - Design of Eccentrically Loaded tension Member

Lecture 21 - Built up Compression Member

Lecture 22 - Design of Built up Compression Member

Lecture 23 - Lacing for Built Up Compression Member

Lecture 24 - Design of Lacing System

Lecture 25 - Design of Batten Plates

Lecture 26 - Introduction to Flexural Members: Beams

Lecture 27 - Design Procedure of Beam Members

Lecture 28 - Design of Laterally Supported Beams

Lecture 29 - Design of Laterally Unsupported Beams

Lecture 30 - Built-Up Beams

Lecture 31 - Built-Up Beams: Curtailment of the Flange Plates and Shear Connections

Lecture 32 - Design of a Built-Up Beams

Lecture 33 - Design of Shear Connections and Purlins

Lecture 34 - Gantry Girders

Lecture 35 - Design of Gantry Girders

Lecture 36 - Introduction to Plate Girders - Part 1

Lecture 37 - Introduction to Plate Girders - Part 2

Lecture 38 - Design of a Plate Girder

Lecture 39 - Column Base - Part 1

Lecture 40 - Column Base - Part 2

NPTEL : Hydraulics (Civil Engineering)

Co-ordinators : Prof. Arup Kumar Sharma

Lecture 1 - Introduction to Hydraulics

Lecture 2 - Open Channel Hydraulics - Part 1

Lecture 3 - Open Channel Hydraulics - Part 2

Lecture 4 - Velocity and Pressure Distribution

Lecture 5 - Practical use of velocity co-efficient in channel flow

Lecture 6 - Conservation Principles & ioioGoverning Equations

Lecture 7 - Uniform Flow

Lecture 8 - Uniform Flow Formula

Lecture 9 - Computation of Uniform Flow - Part 1

Lecture 10 - Computation of Uniform Flow - Part 2

Lecture 11 - Uniform Flow in Mobile Boundary Channel

Lecture 12 - Incipient Motion Condition and Regime of Flow

Lecture 13 - Concept of Specific Energy

Lecture 14 - Computation of Critical Depth

Lecture 15 - Specific Force, Critical Depth & Sequent Depth

Lecture 16 - Non-uniform Flow: Gradually Varied Flow

Lecture 17 - Classification of Gradually Varied Flow

Lecture 18 - Characteristic of Gradually Varied Flow

Lecture 19 - Characteristic of Gradually Varied Flow & its Computation

Lecture 20 - Gradually Varied Flow & its Computation

Lecture 21 - Computation of Gradually Varied Flow

Lecture 22 - Gradually Varied Flow: Numerical Methods and Problem Solving

Lecture 23 - Rapidly Varied Flow: Hydraulic Jump

Lecture 24 - Hydraulic Jump

Lecture 25 - Flow Over Hump and Channel Contraction

Lecture 26 - Canal Design - 1

Lecture 27 - Canal Design - 2

Lecture 28 - Design of Alluvial Channel - 1

Lecture 29 - Design of Alluvial Channel - 2

Lecture 30 - Design of Alluvial Channel - 3

Lecture 31 - Unsteady Flow: Waves and its Classification

Lecture 32 - Unsteady Flow Part - 2

Lecture 33 - Unsteady Flow Part - 3

Lecture 34 - Pipe Flow: Friction Loss

Lecture 35 - Pipe Flow: Losses in Pipes

Lecture 36 - Pipe in Series & Parallel

Lecture 37 - Pipe Network Analysis

Lecture 38 - Water Hammer & Surge Tank

Lecture 39 - Pipe Flow Friction Loss

Lecture 40 - Pipe Flow: Losses in Pipe

NPTEL : NOC:Higher Surveying (Civil Engineering)

Co-ordinators : Prof. Ajay Dashora

Lecture 1 - Introduction to Higher Surveying

Lecture 2 - Understanding reference system, reference frame, and coordinate system for Earth

Lecture 3 - Coordinate and datum transformations

Lecture 4 - Projected coordinate system

Lecture 5 - Fundamentals of astronomy

Lecture 6 - Applications of concepts of astronomy

Lecture 7 - Time

Lecture 8 - Application of concepts of astronomy and time

Lecture 9 - Fundamental concepts of error, accuracy, and error propagation

Lecture 10 - Applications of error propagation

Lecture 11 - Observation Equation Method of adjustments

Lecture 12 - Condition Equation Method and Combined Method of adjustments

Lecture 13 - Analysis of adjustments and reporting of errors

Lecture 14 - Global Positioning System (GPS)

Lecture 15 - Introduction to Photogrammetry

Lecture 16 - Vertical photogrammetry

Lecture 17 - Stereo photogrammetry

Lecture 18 - Analytical photogrammetry - I

Lecture 19 - Analytical photogrammetry - II

Lecture 20 - Photogrammetric products

Lecture 21 - Image matching

Lecture 22 - Close range photogrammetry

Lecture 23 - Fundamentals of LiDAR

Lecture 24 - LiDAR data acquisition

Lecture 25 - Geolocation and errors of LiDAR data

Lecture 26 - Information extraction from LiDAR data

Lecture 27 - RADAR fundamenetals - I

Lecture 28 - RADAR fundamenetals - II

Lecture 29 - RADAR fundamenetals - III

Lecture 30 - Radargrammetry

Lecture 31 - Geoscience perspective for RADAR applications

Lecture 32 - Fundamental concepts of hydrographic survey

Lecture 33 - Field procedures for hydrographic Surveying

Lecture 34 - Modern techniques for hydrographic Survey

Lecture 35 - Navigation

Lecture 36 - Conclusive lecture

NPTEL : NOC:Unsaturated Soil Mechanics (Civil Engineering)

Co-ordinators : Dr. Tadikonda Venkata Bharat

Lecture 1 - Fundamental Aspects of Unsaturated Soil Mechanics and its Basic Principles

Lecture 2 - Phases of Unsaturated Soils-I

Lecture 3 - Phases of Unsaturated Soils-II

Lecture 4 - Equilibrium between Air and Water Phases

Lecture 5 - Capillary Phenomenon in Unsaturated Soils - I

Lecture 6 - Capillary Phenomenon in Unsaturated Soils - II

Lecture 7 - Summary: Fundamental Principles and Constitutive Relationships

Lecture 8 - Concept of Water Retention and Soil Water Characteristics - I

Lecture 9 - Concept of Water Retention and Soil Water Characteristics - II

Lecture 10 - Hydraulic conductivity functions and determination of state variables

Lecture 11 - Suction Measurement/Control Techniques - I

Lecture 12 - Suction Measurement/Control Techniques - II

Lecture 13 - Summary: Suction Measurement and Control Techniques

Lecture 14 - HCF Determination

Lecture 15 - SWCC and HCF Models

Lecture 16 - HCF Modelling

Lecture 17 - Fitting of SWCC and HCF modelling

Lecture 18 - Pedo-transfer Functions (PTF)

Lecture 19 - Steady-State Flow Through Soils

Lecture 20 - Steady-State and Transient Flow

Lecture 21 - Analytical Methods for Transient Flow - I

Lecture 22 - Analytical Methods for Transient Flow - II

Lecture 23 - Shear Strength of Unsaturated Soils

Lecture 24 - Suction-Controlled Direct Shear Test

Lecture 25 - Suction-Controlled Triaxial Test

Lecture 26 - Extended M-C Criterion - I

Lecture 27 - Extended M-C Criterion - II

Lecture 28 - Extended M-C Criterion - III

Lecture 29 - Concept of Suction Stress - I

Lecture 30 - Concept of Suction Stress - II

Lecture 31 - Concept of Suction Stress - III

Lecture 32 - Summary: Shear Strength of Unsaturated Soils and Introduction to Volume Change

Lecture 33 - Swelling Behaviour of Soils

Lecture 34 - Estimation of Swelling Pressure in the Laboratory and Behaviour of Collapsible soil

Lecture 35 - Volume Change Behaviour of Bentonite and Kaolin Clay

Lecture 36 - Demonstration of Various Experiments Related to Unsaturated Soil Mechanics

NPTEL : NOC:Subsurface Exploration: Importance and Techniques Involved (Civil Engineering)

Co-ordinators : Prof. Abhishek Kumar

Lecture 1 - Introduction

Lecture 2 - Phases and classification of subsurface Investigation

Lecture 3 - Test Pits+ Borings

Lecture 4 - Ground water table and rock drilling

Lecture 5 - Standard Penetration Test

Lecture 6 - Cone Penetration Test

Lecture 7 - Dilatometer Test

Lecture 8 - Pressuremeter Test

Lecture 9 - Seismic reflection method

Lecture 10 - Seismic refraction method

Lecture 11 - Electrical Resistivity Survey

Lecture 12 - Magnetic Survey

Lecture 13 - Surface wave method

Lecture 14 - Gravity Survey

Lecture 15 - Offshore Investigation

Lecture 16 - Geophysical Investigation in Offshore Environment

Lecture 17 - Sampling and Geotechnical Investigations in Offshore Environment

Lecture 18 - Important Terminologies in Offshore Environment

Lecture 19 - Dynamic Testing in Pile Driving

Lecture 20 - Dynamic Testing in Pile (Low Strain)

Lecture 21 - Conclusion

NPTEL : NOC:Fluid Mechanics (Civil Engineering)

Co-ordinators : Dr. Subhashisa Dutta

Lecture 1 - Basic Concepts of Fluid

Lecture 2 - Properties of Fluid

Lecture 3 - Properties of Fluid

Lecture 4 - Concepts of Hydrostatic

Lecture 5 - Measurement of Pressure and Hydrostatic forces

Lecture 6 - Buoyancy, Metacentre, Stability and Rigid body motion

Lecture 7 - Reynolds Transport Theorem

Lecture 8 - Conservation of Mass

Lecture 9 - Conservation of Momentum

Lecture 10 - Conservation of Momentum Applications

Lecture 11 - Bernoulliâ€™s Equation

Lecture 12 - Applications of Bernoulliâ€™s Equation

Lecture 13 - Fluid Statics Applications: Example Problems

Lecture 14 - Conservation of Momentum: Example problems

Lecture 15 - Bernoulliâ€™s Equation: Problems Solving on Black Board

Lecture 16 - Lagrangian and Eulerian Descriptions

Lecture 17 - Motion and deformation of fluid elements

Lecture 18 - Problems Solving on Black Board

Lecture 19 - Dimensional Homogeneity

Lecture 20 - Dimensional Analysis and Similarity

Lecture 21 - Laminar and Turbulent Flows

Lecture 22 - Losses in Pipe Fittings

Lecture 23 - Flow in Noncircular Conduits and Multiple Path Pipeflow

Lecture 24 - Mass Conservation Equation - I

Lecture 25 - Mass Conservation Equation - II

Lecture 26 - Stream Function

Lecture 27 - Cauchy's Equation

Lecture 28 - The Navier-Stokes Equation - Part I

Lecture 29 - The Navier-Stokes Equation - Part II

Lecture 30 - The Navier-Stokes Equation - Part III

Lecture 31 - Approximate solutions of Navier Stokes Equation: Bounary Layer Approximation

Lecture 32 - Boundary Layer Approximation - II

Lecture 33 - Boundary Layer Approximation - III

Lecture 34 - Open Channel Flow - I

Lecture 35 - Open Channel Flow - II

Lecture 36 - Open Channel Flow - III

Lecture 37 - Drag and Lift

NPTEL : NOC:Remote Sensing and GIS (Civil Engineering)

Co-ordinators : Prof. Rishikesh Bharti

Lecture 1 - Overview and Introduction

Lecture 2 - Basics of Remote Sensing

Lecture 3 - Error corrections in satellite image

Lecture 4 - Error Identification and Correction - I

Lecture 5 - Error Identification and Correction - II

Lecture 6 - Error Identification and Correction - III

Lecture 7 - DIP - I

Lecture 8 - DIP - II

Lecture 9 - DIP - III

Lecture 10 - DIP - IV

Lecture 11 - Image Classification - I

Lecture 12 - Image Classification - II

Lecture 13 - Photogrammetry

Lecture 14 - Thermal Remote Sensing

Lecture 15 - Microwave Remote Sensing

Lecture 16 - HRS - I

Lecture 17 - HRS - II

Lecture 18 - HRS - III

Lecture 19 - HRS - IV

Lecture 20 - HRS - V

Lecture 21 - GIS - I

Lecture 22 - GIS - II

Lecture 23 - Applications of Remote Sensing and GIS - I

Lecture 24 - Applications of Remote Sensing and GIS - II

NPTEL : NOC:River Engineering (Civil Engineering)

Co-ordinators : Dr. Subhashisa Dutta

Lecture 1 - Introduction to River Engineering

Lecture 2 - Basic properties of sediment - I

Lecture 3 - Basic properties of sediment - II

Lecture 4 - Mass Conservation

Lecture 5 - Linear Momentum Equation

Lecture 6 - Navier-Stokes Equations

Lecture 7 - St. Venant Equation and Solver

Lecture 8 - Specific Energy and Critical Flow

Lecture 9 - Hydraulic Jump and Celerity

Lecture 10 - Floodwave Celerity and Loop Rating Curve

Lecture 11 - Sediment Transport in River - I

Lecture 12 - Sediment Transport in River - II

Lecture 13 - Sediment Transport in River - III

Lecture 14 - Physical River Models

Lecture 15 - Bridge Scour: processes and estimation

Lecture 16 - Bridge Scour-II

Lecture 17 - Jet Scour and River Navigation

Lecture 18 - River Training Work

Lecture 19 - Riverbank Stabilization - I

Lecture 20 - Riverbank Stabilization - II

Lecture 21 - Riverbank Protection and Control Structures

Lecture 22 - River Equilibrium - I

Lecture 23 - River Equilibrium - II

Lecture 24 - River Equilibrium - III

NPTEL : NOC:Municipal Solid Waste Management (Civil Engineering)

Co-ordinators : Prof. Ajay Kalamdhad

Lecture 1 - Introduction to solid waste

Lecture 2 - Functional elements

Lecture 3 - Types and sources of solid waste

Lecture 4 - Sampling and characteristics

Lecture 5 - Estimation of solid waste quantity

Lecture 6 - Factors affecting solid waste generation rate

Lecture 7 - Handling, separation and storage at source

Lecture 8 - Processing at source

Lecture 9 - Primary collection

Lecture 10 - Types of collection system

Lecture 11 - Analysis of collection system - Part I

Lecture 12 - Analysis of collection system - Part II

Lecture 13 - Analysis of collection system - Part III

Lecture 14 - Need and types of transfer station

Lecture 15 - Transport means and methods

Lecture 16 - Unit operation for component separation

Lecture 17 - Material recovery facilities (MRF)

Lecture 18 - Recycling of dry waste components

Lecture 19 - Waste as a fuel

Lecture 20 - Incineration/Combustion

Lecture 21 - Flue gas characteristics and treatment

Lecture 22 - Solid residue generation, characterization and treatment

Lecture 23 - Waste-to-energy (WtE) plants (case studies) pyrolysis and gasification

Lecture 24 - Definition and phases of composting

Lecture 25 - Factors affecting composting process

Lecture 26 - Types of composting - I

Lecture 27 - Types of composting - II

Lecture 28 - Compost quality

Lecture 29 - Vermicomposting

Lecture 30 - Definition, stages and factors affecting anaerobic digestion

Lecture 31 - Pretreatment and co-digestion for enhancement of biogas production

Lecture 32 - Types of biogas digesters

Lecture 33 - Site selection and types of landfill

Lecture 34 - Leachate collection and treatment

Lecture 35 - Landfill gas collection and treatment

Lecture 36 - Design of landfill and Bio-minning of old dumpsite

Lecture 37 - Construction and demolition waste

Lecture 38 - Management of bio-mediacal, e-waste and inert waste

Lecture 39 - Integrated solid waste management (ISWM)

Lecture 40 - Municipal solid waste management rules

Lecture 41 - Financing in MSWM projects

Lecture 42 - Public-Private-Partnership (PPP)

Lecture 43 - Public-Private-Partnership (PPP) in MSWM projects

NPTEL : NOC:Construction Methods and Equipment Management (Civil Engineering)

Co-ordinators : Prof. Indu Siva Ranjani Gandhi

Lecture 1 - Planning process of equipment

Lecture 2 - Estimation of Ownership cost (Average Annual Investment method)

Lecture 3 - Estimation of Ownership cost (Time value method)

Lecture 4 - Operating cost of Equipment

Lecture 5 - Equipment cost estimation

Lecture 6 - Equipment life and replacement analysis - Part 1

Lecture 7 - Equipment life and replacement analysis - Part 2

Lecture 8 - Equipment life and replacement analysis - Part 3

Lecture 9 - Engineering Fundamentals of Moving Earth

Lecture 10 - Bull Dozers

Lecture 11 - Scrapers - Part 1

Lecture 12 - Scrapers - Part 2

Lecture 13 - Front End loaders

Lecture 14 - Excavators

Lecture 15 - Trucks

Lecture 16 - Piles and Pile driving equipment - Part 1

Lecture 17 - Piles and Pile driving equipment - Part 2

Lecture 18 - Cranes - Part 1

Lecture 19 - Cranes - Part 2

Lecture 20 - Concreting Equipment - Part 1

Lecture 21 - Concreting Equipment - Part 2

Lecture 22 - Summary

NPTEL : NOC:Advanced Soil Mechanics (Civil Engineering)

Co-ordinators : Prof. Sreedeep S

Lecture 1 - Introduction to course content

Lecture 2 - Stress acting at a point - Cauchy stress

Lecture 3 - Stress acting at a point - Stress tensor

Lecture 4 - Stress acting on a plane

Lecture 5 - Stress acting on a plane example

Lecture 6 - Transformation of stress tensor

Lecture 7 - Stress invariants

Lecture 8 - Relationship between stress invariants

Lecture 9 - Principle stresses and Eigen vectors

Lecture 10 - Strain in soils

Lecture 11 - Cause effect relationship

Lecture 12 - Important constitutive relationship

Lecture 13 - 3D to 2D idealization

Lecture 14 - Mathematical formulation plane stress plane strain

Lecture 15 - Mathematical formulation axisymmetric

Lecture 16 - Summary of Module 1

Lecture 17 - Basics of shear strength

Lecture 18 - Stress representation

Lecture 19 - Shear strength granular soil - I

Lecture 20 - Shear strength granular soil - II

Lecture 21 - Shear strength cohesive soil

Lecture 22 - Shear strength cohesive soil - Stress strain

Lecture 23 - Pore water pressure and Skemptons equation

Lecture 24 - Overall pore water pressure parameter

Lecture 25 - Pore water pressure - plane strain-effect of sampling

Lecture 26 - Pore water pressure estimation

Lecture 27 - Triaxial test

Lecture 28 - Interpretation triaxial test - UU UCS

Lecture 29 - Interpretation triaxial test - CU

Lecture 30 - Interpretation triaxial test - CD

Lecture 31 - Some additional aspects of shear strength

Lecture 32 - Summary of Module 2

Lecture 33 - Stress path and representation

Lecture 34 - Failure line in stress path

Lecture 35 - Stress path-some common cases - I

Lecture 36 - Stress path-some common cases - II

Lecture 37 - Stress path-triaxial test-drained

Lecture 38 - Stress path-triaxial test-undrained

Lecture 39 - Stress path-additional undrained case

Lecture 40 - Stress path-field cases - I

Lecture 41 - Stress path-field cases - II

Lecture 42 - Stress path problems

Lecture 43 - Summary of Module 3

Lecture 44 - Introduction-critical state soil mechanics

Lecture 45 - Introduction-critical state soil mechanics

Lecture 46 - CSSM-2 D representation

Lecture 47 - Peak state

Lecture 48 - Soil yielding

Lecture 49 - Cam clay

Lecture 50 - Modified Cam clay

Lecture 51 - Prediction of soil behavior from MCCM

Lecture 52 - Prediction of soil behavior from MCCM

Lecture 53 - Strain from MCCM

Lecture 54 - State boundary surface

Lecture 55 - CSSM problems

Lecture 56 - Summary of Module 4

Lecture 57 - Closure of Advanced Soil Mechanics Course

NPTEL : NOC:Plates and Shells (Civil Engineering)

Co-ordinators : Prof. Sudip Talukdar

Lecture 1 - Introduction, classification of plates and some useful relations

Lecture 2 - Theory of thin plate bending

Lecture 3 - Plate equations and boundary conditions with examples

Lecture 4 - Exercises on the plate bending theory

Lecture 5 - Simply supported plate subjected to distributed loading

Lecture 6 - Simply supported plate subjected to concentrated load and couple

Lecture 7 - Simply supported plate resting on elastic foundation and other examples

Lecture 8 - General formulation for rectangular plate with two opposite edges simply supported

Lecture 9 - Levy's solution for different loading and boundary conditions

Lecture 10 - Rectangular plate with Levy's boundary condition subjected to edge moment

Lecture 11 - Transformation of plate equation from rectangular co-ordinates to polar co-ordinates

Lecture 12 - Axi-symmetrical bending of circular plate under pure moment and uniformly distributed load

Lecture 13 - Examples in axisymmetrical bending of solid and annular plate

Lecture 14 - Variational principle in plate problem

Lecture 15 - Applications of Rayleigh-Ritz and Gallerkin's method

Lecture 16 - Finite difference method in plate bending

Lecture 17 - Plate subjected to inplane forces and transverse load

Lecture 18 - Buckling load of rectangular plate plate with Navier's boundary condition

Lecture 19 - Buckling load of rectangular with Levy's boundary condition

Lecture 20 - Rayleigh-Ritz and Gallerkin method in buckling of plate

Lecture 21 - Finite difference method in buckling of plate

Lecture 22 - Introduction to shell structure and behavior of stretched membrane

Lecture 23 - Classification of shell structure

Lecture 24 - Stress resultants and couples in shells

Lecture 25 - Membrane analysis of shells of surface of revolution

Lecture 26 - Analysis of Spherical dome

Lecture 27 - Some examples of axi-symmetrical cases in surface of revolution

Lecture 28 - Membrane theory in pressure vessels

Lecture 29 - Membrane theory in pressure vessel in the form a Torus and in a tank of arbitrary meridian

Lecture 30 - Membrane theory of hyperboloid of revolution: Application to cooling tower

Lecture 31 - Differential Equations of Equilibrium in Cylindrical shell using membrane hypothesis

Lecture 32 - Membrane Analysis of Cylindrical Shell roof subjected to self weight and snow load

Lecture 33 - Circular Cylindrical Shell for Fourier Loading in a membrane state of stress

Lecture 34 - Simplified Bending Theory of Cylindrical Shell-Beam and Arch theories

Lecture 35 - General bending theory of cylindrical shell

Lecture 36 - Some applications of symmetrical bending of circular cylindrical shell

NPTEL : NOC:Optimization methods for Civil engineering (Civil Engineering)

Co-ordinators : Prof. Rajib Kumar Bhattacharjya

Lecture 1 - Introduction to Optimization

Lecture 2 - Classical Optimization

Lecture 3 - Introduction to Linear Problem

Lecture 4 - General system of equations

Lecture 5 - Simplex Method

Lecture 6 - Solution of Linear Problem using Excel Solver

Lecture 7 - Bracketing Method

Lecture 8 - Region Elimination Methods

Lecture 9 - Gradient Based Method and Examples

Lecture 10 - Convex Function

Lecture 11 - Line Search Methods for Multi-Variable Problems

Lecture 12 - Quadratic Approximation Method

Lecture 13 - Constrained Optimization I: Equality constraints

Lecture 14 - Constrained Optimization II: Inequality constraints

Lecture 15 - Constrained Optimization III: Penalty function methods

Lecture 16 - Introduction to Metaheuristic Optimization

Lecture 17 - Genetic Algorithms - Part I

Lecture 18 - Genetic Algorithms - Part II

Lecture 19 - Genetic Algorithms - Part III

Lecture 20 - Real Coded Genetic Algorithms

Lecture 21 - Multi-modal optimization

Lecture 22 - Introductioin to R

Lecture 23 - GA using R (Unconstrained problem)

Lecture 24 - GA using R (Constrained problem)

Lecture 25 - Constraint Handling in GAs

Lecture 26 - Evolution Strategies (ESs)

Lecture 27 - Particle swarm optimization

Lecture 28 - Introductioin to R - Part II

Lecture 29 - Multi-objective Genetic Algorithms

Lecture 30 - Introduction to Differential Evolution

Lecture 31 - Introduction to Matlab

Lecture 32 - Optimization using Matlab (Classical methods)

Lecture 33 - A tutorial on Differential Evolution

Lecture 34 - NSGA II Using R

Lecture 35 - Optimization using MATLAB

Lecture 36 - Optimization using Excel Solver

Lecture 37 - Multi-objective Genetic Algorithms using MATLAB

Lecture 38 - Solution of a Design Problem Using MATLAB

NPTEL : NOC:Engineering Hydrology (Civil Engineering)

Co-ordinators : Prof. Sreeja Pekkat

Lecture 1 - Course Contents

Lecture 2 - Preliminary Concepts

Lecture 3 - Introduction to Reynolds Transport Theorem

Lecture 4 - Derivation of Reynolds Transport Theorem - Part I

Lecture 5 - Derivation of Reynolds Transport Theorem - Part II

Lecture 6 - Conservations Laws

Lecture 7 - Numerical Examples

Lecture 8 - Summary of Module - I

Lecture 9 - Atmospheric Water

Lecture 10 - Water Vapor Dynamics

Lecture 11 - Precipitable Water in the Static Atmospheric Column

Lecture 12 - Numerical Examples on Basic Atmospheric Parameters

Lecture 13 - Precipitation-Types and Formation

Lecture 14 - Terminal Velocity

Lecture 15 - Thunderstorm Cell Model

Lecture 16 - Numerical Examples on Terminal Velocity and Thunderstorm Cell

Lecture 17 - Forms of Precipitation

Lecture 18 - Measurement of rainfall

Lecture 19 - Raingauge Network

Lecture 20 - Presentation of Rainfall Data

Lecture 21 - Analysis of Rainfall Data

Lecture 22 - Average Areal Rainfall

Lecture 23 - Evaporation

Lecture 24 - Evaporation-Energy Balance Method

Lecture 25 - Evaporation-Aerodynamic Method

Lecture 26 - Evaporation-Combined Method

Lecture 27 - Numerical Examples on Evaporation

Lecture 28 - Evaporation-Empirical method

Lecture 29 - Evapotranspiration

Lecture 30 - Evapotranspiration-Numerical Example

Lecture 31 - Summary of Module - II

Lecture 32 - Subsurface Water

Lecture 33 - 1-D Unsteady Unsaturated Flow Equation

Lecture 34 - Infiltration

Lecture 35 - Measurement of Infiltration

Lecture 36 - Estimation of Infiltration-Empirical Equations

Lecture 37 - Numerical examples - Infiltration estimation using empirical equations

Lecture 38 - Estimation of Infiltration-Theoretical Equation

Lecture 39 - Infiltration-Green Ampt Equation

Lecture 40 - Ponding time

Lecture 41 - Numerical Examples on Green Ampt Infiltration Equation

Lecture 42 - Summary of Module - III

Lecture 43 - Surface Water

Lecture 44 - Excess Rainfall and Direct Runoff

Lecture 45 - Numerical Examples on Direct Runoff

Lecture 46 - Overland flow

Lecture 47 - Streamflow Measurement - I

Lecture 48 - Streamflow Measurement - II

Lecture 49 - Representation of Streamflow

Lecture 50 - Numerical Examples on Streamflow Measurement

Lecture 51 - Summary of Module - IV

Lecture 52 - Hydrologic Analysis - Introduction

Lecture 53 - Linear System Theory

Lecture 54 - Hydrograph Analysis-UH

Lecture 55 - Hydrograph Analysis-DRH

Lecture 56 - Numerical examples on UH and DRH

Lecture 57 - S-Hydrograph

Lecture 58 - Unit Hydrograph of Different Duration

Lecture 59 - Numerical examples UH of Different Duration

Lecture 60 - Instantaneous Unit Hydrograph

Lecture 61 - Instantaneous Unit Hydrograph-Nash's Model

Lecture 62 - Numerical Examples on IUH

Lecture 63 - Synthetic Unit Hydrograph

Lecture 64 - SCS-Synthetic Unit Hydrograph

Lecture 65 - Numerical Examples on SUH

Lecture 66 - Hydrograph Routing

Lecture 67 - Reservoir Routing

Lecture 68 - Numerical Example on Reservoir Routing

Lecture 69 - Hydrologic Channel Routing

Lecture 70 - Numerical Examples on Channel Routing

Lecture 71 - Summary of Module - V

Lecture 72 - Hydrologic Statistics-Preliminary Concepts

Lecture 73 - Probability Distribution and Basic Descriptive Statistics

Lecture 74 - Probabiity Distributions

Lecture 75 - Frequency Analysis

Lecture 76 - Exreme Value Analysis

Lecture 77 - Summary of Module - VI

Lecture 78 - Hydrologic Design

Lecture 79 - Numerical examples on probability and risk

Lecture 80 - Design Storm

Lecture 81 - Design Flood

Lecture 82 - Summary of Module - VII

Lecture 83 - Closure of Engineering Hydrology

NPTEL : NOC:Expansive Soil (Civil Engineering)

Co-ordinators : Prof. Anil Kumar Mishra

Lecture 1 - Formation of soil

Lecture 2 - Index properties and classification of soil

Lecture 3 - Engineering properties of soil - I

Lecture 4 - Engineering properties of soil - II

Lecture 5 - Clay mineralogy

Lecture 6 - Properties of clay particles

Lecture 7 - Defination, type and behaviour

Lecture 8 - Mechanism of soil-water interaction

Lecture 9 - Swelling of expansive soil

Lecture 10 - Factors controlling DDL thickness

Lecture 11 - Determination of swelling properties

Lecture 12 - Classification and prediction

Lecture 13 - Factors controlling swelling of soil

Lecture 14 - Shrinkage behaviour of soil

Lecture 15 - Factors controlling shrinkage behavior of soils

Lecture 16 - Measurement of various shrinkage characteristics of soil

Lecture 17 - Cyclic Swelling-Shrinkage Behaviour of Soil

Lecture 18 - Thermo-Mechanical-Hydraulic-Chemical Behaviour - I

Lecture 19 - Thermo-Mechanical-Hydraulic-Chemical Behaviour - II

Lecture 20 - Thermo-Mechanical-Hydraulic-Chemical Behaviour - III

Lecture 21 - Mechanical Methods

Lecture 22 - Hydraulic methods

Lecture 23 - Chemical methods - 1

Lecture 24 - Chemical methods - 2

Lecture 25 - By inclusion or confinement

Lecture 26 - Foundation on expansive soil

Lecture 27 - Use of expansive soil for various geotechnical engineering applications

Lecture 28 - Closure lecture

NPTEL : NOC:Vibration of Continuous Systems (Civil Engineering)

Co-ordinators : Prof. Sudip Talukdar

Lecture 1 - General Introduction and Modelling of Dynamic Systems

Lecture 2 - Time Domain Analysis of Linear System - Harmonic input

Lecture 3 - Time Domain Analysis of Linear System - Arbitrary Input

Lecture 4 - Transformed technique in vibration of linear system

Lecture 5 - Formulation of problem: Equilibrium Approach

Lecture 6 - Formulation of problem by Energy Principle

Lecture 7 - Hamilton's principles for formulating vibration problems

Lecture 8 - Lagrange's equation for formulating vibration problems

Lecture 9 - One Dimensional Wave Equation

Lecture 10 - D-Alembert's Solution of the Wave Equation

Lecture 11 - Transverse Vibration of String

Lecture 12 - Forced Transverse Vibration of String

Lecture 13 - Axial Vibration of Bar

Lecture 14 - Torsional Vibration of Bar

Lecture 15 - Some typical problems in axial and torsional vibrations

Lecture 16 - Transverse vibration of beams

Lecture 17 - Natural frequencies and mode shapes of beams with various end conditions

Lecture 18 - Free damped transverse vibration analysis of beam

Lecture 19 - Forced damped vibration analysis of Euler Bernoulli beam

Lecture 20 - Vibration of beams subjected to moving load

Lecture 21 - Some special topics on the transverse vibration of beam

Lecture 22 - Combination of continuous and lumped parameter system

Lecture 23 - State space solutions in vibration problems

Lecture 24 - Beam with moving oscillator, pulstating force and rolling mass

Lecture 25 - Vibration of membrane

Lecture 26 - Vibration of Circular membrane

Lecture 27 - Vibration of Rectangular plate

Lecture 28 - Free vibration of rectangular plates

Lecture 29 - Forced vibration of rectangular plates

Lecture 30 - Approximate method for vibration analysis

Lecture 31 - Rayleigh-Ritz method for vibration analysis

Lecture 32 - Gallerkin's method and Finite difference method

Lecture 33 - System subjected to support excitation

Lecture 34 - Response of continuous systems to transient excitations

Lecture 35 - Shock spectrum due to half sine pulse

Lecture 36 - Numerical Evaluation of Duhamel Integral

Lecture 37 - Direct Integration Methods

Lecture 38 - Spectral Analysis of structures for earthquake excitation

NPTEL : NOC:Reliability-Based Structural Design (Civil Engineering)

Co-ordinators : Dr. Arunasis Chakarborty

Lecture 1 - Introduction

Lecture 2 - Random Variable

Lecture 3 - Functions of Random Variables

Lecture 4 - Joint Distributions

Lecture 5 - Mt. Gen. Func. and CLT

Lecture 6 - Theory of Estimation

Lecture 7 - Goodness of Fit

Lecture 8 - MVFOSM

Lecture 9 - MVFOSM (Continued...)

Lecture 10 - Hasofer-Lind Rel. Index

Lecture 11 - Rackwitz's Algorithm (Continued...)

Lecture 12 - HL-RF for Non-Normal Problems

Lecture 13 - HL-RF for Correlated Problems

Lecture 14 - FORM using MATLAB

Lecture 15 - FORM using MATLAB (Continued...)

Lecture 16 - FORM Using FEM

Lecture 17 - Morgenstern Model

Lecture 18 - Nataf Model

Lecture 19 - Rosenblatt Transformation

Lecture 20 - Brietung's Model

Lecture 21 - Tvedt's Model

Lecture 22 - Monte-Carlo Simulation

Lecture 23 - Importance Sampling

Lecture 24 - Least Square Curve Fitting

Lecture 25 - Orthogonal Polinomials

Lecture 26 - RSM

Lecture 27 - Stochastic Response Surface Method

Lecture 28 - Moving Least Square Method

Lecture 29 - Adaptive-SRSM

Lecture 30 - Partial Safety Factors

Lecture 31 - Optimal Partial Safety Factors

Lecture 32 - FORM - Revisited

Lecture 33 - Subset Simulation

Lecture 34 - Applications

Lecture 35 - Applications (Continued...)

Lecture 36 - Introduction to Stochastic FEM

NPTEL : NOC:Applied Seismology for Engineers (Civil Engineering)

Co-ordinators : Prof. Abhishek Kumar

Lecture 1 - Plate tectonics and continental drift theory

Lecture 2 - Fault Plane Solution - Part 1

Lecture 3 - Fault Plane Solution - Part 2

Lecture 4 - Fault Plane Solution (Stereonets)

Lecture 5 - Seismic gaps

Lecture 6 - Analogy of active and inactive fault

Lecture 7 - Seismic waves and their use in locating EQ epicentre

Lecture 8 - EQ Intensity, magnitude and wave attenuation

Lecture 9 - Seismic source characterization and seismic activity

Lecture 10 - Earthquake catalogue preparation and seismic activity parameters

Lecture 11 - Ground motion simulation models and GMPEs

Lecture 12 - Deterministic seismic hazard analysis (DSHA)

Lecture 13 - Probabilistic seismic hazard analysis (PSHA)

Lecture 14 - One Dimensional equation of motion: P wave

Lecture 15 - One Dimensional equation of motion: S wave

Lecture 16 - Solution to 1D equation of motion: S wave

Lecture 17 - Local Site Effect (LSE) and Ground Response Analysis - Part I

Lecture 18 - Local Site Effect (LSE) and Ground Response Analysis - Part II

Lecture 19 - Ground Response Analysis - Part III

Lecture 20 - Ground Response Analysis - Part IV

Lecture 21 - State Criteria for Liquefaction - Part 1

Lecture 22 - State Criteria for Liquefaction - Part 2

Lecture 23 - Initiation of Liquefaction

Lecture 24 - Assessment of Liquefaction Potential

Lecture 25 - Paleoliquefaction

Lecture 26 - Seismic Microzonation

Lecture 27 - Landslides: Introduction and classification

Lecture 28 - Seismic vulnerability and risk - Part 1

Lecture 29 - Seismic vulnerability and risk - Part 2

Lecture 30 - Seismic vulnerability and risk - Part 3

NPTEL : NOC:Structural Vibration (Civil Engineering)

Co-ordinators : Prof. Arunasis Chakarborty

Lecture 1 - D'Alembert Principle and Degrees of Freedom

Lecture 2 - Simple Harmonic Motion

Lecture 3 - Examples

Lecture 4 - Undamped Free Vibration

Lecture 5 - Damped free vibration

Lecture 6 - Logarithmic Decrement and Coulomb Damped Free Vibration

Lecture 7 - Structural Damping

Lecture 8 - Damped Forced Vibration

Lecture 9 - Response due to Harmonic Excitation

Lecture 10 - Response due to Harmonic Excitation (Continued...)

Lecture 11 - Examples Set 1

Lecture 12 - Transmissibility and Support Motion Problem

Lecture 13 - Examples Set 2

Lecture 14 - Impulse Response function

Lecture 15 - Duhamel's Integral

Lecture 16 - Response in Frequency Domain

Lecture 17 - Response due to Periodic and Non Periodic Excitations

Lecture 18 - Nigam and Jennings and Central Difference method

Lecture 19 - Wilson Theta and Newmark Method

Lecture 20 - MATLAB Examples

Lecture 21 - Response Spectrum

Lecture 22 - MATLAB Code Generation

Lecture 23 - Generalized SDOF system

Lecture 24 - Rayleigh's Method and Calculus of Variation

Lecture 25 - Hamilton's Principle to Lagrange Equation

Lecture 26 - D'Alembert's Principle to Lagrange Equation

Lecture 27 - Hamilton's Canonical Form

Lecture 28 - Natural Frequencies and Mode shapes of MDOF system

Lecture 29 - Modal Orthogonality and Modal Decomposition

Lecture 30 - Rayleigh Damping Model and Free Vibration

Lecture 31 - Response Analsysis in Time Domain

Lecture 32 - Response Analysis in Frequency Domain

Lecture 33 - Response History Analysis

Lecture 34 - Response Spectrum Analysis

Lecture 35 - Model Reduction Techniques

Lecture 36 - Free Vibration of Beams

Lecture 37 - Forced Vibration of Beams

Lecture 38 - FE Modelling and Modal Analysis of a Building

Lecture 39 - Modal Superposition Analysis of a Building

Lecture 40 - Response Spectrum Analysis of a Building

Lecture 41 - Modal Analysis of a Steel Bridge

NPTEL : Advanced Hydrology (Civil Engineering)

Co-ordinators : Dr. Ashu Jain

Lecture 1

Lecture 2

Lecture 3

Lecture 4

Lecture 5

Lecture 6

Lecture 7

Lecture 8

Lecture 9

Lecture 10

Lecture 11

Lecture 12

Lecture 13

Lecture 14

Lecture 15

Lecture 16

Lecture 17

Lecture 18

Lecture 19

Lecture 20

Lecture 21

Lecture 22

Lecture 23

Lecture 24

Lecture 25

Lecture 26

Lecture 27

Lecture 28

Lecture 29

Lecture 30

Lecture 31

Lecture 32

Lecture 33

Lecture 34

Lecture 35

Lecture 36

Lecture 37

Lecture 38

Lecture 39

Lecture 40

Lecture 41

Lecture 42

Lecture 43

Lecture 44

NPTEL : Concrete Engineering and Technology (Civil Engineering)

Co-ordinators : Dr. Sudhir Misra

Lecture 1 - Introduction and course overview

Lecture 2 - Constituents of concrete - Part 1 of 2

Lecture 3 - Constituents of concrete - Part 2 of 2

Lecture 4 - Admixtures in concrete â€“ mineral and chemical

Lecture 5 - Hydration of cement

Lecture 6 - Basic properties of concrete

Lecture 7 - Proportioning of concrete mixes - Part 1 of 3

Lecture 8 - Proportioning of concrete mixes - Part 2 of 3

Lecture 9 - Proportioning of concrete mixes - Part 3 of 3

Lecture 10 - Pores and porosity in concrete

Lecture 11 - Porosimetry â€“ measuring pores in concrete

Lecture 12 - Principles of quality control in concrete construction

Lecture 13 - Quality control and acceptance criteria for concrete based on compressive strength

Lecture 14 - Fibre reinforced concrete

Lecture 15 - High strength concrete

Lecture 16 - Mass concrete - Part 1 of 2

Lecture 17 - Mass concrete - Part 2 of 2

Lecture 18 - Concreting in cold weather

Lecture 19 - Concreting in hot weather

Lecture 20 - Roller compacted concrete

Lecture 21 - Self-compacting concrete

Lecture 22 - Testing self-compacting concrete

Lecture 23 - Shotcrete and underwater concrete

Lecture 24 - Alkali â€“ aggregate reaction - Part 1 of 2

Lecture 25 - Alkali â€“ aggregate reaction - Part 2 of 2

Lecture 26 - Reinforcement corrosion in concrete

Lecture 27 - Chloride penetration in concrete

Lecture 28 - Using epoxy-coated bars in concrete structures

Lecture 29 - Using FRP as reinforcement in concrete structures - Part 1 of 2

Lecture 30 - Using FRP as reinforcement in concrete structures - Part 2 of 2

Lecture 31 - Grouting and importance of formwork in concrete construction

Lecture 32 - Carbonation and freezing & thawing in concrete structures

Lecture 33 - Using recycled aggregates in concrete construction

Lecture 34 - Basic non-destructive testing for concrete structures

Lecture 35 - Measuring permeability in concrete

Lecture 36 - Some additional topics

Lecture 37 - Considerations in repair of concrete structures - Part 1 of 2

Lecture 38 - Considerations in repair of concrete structures - Part 2 of 2

Lecture 39 - Laboratory demonstration

Lecture 40 - Review of the course

NPTEL : Environmental Air Pollution (Civil Engineering)

Co-ordinators : Prof. Mukesh Sharma

Lecture 1 - Introduction to Atmosphere

Lecture 2 - Air Pollution Systems

Lecture 3 - Air Quality Standards

Lecture 4 - Types and Forms of Air Pollutants

Lecture 5 - Measurement Units and Particulate classification

Lecture 6 - Interpretation and Particle size Distribution

Lecture 7 - Atmospheric formation of Air Pollutants - I

Lecture 8 - Atmospheric formation of Air Pollutants - II

Lecture 9 - Atmospheric formation of Air Pollutants - III

Lecture 10 - Kinetics of Air pollution and combustion processes

Lecture 11 - Internal Combustion Engine and Air Pollution - I

Lecture 12 - Internal Combustion Engine and Air Pollution - II

Lecture 13 - Air Pollution and Health - I

Lecture 14 - Air Pollution and Health - II

Lecture 15 - Emission Inventory

Lecture 16 - Sources of Air Pollution

Lecture 17 - Emission from Fugitive Sources and Sulfuric Acid Production

Lecture 18 - Aluminium Production and Air Pollution - I

Lecture 19 - Aluminium Production and Air Pollution - II

Lecture 20 - Coke Production and Air Pollution

Lecture 21 - Examples for Practice

Lecture 22 - Meteorological Measurements and their interpretation

Lecture 23 - Examples for Practice - Dispersion Modeling

Lecture 24 - Vertical Temperature Profile of Atmosphere

Lecture 25 - Stability, Mixing Height and Plume Behavior - I

Lecture 26 - Stability, Mixing Height and Plume Behavior - II

Lecture 27 - Examples - Solar Radiation Based Stability Calculation

Lecture 28 - Air Quality Modeling - I

Lecture 29 - Air Quality Modeling - II

Lecture 30 - Derivation of Gaussian Model

Lecture 31 - Gaussian Model - Useful Formulation

Lecture 32 - Plume rise, Area and Line Source Model

Lecture 33 - Air Quality Modeling - Maximum Ground Level concentration

Lecture 34 - Examples of Air Quality Modeling

Lecture 35 - Air Pollution Control Devices - I

Lecture 36 - Air Pollution Control Devices - II

Lecture 37 - Source Emission Monitoring

Lecture 38 - Receptor Source Modeling

Lecture 39 - Environmental laws

NPTEL : Surveying (Civil Engineering)

Co-ordinators : Dr. Bharat Lohani

Module 1 - Lecture 1

Module 2 - Lecture 1

Module 2 - Lecture 2

Module 2 - Lecture 3

Module 2 - Lecture 4

Module 2 - Lecture 5

Module 3 - Lecture 1

Module 3 - Lecture 2

Module 3 - Lecture 3

Module 3 - Lecture 4

Module 4 - Lecture 1

Module 4 - Lecture 2

Module 5 - Lecture 1

Module 5 - Lecture 2

Module 5 - Lecture 3

Module 5 - Lecture 4

Module 5 - Lecture 5

Module 5 - Lecture 6

Module 6 - Lecture 1

Module 6 - Lecture 2

Module 6 - Lecture 3

Module 7 - Lecture 1

Module 7 - Lecture 2

Module 7 - Lecture 3

Module 7 - Lecture 4

Module 7 - Lecture 5

Module 8 - Lecture 1

Module 8 - Lecture 2

Module 9 - Lecture 1

Module 9 - Lecture 2

Module 9 - Lecture 3

Module 9 - Lecture 4

Module 9 - Lecture 5

Module 10 - Lecture 1

Module 11 - Lecture 1

Module 11 - Lecture 2

Module 11 - Lecture 3

Module 12 - Lecture 1

Module 12 - Lecture 2

Module 12 - Lecture 3

NPTEL : Water Resources Engineering (Civil Engineering)

Co-ordinators : Dr. Pranab K Mohapatra, Prof. Rajesh Srivastava

Lecture 1

Lecture 2

Lecture 3

Lecture 4

Lecture 5

Lecture 6

Lecture 7

Lecture 8

Lecture 9

Lecture 10

Lecture 11

Lecture 12

Lecture 13

Lecture 14

Lecture 15

Lecture 16

Lecture 17

Lecture 18

Lecture 19

Lecture 20

Lecture 21

Lecture 22

Lecture 23

Lecture 24

Lecture 25 (Lecture Missing)

Lecture 26

Lecture 27

Lecture 28

Lecture 29

NPTEL : Geotechnical Measurements and Explorations (Civil Engineering)

Co-ordinators : Dr. Nihar Ranjan Patra

Lecture 1 - Geotechnical Measurements & Explorations

Lecture 2 - Geotechnical Measurements & Explorations

Lecture 3 - Geotechnical Measurements & Explorations

Lecture 4 - Geotechnical Measurements & Explorations

Lecture 5 - Geotechnical Measurements & Explorations

Lecture 6 - Geotechnical Measurements & Explorations

Lecture 7 - Geotechnical Measurements & Explorations

Lecture 8 - Geotechnical Measurements & Explorations

Lecture 9 - Geotechnical Measurements & Explorations

Lecture 10 - Geotechnical Measurements & Explorations

Lecture 11 - Geotechnical Measurements & Explorations

Lecture 12 - Geotechnical Measurements & Explorations

Lecture 13 - Geotechnical Measurements & Explorations

Lecture 14 - Geotechnical Measurements & Explorations

Lecture 15 - Geotechnical Measurements & Explorations

Lecture 16 - Geotechnical Measurements & Explorations

Lecture 17 - Geotechnical Measurements & Explorations

Lecture 18 - Geotechnical Measurements & Explorations

Lecture 19 - Geotechnical Measurements & Explorations

Lecture 20 - Geotechnical Measurements & Explorations

Lecture 21 - Geotechnical Measurements & Explorations

Lecture 22 - Geotechnical Measurements & Explorations

Lecture 23 - Geotechnical Measurements & Explorations

Lecture 24 - Geotechnical Measurements & Explorations

Lecture 25 - Geotechnical Measurements & Explorations

Lecture 26 - Geotechnical Measurements & Explorations

Lecture 27 - Geotechnical Measurements & Explorations

Lecture 28 - Geotechnical Measurements & Explorations

Lecture 29 - Geotechnical Measurements & Explorations

Lecture 30 - Geotechnical Measurements & Explorations

Lecture 31 - Geotechnical Measurements & Explorations

Lecture 32 - Geotechnical Measurements & Explorations

Lecture 33 - Geotechnical Measurements & Explorations

Lecture 34 - Geotechnical Measurements & Explorations

Lecture 35 - Geotechnical Measurements & Explorations

Lecture 36 - Geotechnical Measurements & Explorations

Lecture 37 - Geotechnical Measurements & Explorations

Lecture 38 - Geotechnical Measurements & Explorations

Lecture 39 - Geotechnical Measurements & Explorations

Lecture 40 - Geotechnical Measurements & Explorations

NPTEL : Application of Soil Mechanics (Civil Engineering)

Co-ordinators : Dr. Nihar Ranjan Patra

Lecture 1 - Application of Soil Mechanics

Lecture 2 - Application of Soil Mechanics

Lecture 3 - Application of Soil Mechanics

Lecture 4 - Application of Soil Mechanics

Lecture 5 - Application of Soil Mechanics

Lecture 6 - Application of Soil Mechanics

Lecture 7 - Application of Soil Mechanics

Lecture 8 - Application of Soil Mechanics

Lecture 9 - Application of Soil Mechanics

Lecture 10 - Application of Soil Mechanics

Lecture 11 - Application of Soil Mechanics

Lecture 12 - Application of Soil Mechanics

Lecture 13 - Application of Soil Mechanics

Lecture 14 - Application of Soil Mechanics

Lecture 15 - Application of Soil Mechanics

Lecture 16 - Application of Soil Mechanics

Lecture 17 - Application of Soil Mechanics

Lecture 18 - Application of Soil Mechanics

Lecture 19 - Application of Soil Mechanics

Lecture 20 - Application of Soil Mechanics

Lecture 21 - Application of Soil Mechanics

Lecture 22 - Application of Soil Mechanics

Lecture 23 - Application of Soil Mechanics

Lecture 24 - Application of Soil Mechanics

Lecture 25 - Application of Soil Mechanics

Lecture 26 - Application of Soil Mechanics

Lecture 27 - Application of Soil Mechanics

Lecture 28 - Application of Soil Mechanics

Lecture 29 - Application of Soil Mechanics

Lecture 30 - Application of Soil Mechanics

Lecture 31 - Application of Soil Mechanics

Lecture 32 - Application of Soil Mechanics

Lecture 33 - Application of Soil Mechanics

Lecture 34 - Application of Soil Mechanics

Lecture 35 - Application of Soil Mechanics

Lecture 36 - Application of Soil Mechanics

Lecture 37 - Application of Soil Mechanics

Lecture 38 - Application of Soil Mechanics

Lecture 39 - Application of Soil Mechanics

Lecture 40 - Application of Soil Mechanics

NPTEL : NOC:Geology and Soil Mechanics (Civil Engineering)

Co-ordinators : Dr. Priyanka Ghosh

Lecture 1 - Description of soil, Engineering Geology Of Soils and Thier Formation

Lecture 2 - Index Properties Of Soil

Lecture 3 - Index Properties Of Soil - A

Lecture 4 - Index Properties Of Soil - B

Lecture 5 - Index Properties Of Soil - C

Lecture 6 - Index Properties Of soil - D

Lecture 7 - Classification Of Soils - A

Lecture 8 - Classification Of Soils - B

Lecture 9 - Classification Of Soils And Clay Mineralogy - A

Lecture 10 - Classification Of Soils And Clay Mineralogy - B

Lecture 11 - Soil compaction - A

Lecture 12 - Soil compaction - B

Lecture 13 - Soil compaction - C

Lecture 14 - Soil compaction - D

Lecture 15 - Soil compaction and Permeability

Lecture 16 - Permeability - A

Lecture 17 - Permeability - B

Lecture 18 - Permeability - C

Lecture 19 - Problems on permeability

Lecture 20 - Seepage

Lecture 21 - Seepage - A

Lecture 22 - Seepage - B

Lecture 23 - Seepage and In situ stress

Lecture 24 - In situ stresses - A

Lecture 25 - In situ stresses - B

Lecture 26 - In situ stresses - A

Lecture 27 - In situ stresses - B

Lecture 28 - In situ stresses - C

Lecture 29 - Consolidation - A

Lecture 30 - Consolidation - B

Lecture 31 - Consolidation - A

Lecture 32 - Consolidation - B

Lecture 33 - Consolidation - C

Lecture 34 - Consolidation - D

Lecture 35 - Consolidation - E

Lecture 36 - Consolidation - F

Lecture 37 - Shear strength of Soil - A

Lecture 38 - Shear strength of Soil - B

Lecture 39 - Shear strength of Soil - C

Lecture 40 - Shear Strength of Soils

Lecture 41 - Shear Strength of Soils.

Lecture 42 - Shear Strength of Soils..

Lecture 43 - Shear strength of Soil

Lecture 44 - Shear strength of Soil- e

Lecture 45 - Shear strength of Soil_B

Lecture 46 - Problem on shear strength of soil

Lecture 47 - Problem on shear strength of soil -a

Lecture 48 - Problem on shear strength of soil -a

Lecture 49 - Earth Pressure on retaining wall

Lecture 50 - Earth Pressure on retaining wall -A

Lecture 51 - Tutorial on Index properties of soil

Lecture 52 - Tutorial on compaction

Lecture 53 - Tutorial on Permeability - a

Lecture 54 - Tutorial on Permeability - b

Lecture 55 - Tutorial On Consoildation

Lecture 56 - Tutorial on consoildation - a

Lecture 57 - Tutorial on Sheer Strength

Lecture 58 - Tutorial on Sheer Strength - a

Lecture 59 - Earth Pressure on Retaining Wall - a

Lecture 60 - Earth Pressure on Retaining Wall - 1

Lecture 61 - Earth Pressure Theories and Problems on Earth Pressure on Retaining Wall

Lecture 62 - Problems on Earth Pressure on Retaining Wall Edit Lesson

Lecture 63 - Problems on Earth Pressure on Retaining Wall - 2

Lecture 64 - Problems on Earth Pressure Theories - 3

Lecture 65 - Problems on Earth Pressure Theories - 4

NPTEL : NOC:Engineering Graphics (Civil Engineering)

Co-ordinators : Dr. Nihar Ranjan Patra

Lecture 1 - Course Objectives, Lettering and Numbering

Lecture 2 - Geometric Constructions - Part I

Lecture 3 - Geometric Constructions - Part II

Lecture 4 - Orthographic Projections - Part I

Lecture 5 - Orthographic Projections - Part II

Lecture 6 - Orthographic Projections - Part III

Lecture 7 - Orthographic Projections - Part IV

Lecture 8 - Orthographic Projections - Part V

Lecture 9 - Isometric Projections - Part I

Lecture 10 - Isometric Projections - Part II

Lecture 11 - Isometric Projections - Part III

Lecture 12 - Isometric Projections - Part IV

Lecture 13 - Isometric Projections - Part V and Oblique Projections - Part I

Lecture 14 - Oblique Projections - Part II

Lecture 15 - Sectioning

Lecture 16 - Hatching

Lecture 17 - Orthographic Projections - Assemblies

Lecture 18 - Missing Lines and Missing Views

Lecture 19 - Perspective View - Part I

Lecture 20 - Perspective View - Part II

Lecture 21 - Perspective View - Part III

Lecture 22 - Angular Perspective and Circles in perspective

Lecture 23 - Perspective View examples and Space Geometry

Lecture 24 - Space Geometry (Continued...)

Lecture 25 - True Length, Point View and Slope of Oblique lines

Lecture 26 - Space Geometry - Introduction

Lecture 27 - Space Geometry - Part 2

Lecture 28 - Auxiliary View, Lines, Planes

Lecture 29 - Relationship between Lines and Planes, Planes and Planes

Lecture 30 - Intersection of Solids

Lecture 31 - AUTOCAD

Lecture 32 - Development of Surfaces

NPTEL : NOC:Earth Sciences for Civil Engineering (Civil Engineering)

Co-ordinators : Prof. Javed N. Malik

Lecture 1 - Introduction to Geosciences in Civil Engineering - Part 1

Lecture 2 - Introduction to Geosciences in Civil Engineering - Part 2

Lecture 3 - Plate Tectonics and Continental Drift - Part 2

Lecture 4 - Plate Tectonics and Continental Drift - Part 3

Lecture 5 - Plate Tectonics and Continental Drift - Part 4

Lecture 6 - Rock Forming Minerals and their Properties - Part 1

Lecture 7 - Rock types and their Properties - Part 1

Lecture 8 - Rock types and their Properties - Part 2

Lecture 9 - Rock types and their Properties - Part 3

Lecture 10 - Rock types and their Properties - Part 4

Lecture 11 - Rock types and their properties - Part 5

Lecture 12 - Rock types and their properties - Part 6

Lecture 13 - Rock types and their properties - Part-6 Seismology and the internal structure of the earth - Part 1

Lecture 14 - Seismology and the internal structure of the earth - Part 2

Lecture 15 - Seismology and the internal structure of the earth - Part 3 Edit Lesson

Lecture 16 - Seismology and the internal structure of the earth - Part 4

Lecture 17 - Seismology and the internal structure of the earth - Part 5 and Geological Structures - Part 1

Lecture 18 - Geological Structures - Part 2

Lecture 19 - Geological Structures - Part 3

Lecture 20 - Geological Structures - Part 4

NPTEL : NOC:Earth Sciences for Civil Engineering - Part 2 (Civil Engineering)

Co-ordinators : Prof. Javed N. Malik

Lecture 1 - Introduction to Geological Hazards and Enviromental Impact - Part 1

Lecture 2 - Introduction to Geological Hazards and Enviromental Impact - Part 2

Lecture 3 - Introduction to Geological Hazards and Enviromental Impact - Part 3

Lecture 4 - Active Faults and its Related Hazards in India - Part 1

Lecture 5 - Active Faults and its Related Hazards in India - Part 2

Lecture 6 - Active faults and its related hazards in India - Part 3

Lecture 7 - Active faults and its related hazards in India - Part 4

Lecture 8 - Active faults its related hazards in India - Part 5

Lecture 9 - Active faults its related hazards in India - Part 6

Lecture 10 - Active faults its related hazards in India - Part 7 and Civil Engineering applications - geological considerations in dams, tunnels - Part 1

Lecture 11 - Civil Engineering applications Â– geological considerations in dams, tunnels - Part 2

Lecture 12 - Civil Engineering applications Â– geological considerations in dams, tunnels - Part 3 and Tsunami and related hazard - Part 1

Lecture 13 - Tsunami and related hazard - Part 2

Lecture 14 - Tsunami and related hazard - Part 3

Lecture 15 - Landslide and subsidence - Part 1

Lecture 16 - Landslide and subsidence - Part 2

Lecture 17 - Landslide and subsidence - Part 3

Lecture 18 - Flood and related hazard - Part 1

Lecture 19 - Flood and related hazard - Part 2

Lecture 20 - Groundwater

NPTEL : NOC:Hydration, Porosity and Strength of Cementitious Materials (Civil Engineering)

Co-ordinators : Dr. Satyaki Roy, Dr. Sudhir Misra

Lecture 1 - Lecture 1 - Introduction to the course

Lecture 2 - Lecture 2 - Concrete - A Three Phase System

Lecture 3 - Lecture 3 - Basic Properties of Concrete

Lecture 4 - Lecture 4 - Portland Cement

Lecture 5 - Lecture 5 - Portland Cement (Continued...)

Lecture 6 - Lecture 6 - Introduction (Aggregates) - 1

Lecture 7 - Lecture 7 - Introduction (Aggregates) - 2

Lecture 8 - Lecture 8 - Introduction (Aggregates) - 3

Lecture 9 - Lecture 9 - Introduction (Concrete Mixture Proportioning Strategies)

Lecture 10 - Lecture 10 - Introduction (Chemical Admixtures)

Lecture 11 - Lecture-11 - Portland Cement Based Paste Systems - I

Lecture 12 - Lecture 12 - Portland Cement Based Paste Systems - II

Lecture 13 - Lecture 13 - Portland Cement Based Paste Systems - III

Lecture 14 - Lecture 14 - Portland Cement Paste Based Systems - IV

Lecture 15 - Lecture 15 - Portland Cement Based Paste Systems - V

Lecture 16 - Lecture 16 - 18 Part 1 - Portland Cement Based Paste Systems - VI

Lecture 17 - Lecture 16 - 18 Part 2 - Portland Cement Based Paste Systems - VII

Lecture 18 - Lecture 19 - Heat of hydration of Portland Cement

Lecture 19 - Lecture 20 - Mass Concrete

Lecture 20 - Lecture 21-22 - Mineral Admixtures - 1

Lecture 21 - Lecture 23-24 - Mineral Admixtures - 2

Lecture 22 - Lecture 25-27 - Mineral Admixtures - 3

Lecture 23 - Lecture 28-30 - Mineral Admixtures - 4

Lecture 24 - Lecture 31 - From paste to concrete

Lecture 25 - Lecture 32 - Demonstration

Lecture 26 - Lecture 33 - Pores and porosity - A revisit

Lecture 27 - Lecture 34 - Measuring permeability of concrete

Lecture 28 - Lecture 35 - Behavior under load

Lecture 29 - Lecture 36 - Curing of concrete

Lecture 30 - Lecture 37 - Stress strain behaviour

Lecture 31 - Lecture 38 - Durability of concrete - I

Lecture 32 - Lecture 39 - Durability of concrete - II - Specifications

NPTEL : NOC:Mechanics of Solids (Civil Engineering)

Co-ordinators : Dr. Priyanka Ghosh

Lecture 1 - Course Handout

Lecture 2 - Analysis of Mechanical System

Lecture 3 - Conditions of equilibrium in 2D and 3D

Lecture 4 - FBD with examples on modelling of typical supports and joints

Lecture 5 - Support Conditions

Lecture 6 - FBD of Frame Structures

Lecture 7 - Stability of Truss

Lecture 8 - Solutions of Plane Truss

Lecture 9 - Method of Sections

Lecture 10 - Friction 2

Lecture 11 - Tutorial on Truss

Lecture 12 - Tutorial on Friction

Lecture 13 - Force Displacement Relationship

Lecture 14 - Hoop Stresses

Lecture 15 - Mechanism of belt around wheel

Lecture 16 - Tutorial on Force Displacement Relationship and Geometric Compatibility - 1

Lecture 17 - Tutorial on Force Displacement Relationship and Geometric Compatibility - 2

Lecture 18 - Tutorial on Force Displacement Relationship and Geometric Compatibility - 3

Lecture 19 - Concept of Stress

Lecture 20 - Plane Stress

Lecture 21 - State of Stresses

Lecture 22 - Mohrs Circle representation of plane stress

Lecture 23 - Construction of Mohrs Circle

Lecture 24 - Principal Stresses and Introduction to Concept of Strain

Lecture 25 - Normal Strain and Shear Strain

Lecture 26 - Strain Transformation

Lecture 27 - Strain Measurement

Lecture 28 - Tutorial

Lecture 29 - Tutorial on Concept of Strain.

Lecture 30 - Elastic Stress Strain Relationship

Lecture 31 - Von Mises Yield Criteria

Lecture 32 - Tresca Criteria

Lecture 33 - True Stress Strain

Lecture 34 - Tutorial 2

Lecture 35 - Forces and Moments Transmitted by Slender Members

Lecture 36 - Bending Moment

Lecture 37 - Shear Force and Bending Moment Diagrams

Lecture 38 - Differential Equation Relationship

Lecture 39 - Tutorial 3

Lecture 40 - Tutorial 4

Lecture 41 - Torsion

Lecture 42 - Stress Components

Lecture 43 - Tutorial A

Lecture 44 - Tutorial B

Lecture 45 - Stresses due to Bending

Lecture 46 - Equilibrium Requirements

Lecture 47 - Beam Transmitting both Shear Force and Bending Moment

Lecture 48 - Shear Stress Distribution

Lecture 49 - Distribution of Shear Stress in I Beam

Lecture 50 - Tutorial 1

Lecture 51 - Deflections due to Bending

Lecture 52 - Integration of Moment Curvature Relation

Lecture 53 - Superposition Continued

Lecture 54 - Load Deflection Differential Equation

Lecture 55 - Castiglianoâ€™s Theorem

Lecture 56 - Strain Energy Methods

Lecture 57 - Introduction to Concept of Elastic Instability

Lecture 58 - Critical Load

Lecture 59 - Critical Load for Flexible Columns

Lecture 60 - Concluding Lecture

NPTEL : NOC:Principles of Construction Management (Civil Engineering)

Co-ordinators : Dr. Sudhir Misra

Lecture 1 - Introduction to the course

Lecture 2 - Interdisciplinary nature of modern construction projects

Lecture 3 - Overview of steps in execution of a project

Lecture 4 - Illustrative examples for evaluation of bids based on different schemes

Lecture 5 - Resource management in construction projects

Lecture 6 - Estimating quantities

Lecture 7 - Description of items

Lecture 8 - Estimation of project cost

Lecture 9 - Discussion on the case study of boundary wall

Lecture 10 - Running account bills

Lecture 11 - Economic decision making in construction projects

Lecture 12 - Depreciation of construction equipment

Lecture 13 - Repayment of a loan

Lecture 14 - Introduction to planning and scheduling

Lecture 15 - Introduction to planning and scheduling (Continued...)

Lecture 16 - Project scheduling

Lecture 17 - Uncertainties in duration of activities -Using PERT in scheduling

Lecture 18 - Project monitoring and control systems

Lecture 19 - Resource leveling and allocation

Lecture 20 - Crashing of networks

Lecture 21 - Introduction to construction safety

Lecture 22 - Accidents in construction industry - I

Lecture 23 - Accidents in construction industry - II

Lecture 24 - Personal protective equipment

Lecture 25 - Implications of construction accidents

Lecture 26 - Safety organization and safety officer

Lecture 27 - Quality control in construction

Lecture 28 - Quality in construction - welding

Lecture 29 - Epoxy coated bars

Lecture 30 - Quality control of grouts in ducts of post-tensioned PC members

Lecture 31 - Quality control (QC) issues in concrete

Lecture 32 - Legal issues in Construction Management - An Introduction

Lecture 33 - Essentials of a Good Contract

Lecture 34 - Dispute Resolution in Construction Projects

Lecture 35 - Types of Construction Contracts - Definitions

Lecture 36 - Closing the Discussion on Legal Aspects

Lecture 37 - Quality Control - Concrete Sewer Pipeline

NPTEL : NOC:Foundation Design (Civil Engineering)

Co-ordinators : Dr. Nihar Ranjan Patra

Lecture 1 - (1A) Subsoil Investigation or Site Investigation - Part 1

Lecture 2 - (1B) Subsoil Investigation or Site Investigation - Part 2

Lecture 3 - (2A) Subsoil Investigation or Site Investigation - Part 3

Lecture 4 - (2B) Subsoil Investigation or Site Investigation - Part 4

Lecture 5 - (3A) Subsoil Investigation or Site Investigation - Part 5

Lecture 6 - (3B) Subsoil Investigation or Site Investigation - Part 6

Lecture 7 - (4A) Subsoil Investigation or Site Investigation - Part 7

Lecture 8 - (4B) Foundations

Lecture 9 - (5A) Bearing Capacity Of Shallow Foundations - Part 1

Lecture 10 - (5B) Bearing Capacity Of Shallow Foundations - Part 2

Lecture 11 - (6A) Bearing Capacity Of Shallow Foundations - Part 3

Lecture 12 - (6B) Bearing Capacity Of Shallow Foundations - Part 4

Lecture 13 - (7A) Bearing Capacity Of Shallow Foundations - Part 5

Lecture 14 - (7B) Bearing Capacity Of Shallow Foundations - Part 6

Lecture 15 - (8A) Settlement Analysis - Part 1

Lecture 16 - (8B) Settlement Analysis - Part 2

Lecture 17 - (9A) Settlement Analysis - Part 3

Lecture 18 - (9B) Stress distribution in soils - Part 1

Lecture 19 - (10A) Stress distribution in soils - Part 2

Lecture 20 - (10B) Stress distribution in soils - Part 3

Lecture 21 - (11A) Stress distribution in soils - Part 4

Lecture 22 - (11B) Stress distribution in soils - Part 5

Lecture 23 - (12A) Examples based on bearing capacity and settlement

Lecture 24 - (12B) Design of foundation - Part 1

Lecture 25 - (13A) Design of Foundation - Part 2

Lecture 26 - (13B) Design of Foundation - Part 3

Lecture 27 - (14A) Design of Foundation - Part 4

Lecture 28 - (14B) Design of Foundation - Part 5

Lecture 29 - (15A) Types of foundations (Combined Footing)

Lecture 30 - (15B) Design of Raft Foundation

Lecture 31 - (16A) Earth Pressure Theories - Part 1

Lecture 32 - (16B) Earth Pressure Theories - Part 2

Lecture 33 - (17A) Earth Pressure Theories - Part 3

Lecture 34 - (17B) Earth Pressure Theories - Part 4

Lecture 35 - (18A) Earth Pressure Theories - Part 5

Lecture 36 - (18B) Deep Foundation - Part 1

Lecture 37 - (18C) Deep Foundation - Part 2

Lecture 38 - (18D) Deep Foundation - Part 3

Lecture 39 - (20A) Deep Foundation - Part 4

Lecture 40 - (20B) Deep Foundation - Part 5

NPTEL : NOC:Photogeology In Terrain Evaluation (Civil Engineering)

Co-ordinators : Prof. Javed N. Malik

Lecture 1 - Introduction to Remote Sensing - Photogeology

Lecture 2 - Introduction to Remote Sensing - Photogeology

Lecture 3 - Fundamental Principle in Remote Sensing

Lecture 4 - Aerial Photography

Lecture 5 - Stereo-photos and their Importance

Lecture 6 - Photo-interpretation Techniques

Lecture 7 - Photogrammetry and its Significance

Lecture 8 - Sensors, Cameras and Panchromatic Data

Lecture 9 - Stereoscopy and Methods

Lecture 10 - Relief Displacement on Aerial Photographs

Lecture 11 - Fluvial Processes and Landforms

Lecture 12 - Geomorphology of River Channels

Lecture 13 - Drainage Basins and their Features

Lecture 14 - Morphometric Parameters of Fluvial Channels

Lecture 15 - Drainage Patterns and their Morphology

Lecture 16 - Determination of Flightline (Lab)

Lecture 17 - Determination of Flightline (Lab)

Lecture 18 - Exercise on Relief Displacement

Lecture 19 - Exercise on Stereoscopic Parallax

Lecture 20 - Exercise on Stereoscopic Parallax

Lecture 21 - Generation of Digital Elevation Model and Anaglyph

NPTEL : NOC:Photogeology In Terrain Evaluation - Part 2 (Civil Engineering)

Co-ordinators : Prof. Javed N. Malik

Lecture 1 - Introduction to Geological Structures, Photo interpretation and Terrain evaluation

Lecture 2 - Photo interpretation/identification of Landforms associated with Folds - 1

Lecture 3 - Photo interpretation/identification of Landforms associated with Folds - 2

Lecture 4 - Identification of features related to ongoing Crustal Deformation and Mountain Building process

Lecture 5 - Identification of Fault Topography

Lecture 6 - Photogeology:Interpretations of Tectonic Landforms

Lecture 7 - Photo Interpretations: Demarcation of Faults and related Landforms - 1

Lecture 8 - Photo Interpretations

Lecture 9 - Photo Interpretations

Lecture 10 - Photo-Interpretations: Lithology and Geomorphic Mapping

Lecture 11 - Photo Interpretations: Lithology of Sedimentary and Intrusive Igneous Rocks

Lecture 12 - Photo Interpretations: Lithology of Metamorphic and Extrusive Igneous Rocks

Lecture 13 - Photo Interpretations: Coastal and Fluvial Landforms - 1

Lecture 14 - Photo Interpretations: Coastal and Fluvial Landforms - 2

Lecture 15 - Photo Interpretations: Aeolian Landforms and their Surface Expressions

Lecture 16 - Exercise on Identification of Geological Structures and related Landforms

Lecture 17 - Exercise on Identification of Geomorphic Features related to Various Environments

Lecture 18 - Exercise on Identification of Tectonic Features and Geomorphic Mapping using Satellite Data

Lecture 19 - Exercise on Identification of Geological Structures and Geomorphic Landforms on Aerial/Satellite Photos

Lecture 20 - Exercise on Morphometric Parameters and 3D observation of the Earth Surface Features

NPTEL : NOC:Introduction to Accounting and Finance for Civil Engineers (Civil Engineering)

Co-ordinators : Dr. Sudhir Misra

Lecture 1 - Overview of the Course

Lecture 2 - Introduction

Lecture 3 - General Discussion on Construction Projects

Lecture 4 - Time value of money

Lecture 5 - Economic Decision Making - I

Lecture 6 - Economic decision making - II

Lecture 7 - Incremental Rate of Return (IROR)

Lecture 8 - Benefit cost ratio

Lecture 9 - Sensitivity analysis - Part 1

Lecture 10 - Sensitivity analysis - Part 2

Lecture 11 - Break-even analysis - Part 1

Lecture 12 - Break-even analysis - Part 2

Lecture 13 - Depreciation of construction equipment

Lecture 14 - Effect of depreciation on cash flows

Lecture 15 - Effect of depreciation and inflation on economic decision making

Lecture 16 - Replacement analysis

Lecture 17 - Risk analysis - Part 1

Lecture 18 - Risk analysis - Part 2

Lecture 19 - Risk analysis - Part 3

Lecture 20 - Simulation - Part 1

Lecture 21 - Simulation - Part 2

Lecture 22 - Bidding - Part 1

Lecture 23 - Bidding - Part 2

Lecture 24 - Bidding - Part 3

Lecture 25 - Bidding - Part 4

Lecture 26 - Bidding - Part 5

Lecture 27 - Bidding - Part 6

Lecture 28 - Bidding - Part 7

Lecture 29 - Introduction to accounting - Part 1

Lecture 30 - Introduction to accounting - Part 2

Lecture 31 - Introduction to accounting - Part 3

Lecture 32 - Revenue recognition

Lecture 33 - Construction Contract Status Reports

Lecture 34 - Assets and Liabilities

Lecture 35 - Accounting statements - case study

Lecture 36 - Working capital

Lecture 37 - Financing resources for working capital

Lecture 38 - Ratio analysis

NPTEL : NOC:Natural Hazards - Part 1 (Civil Engineering)

Co-ordinators : Prof. Javed N. Malik

Lecture 1 - Introduction to Natural Hazards

Lecture 2 - Introduction to Natural Hazards (Types of Hazard)

Lecture 3 - Introduction to Natural Hazards (Earth as a system)

Lecture 4 - Introduction to Natural Hazards (Cyclones and Earthquakes - Part I)

Lecture 5 - Introduction to Natural Hazards (Cyclones and Earthquakes - Part II)

Lecture 6 - Introduction to Natural Hazards (Disaster Management)

Lecture 7 - Introduction to Natural Hazards (Seismic Zonation of India and Landslide)

Lecture 8 - Introduction to Natural Hazards (Flood and Tsunami)

Lecture 9 - Introduction to Natural Hazards (Disaster Prediction and Warning)

Lecture 10 - Introduction to Natural Hazards (Recent Natural Calamities in India and Worldwide)

Lecture 11 - Plate tectonics and related hazards - Part I

Lecture 12 - Plate tectonics and related hazards - Part II

Lecture 13 - Plate tectonics and related hazards - Part III

Lecture 14 - Active fault and Paleoseismology

Lecture 15 - Case study on 2015 Gorkha Earthquake

Lecture 16 - Earthquake and related hazard - Part I

Lecture 17 - Earthquake and related hazard - Part II

Lecture 18 - Earthquake and related hazard - Part III

Lecture 19 - Ground Effects and Evaluation of Earthquake Hazards - Part I

Lecture 20 - Ground Effects and Evaluation of Earthquake Hazards - Part II

Lecture 21 - Ground Effects and Evaluation of Earthquake Hazards - Part III

Lecture 22 - Liquefaction and Related Geological Features

Lecture 23 - Motoring Seismic Activity - Part I

Lecture 24 - Motoring Seismic Activity - Part II

Lecture 25 - Volcano and Related Hazard - Part I

Lecture 26 - Volcano and Related Hazard - Part II

Lecture 27 - Introduction to Landslides

Lecture 28 - Types of Landslide and Related Hazards

Lecture 29 - Civil Engineering applications geological considerations in dams, tunnels - Part 2

Lecture 30 - Civil Engineering applications geological considerations in dams, tunnels - Part 3 and Tsunami and related hazard - Part 1

Lecture 31 - Tsunami and related hazard - Part 2

Lecture 32 - Tsunami and related hazard - Part 3

Lecture 33 - Landslide and subsidence - Part I

Lecture 34 - Flood and Related Hazards - Part I

Lecture 35 - Flood and Related Hazards - Part II

Lecture 36 - Flood and Related Hazards - Part III

Lecture 37 - Flood and Related Hazards - Part IV

Lecture 38 - Flood and Related Hazards - Part V

Lecture 39 - Introduction to Tsunami

Lecture 40 - Tsunami and Related Hazards - Part I

Lecture 41 - Tsunami and Related Hazards - Part II

Lecture 42 - Tsunami and Related Hazards - Part III

Lecture 43 - Tsunami Modelling

NPTEL : NOC:Structural Dynamics for Civil Engineers - SDOF Systems (Civil Engineering)

Co-ordinators : Prof. Riya Catherine George

Lecture 1 - Introduction to Structural Dynamics

Lecture 2 - Modelling of Dynamic System

Lecture 3 - Undamped Free vibration

Lecture 4 - Damped Free Vibrations

Lecture 5 - Coulomb Damped Free Vibrations

Lecture 6 - Forced Vibrations - Part 1

Lecture 7 - Forced Vibrations - Part 2

Lecture 8 - Examples

Lecture 9 - Harmonic Vibration Examples

Lecture 10 - Vibrations under Periodic Forces

Lecture 11 - Energy and Damping

Lecture 12 - Response to Arbitrary excitations

Lecture 13 - Response to Pulse Excitations

NPTEL : NOC:Geomorphic Processes: Landforms and Landscapes (Civil Engineering)

Co-ordinators : Prof. Javed N. Malik

Lecture 1 - Introduction to Geomorphic processes- Landforms and Landscapes - Part I

Lecture 2 - Introduction to Geomorphic Processes- Landforms and Landscapes - Part II

Lecture 3 - Introduction to Geomorphic Processes- Landforms and Landscapes - Part III

Lecture 4 - Earth Energy Budget - Part I

Lecture 5 - Earth Energy Budget - Part II

Lecture 6 - Earth and Environment

Lecture 7 - Surface and Ground Water System and Management - Part I

Lecture 8 - Surface and Ground Water System and Management - Part II

Lecture 9 - Surface and Ground Water System and Management - Part III

Lecture 10 - Interior of the Earth and Plate Tectonics - Part I

Lecture 11 - Interior of the Earth and Plate Tectonics - Part II

Lecture 12 - Interior of the Earth and Plate Tectonics - Part III

Lecture 13 - Interior of the Earth and Plate Tectonics - Part IV

Lecture 14 - Interior of the Earth and Plate Tectonics - Part V

Lecture 15 - Fluvial Processes and Related Landforms - Part I

Lecture 16 - Fluvial Processes and Related Landforms - Part II

Lecture 17 - Fluvial Processes and Related Landforms - Part III

Lecture 18 - Fluvial Processes and Related Landforms - Part IV

Lecture 19 - Fluvial Processes and Related Landforms - Part V

Lecture 20 - Fluvial Processes and Related Landforms - Part VI

Lecture 21 - Fluvial Processes and Related Landforms - Part VII

Lecture 22 - Fluvial Processes and Related Landforms - Part VIII

Lecture 23 - Fluvial Processes and Related Landforms - Part IX

Lecture 24 - Tectonic Geomorphology - Part I

Lecture 25 - Tectonic Geomorphology - Part II

Lecture 26 - Tectonic Geomorphology - Part III

Lecture 27 - Tectonic Geomorphology - Part IV

Lecture 28 - Tectonic Geomorphology - Part V

Lecture 29 - Glacial Landforms - Part I

Lecture 30 - Glacial Landforms - Part II

Lecture 31 - Glacial Landforms - Part III

Lecture 32 - Coastal Processes and Landforms - Part I

Lecture 33 - Coastal Processes and Landforms - Part II

Lecture 34 - Coastal Processes and Landforms - Part III

Lecture 35 - Aeolian Processes and Landforms - Part I

Lecture 36 - Aeolian Processes and Landforms - Part II

Lecture 37 - Tectonic Geomorphology of Kachchh - Part I

Lecture 38 - Tectonic Geomorphology of Kachchh - Part II

NPTEL : NOC:Structural Geology (Civil Engineering)

Co-ordinators : Prof. Santanu Misra

Lecture 1 - Introduction - I

Lecture 2 - Introduction - II

Lecture 3 - Structural Elements and Measurements

Lecture 4 - How to measure strike-dip-pitch/rake-plunge

Lecture 5 - Stereographic Projection in Structural Geology

Lecture 6 - Concept of Strain and Deformation - Part I

Lecture 7 - Concept of Strain and Deformation - Part II

Lecture 8 - Strain Measurement

Lecture 9 - Stress - Part I

Lecture 10 - Stress - Part II

Lecture 11 - Basics of Rheology - Part I

Lecture 12 - Basics of Rheology - Part II

Lecture 13 - Basics of Rheology - Part III

Lecture 14 - Complex Rheology

Lecture 15 - Role of External Parameters

Lecture 16 - Crystal Defects and associated structures

Lecture 17 - Cataclastic Deformation

Lecture 18 - Intracrystalline Deformation

Lecture 19 - Diffusive Mass Transfer

Lecture 20 - Planar Fabrics (Foliation/ Cleavage/ Schistosity) - I

Lecture 21 - Planar Fabrics (Foliation/ Cleavage/ Schistosity) - II

Lecture 22 - Linear Fabrics (Lineation)

Lecture 23 - Folds and Folding: Basic Concepts

Lecture 24 - Folds and Folding: Classifications

Lecture 25 - Folds and Folding: Dip Isogons and Mechanisms

Lecture 26 - Folds and Folding: Superposed Folding

Lecture 27 - Porphyroblasts

Lecture 28 - Boudinage and Pinch-and-Swell Structures - I

Lecture 29 - Boudinage and Pinch-and-Swell Structures - II

Lecture 30 - Stereonet Problem I: True dip from two apparent dips

Lecture 31 - Stereonet Problem II: True dip from strike and one apparent dip

Lecture 32 - Stereonet Problem III: Pole to the Plane

Lecture 33 - Stereonet Problem IV: Fold axis and Axial plane

Lecture 34 - Stereonet Problem V: Fold geometry from pole data of two limbs

Lecture 35 - Fractures and Joints - I

Lecture 36 - Fractures and Joints - II

Lecture 37 - Faults and Faulting - I

Lecture 38 - Stereonet Problem VI - Fold geometry from interlimb angle and fold axes

Lecture 39 - Stereonet Problem VII - Fold geometry from pitch of the limbs on another plane

Lecture 40 - Faults and Faulting - II

Lecture 41 - Ductile Shear Zones - I

Lecture 42 - Ductile Shear Zones - II

Lecture 43 - Basic of Litho-Structural Mapping

Lecture 44 - Paleostress analysis

Lecture 45 - Graphical Problem

Lecture 46 - Three point problem

Lecture 47 - Construction of Topographic Profile

Lecture 48 - Construction of Geological Cross-section

NPTEL : NOC:Earthquake Geology: A tool for Seismic Hazard Assessment (Civil Engineering)

Co-ordinators : Prof. Javed N. Malik

Lecture 1 - Introduction to Earthquake Geology - Part I

Lecture 2 - Introduction to Earthquake Geology - Part II

Lecture 3 - Introduction to Earthquake Geology - Part III

Lecture 4 - Introduction to Earthquake Geology - Part IV

Lecture 5 - Fundamentals Related to Paleoseismology - Part I

Lecture 6 - Fundamentals Related to Paleoseismology - Part II

Lecture 7 - Fundamentals Related to Paleoseismology - Part III

Lecture 8 - Plate Tectonics - Part I

Lecture 9 - Plate Tectonics - Part II

Lecture 10 - Plate Tectonics - Part III

Lecture 11 - Plate tectonics - Part IV

Lecture 12 - Plate Tectonics - Part V

Lecture 13 - Seismic Zonation of India

Lecture 14 - Interior of the Earth - Part I

Lecture 15 - Interior of the Earth - Part II

Lecture 16 - Earthquake Forecasting and Prediction Model - Part I

Lecture 17 - Earthquake Forecasting and Prediction Model - Part II

Lecture 18 - Earthquake Forecasting and Prediction Model - Part III

Lecture 19 - Earthquake in Interplate and Intraplate Region

Lecture 20 - Earthquake Magnitude and Intensity Scale - Part I

Lecture 21 - Earthquake Magnitude and Intensity Scale - Part II

Lecture 22 - Fundamentals Related to Active Faults - Part I

Lecture 23 - Fundamentals Related to Active Faults - Part II

Lecture 24 - Fundamentals Related to Active Faults - Part III

Lecture 25 - Fundamentals Related to Active Faults - Part IV

Lecture 26 - Lab and Field Techniques in Active Fault Mapping and Paleoseismic studies - Part I

Lecture 27 - Lab and Field Techniques in Active Fault Mapping and Paleoseismic studies - Part II

Lecture 28 - Lab and Field Techniques in Active Fault Mapping and Paleoseismic studies - Part III

Lecture 29 - Lab and Field Techniques in Active Fault Mapping and Paleoseismic studies - Part IV

Lecture 30 - Lab and Field Techniques in Active Fault Mapping and Paleoseismic studies - Part V

Lecture 31 - Extensional Tectonic Environments and Related Landforms - Part I

Lecture 32 - Extensional Tectonic Environments and Related Landforms - Part II

Lecture 33 - Extensional Tectonic Environments and Related Landforms - Part III

Lecture 34 - Extensional Tectonic Environments and Related Landforms - Part IV

Lecture 35 - Compressional Tectonic Environments and Related Landforms - Part I

Lecture 36 - Compressional Tectonic Environments and Related Landforms - Part II

Lecture 37 - Compressional Tectonic Environments and Related Landforms - Part III

Lecture 38 - Compressional Tectonic Environments and Related Landforms - Part IV

Lecture 39 - Compressional Tectonic Environments and Related Landforms - Part V

Lecture 40 - Compressional Tectonic Environments and Related Landforms - Part VI

Lecture 41 - Compressional Tectonic Environments and Related Landforms - Part VII

Lecture 42 - Strike-Slip Tectonic Environments and Related Landforms - Part I

Lecture 43 - Strike-Slip Tectonic Environments and Related Landforms - Part II

Lecture 44 - Strike-Slip Tectonic Environments and Related Landforms - Part III

Lecture 45 - Strike-Slip Tectonic Environments and Related Landforms - Part IV

Lecture 46 - Geomoprhic Markers for Fluvial Environment - Part I

Lecture 47 - Geomoprhic Markers for Fluvial Environment - Part II

Lecture 48 - Geomorphic Markers - Part III

Lecture 49 - Tectonic Geomorphology - Part I

Lecture 50 - Tectonic Geomorphology - Part II

Lecture 51 - Coastal Geomorphic Markers - Part I

Lecture 52 - Coastal Geomorphic Markers - Part II

Lecture 53 - Coastal Geomorphic Markers - Part III

Lecture 54 - Tsunami and Paleostsunami signatures Investigation - Part I

Lecture 55 - Tsunami and Paleostsunami signatures Investigation - Part II

Lecture 56 - Tsunami and Paleostsunami signatures Investigation - Part III

Lecture 57 - Field Documentary

NPTEL : NOC:Development and Applications of Special Concretes (Civil Engineering)

Co-ordinators : Prof. Sudhir Misra

Lecture 1 - Some starting points

Lecture 2 - Concrete - A composite material

Lecture 3 - Basic properties (Fresh concrete)

Lecture 4 - Basic properties (Hardened concrete)

Lecture 5 - Fundamentals of proportioning concrete mixes

Lecture 6 - Proportioning of normal concrete mixes

Lecture 7 - Concrete mix proportions: Analysis and adjustments

Lecture 8 - Pores and porosity in concrete

Lecture 9 - Admixtures in concrete

Lecture 10 - Curing of Concrete

Lecture 11 - Cold weather Concreting

Lecture 12 - Hot Weather Concreting

Lecture 13 - Special Topics I - Importance of Right Methods and Specifications

Lecture 14 - Heat of Hydration of Cement and Thermal Stresses

Lecture 15 - Antiwashout Underwater Concrete

Lecture 16 - Concreting Underwater

Lecture 17 - Roller Compacted Concrete

Lecture 18 - Self Compacting Concrete - I

Lecture 19 - Self Compacting Concrete - II

Lecture 20 - Self Compacting Concrete - III

Lecture 21 - Special Topics - Rheology

Lecture 22 - Fibre-Reinforced Concrete - I

Lecture 23 - Fibre-Reinforced Concrete - II

Lecture 24 - Fibre-Reinforced Concrete - III

Lecture 25 - Mixing of Concrete

Lecture 26 - Shotcrete

Lecture 27 - High Strength Concrete

Lecture 28 - Using Polymers in Concrete

Lecture 29 - Improving the Quality of Cover Concrete

Lecture 30 - Compaction of Concrete

Lecture 31 - Precast Concrete

Lecture 32 - Closing the Course

NPTEL : NOC:Introductory Field Structural Geology (Civil Engineering)

Co-ordinators : Prof. Santanu Misra

Lecture 1

Lecture 2

Lecture 3

Lecture 4

Lecture 5

Lecture 6

Lecture 7

Lecture 8

Lecture 9

Lecture 10

Lecture 11

Lecture 12

Lecture 13

Lecture 14

Lecture 15

Lecture 16

Lecture 17

NPTEL : NOC:Earth Sciences for Civil Engineering (Hindi) (Civil Engineering)

Co-ordinators : Prof. Javed N Malik

Lecture 1 - Introduction to Geosciences in Civil Engineering - I

Lecture 2 - Introduction to Geosciences in Civil Engineering - II

Lecture 3 - Introduction to Geosciences in Civil Engineering - III

Lecture 4 - Plate Tectonics and Continental Drift - I

Lecture 5 - Plate Tectonics and Continental Drift - II

Lecture 6 - Plate Tectonics and Continental Drift - III

Lecture 7 - Plate Tectonics and Continental Drift - IV

Lecture 8 - Plate Tectonics and Continental Drift - V

Lecture 9 - Plate Tectonics and Continental Drift - VI

Lecture 10 - Plate Tectonics and Continental Drift - VII

Lecture 11 - Plate Tectonics and Continental Drift - VIII

Lecture 12 - Rock-Forming Minerals and their Properties - I

Lecture 13 - Rock-Forming Minerals and their Properties - II

Lecture 14 - Rock-Forming Minerals and their Properties - III

Lecture 15 - Igneous Rocks and their Properties - I

Lecture 16 - Igneous Rocks and their Properties - II

Lecture 17 - Igneous Rocks and their Properties - III

Lecture 18 - Sedimentary Rocks and their Properties - I

Lecture 19 - Sedimentary Rocks and their Properties - II

Lecture 20 - Sedimentary Rocks and their Properties - III

Lecture 21 - Metamorphic Rocks and their Properties - I

Lecture 22 - Metamorphic Rocks and their Properties - II

Lecture 23 - Seismology and Internal Structure of the earth - Part 1

Lecture 24 - Seismology and Internal Structure of the earth - Part 2

Lecture 25 - Seismology and Internal Structure of the earth - Part 3

Lecture 26 - Seismology and Internal Structure of the earth - Part 4

Lecture 27 - Seismology and Internal Structure of the earth - Part 5

Lecture 28 - Seismic Events and Sediments Amplification - I

Lecture 29 - Seismic Events and Sediments Amplification - II

Lecture 30 - Geological Structures - I

Lecture 31 - Geological Structures - II

Lecture 32 - Geological Structures - III

Lecture 33 - Geological Structures - IV

Lecture 34 - Sterographic Projection of Geological Strata

Lecture 35 - Faults and its Characteristics

Lecture 36 - Active Faults and Associated Hazard - I

Lecture 37 - Active Faults and Associated Hazard - II

Lecture 38 - Active Faults and Associated Hazard - III

Lecture 39 - Rivers and Associated Landforms - I

Lecture 40 - Rivers and Associated Landforms - II

Lecture 41 - Shear Strength of Soil and its Implications towards Hazard

Lecture 42 - Landslides and Associated Hazard

Lecture 43 - Rock Mass Classification System

Lecture 44 - Dam and Tunnels

NPTEL : NOC:Construction Management (Civil Engineering)

Co-ordinators : Prof. Sudhir Misra

Lecture 1

Lecture 2

Lecture 3

Lecture 4

Lecture 5

Lecture 6

Lecture 7

Lecture 8

Lecture 9

Lecture 10

Lecture 11

Lecture 12

Lecture 13

Lecture 14

Lecture 15

Lecture 16

Lecture 17

Lecture 18

Lecture 19

Lecture 20

Lecture 21

Lecture 22

Lecture 23

Lecture 24

Lecture 25

Lecture 26

Lecture 27

Lecture 28

Lecture 29

Lecture 30

Lecture 31

Lecture 32

Lecture 33

Lecture 34

Lecture 35

Lecture 36

Lecture 37

Lecture 38

Lecture 39

Lecture 40

Lecture 41

Lecture 42

NPTEL : NOC:Laboratory Practices in Earth Sciences: Landscape Mapping (Civil Engineering)

Co-ordinators : Prof. Javed N Malik

Lecture 1 - Basic Introduction about the Course

Lecture 2 - Generation Introduction to the Remote Sensing - Part 1

Lecture 3 - Generation Introduction to the Remote Sensing - Part 2

Lecture 4 - Aerial Photogrammetry - Part 1

Lecture 5 - Aerial Photogrammetry - Part 2

Lecture 6 - Stereoscopy

Lecture 7 - Relief Displacement

Lecture 8 - Exploring the Remote Sensing Data and GIS Software - Part 1

Lecture 9 - Exploring the Remote Sensing Data and GIS Software - Part 2

Lecture 10 - Exploring the Remote Sensing Data and GIS Software - Part 3

Lecture 11 - Georeferencing of Toposheets on QGIS

Lecture 12 - Georeferencing of Remote Sensing Data on QGIS

Lecture 13 - Mosaicking, Merging and Generation of Shape Files on QGIS

Lecture 14 - Fluvial Systems and Associated Landforms - Part 1

Lecture 15 - Fluvial Systems and Associated Landforms - Part 2

Lecture 16 - Fluvial Systems and Associated Landforms - Part 3

Lecture 17 - Fluvial Systems and Associated Landforms - Part 4

Lecture 18 - Fluvial Systems and Associated Landforms - Part 5

Lecture 19 - Fluvial Systems and Associated Landforms - Part 6

Lecture 20 - Tectonic Geomorphology - Part 1

Lecture 21 - Tectonic Geomorphology - Part 2

Lecture 22 - Tectonic Geomorphology - Part 3

Lecture 23 - Tectonic Geomorphology - Part 4

Lecture 24 - Anaglyph and DEM Generation of Cartosat-1 data on ENVI

Lecture 25 - Tectono-Geomorphic Mapping on QGIS - Part 1

Lecture 26 - Tectono-Geomorphic Mapping on QGIS - Part 2

Lecture 27 - Tectono-Geomorphic Mapping on QGIS - Part 3

Lecture 28 - Tectono-Geomorphic Mapping on QGIS - Part 4

Lecture 29 - Total Station (TS) and Real Time Kinematics (RTK) and its Applications

Lecture 30 - Field Demonstration of Real Time Kinematics (RTK) - Part 1

Lecture 31 - Field Demonstration of Real Time Kinematics (RTK) - Part 2

Lecture 32 - Field Demonstration of Total Station (TS) - Part 1

Lecture 33 - Field Demonstration of Total Station (TS) - Part 2

Lecture 34 - Ground Penetrating Radar (GPR) and its Applications - Part 1

Lecture 35 - Ground Penetrating Radar (GPR) and its Applications - Part 2

Lecture 36 - Field Demonstration of GPR - Part 1

Lecture 37 - Field Demonstration of GPR - Part 2

Lecture 38 - Optically Stimulated Luminescence (OSL) Dating technique and its Applications

Lecture 39 - Optically Stimulated Luminescence (OSL) Dating Lab

NPTEL : Advanced Foundation Engineering (Civil Engineering)

Co-ordinators : Dr. Kousik Deb

Lecture 1 - Introduction

Lecture 2 - Soil Exploration

Lecture 3 - Soil Exploration - Penetration Tests

Lecture 4 - Soil Exploration - Geophysical Exploration

Lecture 5 - Shallow Foundation - Introduction

Lecture 6 - Shallow Foundation : Bearing Capacity - I

Lecture 7 - Shallow Foundation : Bearing Capacity - II

Lecture 8 - Shallow Foundation : Bearing Capacity - III

Lecture 9 - Shallow Foundation : Bearing Capacity - IV

Lecture 10 - Shallow Foundation : Bearing Capacity - V

Lecture 11 - Shallow Foundation - Settlement Calculation - I

Lecture 12 - Shallow Foundation - Settlement Calculation - II

Lecture 13 - Shallow Foundation - Settlement Calculation - III

Lecture 14 - Design of Shallow Foundation

Lecture 15 - Design of Raft Foundation

Lecture 16 - Deep Foundation - Introduction

Lecture 17 - Pile Foundation - Load Carrying Capacity - I

Lecture 18 - Pile Foundation - Load Carrying Capacity - II

Lecture 19 - Pile Foundation - Load Carrying Capacity - III and Settlement Calculation

Lecture 20 - Tension and Lateral Loaded Piles

Lecture 21 - Well Foundation

Lecture 22 - Well Foundation (Continued...)

Lecture 23 - Design of Retaining Wall

Lecture 24 - Design of Retaining Wall (Continued...)

Lecture 25 - Design of Sheet Piles

Lecture 26 - Design of Sheet Piles (Continued...)

Lecture 27 - Design of Sheet Piles (Continued...)

Lecture 28 - Design of Sheet Piles (Continued...)

Lecture 29 - Reinforced Earth

Lecture 30 - Reinforced Retaining Wall

Lecture 31 - Seismic Design of Retaining Wall

Lecture 32 - Seismic Design of Retaining Walls (Continued...)

Lecture 33 - Soil - Foundation Interaction

Lecture 34 - Soil - Foundation Interaction (Continued...)

Lecture 35 - Soil - Foundation Interaction (Continued...)

Lecture 36 - Soil - Foundation Interaction (Continued...)

Lecture 37 - Soil - Foundation Interaction (Continued...)

Lecture 38 - Soil - Foundation Interaction (Continued...)

Lecture 39 - Soil - Foundation Interaction (Continued...)

Lecture 40 - Soil - Foundation Interaction (Continued...)

NPTEL : Ground Water Hydrology (Civil Engineering)

Co-ordinators : Dr. Anirban Dhar, Dr. V.R. Desaai

Lecture 1 - Introduction : Ground Water (GW) Utilization and Historical Background, GW in hydrologic Cycle

Lecture 2 - Ground Water in & % Hydrologic Cycle (Continued...), Ground Water Budget, Ground Water Level Fluctuations and Environmental Influence

Lecture 3 - Ground water Level Fluctuations and Environmental Influence (Continued...) Literature/Data/Internet Resources

Lecture 4 - Ground water Level Fluctuations and Environmental Influence (Continued...) Literature/Data/Internet Resources

Lecture 5 - Occurrence and Movement of Ground Water : Origin and Age of Ground Water, Rock Properties Affecting Ground Water, Ground Water Column

Lecture 6 - Zones of Aeration and Saturation; Aquifers and their characteristics/classification

Lecture 7 - Aquifer Classification (Continued...), Ground water Basins and Springs; Dorcy's Law; Permeability

Lecture 8 - Determination pf Permeability :Heterogeneity and Anisotropy

Lecture 9 - Ground Water (GW) flowrates and flow directions; general flow equations through porous media

Lecture 10 - General Flow Equations Through Porous Media (Continued...), Dupuit's Assumptions

Lecture 11 - 1-D Unconfined Ground water Flows; Steady Flow into Wells

Lecture 12 - Steady Flow into Wells (Continued...); Unsteady Flow into Wells

Lecture 13 - Unsteady Flow into Wells (Continued...)

Lecture 14 - Unsteady Radial Flow in Confined and Unconfined Aquifers

Lecture 15 - Unsteady Radial Flow in Leaky Aquifers (Continued...); Well Flow Near Aquifer Boundaries

Lecture 16 - Well Flow for Special Conditions; Partially Penetrating Wells; Horizontal Wells and Collector Wells;Multiple Well Systems

Lecture 17 - Well Completion;Well Development; Well Protection; Well Rehabilitation; Well testing for Yields

Lecture 18 - Well Protection/Rehabilitation/Testing for yield (Continued...); Artificial Ground Water Recharge : Concept and Methods

Lecture 19 - Concept and methods of Artificial Ground Water Recharge (Continued...); Recharge Mounds and Induced Recharge

Lecture 20 - Induced Recharge (Continued...); Wastewater recharge for reuse; Water spreading

Lecture 21 - Pollution and Quality Analysis of Ground Water : Sources of Pollution of GW-Municipal, Industrial,Agricultural and Miscellaneous

Lecture 22 - Ground Water Pollution from Industrial, Agricultural and Miscellaneous Sources (Continued...)

Lecture 23 - Ground Water Pollution from Miscellaneous Sources (Continued...), Attenuation and Underground Distribution of Pollutants

Lecture 24 - Potential Evaluation of Ground water Pollution; Physical/Chemical/Biological analysis of Ground Water quality; Criteria and measures of Ground water quality

Lecture 25 - Ground water salinity and samples ;Graphical representations of ground water quality

Lecture 26 - Graphical representations of ground water quality (Continued...), Surface/Sub-Surface Investigation Of Ground Water:Geological/geophysical exploration;Remote sensing/electrical resistivity methods

Lecture 27 - Surface Investigation of ground water (Continued...):Electrical resistivity seismic refraction/gravity/magnetic methods

Lecture 28 - Seismic refraction/gravity/magnetic methods (Continued...);Sub-surface investigation of ground water: Geographical/resistivity methods

Lecture 29 - Sub-surface investigation of ground water (Continued...): Geographical/resistivity/spontaneous potential/radiation of methods of logging

Lecture 30 - Radiation method of logging (Continued...); Temperature/caliper/fluid conductivity/fluid velocity/miscellaneous logging methods

Lecture 31 - Saline Water Intrusion in Aquifers:Occurence, Features affecting aquifers,Bodon - Ghyben - Hergberg Principle

Lecture 32 - Saline Water Intrusion in Aquifers : Bodon - Ghyben - Hergberg principle (Continued...), Analytical Solution of Saline Water Intrusion in Coastal Aquifer

Lecture 33 - Saline Water Intrusion in Aquifers : Analytical Solution of Saline Water Intrusion in Coastal Aquifer (Continued...), Density dependent salt water intrusion model

Lecture 34 - Saline Water Intrusion in Aquifers : Geochemical Investigations, Control of salt water intrusion, Practical Modeling of salt water intrusion

Lecture 35 - Modeling and Management of Ground Water : Ground Water Simulation Models, Ground Water Management Model : Confined Aquifer

Lecture 36 - Modeling and Management of Ground Water : Ground Water Management Model : Confined and Unconfined Aquifer, Linked Simulation - Optimization, Meta Model Based Approach

Lecture 37 - Modeling and Management of Ground Water : Contaminant Source Identification , Monitoring Network Design

Lecture 38 - Modeling and Management of Ground Water : Aquifer Yield and Ground Water Availability, Effects of Ground Water Development, Regional Scale Development of Ground Water

Lecture 39 - Modeling and Management of Ground Water : Conjunctive Surface - Subsurface Modeling of Overland Flow including flow through Vadose zone

Lecture 40 - Modeling and Management of Ground Water : Ground Water - Surface Water Interaction

NPTEL : Numerical Methods in Civil Engineering (Civil Engineering)

Co-ordinators : Dr. A. Deb

Lecture 1 - Introduction to Numerical Methods

Lecture 2 - Error Analysis

Lecture 3 - Introduction to Linear Systems - I

Lecture 4 - Linear Systems - II

Lecture 5 - Linear Systems - III

Lecture 6 - Linear Systems - Error Bounds

Lecture 7 - Error Bounds and Iterative Methods for Solving Linear Systems

Lecture 8 - Iterative Methods for Solving Linear Systems - I

Lecture 9 - Iterative Methods - II

Lecture 10 - Iterative Methods - III

Lecture 11 - Iterative Methods for Eigen Value Extraction

Lecture 12 - Solving Nonlinear Equations - I

Lecture 13 - Solving Nonlinear Equations - II

Lecture 14 - Solving Multi Dimensional Nonlinear Equations - I

Lecture 15 - Solving Multi Dimensional Nonlinear Equations - II

Lecture 16 - ARC Length and Gradient Based Methods

Lecture 17 - Gradient Based Methods

Lecture 18 - Conjugate Gradient Method - I

Lecture 19 - Conjugate Gradient Method - II

Lecture 20 - Nonlinear Conjugate Gradient and Introduction to PDEs

Lecture 21 - Eigenfunction Solutions for the Wave Equation

Lecture 22 - Analytical Methods for Solving the Wave Equation

Lecture 23 - Analytical Methods for Hyperbolic and Parabolic PDEs

Lecture 24 - Analytical Methods for Parabolic and Elliptic PDEs

Lecture 25 - Analytical Methods for Elliptic PDE\'s

Lecture 26 - Series Solutions for Elliptic PDE\'s and Introduction to Differential Operators

Lecture 27 - Differential Operators - I

Lecture 28 - Differential Operators - II

Lecture 29 - Differential Operators - III

Lecture 30 - Interpolation

Lecture 31 - Polynomial Fitting

Lecture 32 - Orthogonal Polynomials - I

Lecture 33 - Orthogonal Polynomials - II

Lecture 34 - Orthogonal Polynomials - III

Lecture 35 - Spline Functions

Lecture 36 - Orthogonal Basis Functions for Solving PDE\'s - I

Lecture 37 - Orthogonal Basis Functions for Solving PDE\'s - II

Lecture 38 - Integral Equations - I

Lecture 39 - Integral Equations - II

Lecture 40 - Integral Equations - III

NPTEL : Probability Methods in Civil Engineering (Civil Engineering)

Co-ordinators : Dr. Rajib Maity

Lecture 1 - Introduction - Role of Probability in Civil Engineering

Lecture 2 - Random Events and Probability Concept

Lecture 3 - Set Theory and Set Operations

Lecture 4 - Axioms of Probability

Lecture 5 - Probability of Events

Lecture 6 - Concept and Defination of Random Variables

Lecture 7 - Probability Distribution of Random Variables

Lecture 8 - CDF and Descriptors of Random Variables

Lecture 9 - Further Descriptors of Random Variables

Lecture 10 - Discrete Probability Distribution

Lecture 11 - Probability Distribution of Continuous RVs

Lecture 12 - Probability Distribution of Continuous RVs (Continued...1)

Lecture 13 - Probability Distribution of Continuous RVs (Continued...2)

Lecture 14 - Functions of Single Random Variables

Lecture 15 - Functions of Random Variables - Different Methods

Lecture 16 - Functions of Random Variables - Different Methods (Continued...)

Lecture 17 - Expectation and Moments of Functions of RV

Lecture 18 - Expectation and Moments of Functions of RV (Continued...)

Lecture 19 - Joint Probability Distribution

Lecture 20 - Marginal Probability Distribution

Lecture 21 - Conditional Probability Distribution

Lecture 22 - Conditional Probability Distribution (Continued...)

Lecture 23 - Properties of Multiple Random Variables

Lecture 24 - Properties of Multiple Random Variables (Continued...)

Lecture 25 - MGF of Multivariate RVs and Multivariate Probability Distributions

Lecture 26 - Multivariate Distribution and Functions of Multiple Random Variables

Lecture 27 - Functions of Multiple Random Variables (Continued...1)

Lecture 28 - Functions of Multiple Random Variables (Continued...2)

Lecture 29 - Introduction to Copulas

Lecture 30 - Introduction to Copulas (Continued...)

Lecture 31 - Probability Models using Normal Distribution

Lecture 32 - Probability Models using Log Normal and Exponential Distribution

Lecture 33 - Probability Models using Gamma and Extreme Value Distribution

Lecture 34 - Probability Models using Discrete Probability Distributions

Lecture 35 - Sampling Distribution and Parameter Estimation

Lecture 36 - Sampling Distribution and Parameter Estimation (Continued...)

Lecture 37 - Hypothesis Testing

Lecture 38 - Goodness - of - fit tests

Lecture 39 - Regression Analyses and Correlation

Lecture 40 - Regression Analyses and Correlation (Continued...)

NPTEL : Design of Reinforced Concrete Structures (Civil Engineering)

Co-ordinators : Prof. N. Dhang

Lecture 1 - Introduction - I

Lecture 2 - Materials

Lecture 3 - Different Methods of Design of Reinforced Concrete Structures

Lecture 4 - Working Stress Method

Lecture 5 - Working Stress Method (Continued...)

Lecture 6 - Limit State of Collapse Flexure - I

Lecture 7 - Limit State of Collapse Flexure - II

Lecture 8 - Design of Doubly Reinforced Beam Flexure - I

Lecture 9 - Design of Doubly Reinforced Beam Flexure - II

Lecture 10 - Design of Doubly Reinforced Beam Flexure

Lecture 11 - Limit State of Collapse Shear

Lecture 12 - Design for Shear

Lecture 13 - Design for Shear (Continued...)

Lecture 14 - Design of Slabs - Part I

Lecture 15 - Design of Slabs - Part II

Lecture 16 - Design of Slabs - Part III

Lecture 17 - Design of Slabs - Part IV

Lecture 18 - Design of Slabs - Part V

Lecture 19 - Design of Columns - Part I

Lecture 20 - Design of Columns - Part II

Lecture 21 - Design of Columns - Part III

Lecture 22 - Design of Columns - Part IV

Lecture 23 - Design of Columns - Part V

Lecture 24 - Design of Footings - Part I

Lecture 25 - Design of Footings - Part II

Lecture 26 - Design of Staircases

Lecture 27 - Design for Torsion - Part I

Lecture 28 - Design for Torsion - Part II

Lecture 29 - Design of RC Slender Columns

Lecture 30 - Deflection of RC Beams

NPTEL : Engineering Geology (Civil Engineering)

Co-ordinators : Dr. Debasis Roy

Lecture 1 - Introduction to Engineering Geology

Lecture 2 - Geologic Structures

Lecture 3 - Geologic Maps and Stratigraphic Sections

Lecture 4 - Remote Sensing in Engineering Geology

Lecture 5 - Physical Properties of Minerals

Lecture 6 - Crystallography and Optical Properties

Lecture 7 - Chemical Characteristics of Minerals

Lecture 8 - Origin And Types of Rocks

Lecture 9 - Origin And Types of Soils

Lecture 10 - Igneous Rocks

Lecture 11 - Sedimentary Rocks

Lecture 12 - Metamorphic Rocks

Lecture 13 - Weathering

Lecture 14 - Sediment Transport and Deposition

Lecture 15 - Introduction to Subsurface Exploration

Lecture 16 - Introduction to Subsurface Exploration

Lecture 17 - Sampling and Non - Intrusive Methods

Lecture 18 - Index Properties and Classification of Soils

Lecture 19 - Index Properties of Rock and Rock Mass

Lecture 20 - Stress-Strain Behavior of Soil and Rock - I

Lecture 21 - Stress-Strain Behavior of Soil and Rock - II

Lecture 22 - In-situ State of Stress

Lecture 23 - Geologic Considerations in Tunneling

Lecture 24 - Geologic Considerations in Dam Construction

Lecture 25 - Groundwater - Preliminaries

Lecture 26 - Groundwater Flow - I

Lecture 27 - Groundwater Flow - II

Lecture 28 - Groundwater Related Engineering Issues

Lecture 29 - Groundwater Over Utilization

Lecture 30 - Plate Tectonics

Lecture 31 - Plate Tectonics - 2 and Earthquake

Lecture 32 - Earthquake Hazard Assessment

Lecture 33 - Geologic Hazards - Seismicity and Volcanism

Lecture 34 - Geologic Hazards - Shoreline Processes

Lecture 35 - Geologic Hazards - Shoreline Processes

Lecture 36 - Geologic Hazards - Landslide Hazards - Zoning

Lecture 37 - Geologic Hazards Subsidence , Collapsible Soils

Lecture 38 - Preparation of Geologic Sections

Lecture 39 - Index testing of soil & rocks

Lecture 40 - Identification of minerals and rock samples

NPTEL : Introduction to Transportation Engineering (Civil Engineering)

Co-ordinators : Dr. K.S. Reddy, Dr. Bhargab Maitra

Lecture 1 - Transportation Engineering

Lecture 2 - Elements of Concern and Components

Lecture 3 - Traffic Stream Characteristics

Lecture 4 - Traffic Studies : Part - I

Lecture 5 - Traffic Studies : Part - II

Lecture 6 - Highway Capacity and Level of Service

Lecture 7 - Intersection Control and Signalization

Lecture 8 - Functional Classification, Design Elements

Lecture 9 - Cross Section Elements

Lecture 10 - Stopping Sight Distance And Decision Sight

Lecture 11 - Overtaking, Intermediate and Headlight Sight

Lecture 12 - Intersection Sight Distance - I

Lecture 13 - Intersection Sight Distance - II

Lecture 14 - Horizontal Alignment - I

Lecture 15 - Horizontal Alignment - II

Lecture 16 - Horizontal Alignment - III

Lecture 17 - Horizontal Alignment - IV

Lecture 18 - Horizontal Alignment - V

Lecture 19 - Horizontal Alignment - VI

Lecture 20 - Vertical Alignment - I

Lecture 21 - Vertical Alignment - II

Lecture 22 - Vertical Alignment - III

Lecture 23 - Highway Alignment

Lecture 24 - Principles of Pavement Design

Lecture 25 - Traffic Loading - I

Lecture 26 - Traffic Loading - II

Lecture 27 - Pavement Materials - I

Lecture 28 - Pavement Materials - II

Lecture 29 - Pavement Materials - III

Lecture 30 - Pavement Materials - IV

Lecture 31 - Pavement Materials - V

Lecture 32 - Design of Bituminous Mixes - I

Lecture 33 - Design of Bituminous Mixes - II

Lecture 34 - Analysis of Flexible Pavements

Lecture 35 - Analysis of Concrete Pavements

Lecture 36 - Flexible Pavement Design Indian Roads Congress

Lecture 37 - Flexible Pavement Design AASHTO Method - 1993

Lecture 38 - Concrete Pavement Design Indian Congress Method

Lecture 39 - Concrete Pavement Design PCA and AASHTO Methods

Lecture 40 - Pavement Evaluation and Rehabilitation

Lecture 41 - Overlay Design - IRC Method

NPTEL : Strength of Materials (Civil Engineering)

Co-ordinators : Prof. S.K. Bhattacharyya

Lecture 1 - Introduction - Strength of Materials

Lecture 2 - Analysis of Stress - I

Lecture 3 - Analysis of Stress - II

Lecture 4 - Analysis of Stress - III

Lecture 5 - Analysis of Stress - IV

Lecture 6 - Analysis of Stress - V

Lecture 7 - Analysis of Strain - I

Lecture 8 - Analysis of Strain - II

Lecture 9 - Analysis of Strain - III

Lecture 10 - Analysis of Strain - IV

Lecture 11 - Analysis of Strain - V

Lecture 12 - Analysis of Strain - VI

Lecture 13 - Analysis of Strain - VII

Lecture 14 - Analysis of Strain - VIII

Lecture 15 - Application of Stress/Strain

Lecture 16 - Application of Stress / Strain

Lecture 17 - Application of Stress / Strain

Lecture 18 - Torsion - I

Lecture 19 - Torsion - II

Lecture 20 - Torsion - III

Lecture 21 - Torsion - IV

Lecture 22 - Bending of Beams - I

Lecture 23 - Bending of Beams - II

Lecture 24 - Bending of Beams - III

Lecture 25 - Bending of Beams - IV

Lecture 26 - Stresses in Beams - I

Lecture 27 - Stresses in Beams - II

Lecture 28 - Stresses in Beams - III

Lecture 29 - Stresses in Beams - IV

Lecture 30 - Deflection of Beams - I

Lecture 31 - Deflection of Beams - II

Lecture 32 - Deflection of Beams - III

Lecture 33 - Deflection of Beams - IV

Lecture 34 - Combined Stresses - I

Lecture 35 - Combined Stresses - II

Lecture 36 - Combined Stresses - III

Lecture 37 - Stability of Columns - I

Lecture 38 - Stability of Columns - II

Lecture 39 - Springs - I

Lecture 40 - Springs - II

NPTEL : NOC:Probability Methods in Civil Engineering (Civil Engineering)

Co-ordinators : Dr. Rajib Maity

Lecture 1 - Random Events and Probability Concept

Lecture 2 - Set Theory and Set Operations

Lecture 3 - Axioms of Probability

Lecture 4 - Probability of Events

Lecture 5 - Concept and definition of Random variables

Lecture 6 - Probability distribution of random variables

Lecture 7 - CDF and Descriptors of Random Variables

Lecture 8 - Further Descriptors of Random Variables

Lecture 9 - Discrete Probability Distribution

Lecture 10 - Probability Distribution of Continuous RVs

Lecture 11 - Probability Distribution of Continuous RVs (Continued.....1)

Lecture 12 - Probability Distribution of Continuous RVs (Continued.....2)

Lecture 13 - Functions of Single Random Variables

Lecture 14 - Functions of Different Variables - Different Methods

Lecture 15 - Functions of Random Variables : Different Methods (Continued...)

Lecture 16 - Probability Models using Normal Distribution

Lecture 17 - Probability Models using Log Normal and Exponential Distribution

Lecture 18 - Probability Models using Gamma and Extreme Value Distribution

Lecture 19 - Probability Models using Discrete Probability Distributions

Lecture 20 - Sampling Distribution and Parameter Estimation

Lecture 21 - Sampling Distribution and Parameter Estimation (Continued...)

Lecture 22 - Hypothesis Testing

Lecture 23 - Goodness of Fit-Tests

Lecture 24 - Regression Analyses and Correlation

Lecture 25 - Regression Analyses and Correlation (Continued...)

NPTEL : NOC:Visual Semiotics for Visual Communication (Civil Engineering)

Co-ordinators : Prof. Mainak Ghosh

Lecture 1 - Visual Semantics for Visual Communication

Lecture 2 - Visual Semantics for Visual Communication (Continued...)

Lecture 3 - Visual Semantics for Visual Communication (Continued...)

Lecture 4 - Visual Semantics for Visual Communication (Continued...)

Lecture 5 - Introduction to Millimeter-Wave Technology (Continued...)

Lecture 6 - Visual Semantics for Visual Communication (Continued...)

Lecture 7 - Visual Semantics for Visual Communication (Continued...)

Lecture 8 - Visual Semantics for Visual Communication (Continued...)

Lecture 9 - Introduction to Millimeter-Wave Technology

Lecture 10 - Visual Semantics for Visual Communication (Continued...)

Lecture 11 - Visual Semantics for Visual Communication (Continued...)

Lecture 12 - Visual Semantics for Visual Communication (Continued...)

Lecture 13 - Conceptual Model and Affordances

Lecture 14 - Visual Semantics for Visual Communication (Continued...)

Lecture 15 - Visual Semantics for Visual Communication (Continued...)

Lecture 16 - Visual Semantics for Visual Communication (Continued...)

Lecture 17 - Visual Semantics for Visual Communication (Continued...)

Lecture 18 - Visual Semantics for Visual Communication (Continued...)

Lecture 19 - Visual Semantics for Visual Communication (Continued...)

Lecture 20 - Visual Semantics for Visual Communication (Continued...)

NPTEL : NOC:Life Cycle Assessment (Civil Engineering)

Co-ordinators : Prof. Brajesh Kumar Dubey

Lecture 1 - Life Cycle Assessment - Introduction

Lecture 2 - Life Cycle Assessment - Introduction

Lecture 3 - LCA and Sustainability

Lecture 4 - LCA and Environmental Systems

Lecture 5 - LCA and Water, Food and Energy

Lecture 6 - RISK Assement and LCA Frameworks

Lecture 7 - RISK Assessment - Toxicology

Lecture 8 - RISK Assessment Methods

Lecture 9 - RISK Assessment Methods (Continued...)

Lecture 10 - Environmental Risk Assessment

Lecture 11 - Environmental Data Collection and LCA Methodology

Lecture 12 - Environmental Data Collection and LCA Methodology (Continued...)

Lecture 13 - Environmental Data Collection and LCA Methodology (Continued...)

Lecture 14 - Environmental Data Collection and LCA Methodology (Continued...)

Lecture 15 - LCA Methodology

Lecture 16 - LCA - A Detailed Methodology

Lecture 17 - LCA - A Detailed Methodology (Continued...)

Lecture 18 - LCA Benefits and Drawbacks

Lecture 19 - History of LCA

Lecture 20 - The ISO Framework

Lecture 21 - Unit Process, Data and LCI Databases

Lecture 22 - Unit Process and System Boundary (Continued...)

Lecture 23 - Inventory Data and LCIA

Lecture 24 - LCIA

Lecture 25 - LCA Interpretation

Lecture 26 - ISO 14040

Lecture 27 - Key Points of a Good LCA and Example LCA

Lecture 28 - Chemical Release in Environment

Lecture 29 - Green Sustainable Materials

Lecture 30 - Green Sustainable Materials (Continued...)

Lecture 31 - Design for Sustainability

Lecture 32 - Design for Sustainability (Continued...)

Lecture 33 - Design for Sustainability (Continued...)

Lecture 34 - Sustainable Engineering Design Principles

Lecture 35 - Sustainable Engineering Design Principles (Continued...)

Lecture 36 - Summary and Case Studies

Lecture 37 - Summary and Case Studies (Continued...)

Lecture 38 - Summary and Case Studies (Continued...)

Lecture 39 - Tutorial I

Lecture 40 - Tutorial II

NPTEL : NOC:Integrated Waste Management for a Smart City (Civil Engineering)

Co-ordinators : Prof. Brajesh Kumar Dubey

Lecture 1 - Introduction

Lecture 2 - Introduction (Continued...)

Lecture 3 - Introduction (Continued...)

Lecture 4 - Introduction (Continued...)

Lecture 5 - Introduction (Continued...)

Lecture 6 - Introduction (Continued...)

Lecture 7 - Municipal Solid Waste Chracteristics and Quantities

Lecture 8 - Municipal Solid Waste Chracteristics and Quantities (Continued...)

Lecture 9 - Municipal Solid Waste Chracteristics and Quantities (Continued...)

Lecture 10 - Municipal Solid Waste Chracteristics and Quantities (Continued...)

Lecture 11 - MSW Characteristics - Thermal Properties and Chemical Composition

Lecture 12 - Chemical Analysis Procedure

Lecture 13 - Chemical Analysis Procedure (Continued...)

Lecture 14 - Working with Data and Statistical Methods

Lecture 15 - Waste Management Rules 2016

Lecture 16 - Waste Management Rules 2016 (Continued...)

Lecture 17 - Swachh Bharat Mission and Smart Cities Program Overview

Lecture 18 - Storage of Solid Waste

Lecture 19 - MSW Collection System

Lecture 20 - MSW Collection System (Continued...)

Lecture 21 - Waste Collection and Transport

Lecture 22 - Waste Collection and Transport (Continued...)

Lecture 23 - Waste Collection and Transport (Continued...)

Lecture 24 - Waste Collection and Transport (Continued...)

Lecture 25 - Waste Collection and Transport (Continued...)

Lecture 26 - Collection System

Lecture 27 - Collection System (Continued...)

Lecture 28 - Review of MSW Management in Proposed Smart Cities

Lecture 29 - Biological Treatment of Waste

Lecture 30 - Biological Treatment of Waste (Continued...)

Lecture 31 - Biological Treatment of Waste (Continued...)

Lecture 32 - Biological Treatment of Waste (Continued...)

Lecture 33 - Biological Treatment of Waste (Continued...)

Lecture 34 - Thermal Treatment

Lecture 35 - Thermal Treatment (Continued...)

Lecture 36 - Thermal Treatment (Continued...)

Lecture 37 - Thermal Treatment (Continued...)

Lecture 38 - Thermal Treatment (Continued...)

Lecture 39 - Thermal Treatment (Continued...)

Lecture 40 - Landfill Disposal

Lecture 41 - Landfill Disposal (Continued...)

Lecture 42 - Landfill Disposal (Continued...)

Lecture 43 - Landfill Disposal (Continued...)

Lecture 44 - Landfill Disposal (Continued...)

Lecture 45 - Landfill Disposal (Continued...)

Lecture 46 - Landfill Disposal (Continued...)

Lecture 47 - Landfill Disposal (Continued...)

Lecture 48 - Construction and Demolition Waste Management

Lecture 49 - Construction and Demolition Waste Management (Continued...)

Lecture 50 - Construction and Demolition Waste Management (Continued...)

Lecture 51 - Construction and Demolition Waste Management (Continued...)

Lecture 52 - Construction and Demolition Waste Management (Continued...)

Lecture 53 - E-Waste Management

Lecture 54 - E-Waste Management (Continued...)

Lecture 55 - E-Waste Management (Continued...)

Lecture 56 - E-Waste Management (Continued...)

Lecture 57 - E-Waste Management (Continued...)

Lecture 58 - E-Waste Management (Continued...)

Lecture 59 - E-Waste Management (Continued...)

Lecture 60 - E-Waste Management (Continued...)

Lecture 61 - Tutorial - I

Lecture 62 - Tutorial - II

NPTEL : NOC:Computational Hydraulics (Civil Engineering)

Co-ordinators : Dr. Anirban Dhar

Lecture 1 - Introduction to Computational Hydraulics

Lecture 2 - Problem Definition and Governing Equations (GE)

Lecture 3 - Classification of Problems based on Initial Condition (IC) and/or Boundary Conditions (BC)

Lecture 4 - Classification of Differential Equations

Lecture 5 - Numerical Methods : Overview

Lecture 6 - Finite Difference Approximation

Lecture 7 - Ordinary Differential Equation : IVP

Lecture 8 - Ordinary Differential Equation : BVP

Lecture 9 - Partial Differential Equation : BVP

Lecture 10 - Partial Differential Equation : IBVP

Lecture 11 - Partial Differential Equation : Numerical Stability of IBVP

Lecture 12 - Partial Differential Equation : Numerical Stability of One Dimensional PDE

Lecture 13 - Finite Volume Method - Overview

Lecture 14 - Finite Volume Method - BVP

Lecture 15 - Finite Volume Method - IBVP

Lecture 16 - Finite Volume Method - Conservation Law

Lecture 17 - Upwind Approach

Lecture 18 - Godunov Approach

Lecture 19

Lecture 20

Lecture 21 - Mesh-Tree Method : Polynomial Interpolation Method

Lecture 22 - Mesh-Free Method : Moving Least Squares Method

Lecture 23 - Mesh-Free Method : Space-Time Moving Least Squares Method

Lecture 24 - Numerical Method : Matrix Structure and Scilab

Lecture 25 - Algebraic Equation : Gauss Elimination Method

Lecture 26 - Algebraic Equation : LU Decomposition Method

Lecture 27 - Algebraic Equation : Tri Diagonal Matrix Method

Lecture 28 - Algebraic Equation : Jacobis Method

Lecture 29 - Algebraic Equation : Gauss - Seidel Method

Lecture 30 - Algebraic Equation : Newton Raphson Method

Lecture 31 - One-Dimensional Flow

Lecture 32 - Steady Two-Dimensional Flow

Lecture 33 - Unsteady Two-Dimensional Flow using Finite Difference Method

Lecture 34

Lecture 35

Lecture 36

Lecture 37

Lecture 38

Lecture 39

Lecture 40 - Steady Channel Flow : Channel Network without reverse Flow

Lecture 41 - Steady Channel Flow : Channel Network without reverse Flow (Continued...)

Lecture 42 - Steady Channel Flow : Channel Network with reverse Flow

Lecture 43 - Steady Channel Flow : Channel Network with reverse Flow (Continued...)

Lecture 44

Lecture 45

Lecture 46

Lecture 47

Lecture 48

Lecture 49 - Unsteady Flow in Pipes

Lecture 50 - Surface Water and Ground Water Interaction

Lecture 51 - Course Summary

NPTEL : NOC:Design of Steel Structures (Civil Engineering)

Co-ordinators : Prof. Damodar Maity

Lecture 1 - Introduction to Design of Steel Structures (Limit State Method)

Lecture 2 - Steel as a Structural Material

Lecture 3 - Limit State Design

Lecture 4 - Introduction to Connections

Lecture 5 - Introduction to Bolt Connections

Lecture 6 - Design of Ordinary Black Bolts

Lecture 7 - Worked out Examples on Design of Ordinary Black Bolts

Lecture 8 - Design of High Strength Friction Grip Bolts

Lecture 9 - Weld connection

Lecture 10 - Design of Fillet Welds

Lecture 11 - Design of Butt Welds

Lecture 12 - Design of Plug and Slot Weld

Lecture 13 - Eccentric Connection (Load Lying in Plane of Bolted Joint)

Lecture 14 - Design of Eccentric Connection (Load Lying in Plane of Bolted Joint)

Lecture 15 - Eccentric Connection (Load Lying in Plane of Welded Joint)

Lecture 16 - Eccentric Connection (Load Lying Perpendicular to Plane of Bolted Joint)

Lecture 17 - Design of Eccentric Connection (Load Lying Perpendicular to Plane of Bolted Joint)

Lecture 18 - Eccentric Connection (Load Lying Perpendicular to Plane of Welded Joint)

Lecture 19 - Tension Members and Net Area

Lecture 20 - Calculation of Net Area in Tension Members

Lecture 21 - Net area, Staggered bolt, Chain bolt, Staggered pitch, Deduction of area

Lecture 22 - Strength Calculation of Tension Members

Lecture 23 - Strength of Tension Members with Weld Connection

Lecture 24 - Steps for Design of Tension Members

Lecture 25 - Design Calculation for Tension Members

Lecture 26 - Design of Gusset Plate

Lecture 27 - Lug Angles

Lecture 28 - Splices in Tension Members

Lecture 29 - Compression Members

Lecture 30 - Design Strength of Compression Members

Lecture 31 - Compressive Strength

Lecture 32 - Compressive Strength of Angle Struts

Lecture 33 - Compressive Strength of Double Angles

Lecture 34 - Design of Compression Members

Lecture 35 - Design of Builtup Compression Members

Lecture 36 - Lacing Systems

Lecture 37 - Design of Lacing Systems

Lecture 38 - Connection Design of Lacing Systems

Lecture 39 - Design of Double Lacing System

Lecture 40 - Batten Plates

Lecture 41 - Design of Batten Plates using Bolt Connection

Lecture 42 - Design of Batten Plates using Weld Connection

Lecture 43 - Design of Column Splices

Lecture 44 - Design of Column Splices due to Shear

Lecture 45 - Introduction to Flexural Members: Beams

Lecture 46 - Failure Modes of Flexural Members

Lecture 47 - Laterally Supported Beams

Lecture 48 - Design of Laterally Supported Beams

Lecture 49 - Laterally Supported Beams with High Shear

Lecture 50 - Laterally Unsupported Beams

Lecture 51 - Strength Calculation of Laterally Unsupported Beams

Lecture 52

Lecture 53

Lecture 54

Lecture 55

Lecture 56

Lecture 57

Lecture 58 - Worked out Example for Gantry Girder

Lecture 59 - Slab Base

Lecture 60 - Design of Slab Base

Lecture 61 - Eccentrically Loaded Base Plate

Lecture 62 - Gusset Base

Lecture 63 - Design of Gusset Base

NPTEL : NOC:Reinforced Concrete Road Bridges (Civil Engineering)

Co-ordinators : Prof. Nirjhar Dhang

Lecture 1 - Introdudction

Lecture 2 - Classification of Bridges

Lecture 3 - General Features of Design

Lecture 4 - IRC Loading

Lecture 5 - Design Codes

Lecture 6 - Working Stress Method

Lecture 7 - Limit State Method of Design as per IS456:2000

Lecture 8 - Limit State Method of Design as per IRC 112:2011

Lecture 9 - Design of Slab Bridges - Part I

Lecture 10 - Design of Slab Bridges - Part II

Lecture 11 - Design of Slab Bridges - Part III

Lecture 12 - Design of Slab Bridges - Part IV

Lecture 13 - Design of Slab Bridges - Part V

Lecture 14 - Design of Slab Bridges - Part VI

Lecture 15 - Abutment

Lecture 16 - Design of RCC T Beam Bridge - Part I

Lecture 17 - Design of RCC T Beam Bridge - Part II

Lecture 18 - Design of RCC T Beam Bridge - Part III

Lecture 19 - Design of RCC T Beam Bridge - Part IV

Lecture 20 - Summary and Closure

NPTEL : NOC:Structural Analysis - I (Civil Engineering)

Co-ordinators : Prof. Amit Shaw

Lecture 1 - Introduction

Lecture 2 - Idealization of Structures, Threats and Responses

Lecture 3 - Static Equilibrium

Lecture 4 - Determinate and Indeterminate Structures

Lecture 5 - Review of Bending Moment and Shear Force Diagram of Beam

Lecture 6 - Tutorial - I

Lecture 7 - Analysis of Statically Determinate Structures: Truss

Lecture 8 - Analysis of Truss: Method of Joints

Lecture 9 - Analysis of Truss: Method of Joints (Continued...)

Lecture 10 - Analysis of Truss: Method of Sections

Lecture 11 - Analysis of Truss: Method of Sections (Continued...)

Lecture 12 - Analysis of Statically Determinate Structures: Method of Virtual Work

Lecture 13 - Analysis of Statically Determinate Structures: Method of Virtual Work (Continued...)

Lecture 14 - Analysis of Statically Determinate Structures: Method of Virtual Work (Continued...)

Lecture 15 - Analysis of Statically Determinate Structures: Method of Virtual Work (Continued...)

Lecture 16 - Analysis of Statically Determinate Structures: Method of Virtual Work (Continued...)

Lecture 17 - Deflection of Beams and Frames

Lecture 18 - Deflection of Beams and Frames (Continued...)

Lecture 19 - Deflection of Beams and Frames (Continued...)

Lecture 20 - Deflection of Beams and Frames (Continued...)

Lecture 21 - Deflection of Beams and Frames (Continued...)

Lecture 22 - Deflection of Beams and Frames (Continued...)

Lecture 23 - Deflection of Beams and Frames (Continued...)

Lecture 24 - Deflection of Beams and Frames (Continued...)

Lecture 25 - Deflection of Beams and Frames (Continued...)

Lecture 26 - Deflection of Beams and Frames (Continued...)

Lecture 27 - Deflection of Beams and Frames (Continued...)

Lecture 28 - Influence Line Diagram and moving Loads

Lecture 29 - Influence Line Diagram and moving Loads (Continued...)

Lecture 30 - Influence Line Diagram and moving Loads (Continued...)

Lecture 31 - Influence Line Diagram and moving Loads (Continued...)

Lecture 32 - Influence Line Diagram and moving Loads (Continued...)

Lecture 33 - Analysis of Statically Indeterminate Structures

Lecture 34 - Analysis of Statically Indeterminate Structures (Continued...)

Lecture 35 - Analysis of Statically Indeterminate Structures (Continued...)

Lecture 36 - Analysis of Statically Indeterminate Structures (Continued...)

Lecture 37 - Analysis of Statically Indeterminate Structures (Continued...)

Lecture 38 - Analysis of Statically Indeterminate Structures: Method of Consistent Deformations

Lecture 39 - Analysis of Statically Indeterminate Structures: Method of Consistent Deformations (Continued...)

Lecture 40 - Analysis of Statically Indeterminate Structures: Method of Consistent Deformations (Continued...)

Lecture 41 - Analysis of Statically Indeterminate Structures: Method of Consistent Deformations (Continued...)

Lecture 42 - Analysis of Statically Indeterminate Structures by Force Method

Lecture 43 - Analysis of Statically Indeterminate Structures by Force Method (Continued...)

Lecture 44 - Analysis of Statically Indeterminate Structures by Force Method (Continued...)

Lecture 45 - Analysis of Statically Indeterminate Structures by Force Method (Continued...)

Lecture 46 - Analysis of Statically Indeterminate Structures by Force Method (Continued...)

Lecture 47 - Analysis of Indeterminate Structures by Displacement Methods

Lecture 48 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)

Lecture 49 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)

Lecture 50 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)

Lecture 51 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)

Lecture 52 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)

Lecture 53 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)

Lecture 54 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)

Lecture 55 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)

Lecture 56 - Analysis of Indeterminate Structures by Displacement Methods (Continued...)

Lecture 57 - Direct Stiffness Method

Lecture 58 - Direct Stiffness Method (Continued...)

Lecture 59 - Direct Stiffness Method (Continued...)

Lecture 60 - Direct Stiffness Method (Continued...)

Lecture 61 - Direct Stiffness Method (Continued...)

NPTEL : NOC:Soil Mechanics, Geotechnical Engineering-I (Civil Engineering)

Co-ordinators : Prof. Dilip Kumar Baidya

Lecture 1 - Rock cycle

Lecture 2 - Soil Formation

Lecture 3 - Soil Classification

Lecture 4 - Soil Classification (Continued...)

Lecture 5 - Soil Classification (Continued...)

Lecture 6 - Three-phase diagram

Lecture 7 - Three-phase diagram (Continued...)

Lecture 8 - Permeability and seepage

Lecture 9 - Permeability and Seepage (Continued...)

Lecture 10 - Permeability and seepage (Continued...)

Lecture 11 - Permeability And Seepage

Lecture 12 - Permeability And Seepage (Continued...)

Lecture 13 - Permeability And Seepage (Continued...)

Lecture 14 - Compaction Of Soils

Lecture 15 - Compaction Of Soils (Continued...)

Lecture 16 - Deep Dynamic Compaction

Lecture 17 - Permeability/Compaction (Continued...)

Lecture 18 - Effective Stress

Lecture 19 - Effective Stress (Continued...)

Lecture 20 - Effective Stress Aplication

Lecture 21 - Vertical Stress Distribution

Lecture 22 - Boussinesq Point Load Formula

Lecture 23 - Vertical Stress For Distributed Load

Lecture 24 - Vertical Stress

Lecture 25 - Vertical Stress (Continued...)

Lecture 26 - Vertical Stress (Continued...)

Lecture 27 - Shear Strength

Lecture 28 - Shear Strength (Continued...)

Lecture 29 - Shear Strength (Continued...)

Lecture 30 - Shear Strength (Continued...)

Lecture 31 - Shear Strength (Continued...)

Lecture 32 - Shear Strength (Continued...)

Lecture 33 - Shear Strength (Continued...)

Lecture 34 - Shear Strength (Continued...)

Lecture 35 - Shear Strength (Continued...)

Lecture 36 - Shear Strength (Continued...)

Lecture 37 - Compressibility Of Soils

Lecture 38 - Compressibility Of Soils (Continued...)

Lecture 39 - Compressibility Of Soils (Continued...)

Lecture 40 - Compressibility Of Soils (Continued...)

Lecture 41 - Compressibility Of Soils (Continued...)

Lecture 42 - Compressibility Of Soils (Continued...)

Lecture 43 - Compressibility Of Soils (Continued...)

Lecture 44 - Compressibility And Settlement Of Soil

Lecture 45 - Compressibility And Settlement (Continued...)

Lecture 46 - Compressibility And Secondary Compression

Lecture 47 - Earth Pressure

Lecture 48 - Earth Pressure (Continued...)

Lecture 49 - Earth Pressure (Continued...)

Lecture 50 - Earth Pressure (Continued...)

Lecture 51 - Earth Pressure (Continued...)

Lecture 52 - Earth Pressure (Continued...)

Lecture 53 - Earth Pressure (Continued...)

Lecture 54 - Earth Pressure (Continued...)

Lecture 55 - Stability Of Slopes

Lecture 56 - Stability Of Slopes (Continued...)

Lecture 57 - Stability Of Slopes (Continued...)

Lecture 58 - Slope Stability

Lecture 59 - Slope Stabilty

Lecture 60 - Concluding Remarks

Lecture 61 - Live Session

NPTEL : NOC:Electronic Waste Management - Issues and Challenges (Civil Engineering)

Co-ordinators : Prof. Brajesh Kumar Dubey

Lecture 1 - E-Waste Overview

Lecture 2 - E-waste Overview

Lecture 3 - E-waste Overview

Lecture 4 - E-waste Management Overview

Lecture 5 - E-waste Management Overview

Lecture 6 - Environmental and Public Health Issues

Lecture 7 - Environmental and Public Health Issues (Continued...)

Lecture 8 - E-waste Health Risk Assessment

Lecture 9 - Environmental and Public Health Issues (Continued...)

Lecture 10 - Environmental and Public Health Issues (Continued...)

Lecture 11 - Recovery of Materials from E-Waste

Lecture 12 - Metal Recovery Process

Lecture 13 - Recovery of Metals from Electronic Waste

Lecture 14 - Recovery of Metals from Electronic Waste

Lecture 15 - Recovery of Metals from Electronic Waste

Lecture 16 - E-waste Management

Lecture 17 - E-waste Management

Lecture 18 - E-waste Management

Lecture 19 - Electronics and LCA

Lecture 20 - LCA applications for Electronics

Lecture 21 - Tutorial-I

Lecture 22 - Tutorial-II

NPTEL : NOC:Mineral Resources - Geology, Exploration, Economics and Environment (Civil Engineering)

Co-ordinators : Prof. M.K.Panigrahi

Lecture 1 - Introduction

Lecture 2 - Mineral Deposits in Space and Time

Lecture 3 - Mineral Deposits in Space and Time (Continued...)

Lecture 4 - Mineral Deposits in Time, Attributes of Mineral Deposits and Theories of Mineral Deposits

Lecture 5 - Classification of Mineral Deposits

Lecture 6 - Magmatic Processes

Lecture 7 - Magmatic Processes

Lecture 8 - Magmatic Processes

Lecture 9 - Magmatic Processes

Lecture 10 - Sedimentary Processes and Resultant Mineral Deposits

Lecture 11 - Sedimentary Processes and Resultant Deposits

Lecture 12 - Sedimentary Processes and Resultant Deposits

Lecture 13 - Sedimentary Processes and Resultant Deposits

Lecture 14 - Sedimentary Processes and Resultant Deposits

Lecture 15 - Morphology of Ore Deposits

Lecture 16 - Hydrothermal Processes

Lecture 17 - Hydrothermal Processe (Continued...)

Lecture 18 - Hydrothermal Processes

Lecture 19 - Hydrothermal Processes

Lecture 20 - Hydrothermal Processes

Lecture 21 - Hydrothermal Processes (Continued...)

Lecture 22 - Hydrothermal Processes (Continued...)

Lecture 23 - Hydrothermal Processes (Continued...)

Lecture 24 - Hydrothermal Systems

Lecture 25 - Hydrothermal Systems (Continued...)

Lecture 26 - Hydrothermal Processes and Resultant Deposits

Lecture 27 - Hydrothermal Processes and Resultant Deposits (Continued...)

Lecture 28 - Hydrothermal Processes and Resultant Mineralization

Lecture 29 - Indian Mineral Deposits

Lecture 30 - Indian Mineral Deposits (Continued...)

Lecture 31 - Indian Mineral Deposits (Continued...)

Lecture 32 - Mineral Exploration

Lecture 33 - Mineral Exploration (Continued...)

Lecture 34 - Mineral Exploration (Continued...)

Lecture 35 - Mineral Exploration (Continued...)

Lecture 36 - Mineral Exploration (Continued...)

Lecture 37 - Mineral Exploration (Continued...)

Lecture 38 - Mineral Exploration (Continued...)

Lecture 39 - Mineral Exploration (Continued...)

Lecture 40 - Mineral Exploration (Continued...)

Lecture 41 - Mineral Exploration (Continued...)

Lecture 42 - Mineral Exploration (Continued...)

Lecture 43 - Mineral Exploration (Continued...)

Lecture 44 - Mineral Exploration (Continued...)

Lecture 45 - Mineral Inventory Estimation

Lecture 46 - Mineral Inventory Estimation (Continued...)

Lecture 47 - Mineral Inventory Estimation (Continued...)

Lecture 48 - Mineral Inventory Estimation (Continued...)

Lecture 49 - Geostatistical Method of Mineral Inventory Estimation

Lecture 50 - Geostatistical Method of Mineral Inventory Estimation (Continued...)

Lecture 51 - Mineral Economics

Lecture 52 - Mineral Economics (Continued...)

Lecture 53 - Mineral Economics (Continued...)

Lecture 54 - Mineral Economics (Continued...)

Lecture 55 - Mineral Economics (Continued...)

Lecture 56 - Environmental Impact of Mineral Resource Exploitation

Lecture 57 - Environmental Impact of Mineral Resource Exploitation (Continued...)

Lecture 58 - Environmental Impact of Mineral Resource Exploitation (Continued...)

Lecture 59 - Environmental Impact of Mineral Resource Exploitation (Continued...)

Lecture 60 - Environmental Impact of Mineral Resource Exploitation (Continued...)

NPTEL : NOC:Introduction to Mineral Processing (Civil Engineering)

Co-ordinators : Prof. Arun Kumar Majumder

Lecture 1 - Importance of Mineral Processing

Lecture 2 - Importance to Mineral Processing (Continued...)

Lecture 3 - Importance of Mineral Processing (Continued...)

Lecture 4 - Importance of Mineral Processing (Continued...)

Lecture 5 - Importance of Mineral Processing (Continued...)

Lecture 6 - Particle Characterization

Lecture 7 - Particle Characterization (Continued...)

Lecture 8 - Particle Characterization (Continued...)

Lecture 9 - Particle Characterization (Continued...)

Lecture 10 - Particle Characterization (Continued...)

Lecture 11 - Particle Characterization (Continued...)

Lecture 12 - Sampling

Lecture 13 - Sampling (Continued...)

Lecture 14 - Plant Sampling

Lecture 15 - Plant Sampling (Continued...)

Lecture 16 - Comminution

Lecture 17 - Comminution (Continued...)

Lecture 18 - Comminution Fundamentals

Lecture 19 - Comminution Fundamentals (Continued...)

Lecture 20 - Crushers

Lecture 21 - Crushers (Continued...)

Lecture 22 - Crushers (Continued...)

Lecture 23 - Grinding

Lecture 24 - Grinding (Continued...)

Lecture 25 - Grinding (Continued...)

Lecture 26 - Grinding (Continued...)

Lecture 27 - Grinding (Continued...)

Lecture 28 - Industrial Screening

Lecture 29 - Industrial Screening (Continued...)

Lecture 30 - Industrial Screening (Continued...)

Lecture 31 - Industrial Screening (Continued...)

Lecture 32 - Industrial Screening (Continued...)

Lecture 33 - Industrial Screening (Continued...)

Lecture 34 - Industrial Screening (Continued...)

Lecture 35 - Movement of Solids in Fluids

Lecture 36 - Movement of Solids in Fluids (Continued...)

Lecture 37 - Movement of Solids in Fluids (Continued...)

Lecture 38 - Classifier

Lecture 39 - Classifier (Continued...)

Lecture 40 - Hydrocyclone

Lecture 41 - Hydrocyclone (Continued...)

Lecture 42 - Hydrocyclone (Continued...)

Lecture 43 - Hydrocyclone (Continued...)

Lecture 44 - Hydrocyclone (Continued...)

Lecture 45 - Mass Balancing

Lecture 46 - Mass Balancing (Continued...)

Lecture 47 - Closed-Circuit Grinding

Lecture 48 - Gravity Concentration

Lecture 49 - Gravity Concentration (Continued...)

Lecture 50 - Gravity Concentration (Continued...)

Lecture 51 - Gravity Concentration (Continued...)

Lecture 52 - Gravity Concentration (Continued...)

Lecture 53 - Flotation

Lecture 54 - Flotation (Continued...)

Lecture 55 - Flotation (Continued...)

Lecture 56 - Flotation Chemicals

Lecture 57 - Flotation Chemicals (Continued...)

Lecture 58 - Flotation Chemicals (Continued...)

Lecture 59 - Flotation Machines

Lecture 60 - Flotation Machines (Continued...)

Lecture 61 - Magnetic Separation

Lecture 62 - Electric Separation

Lecture 63 - Flow Sheets

Lecture 64 - Flow Sheets (Continued...)

NPTEL : NOC:Foundation Engineering (Civil Engineering)

Co-ordinators : Prof. Koushik Deb

Lecture 1 - Introduction

Lecture 2 - Introduction (Continued...)

Lecture 3 - Shear Strength

Lecture 4 - Soil Exploration - Boring

Lecture 5 - Standard Penetration Test

Lecture 6 - Standard Penetration Test and Cone Penetration Test

Lecture 7 - Cone Penetration Test and Other In-Situ Tests

Lecture 8 - Types of Samples

Lecture 9 - Geophysical Exploration - I

Lecture 10 - Geophysical Exploration - II

Lecture 11 - Shallow Foundation - Bearing Capacity I

Lecture 12 - Shallow Foundation - Bearing Capacity II

Lecture 13 - Shallow Foundation - Bearing Capacity III

Lecture 14 - Shallow Foundation - Bearing Capacity IV

Lecture 15 - Shallow Foundation - Bearing Capacity V

Lecture 16 - Shallow Foundation - Settlement I

Lecture 17 - Shallow Foundation - Settlement II

Lecture 18 - Shallow Foundation - Settlement III

Lecture 19 - Shallow Foundation - Settlement IV

Lecture 20 - Shallow Foundation - Settlement V

Lecture 21 - Shallow Foundation - Design I

Lecture 22 - Shallow Foundation - Design II

Lecture 23 - Shallow Foundation - Design III

Lecture 24 - Shallow Foundation - Design IV

Lecture 25 - Shallow Foundation - Design V

Lecture 26 - Shallow Foundation - Design VI

Lecture 27 - Pile Foundation - I

Lecture 28 - Pile Foundation - II

Lecture 29 - Pile Foundation - III

Lecture 30 - Pile Foundation - IV

Lecture 31 - Pile Foundation - V

Lecture 32 - Pile Foundation - VI

Lecture 33 - Pile Foundation - VII

Lecture 34 - Pile Foundation - VIII

Lecture 35 - Pile Foundation - IX

Lecture 36 - Pile Foundation - X

Lecture 37 - Pile Foundation - XI

Lecture 38 - Pile Foundation - XII

Lecture 39 - Pile Foundation - XIII

Lecture 40 - Pile Foundation - XIV

Lecture 41 - Earth Pressure - I

Lecture 42 - Earth Pressure - II

Lecture 43 - Earth Pressure - III

Lecture 44 - Earth Pressure - IV

Lecture 45 - Earth Pressure - V

Lecture 46 - Earth Pressure - VI

Lecture 47 - Earth Pressure - VII

Lecture 48 - Earth Pressure and Retaining Wall

Lecture 49 - Retaining Wall - II

Lecture 50 - Retaining Wall - III

Lecture 51 - Retaining Wall - IV

Lecture 52 - Retaining Wall - V and Sheet Piles - I

Lecture 53 - Sheet Piles - II

Lecture 54 - Sheet Piles - III

Lecture 55 - Sheet Piles - IV

Lecture 56 - Sheet Piles - V

Lecture 57 - Sheet Piles - VI

Lecture 58 - Sheet Piles and Braced Excavation

Lecture 59 - Braced Excavation and Underground Conduits

Lecture 60 - Underground Conduits - II

NPTEL : NOC:Theory of Elasticity (Civil Engineering)

Co-ordinators : Prof. Biswanath Banjerjee, Prof. Amit Shaw

Lecture 1 - Introduction

Lecture 2 - Introduction to Tensor

Lecture 3 - Introduction to Tensor (Continued...)

Lecture 4 - Introduction to Tensor (Continued...)

Lecture 5 - Introduction to Tensor (Continued...)

Lecture 6 - Introduction to Tensor (Continued...)

Lecture 7 - Concept of Stress and Strain

Lecture 8 - Concept of Stress and Strain (Continued...)

Lecture 9 - Concept of Stress and Strain (Continued...)

Lecture 10 - Concept of Stress and Strain (Continued...)

Lecture 11 - Concept of Stress and Strain (Continued...)

Lecture 12 - Constitutive Relation - I

Lecture 13 - Constitutive Relation - I (Continued...)

Lecture 14 - Constitutive Relation - I (Continued...)

Lecture 15 - Constitutive Relation - I (Continued...)

Lecture 16 - Constitutive Relation - I (Continued...)

Lecture 17 - Constitutive Relation - II

Lecture 18 - Constitutive Relation - II (Continued...)

Lecture 19 - Constitutive Relation - II (Continued...)

Lecture 20 - Constitutive Relation - II (Continued...)

Lecture 21 - Constitutive Relation - II (Continued...)

Lecture 22 - Formulation of Boundary Value Problems

Lecture 23 - Formulation of Boundary Value Problems (Continued...)

Lecture 24 - Formulation of Boundary Value Problems (Continued...)

Lecture 25 - Formulation of Boundary Value Problems (Continued...)

Lecture 26 - Formulation of Boundary Value Problems (Continued...)

Lecture 27 - Solution of Boundary Value Problems

Lecture 28 - Solution of Boundary Value Problems (Continued...)

Lecture 29 - Solution of Boundary Value Problems (Continued...)

Lecture 30 - Solution of Boundary Value Problems (Continued...)

Lecture 31 - Solution of Boundary Value Problems (Continued...)

Lecture 32 - Solution of Boundary Value Problems (Continued...)

Lecture 33 - Problems in Flexure

Lecture 34 - Problems in Flexure (Continued...)

Lecture 35 - Problems in Flexure (Continued...)

Lecture 36 - Problems in Flexure (Continued...)

Lecture 37 - Problems in Flexure (Continued...)

Lecture 38 - Boundary Value Problems in Elasticity

Lecture 39 - Boundary Value Problems in Elasticity (Continued...)

Lecture 40 - Boundary Value Problems in Elasticity (Continued...)

Lecture 41 - Boundary Value Problems in Elasticity (Continued...)

Lecture 42 - Boundary Value Problems in Elasticity (Continued...)

Lecture 43 - Complex Variable Method

Lecture 44 - Complex Variable Method (Continued...)

Lecture 45 - Complex Variable Method (Continued...)

Lecture 46 - Complex Variable Method (Continued...)

Lecture 47 - Complex Variable Method (Continued...)

Lecture 48 - Complex Variable Method (Continued...)

Lecture 49 - Thermoelasticity

Lecture 50 - Thermoelasticity (Continued...)

Lecture 51 - Thermoelasticity (Continued...)

Lecture 52 - Thermoelasticity (Continued...)

Lecture 53 - Thermoelasticity (Continued...)

Lecture 54 - Photo-Elasticity

Lecture 55 - Photo-Elasticity (Continued...)

Lecture 56 - Photo-Elasticity (Continued...)

Lecture 57 - Photo-Elasticity (Continued...)

Lecture 58 - Photo-Elasticity (Continued...)

Lecture 59 - Introduction to Nonlinear Elasticity

Lecture 60 - Closure

NPTEL : NOC:Wastewater Treatment and Recycling (Civil Engineering)

Co-ordinators : Prof. Manoj Kumar Tiwari

Lecture 1 - Course Introduction

Lecture 2 - Sources and Types of Wastewater

Lecture 3 - Pollutants in Wastewater: Point and Non-point Sources

Lecture 4 - Wastewater Management: Concept of Treatment and Recycling

Lecture 5 - Wastewater Management: Issues and Challenges

Lecture 6 - Wastewater Generation and Quantity Estimation

Lecture 7 - Quantity Estimation of Sewage

Lecture 8 - Population Forecasting Methods

Lecture 9 - Quantity Estimation of Sewage Flow

Lecture 10 - Sewage Quantity Estimation: Practice Problems

Lecture 11 - Wastewater Characteristics: Quality Parameters

Lecture 12 - Wastewater Characteristics: Quality Parameters (Continued...)

Lecture 13 - Wastewater Characteristics: Quality Parameters (Continued...)

Lecture 14 - Wastewater Characteristics: Quality Parameters (Continued...)

Lecture 15 - Wastewater Characteristics: Practice Problems

Lecture 16 - Fate and Transport of Contaminants Discharged in River

Lecture 17 - Effects on DO and BOD Natural Purification in Rivers: Effects on DO and BOD

Lecture 18 - BOD and Variations in streams Receiving Waste water

Lecture 19 - Natural Purification: Practice Problems

Lecture 20 - Engineered Treatment of Waste water:Concept of mass balance

Lecture 21 - Mass Balance: Application in Specific Cases

Lecture 22 - Mass Balance in Reactors: Application and Practice Problems

Lecture 23 - Basic of Municipal Wastewater Treatment

Lecture 24 - Wastewater Treatment Units: Screening

Lecture 25 - Wastewater Treatment Units: Grit Removal and Equalization

Lecture 26 - Watsewater Treatment Units: Primary Sedimentation

Lecture 27 - Wastewater Treatment Units: Primary Sedimentation

Lecture 28 - Secondary Treatment Processes: Introduction to Biological Treatment of Wastewater

Lecture 29 - Biological Treatment of Wastewater: Microbial Growth and its Kinetics

Lecture 30 - Biological Treatment of Wastewater: Microbial Growth Kinetics

Lecture 31 - Biological Treatment of Wastewater: Activated Sludge Process

Lecture 32 - Biological Treatment of Wastewater: ASP, TF and RCB

Lecture 33 - Secondary Treatment Processes: Introduction to Anaerobic Treatment of Wastewater

Lecture 34 - Anaerobic Degradation Processes

Lecture 35 - Anaerobic Degradation: Characteristics and Applications

Lecture 36 - Anaerobic Treatment of Wastewater: UASB Reactor

Lecture 37 - Anaerobic Treatment of Wastewater: Other High Rate Anaerobic Processes

Lecture 38 - Introduction to Sludge Management

Lecture 39 - Wastewater Sludge: Quantity and Characteristics

Lecture 40 - Wastewater Sludge Processing and Treatment: Sludge Thickening

Lecture 41 - Wastewater Sludge Processing and Treatment: Sludge Stabilization and Conditioning

Lecture 42 - Wastewater Sludge Processing and Treatment: Dewatering, Hygienisation, Disposal/Reuse

Lecture 43 - Tertiary (Advanced) Treatment of Wastewater

Lecture 44 - Tertiary Treatment: Nutrients Removal

Lecture 45 - Tertiary Treatment: Adsorption and Ion Exchange

Lecture 46 - Tertiary Treatment: Membrane Processes

Lecture 47 - Tertiary Treatment: Disinfection and Chemical Treatments

Lecture 48 - Wastewater Treatment Systems: Options and Conventional Approach

Lecture 49 - Wastewater Treatment Systems: Integrated Systems: Wetlands

Lecture 50 - Alternate Wastewater Treatment Systems: SBR and SBBR

Lecture 51 - Alternate Wastewater Treatment Systems: MBR and MBBR

Lecture 52 - Concept of Wastewater Reuse and Recycling

Lecture 53 - Wastewater Reuse and Recycling Opportunities

Lecture 54 - Wastewater Reuse and Recycling Potential and Requirements

Lecture 55 - Wastewater Reuse and Recycling Regulatory Guidelines

Lecture 56 - Wastewater Reuse and Recycling: Centralized Vs Decentralized Recycling

Lecture 57 - Wastewater Reuse and Recycling: Challenges, Risks and Research Trends

Lecture 58 - Decision Making in Wastewater Reuse and Recycling

Lecture 59 - Public Acceptance for Recycled Water Use

Lecture 60 - Wastewater Reuse and Recycling: Global Practices and Case Studies

Lecture 61 - Course Summary

Lecture 62 - Course Summary (Continued...)

NPTEL : NOC:Fluid Inclusion in Mineral Principles, Methodology, Practice and Application (Civil Engineering)

Co-ordinators : Prof. M.K.Panigrahi

Lecture 1 - Introduction

Lecture 2 - Introduction (Continued...)

Lecture 3 - Introduction (Continued...)

Lecture 4 - Introduction (Continued...)

Lecture 5 - Introduction (Continued...)

Lecture 6 - Microthermometry

Lecture 7 - Microthermometry: Principles

Lecture 8 - Microthermometry: Principles (Continued...)

Lecture 9 - Microthermometry: Principles (Continued...)

Lecture 10 - Fluid Inclusion Petrography

Lecture 11 - Aqueous Fluid Inclusions

Lecture 12 - Aqueous Fluid Inclusions (Continued...)

Lecture 13 - Response to Heating Experiment

Lecture 14 - Aqueous Fluid Inclusions (Continued...)

Lecture 15 - Aqueous Fluid Inclusions (Continued...)

Lecture 16 - Pure Carbonic Inclusion

Lecture 17 - Pure Carbonic Inclusion (Continued...)

Lecture 18 - Microthermometry of Aqueous-Carbonic Inclusion

Lecture 19 - Microthermometry of Aqueous-Carbonic Inclusion (Continued...)

Lecture 20 - Microthermometry of Aqueous-Carbonic Fluid Inclusion

Lecture 21 - Application of Fluid Inclusion to Ore Environment

Lecture 22 - Application of Fluid Inclusion Studies to Ore Environment

Lecture 23 - Application of fluid Inclusion to Ore Forming Environments

Lecture 24 - Application of fluid Inclusion to Ore Forming Environments (Continued...)

Lecture 25 - Application of fluid Inclusion to Ore Forming Environments (Continued...)

Lecture 26 - Application of fluid Inclusion to Deformation, Metamorphism

Lecture 27 - Application of fluid Inclusion to Deformation, Metamorphism (Continued...)

Lecture 28 - Application of fluid Inclusion to Deformation, Metamorphism (Continued...)

Lecture 29 - Application of fluid Inclusion to Deformation, Metamorphism (Continued...)

Lecture 30 - Application of fluid Inclusion to Deformation, Metamorphism (Continued...)

Lecture 31 - Analysis of Fluid Inclusion

Lecture 32 - Analysis of Fluid Inclusion (Continued...)

Lecture 33 - Analysis of Fluid Inclusion (Continued...)

Lecture 34 - Analysis of Fluid Inclusion (Continued...)

Lecture 35 - Analysis of Fluid Inclusion (Continued...)

Lecture 36 - Computer Software for Fluid Inclusion Data

Lecture 37 - Computer Software for Fluid Inclusion Data (Continued...)

Lecture 38 - Computer Software for Fluid Inclusion Data (Continued...)

Lecture 39 - Review of the Course

Lecture 40 - Review of the Course (Continued...)

NPTEL : NOC:Matrix Method of Structural Analysis (Civil Engineering)

Co-ordinators : Prof. Biswanath Banjerjee, Prof. Amit Shaw

Lecture 1 - Introduction

Lecture 2 - Review of Structural Analysis - I

Lecture 3 - Review of Structural Analysis - I (Continued...)

Lecture 4 - Review of Structural Analysis - I (Continued...)

Lecture 5 - Review of Structural Analysis - I (Continued...)

Lecture 6 - Review of Structural Analysis - I (Continued...)

Lecture 7 - Review of Structural Analysis - I (Continued...)

Lecture 8 - Review of Structural Analysis - I (Continued...)

Lecture 9 - Review of Structural Analysis - I (Continued...)

Lecture 10 - Review of Structural Analysis - I (Continued...)

Lecture 11 - Matrix Algebra Review

Lecture 12 - Matrix Algebra Review (Continued...)

Lecture 13 - Matrix Algebra Review (Continued...)

Lecture 14 - Matrix Algebra Review (Continued...)

Lecture 15 - Matrix Algebra Review (Continued...)

Lecture 16 - Matrix Method of Analysis of Trusses

Lecture 17 - Matrix Method of Analysis of Trusses (Continued...)

Lecture 18 - Matrix Method of Analysis of Trusses (Continued...)

Lecture 19 - Matrix Method of Analysis of Trusses (Continued...)

Lecture 20 - Matrix Method of Analysis of Trusses (Continued...)

Lecture 21 - Matrix Method of Analysis: Beams

Lecture 22 - Matrix Method of Analysis: Beams (Continued...)

Lecture 23 - Matrix Method of Analysis: Beams (Continued...)

Lecture 24 - Matrix Method of Analysis: Beams (Continued...)

Lecture 25 - Matrix Method of Analysis: Beams (Continued...)

Lecture 26 - Matrix Method of Analysis: Frame (2D)

Lecture 27 - Matrix Method of Analysis: Frame (2D) (Continued...)

Lecture 28 - Matrix Method of Analysis: Frame (2D) (Continued...)

Lecture 29 - Matrix Method of Analysis: Frame (2D) (Continued...)

Lecture 30 - Matrix Method of Analysis: Frame (2D) (Continued...)

Lecture 31 - Computer Implementation

Lecture 32 - Computer Implementation (Continued...)

Lecture 33 - Analysis of 3D Truss

Lecture 34 - Analysis of 3D Truss (Continued...)

Lecture 35 - Analysis of Beam

Lecture 36 - Introduction to Finite Element Method

Lecture 37 - Introduction to Finite Element Method (Continued...)

Lecture 38 - Introduction to Finite Element Method (Continued...)

Lecture 39 - Introduction to Finite Element Method (Continued...)

Lecture 40 - Introduction to Finite Element Method (Continued...)

Lecture 41 - Introduction to Finite Element Method (Continued...)

Lecture 42 - Introduction to Finite Element Method (Continued...)

NPTEL : NOC:Plastic Waste Management (Civil Engineering)

Co-ordinators : Prof. Brajesh Kumar Dubey

Lecture 1 - Plastics - What is Plastic

Lecture 2 - Plastics - Types

Lecture 3 - Plastics - Types (Continued...)

Lecture 4 - Plastics - Uses and Global Statistics

Lecture 5 - Plastics - Global Statistics

Lecture 6 - Plastic Waste Sources

Lecture 7 - Plastic Waste Sources (Continued...)

Lecture 8 - Plastic Waste Sources and Production

Lecture 9 - Global Sources

Lecture 10 - Global and Indian data

Lecture 11 - Plastic Waste Management Rules 2016 (India)

Lecture 12 - Plastic Waste Management Rules (Continued...)

Lecture 13 - Plastic Waste Management Rules (Continued...)

Lecture 14 - Plastic Waste Management Rules (Continued...)

Lecture 15 - Global Rules and Regulations

Lecture 16 - Plastic Bans including China Sword Policy Implication on Global Plastic Waste Management

Lecture 17 - Plastic Bans - Global Examples

Lecture 18 - Plastic Bans - China Sword Policy

Lecture 19 - Plastic Bans - China Sword Policy Impacts

Lecture 20 - Plastic Bans - Impact on Global Plastic Waste Management

Lecture 21 - Impact of Plastic Pollution on Marine Life

Lecture 22 - Impact of Plastic Pollution on Marine Life (Continued...)

Lecture 23 - Plastic Pollution Impacts on Marine and Wildlife

Lecture 24 - Plastic Pollution : Health and Environmental Impact

Lecture 25 - Plastic Pollution : Health and Environmental Impact (Continued...)

Lecture 26 - Plastic Waste Management Practices : Recycling and Waste Plastics

Lecture 27 - Plastic Waste Management : Mechanical and Feedstock Recycling

Lecture 28 - Plastic Waste Management : Feedstock Recycling - Pyrolysis and Waste to Energy

Lecture 29 - Plastic Waste Management : Landfilling, Other Applications

Lecture 30 - Use of Waste Plastics in Road Construction

Lecture 31 - Possible Alternate Materials to Plastics - Greener Alternatives

Lecture 32 - Biodegradable Plastics

Lecture 33 - Greener Plastic Products

Lecture 34 - Biobased Plastic Products

Lecture 35 - How to Quantify Something is Green

Lecture 36 - Plastics Resource Recovery and Circular Economy

Lecture 37 - Plastics Resource Recovery and Intro to Circular Economy

Lecture 38 - Plastics and Circular Economy

Lecture 39 - Plastics and Circular Economy - Case Studies

Lecture 40 - Plastics and Circular Economy - Case Studies (Continued...)

NPTEL : NOC:Geotechnical Engineering-II Foundation Engineering (Civil Engineering)

Co-ordinators : Prof. Dilip Kumar Baidya

Lecture 1 - Quick Review of Soil Mechanics

Lecture 2 - Quick Review of Soil Mechanics (Continued...)

Lecture 3 - Quick Review of Soil Mechanics (Continued...)

Lecture 4 - Quick Review of Soil Mechanics (Continued...)

Lecture 5 - Quick Review of Soil Mechanics (Continued...)

Lecture 6 - Foundation Engineering Introduction

Lecture 7 - Foundation Engineering Introduction (Continued...)

Lecture 8 - Foundation Engineering Introduction (Continued...)

Lecture 9 - Shallow Foundation and Bearing Capacity

Lecture 10 - Shallow Foundation and Bearing Capacity (Continued...)

Lecture 11 - Shallow Foundation and Bearing Capacity (Continued...)

Lecture 12 - Shallow Foundation

Lecture 13 - Shallow Foundation (Continued...)

Lecture 14 - Shallow Foundation (Continued...)

Lecture 15 - Shallow Foundation (Continued...)

Lecture 16 - Shallow Foundation (Continued...)

Lecture 17 - Settlement of Foundation

Lecture 18 - Settlement of Foundation (Continued...)

Lecture 19 - Settlement of Foundation (Continued...)

Lecture 20 - Settlement of Foundation (Continued...)

Lecture 21 - Settlement of Foundation (Continued...)

Lecture 22 - Settlement of Foundation (Continued...)

Lecture 23 - Geotechnical Investigation

Lecture 24 - Geotechnical Investigation (Continued...)

Lecture 25 - Geotechnical Investigation (Continued...)

Lecture 26 - Geotechnical Investigation (Continued...)

Lecture 27 - Geotechnical Investigation (Continued...)

Lecture 28 - Earth Pressure Theories

Lecture 29 - Earth Pressure Theories (Continued...)

Lecture 30 - Earth Pressure Theories (Continued...)

Lecture 31 - Earth Pressure Theories (Continued...)

Lecture 32 - Earth Pressure Theories (Continued...)

Lecture 33 - Stability analysis of earth retaining wall

Lecture 34 - Stability analysis of earth retaining wall (Continued...)

Lecture 35 - Stability analysis of earth retaining wall (Continued...)

Lecture 36 - Stability of earth retaining wall

Lecture 37 - Pile foundation

Lecture 38 - Pile foundation (Continued...)

Lecture 39 - Pile foundation (Continued...)

Lecture 40 - Pile foundation (Continued...)

Lecture 41 - Pile foundation (Continued...)

Lecture 42 - Pile foundation (Continued...)

Lecture 43 - Pile foundation (Continued...)

Lecture 44 - Pile foundation (Continued...)

Lecture 45 - Pile foundation (Continued...)

Lecture 46 - Pile foundation (Continued...)

Lecture 47 - Sheet pile wall

Lecture 48 - Sheet pile wall (Continued...)

Lecture 49 - Anchor bulkhead

Lecture 50 - Anchor bulkhead (Continued...)

Lecture 51 - Deep excavation

Lecture 52 - Deep excavation (Continued...)

Lecture 53 - Introduction to machine foundation

Lecture 54 - Introduction to machine foundation (Continued...)

Lecture 55 - Introduction to machine foundation (Continued...)

Lecture 56 - Introduction to machine foundation (Continued...)

Lecture 57 - Introduction to machine foundation (Continued...)

Lecture 58 - Introduction to machine foundation (Continued...)

Lecture 59 - Introduction to machine foundation (Continued...)

Lecture 60 - Summary

NPTEL : NOC:Mass, Momentum and Energy Balances in Engineering Analysis (Civil Engineering)

Co-ordinators : Prof. Pavitra Sandilya

Lecture 1 - Introduction

Lecture 2 - Preliminaries

Lecture 3 - Balance Equations Preliminaries - I

Lecture 4 - Tutorial 1 - Balance Equations Preliminaries - I

Lecture 5 - Balance Equations Preliminaries - II

Lecture 6 - Tutorial 2 - Balance Equations Preliminaries - II

Lecture 7 - Macroscopic Balances - I

Lecture 8 - Macroscopic Balances - II

Lecture 9 - Macroscopic Balances - III

Lecture 10 - Tutorial 3 - Macroscopic Balances

Lecture 11 - Tutorial 4 - Macroscopic Balances

Lecture 12 - Tutorial 5 - Systems with chemical reactions

Lecture 13 - Tutorial 6 - Material balance involving chemical reactions

Lecture 14 - Tutorial 7 - Energy interactions in reacting systems Energy interactions in reacting systems

Lecture 15 - Tutorial 8 - Energy interactions in reacting systems

Lecture 16 - Solution of Macroscopic Balance Equations - I

Lecture 17 - Solution of Macroscopic Balance Equations - II

Lecture 18 - Tutorial 9 - Solution of Macroscopic Balance Equations - I

Lecture 19 - Tutorial 10 - Solution of Macroscopic Balance Equations - II

Lecture 20 - Mathematical Solution of Macroscopic Balance Equations

Lecture 21 - Mathematical Solution of Macroscopic Balance Equations

Lecture 22 - Numerical Solution of Macroscopic Balance Equations

Lecture 23 - Numerical evaluation of integrations in macroscopic balance equations

Lecture 24 - Microscopic Balances - I

Lecture 25 - Microscopic Balances - II

Lecture 26 - Microscopic Balances - III

Lecture 27 - Microscopic Balances - IV

Lecture 28 - Microscopic Balances - V

Lecture 29 - Microscopic Balances - VI

Lecture 30 - Microscopic Balances - VII

Lecture 31 - Microscopic Balance Illustrations - I

Lecture 32 - Microscopic Balance Illustrations - II

Lecture 33 - Microscopic Balance Illustrations - III

Lecture 34 - Microscopic Balance Illustrations - IV

Lecture 35 - Microscopic Balance Illustrations - V

Lecture 36 - Matrix Techniques - I

Lecture 37 - Matrix Techniques - II

Lecture 38 - Regression

Lecture 39 - Interpolation

Lecture 40 - Illustration of Interpolation

Lecture 41 - Illustration of Regression

Lecture 42 - Tutorial on macroscopic energy balance

Lecture 43 - Selective Mathematical Concepts in Transport Phenomena

NPTEL : NOC:Soil Structure Interaction (Civil Engineering)

Co-ordinators : Prof. Koushik Deb

Lecture 1 - Introduction

Lecture 2 - Bearing Capacity of Soil

Lecture 3 - Bearing Capacity of Soil (Continued...)

Lecture 4 - Bearing Capacity of Soil (Continued...)

Lecture 5 - Settlement of Shallow Foundation

Lecture 6 - Design of Shallow Foundation

Lecture 7 - Design of Shallow Foundation (Continued...)

Lecture 8 - Design of Shallow Foundation (Continued...)

Lecture 9 - Soil-Structure Interaction for Shallow Foundation : Concept of Subgrade Modulus

Lecture 10 - Soil-Structure Interaction for Shallow Foundation : Concept of Subgrade Modulus (Continued...)

Lecture 11 - Soil-Structure Interaction for Shallow Foundation : Concept of Subgrade Modulus (Continued...)

Lecture 12 - Soil-Structure Interaction for Shallow Foundation : Concept of Subgrade Modulus (Continued...)

Lecture 13 - Different Foundation Models

Lecture 14 - Different Foundation Models (Continued...)

Lecture 15 - Different Foundation Models (Continued...)

Lecture 16 - Different Foundation Models (Continued...)

Lecture 17 - Different Foundation Models (Continued...)

Lecture 18 - Beams on Elastic Foundation

Lecture 19 - Beams on Elastic Foundation (Continued...)

Lecture 20 - Beams on Elastic Foundation (Continued...)

Lecture 21 - Beams on Elastic Foundation (Continued...)

Lecture 22 - Beams on Elastic Foundation (Continued...)

Lecture 23 - Beams on Elastic Foundation (Continued...)

Lecture 24 - Beams on Elastic Foundation (Continued...)

Lecture 25 - Beams on Elastic Foundation (Continued...)

Lecture 26 - Beams on Elastic Foundation (Continued...)

Lecture 27 - Beams on Elastic Foundation (Continued...)

Lecture 28 - Beams on Elastic Foundation (Continued...)

Lecture 29 - Beams on Elastic Foundation (Continued...)

Lecture 30 - Beams on Elastic Foundation (Continued...)

Lecture 31 - Beams on Elastic Foundation (Continued...)

Lecture 32 - Beams on Elastic Foundation (Continued...)

Lecture 33 - Beams on Elastic Foundation (Continued...)

Lecture 34 - Beams on Elastic Foundation (Continued...)

Lecture 35 - Beams on Elastic Foundation (Continued...)

Lecture 36 - Beams on Elastic Foundation (Continued...)

Lecture 37 - Beams on Elastic Foundation (Continued...)

Lecture 38 - Beams on Elastic Foundation (Continued...)

Lecture 39 - Beams on Elastic Foundation (Continued...)

Lecture 40 - Beams on Elastic Foundation (Continued...)

Lecture 41 - Plates on Elastic Foundation

Lecture 42 - Plates on Elastic Foundation (Continued...)

Lecture 43 - Plates on Elastic Foundation (Continued...)

Lecture 44 - Plates on Elastic Foundation (Continued...)

Lecture 45 - Use of Finite Difference Method for Soil Structure Interaction Problems

Lecture 46 - Use of Finite Difference Method for Soil Structure Interaction Problems (Continued...)

Lecture 47 - Use of Finite Difference Method for Soil Structure Interaction Problems (Continued...)

Lecture 48 - Use of Finite Difference Method for Soil Structure Interaction Problems (Continued...)

Lecture 49 - Use of Finite Difference Method for Soil Structure Interaction Problems (Continued...)

Lecture 50 - Use of Finite Difference Method for Soil Structure Interaction Problems (Continued...)

Lecture 51 - Use of Finite Difference Method for Soil Structure Interaction Problems (Continued...)

Lecture 52 - Soil Structure Interaction for Pile Foundation

Lecture 53 - Soil Structure Interaction for Pile Foundation (Continued...)

Lecture 54 - Soil Structure Interaction for Pile Foundation (Continued...)

Lecture 55 - Soil Structure Interaction for Pile Foundation (Continued...)

Lecture 56 - Soil Structure Interaction for Pile Foundation (Continued...)

Lecture 57 - Soil Structure Interaction for Pile Foundation (Continued...)

Lecture 58 - Soil Structure Interaction for Pile Foundation (Continued...)

Lecture 59 - Soil Structure Interaction for Pile Foundation (Continued...)

Lecture 60 - Soil Structure Interaction for Pile Foundation (Continued...)

Lecture 61 - Soil Structure Interaction for Pile Foundation (Continued...)

Lecture 62 - Soil Structure Interaction for Pile Foundation (Continued...)

Lecture 63 - Soil Structure Interaction for Pile Foundation (Continued...)

Lecture 64 - Soil Structure Interaction for Pile Foundation (Continued...)

Lecture 65 - Soil Structure Interaction for Pile Foundation (Continued...)

Lecture 66 - Soil Structure Interaction for Pile Foundation (Continued...)

NPTEL : NOC:Water Supply Engineering (Civil Engineering)

Co-ordinators : Prof. Manoj Kumar Tiwari

Lecture 1 - Backgroung and Course Introduction

Lecture 2 - Water Sources and Availability

Lecture 3 - Water Uses

Lecture 4 - Water Supply Key Issues and Concerns

Lecture 5 - Urban water services and water supply systems

Lecture 6 - Urban water services and water supply systems

Lecture 7 - Components of Water Demand

Lecture 8 - Fluctuations in Water Demand

Lecture 9 - Concept of Design Period and Design Population Need to Forecast Population Population Forecasting Methods

Lecture 10 - Demand Forecasting and Design Capacities

Lecture 11 - Water Sources and Collection of Water

Lecture 12 - Surface Water Intakes

Lecture 13 - Surface Water Intakes Systems

Lecture 14 - Groundwater Intake

Lecture 15 - Well Interferences, Well losses and Efficiency

Lecture 16 - Raw water Conveyance and Pumping

Lecture 17 - Practice Problems

Lecture 18 - Raw Water Storage

Lecture 19 - Treated Water Storage

Lecture 20 - Placement, Design and Construction of Storage Reservoirs

Lecture 21 - Practice Problems on Reservoir Capacity Estimation

Lecture 22 - Water Quality and Water Pollutants

Lecture 23 - Water Quality Parameters

Lecture 24 - Philosophy of Water Treatment

Lecture 25 - Water Treatment Units Screening and Aeration

Lecture 26 - Water Treatment Units Sedimentation

Lecture 27 - Practice Problems On Sedimentation

Lecture 28 - Coagulation and Flocculation: Theory

Lecture 29 - Coagulation and Flocculation: Selection and Application

Lecture 30 - Coagulation and Flocculation: Design Operation and Process Control

Lecture 31 - Filtration Theory and Slow Sand Filters

Lecture 32 - Rapid Sand Filter: Filter Media and Components

Lecture 33 - Rapid Sand Filters and Pressure Filters

Lecture 34 - Practice Problems Coagulation Flocculation and Filtration

Lecture 35 - Disinfection Basic

Lecture 36 - Chlorination

Lecture 37 - Other Disinfection Method: Ozone and UV Disinfection

Lecture 38 - Sluge Management

Lecture 39 - Advanced and Alternate Treatment Systems

Lecture 40 - Advanced Oxidation Processes and Membrane Process

Lecture 41 - Practice Problems

Lecture 42 - Basic of Water Distribution System

Lecture 43 - Water Distribution Networks

Lecture 44 - Analysis of Water Distribution Networks

Lecture 45 - Problems onPipe Flow and Water Distribution Network

Lecture 46 - Water Losses in Water Distribution System

Lecture 47 - Water Balance for Water Loss Assessment and Performance Indicators

Lecture 48 - Water Loss Detection and Control

Lecture 49 - Practice Problems on Water Audit and Water Loss Estimation

Lecture 50 - Continuous (24*7) water supply systems

Lecture 51 - District metered area (DMA) for zoning in water distribution networks

Lecture 52 - Software for water distribution networks design and analysis

Lecture 53 - Demonstration on EPANET and GEMS

Lecture 54 - Concept of smart water supply systems

Lecture 55 - Smart Metering and sensing devices

Lecture 56 - IoT and Automation in Water Supply

Lecture 57 - Example of Automation and Smart Water Supply Systems

Lecture 58 - Economics of Water Supply Systems

Lecture 59 - Capital and Operational Cost of Water Supply System

Lecture 60 - Pricing Waters

Lecture 61 - Pricing Waters (Continued...)

Lecture 62 - Case studies and Practice Problem on Water Pricing

NPTEL : NOC:Geo Spatial Analysis in Urban Planning (Civil Engineering)

Co-ordinators : Prof. Saikat Kumar Paul

Lecture 1 - Introduction to Geographic Information System

Lecture 2 - Introduction to Coordinate System and Geographic Projections

Lecture 3 - Geometric Transformation

Lecture 4 - Vector Data Model

Lecture 5 - Raster Data Model

Lecture 6 - Method of Spatial Analysis

Lecture 7 - Vector Data Analysis

Lecture 8 - Vector Data Analysis (Continued...)

Lecture 9 - Raster Data Analysis

Lecture 10 - Raster Operations, Terrain Visualization and Classification

Lecture 11 - Attribute Data Management and Data Exploration

Lecture 12 - Spatial Interpolation

Lecture 13 - Spatial Interpolation

Lecture 14 - Network Analysis

Lecture 15 - Service or Trade Area Analysis in an Urban Area

Lecture 16 - Service or Trade Area Analysis in an Urban Area (Continued...)

Lecture 17 - Landscape metrics and its applications

Lecture 18 - Urban sprawl characterization using Landscape Metrics

Lecture 19 - Multi-Criteria Decision Analysis

NPTEL : NOC:Hydraulic Engineering (Civil Engineering)

Co-ordinators : Prof. Mohammad Saud Afzal

Lecture 1 - Basics of fluid mechanics - I

Lecture 2 - Basics of fluid mechanics - I (Continued...)

Lecture 3 - Basics of fluid mechanics - I (Continued...)

Lecture 4 - Basics of fluid mechanics - I (Continued...)

Lecture 5 - Basics of fluid mechanics - I (Continued...)

Lecture 6 - Basics of fluid mechanics - II

Lecture 7 - Basics of fluid mechanics - II (Continued...)

Lecture 8 - Basics of fluid mechanics - II (Continued...)

Lecture 9 - Basics of fluid mechanics - II (Continued...)

Lecture 10 - Basics of fluid mechanics - II (Continued...)

Lecture 11 - Basics of fluid mechanics - II (Continued...)

Lecture 12 - Laminar and turbulent flow

Lecture 13 - Laminar and turbulent flow (Continued...)

Lecture 14 - Laminar and turbulent flow (Continued...)

Lecture 15 - Laminar and turbulent flow (Continued...)

Lecture 16 - Laminar and turbulent flow (Continued...)

Lecture 17 - Boundary Layer Theory

Lecture 18 - Boundary Layer Theory (Continued...)

Lecture 19 - Boundary Layer Theory (Continued...)

Lecture 20 - Boundary Layer Theory (Continued...)

Lecture 21 - Boundary Layer Theory (Continued...)

Lecture 22 - Boundary Layer Theory (Continued...)

Lecture 23 - Dimensional Analysis and Hydraulic Similitude

Lecture 24 - Dimensional Analysis and Hydraulic Similitude (Continued...)

Lecture 25 - Dimensional Analysis and Hydraulic Similitude (Continued...)

Lecture 26 - Dimensional Analysis and Hydraulic Similitude (Continued...)

Lecture 27 - Dimensional Analysis and Hydraulic Similitude (Continued...)

Lecture 28 - Introduction to Open Channel Flow and Uniform Flow

Lecture 29 - Introduction to Open Channel Flow and Uniform Flow (Continued...)

Lecture 30 - Introduction to Open Channel Flow and Uniform Flow (Continued...)

Lecture 31 - Introduction to Open Channel Flow and Uniform Flow (Continued...)

Lecture 32 - Introduction to Open Channel Flow and Uniform Flow (Continued...)

Lecture 33 - Introduction to Open Channel Flow and Uniform Flow (Continued...)

Lecture 34 - Non-uniform flow and hydraulic jump

Lecture 35 - Non-uniform flow and hydraulic jump (Continued...)

Lecture 36 - Non-uniform flow and hydraulic jump (Continued...)

Lecture 37 - Non-uniform flow and hydraulic jump (Continued...)

Lecture 38 - Pipe flow

Lecture 39 - Pipe flow (Continued...)

Lecture 40 - Pipe flow (Continued...)

Lecture 41 - Pipe flow (Continued...)

Lecture 42 - Pipe flow (Continued...)

Lecture 43 - Pipe networks

Lecture 44 - Pipe networks (Continued...)

Lecture 45 - Pipe networks (Continued...)

Lecture 46 - Pipe networks (Continued...)

Lecture 47 - Pipe networks (Continued...)

Lecture 48 - Viscous fluid flow

Lecture 49 - Viscous fluid flow (Continued...)

Lecture 50 - Viscous fluid flow (Continued...)

Lecture 51 - Viscous fluid flow (Continued...)

Lecture 52 - Viscous fluid flow (Continued...)

Lecture 53 - Viscous fluid flow (Continued...)

Lecture 54 - Computational fluid dynamics

Lecture 55 - Computational fluid dynamics (Continued...)

Lecture 56 - Computational fluid dynamics (Continued...)

Lecture 57 - Computational fluid dynamics (Continued...)

Lecture 58 - Computational fluid dynamics (Continued...)

Lecture 59 - Introduction to wave mechanics

Lecture 60 - Introduction to wave mechanics (Continued...)

Lecture 61 - Introduction to wave mechanics (Continued...)

Lecture 62 - Introduction to wave mechanics (Continued...)

Lecture 63 - Introduction to wave mechanics (Continued...)

NPTEL : NOC:Introduction to Multimodal Urban Transportation Systems (Civil Engineering)

Co-ordinators : Prof. Arkopal Kishore Goswami

Lecture 1 - Overview of urban transportation: Urbanization and Transport

Lecture 2 - Overview of urban transportation: Key issues in urban transportation

Lecture 3 - Overview of urban transportation: Challenges in urban transportation

Lecture 4 - Overview of urban transportation: Travel demand modelling overview

Lecture 5 - Overview of urban transportation: Vehicular Level of Service (LOS) overview

Lecture 6 - Public Transportation: Introduction to public transportation

Lecture 7 - Public Transportation: Basic operating elements of public transportation

Lecture 8 - Public Transportation: Basic operating elements of public transportation (Continued...)

Lecture 9 - Public Transportation: Bus Transportation

Lecture 10 - Public Transportation: Bus Transportation (Continued...)

Lecture 11 - Public Transportation: Financing public transportation

Lecture 12 - Public Transportation: Transit marketing

Lecture 13 - Public Transportation: Rail transportation

Lecture 14 - Public Transportation: Intermediate Public Transportation

Lecture 15 - Public Transportation: Measuring performance of transit systems

Lecture 16 - Public Transportation: Advanced operation concepts of public transportation

Lecture 17 - Public Transportation: Bus and Rail Transit Capacity

Lecture 18 - Public Transportation: Bus and Rail Transit Capacity (Continued...)

Lecture 19 - Public Transportation: Station Capacity

Lecture 20 - Public Transportation: Transit Stop Location

Lecture 21 - Non-motorised Transportation (NMT) Planning: Introduction to NMT Systems

Lecture 22 - Non-motorised Transportation (NMT) Planning: Assessing existing NMT scenario

Lecture 23 - Non-motorised Transportation (NMT) Planning: Data collection and analysis in NMT Planning

Lecture 24 - Non-motorised Transportation (NMT) Planning: Complementarity and Selection of Interventions

Lecture 25 - Non-motorised Transportation (NMT) Planning: Alternative Selection through Economic & Financial Analysis

Lecture 26 - Non-Motorised Transportation (NMT) Planning: Basic NMT Characteristics

Lecture 27 - Non-Motorised Transportation (NMT) Planning: Pedestrian Data Collection and Flow Characteristics

Lecture 28 - Non-Motorised Transportation (NMT) Planning: Pedestrian Flow models

Lecture 29 - Non-Motorised Transportation (NMT) Planning: Pedestrian flow characteristics on facilities

Lecture 30 - Non-Motorised Transportation (NMT) Planning: Pedestrian Level of Service (PLOS) based on Flow models

Lecture 31 - Non-Motorised Transportation (NMT) Planning: Other types of Pedestrian Level of Service (PLOS)

Lecture 32 - Non-Motorised Transportation (NMT) Planning: HCM 2010 Methodology for PLOS

Lecture 33 - Non-Motorised Transportation (NMT) Planning: HCM 2010 Methodology for PLOS (Continued...)

Lecture 34 - Non-Motorised Transportation (NMT) Planning: Bicycle Facilities and Level of Service (BLOS)

Lecture 35 - Non-Motorised Transportation (NMT) Planning: BLOS and Bicycle Compatibility Index (BCI)

Lecture 36 - Non-Motorised Transportation (NMT) Planning: NMT Design Principles

Lecture 37 - Non-Motorised Transportation (NMT) Planning: Design of Pedestrian Infrastructure

Lecture 38 - Non-Motorised Transportation (NMT) Planning: Design of Pedestrian Infrastructure (Continued...)

Lecture 39 - Non-Motorised Transportation (NMT) Planning: Design of Cycling Infrastructure

Lecture 40 - Non-Motorised Transportation (NMT) Planning: Design of Cycling Infrastructure (Continued...)

Lecture 41 - Urban Transport and Sustainability: Travel Demand Management (TDM) overview

Lecture 42 - Urban Transport and Sustainability: Push measures cases

Lecture 43 - Urban Transport and Sustainability: Pull measure cases

Lecture 44 - Urban Transport and Sustainability: Parking Studies

Lecture 45 - Urban Transport and Sustainability: Transit Oriented Development (TOD)

Lecture 46 - Urban Transport and Sustainability: Introduction to Intelligent Transportation Systems (ITS)

Lecture 47 - Urban Transport and Sustainability: ITS components, applications and communication

Lecture 48 - Urban Transport and Sustainability: ITS Architecture

Lecture 49 - Urban Transport and Sustainability: Electronic Toll Collection (ETC)

Lecture 50 - Urban Transport and Sustainability: Public Bicycle Sharing (PBS) System with ITS

Lecture 51 - Urban Transport and Sustainability: Multimodal transportation (MMT) environment

Lecture 52 - Urban Transport and Sustainability: Multimodal Level of Service (MMLOS)

Lecture 53 - Urban Transport and Sustainability: Multimodal Level of Service (MMLOS) (Continued...)

Lecture 54 - Urban Transport and Sustainability: Design of multimodal transfer facilities

Lecture 55 - Urban Transport and Sustainability: Park & Ride (P&R) Facility Planning

Lecture 56 - Urban Transport and Sustainability: An Introduction to Pedestrian Road Safety and associated Risk Factors

Lecture 57 - Urban Transport and Sustainability: Road crash estimation and elements of predictive methods

Lecture 58 - Urban Transport and Sustainability: Predicting Vehicle-Pedestrian and Vehicle-Bicycle conflicts

Lecture 59 - Urban Transport and Sustainability: Environmental Concerns of Urban Transport

Lecture 60 - Urban Transport and Sustainability: Sustainable strategies for Urban Transportation

NPTEL : NOC:Advanced Foundation Engineering (Civil Engineering)

Co-ordinators : Prof. Kousik Deb

Lecture 1 - Introduction and Soil Exploration - I

Lecture 2 - Soil Exploration - II

Lecture 3 - Soil Exploration - III

Lecture 4 - Soil Exploration - IV

Lecture 5 - Soil Exploration - V

Lecture 6 - Soil Exploration - VI

Lecture 7 - Shallow Foundation : Bearing Capacity - I

Lecture 8 - Shallow Foundation : Bearing Capacity - II

Lecture 9 - Shallow Foundation : Bearing Capacity - III

Lecture 10 - Shallow Foundation : Bearing Capacity - IV

Lecture 11 - Shallow Foundation : Bearing Capacity - V

Lecture 12 - Shallow Foundation : Bearing Capacity - VI

Lecture 13 - Shallow Foundation : Bearing Capacity - VII

Lecture 14 - Shallow Foundation : Bearing Capacity - VIII

Lecture 15 - Shallow Foundation : Bearing Capacity - IX

Lecture 16 - Shallow Foundation : Bearing Capacity - X

Lecture 17 - Shallow Foundation : Bearing Capacity - XI

Lecture 18 - Shallow Foundation : Bearing Capacity - XII

Lecture 19 - Shallow Foundation : Bearing Capacity - XIII

Lecture 20 - Shallow Foundation : Bearing Capacity - XIV

Lecture 21 - Shallow Foundation : Bearing Capacity - XV

Lecture 22 - Shallow Foundation : Bearing Capacity - XVI

Lecture 23 - Shallow Foundation : Settlement - I

Lecture 24 - Shallow Foundation : Settlement - II

Lecture 25 - Shallow Foundation : Settlement - III

Lecture 26 - Shallow Foundation : Settlement - IV

Lecture 27 - Beams on Elastic Foundation - I

Lecture 28 - Beams on Elastic Foundation - II

Lecture 29 - Beams on Elastic Foundation - III

Lecture 30 - Beams on Elastic Foundation - IV

Lecture 31 - Beams on Elastic Foundation - V

Lecture 32 - Beams on Elastic Foundation - VI

Lecture 33 - Beams on Elastic Foundation - VII

Lecture 34 - Beams on Elastic Foundation - VIII

Lecture 35 - Beams on Elastic Foundation - IX

Lecture 36 - Design of Shallow Foundation - I

Lecture 37 - Design of Shallow Foundation - II

Lecture 38 - Design of Shallow Foundation - III

Lecture 39 - Design of Shallow Foundation - IV

Lecture 40 - Design of Shallow Foundation - V

Lecture 41 - Pile Foundation : Under Compressive Load - I

Lecture 42 - Pile Foundation : Under Compressive Load - II

Lecture 43 - Pile Foundation : Under Compressive Load - III

Lecture 44 - Pile Foundation : Under Compressive Load - IV

Lecture 45 - Pile Foundation : Under Compressive Load - V

Lecture 46 - Pile Foundation : Under Compressive Load - VI

Lecture 47 - Pile Foundation : Under Compressive Load - VII

Lecture 48 - Pile Foundation : Under Compressive Load - VIII

Lecture 49 - Pile Foundation : Under Compressive Load - IX

Lecture 50 - Pile Foundation : Under Compressive Load - X

Lecture 51 - Pile Foundation : Under Lateral Load and Uplift - I

Lecture 52 - Pile Foundation : Under Lateral Load and Uplift - II

Lecture 53 - Pile Foundation : Under Lateral Load and Uplift - III

Lecture 54 - Pile Foundation : Under Lateral Load and Uplift - IV

Lecture 55 - Pile Foundation : Under Lateral Load and Uplift - V

Lecture 56 - Pile Foundation : Under Lateral Load and Uplift - VI

Lecture 57 - Pile Foundation : Under Lateral Load and Uplift - VII

Lecture 58 - Pile Foundation : Under Lateral Load and Uplift - VIII

Lecture 59 - Pile Foundation : Under Lateral Load and Uplift - IX

Lecture 60 - Well Foundation - I

Lecture 61 - Well Foundation - II

Lecture 62 - Well Foundation - III

Lecture 63 - Well Foundation - IV

Lecture 64 - Well Foundation - V

Lecture 65 - Well Foundation - VI

Lecture 66 - Well Foundation - VII

Lecture 67 - Well Foundation - VIII

Lecture 68 - Well Foundation - IX

Lecture 69 - Foundations on Difficult Soils - I

Lecture 70 - Foundations on Difficult Soils - II

NPTEL : NOC:Urban Transport Systems Planning (Civil Engineering)

Co-ordinators : Prof. Bhargab Maitra

Lecture 1 - Urbanization, Urban Transportation and Transportation Demand

Lecture 2 - Travel Behaviour, Transportation Externalities and Present Scenario of Urban Transportation

Lecture 3 - Approaches for Mitigating Externalities, Need for Transportation Planning and Transport Planning Morphology

Lecture 4 - Transport Planning Morphology

Lecture 5 - Hierarchical Level of Urban Transport Planning and Interrelationship of Transport Problems and Models

Lecture 6 - Traditional Travel Demand Forecasting Process

Lecture 7 - Traditional Travel Demand Forecasting Process, Specification, Calibration, Validation and Forecasting

Lecture 8 - Information Needs for Travel Demand Forecasting: Study Area, Urban Activities, Transportation System

Lecture 9 - Information Needs for Travel Demand Forecasting: Travel Information

Lecture 10 - Data Collection and Techniques

Lecture 11 - Introduction and Basic Considerations of Trip Generation

Lecture 12 - Trip Classifications and Factors Affecting Trip Generation

Lecture 13 - Modelling Approaches and Step-Wise Approach of Multiple Regression Analysis

Lecture 14 - Step-Wise Approach of Multiple Regression Analysis and Examples

Lecture 15 - Examples, Common Mistakes and Zonal Based Models of Multiple Regression Analysis

Lecture 16 - Zonal and Household Based Regression Models

Lecture 17 - Cross Classification Analysis: Model Structure and Calibration

Lecture 18 - Cross Classification Analysis: Model Calibration

Lecture 19 - Cross Classification Analysis: Model Application, Advantages and Dis-Advantages

Lecture 20 - Matching Productions and Attractions; Stability of Trip Generation Models

Lecture 21 - Basic Considerations and Trip Distribution Matrices

Lecture 22 - Methods for Trip Distribution, Uniform Growth Factor Method and Average Growth Factor Method

Lecture 23 - Detroit Method and Fratar Model

Lecture 24 - Furness Method

Lecture 25 - Synthetic Methods, Measures of Travel Resistance and Gravity Model

Lecture 26 - Singly Constrained Gravity Model

Lecture 27 - Bureau of Public Roads Calibration Procedure

Lecture 28 - Doubly Constrained Gravity Model

Lecture 29 - Intervening Opportunities Model

Lecture 30 - Competing Opportunities Model and Linear Programming Approach

Lecture 31 - Factors Influencing Mode Choice and Aggregate Modal Split Models

Lecture 32 - Disaggregate Mode Choice Models - I

Lecture 33 - Disaggregate Mode Choice Models - II

Lecture 34 - Disaggregate Mode Choice Models - III

Lecture 35 - Disaggregate Mode Choice Models - IV

Lecture 36 - Disaggregate Mode Choice Models - V

Lecture 37 - Logit Choice Models - I

Lecture 38 - Logit Choice Models - II

Lecture 39 - Logit Choice Models - III

Lecture 40 - Logit Choice Models - IV

Lecture 41 - Introduction to Traffic Assignment

Lecture 42 - Network Algorithms - I

Lecture 43 - Network Algorithms - II

Lecture 44 - Network Algorithms - III

Lecture 45 - Static assignment models, User Equilibrium

Lecture 46 - User Equilibrium Assignment and System Optimum Assignment

Lecture 47 - Deterministic Traffic Assignment - I

Lecture 48 - Deterministic Traffic Assignment - II

Lecture 49 - Stochastic Traffic Assignment - I

Lecture 50 - Stochastic Traffic Assignment - II and Dynamic Traffic Assignment

Lecture 51 - Land Use and Transportation - I

Lecture 52 - Land Use and Transportation - II

Lecture 53 - Land Use and Transportation - III

Lecture 54 - Land Use and Transportation - IV

Lecture 55 - Urban Goods Movement - I

Lecture 56 - Urban Goods Movement - II

Lecture 57 - Urban Goods Movement - III

Lecture 58 - Urban Goods Movement - IV

Lecture 59 - Activity Based Modelling

Lecture 60 - Big Data, GIS and SDI

NPTEL : NOC:Structural Reliability (Civil Engineering)

Co-ordinators : Prof. Baidurya Bhattacharya

Lecture 1 - Introduction - Part 1

Lecture 2 - Introduction - Part 2

Lecture 3 - Introduction - Part 3

Lecture 4 - Introduction - Part 4

Lecture 5 - Introduction - Part 5

Lecture 6 - Introduction - Part 6

Lecture 7 - Introduction - Part 7

Lecture 8 - Introduction - Part 8

Lecture 9 - Review of Probability Theory - Part 1

Lecture 10 - Review of Probability Theory - Part 2

Lecture 11 - Review of Probability Theory - Part 3

Lecture 12 - Review of Probability Theory - Part 4

Lecture 13 - Review of Probability Theory - Part 5

Lecture 14 - Review of Probability Theory - Part 6

Lecture 15 - Review of Probability Theory - Part 7

Lecture 16 - Review of Probability Theory - Part 8

Lecture 17 - Review of Probability Theory - Part 9

Lecture 18 - Review of Random Variables - Part 1

Lecture 19 - Review of Random Variables - Part 2

Lecture 20 - Review of Random Variables - Part 3

Lecture 21 - Review of Random Variables - Part 4

Lecture 22 - Review of Random Variables - Part 5

Lecture 23 - Review of Random Variables - Part 6

Lecture 24 - Review of Random Variables - Part 7

Lecture 25 - Review of Random Variables - Part 8

Lecture 26 - Review of Random Variables - Part 9

Lecture 27 - Review of Random Variables - Part 10

Lecture 28 - Review of Random Variables - Part 11

Lecture 29 - Review of Random Variables - Part 12

Lecture 30 - Common Probability Distributions - Part 1

Lecture 31 - Common Probability Distributions - Part 2

Lecture 32 - Common Probability Distributions - Part 3

Lecture 33 - Common Probability Distributions - Part 4

Lecture 34 - Common Probability Distributions - Part 5

Lecture 35 - Common Probability Distributions - Part 6

Lecture 36 - Common Probability Distributions - Part 7

Lecture 37 - Common Probability Distributions - Part 8

Lecture 38 - Common Probability Distributions - Part 9

Lecture 39 - Common Probability Distributions - Part 10

Lecture 40 - Common Probability Distributions - Part 11

Lecture 41 - Common Probability Distributions - Part 12

Lecture 42 - Common Probability Distributions - Part 13

Lecture 43 - Common Probability Distributions - Part 14

Lecture 44 - Common Probability Distributions - Part 15

Lecture 45 - Common Probability Distributions - Part 16

Lecture 46 - Common Probability Distributions - Part 17

Lecture 47 - Common Probability Distributions - Part 18

Lecture 48 - Common Probability Distributions - Part 19

Lecture 49 - Common Probability Distributions - Part 20

Lecture 50 - Joint Probability Distributions - Part 1

Lecture 51 - Joint Probability Distributions - Part 2

Lecture 52 - Joint Probability Distributions - Part 3

Lecture 53 - Joint Probability Distributions - Part 4

Lecture 54 - Joint Probability Distributions - Part 5

Lecture 55 - Joint Probability Distributions - Part 6

Lecture 56 - Joint Probability Distributions - Part 7

Lecture 57 - Joint Probability Distributions - Part 8

Lecture 58 - Joint Probability Distributions - Part 9

Lecture 59 - Joint Probability Distributions - Part 10

Lecture 60 - Joint Probability Distributions - Part 11

Lecture 61 - Joint Probability Distributions - Part 12

Lecture 62 - Joint Probability Distributions - Part 13

Lecture 63 - Joint Probability Distributions - Part 14

Lecture 64 - Joint Probability Distributions - Part 15

Lecture 65 - Joint Probability Distributions - Part 16

Lecture 66 - Joint Probability Distributions - Part 17

Lecture 67 - Joint Probability Distributions - Part 18

Lecture 68 - Joint Probability Distributions - Part 19

Lecture 69 - Monte Carlo Simlulations - Part 1

Lecture 70 - Monte Carlo Simlulations - Part 2

Lecture 71 - Monte Carlo Simlulations - Part 3

Lecture 72 - Monte Carlo Simlulations - Part 4

Lecture 73 - Monte Carlo Simlulations - Part 5

Lecture 74 - Monte Carlo Simlulations - Part 6

Lecture 75 - Monte Carlo Simlulations - Part 7

Lecture 76 - Monte Carlo Simlulations - Part 8

Lecture 77 - Monte Carlo Simlulations - Part 9

Lecture 78 - Monte Carlo Simlulations - Part 10

Lecture 79 - Monte Carlo Simlulations - Part 11

Lecture 80 - Monte Carlo Simlulations - Part 12

Lecture 81 - Monte Carlo Simlulations - Part 13

Lecture 82 - Monte Carlo Simlulations - Part 14

Lecture 83 - History Definition and Scope - Part 1

Lecture 84 - History Definition and Scope - Part 2

Lecture 85 - History Definition and Scope - Part 3

Lecture 86 - History Definition and Scope - Part 4

Lecture 87 - History Definition and Scope - Part 5

Lecture 88 - History Definition and Scope - Part 6

Lecture 89 - Reliability Problem Formulatio - Part 1

Lecture 90 - Reliability Problem Formulatio - Part 2

Lecture 91 - Reliability Problem Formulatio - Part 3

Lecture 92 - Reliability Problem Formulatio - Part 4

Lecture 93 - Reliability Problem Formulatio - Part 5

Lecture 94 - Reliability Problem Formulatio - Part 6

Lecture 95 - Reliability Problem Formulatio - Part 7

Lecture 96 - Reliability Problem Formulatio - Part 8

Lecture 97 - Representation of systems - Part 1

Lecture 98 - Representation of systems - Part 2

Lecture 99 - Representation of systems - Part 3

Lecture 100 - Representation of systems - Part 4

Lecture 101 - Representation of systems - Part 5

Lecture 102 - Representation of systems - Part 6

Lecture 103 - Representation of systems - Part 7

Lecture 104 - Representation of systems - Part 8

Lecture 105 - Representation of systems - Part 9

Lecture 106 - Representation of systems - Part 10

Lecture 107 - Representation of systems - Part 11

Lecture 108 - Representation of systems - Part 12

Lecture 109 - Representation of systems - Part 13

Lecture 110 - Representation of systems - Part 14

Lecture 111 - Representation of systems - Part 15

Lecture 112 - Representation of systems - Part 16

Lecture 113 - Representation of systems - Part 17

Lecture 114 - Representation of systems - Part 18

Lecture 115 - Representation of systems - Part 19

Lecture 116 - Representation of systems - Part 20

Lecture 117 - Representation of systems - Part 21

Lecture 118 - Representation of systems - Part 22

Lecture 119 - Representation of systems - Part 23

Lecture 120 - Time Dependent Component Reliability - Part 1

Lecture 121 - Time Dependent Component Reliability - Part 2

Lecture 122 - Component Reliability - Time Dependent - Part 1

Lecture 123 - Component Reliability - Time Dependent - Part 2

Lecture 124 - Component Reliability - Time Dependent - Part 3

Lecture 125 - Component Reliability - Time Dependent - Part 4

Lecture 126 - Component Reliability - Time Dependent - Part 5

Lecture 127 - Component Reliability - Time Dependent - Part 6

Lecture 128 - Component Reliability - Time Dependent - Part 7

Lecture 129 - Component Reliability - Time Dependent - Part 8

Lecture 130 - Component Reliability - Time Defined - Part 9

Lecture 131 - Component Reliability - Time Defined - Part 10

Lecture 132 - Component Reliability - Time Defined - Part 11

Lecture 133 - Component Reliability - Time Defined - Part 12

Lecture 134 - Component Reliability - Time Defined - Part 13

Lecture 135 - Component Reliability - Time Defined - Part 14

Lecture 136 - Component Reliability - Time Defined - Part 15

Lecture 137 - Component Reliability - Time Defined - Part 16

Lecture 138 - Component Reliability - Time Defined - Part 17

Lecture 139 - Component Reliability - Time Defined - Part 18

Lecture 140 - Component Reliability - Time Defined - Part 19

Lecture 141 - Component Reliability - Time Defined - Part 20

Lecture 142 - Component Reliability - Time Defined - Part 21

Lecture 143 - Component Reliability - Time Defined - Part 22

Lecture 144 - Component Reliability - Time Defined - Part 23

Lecture 145 - System Reliability - Time Defined - Part 1

Lecture 146 - System Reliability - Time Defined - Part 2

Lecture 147 - System Reliability - Time Defined - Part 3

Lecture 148 - System Reliability - Time Defined - Part 4

Lecture 149 - System Reliability - Time Defined - Part 5

Lecture 150 - System Reliability - Time Defined - Part 6

Lecture 151 - System Reliability - Time Defined - Part 7

Lecture 152 - System Reliability - Time Defined - Part 8

Lecture 153 - Capacity Demand Component Reliability - Part 1

Lecture 154 - Capacity Demand Component Reliability - Part 2

Lecture 155 - Capacity Demand Component Reliability - Part 3

Lecture 156 - Capacity Demand Component Reliability - Part 4

Lecture 157 - Capacity Demand Component Reliability - Part 5

Lecture 158 - Capacity Demand Component Reliability - Part 6

Lecture 159 - Capacity Demand Component Reliability - Part 7

Lecture 160 - Capacity Demand Component Reliability - Part 8

Lecture 161 - Capacity Demand Component Reliability - Part 9

Lecture 162 - Capacity Demand Component Reliability - Part 10

Lecture 163 - Capacity Demand Component Reliability - Part 11

Lecture 164 - Capacity Demand Component Reliability - Part 12

Lecture 165 - Capacity Demand Component Reliability - Part 13

Lecture 166 - Capacity Demand Component Reliability - Part 14

Lecture 167 - Capacity Demand Component Reliability - Part 15

Lecture 168 - Capacity Demand Component Reliability - Part 16

Lecture 169 - Capacity Demand Component Reliability - Part 17

Lecture 170 - Capacity Demand Component Reliability - Part 18

Lecture 171 - Capacity Demand Component Reliability - Part 19

Lecture 172 - Capacity Demand Component Reliability - Part 20

Lecture 173 - Capacity Demand Component Reliability - Part 21

Lecture 174 - Capacity Demand Component Reliability - Part 22

Lecture 175 - Capacity Demand Component Reliability - Part 23

Lecture 176 - Capacity Demand Component Reliability - Part 24

Lecture 177 - Capacity Demand Component Reliability - Part 25

Lecture 178 - Capacity Demand Component Reliability - Part 26

Lecture 179 - Capacity Demand Component Reliability - Part 27

Lecture 180 - Capacity Demand Component Reliability - Part 28

Lecture 181 - Capacity Demand Component Reliability - Part 29

Lecture 182 - Capacity Demand Component Reliability - Part 30

Lecture 183 - Capacity Demand Component Reliability - Part 31

Lecture 184 - Capacity Demand Component Reliability - Part 32

Lecture 185 - Capacity Demand Component Reliability - Part 33

Lecture 186 - Capacity Demand Component Reliability - Part 34

Lecture 187 - Capacity Demand Component Reliability - Part 35

Lecture 188 - Capacity Demand Component Reliability - Part 36

Lecture 189 - Capacity Demand Component Reliability - Part 37

Lecture 190 - Capacity Demand Component Reliability - Part 38

Lecture 191 - Capacity Demand Component Reliability - Part 39

Lecture 192 - Capacity Demand Time Component Reliability - Part 1

Lecture 193 - Capacity Demand Time Component Reliability - Part 2

Lecture 194 - Capacity Demand Time Component Reliability - Part 3

Lecture 195 - Capacity Demand Time Component Reliability - Part 4

Lecture 196 - Capacity Demand Time Component Reliability - Part 5

Lecture 197 - Capacity Demand Time Component Reliability - Part 6

Lecture 198 - Capacity Demand Time Component Reliability - Part 7

Lecture 199 - Capacity Demand Time Component Reliability - Part 8

Lecture 200 - Capacity Demand Time Component Reliability - Part 9

Lecture 201 - Capacity Demand Time Component Reliability - Part 10

Lecture 202 - Capacity Demand Time Component Reliability - Part 11

Lecture 203 - Capacity Demand Time Component Reliability - Part 12

Lecture 204 - Capacity Demand Time Component Reliability - Part 13

Lecture 205 - Capacity Demand Time Component Reliability - Part 14

Lecture 206 - Capacity Demand Time Component Reliability - Part 15

Lecture 207 - Capacity Demand Time Component Reliability - Part 16

Lecture 208 - Capacity Demand Time Component Reliability - Part 17

Lecture 209 - Capacity Demand Time Component Reliability - Part 18

Lecture 210 - Capacity Demand Systems Reliability - Part 1

Lecture 211 - Capacity Demand Systems Reliability - Part 2

Lecture 212 - Capacity Demand Systems Reliability - Part 3

Lecture 213 - Capacity Demand Systems Reliability - Part 4

Lecture 214 - Capacity Demand Systems Reliability - Part 5

Lecture 215 - Capacity Demand Systems Reliability - Part 6

Lecture 216 - Capacity Demand Systems Reliability - Part 7

Lecture 217 - Capacity Demand Systems Reliability - Part 8

Lecture 218 - Capacity Demand Systems Reliability - Part 9

Lecture 219 - Capacity Demand Systems Reliability - Part 10

Lecture 220 - Capacity Demand Systems Reliability - Part 11

Lecture 221 - Capacity Demand Systems Reliability - Part 12

Lecture 222 - Capacity Demand Systems Reliability - Part 13

Lecture 223 - Capacity Demand Systems Reliability - Part 14

Lecture 224 - Capacity Demand Systems Reliability - Part 15

Lecture 225 - Reliability Based Design Codes - Part 1

Lecture 226 - Reliability Based Design Codes - Part 2

Lecture 227 - Reliability Based Design Codes - Part 3

Lecture 228 - Reliability Based Design Codes - Part 4

Lecture 229 - Reliability Based Design Codes - Part 5

Lecture 230 - Reliability Based Design Codes - Part 6

Lecture 231 - Reliability Based Partial Safety Factors - Part 1

Lecture 232 - Reliability Based Partial Safety Factors - Part 2

Lecture 233 - Reliability Based Partial Safety Factors - Part 3

Lecture 234 - Reliability Based Design Code Development - Part 1

Lecture 235 - Reliability Based Design Code Development - Part 2

Lecture 236 - Reliability Based Design Code Development - Part 3

Lecture 237 - Reliability Based Design Code Development - Part 4

Lecture 238 - Target Reliabilities - Part 1

Lecture 239 - Target Reliabilities - Part 2

Lecture 240 - Target Reliabilities - Part 3

Lecture 241 - Target Reliabilities - Part 4

Lecture 242 - Target Reliabilities - Part 5

Lecture 243 - Target Reliabilities - Part 6

Lecture 244 - Target Reliabilities - Part 7

Lecture 245 - Target Reliabilities - Part 8

Lecture 246 - Target Reliabilities - Part 9

Lecture 247 - Target Reliabilities - Part 10

Lecture 248 - Target Reliabilities and General Conclusions - Part 1

Lecture 249 - Target Reliabilities and General Conclusions - Part 2

Lecture 250 - Target Reliabilities and General Conclusions - Part 3

Lecture 251 - Target Reliabilities and General Conclusions - Part 4

Lecture 252 - Target Reliabilities and General Conclusions - Part 5

NPTEL : NOC:Ground Improvement (Civil Engineering)

Co-ordinators : Prof. Dilip Kumar Baidya

Lecture 1 - Need for Ground Improvement

Lecture 2 - Ground Improvement Methods

Lecture 3 - Ground Improvement Methods (Continued...)

Lecture 4 - GI Methods and Classification

Lecture 5 - Excavation and Replacement, the simplest GI method

Lecture 6 - Shallow Densification

Lecture 7 - Shallow densification (Continued...)

Lecture 8 - Quality Control and Quality Assurance

Lecture 9 - Application Problem

Lecture 10 - Application Problem on Excavation and Replacement

Lecture 11 - Deep Dynamic Compaction

Lecture 12 - Deep Dynamic Compaction (Continued...)

Lecture 13 - Deep Dynamic Compaction (Continued...)

Lecture 14 - Deep Dynamic Compaction (Continued...)

Lecture 15 - Deep Dynamic Compaction (Continued...)

Lecture 16 - Rapid Impact Compaction

Lecture 17 - Rapid Impact Compaction (Continued...)

Lecture 18 - Rapid Impact Compaction (Continued...)

Lecture 19 - Vibro compaction

Lecture 20 - Vibro compaction (Continued...)

Lecture 21 - Design Steps

Lecture 22 - Design Parameters and Procedure

Lecture 23 - Application Problem and Quality Control

Lecture 24 - Deep Replacement

Lecture 25 - Deep Replacement (Continued...)

Lecture 26 - Drainage

Lecture 27 - Dewatering

Lecture 28 - Dewatering (Continued...)

Lecture 29 - Dewatering Design Principle

Lecture 30 - Design Example

Lecture 31 - Preconsolidation

Lecture 32 - Preconsolidation (Continued...)

Lecture 33 - Preconsolidation (Continued...)

Lecture 34 - Preconsolidation (Continued...)

Lecture 35 - Preconsolidation (Continued...)

Lecture 36 - Grouting

Lecture 37 - Grouting (Continued...)

Lecture 38 - Grouting (Continued...)

Lecture 39 - Grouting (Continued...)

Lecture 40 - Grouting (Continued...)

Lecture 41 - Grouting (Continued...)

Lecture 42 - Chemical Stabilisation

Lecture 43 - Chemical Stabilisation (Continued...)

Lecture 44 - Chemical Stabilisation (Continued...)

Lecture 45 - Chemical Stabilisation (Continued...)

Lecture 46 - Soil Nailing

Lecture 47 - Soil Nailing (Continued...)

Lecture 48 - Soil Nailing (Continued...)

Lecture 49 - Soil Nailing (Continued...)

Lecture 50 - Soil Nailing (Continued...)

Lecture 51 - Geosynthetics in Ground Improvement

Lecture 52 - Geosynthetics in Ground Improvement

Lecture 53 - Geosynthetics in Ground Improvement

Lecture 54 - Geosynthetics in Ground Improvement

Lecture 55 - Geosynthetics in Ground Improvement

Lecture 56 - Geosynthetics in Ground Improvement (Continued...)

Lecture 57 - Geosynthetics in Ground Improvement (Continued...)

Lecture 58 - Geosynthetics in Ground Improvement (Continued...)

Lecture 59 - Geosynthetics in Ground Improvement (Continued...)

Lecture 60 - Summary and Concluding Remarks

NPTEL : NOC:Remote Sensing of Leaf Area Index and Primary Productivity (Civil Engineering)

Co-ordinators : Prof. MD Behera

Lecture 1 - Introduction

Lecture 2 - Leaf Area Index - Definition and Basics

Lecture 3 - Leaf Area Index - Field Measurements

Lecture 4 - Remote Sensing - Story of Matter and Energy Interactions

Lecture 5 - Remote Sensing - Optical Properties of Leaf and Canopy

Lecture 6 - LAI- Optical RS Methods: Empirical Transfer Functions

Lecture 7 - LAI Estimation - RS Methods: Model Inversion

Lecture 8 - LAI Estimation - LiDAR and Micowave RS Methods

Lecture 9 - LAI- Global Data Products

Lecture 10 - LAI Products - Challenges and Future Prospects

Lecture 11 - RS of Primary Productivity - Introduction and Overview

Lecture 12 - RS of Primary Productivity - VIs and LUE

Lecture 13 - RS of Primary Productivity - Process Based Models

Lecture 14 - RS of Primary Productivity Methods - SIF

Lecture 15 - RS of Primary Productivity Methods - LST, ML, Inversion/Passive RS

Lecture 16 - LAI Applications: Phenology, Climate and LSMs

Lecture 17 - RS of Primary Productivity - Uncertainities and Challenges - LUE

Lecture 18 - LAI Applications: Indian Examples

Lecture 19 - Primary Productivity Applications: Indian Examples

Lecture 20 - Primary Productivity Applications: Indian Examples and Way Forward

NPTEL : NOC:Rock Mechanics and Tunneling (Civil Engineering)

Co-ordinators : Prof. Debarghya Chakraborty

Lecture 1 - Objective, scope, and associated problems

Lecture 2 - Rock Engineering Application Areas (Continued...) and Discontinuities in rock

Lecture 3 - Discontinuities in rock (Continued...) and classification of rock

Lecture 4 - Classification of rock based on origin (Continued...)

Lecture 5 - Stereographic projection Stereonet Example

Lecture 6 - Stereographic projection Stereonet Example (Continued...)

Lecture 7 - Rock coring

Lecture 8 - Rock coring (Continued...)

Lecture 9 - Rock coring (Continued...) and Geophysical Methods

Lecture 10 - Geophysical Methods (Continued...)

Lecture 11 - Geophysical Methods (Continued...)

Lecture 12 - Introduction, Physical properties

Lecture 13 - Physical properties (Continued...)

Lecture 14 - Physical properties (Continued...)

Lecture 15 - Mechanical Properties

Lecture 16 - Mechanical Properties (Continued...)

Lecture 17 - Laboratory Testing Methods

Lecture 18 - Laboratory Testing Methods (Continued...)

Lecture 19 - Laboratory Testing Methods (Continued...)

Lecture 20 - Laboratory Testing Methods (Continued...)

Lecture 21 - In-situ Testing Methods

Lecture 22 - Rock mass classification

Lecture 23 - Rock mass classification (Continued...)

Lecture 24 - Rock mass classification (Continued...)

Lecture 25 - Rock mass classification (Continued...)

Lecture 26 - Rock mass classification (Continued...)

Lecture 27 - Analysis of Stresses

Lecture 28 - Analysis of Stresses (Continued...)

Lecture 29 - Analysis of Stresses (Continued...)

Lecture 30 - Analysis of Stresses (Continued...) and Stress-Strain Relationship

Lecture 31 - Introduction to rock and rock mass failure

Lecture 32 - Mohr-Coulomb (MC) Failure Criterion

Lecture 33 - Griffith Crack Theory and Empirical Failure Criteria for Rock

Lecture 34 - Empirical Failure Criteria for Rock (Continued...)

Lecture 35 - Equivalent Mohr-Coulomb (MC) Parameters

Lecture 36 - Failure Criterion in Deviatoric Plane

Lecture 37 - Slopes

Lecture 38 - Slopes (Continued...)

Lecture 39 - Slopes (Continued...)

Lecture 40 - Slopes (Continued...)

Lecture 41 - Underground excavations

Lecture 42 - Foundations

Lecture 43 - Foundations (Continued...)

Lecture 44 - Foundations (Continued...)

Lecture 45 - Foundations (Continued...)

Lecture 46 - Rock support systems

Lecture 47 - Shapes and usages

Lecture 48 - Methods of construction

Lecture 49 - Methods of construction (Continued...)

Lecture 50 - Methods of construction (Continued...)

Lecture 51 - Problems associated with tunnels and Tunneling in various subsoil conditions and rocks

Lecture 52 - Methods to determine stresses around openings: Kirsch equation

Lecture 53 - Methods to determine stresses around openings: Kirsch equation (Continued...)

Lecture 54 - Methods to determine stresses around openings: Kirsch equation contdand Greenspanâ€™s method

Lecture 55 - Basic Concepts for Lined, Unlined, and Pressure Tunnels

Lecture 56 - Basic Concepts for Lined, Unlined, and Pressure Tunnels (Continued...)

Lecture 57 - Improvement of rock mass response

Lecture 58 - Improvement of rock mass response (Continued...)

Lecture 59 - Improvement of rock mass response (Continued...)

Lecture 60 - Improvement of rock mass response (Continued...)

Lecture 61 - Improvement of rock mass response (Continued...)

NPTEL : NOC:Retrofitting and Rehabilitation of Civil Infrastructure (Civil Engineering)

Co-ordinators : Prof. Swati Maitra, Prof. Sriman Bhattacharya

Lecture 1 - Introduction

Lecture 2 - Causes of Deterioration

Lecture 3 - Materials Related Distresses

Lecture 4 - Materials Related Distresses (Continued...)

Lecture 5 - Other Distresses in Concrete

Lecture 6 - Load Associated Distresses

Lecture 7 - Identification of Distresses

Lecture 8 - Semi-destructive Testing

Lecture 9 - Non-destructive Tests

Lecture 10 - Non-destructive Tests (Continued...)

Lecture 11 - Other Tests

Lecture 12 - Considerations for Repair and Retrofitting

Lecture 13 - Repair Techniques

Lecture 14 - Repair Techniques (Continued...)

Lecture 15 - Repair Techniques (Continued...)

Lecture 16 - Strengthening of Structural Components

Lecture 17 - Strengthening of Structural Components (Continued...)

Lecture 18 - Introduction to Composites, Types and Characteristics

Lecture 19 - Properties of Fibers, Resins and FRP Composite

Lecture 20 - Micromechanics of Composites

Lecture 21 - Micromechanics of Composites (Continued...)

Lecture 22 - Manufacturing of FRP Composites

Lecture 23 - FRPC in Flexural Strengthening of Structural Members - I

Lecture 24 - FRPC in Flexural Strengthening of Structural Members - II

Lecture 25 - FRPC in Shear Strengthening of Structural Members

Lecture 26 - FRPC in Axial Strengthening of Structural Members - I

Lecture 27 - FRPC in Axial Strengthening of Structural Members - II

Lecture 28 - Near Surface Mounted FRP Reinforcement

Lecture 29 - FRPC in Strengthening of Beam-Column Joints

Lecture 30 - Anchorage Systems for FRP Strengthening

Lecture 31 - Installation of FRP

Lecture 32 - Design Considerations

Lecture 33 - Design Approach for Flexural Strengthening

Lecture 34 - Design of Flexural Strengthening

Lecture 35 - Design Approach for Shear Strengthening

Lecture 36 - Design of Shear Strengthening

Lecture 37 - Design Approach for Axial Strengthening

Lecture 38 - Design of Axial Strengthening

Lecture 39 - Concepts of Concrete Overlay

Lecture 40 - Distresses in Existing Pavement

Lecture 41 - Evaluation of Pavement

Lecture 42 - Design Considerations for Concrete Overlay

Lecture 43 - Construction of Concrete Overlay

Lecture 44 - Introduction

Lecture 45 - Retrofitting Steps

Lecture 46 - Review of Materials and Test Methods

Lecture 47 - Review of Analysis Method

Lecture 48 - Some aspects of Seismic Retrofitting

Lecture 49 - Introduction

Lecture 50 - A Few Retrofitting Techniques

Lecture 51 - A Few Seismic Retrofitting Techniques

Lecture 52 - Introduction

Lecture 53 - Retrofitting steps and Techniques

Lecture 54 - Retrofitting Techniques for Structural Elements

Lecture 55 - Retrofitting Techniques for structural elements (Continued...)

Lecture 56 - Retrofitting Techniques for structural elements (Continued...)

Lecture 57 - Retrofitting Techniques for structural elements (Continued...)

Lecture 58 - Seismic Strengthening of structural elements

Lecture 59 - Introduction and Overview

Lecture 60 - Retrofitting of Structural Members

Lecture 61 - Introduction

Lecture 62 - A case study of Retrofitting

Lecture 63 - A case study of Retrofitting (Continued...)

NPTEL : NOC:Surface Water Hydrology (Civil Engineering)

Co-ordinators : Prof. Rajib Maity

Lecture 1 - Introduction

Lecture 2 - Hydrologic Cycle and its Different Components

Lecture 3 - Hydrological System Concept

Lecture 4 - Surface Water Resources of India

Lecture 5 - Hydrology and Climate Change

Lecture 6 - Different Forms of Precipitation and Indian Monsoon

Lecture 7 - Measurement and Analysis of Precipitation

Lecture 8 - Precipitation Data Quality and Presentation

Lecture 9 - Areal Precipitation and Frequency Analysis

Lecture 10 - Analysis of Precipitation: IDF and PMP

Lecture 11 - Introduction to Evaporation and Evaporimeters

Lecture 12 - Estimation of Evaporation and Control Measures

Lecture 13 - Evapotranspiration

Lecture 14 - Initial Loss and Infiltration Process

Lecture 15 - Modelling of Infiltration Capacity

Lecture 16 - Infiltration Indices

Lecture 17 - Measurement of Flow Velocity

Lecture 18 - Area-Velocity and Moving-Boat Methods

Lecture 19 - Dilution Technique, Electromagnetic and Ultrasonic Methods

Lecture 20 - Indirect Streamflow Measurement

Lecture 21 - Stage-Discharge Relationship and Rating Curve

Lecture 22 - Introduction and Catchment Characteristics

Lecture 23 - Estimation of Runoff Volume: Empirical Models

Lecture 24 - Estimation of Runoff Volume: Conceptual Models

Lecture 25 - Flow Characteristic Curves and Estimation of Reservoir Storage

Lecture 26 - Concept of Droughts and Environmental Flows

Lecture 27 - Basics of Hydrographs

Lecture 28 - Base Flow Separation, DRH and ERH

Lecture 29 - Introduction to Unit Hydrographs

Lecture 30 - Unit Hydrograph to Direct Runoff Hydrograph

Lecture 31 - Derivation of Unit Hydrograph

Lecture 32 - Unit Hydrograph of Different Durations: Method of Superposition

Lecture 33 - Unit Hydrograph of Different Durations: Method of S-Curve

Lecture 34 - More on Unit Hydrographs

Lecture 35 - Synthetic Unit Hydrograph

Lecture 36 - Instantaneous Unit Hydrograph

Lecture 37 - Introduction to Floods and Rational Method

Lecture 38 - Flood Peak Discharge and Catchment Characteristics

Lecture 39 - Estimation of Peak Flood Flow

Lecture 40 - Flood Control and its Status in India

Lecture 41 - Introduction to Flood Routing

Lecture 42 - Reservoir Routing: Modified Pulâ€™s Method

Lecture 43 - Reservoir Routing: Goodrich Method and Runge-Kutta Method

Lecture 44 - Channel Routing: Parameters of Muskingum Method

Lecture 45 - Channel Routing: Muskingum Method and Hydraulic Flood Routing

Lecture 46 - Concept of Routing in IUH Development and Clarkâ€™s Method

Lecture 47 - Nashâ€™s Conceptual Model

Lecture 48 - Basic Concepts of Probability and Statistics

Lecture 49 - Types of Data Series and Concept of Return Period

Lecture 50 - Introduction to Frequency Analysis

Lecture 51 - Parametric Methods of Frequency Analysis

Lecture 52 - Frequency Analysis with Extreme Value Type-I Distribution

Lecture 53 - Confidence Interval and Standard Error in the Frequency Estimates

Lecture 54 - Various Issues behind Frequency Analysis

Lecture 55 - Basics of Hydrologic Design

Lecture 56 - Risk Analysis to Determine Return Period

Lecture 57 - Hydro-economic Analysis to Determine Return Period

Lecture 58 - Uncertainty in Hydrologic Analysis

Lecture 59 - Estimated Limiting Storm and Design Flood

Lecture 60 - Design Storm

Lecture 61 - Hydrologic Design of Reservoirs: Introduction and Determination of Storage Capacity

Lecture 62 - Determination of Storage Capacity and Models in Reservoir Design

NPTEL : NOC:Traffic Engineering (Civil Engineering)

Co-ordinators : Prof. Bhargab Maitra

Lecture 1 - Traffic Engineering Objectives and Role of Transportation Demand and Land-Use

Lecture 2 - Mobility and Accessibility, Traffic Engineering Elements and Components of Traffic

Lecture 3 - Road Users

Lecture 4 - Vehicles, Roadways and Traffic Control Devices

Lecture 5 - Traffic Signs, Delineators and Signals

Lecture 6 - Traffic Facilities and Traffic Stream Parameters

Lecture 7 - Traffic Volumes and Time Headways

Lecture 8 - Traffic Density and Relationships among Macroscopic Parameters

Lecture 9 - Single Regime Traffic Stream Models

Lecture 10 - Multi-Regime Models and Characteristics of Interrupted Flow

Lecture 11 - Analysis of Shock Waves - I

Lecture 12 - Analysis of Shock Waves - II

Lecture 13 - Analysis of Shock Waves - III

Lecture 14 - Queueing Analysis - I

Lecture 15 - Queueing Analysis - II

Lecture 16 - Basic Concepts

Lecture 17 - Analysis of Basic Freeway and Multi-Lane Highway Segments (as per HCM, 2016) - I

Lecture 18 - Analysis of Basic Freeway and Multi-Lane Highway Segments (as per HCM, 2016) - II

Lecture 19 - Analysis of Basic Freeway and Multi-Lane Highway Segments (As per HCM, 2016) - III

Lecture 20 - Analysis of Two-Lane Highway Segments (As per HCM, 2016) - I

Lecture 21 - Analysis of Two-Lane Highway Segments (As per HCM, 2016) - II

Lecture 22 - Analysis of Urban street Segments (As per HCM, 2016) - I

Lecture 23 - Analysis of Urban street Segments (As per HCM, 2016) - II

Lecture 24 - Analysis of Urban street Segments (As per HCM, 2016) - III

Lecture 25 - Analysis of Single, Intermediate and Two-Lane Roads (As per Indo HCM, 2017)

Lecture 26 - Analysis of Multi Lane Highways (As per Indo HCM, 2017)

Lecture 27 - Intersection Control and Critical Aspects of Operation - I

Lecture 28 - Intersection Control and Critical Aspects of Operation - II

Lecture 29 - Intersection Control and Critical Aspects of Operation - III

Lecture 30 - Intersection Control and Critical Aspects of Operation - IV

Lecture 31 - Intersection Control and Critical Aspects of Operation - V

Lecture 32 - Delay as a Performance Measure

Lecture 33 - Pre-Timed Signal Design - I

Lecture 34 - Pre-Timed Signal Design - II

Lecture 35 - Operational Analysis of Signalized Intersection - I

Lecture 36 - Operational Analysis of Signalized Intersection - II

Lecture 37 - Operational Analysis of Signalized Intersection - III

Lecture 38 - Operational Analysis of Signalized Intersection - IV

Lecture 39 - Actuated Signals

Lecture 40 - Signal Coordination - I

Lecture 41 - Signal Coordination - II

Lecture 42 - Signal Coordination - III

Lecture 43 - Oversaturated Signals and Mitigation Strategies

Lecture 44 - Car Following Theory - I

Lecture 45 - Car Following Theory - II

Lecture 46 - Car Following Theory - III

Lecture 47 - Car Following Theory - IV

Lecture 48 - Traffic Simulation - I

Lecture 49 - Traffic Simulation - II

Lecture 50 - Traffic Simulation - III

Lecture 51 - Introduction to Traffic Control and Management

Lecture 52 - Access Management

Lecture 53 - Demand Management

Lecture 54 - Bus Priority Treatments

Lecture 55 - Emerging Traffic Management Measures

Lecture 56 - Parking Management - I

Lecture 57 - Parking Management - II

Lecture 58 - Parking Management - III

Lecture 59 - Introduction to Road Safety

Lecture 60 - Road Safety Engineering and Crash Data

Lecture 61 - Blackspot Analysis

Lecture 62 - Crash Data Analysis

Lecture 63 - Road Safety Audit

Lecture 64 - Safe System Approach

Lecture 65 - Road Safety Countermeasures

Lecture 66 - Speed Management Measures

NPTEL : NOC:Bridge Engineering (Civil Engineering)

Co-ordinators : Prof. Piyali Sengupta

Lecture 1 - Components, Materials, Forms, Evolutions and Classifications of Bridges

Lecture 2 - Site Selection, Subsoil Exploration and Traffic Projections for Bridges

Lecture 3 - Hydraulic Characteristics, Economical Span and Choice of Bridge Type

Lecture 4 - Standard Specifications for Road Bridges

Lecture 5 - Standard Specifications for Rail Bridges

Lecture 6 - Design of Slab Culverts

Lecture 7 - Design of T-Beam and Slab Bridge

Lecture 8 - Voided Slab Bridges, Skew Slab Culverts and Curved Bridge Decks

Lecture 9 - Design of Box Culverts

Lecture 10 - Design of Pipe Culverts

Lecture 11 - Design of Steel Truss Bridges

Lecture 12 - Design Example of Steel Truss Bridges

Lecture 13 - Design of Plate Girder Bridges

Lecture 14 - Design Example of Plate Girder Bridges

Lecture 15 - Masonry Arch Bridges

Lecture 16 - Concrete Arch Bridges

Lecture 17 - Suspension Bridges

Lecture 18 - Cable-Stayed Bridges

Lecture 19 - Balanced Cantilever Bridges

Lecture 20 - Prestressed Concrete Bridges

Lecture 21 - Composite Bridges

Lecture 22 - Rigid Frame Bridges

Lecture 23 - Continuous Girder Bridges

Lecture 24 - Design Example of Continuous Girder Bridges

Lecture 25 - Bridge Piers

Lecture 26 - Bridge Abutments

Lecture 27 - Pile Foundations for Bridges

Lecture 28 - Well and Pneumatic Caisson Foundations for Bridges

Lecture 29 - Bridge Bearings

Lecture 30 - Bridge Joints

Lecture 31 - Bridge Appurtenances

Lecture 32 - Bridge Construction

Lecture 33 - Maintenance and Rehabilitation of Bridges

Lecture 34 - Rebuilding of Bridges

Lecture 35 - Dynamic Response of Bridge Decks

Lecture 36 - Seismic Design of Highway Bridges

Lecture 37 - Seismic Design of Railway Bridges

Lecture 38 - Lessons from Bridge Failures

Lecture 39 - Fatigue and Fracture of Bridges

Lecture 40 - Use of Shape memory Alloys in Bridges

Lecture 41 - Use of Engineered Cementitious Composite (ECC) in Bridges

Lecture 42 - 3D Printing of Bridges

Lecture 43 - High Speed Railway Bridges

NPTEL : NOC:Elastic Stability of Structures (Civil Engineering)

Co-ordinators : Prof. Sarat Kumar Panda

Lecture 1 - Basic concepts of buckling and introduction to equilibrium approach

Lecture 2 - Introduction to energy and imperfection approach

Lecture 3 - Introduction to different types of buckling

Lecture 4 - Weighted residual methods in structual mechanics

Lecture 5 - Weighted residual methods in structual mechanics (Continued...)

Lecture 6 - Introduction to the strong and weak forms of GDE

Lecture 7 - Variational method: Derivation of Euler Lagrange equation

Lecture 8 - Delta opeator in variational method for finding GDE and Boundary conditions

Lecture 9 - Euler lagrange equation for functional having different dependent variables

Lecture 10 - Brachistochrone problem

Lecture 11 - Rayleigh-Ritz method

Lecture 12 - Extension of Rayleigh-Ritz method and Galerkinâ€™s method

Lecture 13 - Single DOF stability model

Lecture 14 - Single DOF stability model and model having imperfection

Lecture 15 - Large deflection theory for stability analysis of rigid body stability models

Lecture 16 - Two DOF rigid body stability models

Lecture 17 - Snap through stability model and model of imperfect geometry

Lecture 18 - Weak form solution for hinged-hinged and fixed-fixed column

Lecture 19 - Weak form solution for fixed-free and fixed-hinged column

Lecture 20 - Strong form solution for hinged-hinged column

Lecture 21 - Strong form solution for fixed-fixed and fixed-free column

Lecture 22 - Critical load for column with elastic support

Lecture 23 - Boundary conditions for column with general case of elastically supported ends

Lecture 24 - Critical load for portal frame with column hinged at base

Lecture 25 - Critical load for portal frame with column fixed at base

Lecture 26 - Element stiffness matrix for beam-column

Lecture 27 - Stability analysis of frames by matrix stiffness method

Lecture 28 - Critical load of Euler column: Large deflection theory

Lecture 29 - Critical load of Euler column with initial imperfection

Lecture 30 - Load deflection curve for beam-column: GDE approach

Lecture 31 - Load deflection curve for beam-column: Energy approach

Lecture 32 - General expression of elastic curve for beam-column

Lecture 33 - Beam-column with several lateral and continuous loads

Lecture 34 - Bending of beam-column by end couples

Lecture 35 - Three moment equation for continuous beam-column

Lecture 36 - Moment equation for continuous beam-column with intermediate column

Lecture 37 - Beam-column on Elastic Foundation

Lecture 38 - St Venant Torsion and Non-uniform Torsion

Lecture 39 - Torsional Buckling

Lecture 40 - Torsional Buckling and Torsional Flexural Buckling

Lecture 41 - Torsional Flexural Buckling of Column Having Different Boundary Conditions

Lecture 42 - Rayleigh-Ritz method for Torsional Flexural Buckling of Column

Lecture 43 - Introduction to Plate Buckling and Small Deflection Theory

Lecture 44 - Governing Differential Equation of Plate Buckling Using Small Deflection Theory

Lecture 45 - Governing Differential Equation of Plate Buckling Using Small Deflection Theory (Continued...)

Lecture 46 - Critical Load of Plate Using Equilibrium Approach

Lecture 47 - Critical Load of Plate Using Energy Approach

Lecture 48 - Critical Load of Plates with Different End Conditions: Energy Approach and Galerkin's

Lecture 49 - F-w Formulation For Plate Buckling

Lecture 50 - Critical load and Post Buckling Behaviour of Plate Using F-w Formulation

Lecture 51 - Governing Differential Equation of Shell Buckling by Using Small Deflection Theory

Lecture 52 - Governing Differential Equation of Shell Buckling by Using Small Deflection Theory (Continued...)

Lecture 53 - Governing Differential Equation of Shell Buckling: Donnell's Equation

Lecture 54 - Solution of Donnell's Equation for Finding Critical Load

Lecture 55 - Governing Differential Equation of Shell Buckling by Using Finite Deflection Theory

Lecture 56 - Post Buckling Behaviour of an Imperfect Axially Compressed Cylindrical Shell Panel

Lecture 57 - Governing Differential Equation for the deflection curve of a thin bar

Lecture 58 - Critical load of a two-hinged and fixed-fixed circular arch

Lecture 59 - Inelastic Buckling Analysis of Column

Lecture 60 - Inelastic Buckling Analysis of Column (Continued...)

NPTEL : NOC:Radiogenic Isotope Geology (Civil Engineering)

Co-ordinators : Prof. R. Anand

Lecture 1 - Fundamentals

Lecture 2 - Nuclear Stability and Decay

Lecture 3 - Radioactive Decay and Growth

Lecture 4 - Geochronometry: Mass Spectrometry

Lecture 5 - Geochronometry: Mass Spectrometry (Continued...)

Lecture 6 - Geochronometry: Isotope dilution analysis

Lecture 7 - Geochronometry: Sample processing

Lecture 8 - K-Ar Method of Dating

Lecture 9 - K-Ar Method of Dating (Continued...)

Lecture 10 - Ar-Ar Method of Dating

Lecture 11 - Ar-Ar Method of Dating (Continued...)

Lecture 12 - Rb-Sr Method of Dating

Lecture 13 - Rb-Sr Method of Dating (Continued...)

Lecture 14 - Sm-Nd Method of Dating

Lecture 15 - Sm-Nd Method of Dating (Continued...)

Lecture 16 - Re-Os Method of Dating

Lecture 17 - Lu-Hf Method of Dating

Lecture 18 - U-Th-Pb Geochronology

Lecture 19 - U-Th-Pb Geochronology (Continued...)

Lecture 20 - U-Th-Pb Geochronology (Continued...)

Lecture 21 - Isotope Geology of Pb

Lecture 22 - Isotope Geology of Pb (Continued...)

Lecture 23 - Processing and Presentation of Raw Isotope Geochemical Data

Lecture 24 - Processing and Presentation of Raw Isotope Geochemical Data (Continued...)

Lecture 25 - Application of Sr, Nd, Pb and Hf Isotopes in Petrogenetic Studies

Lecture 26 - Application of Sr, Nd, Pb and Hf Isotopes in Petrogenetic Studies (Continued...)

Lecture 27 - U-series disequilibrium method of dating

Lecture 28 - U-series disequilibrium method of dating

Lecture 29 - Fission-Track dating

Lecture 30 - Cosmogenic radionuclides and their applications

Lecture 31 - Cosmogenic radionuclides and their applications

Lecture 32 - Cosmogenic radionuclides and their applications

Lecture 33 - Extinct radionuclides and cosmochronology

Lecture 34 - Extinct radionuclides and cosmochronology (Continued...)

Lecture 35 - Extinct radionuclides and cosmochronology

NPTEL : NOC:Availability and Management of Groundwater Resources (Civil Engineering)

Co-ordinators : Prof. Prasoon Kumar Singh

Lecture 1 - Hydrological cycle, Need for conservation of Groundwater Resources

Lecture 2 - Hydrological cycle, Need for conservation of Groundwater Resources (Continued...)

Lecture 3 - Hydrological cycle, Need for conservation of Groundwater Resources (Continued...)

Lecture 4 - Hydrological cycle, Need for conservation of Groundwater Resources (Continued...)

Lecture 5 - Hydrological cycle, Need for conservation of Groundwater Resources (Continued...)

Lecture 6 - Geological formation as Aquifer

Lecture 7 - Geological formation as Aquifer (Continued...)

Lecture 8 - Geological formation as Aquifer (Continued...)

Lecture 9 - Geological formation as Aquifer (Continued...)

Lecture 10 - Introduction about Vadose and Saturated Zone

Lecture 11 - Vadose and Saturated Zone (Continued...)

Lecture 12 - Vadose and Saturated Zone (Continued...)

Lecture 13 - Vadose and Saturated Zone (Continued...)

Lecture 14 - Vadose and Saturated Zone (Continued...)

Lecture 15 - Confined and Unconfined Aquifer and their parameters

Lecture 16 - Confined and Unconfined Aquifer and their parameters (Continued...)

Lecture 17 - Confined and Unconfined Aquifer and their Parameters (Continued...)

Lecture 18 - Confined and Unconfined Aquifer and their Parameters (Continued...)

Lecture 19 - Confined and Unconfined Aquifer and their parameters (Continued...)

Lecture 20 - Porosity, Permeability, Transmissivity and Storage Coefficient

Lecture 21 - Porosity, Permeability, Transmissivity and Storage Coefficient (Continued...)

Lecture 22 - Porosity, Permeability, Transmissivity and Storage Coefficient (Continued...)

Lecture 23 - Porosity, permeability, transmissivity and storage coefficient

Lecture 24 - Porosity, permeability, transmissivity and storage coefficient (Continued...)

Lecture 25 - Law of groundwater movement, Darcy's law and application (Continued...)

Lecture 26 - Law of groundwater movement, Darcy's law and application (Continued...)

Lecture 27 - Law of groundwater movement, Darcy's law and application (Continued...)

Lecture 28 - Law of groundwater movement, Darcy's law and application (Continued...)

Lecture 29 - Law of groundwater movement, Darcy's law and application (Continued...)

Lecture 30 - Estimation of Subsurface Runoff, Types of Wells, Well Hydraulics

Lecture 31 - Estimation of Subsurface Runoff, Types of Wells, Well Hydraulics (Continued...)

Lecture 32 - Estimation of Subsurface Runoff, Types of Wells, Well Hydraulics (Continued...)

Lecture 33 - Estimation of Subsurface Runoff, Types of Wells, Well Hydraulics (Continued...)

Lecture 34 - Estimation of Subsurface Runoff, Types of Wells, Well Hydraulics (Continued...)

Lecture 35 - Measurement of rainfall, Index of wetness, Infiltration rate

Lecture 36 - Measurement of rainfall, Index of wetness, Infiltration rate (Continued...)

Lecture 37 - Measurement of rainfall, Index of wetness, Infiltration rate (Continued...)

Lecture 38 - Measurement of rainfall, Index of wetness, Infiltration rate (Continued...)

Lecture 39 - Measurement of rainfall, Index of wetness, Infiltration rate (Continued...)

Lecture 40 - Estimation of Total Annual Replenishable Natural Groundwater Recharge

Lecture 41 - Estimation of Total Annual Replenishable Natural Groundwater Recharge (Continued...)

Lecture 42 - Estimation of Total Annual Replenishable Natural Groundwater Recharge (Continued...)

Lecture 43 - Estimation of Total Annual Replenishable Natural Groundwater Recharge (Continued...)

Lecture 44 - Estimation of Total Annual Replenishable Natural Groundwater Recharge (Continued...)

Lecture 45 - Groundwater resources planning and management

Lecture 46 - Groundwater Resources Planning and Management (Continued...)

Lecture 47 - Groundwater Resources Planning and Management (Continued...)

Lecture 48 - Groundwater Resources Planning and Management (Continued...)

Lecture 49 - Groundwater Resources Planning and Management (Continued...)

Lecture 50 - Rainwater Harvesting and Artificial Groundwater Recharge

Lecture 51 - Rainwater Harvesting and Artificial Groundwater Recharge (Continued...)

Lecture 52 - Rainwater Harvesting and Artificial Groundwater Recharge (Continued...)

Lecture 53 - Rainwater Harvesting and Artificial Groundwater Recharge (Continued...)

Lecture 54 - Rainwater Harvesting and Artificial Groundwater Recharge (Continued...)

Lecture 55 - Impact of climate change on water resources

Lecture 56 - Impact of climate change on water resources (Continued...)

Lecture 57 - Impact of climate change on water resources (Continued...)

Lecture 58 - Impact of climate change on water resources (Continued...)

Lecture 59 - Impact of climate change on water resources (Continued...)

Lecture 60 - Impact of climate change on water resources (Continued...)

NPTEL : NOC:Soil Dynamics (Civil Engineering)

Co-ordinators : Prof. Paramita Bhattacharya

Lecture 1 - Introduction and Theory of Vibrations

Lecture 2 - Theory of Vibrations

Lecture 3 - Single Degree of Freedom System (SDOF) - Part 1

Lecture 4 - Single Degree of Freedom System (SDOF) - Part 2

Lecture 5 - Single Degree of Freedom System (SDOF) - Part 3

Lecture 6 - Single Degree of Freedom System (SDOF) - Part 4

Lecture 7 - Single Degree of Freedom System (SDOF) - Part 5

Lecture 8 - Single Degree of Freedom System (SDOF) - Part 6

Lecture 9 - Single Degree of Freedom System (SDOF) - Part 7

Lecture 10 - Single Degree of Freedom System (SDOF) - Part 8

Lecture 11 - Single Degree of Freedom System (SDOF) - Part 9

Lecture 12 - Multiple Degree of Freedom System (MDOF) - Part 1

Lecture 13 - Multiple Degree of Freedom System (MDOF) - Part 2

Lecture 14 - Multiple Degree of Freedom System (MDOF) - Part 2

Lecture 15 - Multiple Degree of Freedom System (MDOF) - Part 3

Lecture 16 - Multiple Degree of Freedom System (MDOF) - Part 5

Lecture 17 - Wave Propagation in An Elastic Rod

Lecture 18 - Wave Propagation in An Elastic Rod of Finite Length

Lecture 19 - Wave Propagation in An Infinite Elastic Medium

Lecture 20 - Wave Propagation in An Infinite and Semi-Infinite Elastic Medium

Lecture 21 - Determination of Dynamic Properties of Soils (Laboratory Tests) - Part 1

Lecture 22 - Determination of Dynamic Properties of Soils (Laboratory Tests) - Part 2

Lecture 23 - Determination of Dynamic Properties of Soils (Laboratory Tests) - Part 3

Lecture 24 - Determination of Dynamic Properties of Soils (Laboratory Tests) - Part 4

Lecture 25 - Determination of Dynamic Properties of Soils (Laboratory Tests) - Part 5

Lecture 26 - Determination of Dynamic Properties of Soils (Seismic Reflection Survey)

Lecture 27 - Determination of Dynamic Properties of Soils (Seismic Reflection Survey)

Lecture 28 - Determination of Dynamic Properties of Soils (Seismic Refraction Survey-Inclined Layering)

Lecture 29 - Determination of Dynamic Properties of Soils (Numerical Problems on Seismic Reflection

Lecture 30 - Determination of Dynamic Properties of Soils (Block Vibration Test)

Lecture 31 - Liquefaction of Soils - Part 1

Lecture 32 - Liquefaction of Soils - Part 2

Lecture 33 - Liquefaction of Soils - Part 3

Lecture 34 - Liquefaction of Soils - Part 4

Lecture 35 - Liquefaction of Soils - Part 5

Lecture 36 - Machine Foundations (Design Criteria)

Lecture 37 - Analysis of Machine Foundations (Elastic Half Space Method) - Part 1

Lecture 38 - Analysis of Machine Foundations (Elastic Half Space Method) - Part 2

Lecture 39 - Analysis of Machine Foundations (Elastic Half Space Method) - Part 3

Lecture 40 - Analysis of Machine Foundations (Elastic Half Space Method) - Part 4

Lecture 41 - Analysis of Machine Foundations (Linear Elastic Weightless Spring Method - Part 1)

Lecture 42 - Analysis of Machine Foundations (For Reciprocating Machines) - Part 2

Lecture 43 - Analysis of Machine Foundations (For Reciprocating Machines) - Part 3

Lecture 44 - Analysis of Machine Foundations (For Reciprocating Machines) - Part 4

Lecture 45 - Analysis of Machine Foundations (For Impact Type Machines) - Part 1

Lecture 46 - Analysis of Machine Foundations (For Impact Type Machines) - Part 2

Lecture 47 - Analysis of Machine Foundations (For Rotary Machines) - Part 1

Lecture 48 - Analysis of Machine Foundations (For Rotary Machines) - Part 2

Lecture 49 - Analysis of Machine Foundations (For Rotary Machines) - Part 3

Lecture 50 - Analysis of Machine Foundations (For Rotary Machines) - Part 3 (Continued...)

Lecture 51 - Analysis of Pile Foundation Under Dynamic Loading - Part I

Lecture 52 - Analysis of Pile Foundation Under Dynamic Loading - Part II

Lecture 53 - Analysis of Pile Foundation Under Dynamic Loading - Part III

Lecture 54 - Analysis of Pile Foundation Under Dynamic Loading - Part IV

Lecture 55 - Analysis of Pile Foundation Under Dynamic Loading - Part V

Lecture 56 - Isolation of Vibration - Part 1

Lecture 57 - Isolation of Vibration - Part 2

Lecture 58 - Isolation of Vibration - Part 3

Lecture 59 - Isolation of Vibration - Part 4

Lecture 60 - Summary

NPTEL : NOC:Geotechnical Earthquake Engineering (Civil Engineering)

Co-ordinators : Prof. Kousik Deb

Lecture 1 - Introduction

Lecture 2 - Causes of Earthquake

Lecture 3 - Seismic Waves

Lecture 4 - Seismic Waves (Continued...)

Lecture 5 - Size of Earthquake

Lecture 6 - Size of Earthquake (Continued...)

Lecture 7 - Introduction

Lecture 8 - Measurement of Ground Motion

Lecture 9 - Ground Motion Parameters

Lecture 10 - Ground Motion Parameters (Continued...)

Lecture 11 - Ground Motion Parameters (Continued...)

Lecture 12 - Ground Motion Parameters (Continued...)

Lecture 13 - Ground Motion Parameters (Continued...)

Lecture 14 - Estimation of Ground Motion Parameters

Lecture 15 - Examples

Lecture 16 - Examples (Continued...)

Lecture 17 - Examples (Continued...)

Lecture 18 - Field Tests

Lecture 19 - Field Tests (Continued...)

Lecture 20 - Field Tests (Continued...)

Lecture 21 - Field Tests (Continued...)

Lecture 22 - Field Tests (Continued...)

Lecture 23 - Field Tests (Continued...)

Lecture 24 - Field Tests (Examples)

Lecture 25 - Field Tests (Continued...)

Lecture 26 - Field Tests (Continued...)

Lecture 27 - Laboratory and Model Tests

Lecture 28 - Stress-Strain Behavior of Cyclically Loaded Soils

Lecture 29 - Stress-Strain Behavior of Cyclically Loaded Soils (Continued...)

Lecture 30 - Stress-Strain Behavior of Cyclically Loaded Soils (Continued...)

Lecture 31 - Linear Approach

Lecture 32 - Linear Approach (Continued...)

Lecture 33 - Equivalent Linear and Non Linear Approach

Lecture 34 - Evaluation of Liquefaction Resistance of Soils

Lecture 35 - Evaluation of Liquefaction Resistance of Soils (Continued...)

Lecture 36 - Evaluation of Liquefaction Resistance of Soils (Continued...)

Lecture 37 - Evaluation of Liquefaction Resistance of Soils (Continued...)

Lecture 38 - Evaluation of Liquefaction Resistance of Soils (Continued...)

Lecture 39 - Evaluation of Liquefaction Resistance of Soils (Continued...)

Lecture 40 - Evaluation of Liquefaction Resistance of Soils (Continued...)

Lecture 41 - Evaluation of Liquefaction Resistance of Soils (Continued...)

Lecture 42 - Evaluation of Liquefaction Resistance of Soils (Continued...)

Lecture 43 - Liquefaction Susceptibility Criteria for Silts and Clays

Lecture 44 - Liquefaction Susceptibility Criteria for Silts and Clays (Continued...)

Lecture 45 - Liquefaction Susceptibility Criteria for Silts and Clays (Continued...)

Lecture 46 - Liquefaction Susceptibility Criteria for Silts and Clays (Continued...)

Lecture 47 - Settlement of Sand due to Earthquake Shaking

Lecture 48 - Settlement of Sand due to Earthquake Shaking (Continued...)

Lecture 49 - Seismic or Liquefaction Hazard Mitigation

Lecture 50 - Seismic or Liquefaction Hazard Mitigation (Continued...)

Lecture 51 - Seismic or Liquefaction Hazard Mitigation (Continued...)

Lecture 52 - Seismic or Liquefaction Hazard Mitigation (Continued...)

Lecture 53 - Seismic or Liquefaction Hazard Mitigation (Continued...)

Lecture 54 - Seismic slope stability analysis: Pseudostatic Analysis

Lecture 55 - Seismic slope stability analysis: Pseudostatic Analysis (Continued...)

Lecture 56 - Seismic slope stability analysis: Newmark Sliding Block Analysis

Lecture 57 - Seismic slope stability analysis: Newmark Sliding Block Analysis (Continued...)

Lecture 58 - Seismic design of retaining walls

Lecture 59 - Seismic design of retaining walls (Continued...)

Lecture 60 - Seismic design of retaining walls (Continued...)

Lecture 61 - Seismic design of retaining walls (Continued...)

Lecture 62 - Seismic design of retaining walls (Continued...)

Lecture 63 - Seismic design of retaining walls (Continued...)

Lecture 64 - Seismic design of retaining walls (Continued...)

Lecture 65 - Seismic design of retaining walls (Continued...)

Lecture 66 - Seismic design of retaining walls (Continued...)

Lecture 67 - Seismic design of retaining walls (Continued...)

Lecture 68 - Seismic design of retaining walls (Continued...)

Lecture 69 - Seismic design of retaining walls (Continued...)

NPTEL : NOC:Earthquake Seismology (Civil Engineering)

Co-ordinators : Dr. Mohit Agrawal

Lecture 1 - Introduction

Lecture 2 - Waves on a String

Lecture 3 - Stress

Lecture 4 - Strain tensor and Constitutive equations

Lecture 5 - Equations of Motion

Lecture 6 - Wavenumber vector, Slowness, P-and S-wave Polarization

Lecture 7 - Seismic spectrum, Seismogram rotation, Spherical Waves

Lecture 8 - Energy in the Plane Wave, Potentials at an Interface

Lecture 9 - Boundary Conditions, Types Of Interfaces, Ray Theory, Reflection/Transmission

Lecture 10 - Snell's law, Transmission and Reflection Coefficients, Fermat's Principle, Huygen's

Lecture 11 - Precritical, Critical, and Postcritical waves, reflection and transmission coefficients

Lecture 12 - Surface waves

Lecture 13 - Rayleigh Waves

Lecture 14 - Love waves

Lecture 15 - Dispersion

Lecture 16 - Dispersion example in the Earth and Tsunamis

Lecture 17 - Normal modes

Lecture 18 - Torsional and Spheroidal Modes

Lecture 19 - Solving numerical problems

Lecture 20 - Refraction seismology

Lecture 21 - Refraction seismology (Continued...)

Lecture 22 - Reflection seismology (Continued...)

Lecture 23 - Earth as a constant velocity Distribution

Lecture 24 - Multi Channel Data Geometry

Lecture 25 - Seismic waves in spherical earth

Lecture 26 - Velocity distribution

Lecture 27 - Body waves

Lecture 28 - Core Phases

Lecture 29 - Velocity structure of upper mantle and lower mantle

Lecture 30 - Anisotropic earth structure

Lecture 31 - Anisotropic earth structure (Continued...)

Lecture 32 - Attenuation and Anelasticity

Lecture 33 - Attenuation and Anelasticity (Continued...)

Lecture 34 - Attenuation and Anelasticity (Continued...)

Lecture 35 - Composition of the mantle and core

Lecture 36 - Composition of the mantle and core (Continued...)

Lecture 37 - Composition of the mantle and core (Continued...)

Lecture 38 - Composition of the mantle and core (Continued...)

Lecture 39 - Earthquakes, focal mechanisms, moment tensors

Lecture 40 - Earthquakes, focal mechanisms, moment tensors (Continued...)

Lecture 41 - Earthquakes, focal mechanisms, moment tensors (Continued...)

Lecture 42 - Earthquakes, focal mechanisms, moment tensors (Continued...)

Lecture 43 - Earthquakes, focal mechanisms, moment tensors (Continued...)

Lecture 44 - Brief on Earthquake geodesy

Lecture 45 - Brief on Earthquake geodesy (Continued...)

Lecture 46 - Brief on Earthquake geodesy (Continued...)

Lecture 47 - Brief on Earthquake geodesy (Continued...)

Lecture 48 - Source parameters, Earthquake statistics

Lecture 49 - Source parameters, Earthquake statistics (Continued...)

Lecture 50 - Source parameters, Earthquake statistics (Continued...)

Lecture 51 - Source parameters, Earthquake statistics (Continued...)

Lecture 52 - Source parameters, Earthquake statistics (Continued...)

Lecture 53 - Seismology and Plate tectonics, Spreading centers, Subduction zones

Lecture 54 - Seismology and Plate tectonics, Spreading centers, Subduction zones (Continued...)

Lecture 55 - Seismology and Plate tectonics, Spreading centers, Subduction zones (Continued...)

Lecture 56 - Numerical Problems in Seismology

Lecture 57 - Numerical Problems in Seismology (Continued...)

NPTEL : NOC:Engineering Geology (Civil Engineering)

Co-ordinators : Prof. R. K. Dubey

Lecture 1 - Introduction and significance

Lecture 2 - Enginnering geological ground, concept and categorization

Lecture 3 - Geomaterial: Rock, rock material and rock strata, concept of stress, deformation ...

Lecture 4 - Stress-strain behaviour and mechanical parameters of rocks

Lecture 5 - Geomorphology of river valley and mountainous regions and landforms

Lecture 6 - Different types of water and distribution of water, different type of rocks and ...

Lecture 7 - Surface and subsurface water and their interaction with geoground

Lecture 8 - Weathering processes and classification

Lecture 9 - Chemical weathering and impact of weathering

Lecture 10 - Weatherability and weathering indices

Lecture 11 - Characteristic of rocks and rock strata and some physical property

Lecture 12 - Common physical attributes of geomaterials

Lecture 13 - Engineering properties of rocks

Lecture 14 - Geotechnical characteristic of joint and approach for rock mass classification

Lecture 15 - Rock mass classification

Lecture 16 - About construction materials and dimensional stone

Lecture 17 - Crushed stone and suitability of rocks as construction materials

Lecture 18 - Aggregate and deleterious materials

Lecture 19 - Pozzolan and soil

Lecture 20 - Cement-aggregate reaction

Lecture 21 - Concept and classification of dams

Lecture 22 - Classification of dams based on materials used

Lecture 23 - Classification of dam based on design and function

Lecture 24 - Arch dams and classification dams based on use and function and technical ...

Lecture 25 - Forces acting on dam and engineering geological characteristics for dam construction

Lecture 26 - About tunnels and classification of tunnels

Lecture 27 - Tunnelling methods

Lecture 28 - Treatments

Lecture 29 - Anchoring of rock strata : grouting

Lecture 30 - Anchoring of rock strata : rock bolting

Lecture 31 - Categorization of major geological structures affecting stability of engineering ...

Lecture 32 - Major geological structures Fold, Faults, joints

Lecture 33 - Major geological structures: sedimentary structures, unconformity and effect ...

Lecture 34 - Effects of beddings, folds, faults, joints and unconformity on stability of dams

Lecture 35 - Effects of beddings, folds, faults, joints and unconformity on ground control ...

Lecture 36 - Rock-load/ground pressure, factors affecting ground pressure

Lecture 37 - Methods for determination of rock load: empirical approaches

Lecture 38 - Methods for determination of rock load: empirical, semi-empirical approaches

Lecture 39 - Methods for determination of rock load: Structural defect and rock-support ...

Lecture 40 - Unified approach, support system, and mechanics of rock bolt working

Lecture 41 - About road and highway features and pavement

Lecture 42 - Stress distributions and engineering geological facets of new road/highway alignments

Lecture 43 - About bridges, classifications and working mechanism

Lecture 44 - Engineering geological facets of bridges and material quality

Lecture 45 - Building, building foundation and foundation strata

Lecture 46 - Landslide

Lecture 47 - Landslide Hazards Zonation, causes and mitigation

Lecture 48 - Slope stability aspects of landslide

Lecture 49 - Earthquakes

Lecture 50 - Induced seismicity

Lecture 51 - Sea, seacoast, features and agents

Lecture 52 - Wave propagations and concept of surf zones and breaking of waves

Lecture 53 - Waves propagation in different depth and wave mechanics

Lecture 54 - Erosion induced and deposition assisted sea landforms

Lecture 55 - Sea shore hazards, mitigation and protective structures

Lecture 56 - Energy and introductory aspects of geothermal energy

Lecture 57 - Geothermal resources and enhanced geothermal systems

Lecture 58 - Geotechnical facets of gas hydrate

Lecture 59 - Engineering geological facets of CBM and shale gas

Lecture 60 - Engineering geological aspect of carbon capture, usage and storage (CCUS)

NPTEL : NOC:Industrial Wastewater Treatment (Civil Engineering)

Co-ordinators : Prof Alok Sinha, Prof S K Gupta

Lecture 1 - Sources and characteristics of industrial wastewater

Lecture 2 - Sources and characteristics of industrial wastewater

Lecture 3 - Wastewater Management

Lecture 4 - Design Aspects of Equalization Tank

Lecture 5 - Neutralization and Proportioning

Lecture 6 - Ion Exchange Process

Lecture 7 - Ion Exchange Process

Lecture 8 - Ion Exchange Process

Lecture 9 - Adsorption Process

Lecture 10 - Adsorption Process

Lecture 11 - Gas Transfer and Air Stripping (Ammonia Removal)

Lecture 12 - Gas Transfer and Air Stripping (Ammonia Removal)

Lecture 13 - Advanced oxidation processes

Lecture 14 - Advanced oxidation processes

Lecture 15 - Advanced oxidation processes

Lecture 16 - Advanced oxidation processes

Lecture 17 - Membrane processes for wastewater treatment

Lecture 18 - Membrane processes for wastewater treatment

Lecture 19 - Membrane processes for wastewater treatment

Lecture 20 - Membrane processes for wastewater treatment

Lecture 21 - Coagulation, Precipitation and Heavy Metal Removal

Lecture 22 - Coagulation, Precipitation and Heavy Metal Removal

Lecture 23 - Coagulation, Precipitation and Heavy Metal Removal

Lecture 24 - Coagulation, Precipitation and Heavy Metal Removal

Lecture 25 - Coagulation, Precipitation and Heavy Metal Removal

Lecture 26 - Treatment and disposal of sludge

Lecture 27 - Treatment and disposal of sludge

Lecture 28 - Treatment and disposal of sludge

Lecture 29 - Treatment and disposal of sludge

Lecture 30 - Treatment and disposal of sludge

Lecture 31 - Treatment of wastewater produced from Distillery and Dairy Industries

Lecture 32 - Treatment of wastewater produced from Distillery and Dairy Industries

Lecture 33 - Treatment of wastewater produced from Distillery and Dairy Industries

Lecture 34 - Treatment of wastewater produced from Distillery and Dairy Industries

Lecture 35 - Treatment of wastewater produced from Distillery and Dairy Industries

Lecture 36 - Treatment of wastewater produced from Tannery and Pulp and Paper

Lecture 37 - Treatment of wastewater produced from Tannery and Pulp and Paper

Lecture 38 - Treatment of wastewater produced from Tannery and Pulp and Paper

Lecture 39 - Treatment of wastewater produced from Tannery and Pulp and Paper

Lecture 40 - Treatment of wastewater produced from Tannery and Pulp and Paper

Lecture 41 - Treatment of wastewater produced from Textile and Dye and Fertilizers

Lecture 42 - Treatment of wastewater produced from Textile and Dye and Fertilizers

Lecture 43 - Treatment of wastewater produced from Textile and Dye and Fertilizers

Lecture 44 - Treatment of wastewater produced from Textile and Dye and Fertilizers

Lecture 45 - Treatment of wastewater produced from Textile and Dye and Fertilizers

Lecture 46 - Treatment of wastewater produced from Refineries and Iron and Steel (Coke Ovens)

Lecture 47 - Treatment of wastewater produced from Refineries and Iron and Steel (Coke Ovens)

Lecture 48 - Treatment of wastewater produced from Refineries and Iron and Steel (Coke Ovens)

Lecture 49 - Treatment of wastewater produced from Refineries and Iron and Steel (Coke Ovens)

Lecture 50 - Treatment of wastewater produced from Refineries and Iron and Steel (Coke Ovens)

Lecture 51 - Treatment of wastewater produced from Pharmaceutical industry

Lecture 52 - Treatment of wastewater produced from Pharmaceutical industry

Lecture 53 - Treatment of wastewater produced from Pharmaceutical industry

Lecture 54 - Treatment of wastewater produced from Pharmaceutical industry

Lecture 55 - Treatment of wastewater produced from Pharmaceutical industry

Lecture 56 - Mine Wastewater including Acid Mine Drainage and Industrial Complexing

Lecture 57 - Mine Wastewater including Acid Mine Drainage and Industrial Complexing

Lecture 58 - Mine Wastewater including Acid Mine Drainage and Industrial Complexing

Lecture 59 - Mine Wastewater including Acid Mine Drainage and Industrial Complexing

Lecture 60 - Mine Wastewater including Acid Mine Drainage and Industrial Complexing

NPTEL : Advanced Structural Analysis (Civil Engineering)

Co-ordinators : Prof. Devdas Menon

Lecture 1 - Review of Basic Structural Analysis - I

Lecture 2 - Review of Basic Structural Analysis - I

Lecture 3 - Review of Basic Structural Analysis - I

Lecture 4 - Review of Basic Structural Analysis - I

Lecture 5 - Review of Basic Structural Analysis - I

Lecture 6 - Review of Basic Structural Analysis - I

Lecture 7 - Review of Basic Structural Analysis - II

Lecture 8 - Review of Basic Structural Analysis - II

Lecture 9 - Review of Basic Structural Analysis - II

Lecture 10 - Review of Basic Structural Analysis - II

Lecture 11 - Review of Basic Structural Analysis - II

Lecture 12 - Review of Basic Structural Analysis - II

Lecture 13 - Review of Basic Structural Analysis - II

Lecture 14 - Review of Basic Structural Analysis - II

Lecture 15 - Review of Basic Structural Analysis - II

Lecture 16 - Review of Basic Structural Analysis - II

Lecture 17 - Basic Matrix Concepts

Lecture 18 - Basic Matrix Concepts

Lecture 19 - Basic Matrix Concepts

Lecture 20 - Basic Matrix Concepts

Lecture 21 - Basic Matrix Concepts

Lecture 22 - Matrix Analysis of Structures with Axial Elements

Lecture 23 - Matrix Analysis of Structures with Axial Elements

Lecture 24 - Matrix Analysis of Structures with Axial Elements

Lecture 25 - Matrix Analysis of Structures with Axial Elements

Lecture 26 - Matrix Analysis of Structures with Axial Elements

Lecture 27 - Matrix Analysis of Beams and Grids

Lecture 28 - Matrix Analysis of Beams and Grids

Lecture 29 - Matrix Analysis of Beams and Grids

Lecture 30 - Matrix Analysis of Beams and Grids

Lecture 31 - Matrix Analysis of Beams and Grids

Lecture 32 - Matrix Analysis of Beams and Grids

Lecture 33 - Matrix Analysis of Plane and Space Frames

Lecture 34 - Matrix Analysis of Plane and Space Frames

Lecture 35 - Matrix Analysis of Plane and Space Frames

Lecture 36 - Matrix Analysis of Plane and Space Frames

Lecture 37 - Matrix Analysis of Plane and Space Frames

Lecture 38 - Analysis of elastic instability and second-order effects

Lecture 39 - Analysis of elastic instability and second-order effects

Lecture 40 - Analysis of elastic instability and second-order effects

Lecture 41 - Life beyond Structures & Analysis

NPTEL : Finite Element Analysis (Civil Engineering)

Co-ordinators : Dr. B.N. Rao

Lecture 1

Lecture 2

Lecture 3

Lecture 4

Lecture 5

Lecture 6

Lecture 7

Lecture 8

Lecture 9

Lecture 10

Lecture 11

Lecture 12

Lecture 13

Lecture 14

Lecture 15

Lecture 16

Lecture 17

Lecture 18

Lecture 19

Lecture 20

Lecture 21

Lecture 22

Lecture 23

Lecture 24

Lecture 25

Lecture 26

Lecture 27

Lecture 28

Lecture 29

Lecture 30

Lecture 31

Lecture 32

Lecture 33

Lecture 34

Lecture 35

Lecture 36

Lecture 37

Lecture 38

Lecture 39

Lecture 40

NPTEL : Geosynthetics and Reinforced Soil Structures (Civil Engineering)

Co-ordinators : Dr. K. Rajagopal

Lecture 1 - Introduction & Need for Geosynthetics

Lecture 2 - Types and Functions of Geosynthetics

Lecture 3 - Polymers in Geosynthetics and Manufacturing Techniques

Lecture 4 - Strength Analysis of Reinforced Soils - I

Lecture 5 - Strength Analysis of Reinforced Soils - II

Lecture 6 - Testing of Geosynthetics - I

Lecture 7 - Testing of Geosynthetics - II

Lecture 8 - Testing of Geosynthetics - III

Lecture 9 - Different Types of Soil Retaining Structures

Lecture 10 - Construction Aspects of Geosynthetic Reinforced Soil Retaining Walls

Lecture 11 - Design Codes for Reinforced Soil Retaining Walls

Lecture 12 - External Stability Analysis of Reinforced Soil Retaining Walls

Lecture 13 - Seismic Loads and Internal Stability Analysis of Reinforced Soil Walls

Lecture 14 - Testing Requirements for Reinforced Soil Retaining Walls

Lecture 15 - Design Example of Reinforced Soil Retaining Walls - I

Lecture 16 - Design Example of Reinforced Soil Retaining Walls - II

Lecture 17 - Design Example of Reinforced Soil Retaining Walls - III

Lecture 18 - Design Example of Reinforced Soil Retaining Walls - IV

Lecture 19 - Case Study of Construction of Very High Tiered Reinforced Soil Walls

Lecture 20 - Controlled Yielding to Reduce Lateral Earth Pressures on Rigid Walls

Lecture 21 - Geosynthetic Reinforced Soil Embankments - I

Lecture 22 - Geosynthetic Reinforced Soil Embankments - II

Lecture 23 - Two-Part Wedge Analysis of Reinforced Soil Embankments

Lecture 24 - Soil Embankments Supported on Geocell Mattresses

Lecture 25 - Accelerated Pre-Consolidation of Soft Clay Soils Using Geosynthetics

Lecture 26 - Geosynthetic Reinforced Pile Systems for High Embankments

Lecture 27 - Geosynthetic Encasement for Stronger and Stiffer Stone Columns

Lecture 28 - Response of Footings Resting on Reinforced Foundation Soils

Lecture 29 - Bearing Capacity Analysis of Footings Resting on Reinforced Foundation Soils

Lecture 30 - Design and Construction of Container Yards Using Geosynthetics

Lecture 31 - Geosynthetics in Flexible Pavements - I

Lecture 32 - Geosynthetics in Flexible Pavements - II

Lecture 33 - Geosynthetics in Flexible Pavements and Carbon Foot Print Analysis

Lecture 34 - Filtration of Soils Using Geosynthetics

Lecture 35 - Drainage Applications of Geosynthetics

Lecture 36 - Erosion Control of Soils Using Geosynthetics

Lecture 37 - Sustainable Infrastructure Development & Natural Geosynthetics

Lecture 38 - Introduction to Geosynthetics in Landfills

Lecture 39 - Case Study of the Construction of Airport Runway at Pakyong, Sikkim Using Geosynthetics (Guest Lecture)

Lecture 40 - Landfill Engineering Systems (Guest Lecture)

NPTEL : Modern Construction Materials (Civil Engineering)

Co-ordinators : Dr. Ravindra Gettu

Lecture 1 - Prologue

Lecture 2 - The Science, Engineering and Technology of Materials An Introduction - I

Lecture 3 - The Science, Engineering and Technology of Materials An Introduction - II

Lecture 4 - Review of Atomic Bonding - I

Lecture 5 - Review of Atomic Bonding - II

Lecture 6 - Structure of Solids - I

Lecture 7 - Structure of Solids - II

Lecture 8 - Structure of Solids - III

Lecture 9 - Movement of Atoms in Solids

Lecture 10 - Development of Microstructure - I

Lecture 11 - Development of Microstructure - II

Lecture 12 - Surface Properties

Lecture 13 - Response to Stress - Part 1

Lecture 14 - Response to Stress - Part 2

Lecture 15 - Response to Stress - Part 3

Lecture 16 - Failure Theories

Lecture 17 - Fracture Mechanics - Part 1

Lecture 18 - Fracture Mechanics - Part 2

Lecture 19 - Rheology of Liquids and Solids

Lecture 20 - Thermal Properties

Lecture 21 - Review of Construction Materials

Lecture 22 - Wood and Wood Products - 1

Lecture 23 - Wood and Wood Products - 2

Lecture 24 - Wood and Wood Products - Guest Lecture

Lecture 25 - Polymers

Lecture 26 - Fibre Reinforced Polymer - 1

Lecture 27 - Fibre Reinforced Polymer - 2

Lecture 28 - Metals - Part 1

Lecture 29 - Metals - Part 2

Lecture 30 - Metals - Part 3

Lecture 31 - Bituminous Material - Part 1

Lecture 32 - Bituminous Material - Part 2

Lecture 33 - Concrete - Part 1

Lecture 34 - Concrete - Part 2

Lecture 35 - Concrete - Part 3

Lecture 36 - Concrete - Part 4

Lecture 37 - Concrete - Part 5

Lecture 38 - Glass - Guest Lecture

Lecture 39 - Social Perception - Guest Lecture

Lecture 40 - Water Proofing - Guest Lecture

Lecture 41 - Floor Finishes - Guest Lecture

Lecture 42 - Anchors - Guest Lecture

NPTEL : Urban transportation planning (Civil Engineering)

Co-ordinators : Dr. V. Thamizh Arasan

Lecture 1 - Introduction

Lecture 2 - Introduction (Continued...)

Lecture 3 - Introduction (Continued...)

Lecture 4 - Course Outline

Lecture 5 - Conceptual Aspects

Lecture 6 - Conceptual Aspects (Continued...)

Lecture 7 - Conceptual Aspects (Continued...)

Lecture 8 - Conceptual Aspects (Continued...)

Lecture 9 - Trip Generation Analysis

Lecture 10 - Trip Generation Analysis (Continued...)

Lecture 11 - Trip Generation Analysis (Continued...)

Lecture 12 - Trip Generation Analysis (Continued...)

Lecture 13 - Modal Split Analysis

Lecture 14 - Modal Split Analysis (Continued...)

Lecture 15 - Modal Split Analysis (Continued...)

Lecture 16 - Modal Split Analysis (Continued...)

Lecture 17 - Modal Split Analysis (Continued...)

Lecture 18 - Modal Split Analysis (Continued...)

Lecture 19 - Modal Split Analysis (Continued...)

Lecture 20 - Trip Distribution Analysis

Lecture 21 - Trip Distribution Analysis (Continued...)

Lecture 22 - Trip Distribution Analysis (Continued...)

Lecture 23 - Trip Distribution Analysis (Continued...)

Lecture 24 - Trip Distribution Analysis (Continued...)

Lecture 25 - Trip Distribution Analysis (Continued...)

Lecture 26 - Trip Distribution Analysis (Continued...)

Lecture 27 - Route Assignment

Lecture 28 - Route Assignment (Continued...)

Lecture 29 - Route Assignment (Continued...)

Lecture 30 - Route Assignment (Continued...)

Lecture 31 - Transportation Surveys

Lecture 32 - Transportation Surveys (Continued...)

Lecture 33 - Transportation Surveys (Continued...)

Lecture 34 - Transport Related Land-Use Models

Lecture 35 - Transport Related Land-Use Models (Continued...)

Lecture 36 - Transport Related Land-Use Models (Continued...)

Lecture 37 - Urban Structure

Lecture 38 - Urban Structure (Continued...)

Lecture 39 - Urban Goods Movement

Lecture 40 - Urban Goods Movement (Continued...)

NPTEL : Mechanics of Solids (Civil Engineering)

Co-ordinators : Prof. M.S. Sivakumar

Lecture 1 - Planar Rigid Body

Lecture 2 - Degrees of freedom

Lecture 3 - Equations of Equilibrium

Lecture 4 - Planar rigid body Statics - Example 1

Lecture 5 - Rigid Body Statics - Example 2

Lecture 6 - Structural Systems with rigid bodies

Lecture 7 - Types of 1-D Structural Elements

Lecture 8 - Trusses - Axial members

Lecture 9 - Analysis of Truss Systems

Lecture 10 - Stability of Structural systems

Lecture 11 - Trusses - additional discussions

Lecture 12 - Trusses - Method of Sections

Lecture 13 - Beams - Example 1

Lecture 14 - Beams - BMD & SFD

Lecture 15 - Beams - loading, shear and BM relationships

Lecture 16 - Virtual work method

Lecture 17 - Virtual displacements

Lecture 18 - Finding virtual displacements

Lecture 19 - Virtual Work Method - Example 1

Lecture 20 - Virtual Work Method - Example 2

Lecture 21 - Static Friction - an understanding

Lecture 22 - Belt Friction

Lecture 23 - Friction : Solving Problems

Lecture 24 - General concepts - rigid bodies

Lecture 25 - Motion of a rigid body = a translation + a rotation

Lecture 26 - Motion of a point of the rigid body

Lecture 27 - Motion of one point on a rigid body relative to another

Lecture 28 - Understanding rotational motion r_dot = w x r

Lecture 29 - Kinematics velocity and acceleration

Lecture 30 - Understanding Coriolis Acceleration

Lecture 31 - Kinematics - Solving problems

Lecture 32 - Equations of motion of a rigid body

Lecture 33 - Tips and Techniques 1/2

Lecture 34 - Tips and Techniques 2/2

Lecture 35 - Solving Problems 1/4

Lecture 36 - Solving Problems 2/4

Lecture 37 - Solving Problems 3/4

Lecture 38 - Solving Problems 4/4

Lecture 39 - Engineering Statics - Solving problems

NPTEL : Pre-stressed Concrete Structures (Civil Engineering)

Co-ordinators : Prof. Devdas Menon, Dr. Amlan Kumar Sengupta

Lecture 1 - Prestressing System

Lecture 2 - Types of Prestressing

Lecture 3 - Prestressing System and Devices (Pre-Tensioning)

Lecture 4 - Prestressing System and Devices (Post-Tensioning)

Lecture 5 - Concrete - Part-1

Lecture 6 - Concrete, Grout - Part-2

Lecture 7 - Prestressing Steel

Lecture 8 - Losses in Prestress

Lecture 9 - Friction & Anchorage Slip

Lecture 10 - Creep,Shrinkage & Relaxation Losses

Lecture 11 - Analysis of Members

Lecture 12 - Analysis of Members Under Flexure

Lecture 13 - Cracking Moment,Kern Point and Pressure Line

Lecture 14 - Analysis of Rectangular sections

Lecture 15 - Analysis of Flanged Sections

Lecture 16 - Analysis of Partially Prestressed Section

Lecture 17 - Design of Members

Lecture 18 - Design of Members for Flexure (Type1 Members)

Lecture 19 - Design of Members for Flexure (Type1 & Type3)

Lecture 20 - Choice of Sections and Determination of Limiting

Lecture 21 - Magnel`s Graphical Method

Lecture 22 - Detailing Requirements

Lecture 23 - Analysis and Design for Shear and Torsion

Lecture 24 - Design for Shear - Part-1

Lecture 25 - Design for Shear - Part-2

Lecture 26 - Analysis of Torsion

Lecture 27 - Analysis of Torsion - Part-1

Lecture 28 - Analysis of Torsion - Part-2

Lecture 29 - Calculations of Deflection and Crack Width

Lecture 30 - Transmission of Prestress

Lecture 31 - Post-tensioned Members

Lecture 32 - Cantilever Beams

Lecture 33 - Continuous Beams - Part-1

Lecture 34 - Continuous Beams - Part-2

Lecture 35 - Composite Sections

Lecture 36 - One-Way Slabs

Lecture 37 - Two-Way Slabs - Part-1

Lecture 38 - Two-Way Slabs - Part-2

Lecture 39 - compression Members

Lecture 40 - Circular Prestressing, Conclusion

NPTEL : Water and Waste Water Engineering (Civil Engineering)

Co-ordinators : Prof. B.S. Murty, Prof. C. Venkobachar, Prof. Ligy Philip

Lecture 1 - Introduction To Water & Waste Water Engineering

Lecture 2 - Water & Waste Water Quality Enhancement

Lecture 3 - Water & Waste Water Quantity Estimation

Lecture 4 - Water & Waste Water Quantity Estimation (Continued...)

Lecture 5 - Water & Waste Water Characteristics

Lecture 6 - Water & Waste Water Characteristics (Continued...)

Lecture 7 - Water Treatment System Unit Operations

Lecture 8 - Sedimentation

Lecture 9 - Sedimentation (Continued...)

Lecture 10 - Coagulation & Flocculation

Lecture 11 - Coagulation & Flocculation (Continued...)

Lecture 12 - Softening

Lecture 13 - Filtration

Lecture 14 - Filtration (Continued...)

Lecture 15 - Disinfection

Lecture 16 - Introduction To Domestic Waste Water Treatment

Lecture 17 - Physical Unit Processes For Waste Water Treatment

Lecture 18 - Introduction To Microbiology

Lecture 19 - Microbiology - (Continued...)

Lecture 20 - Waste Water Treatment Reactor Analysis

Lecture 21 - Biological Unit Processes - Activated Sludge Process

Lecture 22 - Activated Sludge Process - Modification

Lecture 23 - Activated Sludge Process (Continued...)

Lecture 24 - Aeration,Nitrification And Denitrification

Lecture 25 - Natural Waste Water Treatment Systems: Ponds & Lagoons

Lecture 26 - Attached Growth Aerobic Process: Trickling Filters And Rotating Biological Contractors

Lecture 27 - Anaerobic Treatment

Lecture 28 - Anaerobic Process-UASB Reactor (Continued...)

Lecture 29 - UASB- Continued & Sludge Treatment

Lecture 30 - Sludge Treatment (Continued...)

Lecture 31 - Sludge Treatment (Continued...) & Waste Water Disposal

Lecture 32 - Waste Water Disposal And Reuse

Lecture 33 - Advanced Waste Water Treatment

Lecture 34 - Adsorption

Lecture 35 - Ion Exchange, Advanced Oxidation Process

Lecture 36 - Industrial Waste Water Treatment

Lecture 37 - Water Distribution Networks

Lecture 38 - Sanitary sewerage systems

Lecture 39 - Storm water sewerage systems

Lecture 40 - Intake Structures And Pumping Installations

NPTEL : NOC:Sustainable River Basin Management (Civil Engineering)

Co-ordinators : Dr. Franziska Steinbruch

Lecture 1

Lecture 2

Lecture 3

Lecture 4

Lecture 5

Lecture 6

Lecture 7

Lecture 8

Lecture 9

Lecture 10

Lecture 11

Lecture 12

Lecture 13

Lecture 14

Lecture 15

Lecture 16

Lecture 17

Lecture 18

Lecture 19

Lecture 20

Lecture 21

Lecture 22

Lecture 23

Lecture 24

Lecture 25

Lecture 26

Lecture 27

Lecture 28

Lecture 29

Lecture 30

Lecture 31

Lecture 32

Lecture 33

Lecture 34

Lecture 35

Lecture 36

Lecture 37

Lecture 38

Lecture 39

Lecture 40

NPTEL : NOC:Project Planning and Control (Civil Engineering)

Co-ordinators : Dr. Koshy Varghese

Lecture 1 - What is Project Management? Is Project Management an Art/Science ?

Lecture 2 - Objectives of a Project, Scientific Way of Managing of Objectives

Lecture 3 - Course Scope and Plan, Questions and Discussions

Lecture 4 - Construction Industry and National Growth

Lecture 5 - Project Stakeholders, Project Phases, Project Organization

Lecture 6 - Project Scheduling Levels (Scheduling Engineer Responsibilities)

Lecture 7 - Time Management - Overview

Lecture 8 - Basics of Work Breakdown Structure (WBS)

Lecture 9 - Tools for Time Management

Lecture 10 - Gantt / Bar Chart - History, Representation, Progress Monitoring, Uses, Steps to draw a Bar Chart

Lecture 11 - Develop a Bar Chart (Exercise)

Lecture 12 - Bar Charts for Resource Usage, Pros and Cons

Lecture 13 - Duration Estimation - Types, Inputs, Methods, Parametric Estimation

Lecture 14 - Factors influencing Productivity, Example for Ideal Productivity, Factored Productivity and Working Time Factor

Lecture 15 - Piling Activity Example, Applicability of different methods to Estimate Activity Duration

Lecture 16 - Summary of Key Topics, Types of Networks

Lecture 17 - Networks - Introduction, Techniques

Lecture 18 - Representing Results in a Bar Chart, AON Example-2

Lecture 19 - Introduction to Floats, Types of Floats and Example-1 Discussion

Lecture 20 - Example 4, Usage of Floats for Project Decisions

Lecture 21 - Two-Span Bridge : Activity Identification and Duration Estimation (Continued...)

Lecture 22 - Two-Span Bridge : Activity Identification and Duration Estimation

Lecture 23 - Two-Span Bridge : Activity- Duration- Predecessors

Lecture 24 - Review Network Analysis Concepts, Apply Network Analysis to Two-Span Bridge (Continued...)

Lecture 25 - Two-Span Bridge : Network Analysis

Lecture 26 - Two-Span Bridge : Resource Constraints in Network Logic

Lecture 27 - Fast-Tracking vs Crashing, Relationship between Activity Direct Cost and Activity Duration - Assumptions

Lecture 28 - Time-Cost trade-off : ABCD Example Project, Steps for Crashing

Lecture 29 - Time-Cost trade-off : Class Exercise-2

Lecture 30 - Time-Cost trade-off : Problem-3, Tabulation Approach

Lecture 31 - Incorporating Factors such as Bonus and Penalty; Problem-4

Lecture 32 - What is Resource?, Influence of Resources on Schedule, Two-Span Bridge Example, Resource Decisions; ABCD Example Project; Resource Over-Allocation; Example-2

Lecture 33 - Projects and Resources, Example of Two Resources, Exercise, Two-Span Bridge Example

Lecture 34 - Review Problem-1; Problem-2 (Cash Resource); Resolving Over-Allocation

Lecture 35 - Problem 1 - Two Resources; Resolving Resource Allocation Problems

Lecture 36 - Resource Profile Requirements

Lecture 37 - Resource Leveling - Example Network

Lecture 38 - Minimum Moment Concept

Lecture 39 - Applying Improvement Factor - Illustration

Lecture 40 - Introduction to Precedence Diagramming Method (PDM)

Lecture 41 - PDM network representation and its issues, Network Calculation

Lecture 42 - PDM Â– Problem #1

Lecture 43 - Issues in PDM, Negative Lags, Problem #2 Solution

Lecture 44 - PDM Â– Analysis with non-continuous duration, Floats

Lecture 45 - Defining Relationship (Based on Construction Method) - Simple Shed

Lecture 46 - Project Monitoring & Control Â– Typical Project Time Monitoring Process, Levels and Frequency of updates

Lecture 47 - Project Control Process, Daily Progress Report, Macro Level Update- Data Need, Standard Progress Reports

Lecture 48 - Application: Two Span Bridge Â– ES Schedule

Lecture 49 - Review of Key Issues in Project Monitoring, Earned Value Concept Through Examples

Lecture 50 - Basic Earned Value Definitions and Terminology, Summary

Lecture 51 - Uncertainty in Project Schedules

Lecture 52 - PERT Background & Assumptions, Stepwise Procedure

Lecture 53 - PERT Example Problem, Summary

Lecture 54 - Course Conclusion

Lecture 55 - Emerging Trends / Tools in Project Planning

Lecture 56 - Industry Perspective Â– Prof. N. Raghavan

Lecture 57 - Final Exam Pattern, Acknowledgements

NPTEL : NOC:Structural Dynamics (Civil Engineering)

Co-ordinators : Prof. Ramancharala Pradeep Kumar

Lecture 1 - Module 1: Introduction of Structural Dynamics

Lecture 2 - Module 2: Types of Analysis

Lecture 3 - Module 3: Degrees of Freedom

Lecture 4 - Module 4: Vibrations of SDOF Systems

Lecture 5 - Module 5: Methods Solution of Equilibrium Equation

Lecture 6 - Module 6: UnDamped free Vibration

Lecture 7 - What is MATLAB?

Lecture 8 - Getting Started with MATLAB Online

Lecture 9 - MATLAB Variables

Lecture 10 - MATLAB as a Calculator

Lecture 11 - MATLAB Functions

Lecture 12 - Creating Vectors

Lecture 13 - Creating Uniformly Spaced Vectors (Colon Operator)

Lecture 14 - Creating Uniformly Spaced Vectors (LINSPACE)

Lecture 15 - Accessing Elements of a Vector

Lecture 16 - Calculations with Vectors

Lecture 17 - Creating Matrices

Lecture 18 - Matrix Creation Functions

Lecture 19 - Accessing Elements of a Matrix

Lecture 20 - Matrix Multiplication

Lecture 21 - Logical Operators

Lecture 22 - Writing a FOR Loop

Lecture 23 - If - Else Statements

Lecture 24 - While Loop

Lecture 25 - Line Plots

Lecture 26 - Annotating Graphs

Lecture 27 - Exploring Figures in MATLAB Online

Lecture 28 - Damped Free Vibration

Lecture 29 - Types of Damping

Lecture 30 - Logarithmic Decrement

Lecture 31 - Dynamic Equilibrium Equation Using Energy Method

Lecture 32 - Module 1: UnDamped Forced Vibration

Lecture 33 - Module 2: Damped Forced Vibration

Lecture 34 - Module 3: Relationship between Rd, Rv & Ra

Lecture 35 - Module 4: Resonant Frequency & Half Power Band Width

Lecture 36 - Module 5: Transmissibility

Lecture 37 - Module 1: Response to Arbitrary Force

Lecture 38 - Module 2: Special Cases in Arbitrary Force

Lecture 39 - Module 3: Fourier Transformation

Lecture 40 - Module 1: Numerical Methods

Lecture 41 - Module 2: Methods Based on Interpolation of Excitation

Lecture 42 - Module 3: Central Difference Method

Lecture 43 - Module 4: Numerical Methods based on Variation of Acceleration: NewmarkÂ’s Method

Lecture 44 - Central Difference Method (Tutorial)

Lecture 45 - Module 1: Response Spectrum

Lecture 46 - Module 2: Special Cases of Response Spectrum

Lecture 47 - Module 3: Development of Tripartite Plot

Lecture 48 - Module 1: Multi-Degree of Freedom System

Lecture 49 - Module 2: Multi-Degree of Freedom System: Solution of Equilibrium Equation

Lecture 50 - Module 3: Multi-Degree of Freedom System: Modal Orthogonality

Lecture 51 - Module 4: Approximate Methods For Finding Natural Frequency

Lecture 52 - Tutorial 01: Generation of Mass Matrix

Lecture 53 - Tutorial 2: Eigen vector and Modal Orthogonality

Lecture 54 - Module 1: Time History Analysis

Lecture 55 - Module 2: Response Spectrum Analysis

Lecture 56 - Module 1: Three Dimensional Dynamic Analysis

Lecture 57 - Module 2: Generation of Elastic Design Response Spectra

Lecture 58 - W09T01: Centre of Mass & Centre of Stiffness

Lecture 59 - Module 1: Vibration of Continuous Systems

Lecture 60 - Module 2: Example Problem on Continuous system

Lecture 61 - Module 3: Theory of Seismometer

Lecture 62 - Module 1: Dynamics of Non Structural Elements

Lecture 63 - Module 2: Non Structural Elements Example

Lecture 64 - W11T: Non Structural Elements

Lecture 65 - Module 1: Classical and Non-classical Damping

Lecture 66 - Module 2: Vibration Control

Lecture 67 - Module 3: Base Isolation

Lecture 68 - Module 4: Tuned Mass Damper

NPTEL : NOC:Mechanics of Materials (Civil Engineering)

Co-ordinators : Dr. U. Saravanan

Lecture 1 - Why this course?

Lecture 2 - Concepts and equations in this course

Lecture 3 - Objectives and prerequisite

Lecture 4 - Linear Algebra

Lecture 5 - Vector Algebra

Lecture 6 - Representation of Vector

Lecture 7 - Concept of Force

Lecture 8 - Definition of a body

Lecture 9 - Motion and Displacement field

Lecture 10 - Traction

Lecture 11 - Properties of traction

Lecture 12 - Defnition of stress tensor and linear function

Lecture 13 - Tensor Algebra

Lecture 14 - Meaning of components of the stress tensor

Lecture 15 - Transformation of stress components

Lecture 16 - Mohr's Circle derivaion

Lecture 17 - Example 1: Construction of Mohr's circle

Lecture 18 - Example 2: Extremum normal and shear stress

Lecture 19 - Example 3: Transformation of stress components

Lecture 20 - Uniaxial stress

Lecture 21 - Hydrostatic, pure shear and deviatoric stress

Lecture 22 - Biaxial and Plane state of stress

Lecture 23 - Extreme stress for 3D stresses

Lecture 24 - Extremum shear stress

Lecture 25 - Stresses in the Octahedral plane

Lecture 26 - 2D Equilibrium equations

Lecture 27 - 3D Equilibrium equations

Lecture 28 - Stretch ratio and strain

Lecture 29 - Curves and arc Length

Lecture 30 - Gradient

Lecture 31 - Deformation and displacement Gradient

Lecture 32 - Right Cauchy Green Deformation tensor

Lecture 33 - Homogeneous deformation

Lecture 34 - Engineering strain

Lecture 35 - Change in Angle

Lecture 36 - Transformation of strain components/ Strain Rosette

Lecture 37 - Compatibility condition

Lecture 38 - Constitutive relation

Lecture 39 - Young's Modulus and Poisson's Ratio

Lecture 40 - Shear Modulus

Lecture 41 - Bulk Modulus

Lecture 42 - Restriction on material parameters

Lecture 43 - Thermal strain

Lecture 44 - Strain energy, load potential and total potential

Lecture 45 - Stepped shaft subjected to axial force

Lecture 46 - Inhomogeneous bar subjected to axial force

Lecture 47 - Stepped shaft subjected to raise in temperature

Lecture 48 - Traction in member subjected to bending

Lecture 49 - Governing equilibrium equations

Lecture 50 - Displacement field

Lecture 51 - Bending equation

Lecture 52 - Radius of curvature

Lecture 53 - Shear force and bending moment diagram

Lecture 54 - Variation of axial stress

Lecture 55 - Deflected shape and rotation of cross section

Lecture 56 - Expression to find shear stress

Lecture 57 - Finding centroid of a cross section

Lecture 58 - Parallel axis theorem and its application

Lecture 59 - Vertical shear stress in I section

Lecture 60 - Horizontal shear stress in I section

Lecture 61 - Connection design

Lecture 62 - Definition of shear center

Lecture 63 - Shear center of Channel section

Lecture 64 - Expression to find shear center

Lecture 65 - Shear force and bending moment diagram

Lecture 66 - Deflected shape and rotation of cross section

Lecture 67 - Finding allowable load

Lecture 68 - Modified bending equation

Lecture 69 - Bending of a composite beam

Lecture 70 - Connection design

Lecture 71 - Moment of Intertia about arbitrarily oriented axis

Lecture 72 - Example: Angle section

Lecture 73 - Bending equation for bending about principal axis

Lecture 74 - Bending equation about arbitrary axis

Lecture 75 - Neutral axis

Lecture 76 - Load not about principal axis

Lecture 77 - Load about principal axis

Lecture 78 - Displacement field

Lecture 79 - Torsion equation

Lecture 80 - Example problems

Lecture 81 - Expression relating angle of twist with torsion and shear stress

Lecture 82 - Example problems: Open sections

Lecture 83 - Thin walled closed sections

Lecture 84 - Example problems: Thin walled sections

Lecture 85 - Cylindrical polar coordinate system

Lecture 86 - Displacement field

Lecture 87 - Governing differential equation and solution

Lecture 88 - Example problems : Thick walled cylindrical vessel

Lecture 89 - Thin walled pressure vessels

Lecture 90 - General Principals

Lecture 91 - Different failure modes

Lecture 92 - Tresca Condition

Lecture 93 - vonMises condition

Lecture 94 - Maximum normal stress or rankine condition

Lecture 95 - Mohr - Columb condition

Lecture 96 - Drucker-Prager Condition

Lecture 97 - General Concepts

Lecture 98 - Euler critical load for simply supported column

Lecture 99 - Euler critical load for column with any boundary condition

Lecture 100 - Secant formula

Lecture 101 - Pressure vessel and failure theory

Lecture 102 - Determination of maximum load carrying capacity of a simple truss

NPTEL : NOC:Advanced Concrete Technology (Civil Engineering)

Co-ordinators : Prof. Manu Santhanam

Lecture 0 - Introduction to course

Lecture 1 - Cement Production - Part 1

Lecture 2 - Cement Production - Part 2

Lecture 3 - Cement Composition - Part 1

Lecture 4 - Cement Composition - Part 2

Lecture 5 - Cement Classification - Part 1

Lecture 6 - Cement Classification - Part 2

Lecture 7 - Cement Chemistry - Part 1

Lecture 8 - Cement Chemistry - Part 2

Lecture 9 - Cement Chemistry - Part 3

Lecture 10 - Cement Chemistry - Part 4

Lecture 11 - Cement Chemistry - Part 5

Lecture 12 - Aggregates for concrete - Part 1

Lecture 13 - Aggregates for concrete - Part 2

Lecture 14 - Chemical admixtures - Part 1

Lecture 15 - Chemical admixtures - Part 2

Lecture 16 - Chemical admixtures - Part 3

Lecture 17 - Chemical admixtures - Part 4

Lecture 18 - Chemical admixtures - Part 5

Lecture 19 - Mineral admixtures - Part 1

Lecture 20 - Mineral admixtures - Part 2

Lecture 21 - Mineral admixtures - Part 3

Lecture 22 - Mineral admixtures - Part 4

Lecture 23 - Mineral admixtures - Part 5

Lecture 24 - Mineral admixtures - Part 6

Lecture 25 - Mineral admixtures - Part 7

Lecture 26 - Mixture proportioning

Lecture 27 - Fresh concrete - Part 1

Lecture 28 - Fresh concrete - Part 2

Lecture 29 - Fresh properties - Part 3

Lecture 30 - Introduction to Harden concrete properties

Lecture 31 - Post peak response and Fibre reinforced concrete

Lecture 32 - Shrinkage: Mechanism and Behaviours

Lecture 33 - Creep: Mechanism and Behaviours

Lecture 34 - Shrinkage: Plastic Shrinkage

Lecture 35 - Shrinkage: Drying Shrinkage

Lecture 36 - Introduction to Durability

Lecture 37 - Performance based specifications for durable concrete

Lecture 38 - Durability issues in concrete - Part 1

Lecture 39 - Durability issues in concrete - Part 2

Lecture 40 - Durability issues in concrete - Part 3

Lecture 41 - Durability issues in concrete - Part 4

Lecture 42 - Durability issues in concrete - Part 5

Lecture 43 - Durability issues in concrete - Part 6

NPTEL : NOC:Glass in Buildings: Design and Application (Civil Engineering)

Co-ordinators : Prof. K.N. Satyanarayana

Lecture 1 - Introduction

Lecture 2 - Float Process for Manufacturing Glass - Part 1

Lecture 3 - Float Process for Manufacturing Glass - Part 2

Lecture 4 - Coatings on Glass - Need and Types - Part 2

Lecture 5 - Coatings on Glass - Need and Types - Part 2

Lecture 6 - Glass Design for Safety, Sustainability and Aesthetic - Part 1

Lecture 7 - Glass Design for Safety, Sustainability and Aesthetic - Part 2

Lecture 8 - Structural Control and Design for Energy Efficiency - Part I

Lecture 9 - Structural Control and Design for Energy Efficiency - Part II

Lecture 10 - Structural Control and Design for Energy Efficiency - Part III

Lecture 11 - Structural Control and Design for Energy Efficiency - Part IV

Lecture 12 - Structural Control and Design for Energy Efficiency - Part V

Lecture 13 - Design Tools for Glass Selection - Part I

Lecture 14 - Design Tools for Glass Selection - Part II

Lecture 15 - Modeling the Building Envelope - Part I

Lecture 16 - Modeling the Building Envelope - Part II

Lecture 17 - Modeling the Building Envelope - Part III

Lecture 18 - Innovations in Glass Future Facades - Part I

Lecture 19 - Innovations in Glass Future Facades - Part II

Lecture 20 - Standards Related to Glass

Lecture 21 - Introduction to Useful Daylighting in Buildings

Lecture 22 - Fundamentals of Daylighting - Part I

Lecture 23 - Fundamentals of Daylighting - Part II

Lecture 24 - Daylighting Strategies - Techniques - Part I - Video 1

Lecture 25 - Daylighting Strategies - Techniques - Part I - Video 2

Lecture 26 - Daylighting Strategies - Techniques - Part II - Video 1

Lecture 27 - Daylighting Strategies - Techniques - Part II - Video 2

Lecture 28 - Daylighting Strategies - Techniques - Part II - Video 3

Lecture 29 - ECBC and Green Building Requirements

Lecture 30 - Introduction to Daylight Simulation

Lecture 31 - Daylighting Controls - Part I

Lecture 32 - Daylighting Controls - Part II

Lecture 33 - Acheving Acoustics Through Glass

Lecture 34 - Glass Processing Overview - Part I

Lecture 35 - Glass Processing Overview - Part II

Lecture 36 - Interior Glazing Program - Part I

Lecture 37 - Interior Glazing Program - Part II

Lecture 38 - Interior Glazing Applications-Shower Enclosure - Part I

Lecture 39 - Interior Glazing Applications-Shower Enclosure - Part II

Lecture 40 - Interior Glazing Applications-Shower Enclosure - Part III

Lecture 41 - Interior Glazing Applications-Shower Enclosure - Part IV

Lecture 42 - Glass in Passive Fire Protection - Part I

Lecture 43 - Glass in Passive Fire Protection - Part II

Lecture 44 - Glass in Passive Fire Protection - Part III

Lecture 45 - Glazing Choices for Project Segment - Part I

Lecture 46 - Glazing Choices for Project Segment - Part II

Lecture 47 - National Building Code 2016 - Part I

Lecture 48 - National Building Code 2016 - Part II

Lecture 49 - National Building Code 2016 - Part III

Lecture 50 - National Building Code 2016 - Part IV

Lecture 51 - Facade Fundamentals - Part I

Lecture 52 - Facade Fundamentals - Part II

Lecture 53 - Facade Fundamentals - Part III

Lecture 54 - Facade Fundamentals - Part IV

Lecture 55 - Glass Application on Facades - Part I

Lecture 56 - Glass Application on Facades - Part II

Lecture 57 - Glass Application on Facades - Part III

Lecture 58 - Energy Efficiency Facade System

Lecture 59 - Structural Design of Facades - Part I

Lecture 60 - Structural Design of Facades - Part II

Lecture 61 - Silicone for Structural Glazing - Part - I

Lecture 62 - Silicone for Structural Glazing - Part - II

Lecture 63 - Silicone for Structural Glazing - Part - III

Lecture 64 - Facade Factory Operations - Part I

Lecture 65 - Facade Factory Operations - Part II

Lecture 66 - Performance Testing for Facades - Part I

Lecture 67 - Performance Testing for Facades - Part II

Lecture 68 - The Role of Windows in Building Design - Part I

Lecture 69 - The Role of Windows in Building Design - Part II

Lecture 70 - Standards Related to Glass II

Lecture 71 - FAQs about usage of Glass in Buildings

Lecture 72 - Case Study of a Different Concept of Facade

Lecture 73 - Case Studies-Envelope Design and Its Impact - Part I

Lecture 74 - Case Studies-Envelope Design and Its Impact - Part II

Lecture 75 - A Case Study of Building Envelope in the context of Environmentally Sustainable Design - Part I

Lecture 76 - A Case Study of Building Envelope in the context of Environmentally Sustainable Design - Part II

Lecture 77 - Sustainable Building and Facades - Part I

Lecture 78 - Sustainable Building and Facades - Part II

Lecture 79 - Building Envelope Design for Sustainable Buildings

Lecture 80 - Building Envelope Design

Lecture 81 - Case Study for Building Envelop Design - Part I

Lecture 82 - Case Study for Building Envelop Design - Part II

Lecture 83 - Case study-Commercial Buildings - Part I

Lecture 84 - Case study-Commercial Buildings - Part II

Lecture 85 - Case study-Commercial Buildings - Part III

Lecture 86 - Case Study-The Untold Truth of the Unbuilt - Part I

Lecture 87 - Case Study-The Untold Truth of the Unbuilt - Part II

NPTEL : NOC:Glass Processing Technology (Civil Engineering)

Co-ordinators : Prof. K.N. Satyanarayana

Lecture 1 - Introduction

Lecture 2 - Glass as Building Material - Part I

Lecture 3 - Glass as Building Material - Part II

Lecture 4 - Float Glass Manufacturing - Part I

Lecture 5 - Float Glass Manufacturing - Part II

Lecture 6 - Glass Coating Technology - Part I

Lecture 7 - Glass Coating Technology - Part II

Lecture 8 - Safety in Industries - Part I

Lecture 9 - Safety in Industries - Part II

Lecture 10 - Safety in Glass Handling - Part I

Lecture 11 - Safety in Glass Handling - Part II

Lecture 12 - Process Flow- PPE

Lecture 13 - Serviceability-Sales - Production Planning in Solutions Business - Part I

Lecture 14 - Serviceability-Sales - Production Planning in Solutions Business - Part II

Lecture 15 - Serviceability-Sales - Production Planning in Solutions Business - Part III

Lecture 16 - Environment and Eco packaging

Lecture 17 - Glass Warehouse Management - Part I

Lecture 18 - Glass Warehouse Management - Part II

Lecture 19 - Cutting and Snapping

Lecture 20 - Pre-Processing-Drilling - Part I

Lecture 21 - Pre-Processing-Drilling - Part II

Lecture 22 - Grinding and Fabrication

Lecture 23 - Pre-Processing - Washing

Lecture 24 - Tempering - Part I

Lecture 25 - Tempering - Part II

Lecture 26 - Tempering - Part III

Lecture 27 - Tempering - Part IV

Lecture 28 - Tempering - Part V

Lecture 29 - Tempering - Part VI

Lecture 30 - Tempering - Part VII

Lecture 31 - Lamination - Part I

Lecture 32 - Lamination - Part II

Lecture 33 - Lamination - Part III

Lecture 34 - Insulating Glass Unit - Part I

Lecture 35 - Insulating Glass Unit - Part II

Lecture 36 - Insulating Glass Unit - Part III

Lecture 37 - Insulating Glass Unit - Part IV

Lecture 38 - Insulating Glass Unit - Part V

Lecture 39 - Insulating Glass Unit - Part VI

Lecture 40 - Insulating Glass Unit - Part VII

Lecture 41 - Insulating Glass Unit - Part VIII

Lecture 42 - Insulating Glass Unit - Part IX

Lecture 43 - Silicone Sealant for Insulated Glass - Part I

Lecture 44 - Silicone Sealant for Insulated Glass - Part II

Lecture 45 - Insulating Glass Unit - Part X

Lecture 46 - Insulating Glass Unit - Part XI

Lecture 47 - Insulating Glass Unit - Part XII

Lecture 48 - Processing Standards and Checks

Lecture 49 - Quality Testing - Part I

Lecture 50 - Quality Testing - Part II

Lecture 51 - Quality Testing - Part III

Lecture 52 - Quality Testing - Part IV - Video 1

Lecture 53 - Quality Testing - Part IV - Video 2

Lecture 54 - Quality Testing - Part V

Lecture 55 - Quality Testing - Part VI

Lecture 56 - Quality Testing - Part VII

Lecture 57 - Heat soaking - Part I

Lecture 58 - Heat soaking - Part II

Lecture 59 - Ceramic Printing on Glass - Part I

Lecture 60 - Ceramic Printing on Glass - Part II

Lecture 61 - Ceramic Printing on Glass - Part III

Lecture 62 - Ceramic Printing on Glass - Part IV

Lecture 63 - Glass Breakage Reasons

Lecture 64 - Internal Process Loss - Part I

Lecture 65 - Internal Process Loss - Part II

Lecture 66 - Internal Process Loss - Part III

Lecture 67 - Root Cause Analysis - Part I

Lecture 68 - Root Cause Analysis - Part II

Lecture 69 - Post Manufacturing Expenses

Lecture 70 - 5S in Glass Processing

Lecture 71 - Introduction to Quality Management System - Part I

Lecture 72 - Introduction to Quality Management System - Part II

Lecture 73 - Glass Processing - Applications, Innovations and Futuristic Trends - Part I

Lecture 74 - Glass Processing - Applications, Innovations and Futuristic Trends - Part II

Lecture 75 - Sustainability on Glass Processing

NPTEL : NOC:Advanced Topics in the Science and Technology of Concrete (Civil Engineering)

Co-ordinators : Prof. Manu Santhanam, Dr. Ravindra Gettu

Lecture 1 - Calcium sulfoaluminate cement-based binder: Properties and application

Lecture 2 - Micro-structural characterisation of cementitious materials - Part 1

Lecture 3 - Micro-structural characterisation of cementitious materials - Part 2

Lecture 4 - Micro-structural characterisation of cementitious materials - Part 3

Lecture 5 - Interview with Prof Karen Scrivener

Lecture 6 - Performance of Fiber reinforced materials

Lecture 7 - Ultra-High performance concrete (UHPC): Material design and properties - Part 1

Lecture 8 - Ultra-High performance concrete (UHPC): Material design and properties - Part 2

Lecture 9 - Closed-Loop testing - Part 1

Lecture 10 - Closed-Loop testing - Part 2

Lecture 11 - Uni-axial tensile test of textile reinforced concrete (TRC) panel

Lecture 12 - Fiber reinforced concrete: Notched beam flexural test

Lecture 13 - Strain softening response of concrete Under uniaxial compression

Lecture 14 - Tension test of 7-wire steel strand

Lecture 15 - Bond Test of Strand-concrete System

Lecture 16 - Interview with Prof. S. P. Shah

Lecture 17 - Introduction to concrete durability

Lecture 18 - Sulphate attack of concrete

Lecture 19 - Development and performance approach for durability and service life production for structures

Lecture 20 - Colorimetric test to assess carbonation resistance in concrete

Lecture 21 - Experiments on durability index: Rapid chloride permeability test, Oxygen permeability test, and Water Sorptivity test

Lecture 22 - Prof. Mark Alexander

Lecture 23 - Chloride induced corrosion and service life of reinforced concrete structures - Part 1

Lecture 24 - Chloride induced corrosion and service life of reinforced concrete structures - Part 2

Lecture 25 - Corrosion control and cathodic protection of steel reinforcement: Past, present, and future

Lecture 26 - LCA of cement and concrete - Part 1

Lecture 27 - LCA of cement and concrete - Part 2

Lecture 28 - 8. Chloride threshold testing using linear polarization resistance (LPR) and electrochemical impedance spectroscopy (EIS)

Lecture 29 - Interview with Prof George Sergi

NPTEL : NOC:Infrastructure Planning and Managements (Civil Engineering)

Co-ordinators : Dr. Ashwin Mahalingam

Lecture 1 - Introduction to infrastructure and the Transportation sector - Part 1A

Lecture 2 - Introduction to infrastructure and the Transportation sector - Part 1B

Lecture 3 - Introduction to infrastructure and the Transportation sector - Part 1C

Lecture 4 - Introduction to infrastructure and the Transportation sector - Part 1D

Lecture 5 - Introduction to Power and Telecom sectors - Part 2A

Lecture 6 - Introduction to Power and Telecom sectors - Part 2B

Lecture 7 - Urban and Rural Infrastructure - Part 1A

Lecture 8 - Urban and Rural Infrastructure - Part 1B

Lecture 9 - Urban and Rural Infrastructure - Part 1C

Lecture 10 - Phases and Players in Infrastructure Planning and Managements - Part 2A

Lecture 11 - Phases and Players in Infrastructure Planning and Managements - Part 2B

Lecture 12 - Infrastructure Economics and Finance

Lecture 13 - Public-Private Partnership for Infrastructure

Lecture 14 - Public-Private Partnership for Infrastructure - Case Studies - Part 1

Lecture 15 - Public-Private Partnership for Infrastructure - Case Studies - Part 2

Lecture 16 - Public-Private Partnership for Infrastructure - Case Studies - Part 3

Lecture 17 - Risks and Challenges in Infrastructure - Part 1

Lecture 18 - Risks and Challenges in Infrastructure - Part 2

Lecture 19 - Risks and Challenges in Infrastructure - Part 3

Lecture 20 - Economic Risk in Infrastructure - Part 1

Lecture 21 - Economic Risk in Infrastructure - Part 2

Lecture 22 - Political Risk in Infrastructure - Part 1

Lecture 23 - Political Risk in Infrastructure - Part 2

Lecture 24 - Social Environmental Risk in Infrastructure - Part 1

Lecture 25 - Social Environmental Risk in Infrastructure - Part 2

Lecture 26 - Actor Mapping and Social Network Analysis - Part 1

Lecture 27 - Actor Mapping and Social Network Analysis - Part 2

Lecture 28 - Fair Process and Negotiations - Part 1

Lecture 29 - Fair Process and Negotiations - Part 2

Lecture 30 - Design Thinking - Part 1

Lecture 31 - Design Thinking - Part 2

Lecture 32 - Sustainable Development and Socio - Economic Analysis - Part 1

Lecture 33 - Sustainable Development and Socio - Economic Analysis - Part 2

Lecture 34 - Public Sector Governance - Part 1

Lecture 35 - Public Sector Governance - Part 2

Lecture 36 - Flexibilities and Options on Projects - Part 1

Lecture 37 - Flexibilities and Options on Projects - Part 2

Lecture 38 - Module Flexibilities in Projects - Part 1

Lecture 39 - Module Flexibilities in Projects - Part 2

Lecture 40 - Case Study on PPP Project - Delhi Airport

Lecture 41 - Case Study on PPP Project - Tirupur Water Supply

Lecture 42 - Polycentric Governance and Incomplete Design - Part 1

Lecture 43 - Polycentric Governance and Incomplete Design - Part 2

Lecture 44 - Successful Project Delivery Strategies - Part 1

Lecture 45 - Successful Project Delivery Strategies - Part 2

Lecture 46 - Guest Lecture by K Venkatesh

Lecture 47 - Guest Lecture by Kavitha Selvaraj

NPTEL : NOC:Design of Masonry Structures (Civil Engineering)

Co-ordinators : Prof. Arun Menon

Lecture 1 - Introductory - Part I

Lecture 2 - Introductory - Part II

Lecture 3 - Introductory - Part III

Lecture 4 - Introductory - Part IV

Lecture 5 - Masonry Materials and Properties - Part I

Lecture 6 - Masonry Materials and Properties - Part II

Lecture 7 - Masonry Materials and Properties - Part III

Lecture 8 - Masonry Materials and Properties - Part IV

Lecture 9 - Masonry Materials and Properties - Part V

Lecture 10 - Masonry Materials and Properties - Part VI

Lecture 11 - Strength and Behaviour of Masonry - Part I

Lecture 12 - Strength and Behaviour of Masonry - Part II

Lecture 13 - Strength and Behaviour of Masonry - Part III

Lecture 14 - Strength and Behaviour of Masonry - Part IV

Lecture 15 - Strength and Behaviour of Masonry - Part V

Lecture 16 - Strength and Behaviour of Masonry - Part VI

Lecture 17 - Strength and Behaviour of Masonry - Part VII

Lecture 18 - Strength and Behaviour of Masonry - Part VIII

Lecture 19 - Strength and Behaviour of Masonry - Part IX

Lecture 20 - Strength and Behaviour of Masonry - Part X

Lecture 21 - Strength and Behaviour of Masonry - Part XI

Lecture 22 - Design of Masonry Components and Systems - Part I

Lecture 23 - Design of Masonry Components and Systems - Part II

Lecture 24 - Design of Masonry Components and Systems - Part III

Lecture 25 - Design of Masonry Components and Systems - Part IV

Lecture 26 - Design of Masonry Components and Systems - Part V

Lecture 27 - Design of Masonry Components and Systems - Part VI

Lecture 28 - Design of Masonry Components and Systems - Part VII

Lecture 29 - Design of Masonry Components and Systems - Part VIII

Lecture 30 - Design of Masonry Components and Systems - Part IX

Lecture 31 - Design of Masonry Components and Systems - Part X

Lecture 32 - Design of Masonry Components and Systems - Part XI

Lecture 33 - Design of Masonry Components and Systems - Example I

Lecture 34 - Design of Masonry Components and Systems - Example II

Lecture 35 - Design of Masonry Components and Systems - Example III

Lecture 36 - Special Topics - Confined Masonry

Lecture 37 - Special Topics - Masonry Infill in RC Frames

Lecture 38 - Special Topics - Assessment of Existing Masonry Structures - Part I

Lecture 39 - Special Topics - Assessment of Existing Masonry Structures - Part II

Lecture 40 - Special Topics - Assessment of Existing Masonry Structures - Part III

NPTEL : NOC:Characterization of Construction Materials (Civil Engineering)

Co-ordinators : Prof. Manu Santhanam, Prof. Piyush Chaunsali

Lecture 1 - Characterization of Construction Materials: An Introduction - Part 1

Lecture 2 - Characterization of Construction Materials: An Introduction - Part 2

Lecture 3 - Structure of Contruction Materials: An Overview - Part 1

Lecture 4 - Structure of Contruction Materials: An Overview - Part 2

Lecture 5 - Structure of Contruction Materials: An Overview - Part 3

Lecture 6 - Structure of Contruction Materials: An Overview - Part 4

Lecture 7 - Calorimetry: Introduction and types of Calorimeters - Part 1

Lecture 8 - Calorimetry: Introduction and types of Calorimeters - Part 2

Lecture 9 - Calorimetry: Sample preparation, Practical note and Heat of hydration - Part 1

Lecture 10 - Calorimetry: Sample preparation, Practical note and Heat of hydration - Part 2

Lecture 11 - Calorimetry: Applications of calorimetry - Part 1

Lecture 12 - X Ray diffraction: Introduction to X Rays and crystallography - Part 1

Lecture 13 - X Ray diffraction: Introduction to X Rays and crystallography - Part 2

Lecture 14 - X Ray diffraction: Crystal systems and History of XRD - Part 1

Lecture 15 - X Ray diffraction: Crystal systems and History of XRD - Part 2

Lecture 16 - X Ray diffraction: Diffractogram

Lecture 17 - X Ray diffraction: Diffractogram - Calculations - Part 1

Lecture 18 - X Ray diffraction: Diffractogram - Calculations - Part 2

Lecture 19 - X Ray Diffraction: Qualitative Phase Analysis - Part 1

Lecture 20 - X Ray Diffraction: Qualitative Phase Analysis - Part 2

Lecture 21 - X Ray Diffraction: Sample Preparation and Application in study of cements - Part 1

Lecture 22 - X Ray Diffraction: Sample Preparation and Application in study of cements - Part 2

Lecture 23 - Thermal Analysis - Part 1

Lecture 24 - Thermal Analysis - Part 2

Lecture 25 - Application of thermal analysis to study construction materials - Part 1

Lecture 26 - Application of thermal analysis to study construction materials - Part 2

Lecture 27 - Surface Area Measurement: Sampling and particle size distribution - Part 1

Lecture 28 - Surface Area Measurement: Sampling and particle size distribution - Part 2

Lecture 29 - Surface Area Measurement: Different techniques - Part 1

Lecture 30 - Surface Area Measurement: Different techniques - Part 2

Lecture 31 - Surface Area Measurement: calculation and applications

Lecture 32 - Optical and Scanning Microscopy- Introduction and specimen preperation - Part 1

Lecture 33 - Optical and Scanning Microscopy- Introduction and specimen preperation - Part 2

Lecture 34 - Optical and Scanning Microscopy- Features and functions - Part 1

Lecture 35 - Optical and Scanning Microscopy- Features and functions - Part 2

Lecture 36 - Types of optical microsopy - Part 1

Lecture 37 - Types of optical microsopy - Part 2

Lecture 38 - Scanning electron microscope Part 1- Parts and Functioning - Part 1

Lecture 39 - Scanning electron microscope Part 1- Parts and Functioning - Part 2

Lecture 40 - Scanning electron microscope Part 2- Working Principles - Part 1

Lecture 41 - Scanning electron microscope Part 2- Working Principles - Part 2

Lecture 42 - Scanning electron microscope Part 3 - Analysis of cementitious systems 1 - Part 1

Lecture 43 - Scanning electron microscope Part 3 - Analysis of cementitious systems 1 - Part 2

Lecture 44 - Scanning electron microscope Part 4 - Analysis of cementitious system 2 - Part 1

Lecture 45 - Scanning electron microscope Part 4 - Analysis of cementitious system 2 - Part 2

Lecture 46 - Application of characterization techniques to assess composite binder with limestone-calcined clay: what, why and how? - Part 1

Lecture 47 - Application of characterization techniques to assess composite binder with limestone-calcined clay: what, why and how? - Part 2

Lecture 48 - Image analysis - Introduction and image mapping - Part 1

Lecture 49 - Image analysis - Introduction and image mapping - Part 2

Lecture 50 - Image analysis - Basic operations - Part 1

Lecture 51 - Image analysis - Basic operations - Part 2

Lecture 52 - Spectroscopy Techniques - Part 1 AAS, AES - Part 1

Lecture 53 - Spectroscopy Techniques - Part 1 AAS, AES - Part 2

Lecture 54 - Spectroscopy Techniques - Part 2 UV and IR spectroscopy - Part 1

Lecture 55 - Spectroscopy Techniques - Part 2 UV and IR spectroscopy - Part 2

Lecture 56 - Spectroscopy Techniques - Part 3 FTIR and NMR spectroscopy - Part 1

Lecture 57 - Spectroscopy Techniques - Part 3 FTIR and NMR spectroscopy - Part 2

Lecture 58 - Spectrocopy techniques - Part 4 Principle of NMR spectroscopy

Lecture 59 - Porosity and pore structure - Intoduction, significance of pore distribution

Lecture 60 - Porosity and pore structure - Woking of mercury intrusion porosimeter - Part 1

Lecture 61 - Porosity and pore structure - Woking of mercury intrusion porosimeter - Part 2

Lecture 62 - Electrical Impedance analysis - Principle and different methods - Part 1

Lecture 63 - Electrical Impedance analysis - Principle and different methods - Part 2

Lecture 64 - Electrical Impedance analysis - Deliverables and Interpretation - Part 1

Lecture 65 - Electrical Impedance analysis - Deliverables and Interpretation - Part 2

Lecture 66 - Electrochemical testing (Corrosion) using Electrochemical Impedance Spectroscopy (EIS) - Part 1

Lecture 67 - Electrochemical testing (Corrosion) using Electrochemical Impedance Spectroscopy (EIS) - Part 2

NPTEL : NOC:Introduction to Civil Engineering Profession (Civil Engineering)

Co-ordinators : Dr. Ravindra Gettu, Prof. Subhadeep Banerjee

Lecture 1 - What is Civil Engineering - Part 1

Lecture 2 - What is Civil Engineering - Part 2

Lecture 3 - Structural Conservation of Built Heritage

Lecture 4 - Introduction to Environmental Engineering

Lecture 5 - Interesting Environmental Projects

Lecture 6 - Hydraulic and Water Resources Engineering

Lecture 7 - Geotechnical Engineering

Lecture 8 - Construction Materials and Methods

Lecture 9 - Infrastructure Management

Lecture 10 - Structural Engineering - 1

Lecture 11 - Structural Engineering - 2

Lecture 12 - Structural Engineering - Analysis and Design

Lecture 13 - Structural Modeling

Lecture 14 - Scope for Highway Engineers in Civil Engineering Profession - 1

Lecture 15 - Scope for Highway Engineers in Civil Engineering Profession - 2

Lecture 16 - Introduction to Civil Engineering Profession

Lecture 17 - Hydrology and Water Security

Lecture 18 - An Overview of Computational Science and Engineering

Lecture 19 - Sustainability

Lecture 20 - The Big Picture

NPTEL : NOC:Maintenance and Repair of Concrete Structures (Civil Engineering)

Co-ordinators : Prof. Radhakrishna G. Pillai

Lecture 1 - Prologue

Lecture 2 - Corrosion of embedded metal; Significance and fundamentals of corrosion

Lecture 3 - Corrosion of embedded metal; Carbonation-induced and chloride-induced corrosion

Lecture 4 - Corrosion of embedded metal; Types of reinforcement - Bare steels

Lecture 5 - TM - Ring Test For Assessing The Quality of TMT/QST Steel Rebars

Lecture 6 - Corrosion of embedded metal; Types of reinforcement - Metallic and non metallic coated rebars

Lecture 7 - Corrosion in prestressed concrete

Lecture 8 - Deterioration of cementitious systems - Introduction, sulphate attack, biofouling and acid attack

Lecture 9 - Deterioration of cementitious systems - frost attack, freeze-thaw and alkali-silica reaction

Lecture 10 - Deterioration of cementitious systems - Shrinkage and Creep

Lecture 11 - Deterioration of cementitious systems - Fire attack, abrasion and erosion

Lecture 12 - Condition assessment of concrete structures: Exposure conditions, visual inspection, on-site Concrete testing

Lecture 13 - Condition assessment of concrete structures: Testing of concerete in laboratory

Lecture 14 - Condition assessmennt of concrete structures; mechanical and corrosion testing of rebars

Lecture 15 - Strategies and materials for surface repair

Lecture 16 - Strategies and materials for surface repair

Lecture 17 - Strategies and materials for surface repair

Lecture 18 - Surface preparation and protective treatment

Lecture 19 - Surface preparation and Protective treatments

Lecture 20 - Surface preparation and Protective treatments

Lecture 21 - Surface preparation and Protective treatments

Lecture 22 - Surface preparation and Protective treatments

Lecture 23 - Coatings on concrete infrastructures

Lecture 24 - Waterproofing of concrete structures - 1

Lecture 25 - Waterproofing of concrete structures - 2

Lecture 26 - Structural Strengthening and Stabilization - Load effects and Introduction to S&S

Lecture 27 - Structural Strengthening and Stabilization - Beams and Slabs

Lecture 28 - Structural Strengthening and Stabilization - Columns and Walls

Lecture 29 - Structural strengthening - 4 (Joints and connections)

Lecture 30 - Injection Grouts for concrete repair

Lecture 31 - Structural repair of prestressed concrete systems

Lecture 32 - Case studies on structural repair (Right methodologies and systematic approach / case studies)

Lecture 33 - Cathodic Protection in Concrete Structures - Laboratory and field studies

Lecture 34 - Service life estimation - 1

Lecture 35 - Service life estimation - 2

NPTEL : NOC:Mechanical Characterization of Bituminous Materials (Civil Engineering)

Co-ordinators : Dr. J. Murali Krishnan, Prof. M. R. Nivitha, Prof. Neethu Roy, Prof. A. Padmarekha

Lecture 1 - Mechanical Characterization of Bituminous Materials-Introduction - Part 1

Lecture 2 - Mechanical Characterization of Bituminous Materials-Introduction - Part 2

Lecture 3 - Linear Viscoelastic Response - Part 1

Lecture 4 - Linear Viscoelastic Response - Part 2

Lecture 5 - Linear Viscoelastic Response - Part 3

Lecture 6 - Linear Viscoelastic Response - Part 4

Lecture 7 - Linear Viscoelastic Response - Part 5

Lecture 8 - Small Amplitude Oscillatory Shear - Part 1

Lecture 9 - Small Amplitude Oscillatory Shear - Part 2

Lecture 10 - Small Amplitude Oscillatory Shear - Part 3

Lecture 11 - Small Amplitude Oscillatory Shear - Part 4

Lecture 12 - Time temperature superposition principle - Part 1

Lecture 13 - Time temperature superposition principle - Part 2

Lecture 14 - Master curve models

Lecture 15 - Asphalt Usage and Processing - Part 1

Lecture 16 - Asphalt Usage and Processing - Part 2

Lecture 17 - Chemical composition of bitumen - Part 1

Lecture 18 - Chemical composition of bitumen - Part 2

Lecture 19 - Chemical composition of bitumen - Part 3

Lecture 20 - Chemical composition of bitumen - Part 4

Lecture 21 - Chemical composition of bitumen - Part 5

Lecture 22 - Aging of Bituminous Binders and Mixtures - Part I

Lecture 23 - Aging of Bituminous Binders and Mixtures - Part II

Lecture 24 - Aging of Bituminous Binders and Mixtures - Part III

Lecture 25 - Dynamic Shear Rheometer - Part I

Lecture 26 - Dynamic Shear Rheometer - Part II

Lecture 27 - Viscosity Grading - Part 1

Lecture 28 - Viscosity Grading - Part 2

Lecture 29 - Performance Grading - Part 1

Lecture 30 - Performance Grading - Part 2

Lecture 31 - PG-Theoretical Basis

Lecture 32 - Low-temperature PG

Lecture 33 - Modifiers for Bitumen - Part 1

Lecture 34 - Modifiers for Bitumen - Part 2

Lecture 35 - Modifiers for Bitumen - Part 3

Lecture 36 - Modifiers for Bitumen - Part 4

Lecture 37 - Mixing and Compaction Temperature - Part 1

Lecture 38 - Mixing and Compaction Temperature - Part 2

Lecture 39 - Mixing and Compaction Temperature - Part 3

Lecture 40 - Dynamic Modulus of Bituminous Mixtures - Part 1

Lecture 41 - Dynamic Modulus of Bituminous Mixtures - Part 2

Lecture 42 - Resilient Modulus of Bituminous Mixtures - Part 1

Lecture 43 - Resilient Modulus of Bituminous Mixtures - Part 2

Lecture 44 - Rutting Characterisation - Different approaches

Lecture 45 - Dry Rut Wheel Testing of Bituminous Mixtures

Lecture 46 - Laboratory investigation for rutting of bituminous mixtures - Part 1

Lecture 47 - Laboratory investigation for rutting of bituminous mixtures - Part 2

Lecture 48 - Fatigue of Bituminous mixtures - Part 1

Lecture 49 - Fatigue of Bituminous mixtures - Part 2

Lecture 50 - Fatigue of Bituminous mixtures - Part 3

Lecture 51 - Fatigue of Bituminous mixtures - Part 4

Lecture 52 - Fatigue of Bituminous mixtures - Part 5

Lecture 53 - Introduction to curve fitting using Matlab - Part 1

Lecture 54 - Introduction to curve fitting using Matlab - Part 2

Lecture 55 - MSCR Analysis using Matlab

Lecture 56 - Summary

NPTEL : NOC:Colloids and Surfaces (Chemical Engineering)

Co-ordinators : Prof. Basavaraj Madivala Gurappa

Lecture 1 - Introduction and motivation

Lecture 2 - Colloidal dispersions, terminology and classification

Lecture 3 - Stability in colloids

Lecture 4 - Source, synthesis and characterisation of colloids

Lecture 5 - Characterisation of colloidal particles - I

Lecture 6 - Characterisation of colloidal particles - II

Lecture 7 - Introduction to forces acting on an individual colloidal particle

Lecture 8 - Introduction to interaction between colloidal particles

Lecture 9 - Application of Brownian force: Measument of diffusivity and size

Lecture 10 - Radiation used to study colloidal systems

Lecture 11 - Radiation used to study colloidal systems

Lecture 12 - Molecular origin of Van der waals forces

Lecture 13 - Vanderwaal interactions between particles

Lecture 14 - Problem on scaling of Vanderwaal interactions

Lecture 15 - Calculation of Vanderwaal's forces between semi-infinite blocks and Hamaker constant - I

Lecture 16 - Calculation of Vanderwaal's forces between semi-infinite blocks and Hamaker constant - II

Lecture 17 - Theories of Vanderwaal forces based on bulk properties and calculation of Hamaker constant using bulk properties

Lecture 18 - Effect of medium on Vanderwaal's interactions - I

Lecture 19 - Effect of medium on Vanderwaal's interactions - II

Lecture 20 - Colloid Polymer mixtures

Lecture 21 - Colloid polymer mixtures: colloid-solvent interactions and colloid-polymer interactions

Lecture 22 - Colloid polymer mixtures: Depletion flocculation

Lecture 23 - Colloid polymer mixtures: Depletion stabilisation

Lecture 24 - Depletion interactions

Lecture 25 - Steric interactions/osmotic repulsion

Lecture 26 - Tutorial problem on depletion interactions

Lecture 27 - Colloidal Interactions: Introduction to electrostatic interactions/electrical double layer interactions

Lecture 28 - Introduction to models of electrical double layer: Helmholtz model/capacitor model

Lecture 29 - Review and summary of Helmholtz model (or capacitor model) of electrical double layer

Lecture 30 - Models of electrical double layer: Diffuse double layer model/Gouy-Chapman model

Lecture 31 - Potential distribution near planar surfaces: Derivation of the Poisson-Boltzmann equation

Lecture 32 - Potential distribution near planar surfaces: Solution to the linearised Poisson-Boltzmann equation

Lecture 33 - Potential distribution near spherical surfaces: Solution to linearised Poisson-Boltzmann equation

Lecture 34 - Comparison of Capacitor model and Diffuse double layer model

Lecture 35 - Models of electrical double layer: Gouy Chapman Theory - I

Lecture 36 - Models of electrical double layer: Gouy Chapman Theory - II

Lecture 37 - Structure of Electrical double layer

Lecture 38 - Force of Repulsion between interacting surfaces

Lecture 39 - Potential Energy of repulsion between Planar double layers and DLVO Theory

Lecture 40 - Zeta Potential and Electrophoretic mobility of an ion

Lecture 41 - Electrokinetic Phenomena

Lecture 42 - Relation between Electrophoretic mobility and Zeta potential - I

Lecture 43 - Relation between Electrophoretic mobility and Zeta potential - II

Lecture 44 - Colloidal particles at interfaces:Introduction

Lecture 45 - Characterization of Particles at interface

Lecture 46 - Experimental Observations -Concept of Electrostatic interactions and Stability at interfaces

Lecture 47 - Implications from Surface energy balances and Estimation of energy required for detachment

Lecture 48 - Colloidal interactions at interface

NPTEL : NOC:Polymers: Concepts, Properties, Uses and Sustainability (Chemical Engineering)

Co-ordinators : Dr. Abhijit P. Deshpande

Lecture 1 - Why are polymers so common?

Lecture 2 - Polymers: Molecular structure

Lecture 3 - Process, structure, property

Lecture 4 - Biopolymers

Lecture 5 - Molecular weight and distribution

Lecture 6 - Polymerization

Lecture 7 - Macromolecular nature

Lecture 8 - Renewable sources for polymers

Lecture 9 - Polymerization/depolymerization

Lecture 10 - States of interest

Lecture 11 - Application based terms

Lecture 12 - Reuse and repurpose

Lecture 13 - Molecular conformations

Lecture 14 - Size, mobility and flexibility

Lecture 15 - Polyelectrolytes

Lecture 16 - Structures in biopolymers

Lecture 17 - Amorphous/crystalline states - 1

Lecture 18 - Amorphous/crystalline states - 2

Lecture 19 - Orientation

Lecture 20 - Interactions

Lecture 21 - Kinetics of crystallization

Lecture 22 - Glass transition - 1

Lecture 23 - Glass transition - 2

Lecture 24 - States in environment

Lecture 25 - Liquid crystalline polymers

Lecture 26 - Copolymers - 1

Lecture 27 - Copolymers - 2

Lecture 28 - Blends - 1

Lecture 29 - Blends - 2

Lecture 30 - Microstructure in polymers

Lecture 31 - Composites

Lecture 32 - Stress strain response

Lecture 33 - Additives for polymeric systems

Lecture 34 - Blends/composites in recycling

Lecture 35 - Physical/chemical crosslinking

Lecture 36 - Mechanical properties - I

Lecture 37 - Mechanical properties - II

Lecture 38 - Physical and chemical aging

Lecture 39 - Solutions: properties

Lecture 40 - Conducting polymers

Lecture 41 - Dielectric response - I

Lecture 42 - Dielectric response - II

Lecture 43 - Plasticity

Lecture 44 - Properties of composites

Lecture 45 - Viscoelasticity: introduction

Lecture 46 - Thermal response

Lecture 47 - Viscoelasticity: characterization

Lecture 48 - Viscoelasticity: simple models

Lecture 49 - Dynamic Mechanical analysis

Lecture 50 - Damping Applications

Lecture 51 - Time Temperature superposition

Lecture 52 - Impact and energy absorption

Lecture 53 - Testing for applications

Lecture 54 - Properties of blends

Lecture 55 - Biomimetic polymers

Lecture 56 - Advanced mechanics

Lecture 57 - Viscoelastic response: examples

Lecture 58 - Polymer packaging

Lecture 59 - Porous polymers/membranes

Lecture 60 - Polymer at interfaces

Lecture 61 - Diffusion in polymers

Lecture 62 - Compatibilizers

Lecture 63 - Biopolymer applications

Lecture 64 - Adhesives and Paints

Lecture 65 - Dissolution and recovery

Lecture 66 - Polymerization kinetics

Lecture 67 - Polymerization reactors

Lecture 68 - Polymer processing - I

Lecture 69 - Polymer processing - II

Lecture 70 - Polymer processing - III

Lecture 71 - Flow simulations

Lecture 72 - Processing for recycling

Lecture 73 - Recycle, up-down cycling - I

Lecture 74 - Recycle, up-down cycling - II

Lecture 75 - Flow behaviour - rheology

Lecture 76 - Crosslinking

Lecture 77 - Conversion of polymers

Lecture 78 - Rheology and entanglement

Lecture 79 - Rheological models

Lecture 80 - Rheology and processing

Lecture 81 - Absorption and leaching

Lecture 82 - Swelling of polymers

Lecture 83 - Viscosity for polymer processing

Lecture 84 - Microplastics, aerosols, sediments

Lecture 85 - Biodegradation of polymers

Lecture 86 - Biodegradable polymers - 1

Lecture 87 - Biodegradable polymers - 2

NPTEL : NOC:Basic Construction Materials (Civil Engineering)

Co-ordinators : Prof. Radhakrishna G. Pillai, Prof. Manu Santhanam

Lecture 1 - Introduction to Construction Materials - Part 1

Lecture 2 - Introduction to Construction Materials - Part 2

Lecture 3 - Introduction to Construction Materials - Part 3

Lecture 4 - Materials Engineering Concepts - Part 1

Lecture 5 - Materials Engineering Concepts - Part 2

Lecture 6 - Materials Engineering Concepts - Part 3

Lecture 7 - Materials Engineering Concepts - Part 4

Lecture 8 - Materials Engineering Concepts - Part 5

Lecture 9 - Materials Engineering Concepts - Part 6

Lecture 10 - Materials Engineering Concepts - Part 7

Lecture 11 - Nature of Materials - Part 1

Lecture 12 - Nature of Materials - Part 2

Lecture 13 - Nature of Materials - Part 3

Lecture 14 - Nature of Materials - Part 5

Lecture 15 - Nature of Materials - Part 6

Lecture 16 - Nature of Materials - Part 6

Lecture 17 - Nature of Materials - Part 7

Lecture 18 - Stone, Brick and Mortar 1 - Part 1

Lecture 19 - Stone, Brick and Mortar 1 - Part 2

Lecture 20 - Stone, Brick and Mortar 1 - Part 3

Lecture 21 - Stone, Brick and Mortar 1 - Part 4

Lecture 22 - Stone, Brick and Mortar 2 - Part 1

Lecture 23 - Stone, Brick and Mortar 2 - Part 2

Lecture 24 - Cement and Concrete 1 - Part 1

Lecture 25 - Cement and Concrete 1 - Part 2

Lecture 26 - Cement and Concrete 1 - Part 3

Lecture 27 - Cement and Concrete 2 - Part 1

Lecture 28 - Cement and Concrete 2 - Part 2

Lecture 29 - Cement and Concrete 3 - Part 1

Lecture 30 - Cement and Concrete 3 - Part 2

Lecture 31 - Cement and Concrete 4 - Part 1

Lecture 32 - Cement and Concrete 4 - Part 2

Lecture 33 - Metals - 1 - Part 1

Lecture 34 - Metals - 1 - Part 2

Lecture 35 - Metals - 2 - Part 1

Lecture 36 - Metals - 2 - Part 2

Lecture 37 - Metals - 3 - Part 1

Lecture 38 - Metals - 3 - Part 2

Lecture 39 - Metals - 4

Lecture 40 - Metals - 5 - Part 1

Lecture 41 - Metals - 5 - Part 2

Lecture 42 - Polymers and Composites - Part 1

Lecture 43 - Polymers and Composites - Part 2

Lecture 44 - Polymers and Composites - Part 3

Lecture 45 - Pavement Materials 1 - Part 1

Lecture 46 - Pavement Materials 1 - Part 2

Lecture 47 - Pavement Materials 2 - Part 1

Lecture 48 - Pavement Materials 2 - Part 2

Lecture 49 - Wood and wood products - Part 1

Lecture 50 - Wood and wood products - Part 2

Lecture 51 - Glass

NPTEL : NOC:Introduction to Lean Construction (Civil Engineering)

Co-ordinators : Prof. Koshy Varghese, Prof. N Raghavan

Lecture 1 - Course Contents, Long-term Goals, Structure and Module 1 Topics

Lecture 2 - Pedagogy, Approach, Institutions, Instructors, Audience and Pre-requisites

Lecture 3 - ILCE, Conferences, Resources, Further Work Possible

Lecture 4 - Lean Implementation in India from ILCE Directors and other Talks/Testimonials

Lecture 5 - Status of Lean Implementation in India through Industry Panel Discussion with ILCE Directors

Lecture 6 - History of Lean and other Management Philosophies; Toyota Production System (TPS); What is Lean?

Lecture 7 - Lean Construction Timeline; Lean Project Delivery vs LC; Project Management vs LC

Lecture 8 - Key Lean Concepts#1 (Wastes)

Lecture 9 - Key Lean Concepts#1 (Value, Value Stream, Flow, Pull, Perfection)

Lecture 10 - Key Lean Concepts#2 (Continuous Improvement, Collaborative working, Production System, Lean Culture)

Lecture 11 - Key Lean Tools#1 (Productivity Measurement System, Work Sampling, Value Stream Mapping)

Lecture 12 - Lean Overview - Key Lean Tools#2 (5S, CPS/ LPS, Big Room Approach)

Lecture 13 - Lean Overview - Future module

Lecture 14 - Productivity Measurement and Improvement, Construction Productivtiy, Productivity levels

Lecture 15 - What is Productivity, Production?; Illustration

Lecture 16 - Productivity and Production Impact; Visualizing Activity Productivity and Production Performance

Lecture 17 - Profit, ROCE, Influences on Operational Productivity; Operational view vs. System view, Summary

Lecture 18 - Outline, Planning and monitoring levels; Productivity Measurement System

Lecture 19 - Measuring Output - Level of Effort (LOE)

Lecture 20 - Productivity and Production Calculations: daily, weekly, cumulative

Lecture 21 - Productivity and Production Calculations: Performance Evaluation

Lecture 22 - Productivity and Production Calculations: Workhour Forecast and Analysis of Trends

Lecture 23 - Factors Influencing Productivity, Productivity Improvement Approach, Summary

Lecture 24 - Sampling/ Surveying Techniques - Data Sources in Construction

Lecture 25 - Construction Activity with Workers doing VA/ NVAN/ NVA; WS vs PMS; Work Sampling

Lecture 26 - Sampling basics, Sampling in construction

Lecture 27 - Steps to Conduct a Work Sampling Study; WS Outcomes

Lecture 28 - Illustration of Tour-based Work Sampling Approach

Lecture 29 - Illustration of Crew-based Work Sampling Approach

Lecture 30 - Explore relationship between WS Categories and Productivity; Summary

Lecture 31 - Sampling/ Surveying Techniques - Foreman delay survey

Lecture 32 - Sampling/ Surveying Techniques - Foreman delay survey - Implementation

Lecture 33 - Foreman delay survey - Illustrations; Comparison - PMS vs WS vs FDS - discussion

Lecture 34 - Value Stream, Value Stream Mapping (VSM), System vs Process, References

Lecture 35 - Illustration: Value and Value Stream in Food Delivery

Lecture 36 - Value, Value Stream, VSM/PM, Language, Basic VSM - current state and future state

Lecture 37 - Key steps for VSM, Work: Degrees of Granularity, Measurement Metrics

Lecture 38 - VSM - Example 1 (Reinforcement)

Lecture 39 - VSM - Example 2 (Blockwork); Summary

Lecture 40 - Flow Process Chart, Symbols, Process mapping - steps and timing, Measurement metrics

Lecture 41 - Process mapping - Illustration: Reinforcement shifting

Lecture 42 - VSM vs PM; Process Flow chart - variations; Swim-lane diagrams; Summary

Lecture 43 - Understand the Basics of 5S, Explanations and 5S Steps

Lecture 44 - Understand Each -S- in Detail - Sort, Set in Order, Shine

Lecture 45 - Understand Each -S- in Detail - Standardize, Sustain

Lecture 46 - 5S: Key Points, Benefits, Signs of a 5S Site

Lecture 47 - Experiment 5S with Yourself First, Project Implementation, Facilitations, Why 5S May Fail?, Recap

Lecture 48 - Understand the Applications of 5S through Case Studies_2 cases

Lecture 49 - Understand the Applications of 5S through Case Studies_3 cases

Lecture 50 - Understand the Applications of 5S through Case Study - Ms Diamond Barretto (Godrej Construction)

Lecture 51 - Current Project Performance, Workflow Variation, Traditional PM vs Lean Production Management

Lecture 52 - Some Key Lean Concepts, Focusing on frontline Execution, CPS - Collaborative Planning System

Lecture 53 - CPS Process, Overall Schedules (Master Schedule,Phase Schedule,LAP, Weekly Plan),Constraint Analysis

Lecture 54 - Collaborative -Pull- Planning, Percentage Plan Completed (PPC), Daily Huddle, Variance Analysis, RCA

Lecture 55 - Lean Work Structuring

Lecture 56 - Impact of PPC on Productivity, Key aspects,Advantages,The Necessary Conditions,Blocks - CPS,Summary

Lecture 57 - COLPLASSE: Look-Ahead Plan, Constraint Analysis, Weekly Plan, Summary

Lecture 58 - Lean Project Delivery System, Conclusion

Lecture 59 - Understand the Applications of CPS/LPS through Case Studies

Lecture 60 - CPS/LPS implementation in Construction Projects through a Panel of Experts - Part 1

Lecture 61 - CPS/LPS implementation in Construction Projects through a Panel of Experts - Part 2

Lecture 62 - CPS/LPS implementation in Construction Projects through a Panel of Experts - Part 3

Lecture 63 - Introduction of Big Room Approach, Some Requirements for Efficient Working, Virtual BR Meetings

Lecture 64 - Big Room Approach through Case Studies

Lecture 65 - Big Room Approach - Implementation case from URC Construction

Lecture 66 - Future Construction Site, Lean Tools and Processes, Automation strategies and impact, Programming

Lecture 67 - Document Management, Workflow Process, Communication/Collab./Authen., Sensing

Lecture 68 - Mechanisation/ Robots, Visualization, AI/ Analytics, BIM, CPS/ IOT/ Industry 4.0, Digital Twin

Lecture 69 - Challenges and Causes, Problem?, Lean, BIM?, Traditional vs BIM, Tools/Technology providers

Lecture 70 - BIM uses; Metrics

Lecture 71 - BIM and Lean, Implementation Framework, BIM Execution Plan, Evidence Cases, Key takeaway

Lecture 72 - How to Start Practicing Lean Tools in Project Sites-1: Work Sampling

Lecture 73 - How to Start Practicing Lean Tools in Project Sites-1: VSM

Lecture 74 - How to Start Practicing Lean Tools in Project Sites-1: 5S

Lecture 75 - How to Start Practicing Lean Tools in Project Sites-1: CPS/ LPS

Lecture 76 - How to Start Practicing Lean Tools in Project Sites-1: Big Room Approach

Lecture 77 - Acknowledgement

NPTEL : NOC:Design of Connections in Steel Structures (Civil Engineering)

Co-ordinators : Prof. Anil Agarwal

Lecture 1 - Bolts: dimensions and material

Lecture 2 - Bolts: installation techniques and clearances

Lecture 3 - Design of Bearing type bolts in shear: Basic design principle

Lecture 4 - Correction factors for bolts for long joints, long grip lengths, and thick packing plate

Lecture 5 - Design of friction grip bolts in shear and design of bolts in tension

Lecture 6 - Structural Welding Process

Lecture 7 - Groove/Butt Welds

Lecture 8 - Fillet Welds - 1

Lecture 9 - Fillet Welds - 2

Lecture 10 - Weld symbols, defects, and filler material

Lecture 11 - Design of groove welds

Lecture 12 - Design of fillet welds - 1

Lecture 13 - Design of fillet welds - 2

Lecture 14 - Design example of a bolt group

Lecture 15 - Design example of a weld group

Lecture 16 - Simple and rigid frame connections

Lecture 17 - Design of double angle connections

Lecture 18 - Design of seated angle connections

Lecture 19 - End-plate rigid connection: Introduction

Lecture 20 - End-plate connection: Design example

Lecture 21 - Welded-flange rigid connection

Lecture 22 - Ductile detailed beam-column connections - 1

Lecture 23 - Ductile detailed beam-column connections - 2

NPTEL : NOC:Analysis and Design of Bituminous Pavements (Civil Engineering)

Co-ordinators : A. Padmarekha, J. Murali Krishnan, M. R. Nivitha, Neethu Roy

Lecture 1 - Pavement Cross-sections and Pavement Design Process

Lecture 2 - Pavement Design Factors - I

Lecture 3 - Pavement Design Factors - II

Lecture 4 - Stresses and Strains in Bituminous Pavements - I

Lecture 5 - Stresses and Strains in Bituminous Pavements - II

Lecture 6 - Numerical Problems in One-layer Theory

Lecture 7 - Numerical Problems in Two-layer Theory

Lecture 8 - Introduction to KENLAYER

Lecture 9 - KENLAYER - 1

Lecture 10 - KENLAYER - 2

Lecture 11 - KENLAYER - 3

Lecture 12 - KENLAYER - 4

Lecture 13 - Traffic Analysis - ESWL - Part 1

Lecture 14 - Traffic Analysis - ESWL - Part 2

Lecture 15 - Traffic Analysis - EALF

Lecture 16 - Traffic Analysis - ESAL using VDF

Lecture 17 - Traffic Analysis - ESAL using TF

Lecture 18 - Traffic Analysis - Examples

Lecture 19 - Traffic Analysis - Load Spectra Factor

Lecture 20 - Modulus for Design - CBR

Lecture 21 - Modulus for Design - Resilient modulus (Granular material)

Lecture 22 - Modulus for Design - Resilient modulus (Bituminous material)

Lecture 23 - Modulus for Design - Dynamic Modulus

Lecture 24 - Environmental Effect - Part 1

Lecture 25 - Environmental Effect - Part 2

Lecture 26 - Environmental Effect - Part 3

Lecture 27 - Environmental Effect - Part 4

Lecture 28 - Enhanced Integrated Climatic Model - Part 1

Lecture 29 - Enhanced Integrated Climatic Model - Part 2

Lecture 30 - Climate Consideration in Design Procedures

Lecture 31 - Reliability in Pavement Design - Part 1

Lecture 32 - Reliability in Pavement Design - Part 2

Lecture 33 - Reliability in Pavement Design - Part 3

Lecture 34 - Reliability in Pavement Design - Part 4

Lecture 35 - Reliability in Pavement Design - Part 5

Lecture 36 - Reliability in Pavement Design - Part 6

Lecture 37 - Distress Transfer Function - Fatigue Cracking

Lecture 38 - Rutting and Low-Temperature Cracking

Lecture 39 - KENLAYER - Nonlinear Analysis

Lecture 40 - KENLAYER - Damage Analysis

Lecture 41 - IRC design steps

Lecture 42 - Design Input and IITPAVE software

Lecture 43 - Pavement design with granular base

Lecture 44 - Pavement design with CTB

Lecture 45 - Pavement design with RAP Base

Lecture 46 - Overview of Mechanistic-Empirical Pavement Design Methods - IRC

Lecture 47 - Overview of Mechanistic-Empirical Pavement Design Methods - South Africa - Part I

Lecture 48 - Overview of Mechanistic-Empirical Pavement Design Methods - South Africa - Part II

Lecture 49 - Overview of Mechanistic-Empirical Pavement Design Methods - South Africa - Part III

Lecture 50 - Overview of Mechanistic-Empirical Pavement Design Methods - Australia - Part I

Lecture 51 - Overview of Mechanistic-Empirical Pavement Design Methods - Australia - Part II

Lecture 52 - Overview of Mechanistic-Empirical Pavement Design Methods - AASHTO - Part I

Lecture 53 - Overview of Mechanistic-Empirical Pavement Design Methods - AASHTO - Part II

Lecture 54 - Summary of the course and design projects

NPTEL : NOC:FEM and Constitutive Modelling in Geomechanics (Civil Engineering)

Co-ordinators : Prof. K Rajagopal

Lecture 1 - Introductory lecture and course outline

Lecture 2 - Matrix algebra and Gauss elimination method

Lecture 3 - Development of equilibrium equations for 1-d systems

Lecture 4 - Development of equilibrium equations for 2-d bar elements and truss structures

Lecture 5 - Development of equilibrium equations for beam elements

Lecture 6 - Virtual work and principle of stationary potential energy

Lecture 7 - Introduction to Rayleigh-Ritz Method

Lecture 8 - Use of GEOFEM finite element program - Part I

Lecture 9 - Use of GEOFEM finite element program - Part II

Lecture 10 - Stresses and strains in continuum

Lecture 11 - 2-dimensional approximations of continuum

Lecture 12 - Analysis of continuum systems

Lecture 13 - 3-node Constant Strain Triangle

Lecture 14 - Classical methods for developing shape functions

Lecture 15 - Numerical integration techniques

Lecture 16 - Isoparametric Elements - Part I

Lecture 17 - Isoparametric Elements - Part II

Lecture 18 - Isoparametric calculations for stiffness and load vectors

Lecture 19 - Force vector due to surface traction

Lecture 20 - Patch test and Finite Element Modelling

Lecture 21 - GEOFEM - Part III

Lecture 22 - In situ earth pressures, construction and excavation sequences

Lecture 23 - Joint and interface element modelling

Lecture 24 - Modelling of interfaces - Joint Elements

Lecture 25 - Mapped infinite elements for semi-infinite soil medium

Lecture 26 - Some observations of soil behaviour and stress invariants

Lecture 27 - Nonlinear analysis technique - 1

Lecture 28 - Nonlinear analysis technique - 2

Lecture 29 - Nonlinear analysis technique - 3

Lecture 30 - Bilinear elastic models

Lecture 31 - Nonlinear elastic and hyperbolic models

Lecture 32 - Modified hyperbolic model and determination of material parameters

Lecture 33 - Stress correction procedures in finite element analysis

Lecture 34 - Numerical examples on working with modified hyperbolic models

Lecture 35 - Some Limit solutions in geotechnical engineering

Lecture 36 - Elastic - Plastic Constitutive Matrix

Lecture 37 - Nonassociated Elastic - Plastic Joint Element

Lecture 38 - Introduction to consolidation and dynamic analysis

Lecture 39 - Cam Clay models

Lecture 40 - Modified cam clay models

Lecture 41 - FEM in Geotechnical applications

Lecture 42 - Soil behaviour and An Introduction to the Existing Soil Models

Lecture 43 - Simulation of soil liquefaction using FLAC

Lecture 44 - Mitigation of soil liquefaction using granular columns

NPTEL : NOC:The Evolution of the Earth and life (Civil Engineering)

Co-ordinators : Prof. Devapriya Chattopadhyay

Lecture 1 - Course Structure

Lecture 2 - Introduction to Google Earth

Lecture 3 - How Does Earth Science Work ?

Lecture 4 - What is a Mineral

Lecture 5 - Minerals and Rock Cycle

Lecture 6 - Continental Drift

Lecture 7 - Plate Tectonics

Lecture 8 - What are Igneous Rocks ?

Lecture 9 - Compositional Variation of Igneous Rocks

Lecture 10 - Why Does the Rock Melt ?

Lecture 11 - Igneous Activity and Plate Tectonics

Lecture 12 - Igneous Structures

Lecture 13 - Volcanoes

Lecture 14 - Discussion on Posted Questions

Lecture 15 - What are Metamorphic Rocks

Lecture 16 - Types of Metamorphism

Lecture 17 - Metamorphism and Plate Tectonics

Lecture 18 - Weathering and Erosion

Lecture 19 - Detrital Sedimentary Rocks

Lecture 20 - Chemical and Organic Sedimentary Rocks

Lecture 21 - Sedimentary Environment and Plate Tectonics

Lecture 22 - Discussion on Conceptual Questions

Lecture 23 - Discussion on Posted Questions

Lecture 24 - Diversity of Life

Lecture 25 - Why Do Groups Change ?

Lecture 26 - Nature of Paleontological Data

Lecture 27 - Introduction to PaleoDB

Lecture 28 - Relative Age

Lecture 29 - Correlation

Lecture 30 - Attempts to Estimate Absolute Age

Lecture 31 - Radiometric Dating

Lecture 32 - Rocks Full of Life

Lecture 33 - Discussion on Posted Questions_3

Lecture 34 - The Beginning

Lecture 35 - The Formation of the Planets and Moon

Lecture 36 - The Formation of the Continents

Lecture 37 - The Formation of the Atmosphere and Ocean

Lecture 38 - Origin of Life: Initial Ideas

Lecture 39 - Origin of Life: Which Biomolecules Came First ?

Lecture 40 - Origin of Life: Where did it all Start ?

Lecture 41 - Evidence of Early Life

Lecture 42 - Proterozoic Events and Life

Lecture 43 - Discussion on Posted Questions_4

Lecture 44 - Cambrian Earth and Life

Lecture 45 - Cambrian Explosion

Lecture 46 - Journey to Land: Fishes and Tetrapods

Lecture 47 - Journey to Land: Transitional Forms

Lecture 48 - Appearance of Amniotes

Lecture 49 - Dinosaurs

Lecture 50 - Dinosaurs Footprints

Lecture 51 - Appearance of Feathers

Lecture 52 - Mass Extinctions and Their Impact

Lecture 53 - K-Pg Extinction: Patterns

Lecture 54 - K-Pg Extinction: Mechanisms

Lecture 55 - Paleoclimatic Reconstruction

Lecture 56 - Cenozoic Climate

Lecture 57 - Recovery from K-Pg: Paleogene Event

Lecture 58 - Who are Whales ?

Lecture 59 - Discussion on Posted Questions_5

Lecture 60 - Development of Bipedality

Lecture 61 - Early Hominids

Lecture 62 - Megafaunal Extinction

Lecture 63 - Recent Extinctions

Lecture 64 - Anthropocene and Future

Lecture 65 - Discussion on Posted Questions_6

NPTEL : NOC:Advanced Reinforced Concrete Design (Civil Engineering)

Co-ordinators : Prof S. Suriya Prakash

Lecture 1 - Introduction-Overview of RCC - Part 1

Lecture 2 - Introduction-Overview of RCC - Part 2

Lecture 3 - Introduction to Design Concepts and Philosophies - Part 1

Lecture 4 - Introduction to Design Concepts and Philosophies - Part 2

Lecture 5 - Materials Short Term Properties - Part 1

Lecture 6 - Materials Short Term Properties - Part 2

Lecture 7 - Materials Short Term Properties - Part 3

Lecture 8 - Materials Short Term Properties - Part 4

Lecture 9 - Materials Long Term Properties - Part 1

Lecture 10 - Materials Long Term Properties - Part 2

Lecture 11 - Materials Rebar Properties

Lecture 12 - Durability - Overview

Lecture 13 - Durability - Effect of Chemical actions

Lecture 14 - Durability - Effect of Physical,mechanical and corrosion

Lecture 15 - Durability - Design approaches and code provisions

Lecture 16 - Axial Behaviour - Introduction

Lecture 17 - Axial Behaviour of Reinforced Concrete

Lecture 18 - Axial Behaviour - Effect of Compressive Strength

Lecture 19 - Flexure Behaviour - Background to flexural theory

Lecture 20 - Flexure Behaviour - Moment curvature analysis-procedure

Lecture 21 - Flexure Behaviour - Example-Moment curvature of singly reinforced section

Lecture 22 - Flexure Behaviour - Effect of increasing reinforcement on Moment curvature behaviour

Lecture 23 - Flexure Behaviour - Effect of compressive strength on Moment curvatureÃ, behaviour

Lecture 24 - Flexure Behaviour - Effect of axial Compression on Moment curvature behaviour - Part 1

Lecture 25 - Flexure Behaviour - Effect of axial Compression on Moment curvature behaviour - Part 2

Lecture 26 - Flexure Behaviour - Effect of Compression steel on Moment curvature behaviour - Part 1

Lecture 27 - Flexure Behaviour - Effect of Compression steel on Moment curvature behaviour - Part 2

Lecture 28 - Flexure Behaviour - Analysis and Design of Singly Reinforced Sections using IS Code - Part 1

Lecture 29 - Flexure Behaviour - Analysis and Design of Singly Reinforced Sections using IS Code - Part 2

Lecture 30 - Flexure Behaviour - Examples in Flexure using IS Code Provisions

Lecture 31 - Flexure Behaviour - Analysis and Design of Doubly Reinforced Sections using IS Code

Lecture 32 - Flexure Behaviour - Analysis and Design of Flanged Sections using ISÃ, CodeÃ, Provisions

Lecture 33 - Shear Behaviour of RC elements - Part 1

Lecture 34 - Shear Behaviour of RC elements - Part 2

Lecture 35 - Shear Behaviour of RC elements - Part 3

Lecture 36 - Shear Behaviour - Shear Design using IS 456 Provisions

Lecture 37 - Shear Behaviour - Examples for Shear Design using IS 456 Provisions

Lecture 38 - Shear Behaviour - Torsional Behaviour of RC elements - Part 1

Lecture 39 - Shear Behaviour - Torsional Behaviour of RC elements - Part 2

Lecture 40 - Shear Behaviour - Torsional Behaviour of RC elements - Part 3

Lecture 41 - Shear Behaviour - Torsion Design of RC Beams using IS 456 Provisions

Lecture 42 - Compression behaviour of RC Columns - Intro and Types - Part 1

Lecture 43 - Compression behaviour of RC Columns - Short vs Slender and Effective length - Part 2

Lecture 44 - Compression behaviour of RC Columns - Lateral Flexibility and Example - Part 3

Lecture 45 - Compression behaviour of RC Columns IS Code Provisions - Part 1

Lecture 46 - Compression behaviour of RC Columns Confinement and Tied Vs Spiral Confined Columns - Part 2

Lecture 47 - Compression behaviour of RC Columns - P-M Interaction : Theory

Lecture 48 - Compression behaviour of RC Columns - P-M Interaction : Example as per IS 456

Lecture 49 - Compression behaviour of Design of RC Columns for Biaxial Bending - Part 1

Lecture 50 - Compression behaviour of Design of RC Columns for Biaxial Bending - Part 2

Lecture 51 - Compression behaviour of Slender Column Design: Theory - Part 1

Lecture 52 - Compression behaviour of Slender Column Design: Example as per IS 456 - Part 2

Lecture 53 - Serviceability - Introduction to Deflection of RC Beam Part - 1

Lecture 54 - Serviceability - Introduction to Deflection of RC Beam Part - 2

Lecture 55 - Serviceability - Long term deflection and IS code Provisions

Lecture 56 - Serviceability - Numerical Example for the calculation of Deflection of RC beam

Lecture 57 - Crack width calculation - Theory - Part 1

Lecture 58 - Crack width Calculation - Example - Part 2

Lecture 59 - Serviceability - Design for Bond - Theory - Part 1

Lecture 60 - Serviceability - Design for Bond - Theory - Part 2

Lecture 61 - Serviceability - Design example for Bond and Splicing - Part 3

Lecture 62 - Two way slabs - Background

Lecture 63 - Two way slabs - Design Methods

Lecture 64 - Two way slabs - Direct Design Method - Part 1

Lecture 65 - Two way slabs - Direct Design Method - Part 2

Lecture 66 - Two way slabs - Equivalent Frame Method - Part 1

Lecture 67 - Two way slabs - Equivalent Frame Method (Example) - Part 2

NPTEL : NOC:Admixtures and Special Concretes (Civil Engineering)

Co-ordinators : Prof. Manu Santhanam

Lecture 1 - Overview of Cement Chemistry and concrete performance: Cement history and production

Lecture 2 - Overview of Cement Chemistry and concrete performance: Quality control and composition

Lecture 3 - Overview of Cement Chemistry: Composition of Cement and Classification of Cement

Lecture 4 - Overview of Cement Chemistry: Hydration of Cement

Lecture 5 - Overview of Concrete Performance: Curing and Hardened Concrete

Lecture 6 - Overview of Concrete Performance: Basics of Hardened Concrete

Lecture 7 - Chemical Admixtures: Introduction

Lecture 8 - Chemical Admixtures: Water reducers - Part 1

Lecture 9 - Chemical Admixtures: Water reducers - Part 2

Lecture 10 - Chemical Admixtures: Water reducers - Part 3

Lecture 11 - Chemical Admixtures: Water reducers - Part 4

Lecture 12 - Chemical Admixtures: Water reducers - Part 5

Lecture 13 - Chemical Admixtures: Water reducers - Part 6

Lecture 14 - Chemical Admixtures: Set controllers

Lecture 15 - Chemical Admixtures: Set controllers - Accelerators

Lecture 16 - Chemical Admixtures: Set controllers - Retarders

Lecture 17 - Chemical Admixtures: Standards

Lecture 18 - Chemical Admixtures: Air entrainers - Part 1

Lecture 19 - Chemical Admixtures: Air entrainers - Part 2

Lecture 20 - Chemical Admixtures: Understanding Concrete Rheology - Part 1

Lecture 21 - Chemical Admixtures: Understanding Concrete Rheology - Part 2

Lecture 22 - Chemical Admixtures: Viscosity Modifying Agents (VMA)

Lecture 23 - Chemical Admixtures: Mechanism of corrosion

Lecture 24 - Chemical Admixtures: Corrosion inhibitors, Shrinkage reducing admixtures

Lecture 25 - Chemical Admixtures: Other specialty admixtures

Lecture 26 - Chemical Admixtures: Curing compounds

Lecture 27 - Mineral Admixtures: Introduction

Lecture 28 - Mineral Admixtures: Types, Composition and Particle size distribution

Lecture 29 - Mineral Admixtures: Microstructure of SCMs and Pozzolonic reactions

Lecture 30 - Mineral Admixtures: Pozzolonic activity

Lecture 31 - Mineral Admixtures: Electrical Conductivity method, Frattini test and Lime saturation method

Lecture 32 - Mineral Admixtures: Strength Activity test, Lime reactivity test, Mixture Proportioning and R3 test

Lecture 33 - Mineral Admixtures: Flyash - Part 1: Introduction

Lecture 34 - Mineral Admixtures: Flyash - Part 2: Classification and structure

Lecture 35 - Mineral Admixtures: Flyash - Part 3: Effects on fresh concrete

Lecture 36 - Mineral Admixtures: Flyash - Part 4: Effects on hardened concrete

Lecture 37 - Mineral Admixtures: Silica fume - Part 1: Introduction

Lecture 38 - Mineral Admixtures: Silica fume - Part 2: Effects on fresh and hardened concrete

Lecture 39 - Mineral Admixtures: Silica fume - Part 3: Effects on Microstructure + GGBS - Part 1 : Introduction

Lecture 40 - Mineral Admixtures: GGBS - Part 2 : Properties

Lecture 41 - Mineral Admixtures: GGBS - Part 3 : Hydration of slag and Durability of slag cements

Lecture 42 - Mineral Admixtures: Metakaolin

Lecture 43 - Mineral Admixtures: LC3 - Part 1 : Introduction

Lecture 44 - Mineral Admixtures: LC3 - Part 2 : Comparision with other SCMs

Lecture 45 - Mineral Admixtures: LC3 - Part 3 : Durability Performance

Lecture 46 - Mineral Admixtures: Agricultural ashes - Part 1 : Sugarcane bagasse ash

Lecture 47 - Mineral Admixtures: Agricultural ashes - Part 2 : Rice husk ash

Lecture 48 - Mineral Admixtures: Calorimeter

Lecture 49 - Mineral Admixtures: Pore solution analysis

Lecture 50 - Mineral Admixtures: CASH analysis in blended system and Life cycle assessment of concrete - Part 1

Lecture 51 - Life cycle assessment of concrete - Part 2

Lecture 52 - Life cycle assessment of concrete - Part 3

Lecture 53 - Special concretes - High strength concrete - Definition, design and concept of particle packing

Lecture 54 - Special concretes - High strength concrete - Particle packing models

Lecture 55 - Special concretes - High strength concrete - Mix designs, strength and durability

Lecture 56 - Special concretes - High strength concrete - Design attributes, fresh and hardened properties

Lecture 57 - Special concretes - High strength concrete - Stress:strain relationships, applications

Lecture 58 - Special concretes - Ultra high performance concrete - Design principles, strength, durability

Lecture 59 - Special concretes: Self compacting concrete -Introduction, design requirements and plastic shrinkage

Lecture 60 - Special concretes: Self compacting concrete - Segregation and laboratory tests

Lecture 61 - Special concretes - Self Compacting Concrete - Workability test methods, classifications and issues

Lecture 62 - Special concretes - Self Compacting Concrete - Design principles, mix designs, concrete properties

Lecture 63 - Special concretes - Mass concrete - Introduction, materials, thermal cracking

Lecture 64 - Special concretes - Mass concrete - Design guidelines, temperature differential measurement

Lecture 65 - Special concretes - Mass concrete - Temperature differential measurement, Design

Lecture 66 - Special concretes - Mass concrete - Temperature monitoring, nomogram, minimizing restraints

Lecture 67 - Special concretes - Mass concrete - Heat modelling

Lecture 68 - Special concretes - Lightweight concrete - Introduction, classifications

Lecture 69 - Special concretes - Lightweight concrete - Foamed concrete, lightweight aggregates

Lecture 70 - Special concretes - Lightweight concrete - Light weigh aggregates, aerated concrete

Lecture 71 - Special concretes - High density concrete - Heavy weight aggregates, design, case stud

Lecture 72 - Special concretes - Concrete for 3D printing - Introduction, classification, printing process

Lecture 73 - Special concretes - Concrete for 3D printing - Developments, advantages, case study

Lecture 74 - Special concretes - Concrete for 3D printing - Critical parameters, yield stress

Lecture 75 - Special concretes - Concrete for 3D printing - Mix design approach, admixtures

Lecture 76 - Special concretes - Concrete for 3D printing - Failure modes, buildability, early-age beahaviour

NPTEL : NOC:Advanced Topics in Science and Technology of Concrete (Civil Engineering)

Co-ordinators : Prof. Ravindra Gettu, Prof. Manu Santhanam

Lecture 1 - Aggregates and their effects on concrete properties - Part 1

Lecture 2 - Aggregates and their effects on concrete properties - Part 2

Lecture 3 - An overview of recycled concrete aggregates (RCA): sources and types - Part 1

Lecture 4 - An overview of recycled concrete aggregates (RCA): sources and types - Part 2

Lecture 5 - Recycled Concrete Aggregate (RCA): Availability, Collection, and Processing Methods - Part 1

Lecture 6 - Recycled Concrete Aggregate (RCA): Availability, Collection, and Processing Methods - Part 2

Lecture 7 - Recycled Concrete Aggregates: Properties and Performance - Part 1

Lecture 8 - Recycled Concrete Aggregates: Properties and Performance - Part 2

Lecture 9 - Recycled Concrete Aggregates: Properties and Performance - Part 3

Lecture 10 - Recycled Concrete Aggregates: Properties and Performance - Part 4

Lecture 11 - Recycled Concrete Aggregates: Properties and Performance - Part 5

Lecture 12 - Effect of moisture condition on the microstructure and design of RCA concrete - Part 1

Lecture 13 - Effect of moisture condition on the microstructure and design of RCA concrete - Part 2

Lecture 14 - Overview and generation of recycled concrete fines

Lecture 15 - Utilisation of recycled concrete fines

Lecture 16 - Recycled Concrete Aggregates: Properties, Design, and Standards

Lecture 17 - Environmental impact and life cycle assessment (LCA) - Part 1

Lecture 18 - Environmental impact and life cycle assessment (LCA) - Part 2

Lecture 19 - Construction supply chains - Part 1

Lecture 20 - Construction supply chains - Part 2

Lecture 21 - Recycled concrete aggregates market: problems and prospects - Part 1

Lecture 22 - Recycled concrete aggregates market: problems and prospects - Part 2

NPTEL : Foundation Engineering (Civil Engineering)

Co-ordinators : Prof. Priti Maheswari, Prof. N.K. Samadhiya, Prof. Mahendra Singh

Lecture 1 - Shallow Foundation - 1

Lecture 2 - Shallow Foundation - 2

Lecture 3 - Shallow Foundation - 3

Lecture 4 - Shallow Foundation - 4

Lecture 5 - Shallow Foundation - 5

Lecture 6 - Shallow Foundation - 6

Lecture 7 - Shallow Foundation - 7

Lecture 8 - Lateral Earth pressure Theories Retaining Walls - 1

Lecture 9 - Lateral Earth pressure Theories Retaining Walls - 2

Lecture 10 - Lateral Earth pressure Theories Retaining Walls - 3

Lecture 11 - Lateral Earth Pressure Theories Retaining Walls - 4

Lecture 12 - Lateral Earth Pressure Theories Retaining Walls - 5

Lecture 13 - Pile Foundations - 1

Lecture 14 - Pile Foundations - 2

Lecture 15 - Pile Foundations - 3

Lecture 16 - Pile Foundations - 4

Lecture 17 - Pile Foundations - 5

Lecture 18 - Pile Foundations - 6

Lecture 19 - Pile Foundations - 7

Lecture 20 - Machine Foundations - 1

Lecture 21 - Machine Foundations - 2

Lecture 22 - Machine Foundations - 3

Lecture 23 - Machine Foundations - 4

Lecture 24 - Well Foundations - 1

Lecture 25 - Well Foundations - 2

Lecture 26 - Well Foundations - 3

Lecture 27 - Foundation Engineering - 1

Lecture 28 - Foundation Engineering - 2

Lecture 29 - Foundation Engineering - 3

Lecture 30 - Foundation Engineering - 4

Lecture 31 - Foundation Engineering - 5

Lecture 32 - Foundation Engineering - 6

Lecture 33 - Foundation Engineering - 7

Lecture 34 - Foundation Engineering - 8

Lecture 35 - Foundation Engineering - 9

Lecture 36 - Foundation Engineering - 10

Lecture 37 - Foundation Engineering - 11

Lecture 38 - Foundation Engineering - 12

Lecture 39 - Foundation Engineering - 13

Lecture 40 - Foundation Engineering - 14

NPTEL : Modern Surveying Techniques (Civil Engineering)

Co-ordinators : Prof. S.K. Ghosh

Lecture 1 - Geographic Information System An Introduction

Lecture 2 - Introduction to Global Positioning System

Lecture 3 - GPS Positioning Methods

Lecture 4 - GPS Solutions and Errors

Lecture 5 - GPS Application

Lecture 6 - Remote Sensing Introduction

Lecture 7 - Electromagnetic Spectrum

Lecture 8 - Sensors and Platform

Lecture 9 - Sensors and Platform

Lecture 10 - Image Interpretation

Lecture 11 - Statistical Evaluation of RS Data

Lecture 12 - Rectification and Restoration

Lecture 13 - Image Enhancement

Lecture 14 - Image Transformation

Lecture 15 - Orthogonal Transformation

Lecture 16 - Image Classification (Supervised Classification)

Lecture 17 - Image Classification (Unsupervised Classification)

Lecture 18 - Spatial Filtering-Noise Removal

Lecture 19 - Spatial Filtering-Edge Removal

Lecture 20 - Photogramatic-Basic concepts of a single photography

Lecture 21 - Stereoscopy-Basic concepts

Lecture 22 - Stereoscopy-Geometry of overlaping photograph

Lecture 23 - Terrestrial Photogrammetry

Lecture 24 - Digital Elevation Model-Basic Concepts

Lecture 25 - Digital Elevation Model-Data Input and Stamping

Lecture 26 - Digital Elevation Model-Surface representation and analysis

Lecture 27 - GIS-Introductory Concepts

Lecture 28 - GIS-Data Input

Lecture 29 - Data Verification and Editing

Lecture 30 - GIS Data Model

Lecture 31 - GIS Data Base

Lecture 32 - Spatial Analysis

Lecture 33 - Map Overlay and Spatial Correlation

Lecture 34 - Application to Drought Management

Lecture 35 - GIS base planning model for educational facilities in rural areas

Lecture 36 - Application extraction of building attributes

Lecture 37 - Zonal based tourism planning

Lecture 38 - Zonal Planning using remote sensing

Lecture 39 - Municipal GIS for assassment of property tax

Lecture 40 - Application of remote sensing

NPTEL : Transportation Engineering II (Civil Engineering)

Co-ordinators : Prof. Rajat Rastogi

Lecture 1 - Introduction to Railway Engineering

Lecture 2 - Gauges and Permanent Way

Lecture 3 - Wheel and Axles, Coning of Wheels

Lecture 4 - Track Resistances, Hauling Capacity

Lecture 5 - Track Modulus, Stresses in Track

Lecture 6 - Stresses in Components of Track

Lecture 7 - Rails

Lecture 8 - Creep in Rails

Lecture 9 - Wears & Failures in Rails

Lecture 10 - Jointed or Welded rails

Lecture 11 - Sleepers

Lecture 12 - Ballast

Lecture 13 - Fastenings

Lecture 14 - Geometric Design - Alignment of Track

Lecture 15 - Horizontal Curve and Super elevation

Lecture 16 - Speeds on Track

Lecture 17 - Transition Curve & Widening of Track

Lecture 18 - Vertical Curve & Gradients

Lecture 19 - Turnouts - Components

Lecture 20 - Crossing and Design of Turnout

Lecture 21 - Track Junctions and Designs

Lecture 22 - Signals - Part 1

Lecture 23 - Signals - Part 2

Lecture 24 - Train Control Systems

Lecture 25 - Interlocking of Track

Lecture 26 - High Speed Tracks

Lecture 27 - Introduction of Air Transport

Lecture 28 - Aircraft Characteristics

Lecture 29 - Aircraft Controls, Airport Site&Size Selection

Lecture 30 - Airport Obstructions

Lecture 31 - Runway Orientation

Lecture 32 - Runway Length

Lecture 33 - Runway Geometric

Lecture 34 - Taxiway

Lecture 35 - Exit Taxiway

Lecture 36 - Aprons and Aircraft Parking

Lecture 37 - Terminal Area and Building

Lecture 38 - Terminal Planning and Hangers

Lecture 39 - Visual Aids-Markings

Lecture 40 - Visual Aids-Lighting and Signage

NPTEL : NOC:Introduction to Geographic Information Systems (Civil Engineering)

Co-ordinators : Dr.Arun K.Saraf

Lecture 1 - What is Geographic Information Systems ?

Lecture 2 - Different components of GIS

Lecture 3 - Different types of vector data and concept of topology

Lecture 4 - Raster data models and comparisons with vector

Lecture 5 - TIN data model and comparisons with raster

Lecture 6 - Non-spatial data (attributes) and their type

Lecture 7 - Raster data compression techniques

Lecture 8 - Spatial database systems and their types

Lecture 9 - Pre-processing of spatial datasets

Lecture 10 - Geo-referencing

Lecture 11 - Different map projections

Lecture 12 - Spatial interpolation techniques

Lecture 13 - Digital Elevation Models and different types of resolutions

Lecture 14 - Quality assessment of freely available DEMS

Lecture 15 - GIS analysis - Part 1

Lecture 16 - GIS analysis - Part 2 (Overlaying Operations)

Lecture 17 - GIS analysis - Part 3 (Buffer Analysis)

Lecture 18 - Classification Methods

Lecture 19 - Errors in GIS and Key elements of maps

Lecture 20 - Limitations of GIS

NPTEL : NOC:Principles and Applications of Building Science (Civil Engineering)

Co-ordinators : Dr. E. Rajasekar

Lecture 1 - Solar Geometry

Lecture 2 - Climate Classification

Lecture 3 - Thermal Comfort in Built Environment - 1

Lecture 4 - Thermal Comfort in Built Environment - 2

Lecture 5 - Thermal Adaptation

Lecture 6 - Bioclimatic Assessment

Lecture 7 - Thermal Performance of Building Envelop

Lecture 8 - Thermal Performance of Building Envelop - Indices and Measures (1/2)

Lecture 9 - Thermal Performance of Building Envelop - Indices and Measures (2/2)

Lecture 10 - Glazing and Shading Systems

Lecture 11 - Shading Analysis

Lecture 12 - Energy Efficiency and Simulation

Lecture 13 - Building Acoustics - Basics

Lecture 14 - Sound Propagation

Lecture 15 - Acoustic Quality Indicators (1/2)

Lecture 16 - Acoustic Quality Indicators (2/2)

Lecture 17 - Acoustic Design Considerations

Lecture 18 - Acoustic Materials

Lecture 19 - Lighting - Basics

Lecture 20 - Lighting Â– Design Concepts

NPTEL : NOC:GPS Surveying (Civil Engineering)

Co-ordinators : Dr.Jayanta Kumar Ghosh

Lecture 1 - Introduction (GPS Surveying and Applications)

Lecture 2 - GPS System

Lecture 3 - GPS Signal (Civilian Perspective)

Lecture 4 - GPS Receiver

Lecture 5 - GPS Software

Lecture 6 - GPS Position

Lecture 7 - GPS Positioning (Principle and Methods)

Lecture 8 - Field demonstration of GPS Positioning Method

Lecture 9 - GPS Observables (Types, Errors and Quality)

Lecture 10 - Errors in GPS Observables (Systematics Errors)

Lecture 11 - GPS Data Pre-Processing - I

Lecture 12 - GPS Data Pre-Processing - II

Lecture 13 - GPS Data Processing - I

Lecture 14 - GPS Data Processing - II

Lecture 15 - Quality Assessment of GPS Surveying

Lecture 16 - Procedure of GPS Surveying - I

Lecture 17 - Procedure of GPS Surveying - II

Lecture 18 - Procedure of GPS Surveying - III

Lecture 19 - GPS Field Surveying

Lecture 20 - GPS Data Processing

NPTEL : NOC:Digital Land Surveying And Mapping (Civil Engineering)

Co-ordinators : Prof. Jayanta Kumar Ghosh

Lecture 1 - Introduction and Applications

Lecture 2 - Fundamentals and Operations

Lecture 3 - Overview of Digital Land Surveying

Lecture 4 - Introduction of GPS

Lecture 5 - GPS Signal (Civilian Perspective)

Lecture 6 - GPS User Segment

Lecture 7 - GPS Positioning of Control Point

Lecture 8 - Demonstration of GPS Receivers, Software and Positioning of Control Point

Lecture 9 - GPS Position

Lecture 10 - Principle of GPS Positioning and GPS Observables

Lecture 11 - Errors in GPS Observables

Lecture 12 - GPS Data Pre-processing: Differencing

Lecture 13 - GPS Data Pre-processing: Point Positioning

Lecture 14 - GPS Data Processing: Baseline Processing

Lecture 15 - GPS Data Processing: Network Adjustment

Lecture 16 - Quality Assessment of GPS Surveying

Lecture 17 - Introduction to Total Station

Lecture 18 - Parts of Total Station

Lecture 19 - Accessories of Total Station

Lecture 20 - Handling and Setting of Total Station

Lecture 21 - Measurement of Distance

Lecture 22 - Measurement of Distance Using TS

Lecture 23 - Measurement of Horizontal Angle Using TS

Lecture 24 - Measurement of Vertical Angle and Height Using TS

Lecture 25 - Errors in Total Station

Lecture 26 - Other Errors in Total Station

Lecture 27 - Errors and Quality of Surveying Measurements

Lecture 28 - Error Propagation and Survey Specifications

Lecture 29 - Basics of Vertical Representation

Lecture 30 - Contouring

Lecture 31 - Mapping Fundamentals

Lecture 32 - Mapping Basics

Lecture 33 - Mapping Software

Lecture 34 - Automated Mapping

Lecture 35 - Working Steps

Lecture 36 - Establishment of Control Point

Lecture 37 - Detailing of Digital Land Surveying

Lecture 38 - Demonstration of Digital Land Survey Detailing

Lecture 39 - Data Preparation and Map Making

Lecture 40 - Overview of the Course

NPTEL : NOC:Digital Image Processing of Remote Sensing Data (Civil Engineering)

Co-ordinators : Dr.Arun K.Saraf

Lecture 1 - Remote-sensing Image and How it is represented

Lecture 2 - Different Techniques of Image Acquisition

Lecture 3 - Why is Digital Image processing Important ?

Lecture 4 - Image characteristics and Different Resolutions in Remote Sensing

Lecture 5 - Electromagnetic spectrum, solar reflection, and thermal emission

Lecture 6 - Color Representation and Transformations

Lecture 7 - Image histograms and statistics

Lecture 8 - Geo-referencing Techniques

Lecture 9 - Image Enhancement Techniques part 1

Lecture 10 - Image Enhancement Techniques part 2

Lecture 11 - Multispectral Transform, Scatter Plot, Principal Component Analysis and Decorrelation Stretch

Lecture 12 - Spatial Filtering Techniques

Lecture 13 - Frequency Domain Fourier Transformation

Lecture 14 - Basic Image Compression Techniques and Different Image File Formats

Lecture 15 - Image Classification Techniques

Lecture 16 - Principles of Image Interpretation

Lecture 17 - SAR Interferometry (InSAR) Techniques

Lecture 18 - Image Merging and Image Mosaicing Techniques

Lecture 19 - Application of Image Analysis

Lecture 20 - Limitations and Future of Digital Image Processing

NPTEL : NOC:Applied Environmental Microbiology (Civil Engineering)

Co-ordinators : Dr. Gargi Singh

Lecture 1 - Introduction - I

Lecture 2 - Introduction - II

Lecture 3 - Cell Structure - I

Lecture 4 - Cell Structure - II

Lecture 5 - Central Dogma - I

Lecture 6 - Central Dogma - II

Lecture 7 - Microbial Energetics - I

Lecture 8 - Microbial Energetics - II

Lecture 9 - Microbial Energetics - III

Lecture 10 - Microbial Energetics - IV

Lecture 11 - Microbial Metabolism - I

Lecture 12 - Microbial Metabolism - II

Lecture 13 - Functional Diversity of Bacteria - I

Lecture 14 - Functional Diversity of Bacteria - II

Lecture 15 - Functional Diversity of Bacteria - III

Lecture 16 - Microbial Ecosystem - I

Lecture 17 - Microbial Ecosystem - II

Lecture 18 - Microbial Ecosystem - III

Lecture 19 - Microbial Ecosystem - IV

Lecture 20 - Microbial Ecosystem - V

Lecture 21 - Environmental Genomics - I

Lecture 22 - Environmental Genomics - II

Lecture 23 - Environmental Genomics - III

Lecture 24 - Environmental Genomics - IV

Lecture 25 - Environmental Genomics - V

Lecture 26 - Microbial Symbiosis - I

Lecture 27 - Microbial Symbiosis - II

Lecture 28 - Virus - I

Lecture 29 - Virus - II

Lecture 30 - Applied Environmental Microbiology

Lecture 31 - Techniques in Environmental Microbiology - I

Lecture 32 - Techniques in Environmental Microbiology - II

Lecture 33 - Bioremediation - I

Lecture 34 - Bioremediation - II

Lecture 35 - Bioremediation - III

Lecture 36 - Wastewater Microbiology - I

Lecture 37 - Wastewater Microbiology - II

Lecture 38 - Built Microbiology

Lecture 39 - Exposomes - I

Lecture 40 - Exposomes - II

Lecture 41 - Drinking Water Microbiology - I

Lecture 42 - Drinking Water Microbiology - II

Lecture 43 - Drinking Water Microbiology - III

Lecture 44 - Drinking Water Microbiology - IV

Lecture 45 - Drinking Water Microbiology - V

Lecture 46 - Solid Waste Microbiology - I

Lecture 47 - Solid Waste Microbiology - II

Lecture 48 - Solid Waste Microbiology - III

Lecture 49 - Antimicrobial Resistance - I

Lecture 50 - Antimicrobial Resistance - II

Lecture 51 - Epidemiology - I

Lecture 52 - Epidemiology - II

Lecture 53 - Biosensors - I

Lecture 54 - Biosensors - II

Lecture 55 - Biosensors - III

Lecture 56 - Bioinformatics - I

Lecture 57 - Bioinformatics - II

Lecture 58 - Bioinformatics - III

Lecture 59 - Bioinformatics - IV

Lecture 60 - Bioinformatics - V

NPTEL : NOC:Digital Elevation Models and Applications (Civil Engineering)

Co-ordinators : Prof. Arun K. Saraf

Lecture 1 - Concept of Digital Elevation Model and How It Is Represented

Lecture 2 - Various Techniques to Generate Digital Elevation Model - 1

Lecture 3 - Various Techniques to Generate Digital Elevation Model - 2

Lecture 4 - Various Techniques to Generate Digital Elevation Model - 3

Lecture 5 - Importance of Spatial Resolution With DEMs

Lecture 6 - How To Assess Quality of DEM?

Lecture 7 - Integration of DEMs With Satellite Data

Lecture 8 - Common Derivatives of DEMs- Slope and Aspect

Lecture 9 - Triangulated Irregular Network (TIN) and Its Derivatives

Lecture 10 - Shaded Relief Models and Thier Applications

Lecture 11 - DEMs Derivatives - 1

Lecture 12 - DEMs Derivatives - 2

Lecture 13 - DEMs Derivatives - 3

Lecture 14 - DEMs Derivatives - 4

Lecture 15 - DEM Based Surface Hydrologic Modelling - 1

Lecture 16 - DEM Based Surface Hydrologic Modelling - 2

Lecture 17 - DEM and DAM Simulation and Its Application In Ground Water Hydrology

Lecture 18 - Applications of DEMs In Solar and Wind Energy Potential Estimations

Lecture 19 - Applications of DEMs in Viewshed and Flood Hazard Mapping

Lecture 20 - DEMs Sources, Limitations and Future of Digital Elevation Models

NPTEL : NOC:Environmental Engineering-Chemical Processes (Civil Engineering)

Co-ordinators : Prof. Bhanu Prakash Vellanki

Lecture 1 - Introduction, Fundamentals of Equilibrium and Kinetics

Lecture 2 - Equilibrium-Process Feasibility, Gibbs Energy-Standard Condition

Lecture 3 - Gibbs Free Energy-Non Standard Conditions - I

Lecture 4 - Gibbs Free Energy-Non Standard Conditions - II

Lecture 5 - Phase Equilibrium

Lecture 6 - Component Balance

Lecture 7 - Reaction Kinetics

Lecture 8 - Rate of Reaction - I

Lecture 9 - Rate of Reaction - II, Types of Reactors

Lecture 10 - Mass Balance on different types of Reactors

Lecture 11 - Material Balance for Complex Reactions

Lecture 12 - Material Balance for Reversible Reactions

Lecture 13 - Determination of Kinetic Equations

Lecture 14 - Acid-Base Reactions

Lecture 15 - Acid Dissociation Constant, Strength of Acid

Lecture 16 - Ionization Fractions

Lecture 17 - Introduction to VMINTEQ

Lecture 18 - Estimation of pH using VMINTEQ

Lecture 19 - Mixing Problems

Lecture 20 - Inverse Dose Problems

Lecture 21 - logC-pH Diagram

Lecture 22 - Carbonate System: Closed System

Lecture 23 - Carbonate System: Open System

Lecture 24 - VMINTEQ: Application of Gases, Acid-Base Titration

Lecture 25 - VMINTEQ: Titration and Multisweeep, Buffer: Introduction

Lecture 26 - VMINTEQ: Buffer System, Buffer Intensity: Introduction

Lecture 27 - Buffer Intensity: Monoprotic and Diprotic Acids

Lecture 28 - Alkalinity: Introduction

Lecture 29 - Alkalinity: Theoretical and Practical Definition

Lecture 30 - Acidity and its Applications

Lecture 31 - Alkalinity and Acidity: Applications

Lecture 32 - Mixing of Two Solutions and Conservative Quantities - I

Lecture 33 - Mixing of Two Solutions and Conservative Quantities - II

Lecture 34 - Carbonate and Non-Carbonate Alkalinity

Lecture 35 - Anaerobic Digester: Acid Formation and Neutralization

Lecture 36 - Aqueous Complexes: Applications in Toxicity Reduction

Lecture 37 - Aqueous Complexes: Solubility, Rate Constants and Strength of Ligands

Lecture 38 - Aqueous Complexes of Aluminium (Al)

Lecture 39 - Aqueous Complexes of Mercury (Hg)

Lecture 40 - Precipitation and Dissolution: Introduction and Applications

Lecture 41 - Applications of Precipitation and Dissolution

Lecture 42 - Different Stages in Precipitation, Equilibrium of Precipitation - I

Lecture 43 - Equilibrium of Precipitation - II

Lecture 44 - Examples Related to Equilibrium of Precipitation

Lecture 45 - Other Examples of Equilibrium of Precipitation

Lecture 46 - Solubility and Competitive Precipitation

Lecture 47 - Predominance Area Diagram and Introduction to Redox Processes

Lecture 48 - Redox Reactions and its Applications

Lecture 49 - Balancing of Redox and Development of Half Reaction

Lecture 50 - Kinetics of Redox Processes

Lecture 51 - Equilibrium of Redox - I

Lecture 52 - Equilibrium of Redox - II and Reaction Feasibility

Lecture 53 - Reaction Feasibility Based on Pe - I

Lecture 54 - Reaction Feasibility Based on Pe - II

Lecture 55 - Effect of Complexation on Redox

Lecture 56 - Effect of Complexation and Solid Phase on Redox

Lecture 57 - Reaction Feasibility based on Eh

Lecture 58 - Introduction to Electrochemical cell (Ecell)

Lecture 59 - Applications of Ecell

Lecture 60 - logC-Pe and pH-Pe Diagram

NPTEL : NOC:Environmental Remediation of Contaminated Sites (Civil Engineering)

Co-ordinators : Prof. Bhanu Prakash Vellanki, Prof. Thomas Boving

Lecture 1 - Introduction - I

Lecture 2 - Introduction - II

Lecture 3 - Course Outline

Lecture 4 - Introduction to hazardous waste laws and risk assessment

Lecture 5 - The major aspects of Risk Assessment

Lecture 6 - Risk Characterization

Lecture 7 - Risk Assessment - Deterministic approach

Lecture 8 - Risk Assessment - Stochastic Approach

Lecture 9 - Hazardous Waste laws - The TCLP Test

Lecture 10 - Hazardous rules and regulations

Lecture 11 - Remediation of contaminated GW-Plume Containment

Lecture 12 - Remediation of contaminated GW-Javendel et alÃ¢â‚¬â„¢s approach

Lecture 13 - Remediation of contaminated GW by Pump and Treat - I

Lecture 14 - Remediation of contaminated GW by Pump and Treat - II

Lecture 15 - Remediation of contaminated GW- Calculation of remediation time and introduction to source control

Lecture 16 - Permeable Reactive Barriers - I

Lecture 17 - Permeable Reactive Barriers - II

Lecture 18 - Permeable Reactive Barriers - III

Lecture 19 - Design of Permeable Reactive Barriers

Lecture 20 - Case Study on Permeable Reactive Barriers - I

Lecture 21 - Case Study on Permeable Reactive Barriers - II

Lecture 22 - Case Study- PRB (Utah)

Lecture 23 - Case Study (Utah) (Continued...)

Lecture 24 - Mechanism of natural attenuation and the affecting factors

Lecture 25 - Introduction to natural attenuation and its types

Lecture 26 - Pathways of Contaminant Transport and Rate of Degradation of Contaminant

Lecture 27 - Rate of Degradation of Contaminant when advection is considered

Lecture 28 - Rate of Degradation of Contaminant when both diffusion and advection are considered

Lecture 29 - Example of Rate of Degradation in natural attenuation

Lecture 30 - Case study: Natural Attenuation

Lecture 31 - Results of Case Study: Natural Attenuation

Lecture 32 - Introduction of Soil/Sediments contamination with some examples

Lecture 33 - Case Study: Soil/Sediments Contamination and remediation by Excavation and Disposal

Lecture 34 - Hazardous waste disposal site/TSDF

Lecture 35 - Different type of fluxes through containment barrier

Lecture 36 - Introduction to Solidification and Stabilisation and Case Study

Lecture 37 - Different contaminant reactions during solidification and stabilisation

Lecture 38 - Diffusion of contaminant through solidified form

Lecture 39 - Calculations for fractions of binders, admixtures, waste and water used in solidification

Lecture 40 - Discussion of TCLP approach in solidification and its examples

Lecture 41 - Discussion of TCLP approach (contd.) and Cost estimation of Solidification

Lecture 42 - Case Study: Solidification and Stabilization

Lecture 43 - Chemical Treatment

Lecture 44 - Case Study: In-Situ Chemical Oxidation - Part I

Lecture 45 - Case Study: In-Situ Chemical Oxidation - Part II

Lecture 46 - Case Study: In-Situ Chemical Oxidation - Part III

Lecture 47 - Surfactant Extraction - Part I

Lecture 48 - Surfactant Extraction - Part II

Lecture 49 - Case Study: Surfactant Extraction - Part I

Lecture 50 - Case Study: Surfactant Extraction - Part II

Lecture 51 - Soil Vapor Extraction - Part I

Lecture 52 - Soil Vapor Extraction - Part II

Lecture 53 - Bioremediation - Part I

Lecture 54 - Bioremediation - Part II

Lecture 55 - Case Study: Bioremediation

Lecture 56 - Case Study: Soil Vapor Extraction - Part I

Lecture 57 - Case Study: Soil Vapor Extraction - Part II

Lecture 58 - Phyto-remediation

Lecture 59 - Conceptual Site Model

Lecture 60 - Adaptive Design in Remediation Engineering

Lecture 61 - Solubilization Theory - Part I

Lecture 62 - Solubilization Theory - Part II

Lecture 63 - Enhanced Aquifer Flushing Technologies

NPTEL : NOC:Global Navigation Satellite Systems and Applications (Civil Engineering)

Co-ordinators : Prof. Arun K. Saraf

Lecture 1 - Introduction to Global Navigation Satellite System (GNSS)

Lecture 2 - How position is determined by the GNSS? - Part I

Lecture 3 - How position is determined by the GNSS? - Part II

Lecture 4 - How position is determined by the GNSS? - Part III

Lecture 5 - NAVSTAR - Global Positioning System

Lecture 6 - Global Navigation Satellite System (GLONASS)

Lecture 7 - BeiDou Navigation Satellite System (BDS)

Lecture 8 - Indian Regional Navigation Satellite System (IRNSS)

Lecture 9 - GALILEO

Lecture 10 - Quasi-Zenith Satellite System (QZSS)

Lecture 11 - Differential Global Navigation Satellite System (DGNSS)

Lecture 12 - Real-Time Kinematic (RTK)

Lecture 13 - Satellite Based Augmentation System (SBAS)

Lecture 14 - GNSS Errors

Lecture 15 - GNSS Correction Methods

Lecture 16 - Why altitude estimated by GNSS receivers is not very accurate

Lecture 17 - Global Navigation Satellite Systems (GNSS) Applications - I

Lecture 18 - Global Navigation Satellite Systems (GNSS) Applications - II

Lecture 19 - GNSS: Current Trends and Future

Lecture 20 - GNSS: Opportunities in India

NPTEL : NOC:Geomorphology (Civil Engineering)

Co-ordinators : Prof. Pitambar Pati

Lecture 1 - Introduction to Geomorphology and Concept of Time Scale in a Geomorphic System

Lecture 2 - Process of Landform Development

Lecture 3 - Energy Flow in Geomorphic System and Role of Uniformitarianism Vs Catastrophism

Lecture 4 - Landform Development - Equilibrium and Evolution

Lecture 5 - Process Geomorphology - I

Lecture 6 - Process Geomorphology - II

Lecture 7 - Weathering and soil Formation Introduction - I

Lecture 8 - Weathering and soil Formation Introduction - II

Lecture 9 - Weathering and Soil Formation (Types of Weathering)

Lecture 10 - Weathering and Soil Formation (Mechanical Weathering)

Lecture 11 - Weathering and Soil Formation (Mechanical and Chemical Weathering)

Lecture 12 - Weathering and Soil Formation (Chemical and Biological Weathering)

Lecture 13 - Weathering of Silicate rocks and Weathering Products

Lecture 14 - Factors of Weathering

Lecture 15 - Soil Formation

Lecture 16 - Soil Formation Processes

Lecture 17 - Soil Classification

Lecture 18 - Mass Wasting

Lecture 19 - Classification of Mass Wasting - I

Lecture 20 - Classification of Mass Wasting - II

Lecture 21 - Hill Slope Evolution - I

Lecture 22 - Hill Slope Evolution - II

Lecture 23 - Arid Zone Geomorphology

Lecture 24 - Landforms in Dry Region

Lecture 25 - Pediment Evolution

Lecture 26 - Aeolian Processes and Landforms - I

Lecture 27 - Aeolian Processes and Landforms - II

Lecture 28 - Wind Erosional Landforms - I

Lecture 29 - Wind Erosional Landforms - II

Lecture 30 - Dune Classification - I

Lecture 31 - Dune Classification - II

Lecture 32 - Coastal Geomorphology - I

Lecture 33 - Coastal Geomorphology and Landforms

Lecture 34 - Coastal Geomorphology - II

Lecture 35 - Coastal Geomorphology - III

Lecture 36 - Shoreline Platform

Lecture 37 - Coastal Geomorphology - IV

Lecture 38 - Coastal Geomorphology - V

Lecture 39 - Coastal Geomorphology - VI

Lecture 40 - Coastal Geomorphology - VII

Lecture 41 - Coastal Geomorphology - VIII

Lecture 42 - Coastal Geomorphology - IX

Lecture 43 - Tectonic Geomorphology

Lecture 44 - Fluvial Process

Lecture 45 - Fluvial Process - I

Lecture 46 - Fluvial Process - II

Lecture 47 - Fluvial Process - III

Lecture 48 - Fluvial Process - IV

Lecture 49 - Fluvial Process - V and Drainage Analysis

Lecture 50 - Fluvial Process - VI and Drainage Analysis

Lecture 51 - Fluvial Geomorphology River System - I

Lecture 52 - Fluvial Geomorphology River System - II

Lecture 53 - Glacial Geomorphology - I

Lecture 54 - Glacial Geomorphology - II (Valley Glacier)

Lecture 55 - Glacial Geomorphology - III

Lecture 56 - Glacial Geomorphology - IV (Geomorphic Changes by Glacier)

Lecture 57 - Exploration Geomorphology in Oil field Sandbody Geometry - I

Lecture 58 - Exploration Geomorphology in Oil Field Sandbody Geometry - II

Lecture 59 - Seismic Geomorphology - I

Lecture 60 - Seismic Geomorphology - II

NPTEL : NOC:Remote Sensing Essentials (Civil Engineering)

Co-ordinators : Dr.Arun K.Saraf

Lecture 1 - Rudiments of Remote Sensing and Advantages

Lecture 2 - Historical Perspective of development of remote sensing technology

Lecture 3 - EM spectrum, solar reflection and thermal emission

Lecture 4 - Interaction of EM radiation with atmosphere including atmospheric scattering, absorption and emission

Lecture 5 - Interaction mechanisms of EM radiation with ground, spectral response curves

Lecture 6 - Laws of Radiation and their relevance in Remote Sensing

Lecture 7 - Basis of remote sensing image representation

Lecture 8 - Various Remote Sensing Platforms

Lecture 9 - Multi-spectral scanners and imaging devices

Lecture 10 - Significant characteristics of LANDSAT, SPOT, Sentinel sensors

Lecture 11 - Prominent characteristics of IRS, Cartosat, ResourceSat sensors

Lecture 12 - Unmanned Aerial Vehicle/Drone

Lecture 13 - Passive Microwave Remote Sensing

Lecture 14 - Image characteristics and different resolutions in Remote Sensing

Lecture 15 - Different techniques of Image acquisition

Lecture 16 - Importance of digital image processing

Lecture 17 - Digital Image Processing Software

Lecture 18 - Basic image enhancement techniques

Lecture 19 - Colour representations and transformtions

Lecture 20 - Image Histograms and statistics

Lecture 21 - Atmospheric errors and corrections

Lecture 22 - Geometric transformations/Geo-referencing Technique

Lecture 23 - Digital Image Processing Software Demonstration - 1

Lecture 24 - Image enhancement techniques - 1

Lecture 25 - Image enhancement techniques - 2

Lecture 26 - Digital Image Processing Software Demonstration - 2

Lecture 27 - Spatial Filtering Techniques, Band rationing and PCA

Lecture 28 - Frequency Doman Fourier Transformation

Lecture 29 - Digital Image Processing Software Demonstration - 3

Lecture 30 - Unsupervised image classification and density slicing techniques

Lecture 31 - Supervised image classification techniques and limitations

Lecture 32 - Digital Image Processing Software Demonstration - 4

Lecture 33 - LiDAR Technique and applications

Lecture 34 - Mosaicking, subsets, sub-sampling techniques and applications

Lecture 35 - False Topographic Phenomena and correction techniques - 1

Lecture 36 - False Topographic Phenomena and correction techniques - 2

Lecture 37 - High Spatial Resolution Satellite Images and limitations

Lecture 38 - Basic Image Compression techniques and different image file formats

Lecture 39 - Hyperspectral Remote Sensing

Lecture 40 - Digital Image vs Digital Photograph

Lecture 41 - NDVI and other indices

Lecture 42 - Active Microwave Remote Sensing - 1

Lecture 43 - Active Microwave Remote Sensing - 2

Lecture 44 - Radar Images interpretation and applications

Lecture 45 - SAR Interferometry (InSAR) Technique - 1

Lecture 46 - SAR Interferometry (InSAR) Technique - 2

Lecture 47 - Principles of image interpretation

Lecture 48 - Image interpretation of different geological landforms, rock types and structures

Lecture 49 - Remote Sensing of Moon and Mars

Lecture 50 - Google Earth and its Applications

Lecture 51 - Integrated applications of RS and GIS in groundwater studies - 1

Lecture 52 - Integrated applications of RS and GIS in groundwater studies - 2

Lecture 53 - Applications of Remote Sensing in Earthquake Studies - 1

Lecture 54 - Applications of Remote Sensing in Earthquake Studies - 2

Lecture 55 - Different sources of free satellite images

Lecture 56 - Limitations of Remote Sensing Techniques

NPTEL : NOC:Earthquake Resistant Design of Foundations (Civil Engineering)

Co-ordinators : Prof. B. K. Maheshwari

Lecture 1 - Introduction

Lecture 2 - Shallow Foundations: General Requirements

Lecture 3 - Shallow Foundations: Bearing Capacity

Lecture 4 - Shallow Foundations: Settlement

Lecture 5 - Shallow Foundations: Numerical Examples

Lecture 6 - Combined Footings

Lecture 7 - Raft Foundations: General Requirements

Lecture 8 - Raft Foundations: Methods of Analysis

Lecture 9 - Footings under Dynamic Loads: Eccentric and Inclined Loads, A New Method

Lecture 10 - Footings under Dynamic Loads: Design Procedure and Example on a New Method

Lecture 11 - Footings under Dynamic Loads: Analytical Approaches

Lecture 12 - Footings under Dynamic Loads: Numerical on Analytical Approaches

Lecture 13 - Pile Foundations subjected to Static Vertical Load

Lecture 14 - Pile Foundations: Group Action of Piles and Numerical

Lecture 15 - Pile Foundations under Lateral Loads: Conventional and Elastic Methods

Lecture 16 - Pile Foundations under Lateral Loads: Elastic Method for Cohesionless Soils

Lecture 17 - Pile Foundations under Lateral Loads: Elastic Method for Cohesive Soils including degradation of modulus of subgrade reaction (k)

Lecture 18 - Pile Foundations under Lateral Loads: Numerical Examples

Lecture 19 - Dynamic Analysis of Piles under Vertical and Horizontal Vibrations

Lecture 20 - Dynamic Analysis of Piles under Horizontal Vibration: Continue with Numerical Example

Lecture 21 - Seismic Response of Pile Foundations - 1

Lecture 22 - Seismic Response of Pile Foundations - 2

Lecture 23 - Combined Pile-Raft Foundations (CPRF) - General

Lecture 24 - Geotechnical and Seismic Analyses of CPRF

Lecture 25 - Design of Piles in Liquefiable Soils - 1

Lecture 26 - Design of Piles in Liquefiable Soils - 2

Lecture 27 - Introduction to Well Foundations

Lecture 28 - Lateral Stability of Well Foundations

Lecture 29 - Lateral Stability, Construction and Sinking of Well Foundation

Lecture 30 - Titling and Shifting of Wells, Numerical Problems

Lecture 31 - Introduction to Soil-Structure Interaction

Lecture 32 - Effects of Soil-Structure Interaction

Lecture 33 - SGM and Wave Propagation

Lecture 34 - Dispersion, Attenuation of Waves and Damping

Lecture 35 - Ground Response Analysis (GRA)

Lecture 36 - Soil-Pile Interaction (SPI)

Lecture 37 - Raft Foundations â€“ Numerical Examples

Lecture 38 - Foundations on Slopes - 1

Lecture 39 - Foundations on Slopes - 2

Lecture 40 - Codal Provisions

NPTEL : NOC:Geographic Information Systems (Civil Engineering)

Co-ordinators : Prof. Arun K. Saraf

Lecture 1 - What is Geographic Information Systems ?

Lecture 2 - Essential Components of GIS

Lecture 3 - Different types of vector data

Lecture 4 - Concept of topology

Lecture 5 - Demonstration through GIS software

Lecture 6 - Raster data model and comparisons with vector

Lecture 7 - TIN data model and comparisons with raster

Lecture 8 - Non-spatial data (attributes) and their types

Lecture 9 - Vector data compression techniques

Lecture 10 - Demonstration through GIS software

Lecture 11 - Raster data compression techniques - 1

Lecture 12 - Raster data compression techniques - 2

Lecture 13 - Georeferencing

Lecture 14 - Pre-processing of spatial datasets - 1

Lecture 15 - Demonstration through GIS software

Lecture 16 - Pre-processing of spatial datasets - 2

Lecture 17 - Pre-processing of spatial datasets - 3

Lecture 18 - Spatial Interpolation Techniques - 1

Lecture 19 - Spatial Interpolation Techniques - 2

Lecture 20 - GIS ANALYSIS - 1

Lecture 21 - GIS Analysis - 2

Lecture 22 - GIS Analysis - 3

Lecture 23 - GIS Analysis - 4

Lecture 24 - GIS Analysis - 5

Lecture 25 - Demonstration through GIS software

Lecture 26 - GIS Analysis - 6

Lecture 27 - GIS Analysis - 7

Lecture 28 - Attributes Classification Methods

Lecture 29 - Special database systems and their types - 1

Lecture 30 - Demonstration through GIS software

Lecture 31 - Spatial database systems and their types - 2

Lecture 32 - Concept of NoData in Raster

Lecture 33 - Different map projections

Lecture 34 - Concept of digital elevation model (DEM) and how it is represented

Lecture 35 - Demonstration through GIS software

Lecture 36 - Various techniques to generate digital elevation model - 1

Lecture 37 - Various techniques to generate digital elevation model - 2

Lecture 38 - Various techniques to generate digital elevation model - 3

Lecture 39 - Digital Elevation Models and different types of resolutions

Lecture 40 - Demonstration through GIS software

Lecture 41 - How to assess quality of a DEM?

Lecture 42 - Integration of DEMs with satellite data

Lecture 43 - Demonstration through GIS software...

Lecture 44 - Common derivatives of DEMs - Slope and aspect - 1

Lecture 45 - Common derivatives of DEMs - Slope and aspect - 2

Lecture 46 - Common derivatives of DEMs - Slope and aspect - 3

Lecture 47 - Demonstration through GIS software

Lecture 48 - DEMs derivatives - 1

Lecture 49 - DEMs derivatives - 2

Lecture 50 - DEMs derivatives - 3

Lecture 51 - DEMs derivatives - 4

Lecture 52 - Shaded relief models and their applications

Lecture 53 - DEM based Surface Hydrologic Modelling - 1

Lecture 54 - DEM based Surface Hydrologic Modelling - 2

Lecture 55 - DEMs and Dam Simulation and its application in groundwater hydrology

Lecture 56 - Applications of DEMs in Viewshed and Flood Hazard Mapping

Lecture 57 - Applications of DEMs in solar and wind energy potential estimations

Lecture 58 - DEMs Sources, limitations and future of Digital Elevation Models

Lecture 59 - Errors in GIS and key elements of maps

Lecture 60 - Limitations of GIS

NPTEL : NOC:Water and Waste Water Treatment (Civil Engineering)

Co-ordinators : Prof. Bhanu Prakash Vellanki

Lecture 1 - Importance of water and wastewater treatment

Lecture 2 - Life expectancy and real-world scenario

Lecture 3 - Course outline

Lecture 4 - Review of fundamentals

Lecture 5 - Mass balance

Lecture 6 - Mass Balance: Batch reactor, CSTR, and Plug flow reactors

Lecture 7 - Mass balance: Comparison of CSTR and Plug flow reactor

Lecture 8 - Mass Balance: Non ideal system and Water quality parameters

Lecture 9 - Water quality: DO and ways to measure it

Lecture 10 - Water quality: Nutrients in water

Lecture 11 - Water quality: Total suspended solids and Pathogens

Lecture 12 - Wastewater treatment plant: basic principals

Lecture 13 - Wastewater treatment plant: Preliminary treatment

Lecture 14 - Wastewater treatment plant: Sedimentation and basics

Lecture 15 - Sedimentation: Discrete and Flocculant settling

Lecture 16 - Design of primary settling tank

Lecture 17 - Biological treatment: BOD and Nutrient removal

Lecture 18 - Analysis of biological removal process(ASP)

Lecture 19 - Activated sludge process: Material balance for aeration basin

Lecture 20 - Oxygen transfer: types and basic principals

Lecture 21 - Relevance of F/M ratio and Design Parameters of Activated Sludge Process

Lecture 22 - Sludge Bulking and Activated Sludge Variations

Lecture 23 - Sequencing Batch Reactor

Lecture 24 - Nitrogen Removal - I

Lecture 25 - Nitrogen Removal - II and Phosphorus Removal - I

Lecture 26 - Phosphorus Removal - II

Lecture 27 - Secondary Clarifiers and Attached Growth System

Lecture 28 - Disinfection

Lecture 29 - Chlorination Disinfection

Lecture 30 - Disinfection By-products (DBPs) and Disinfectant Removal

Lecture 31 - Water demand

Lecture 32 - Water Quality Parameters

Lecture 33 - Overview of Water Treatment

Lecture 34 - Physico-Chemical treatment

Lecture 35 - Coagulation - I

Lecture 36 - Coagulation - II

Lecture 37 - Rapid Mixing

Lecture 38 - Flocculation - I

Lecture 39 - Flocculation - II

Lecture 40 - Flocculent settling

Lecture 41 - Filtration

Lecture 42 - Depth filtration

Lecture 43 - Design of Sand filter and Surface filtration

Lecture 44 - Disinfection

Lecture 45 - Hardness - I

Lecture 46 - Hardness - II

Lecture 47 - Lime-Soda softening - I

Lecture 48 - Lime-Soda softening - II

Lecture 49 - Recarbonation

Lecture 50 - Types of Softening Basin and Adsorption

Lecture 51 - Adsorption

Lecture 52 - Adsorption Isotherms

Lecture 53 - Ion Exchange

Lecture 54 - Nanofiltration and RO

Lecture 55 - Aeration: Removal of Fe and Mn

Lecture 56 - Residual Management

Lecture 57 - Sludge Thickening

Lecture 58 - Stabilization of Sludge

Lecture 59 - Anaerobic and Aerobic digestion of sludge

Lecture 60 - Conditioning, Dewatering and Disposal of Sludge

NPTEL : NOC:Rock Engineering (Civil Engineering)

Co-ordinators : Prof. Priti Maheshwari

Lecture 1 - Introduction

Lecture 2 - Minerals and Rock Classes

Lecture 3 - Mineral Identification Procedure

Lecture 4 - Rock Identification Procedure

Lecture 5 - Geological Structures and Discontinuities

Lecture 6 - Spherical Representation of Geological Data - 1

Lecture 7 - Spherical Representation of Geological Data - 2

Lecture 8 - Spherical Representation of Geological Data - 3

Lecture 9 - Application of Graphical Representation of Geological Data

Lecture 10 - Laboratory Testing of Rocks - Sampling

Lecture 11 - Laboratory testing of Rocks - Preperations and UCS

Lecture 12 - Factors Influencing UCS and Modes of Failure in Compression

Lecture 13 - Failure Mechanism and Post-Failure Behaviour in Compression, Indirect Method for UCS

Lecture 14 - Indirect Method for UCS, Brazilian Test, Schnidt Rebound Hardness Test

Lecture 15 - Sound Velocity Test, Slake Durability Test, Swelling Pressure and Free Swell Test and Void Index Test

Lecture 16 - Shear Tests - 1

Lecture 17 - Shear Tests - 2

Lecture 18 - Engineering Classification of Intact Rocks, Concept of Rock Mass, RQD

Lecture 19 - Concept of Rock Mass, Factors Affecting Discontinuities

Lecture 20 - Factors Affecting Discontinuities

Lecture 21 - Classification of Rock Mass: Rock Mass Rating (RMR) - 1

Lecture 22 - Classification of Rock Mass: Rock Mass Rating (RMR) - 2

Lecture 23 - Classification of Rock Mass: Rock Mass Quality (Q-system) - 1

Lecture 24 - Classification of Rock Mass: Rock Mass Quality (Q-system) - 2

Lecture 25 - Classification of Rock Mass: Geological Strength Index (GSI)

Lecture 26 - Strength Criteria for Isotropic and Anisotropic Rock - 1

Lecture 27 - Strength Criteria for Isotropic and Anisotropic Rocks -2, Mohrâ€™s Failure Theory

Lecture 28 - Mohr-Coulomb Failure Criterion

Lecture 29 - Mohr-Coulomb Failure Criterion, Coulomb Navier Failure Criterion

Lecture 30 - Concept of Instantaneous c and Ï†: Balmer Approach

Lecture 31 - Empirical Failure Criteria: Basics of Regression Analysis

Lecture 32 - Hoek and Brown Criterion (1980)

Lecture 33 - Parameters of Failure Criteria

Lecture 34 - Failure Criteria for Rock Mass

Lecture 35 - Tunneling: Underground Excavations

Lecture 36 - Tunneling: Ground Conditions

Lecture 37 - Elastic Stress Distribution Around Circular Tunnels - 1

Lecture 38 - Elastic Stress Distribution Around Circular Tunnels - 2

Lecture 39 - Elastic Analysis of Circular Tunnels - Displacements

Lecture 40 - Thick Wall Cylinder in Biaxial Stress Field

Lecture 41 - Elasto-Plastic Stress Distribution Around Circular Tunnel

Lecture 42 - Underground Excavation Failure Mechanisms

Lecture 43 - Structurally Controlled Failure: Roof Failure

Lecture 44 - Structurally Controlled Failure: Sidewall Failures - 1

Lecture 45 - Structurally Controlled Failure: Sidewall Failures - 2

Lecture 46 - Rock Mass Support Interaction Analysis - 1

Lecture 47 - Rock Mass Support Interaction Analysis - 2

Lecture 48 - Rock Slope Stability

Lecture 49 - Rock Slope Stability - Plane Failure

Lecture 50 - Rock Slope Stability - Wedge Failure

Lecture 51 - Rock Slope Stability - Circular Failure

Lecture 52 - Rock Slope Stability - Toppling Failure - 1

Lecture 53 - Rock Slope Stability - Toppling Failure - 2

Lecture 54 - Rock Slope Stability - Toppling Failure - 3

Lecture 55 - Rock Slope Stabilization

Lecture 56 - Foundations on Weak Rocks

Lecture 57 - Ultimate Bearing Capacity Using Bellâ€™s Approach

Lecture 58 - Bearing Capacity from Classification Approaches and Based on UCS

Lecture 59 - Bearing Capacity Based on Plate Load test; Treatment of Foundations

Lecture 60 - Dam Foundation Problems

NPTEL : NOC:Finite Element Method and Computational Structural Dynamics (Civil Engineering)

Co-ordinators : Prof. Manish Shrikhande

Lecture 1 - Introduction to Scientific Computations - I

Lecture 2 - Introduction to Scientific Computations - II

Lecture 3 - Basic Concepts of Linear Algebra

Lecture 4 - Polynomial Interpolation and Numerical Quadrature - I

Lecture 5 - Polynomial Interpolation and Numerical Quadrature - II

Lecture 6 - Polynomial Interpolation and Numerical Quadrature - III

Lecture 7 - Polynomial Interpolation and Numerical Quadrature - IV

Lecture 8 - Mathematical Modelling and Approximate Solutions - I

Lecture 9 - Mathematical Modelling and Approximate Solutions - II

Lecture 10 - Mathematical Modelling and Approximate Solutions - III

Lecture 11 - Approximation via Variational Principles

Lecture 12 - Introduction to the Finite Element Concept

Lecture 13 - Finite Elements of C^0 Continuity in 1-D - I

Lecture 14 - Finite Elements of C^0 Continuity in 1-D - II

Lecture 15 - Finite Elements of C^0 Continuity in 1-D - III

Lecture 16 - Finite Elements of C^0 Continuity in 1-D - IV

Lecture 17 - Finite Elements of C^1 Continuity in 1-D - I

Lecture 18 - Finite Elements of C^1 Continuity in 1-D - II

Lecture 19 - Finite Elements of C^0 Continuity in 2-D and 3-D - I

Lecture 20 - Finite Elements of C^0 Continuity in 2-D and 3-D - II

Lecture 21 - Finite Elements of C^0 Continuity in 2-D and 3-D - III

Lecture 22 - Finite Elements of C^0 Continuity in 2-D and 3-D - IV

Lecture 23 - Finite Elements of C^0 Continuity in 2-D and 3-D - V

Lecture 24 - Finite Elements of C^0 Continuity in 2-D and 3-D - VI

Lecture 25 - Finite Elements of C^0 Continuity in 2-D and 3-D - VII

Lecture 26 - Finite Elements of C^0 Continuity in 2-D and 3-D - VIII

Lecture 27 - Finite Elements of C^0 Continuity in 2-D and 3-D - IX

Lecture 28 - Finite Elements of C^0 Continuity in 2-D and 3-D - X

Lecture 29 - Finite Elements of C^0 Continuity in 2-D and 3-D - XI

Lecture 30 - Finite Elements of C^0 Continuity in 2-D and 3-D - XII

Lecture 31 - Mapped Elements - I

Lecture 32 - Mapped Elements - II

Lecture 33 - Mapped Elements - III

Lecture 34 - Mapped Elements - IV

Lecture 35 - Mapped Elements - V

Lecture 36 - Variational Crimes

Lecture 37 - The Patch Test

Lecture 38 - Finite Elements for Plates and Shells - I

Lecture 39 - Finite Elements for Plates and Shells - II

Lecture 40 - Finite Elements for Plates and Shells - III

Lecture 41 - The Time Dimension and Dynamic Effects - I

Lecture 42 - The Time Dimension and Dynamic Effects - II

Lecture 43 - Solution of Linear Simultaneous Equations - I

Lecture 44 - Solution of Linear Simultaneous Equations - II

Lecture 45 - Solution of Linear Simultaneous Equations - III

Lecture 46 - Solution of Linear Simultaneous Equations - IV

Lecture 47 - The Algebraic Eigenvalue Problem - I

Lecture 48 - The Algebraic Eigenvalue Problem - II

Lecture 49 - The Algebraic Eigenvalue Problem - III

Lecture 50 - The Algebraic Eigenvalue Problem - IV

Lecture 51 - Time Marching - I

Lecture 52 - Time Marching - II

Lecture 53 - Time Marching - III

Lecture 54 - Discrete Fourier Transform - I

Lecture 55 - Discrete Fourier Transform - II

Lecture 56 - Discrete Fourier Transform - III

Lecture 57 - Discrete Fourier Transform - IV

Lecture 58 - Discrete Fourier Transform - V

Lecture 59 - Discrete Fourier Transform - VI

Lecture 60 - Discrete Fourier Transform - VII

NPTEL : NOC:Sustainable Transportation systems (Civil Engineering)

Co-ordinators : Prof. Bhola Ram Gurjar

Lecture 1 - Introduction to Transportation Systems - I

Lecture 2 - Introduction to Transportation Systems - II

Lecture 3 - Concept of Sustainability

Lecture 4 - Current Scenario of Transportation in India

Lecture 5 - Climate Change: Indicators and Impacts

Lecture 6 - Impacts of Transportation Systems - I

Lecture 7 - Impacts of Transportation Systems - II

Lecture 8 - Impacts of Transportation Systems - III

Lecture 9 - Impacts of Transportation Systems - IV

Lecture 10 - Impacts of Transportation Systems - V

Lecture 11 - Introduction to Environment Impact Assessment (EIA)

Lecture 12 - EIA Processes - I

Lecture 13 - EIA Processes - II

Lecture 14 - Methodologies of EIA

Lecture 15 - EIA Process in India

Lecture 16 - Global practices in EIA process

Lecture 17 - EIA Case Study - I

Lecture 18 - EIA Case Study - II

Lecture 19 - EIA Case Study - III

Lecture 20 - EIA Case Study - IV

Lecture 21 - EIA Case Study - V

Lecture 22 - Introduction of Land use

Lecture 23 - Land use Planning and Zoning

Lecture 24 - Transit Oriented Development (TOD)

Lecture 25 - TOD Implementation

Lecture 26 - TOD Case study-I: Section of Delhi Metro

Lecture 27 - TOD Case study-II: TOD planning for Belgrade, Serbia

Lecture 28 - TOD Case study-III: Naya Raipur

Lecture 29 - Introduction to Sustainable Transport Planning

Lecture 30 - Sustainable Transport Planning and Approaches-I: The Traditional Transport Planning Process

Lecture 31 - Sustainable Transport Planning and Approaches-II: The Contemporary Planning Process

Lecture 32 - Sustainable Transport Planning and Approaches-III: Management Strategies

Lecture 33 - Life Cycle Assessment (LCA): An Introduction

Lecture 34 - Life Cycle Assessment: Theory and Practice

Lecture 35 - LCA Case Study

Lecture 36 - Material Flow Analysis (MFA)

Lecture 37 - Material Flow Analysis: Case Study

Lecture 38 - Concept of Circular Economy

Lecture 39 - Circular Economy in Transport Sector

Lecture 40 - Modelling of Transport Emissions - I

Lecture 41 - Modelling of Transport Emissions - II

Lecture 42 - Dispersion Models for Transport Emissions

Lecture 43 - Traffic Noise Emission Models

Lecture 44 - Initiatives and Policies for Environmental Sustainability

Lecture 45 - National Clean Air Programme and Transport Sector

Lecture 46 - Decarbonizing the Transport Sector

Lecture 47 - Alternate Fuels and Sustainable Transportation

Lecture 48 - Electric Vehicles and Sustainability

Lecture 49 - Emerging Transport Technology - Hyperloop

Lecture 50 - Case Study-I: Bus Rapid Transit System (BRTS)

Lecture 51 - Case Study-II: Mass Rapid Transit (MRT) Systems

Lecture 52 - Case Study-III: Sustainability in Airports

Lecture 53 - Case Study-IV: Sustainable Water Transport

Lecture 54 - Case Study-V: Non-Motorized Transport (NMT)

Lecture 55 - openLCA - An LCA Tool

Lecture 56 - openLCA Application - Case Study

Lecture 57 - Material Flow Analysis Tool - STAN

Lecture 58 - Sustainability Indicators

Lecture 59 - Sustainable Transport Appraisal Rating (STAR)

Lecture 60 - Measuring Sustainability

NPTEL : NOC:Air Pollution and Control (Civil Engineering)

Co-ordinators : Prof. Bhola Ram Gurjar

Lecture 1 - Introduction to Air Pollution - I

Lecture 2 - Introduction to Air Pollution - II

Lecture 3 - Impact of Air Pollution on Human Health

Lecture 4 - Impact of Air Pollution on Vegetation and Animals

Lecture 5 - Impact of Air Pollution on Building Materials and Structures

Lecture 6 - Impact of Air Pollution on Atmosphere, Soil and Water Bodies

Lecture 7 - Sources and Classification of Air Pollutants

Lecture 8 - Atmospheric Formation and Fate of Air Pollutants

Lecture 9 - Meteorological Parameters and Air Pollution

Lecture 10 - Atmospheric Stability and Lapse Rates

Lecture 11 - Atmospheric Stability and Plume Behaviour

Lecture 12 - Boundary Layer, Mixing Height, Stack Height and Plume Rise

Lecture 13 - Status of Air Quality Monitoring in India

Lecture 14 - Air Quality Index (AQI)

Lecture 15 - Introduction to Air Quality Modelling

Lecture 16 - Gaussian Dispersion Model for Point Source

Lecture 17 - Gaussian Dispersion Model for Line Source and Area Source

Lecture 18 - Determination of Concentration of Pollutants using Gaussian Dispersion Model

Lecture 19 - Assimilative Capacity of an Airshed

Lecture 20 - Emission Inventory

Lecture 21 - Transport Emission Inventory

Lecture 22 - Emission Inventory for Industrial Sector

Lecture 23 - Emission Inventory for Agriculture Sector

Lecture 24 - Emission Inventory for Residential and Commercial Sectors

Lecture 25 - Application of Remote Sensing/Satellite-Based Data in Air Quality Management

Lecture 26 - Emission Inventory: Case Study

Lecture 27 - Methods of Source Apportionment

Lecture 28 - Source apportionment using Receptor Modeling

Lecture 29 - Indoor Air Quality: An Introduction

Lecture 30 - Specific Sources and Types of Indoor Air Pollutants

Lecture 31 - Health Impacts Due to Indoor Air Pollution

Lecture 32 - Assessment of Exposure to Indoor Air Pollution

Lecture 33 - Indoor Air Quality Modelling

Lecture 34 - Technologies to Mitigate Indoor Air Pollution

Lecture 35 - Personal Exposure to Fine Particles: A Case Study

Lecture 36 - Indoor Air Quality in Nursery Buildings, UAE â€" Case Study

Lecture 37 - Global and Regional Environmental Issues - Ozone Depletion

Lecture 38 - Global and Regional Environmental Issues - Global Warming

Lecture 39 - Global and Regional Environmental Issues - Climate Change

Lecture 40 - Global and Regional Environmental Issues - Acid Rain

Lecture 41 - Introduction to Air Pollution Control

Lecture 42 - Air Pollution Control Devices - Part 1

Lecture 43 - Air Pollution Control Devices - Part 2

Lecture 44 - Air Pollution Control Devices - Part 3

Lecture 45 - Air Pollution Control Devices - Part 4

Lecture 46 - Tutorial-II - Practice Examples on Particulate Emission Control Devices

Lecture 47 - Tutorial-III - Practice Examples on Gaseous Emission Control Devices

Lecture 48 - Air Quality Standards

Lecture 49 - Air Pollution Legislations and Regulations

Lecture 50 - National Policies for Managing the Ambient Air Quality (AAQ)

Lecture 51 - International Environmental Treaties to Reduce Air Pollution and GHG Emissions

Lecture 52 - Impact of Lockdown on Air Quality

Lecture 53 - Sector Wise Mitigation Measures to Control Air Pollution

Lecture 54 - Challenges and the Way Forward

Lecture 55 - Sampling and Analysis of PM10 in Ambient Air

Lecture 56 - Sampling and Analysis of PM2.5 in Ambient Air

Lecture 57 - Sampling and Analysis of SO2 and NO2 in Ambient Air

Lecture 58 - Stack Emission Monitoring using Isokinetic Sampling

Lecture 59 - Indoor Air Quality Assessment using Multi Gas Monitor

Lecture 60 - Sampling and Analysis of PM10 and PM2.5 using Spectrometer

NPTEL : NOC:Underground Space Technology (Civil Engineering)

Co-ordinators : Prof. Priti Maheshwari

Lecture 1 - Basics of Rock Engineering: Introduction

Lecture 2 - Basics of Rock Engineering: coring, sampling, UCS of intact rock

Lecture 3 - Basics of Rock Engineering: Tensile strength and shear strength of intact rock

Lecture 4 - Basics of Rock Engineering: Classification of intact rocks, concept of rock mass, RQD

Lecture 5 - Basics of Rock Engineering: Classification of rock mass - 1

Lecture 6 - Basics of Rock Engineering: Classification of rock mass: Q-system and GSI

Lecture 7 - Basics of Rock Engineering: Failure criteria for rocks - 1

Lecture 8 - Basics of Rock Engineering: Empirical failure criteria

Lecture 9 - Tunneling: Underground excavations

Lecture 10 - Tunneling: Ground conditions

Lecture 11 - Planning of and exploration for underground construction projects

Lecture 12 - Underground excavation failure mechanisms

Lecture 13 - Application of stereographic projection method: roof failure

Lecture 14 - Application of stereographic projection method: sidewall failures - 1

Lecture 15 - Application of stereographic projection method: sidewall failures - 2

Lecture 16 - Elastic stress distribution around circular tunnels - 1

Lecture 17 - Elastic stress distribution around circular tunnels - 2

Lecture 18 - Elastic analysis of circular tunnels-displacements

Lecture 19 - Thick wall cylinder in biaxial stress field

Lecture 20 - Stress distribution around non-circular openings in elastic ground conditions - 1

Lecture 21 - Stress distribution around non-circular openings in elastic ground conditions - 2

Lecture 22 - Stress distribution under different in-situ stress conditions: design principles

Lecture 23 - Stress distribution for multiple openings

Lecture 24 - Openings in laminated rocks - 1

Lecture 25 - Openings in laminated rocks - 2

Lecture 26 - Openings in laminated rocks - 3

Lecture 27 - Openings in laminated rocks - 4

Lecture 28 - Elasto-plastic analysis of tunnels: Tresca yield criterion - 1

Lecture 29 - Elasto-plastic analysis of tunnels: Tresca yield criterion - 2

Lecture 30 - Elasto-plastic analysis of tunnels: Mohr-Coulomb criterion

Lecture 31 - Application of rock mass classification system: TerzaghiÃ¢s rock load theory - 1

Lecture 32 - Application of rock mass classification system: TerzaghiÃ¢s rock load theory - 2

Lecture 33 - Application of rock mass classification system: rock mass rating (RMR)

Lecture 34 - Tunnel hazards

Lecture 35 - Tunnel hazards: squeezing ground conditions

Lecture 36 - Application of rock mass classification system: rock mass quality system - 1

Lecture 37 - Application of rock mass classification system: rock mass quality system - 2, NATM, NMT

Lecture 38 - Modulus of deformation of rock mass using Q-system, rock mass number, plate loading test

Lecture 39 - Modulus of deformation of rock mass: uni-axial jacking/plate jacking test

Lecture 40 - Modulus of deformation of rock mass: radial jacking test and Goodman jack test

Lecture 41 - Rock mass support interaction analysis: ground response and support reaction curves - 1

Lecture 42 - Rock mass support interaction analysis: ground response and support reaction curves - 2

Lecture 43 - Rock mass support interaction analysis: influencing factors, LadanyiÃ¢s E-P analysis

Lecture 44 - LadanyiÃ¢s elasto-plastic analysis of tunnels: analysis of stresses and deformations

Lecture 45 - Rock-support interaction analysis: required support line, analysis of available support

Lecture 46 - Rock-support interaction analysis: for shotcrete/concrete lining and blocked steel sets

Lecture 47 - Rock-support interaction analysis: for ungrouted rock bolts, grouted rock bolts/cables

Lecture 48 - Calculation sequence for rock-support interaction analysis - 1

Lecture 49 - Calculation sequence for rock-support interaction analysis - 2

Lecture 50 - Calculation sequence for rock-support interaction analysis - example

Lecture 51 - Methods of tunnel excavation, various support systems: shotcrete

Lecture 52 - Shotcrete

Lecture 53 - Various support systems: rock bolts

Lecture 54 - Permeability and groutability - 1

Lecture 55 - Permeability and groutability - 2

Lecture 56 - Rock stress determination: flat jack test

Lecture 57 - Rock stress determination: hydraulic fracturing technique

Lecture 58 - Instrumentation and monitoring of tunnels - 1

Lecture 59 - Instrumentation and monitoring of tunnels - 2

Lecture 60 - Few case studies

NPTEL : NOC:Environmental Modeling and Simulation (Civil Engineering)

Co-ordinators : Prof. Gargi Singh

Lecture 1 - Introduction - Part I

Lecture 2 - Introduction - Part II

Lecture 3 - 1D Models - Part I

Lecture 4 - 1D Models - Part II

Lecture 5 - Logistic Growth Models - Part I

Lecture 6 - Logistic Growth Models - Part II

Lecture 7 - 1D Models: Auto Catalysis

Lecture 8 - Semi Quantitative Approach to Solve 1D Models

Lecture 9 - Using MATLAB for 1D systems

Lecture 10 - Using R for 1D Systems

Lecture 11 - Bifurcations - I

Lecture 12 - Bifurcations - II

Lecture 13 - Bifurcations - III

Lecture 14 - Bifurcations - IV

Lecture 15 - Bifurcations - V

Lecture 16 - Insect Outbreak Model

Lecture 17 - 2D Systems - I

Lecture 18 - 2D Systems - II

Lecture 19 - 2D Systems - III

Lecture 20 - 2D Systems - IV

Lecture 21 - 2D Systems - V

Lecture 22 - 2D Systems - VI

Lecture 23 - 2D Systems - VII

Lecture 24 - 2D Systems - VIII

Lecture 25 - 2D Systems - IX

Lecture 26 - 2D Systems - X

Lecture 27 - 2D Systems - XI

Lecture 28 - 2D Systems - XII

Lecture 29 - Limit Cycles - I

Lecture 30 - Limit cycles - II and Bifurcations

Lecture 31 - Bifurcations

Lecture 32 - Bifurcations - I

Lecture 33 - Bifurcations - II

Lecture 34 - Bifurcations - III

Lecture 35 - Application of Empirical Approach - I

Lecture 36 - Application of Empirical Approach - II

Lecture 37 - Application of Empirical Approach - III

Lecture 38 - Gaussian Plumes - Air - I

Lecture 39 - Gaussian Plumes - Air - II

Lecture 40 - Gaussian Plumes - Air - III

Lecture 41 - Gaussian Plumes - Air - IV

Lecture 42 - Gaussian Plumes - Air - V

Lecture 43 - Gaussian Plumes - Air - VI

Lecture 44 - Ground Water - I

Lecture 45 - Ground Water - II

Lecture 46 - Environmental Transport Processes

Lecture 47 - Environmental Non-reactive and Reactive Processes - I

Lecture 48 - Environmental Non-reactive and Reactive Processes - II

Lecture 49 - Environmental Non-reactive and Reactive Processes - III

Lecture 50 - Homogeneous reactors

Lecture 51 - Heterogeneous Reactors - I

Lecture 52 - Heterogeneous Reactors - II

Lecture 53 - Ground Water Extraction

Lecture 54 - 2D Model Using MATLAB

Lecture 55 - Phase Portrait of 1D Models Using R

Lecture 56 - Phase Portrait of 2D Models Using R

Lecture 57 - Simulations - I

Lecture 58 - Simulations - II

Lecture 59 - Application: Climate change and GDP - I

Lecture 60 - Application: Climate change and GDP - II

NPTEL : NOC:Advanced Geomatics Engineering (Civil Engineering)

Co-ordinators : Prof. Pradeep Kumar Garg

Lecture 1 - Introduction to Geomatics Engineering

Lecture 2 - Various Applications of Geomatics Engineering

Lecture 3 - Photogrammetry - An Introduction

Lecture 4 - Photogrammetry - Geometry of Aerial Photographs

Lecture 5 - Photogrammetry - Scale of Aerial Photographs

Lecture 6 - Photogrammetry - Relief Displacment

Lecture 7 - Photogrammetry - Stereo Pairs and Stereovision

Lecture 8 - Photogrammetry - Stereovision with Stereoscopes

Lecture 9 - Photogrammetry - Parallax in Photographs

Lecture 10 - Height Determination from Stereo-Pairs

Lecture 11 - Photogrammetry - 3D Mapping, DEM, DTM and DSM

Lecture 12 - Digital Photogrammetry

Lecture 13 - Remote Sensing - An Introduction

Lecture 14 - Remote Sensing - Electromagnetic Spectrum

Lecture 15 - Remote Sensing - Energy Interaction with Atmosphere / Earth Surface

Lecture 16 - Remote Sensing - Blackbody and Atmospheric Window

Lecture 17 - Spectral Signature in Remote Sensing

Lecture 18 - Remote Sensing - Types of Resolutions

Lecture 19 - Multi-concepts in Remote Sensing

Lecture 20 - Remote Sensing - Satellite Orbits

Lecture 21 - Remote Sensing - Various Sensors

Lecture 22 - Remote Sensing Sensors and Platforms - I

Lecture 23 - Remote Sensing Sensors and Platforms - II

Lecture 24 - Very High Resolution Remote Sensing Data

Lecture 25 - Remote Sensing - Thermal, Microwave, and Hyperspectral Images

Lecture 26 - Remote Sensing - Visual Interpretation Method

Lecture 27 - GPS Surveying - Introduction and Components

Lecture 28 - GPS Surveying - Working Principle

Lecture 29 - GPS Surveying - Various Methods

Lecture 30 - GPS Surveying - Sources of Errors

Lecture 31 - GPS - Applications

Lecture 32 - LiDAR - An Introduction

Lecture 33 - Data Collection with Mobile Laser Scanners

Lecture 34 - Data Collection with Airborne LiDAR Systems

Lecture 35 - Unmanned Aerial Vehicles - An Introduction

Lecture 36 - Classifications of UAVs/Drones

Lecture 37 - Various Components of Drone and Their Functions

Lecture 38 - Flying Drones for Data Collection

Lecture 39 - Unmanned Aerial Vehicles - Various Applications

Lecture 40 - Digital Image Processing - An Introduction

Lecture 41 - Pre-processing - Atmospheric Corrections

Lecture 42 - Pre-processing - Geometric Corrections

Lecture 43 - Pre-processing - Resampling Methods

Lecture 44 - Digital Image Enhancement Methods

Lecture 45 - Spatial Filtering in Digital Remote Sensing

Lecture 46 - Digital Image Transformation Methods

Lecture 47 - Supervised Classification Methods

Lecture 48 - Unsupervised Classification Methods

Lecture 49 - Accuracy Assessment of Classification

Lecture 50 - Geographic Information System - An Introduction

Lecture 51 - Various Components of a GIS

Lecture 52 - GIS - Various Data Types and Their Characteristics

Lecture 53 - Geographic Information System - Data Input

Lecture 54 - GIS Databases and Their Uses

Lecture 55 - GIS - Based Extraction of Parameters from DEM

Lecture 56 - Buffering and Overlay Analysis in GIS

Lecture 57 - Spatial and Network Analysis in GIS

Lecture 58 - Geomatics Applications - Site Suitability Analysis

Lecture 59 - Geomatics Applications - Transportation Route Planning

Lecture 60 - Geomatics Applications - Smart City Planning

NPTEL : NOC:Pavement Materials (Under Pavement Engineering) (Civil Engineering)

Co-ordinators : Prof. Nikhil Saboo

Lecture 1 - Introduction to Soil as a Highway Material

Lecture 2 - Particle Size Distribution - Part 1

Lecture 3 - Particle Size Distribution - Part 2

Lecture 4 - Consistency Limits and Classification of Soils - Part 1

Lecture 5 - Consistency Limits and Classification of Soils - Part 2

Lecture 6 - Strength Properties of Soil - Part 1

Lecture 7 - Strength Properties of Soil - Part 2

Lecture 8 - Strength Properties of Soil - Part 3

Lecture 9 - Strength Properties of Soil - Part 4

Lecture 10 - Expansive Soils and Stabilization Techniques

Lecture 11 - Introduction to Mineral Aggregates: Origin and Types

Lecture 12 - Production and Storage of Aggregates

Lecture 13 - Classification and Gradation of Aggregates - Part 1

Lecture 14 - Classification and Gradation of Aggregates - Part 2

Lecture 15 - Mineralogy of Aggregates and its Importance

Lecture 16 - Aggregates Shape and Surface Texture

Lecture 17 - Aggregate Properties - Part 1

Lecture 18 - Aggregate Properties - Part 2

Lecture 19 - Aggregate Properties - Part 3

Lecture 20 - Aggregate Properties - Part 4

Lecture 21 - Bitumen Basics

Lecture 22 - Chemistry of Bitumen

Lecture 23 - Physical Properties of Bitumen - Part 1

Lecture 24 - Physical Properties of Bitumen - Part 2

Lecture 25 - Physical Properties of Bitumen - Part 3

Lecture 26 - Introduction to Viscoelasticity

Lecture 27 - Rheological Properties of Bitumen - Part 1

Lecture 28 - Rheological Properties of Bitumen - Part 2

Lecture 29 - Grading of Bitumen - Part 1

Lecture 30 - Grading of Bitumen - Part 2

Lecture 31 - Modified Bitumen

Lecture 32 - Bitumen Emulsion

Lecture 33 - Production of Bituminous Mixtures

Lecture 34 - Role and Desirable Properties: Mix Design

Lecture 35 - Volumetrics in Mix Design - Part 1

Lecture 36 - Volumetrics in Mix Design - Part 2

Lecture 37 - Volumetrics in Mix Design - Part 3

Lecture 38 - Volumetrics in Mix Design - Part 4

Lecture 39 - Volumetrics in Mix Design - Part 5

Lecture 40 - Marshall and Superpave Mix Design - Part 1

Lecture 41 - Marshall and Superpave Mix Design - Part 2

Lecture 42 - Hot Recycled Mixtures - Part 1

Lecture 43 - Hot Recycled Mixtures - Part 2

Lecture 44 - Hot Recycled Mixtures - Part 3

Lecture 45 - Cold Bituminous Mixtures

Lecture 46 - Performance Based Mix Design Concepts

Lecture 47 - Characterization of Bituminous Mixtures - Part 1

Lecture 48 - Characterization of Bituminous Mixtures - Part 2

Lecture 49 - Cementitious Materials - Part 1

Lecture 50 - Cementitious Materials - Part 2

Lecture 51 - Types of Cement, Admixtures, Geopolymers - Part 1

Lecture 52 - Types of Cement, Admixtures, Geopolymers - Part 2

Lecture 53 - Mix Design of PQC - IRC 44

Lecture 54 - Mix Design of PQC - Examples - Part 1

Lecture 55 - Mix Design of PQC - Examples - Part 2

Lecture 56 - Mix Design of DLC - IRC SP 49

Lecture 57 - Mix Design of Pervious Concrete - Part 1

Lecture 58 - Mix Design of Pervious Concrete - Part 2

Lecture 59 - Overview of Alternate Pavement Materials - Part 1

Lecture 60 - Overview of Alternate Pavement Materials - Part 2

NPTEL : NOC:Geometric Design of Highways (Civil Engineering)

Co-ordinators : Prof. Rajat Rastogi

Lecture 1 - Introduction and Design Controls - 1

Lecture 2 - Design Controls - 2

Lecture 3 - Design Controls - 3

Lecture 4 - Design Controls - 4

Lecture 5 - Design Controls and Space Requirements

Lecture 6 - Space and Sight Distance Requirements - 1

Lecture 7 - Sight Distance Requirements - 2

Lecture 8 - Sight Distance Requirements - 3

Lecture 9 - Sight Distance Requirements - 4

Lecture 10 - Sight Distance Requirements - 5

Lecture 11 - Cross-Section Elements - 1

Lecture 12 - Cross-Section Elements - 2

Lecture 13 - Cross-Section Elements - 3

Lecture 14 - Cross-Section Elements - 4

Lecture 15 - Cross-Section Elements - 5

Lecture 16 - Cross-Section Elements - 6

Lecture 17 - Cross-Section Elements - 7

Lecture 18 - Cross-Section Elements - 8

Lecture 19 - Cross-Section Elements - 9

Lecture 20 - Crossing Facility and Road Furniture - 1

Lecture 21 - Road Furniture - 2

Lecture 22 - Road Furniture - 3

Lecture 23 - Road Furniture - 4

Lecture 24 - Road Furniture - 5

Lecture 25 - Road Furniture - 6

Lecture 26 - Road Furniture - 7

Lecture 27 - Alignment Design - 1

Lecture 28 - Alignment Design - 2

Lecture 29 - Alignment Design - 3

Lecture 30 - Alignment Design - 4

Lecture 31 - Alignment Design - 5

Lecture 32 - Alignment Design - 6

Lecture 33 - Alignment Design - 7

Lecture 34 - Alignment Design - 8

Lecture 35 - Alignment Design - 9

Lecture 36 - Alignment Design - 10

Lecture 37 - Alignment Design - 11

Lecture 38 - Alignment Design - 12

Lecture 39 - Alignment Design - 13

Lecture 40 - Alignment Design - 14

Lecture 41 - Alignment Design - 15

Lecture 42 - Alignment Design - 16

Lecture 43 - Intersection Layouts - 1

Lecture 44 - Intersection Layouts - 2

Lecture 45 - Intersection Layouts - 3

Lecture 46 - Intersection Layouts - 4

Lecture 47 - Intersection Layouts - 5

Lecture 48 - Intersection Layouts - 6

Lecture 49 - Intersection Layouts - 7

Lecture 50 - Intersection Layouts - 8

Lecture 51 - Intersection Layouts - 9

Lecture 52 - Intersection Layouts - 10

Lecture 53 - Design of Facilities - 1

Lecture 54 - Design of Facilities - 2

Lecture 55 - Design of Facilities - 3

Lecture 56 - Design of Facilities - 4

Lecture 57 - Design of Facilities - 5

Lecture 58 - Design of Facilities - 6

Lecture 59 - Design of Facilities - 7

Lecture 60 - Design of Facilities - 8

Lecture 61 - Design of Facilities - 9

Lecture 62 - Design of Facilities - 10

NPTEL : NOC:Plate Tectonics (Civil Engineering)

Co-ordinators : Prof. Pitambar Pati

Lecture 1 - Interior of Earth - I

Lecture 2 - Interior of Earth - II

Lecture 3 - Interior of Earth - III

Lecture 4 - Interior of Earth - IV

Lecture 5 - Interior of Earth - V

Lecture 6 - Interior of Earth - VI

Lecture 7 - Oceanic Crust - I

Lecture 8 - Oceanic Crust - II

Lecture 9 - Continental Crust - I

Lecture 10 - Continental Crust - II

Lecture 11 - Types of Plates and Plate Margins

Lecture 12 - Basic Assumption of Plate Tectonics

Lecture 13 - Relative Motion of Lithospheric Plates

Lecture 14 - Euler's Theory on Lithospheric Plate Motion

Lecture 15 - Constructive/Creative Plate Margin

Lecture 16 - Slow and Fast Spreading Ridges

Lecture 17 - Magma Chamber Properties at Mid-Oceanic Ridge

Lecture 18 - Age-Depth Relationship Around the Mid-Oceanic Ridge

Lecture 19 - Along Axis Segmentation of the Mid Oceanic Ridge

Lecture 20 - Propagating Rifts and Microplate Development

Lecture 21 - Conservative Plate Margin - I

Lecture 22 - Conservative Plate Margin - II, Continental Transform Faults

Lecture 23 - Conservative Plate Margin - III, Transform Continental Margins

Lecture 24 - Conservative Plate Margin - IV, Continental Transform Faults

Lecture 25 - Destructive Plate Margins - I

Lecture 26 - Destructive Plate Margins - II, The Oceanic Trench

Lecture 27 - Destructive Plate Margins - III, The Island Arc System

Lecture 28 - Destructive Plate Margins - IV, The Back Arc Basin and Accretionary Prism

Lecture 29 - Destructive Plate Margins - V, Seismicity in the Subduction Zone

Lecture 30 - Destructive Plate Margins - VI, Gravity Anomaly and Thermal Structure at Subduction Zone

Lecture 31 - Magmatism and Metamorphism at Different Plate Settings - I, Magmatism at Subduction Zone

Lecture 32 - Magmatism and Metamorphism at Different Plate Settings - II, Metamorphic at Subduction Zone

Lecture 33 - Orogeny and Epiorogeny - I, Ocean-Continent Collision

Lecture 34 - Orogeny and Epiorogeny - II, Continent-Continent Collision

Lecture 35 - Orogeny and Epiorogeny - III, Arc-Continent Collision

Lecture 36 - Fault Plane Solution

Lecture 37 - Plate Tectonics and Mineralisation - I

Lecture 38 - Plate Tectonics and Mineralisation - II

Lecture 39 - Plate Tectonics and Mineralisation at Divergent Margins - III

Lecture 40 - Plate Tectonics and Mineralisation at Divergent Margins - IV

Lecture 41 - Plate Tectonics and Mineralisation at Convergent Margins - V

Lecture 42 - Plate Tectonics and Mineralisation at Convergent Margins - VI

Lecture 43 - Plate Tectonics and Mineralisation at Convergent Margins - VII

Lecture 44 - Plate Tectonics and Mineralisation at Intraplate Tectono-Metallogenic System - VIII

Lecture 45 - Plate Tectonics and Hydrocarbon Exploration - I

Lecture 46 - Plate Tectonics and Hydrocarbon Exploration - II

Lecture 47 - Plate Tectonics and Climate Change

Lecture 48 - Stability of Triple Junction

Lecture 49 - Volcano

Lecture 50 - Volcano and its Products - I

Lecture 51 - Volcano and its Products - II

Lecture 52 - Himalayan Tectonics - I

Lecture 53 - Himalayan Tectonics - II

Lecture 54 - Indian Seismicity

Lecture 55 - Neotectonics - I

Lecture 56 - Neotectonics - II

Lecture 57 - Continental Drift - I

Lecture 58 - Continental Drift - II

Lecture 59 - Seafloor Spreading

Lecture 60 - Global Positioning System (GPS) and Plate

NPTEL : NOC:Earthquake Geotechnical Engineering (Civil Engineering)

Co-ordinators : Prof. B.K. Maheshwari

Lecture 1 - Introduction

Lecture 2 - Introduction (Continued...)

Lecture 3 - Engineering Seismology

Lecture 4 - Engineering Seismology (Continued...)

Lecture 5 - Strong Ground Motion

Lecture 6 - Strong Ground Motion (Continued...)

Lecture 7 - Seismic Hazard Analysis

Lecture 8 - Seismic Hazard Analysis (Continued...)

Lecture 9 - Wave Propagation

Lecture 10 - Wave Propagation (Continued...)

Lecture 11 - Stress Conditions

Lecture 12 - Field Tests

Lecture 13 - Field Tests (Continued...)

Lecture 14 - Field Tests (Continued...)

Lecture 15 - Laboratory Tests

Lecture 16 - Laboratory Tests (Continued...)

Lecture 17 - Laboratory Tests (Continued...)

Lecture 18 - Constitutive Relationships of Soils

Lecture 19 - Constitutive Relationships of Soils (Continued...)

Lecture 20 - Constitutive Relationships of Soils (Continued...)

Lecture 21 - One-Dimensional

Lecture 22 - One-Dimensional (Continued...)

Lecture 23 - One-Dimensional (Continued...)

Lecture 24 - Two Dimensional

Lecture 25 - Soil-Structure Interaction

Lecture 26 - Soil-Structure Interaction (Continued...)

Lecture 27 - Local Site Effects

Lecture 28 - Local Site Effects (Continued...)

Lecture 29 - Local Site Effects (Continued...)

Lecture 30 - Local Site Effects (Continued...)

Lecture 31 - Introduction

Lecture 32 - Liquefaction Susceptibility

Lecture 33 - Liquefaction Susceptibility (Continued...)

Lecture 34 - Initiation of Liquefaction

Lecture 35 - Initiation of Liquefaction (Continued...)

Lecture 36 - Initiation of Liquefaction (Continued...)

Lecture 37 - Initiation of Liquefaction (Continued...)

Lecture 38 - Initiation of Liquefaction (Continued...)

Lecture 39 - Initiation of Liquefaction (Continued...)

Lecture 40 - Effects of Liquefaction

Lecture 41 - Slope Stability Analysis

Lecture 42 - Slope Stability Analysis (Continued...)

Lecture 43 - Slope Stability Analysis (Continued...)

Lecture 44 - Slope Stability Analysis (Continued...)

Lecture 45 - Slope Stability Analysis (Continued...)

Lecture 46 - Introduction to Retaining Walls

Lecture 47 - Static Pressure on Retaining Walls

Lecture 48 - Static Pressure on Retaining Walls (Continued...)

Lecture 49 - Design of Retaining Walls

Lecture 50 - Design of Retaining Walls (Continued...)

Lecture 51 - Slope Stability and Retaining Walls: Design of Retaining Walls

Lecture 52 - Ground Improvement Techniques: Types of GIT

Lecture 53 - Ground Improvement Techniques: Types of GIT

Lecture 54 - Ground Improvement Techniques: Types of GIT

Lecture 55 - Ground Improvement Techniques: Geosynthetics

Lecture 56 - Ground Improvement Techniques: Geosynthetics

Lecture 57 - Ground Improvement Techniques: Vertical Drains

Lecture 58 - Ground Improvement Techniques: Vertical Drains

Lecture 59 - Ground Improvement Techniques: Reinforced Fibers

Lecture 60 - Ground Improvement Techniques: Verification and IS Code

NPTEL : Ground Improvement Techniques (Civil Engineering)

Co-ordinators : Dr. G.L. Sivakumar Babu

Lecture 1 - Need for Ground Improvement

Lecture 2 - Classification of ground modification techniques

Lecture 3 - Emerging trends in ground improvement

Lecture 4 - Mechanical modification

Lecture 5 - Compaction Control

Lecture 6 - Deep compaction

Lecture 7 - Dynamic compaction

Lecture 8 - Vibro-compaction methods

Lecture 9 - Case studies in stone columns

Lecture 10 - Prefabricated Vertical Drains (PVDS) - I

Lecture 11 - Prefabricated drains (PVDS) - II

Lecture 12 - Dewatering - I

Lecture 13 - Dewatering - II

Lecture 14 - Electro-kinetic stabilization

Lecture 15 - Heating and freezing methods, Blasting methods - I

Lecture 16 - Heating and freezing methods, Blasting methods - II

Lecture 17 - Ground Treatment with lime - I

Lecture 18 - Ground Treatment with lime - II

Lecture 19 - Ground treatment with cement

Lecture 20 - Grouting procedures

Lecture 21 - Grouting

Lecture 22 - Micropiles

Lecture 23 - Introduction to Geosynthetics - I

Lecture 24 - Introduction to Geosynthetics - II

Lecture 25 - Reinforced soil principles and mechanisms

Lecture 26 - Material properties

Lecture 27 - Factors affecting reinforced soil

Lecture 28 - Bearing capacity improvement - I

Lecture 29 - Bearing capacity improvement - II

Lecture 30 - Reinforced soil slopes

Lecture 31 - Reinforced Soil Walls

Lecture 32 - Reinforced Soil Walls - I

Lecture 33 - Soil Nailing

Lecture 34 - Design of embankments on soft soil using geosynthetics

Lecture 35 - Design of embankments on soft soil using geocells, Use of geosyntheticsfor filtration and drainage

Lecture 36 - Applications in filtration and drainage & erosion control

Lecture 37 - Geosynthetics in pavements

Lecture 38 - Sustainable development and energy geotechnology

Lecture 39 - Microbial geotechnology and Ground Improvement

Lecture 40 - Nano-technologies in ground improvement and site remediation

NPTEL : Stochastic Hydrology (Civil Engineering)

Co-ordinators : Prof. P.P. Mujumdar

Lecture 1 - Introduction

Lecture 2 - Bivariate Distributions

Lecture 3 - Independence ; Functions of Random Variables

Lecture 4 - Moments of a Distribution

Lecture 5 - Normal Distribution

Lecture 6 - Other Continuous Distributions

Lecture 7 - Parameter Estimation

Lecture 8 - Covariance and Correlation

Lecture 9 - Data Generation

Lecture 10 - Time Series Analysis (1)

Lecture 11 - Time Series Analysis (2)

Lecture 12 - Time Series Analysis (3)

Lecture 13 - Frequency Domain Analysis (1)

Lecture 14 - Frequency Domain Analysis (2) and ARIMA Models (1)

Lecture 15 - ARIMA Models (2)

Lecture 16 - ARIMA Models (3)

Lecture 17 - ARIMA Models (4)

Lecture 18 - Case Studies (1)

Lecture 19 - Case Studies (2)

Lecture 20 - Case Studies (3)

Lecture 21 - Case Studies (4)

Lecture 22 - Markov Chains (1)

Lecture 23 - Markov Chains (2)

Lecture 24 - Frequency Analysis (1)

Lecture 25 - Frequency Analysis (2)

Lecture 26 - Frequency Analysis (3) and Probability Plotting (1)

Lecture 27 - Probability Plotting (2)

Lecture 28 - Goodness of Fit

Lecture 29 - IDF Relationships

Lecture 30 - Multiple Linear Regression

Lecture 31 - Principal Component Analysis

Lecture 32 - Regression on Principal Components

Lecture 33 - Multivariate Stochastic Models (1)

Lecture 34 - Multivariate Stochastic Models (2)

Lecture 35 - Multivariate Stochastic Models (3)

Lecture 36 - Data Consistency Checks (1)

Lecture 37 - Data Consistency Checks (2)

Lecture 38 - Data Consistency Checks (3)

Lecture 39 - Recent Applications: Climate Change Impact Assessment

Lecture 40 - Summary of the Course

NPTEL : Stochastic Structural Dynamics (Civil Engineering)

Co-ordinators : Prof. C.S. Manohar

Lecture 1 - Definition of probability measure and conditional probability

Lecture 2 - Scalar random variables - 1

Lecture 3 - Scalar random variables - 2

Lecture 4 - Multi-dimensional random variables - 1

Lecture 5 - Multi-dimensional random variables - 2

Lecture 6 - Random processes - 1

Lecture 7 - Random processes - 2

Lecture 8 - Random processes - 3

Lecture 9 - Random processes - 4, Random vibrations of sdof systems - 1

Lecture 10 - Random processes - 4, Random vibrations of sdof systems - 1

Lecture 11 - Random vibrations of sdof systems - 2

Lecture 12 - Random vibrations of sdof systems - 3

Lecture 13 - Random vibrations of sdof systems - 4

Lecture 14 - Random vibrations of mdof systems - 1

Lecture 15 - Random vibrations of mdof systems - 2

Lecture 16 - Random vibrations of mdof systems - 3

Lecture 17 - Random vibrations of mdof systems - 4

Lecture 18 - Failure of randomly vibrating systems - 1

Lecture 19 - Failure of randomly vibrating systems - 2

Lecture 20 - Failure of randomly vibrating systems - 3

Lecture 21 - Failure of randomly vibrating systems - 4

Lecture 22 - Markov vector approach - 1

Lecture 23 - Markov vector approach - 2

Lecture 24 - Markov vector approach - 3

Lecture 25 - Markov vector approach - 4

Lecture 26 - Markov vector approach - 5, Monte Carlo simulation approach - 1

Lecture 27 - Markov vector approach - 5 & Monte Carlo simulation approach - 1

Lecture 28 - Monte Carlo simulation approach - 2

Lecture 29 - Monte Carlo simulation approach - 3

Lecture 30 - Monte Carlo simulation approach - 4

Lecture 31 - Monte Carlo simulation approach - 5

Lecture 32 - Monte Carlo simulation approach - 6

Lecture 33 - Monte Carlo simulation approach - 7

Lecture 34 - Probabilistic methods in earthquake engineering - 1

Lecture 35 - Probabilistic methods in earthquake engineering - 2

Lecture 36 - Probabilistic methods in earthquake engineering - 3

Lecture 37 - Probabilistic methods in earthquake engineering - 4

Lecture 38 - Fatigue failure & Vibration energy flow models

Lecture 39 - Problem solving session - 1

Lecture 40 - Problem solving session - 2

Lecture 41 - Problem solving session - 3

Lecture 42 - Problem solving session - 4

NPTEL : Water Resources Systems : Modeling Techniques and Analysis (Civil Engineering)

Co-ordinators : Prof. P.P. Mujumdar

Lecture 1 - Introduction

Lecture 2 - Definitions and types of systems

Lecture 3 - Optimization: Functions of a single variable

Lecture 4 - Optimization: Functions of multiple variables

Lecture 5 - Constrained optimization (1)

Lecture 6 - Constrained optimization (2)

Lecture 7 - Kuhn-Tucker conditions and Introduction to Linear Programming

Lecture 8 - Linear Programming: Graphical method

Lecture 9 - Linear Programming: Simplex method (1)

Lecture 10 - Linear Programming: Simplex method (2)

Lecture 11 - Linear Programming: Multiple solutions

Lecture 12 - Linear Programming: Unbounded and infeasible problems

Lecture 13 - Linear Programming: Dual problem

Lecture 14 - Introduction to Dynamic Programming

Lecture 15 - Dynamic Programming: Water allocation problem

Lecture 16 - Dynamic Programming: Reservoir operation problem

Lecture 17 - Dynamic Programming: Capacity expansion and shortest route problems

Lecture 18 - Simulation: Introduction to Multi-objective planning

Lecture 19 - Multi-objective planning

Lecture 20 - Reservoir sizing

Lecture 21 - Reservoir capacity using Linear Programming (1)

Lecture 22 - Reservoir capacity using Linear Programming (2)

Lecture 23 - Reservoir operation

Lecture 24 - Multi-reservoir systems

Lecture 25 - Stationary policy using Dynamic Programming

Lecture 26 - Hydropower generation

Lecture 27 - Basic probability theory (1)

Lecture 28 - Basic probability theory (2)

Lecture 29 - Chance constrained Linear Programming for reservoir operation and design (1)

Lecture 30 - Chance constrained Linear Programming for reservoir operation and design (2)

Lecture 31 - Stochastic Dynamic Programming for reservoir operation (1)

Lecture 32 - Stochastic Dynamic Programming for reservoir operation (2)

Lecture 33 - Stochastic Dynamic Programming for reservoir operation (3)

Lecture 34 - Fuzzy optimization (1)

Lecture 35 - Fuzzy optimization (2)

Lecture 36 - Fuzzy optimization for water quality control and reservoir operation

Lecture 37 - Conjunctive use of ground and surface water

Lecture 38 - Hydropower optimization

Lecture 39 - Crop yield optimization

Lecture 40 - Multi-basin and multi-reservoir systems

NPTEL : Finite Element method for vibration and Stability analyses (Civil Engineering)

Co-ordinators : Prof. C.S. Manohar

Lecture 1 - Equations of motion using HamiltonÂ’s principle

Lecture 2 - Equations of motion for continuous systems and RayleighÂ’s quotient

Lecture 3 - Rayleigh Ritz method and method of weighted residuals

Lecture 4 - FEM: motivations. Analysis of axially vibrating rods and Euler-Bernoulli beams

Lecture 5 - Beam elements. Reference systm. Assembly of matrices. Imposition of BCS. Final equation of motion

Lecture 6 - FE modelling of planar structures

Lecture 7 - FE modelling of planar structures (Continued...)

Lecture 8 - FRF-s and damping models-1

Lecture 9 - FRF-s and damping models-2

Lecture 10 - Material damping models. Dynamic stiffness and transfer matrices

Lecture 11 - Twisting of circular bars and rectangular bars. Analysis of grids

Lecture 12 - 3D frames

Lecture 13 - Mathematical preliminaries and terminologies; EulerÂ’s forward and backward difference methods

Lecture 14 - Forward and backward Euler method. Central difference method

Lecture 15 - Second order implicit methods

Lecture 16 - Energy conservation. Nonlinear systems

Lecture 17 - Model reduction schemes

Lecture 18 - Substructuring schemes

Lecture 19 - Plane stress models

Lecture 20 - Plane stress models (Continued...)

Lecture 21 - 3d Solid element

Lecture 22 - Axisymmetric models. Plate bending elements.

Lecture 23 - Plate bending elements (Continued...)

Lecture 24 - Plate bending elements (Continued...)

Lecture 25 - Plate bending elements (Continued...)

Lecture 26 - Introduction

Lecture 27 - Introduction (Continued...)

Lecture 28 - Nonlinear dynamical systems, fixed points and bifurcations

Lecture 29 - Energy methods in stability analysis

Lecture 30 - FEM for stability analysis. Euler-Bernoulli beam and general formulations

Lecture 31 - 3D beam element; plate element; imperfection sensitive structures; beams on elastic foundations; rings and arches

Lecture 32 - Dynamic analysis of stability and analysis of time varying systems

Lecture 33 - Dynamic analysis of stability and analysis of time varying systems

Lecture 34 - FE modelling of vehicle structure interactions

Lecture 35 - Inverse response sensitivity analysis

Lecture 36 - Inverse response sensitivity analysis (Continued...)

Lecture 37 - Introduction and review of continuum mechanics

Lecture 38 - Review of measures of strain and stress; balance laws

Lecture 39 - Total and updated Lagrangian formulations

Lecture 40 - Closure

NPTEL : NOC:Introduction to Engineering Seismology (Civil Engineering)

Co-ordinators : Dr. P. Anbazhagan

Lecture 1 - Introduction

Lecture 2 - Earthquake hazard: Mitigation and preparedness

Lecture 3 - Different Earthquake Hazards

Lecture 4 - Different Earthquake Hazards (Continued...)

Lecture 5 - Earthquake Terminologies

Lecture 6 - Plate Tectonics

Lecture 7 - Faults; Seismic Sources

Lecture 8 - Types of Earthquakes; Causes of Earthquakes

Lecture 9 - Introduction to Wave Propagation

Lecture 10 - Seismic Wave propagation;

Lecture 11 - Instrumentation to record Earthquake

Lecture 12 - Seismic Sensors

Lecture 13 - Seismic Instrumentation in India

Lecture 14 - Seismic Instrumentation in India (Continued...)

Lecture 15 - Intensity scales of Earthquake

Lecture 16 - Road Damage Intensity Scale; and Seismic Vulnerability assessment

Lecture 17 - Quantification of Earthquake (magnitude)

Lecture 18 - Energy released due to earthquakes

Lecture 19 - Interpretation of Earthquake records; Baseline correction

Lecture 20 - Interpretation of Earthquake records (Continued...); Time Domain Parameters

Lecture 21 - Time Domain Parameters (Continued...)

Lecture 22 - Duration parameters; Duration Prediction Equations

Lecture 23 - Frequency Domain Characteristics; Response Spectrum

Lecture 24 - Fourier Spectrum

Lecture 25 - Seismic Source Parameters;

Lecture 26 - Time history; response Spectra (design); Stochastic models

Lecture 27 - Ground Motion Simulation models

Lecture 28 - Prediction Relationships

Lecture 29 - Recapitulation - 1

Lecture 30 - Recapitulation - 2

Lecture 31 - Recapitulation - 3

Lecture 32 - Recapitulation - 4

Lecture 33 - Recapitulation - 5

Lecture 34 - Recapitulation - 6

Lecture 35 - Recapitulation - 7

Lecture 36 - Recapitulation - 8

Lecture 37 - Earthquake Prediction

Lecture 38 - Earthquake prediction (Continued...)

Lecture 39 - Seismic Gap

Lecture 40 - Earthquake Prediction (some Precautions)

Lecture 41 - Seismic zonation and microzonation

Lecture 42 - Seismic zonation and microzonation (Continued...)

Lecture 43 - Seismic microzonation of various Indian cities

Lecture 44 - Seismic microzonation of various Indian cities (Continued...)

Lecture 45 - Global Equation model

Lecture 46 - Global Earthquake risk map

Lecture 47 - Seismic Microzonation of Bangalore

Lecture 48 - Seismic Microzonation of Bangalore

Lecture 49 - Seismic zonation of India

Lecture 50 - IS 1893 version 2002 and 2016 explained

Lecture 51 - Zonation Map of India

Lecture 52 - Seismicity of India : Some Past Earthquakes reported in India - 1

Lecture 53 - Seismicity of India : Some Past Earthquakes reported in India - 2

Lecture 54 - SeismoTectonics of India - 1

Lecture 55 - SeismoTectonics of India - 2

Lecture 56 - SeismoTectonics of India - 3

Lecture 57 - Seismic Hazard Analysis - Introduction

Lecture 58 - SHA (Continued...) - Seismic Study area and Seismotectonic Map

Lecture 59 - SHA (Continued...) - Seismic Data Collection

Lecture 60 - SHA (Continued...) - Maximum Magnitude Estimation

Lecture 61 - SHA - Source and Source-Site Distance

Lecture 62 - SHA - Prediction Equation for India

Lecture 63 - SHA - Selection of GMPE

Lecture 64 - SHA - Estimation of Hazard