NPTEL : Advanced Chemical Reaction Engineering (PG) (Chemical Engineering)

Co-ordinators : Prof. H.S. Shankar

NPTEL : Advanced Process Control (Chemical Engineering)

Co-ordinators : Prof. Sachin C. Patwardhan

NPTEL : Chemical Reaction Engineering II (Chemical Engineering)

Co-ordinators : Prof. A.K. Suresh, Prof. Ganesh A. Viswanathan, Prof. Sanjay M. Mahajani

NPTEL : Advanced Numerical Analysis (Chemical Engineering)

Co-ordinators : Prof. Sachin C. Patwardhan

NPTEL : NOC:Introduction to Evolutionary Dynamics (Chemical Engineering)

Co-ordinators : Prof. Supreet Saini

NPTEL : NOC:Heat Transfer (Chemical Engineering)

Co-ordinators : Prof. Ganesh A. Viswanathan

NPTEL : NOC:Chemical Reaction Engineering-II (Chemical Engineering)

Co-ordinators : Prof. Ganesh Vishwanathan

Lecture 32 - Overall effectiveness factor - II

Lecture 33 - Identification of internal diffusion and reaction-limited regimes

Lecture 34 - Packed-bed reactor design

Lecture 35 - Generalized criterion for diffusion and reaction-limited conditions

Lecture 36 - Network of first order reactions

Lecture 37 - Use of experimental data

Lecture 38 - Packed-bed reactor design: External and Internal resistances

Lecture 39 - Fluidized bed reactor design - I

Lecture 40 - Fluidized bed reactor design - II

Lecture 41 - Fluidized bed reactor design - III

Lecture 42 - Fluidized bed reactor design - IV

Lecture 43 - Fluid-solid noncatalytic reactions - I

Lecture 44 - Fluid-solid noncatalytic reactions - II

Lecture 45 - Fluid-solid noncatalytic reactions - III

Lecture 46 - Fluid-solid noncatalytic reactions - IV

Lecture 47 - Fluid-solid noncatalytic reactions - V

Lecture 48 - Fluid-solid noncatalytic reactions - VI

Lecture 49 - Residence time distribution (RTD): Introduction

Lecture 50 - RTD: Non-ideal reactors

Lecture 51 - Measurement of RTD - I

Lecture 52 - Measurement of RTD - II

Lecture 53 - RTD function

Lecture 54 - Properties of RTD function

Lecture 55 - Reactor diagnostics and troubleshooting - I

Lecture 56 - Reactor diagnostics and troubleshooting - II

Lecture 57 - Modeling nonideal reactors - I

Lecture 58 - Modeling nonideal reactors - II

Lecture 59 - Non-ideal reactors: Zero parameter models - I

Lecture 60 - Non-ideal reactors: Zero parameter models - II

NPTEL : NOC:Chemical Process Control (Chemical Engineering)

Co-ordinators : Prof. Sujit Jogwar

NPTEL : NOC:Introduction to Interfacial Waves (Chemical Engineering)

Co-ordinators : Prof. Ratul Dasgupta

Lecture 1 - Introduction

Lecture 2 - Coupled, linear, spring-mass systems

Lecture 3 - Coupled, linear, spring-mass systems (Continued...)

Lecture 4 - Coupled, linear, spring-mass systems (Continued...)

Lecture 5 - Coupled, linear, spring-mass system: continuum limit

Lecture 6 - Normal modes of a string fixed at both ends

Lecture 7 - Vibrations of clamped membranes

Lecture 8 - Vibrations of clamped membranes (Continued...)

Lecture 9 - Introduction to Jacobian elliptic functions

Lecture 10 - The non-linear pendulum

Lecture 11 - The non-linear pendulum (Continued...)

Lecture 12 - Time period of the non-linear pendulum

Lecture 13 - Introduction to perturbation methods

Lecture 14 - Perturbation methods (Continued...)

Lecture 15 - Non-dimensionalisation

Lecture 16 - Perturbative solution to the projectile equation

Lecture 17 - Perturbative solution to the nonlinear pendulum

Lecture 18 - Lindstedt-Poincare technique

Lecture 19 - Method of multiple scales

Lecture 20 - Method of multiple scales (Continued...)

Lecture 21 - Multiple scale analysis for damped-harmonic oscillator

Lecture 22 - Duffing equation using multiple scales

Lecture 23 - Duffing equation (Continued...)

Lecture 24 - Kapitza pendulum

Lecture 25 - Introduction to Floquet theory

Lecture 26 - Floquet theorem (Continued...)

Lecture 27 - Floquet analysis of the Mathieu equation

Lecture 28 - Introduction to waves on an interface

Lecture 29 - Linearized wave equations in deep water

Lecture 30 - Linearized wave equations in deep water: dispersion relation

Lecture 31 - Linearised deep-water surface gravity waves (Continued...)

Lecture 32 - Standing and travelling waves in deep water

Lecture 33 - Cauchy-Poisson initial value problem for surface-gravity waves in deep water

Lecture 34 - Cauchy-Poisson problem (Continued...)

Lecture 35 - Cauchy-Poisson problem in cylindrical geometry

Lecture 36 - Cauchy-Poisson problem in cylindrical geometry (Continued...)

Lecture 37 - Group-velocity and the Cauchy-Poisson problem

Lecture 38 - Cauchy-Poisson problem for delta function initial condition

Lecture 39 - Cauchy-Poisson problem for delta function initial condition (Continued...)

Lecture 40 - Capillary-gravity waves

Lecture 41 - Waves on a pool of finite depth

Lecture 42 - Axisymmetric Cauchy-Poisson problem visualisation: the pebble in the deep pond problem

Lecture 43 - Rayleigh-Plateau capillary instability

Lecture 44 - Rayleigh-Plateau capillary instability (Continued...)

Lecture 45 - Rayleigh-Plateau capillary instability on thin film coating a rod

Lecture 46 - Rayleigh-Plateau capillary instability of a cylindrical air column in a liquid

Lecture 47 - Mechanism of the Rayleigh-Plateau instability

Lecture 48 - Shape oscillations of a spherical interface

Lecture 49 - Shape oscillations of a spherical interface (Continued...)

Lecture 50 - Shape oscillations of a spherical interface (Continued...)

Lecture 51 - Analysis of l=0 and l=1 modes for a spherical drop

Lecture 52 - Faraday waves on an interface - stability of time dependent base states

Lecture 53 - Mathieu equation for Faraday waves

Lecture 54 - Applications of Faraday waves - atomisation and spray formation

Lecture 55 - Waves and instability on density stratified shear flows - the KH model

Lecture 56 - Limits of KH dispersion relation: Rayleigh-Taylor instability

Lecture 57 - KH dispersion relation : model of wind wave generation

Lecture 58 - Helmholtz instability of a vortex sheet and summary

Lecture 59 - Derivation of the Stokes travelling wave

Lecture 60 - Derivation of the Stokes travelling wave (Continued...)

Lecture 61 - Derivation of the Stokes travelling wave (Continued...)

NPTEL : NOC:Hydrogen Energy: Production, Storage, Transportation and Safety (Chemical Engineering)

Co-ordinators : Prof. Pratibha Sharma

Lecture 1 - Properties of Hydrogen

Lecture 2 - Status of Hydrogen Supply and Demand

Lecture 3 - Methods of Hydrogen Production

Lecture 4 - Steam Methane Reforming - Part 1

Lecture 5 - Steam Methane Reforming - Part 2

Lecture 6 - Steam Reforming of Higher Hydrocarbons

Lecture 7 - Tutorial-1

Lecture 8 - Advanced Methods of Steam Reforming

Lecture 9 - Partial Oxidation Method for Hydrogen Production

Lecture 10 - Autothermal Reforming

Lecture 11 - Combined, Dry, Bi and Tri Reforming

Lecture 12 - Reforming using Alternate Energy Sources

Lecture 13 - Tutorial-2

Lecture 14 - Hydrogen Production by Methane Decomposition

Lecture 15 - Hydrogen Production from Biomass - Part 1

Lecture 16 - Hydrogen Production from Biomass - Part 2

Lecture 17 - Hydrogen Production from Biomass - Part 3

Lecture 18 - Hydrogen Production from Coal

Lecture 19 - Tutorial-3

Lecture 20 - Hydrogen Separation and Purification - Part 1

Lecture 21 - Hydrogen Separation and Purification - Part 2

Lecture 22 - Thermochemical Cycles for Hydrogen Production

Lecture 23 - Electrolysis of Water for Hydrogen Production

Lecture 24 - Fundamental of Electrolysis of Water

Lecture 25 - Electrolytic Cell Components and Electrolyzer stack

Lecture 26 - Different Types of ElectrolyzerTechnologies

Lecture 27 - Photoelectrochemical Hydrogen Production

Lecture 28 - Tutorial-4

Lecture 29 - Technical Comparison of Various Hydrogen Production Routes

Lecture 30 - Economics and Status of Various Hydrogen Production Routes

Lecture 31 - Introduction to Hydrogen Storage

Lecture 32 - Underground Hydrogen Storage

Lecture 33 - Fundamentals of Hydrogen Compression and Expansion

Lecture 34 - Thermodynamics of Hydrogen Compression - Part 1

Lecture 35 - Thermodynamics of Hydrogen Compression - Part 2

Lecture 36 - Reciprocating and Diaphragm compressors for Hydrogen Compression

Lecture 37 - Linear and Liquid Hydrogen Compressors

Lecture 38 - Cryogenic and Metal Hydride based Hydrogen Compressors

Lecture 39 - Electrochemical and Adsorption based Compressors

Lecture 40 - Compressed Hydrogen Tanks

Lecture 41 - Tutorial-5

Lecture 42 - Hydrogen Liquefaction

Lecture 43 - Liquid State Hydrogen Storage

Lecture 44 - Fundamentals of Adsorption based Materials for Hydrogen Storage

Lecture 45 - Adsorption based Solid State Hydrogen Storage Materials

Lecture 46 - Metal Hydrides for Solid State Hydrogen Storage - Part 1

Lecture 47 - Fundamentals of Metal hydrides for Solid State Hydrogen Storage - Part 1

Lecture 48 - Fundamentals of Metal Hydrides for Solid State Hydrogen Storage - Part 2

Lecture 49 - Different Types of Hydrides for Hydrogen Storage

Lecture 50 - Tailoring Metal Hydrides for Practical Applications: Nanostructure - Part 1

Lecture 51 - Tailoring Metal Hydrides for Practical Applications: Nanostructure - Part 2

Lecture 52 - MH System Design and Experimental Facilities on SolidState Hydrogen Storage

Lecture 53 - Tutorial-6 (MH systems design)

Lecture 54 - Novel Materials and Overall Storage

Lecture 55 - Overview of Storage Methods and Economics

Lecture 56 - Hydrogen Transportation via H2 Pipelines

Lecture 57 - Other Options for Long Distance Hydrogen Transmission

Lecture 58 - Hydrogen Transport via Road

Lecture 59 - Hydrogen Refuelling Stations

Lecture 60 - Use of Hydrogen in Internal Combustion Engines - Part 1

Lecture 61 - Use of Hydrogen in Internal Combustion Engines - Part 2

Lecture 62 - Use of Hydrogen in Fuel Cells

Lecture 63 - Hydrogen Sensing - Part 1

Lecture 64 - Hydrogen Sensing - Part 2

NPTEL : NOC:Modeling Stochastic Phenomena for Engineering Applications: Part-1 (Chemical Engineering)

Co-ordinators : Prof. Yelia Shankaranarayana Mayya

NPTEL : Heterogeneous Catalysis and Catalytic Processes (Chemical Engineering)

Co-ordinators : Dr. K.K. Pant

NPTEL : Interfacial Engineering (Chemical Engineering)

Co-ordinators : Prof. A.N. Bhaskarwar

Lecture 1 - General Introduction Definitions

Lecture 2 - General Introduction, Definitions, Surface Tension

Lecture 3 - Surface Tension Free Energies and Adsorption

Lecture 4 - Properties over Curved Surfaces

Lecture 5 - Total Surface Energy

Lecture 6 - Interfacial Tension Entropy, Cohesion, Adhesion

Lecture 7 - Cohesion, Adhesion and Spreading

Lecture 8 - Spreading from Liquids and Solids

Lecture 9 - Spreading, Interfacial Tensions, Surface Tensions

Lecture 10 - Spreading, Contact Angles Free Energies

Lecture 11 - Spreading/Contact Angles Rough Surfaces, Free Energies

Lecture 12 - Spreading/Contact Angles Work of Adhesion, De-wetting

Lecture 13 - Work of Adhesion, Surface and Interfacial Tensions

Lecture 14 - Surface and Interfacial Tensions: Drop Weight and Wilhelmy Plate Methods

Lecture 15 - Surface and Interfacial Tensions: Wilhelmy Plate, Pendant Drop and Maximum Bubble Pressure Methods

Lecture 16 - Wetting Balance Method Spreading Coefficient Work of Adhesion Sessile Drop Method, Positive S

Lecture 17 - Indirect and Direct Methods for Positive S, Adhesion Energies Interfacial Potentials

Lecture 18 - Surface and Interfacial Potentials Distribution and Contact Potentials

Lecture 19 - Diffusion Potential Surface and Interfacial Potentials Components of Contact Potential

Lecture 20 - Electrically Charged Monolayers Gouy Theory

Lecture 21 - Equations of State, Cohesion Repulsion, Limiting Area

Lecture 22 - Condensed and Liquid Expanded Monolayers Phase Transformations

Lecture 23 - Films of Polymers Molecular Weight, Surface Viscosity Drag, Canal Method

Lecture 24 - Canal Method Joly's Semi-Empirical Correction Rotational Torsional Surface Viscometer Compressional Moduli

Lecture 25 - Magnitudes of Surface Compressional Moduli Surface Waves and Ripples

Lecture 26 - Surface waves and Ripples, Velocity Effect of Surface Tension and Surface Compressional Modulus Rates of adsorption and absorption Damping

Lecture 27 - Surface waves and ripples,velocity effect of surface tension and surface compressional modulus damping for clean and contaminated,surfaces,fiber from monolayers

Lecture 28 - Shear Elastic Moduli,Yield Stress Fibres from MLs, Surface Reactions

Lecture 29 - Surface Reactions, Comparison with Bulk-Phase Reactions Steric Factors, Inhibition

Lecture 30 - Hydrolyses of Esters by Alkali Acid or Enzyme Photochemical Reactions in Monolayers Polymerization in MLs,

NPTEL : NOC:Fluid Mechanics and its Applications (Chemical Engineering)

Co-ordinators : Prof. Vijay Gupta

Lecture 1 (1)

Lecture 2 (1A)

Lecture 3 (2)

Lecture 4 (2A)

Lecture 5 (3)

Lecture 6 (3A)

Lecture 7 (4)

Lecture 8 (4A)

Lecture 9 (5)

Lecture 10 (5A)

Lecture 11 (6)

Lecture 12 (6A)

Lecture 13 (7)

Lecture 14 (7A)

Lecture 15 (8)

Lecture 16 (8A)

Lecture 17 (8B)

Lecture 18 (9)

Lecture 19 (9A)

Lecture 20 (10)

Lecture 21 (10A)

Lecture 22 (10B)

Lecture 23 (11)

Lecture 24 (12)

Lecture 25 (12A)

Lecture 26 (12B)

Lecture 27 (13)

Lecture 28 (13A)

Lecture 29 (14)

Lecture 30 (14A)

Lecture 31 (15)

Lecture 32 (15A)

Lecture 33 (16)

Lecture 34 (16A)

Lecture 35 (17)

Lecture 36 (17A)

Lecture 37 (18)

Lecture 38 (18A)

Lecture 39 (19)

Lecture 40 (19A)

Lecture 41 (20)

Lecture 42 (20A)

Lecture 43 (20B)

Lecture 44 (21)

Lecture 45 (21A)

Lecture 46 (22)

Lecture 47 (22A)

Lecture 48 (23)

Lecture 49 (23A)

Lecture 50 (24)

Lecture 51 (24A)

Lecture 52 (25)

Lecture 53 (25A)

Lecture 54 (26)

Lecture 55 (26A)

Lecture 56 (25)

Lecture 57 (27)

Lecture 58 (28)

Lecture 59 (28A)

Lecture 60 (29)

Lecture 61 (29A)

Lecture 62 (30)

Lecture 63 (30A)

Lecture 64 (31)

Lecture 65 (31A)

NPTEL : NOC:Computational Process Design (Chemical Engineering)

Co-ordinators : Prof. Manojkumar Ramteke, Prof. Hariprasad Kodamana

Lecture 1 - Flowsheet Synthesis - I

Lecture 2 - Flowsheet Synthesis - II

Lecture 3 - Mass Balance - I

Lecture 4 - Mass Balance - II

Lecture 5 - Mass and Energy Balance of Complete Flowsheet

Lecture 6 - Equipment Sizing and Costing

Lecture 7 - Economic Evaluation

Lecture 8 - Design of Batch Plants

Lecture 9 - Simulations for Process Flowsheet

Lecture 10 - Optimization Methods used for Designing

Lecture 11 - Heat Exchanger Network Design - 1

Lecture 12 - Heat Exchanger Network Design - 2

Lecture 13 - Geometric Methods for Reactor Network Synthesis

Lecture 14 - Optimization Methods for Process Design - 1

Lecture 15 - Optimization Methods for Process Design - 2

Lecture 16 - Quantifying Sustainability for Design

Lecture 17 - Process Network Analysis and Footprint Assessment

Lecture 18 - Energy, Exergy and Emergy

Lecture 19 - Ecosystems in Sustainability Assessment

NPTEL : Heat Transfer (Chemical Engineering)

Co-ordinators : Prof. A.K. Ghoshal

NPTEL : Mass Transfer Operations I (Chemical Engineering)

Co-ordinators : Dr. B. Mandal

Lecture 32 - Fractional Distillation: McCabe Thiele Method

Lecture 33 - Fractional Distillation: Minimum Reflux and Pinch Point

Lecture 34 - Fractional Distillation: Subcooled Reflux ,Tray Efficiency and Use of Open Steam

Lecture 35 - Fractional Distillation: Multiple Feeds and Side Stream

Lecture 36 - Multistage Batch Distillation with Reflux

Lecture 37 - Fractional Distillation: Ponchan and Savarit Method

Lecture 38 - Ponchan and Savarit Method and Packed Tower Distillation

Lecture 39 - Multicomponent Distillation

NPTEL : Process Design Decisions and Project Economics (Chemical Engineering)

Co-ordinators : Dr. Vijay S. Moholkar

NPTEL : NOC:Fluidization Engineering (Chemical Engineering)

Co-ordinators : Dr. S.K. Majumder

NPTEL : NOC:An Introduction to Cardiovascular Fluid Mechanics (Chemical Engineering)

Co-ordinators : Dr. Raghvendra Gupta

NPTEL : NOC:Multiphase Microfluidics (Chemical Engineering)

Co-ordinators : Dr. Raghvendra Gupta

Lecture 1 - An Introduction

Lecture 2 - Interface and Surface Tension

Lecture 3 - Flow Regimes 1

Lecture 4 - Flow Regimes 2

Lecture 5 - Taylor Flow 1

Lecture 6 - Taylor Flow 2

Lecture 7 - Computational Techniques

Lecture 8 - Bubble and Droplet Generation

Lecture 9 - Interface and Surface tension 2

Lecture 10 - Void Fraction and Pressure Drop

Lecture 11 - Liquid-Liquid Flow: Flow Regimes

Lecture 12 - Ideal annular Flow

Lecture 13 - Taylor Flow : Heat transfer 1

Lecture 14 - Taylor Flow : Heat transfer 2

Lecture 15 - Taylor Flow : Meat Transfer 1

Lecture 16 - Taylor Flow : Meat Transfer 2

Lecture 17 - Flow boiling in microchannels

Lecture 18 - Flow boiling in microchannels (Continued...)

Lecture 19 - Flow Measurement Techniques

Lecture 20 - Particle image Velocimetry

Lecture 21 - Inertial Microfluidics

Lecture 22 - Microfluidic applications

Lecture 23 - Microfluidic applications (Continued...)

Lecture 24 - Concluding Remarks

NPTEL : NOC:Measurement Technique in Multiphase Flows (Chemical Engineering)

Co-ordinators : Prof. Rajesh Kumar Upadhyay

NPTEL : NOC:Multiphase Flows (Chemical Engineering)

Co-ordinators : Prof. Rajesh Kumar Upadhyay

NPTEL : NOC:Introduction to Polymer Physics (IIT-G) (Chemical Engineering)

Co-ordinators : Prof. Amit Kumar

NPTEL : NOC:Natural Gas Engineering (Chemical Engineering)

Co-ordinators : Prof. Pankaj Tiwari

Lecture 1 - Introduction to Natural Gas - I

Lecture 2 - Introduction to Natural Gas - II

Lecture 3 - Introduction to Natural Gas - III

Lecture 4 - Wellbore Performance Relationship (WPR)

Lecture 5 - Choke Performance Relationship (CPR)

Lecture 6 - Nodal Analysis

Lecture 7 - Inflow Performance Relationship (IPR) - I

Lecture 8 - Inflow Performance Relationship (IPR) - II

Lecture 9 - Gas Well Testing

Lecture 10 - Wellbore Performance Relationship (WPR)

Lecture 11 - Choke Performance Relationship (CPR)

Lecture 12 - Nodal Analysis

Lecture 13 - Natural Gas Separation - I

Lecture 14 - Natural Gas Separation - II

Lecture 15 - Dehydration of Natural Gas

Lecture 16 - Sweeting of Natural Gas

Lecture 17 - Compressor Design

Lecture 18 - Measurement of Natural Gas

Lecture 19 - Transportation of Natural Gas - I

Lecture 20 - Transportation of Natural Gas - II

Lecture 21 - Unconventional production of Natural Gas

Lecture 22 - Review: Concluding Remarks

NPTEL : NOC:Chemical Engineering Thermodynamics (Chemical Engineering)

Co-ordinators : Prof. Sasidhar Gumma

NPTEL : NOC:Mass Transfer Operations-I (Chemical Engineering)

Co-ordinators : Dr. B. Mandal

NPTEL : NOC:Transport Phenomena of Non-Newtonian Fluids (Chemical Engineering)

Co-ordinators : Prof. N. Kishore

NPTEL : NOC:Fluid Flow Operations (Chemical Engineering)

Co-ordinators : Dr. S.K. Majumder

Lecture 1 - Introduction

Lecture 2 - Characteristics of fluid (Continued...)

Lecture 3 - Fluid Statics

Lecture 4 - Fluid Statics (Continued...)

Lecture 5 - Fundamentals of flow - Part 1

Lecture 6 - Fundamentals of flow - Part 2

Lecture 7 - One dimensional flow - Part 1

Lecture 8 - One dimensional flow - Part 2

Lecture 9 - One dimensional flow - Part 3

Lecture 10 - Flow of Viscous fluid - Introduction

Lecture 11 - Velocity distribution in laminar flow

Lecture 12 - Velocity distribution in turbulent flow

Lecture 13 - Boundary layer theory

Lecture 14 - Theory of lubrication

Lecture 15 - Frictional resistance

Lecture 16 - Losses in gematric change

Lecture 17 - Losses in geometric change (Continued...)

Lecture 18 - Flow Velocity and Optimum Shape

Lecture 19 - Equation of Energy and Discharge of Water Channel

Lecture 20 - Drag

Lecture 21 - Lift and Cavitation

Lecture 22 - Dimensional Analysis

Lecture 23 - Dimensional Analysis: BuckinghamÃ¢â‚¬â„¢s PI Theorem

Lecture 24 - Law of Similarity and Significant Dimensionless Number

Lecture 25 - Compressible Flow - Part 1

Lecture 26 - Compressible Flow - Part 2

Lecture 27 - Measurement of Flow - Part 1

Lecture 28 - Measurement of Flow - Part 2

Lecture 29 - Measurement of Flow - Part 3

Lecture 30 - Introduction to multiphase flow

Lecture 31 - Hydrodynamics in multiphase flow

NPTEL : NOC:Chemical Process Intensification (Chemical Engineering)

Co-ordinators : Dr. S.K. Majumder

Lecture 1 - History, Philosophy and Concept

Lecture 2 - Principle Features

Lecture 3 - Strategies and domain based techniques

Lecture 4 - Intensification by fluid flow process

Lecture 5 - Mechanism of Intensification by mixing

Lecture 6 - Intensification in Reactive system

Lecture 7 - Problems leading to sustainable development

Lecture 8 - Concept, Issues and Challenges

Lecture 9 - Strategies in process design

Lecture 10 - Scales and stages of process intensification

Lecture 11 - Methods and Tools for Achieving sustainable design

Lecture 12 - Multi-level Computer aided tools

Lecture 13 - Introduction on Stochastic Optimization

Lecture 14 - Optimization Algorithms

Lecture 15 - Applications of Optimization Algorithms

Lecture 16 - Introduction and Mechanism of Cavitation-based PI

Lecture 17 - Cavitational Reactor Configurations and activity

Lecture 18 - Parametric effects on cavitation

Lecture 19 - Introduction of monolith reactor

Lecture 20 - Preparation of monolithic catalyst

Lecture 21 - Application of monolithic catalyst

Lecture 22 - Hydrodynamics, transport of monolithic reactor

Lecture 23 - Overview of interfacial area based processes

Lecture 24 - Ejector induced downflow system for PI

Lecture 25 - Hydrodynamics and transport in downflow system

Lecture 26 - Introduction and Principles

Lecture 27 - Types of Intensified Distillation Units

Lecture 28 - Design of membrane-assisted distillation

Lecture 29 - Introduction and Principles

Lecture 30 - Supercritical extraction for process intensification

Lecture 31 - Introduction to membrane and its principles

NPTEL : NOC:Chemical Reaction Engineering-I (Chemical Engineering)

Co-ordinators : Dr. B. Mandal

NPTEL : NOC:Mass Transfer Operations-II (Chemical Engineering)

Co-ordinators : Dr. Chandan Das

Lecture 32 - Concluding remarks - Part 2

NPTEL : NOC:Mechanical Unit Operations (Chemical Engineering)

Co-ordinators : Prof. Nanda Kishore

Lecture 32 - Gravity Sedimentation - Design of Thickeners - 1

Lecture 33 - Gravity Sedimentation - Design of Thickeners - 2

Lecture 34 - Centrifugal Separations - 1

Lecture 35 - Centrifugal Separations - 2

Lecture 36 - Floatation - 1

Lecture 37 - Floatation - 2

NPTEL : NOC:Advanced Thermodynamics (Chemical Engineering)

Co-ordinators : Prof. Nanda Kishore

NPTEL : NOC:Membrane Technology (Chemical Engineering)

Co-ordinators : Prof. Kaustubha Mohanty

Lecture 1 - Separation Processes, Historical Development, Definition and Types of Membranes

Lecture 2 - Membrane Processes and Classifications, Advantages, Disadvantages, Applications

Lecture 3 - Polymer Basics, Polymers used in Membrane Preparation and their Properties

Lecture 4 - Inorganic Materials for Membrane Preparation, their Advantages and Disadvantages

Lecture 5 - Membrane Modules and Selection, Flow Types

Lecture 6 - Preparation of Synthetic Membrane, Phase Inversion Membranes

Lecture 7 - Composite membranes: Interfacial polymerization, dip-coating, plasma polymerization

Lecture 8 - Inorganic membranes: Sol-Gel process, ceramic membrane preparation, membrane modification

Lecture 9 - Porous and non-porous membranes, characterization of porous membranes and MF membrane

Lecture 10 - MF membrane characterization: Bubble point,Mercury intrusion, Permeability method

Lecture 11 - UF membrane characterization: Gas adsorption-desorption, Thermoporometry, MWCO method

Lecture 12 - Passive transport, active transport, description of transport process

Lecture 13 - Transport through porous membrane and nonporus membrane

Lecture 14 - Concept of osmosis and reverse osmosis, thermodynamic analysis

Lecture 15 - Revision of concepts and fundaments

Lecture 16 - HP and LP RO, membrane materials, modules, models for RO transport

Lecture 17 - Advantages of RO, fouling, RO applications, Pressure retarded osmosis

Lecture 18 - Nanofiltration basics, transport mechanism, fouling model and applications

Lecture 19 - Basic principles of UF, membranes and modules, UF configurations

Lecture 20 - Models for UF transport, mass transfer coefficient, membrane rejection and sieving coefficient

Lecture 21 - Factors affecting UF performance, fouling and permeate flux enhancement, UF applications1

Lecture 22 - Micellar-enhanced UF, affinity UF, UF based bioseparation

Lecture 23 - Basic principles, advantages of MF, cross-flow and dead-end MF, membranes and modules

Lecture 24 - Models for MF transport, plugging and throughput, fouling in MF, MF applications

Lecture 25 - Problems and solutions based on RO and MF

Lecture 26 - Problems and solutions based on UF

Lecture 27 - Dialysis, membranes and modules, mass transport in dialysis, diffusion analysis, applications

Lecture 28 - Ion-exchange membranes, ED process, energy requirement, applications, reverse ED

Lecture 29 - PV principle, advantages, mass transfer and applications, hybrid distillation/PV

Lecture 30 - Problems and solutions based on ED and PV

Lecture 31 - Concept, types of LM, mechanism of mass transfer in LM, choice of solvent and carrier, applications

Lecture 32 - Basic principle of gas separation, transport mechanism, factors affecting gas separation, applications

Lecture 33 - Basic principle of MD, mechanism, process parameters, membranes, applications

Lecture 34 - Mechanism, coupled transport, carrier agent, active and passive transport, applications

Lecture 35 - Gas-liquid and liquid-liquid contactors, membrane reactors and bioreactors, PEM hydrogen fuel cell

Lecture 36 - Perstraction, membrane chromatography and controlled drug delivery

NPTEL : NOC:Computer Aided Applied Single Objective Optimization (Chemical Engineering)

Co-ordinators : Prof. Prakash Kotecha

NPTEL : NOC:Basic Principles and Calculations in Chemical Engineering (Chemical Engineering)

Co-ordinators : Prof. Subrata Kumar Majumdar

NPTEL : NOC:Renewable Energy Engineering: Solar, Wind and Biomass Energy Systems (Chemical Engineering)

Co-ordinators : Prof. R. Anandalakshmi, Prof. Vaibhav Vasant Goud

NPTEL : NOC:Biomass Conversion and Biorefinery (Chemical Engineering)

Co-ordinators : Prof. Kaustubha Mohanty

Lecture 1 - Energy and Environment scenario

Lecture 2 - Need for biomass based industries

Lecture 3 - Biomass basics

Lecture 4 - Dedicated energy crops

Lecture 5 - Oil cropns and microalgae

Lecture 6 - Enhancing biomass properties

Lecture 7 - Basic concepts and types

Lecture 8 - Feedstocks and properties

Lecture 9 - Economics and LCA

Lecture 10 - Barriers and Types

Lecture 11 - Dilute acid, alkali, ozone

Lecture 12 - Hybrid methods

Lecture 13 - Physical Processes

Lecture 14 - Gasification and Pyrolysis

Lecture 15 - Products and Commercial Success Stories

Lecture 16 - Types, fundamentals, equipments, applications

Lecture 17 - Details of various processes

Lecture 18 - Products and Commercial Success Stories

Lecture 19 - Diesel from vegetable oils, microalgae and syngas

Lecture 20 - Transesterification; FT process, catalysts

Lecture 21 - Biodiesel purification, fuel properties

Lecture 22 - Biooil and biochar production, reactors

Lecture 23 - Factors affecting biooil, biochar production, fuel properties characterization

Lecture 24 - Biooil upgradation technologies

Lecture 25 - Microorganisms, current industrial ethanol production technology

Lecture 26 - Cellulase production, SSF and CBP

Lecture 27 - ABE fermentation pathway and kinetics, product recovery technologies

Lecture 28 - Biohydrogen production, metabolics, microorganisms

Lecture 29 - Biogas technology, fermenter designs, biogas purification

Lecture 30 - Methanol production and utilization

Lecture 31 - Biomass as feedstock for synthetic organic chemicals, lactic acid, polylactic acid

Lecture 32 - Succinic acid, propionic acid, acetic acid, butyric acid

Lecture 33 - 1,3-propanediol, 2,3-butanedioil, PHA

Lecture 34 - Concept, lignocellulosic biorefinery

Lecture 35 - Aquaculture and algal biorefinery, waste biorefinery

Lecture 36 - Techno-economic evaluation

Lecture 37 - Life-cycle assessment

NPTEL : NOC:Aspen PlusÂ® Simulation Software - A basic course for beginners (Chemical Engineering)

Co-ordinators : Prof. Prabirkumar Saha

NPTEL : NOC:Physical and Electrochemical Characterizations in Chemical Engineering (Chemical Engineering)

Co-ordinators : Prof. Tamal Banerjee

Lecture 1 - Introduction of Characterization Techniques - Part 1

Lecture 2 - Introduction to Characterization Techniques - Part 2

Lecture 3 - Infrared Spectroscopy: Fundamentals

Lecture 4 - Infrared Spectroscopy: IR Bands and Applications

Lecture 5 - Infrared Spectrophotometer Instrumentation

Lecture 6 - Raman Spectroscopy

Lecture 7 - NMR: Concepts and Fundamentalsâ€‹

Lecture 8 - Chemical Shifts

Lecture 9 - Factors Affecting Chemical Shift and 2D NMRâ€‹

Lecture 10 - Physisorption: Surface Area and Pore Analysis

Lecture 11 - Physisorption Measurements

Lecture 12 - Chemisorption

Lecture 13 - Surface Tension and its Measurement - Part 1

Lecture 14 - Surface Tension and its Measurement - Part 2

Lecture 15 - Interfacial Tension and its Application

Lecture 16 - Interfacial Tension and Influence of Surface Curvatureâ€‹

Lecture 17 - Rheology: Fundamentals and Principlesâ€‹

Lecture 18 - Complex Fluids and their Propertiesâ€‹

Lecture 19 - Rheology: Case Study on Hydrogel Synthesis

Lecture 20 - Electron Spectroscopy for Surface Analysisâ€‹

Lecture 21 - Quantification in XRF and XPS Spectroscopyâ€‹

Lecture 22 - XPS Instrument and Applicationâ€‹

Lecture 23 - Introduction to Electrochemical Characterization Techniquesâ€‹

Lecture 24 - Electrode Potential, Kinetics and Mass Transfer Resistanceâ€‹

Lecture 25 - Voltammetry and Galvanostatic Charge-Dischargeâ€‹

NPTEL : NOC:Chemical Process Technology (Chemical Engineering)

Co-ordinators : Prof. Tamal Banerjee

Lecture 1 - Important Steps for Process Development

Lecture 2 - Structure of Chemical Industry

Lecture 3 - Safety and Loss Prevention

Lecture 4 - Sulfuric Acid: Reactions and Thermodynamics

Lecture 5 - SO2 Conversion Reactor and Sulfuric Acid Production Process

Lecture 6 - Sulfur Production: Claus Process

Lecture 7 - Synthesis Gas Production

Lecture 8 - Coal Gasification

Lecture 9 - Coal Gasifiers

Lecture 10 - Gasification Technology and Applications

Lecture 11 - Thermodynamics of Ammonia Synthesis

Lecture 12 - Integrated Ammonia Plant and Hydrogen Recovery - I

Lecture 13 - Integrated Ammonia Plant and Hydrogen Recovery - II

Lecture 14 - Urea Production

Lecture 15 - Nitric acid: Reactions and Thermodynamics

Lecture 16 - Production of Phosphoric Acid: Dihydrate Process

Lecture 17 - Production of Phosphoric Acid: Hemihydrate Process

Lecture 18 - Emission Abatement in Phosphoric Acid Plants

Lecture 19 - Chlorine Production

Lecture 20 - Soda Ash Process

Lecture 21 - Heterogeneous Catalysis

Lecture 22 - Catalysis with Zeolites and production of Iso-butene

Lecture 23 - Production of Ethylbenzene

Lecture 24 - Periodic Flow Reversal and Production of Styrene

Lecture 25 - Selective Oxidation Processes and Ethene Production

Lecture 26 - Monolith Reactors for Automotive Emission

Lecture 27 - Methanol Production

Lecture 28 - Methanol and Formaldehyde Production

Lecture 29 - Fischer-Tropsch Synthesis

Lecture 30 - Fischer Tropsch Process: SASOL and SDMS

Lecture 31 - Methanol to Gasoline: Haldor Topsoe and TIGAS

NPTEL : NOC:Inorganic Chemical Technology (Chemical Engineering)

Co-ordinators : Prof. Nanda Kishore

NPTEL : NOC:Organic Chemical Technology (Chemical Engineering)

Co-ordinators : Prof. Nanda Kishore

Lecture 1 - Introduction to Organic Chemical Technology

Lecture 2 - Basic Unit Processes and Unit Operations of OCT

Lecture 3 - Introduction to Chemical Plant Design

Lecture 4 - Edible and Essential Oils

Lecture 5 - Vegetable Oils and Processing

Lecture 6 - Processing of Oils and Waxes

Lecture 7 - Soaps and Glycerine Manufacture

Lecture 8 - Detergents Manufacture

Lecture 9 - Carbohydrates Industry - Sugar

Lecture 10 - Carbohydrates Industry - Refined Sugar

Lecture 11 - Carbohydrates Industry - Beet Sugar and Starch

Lecture 12 - Fermentation Industry

Lecture 13 - Fermentation Industry â€“ Ethanol

Lecture 14 - Fermentation Industry â€“ Citric Acid and Penicillin

Lecture 15 - Pulp and Paper Industry

Lecture 16 - Pulp and Paper Industry - 2

Lecture 17 - Pulp and Paper Industry - 3

Lecture 18 - Petroleum Industry

Lecture 19 - Petroleum Refinery Products, Characteristics and Processes

Lecture 20 - Petroleum Refinery Processes

Lecture 21 - Petroleum Refinery Processes - 2

Lecture 22 - Chemicals from C1 Compounds: Methanol and Formaldehyde

Lecture 23 - Chemicals from C1 and C2 Compounds

Lecture 24 - Chemicals from C2 Compounds

Lecture 25 - Chemicals from C2 Compounds - 2

Lecture 26 - Chemicals from C3 Compounds

Lecture 27 - Chemicals from C3 Compounds - 2

Lecture 28 - Chemicals from C4 Compounds

Lecture 29 - Chemicals from Aromatic Compounds

Lecture 30 - Chemicals from Aromatic Compounds - Phenol

Lecture 31 - Chemicals from Aromatic Compounds - 3

NPTEL : NOC:Solid-Fluid Operations (Chemical Engineering)

Co-ordinators : Prof. Subrata Kumar Majumder

Lecture 1 - Introduction to Solid-Fluid Operations

Lecture 2 - Characteristics of Single particle

Lecture 3 - Particle size and Its distribution in mixture

Lecture 4 - Mechanism of Size Reduction

Lecture 5 - General Machines for Size Reduction

Lecture 6 - Laws of Energy for Size Reduction

Lecture 7 - Introduction on Size Enlargement

Lecture 8 - Mechanism of Size Enlargement

Lecture 9 - Equipment for Size Enlargement

Lecture 10 - Flow Past a Cylinder and Spherical Particle

Lecture 11 - Terminal velocity of single particle

Lecture 12 - Multiple particle Interaction/Sedimentation: Hindered settling velocity

Lecture 13 - Basic law and terminology of flow through granular bed

Lecture 14 - General expressions for flow through packed beds-Ergun Equation

Lecture 15 - Two-phase flow through packed bed

Lecture 16 - Mixing of Solids: Introduction

Lecture 17 - Degree of mixing and Its Assessment

Lecture 18 - Mixing and agitation of fluids/slurries

Lecture 19 - Basic understandings and applications of fluidization

Lecture 20 - Minimum Fluidization Velocity

Lecture 21 - Basic understanding of froth flotation

Lecture 22 - Separation of particles by Screening

Lecture 23 - Particulate Matter Separation by Gravity Settling Chamber

Lecture 24 - Particle Separation by Cyclone and Centrifuge

Lecture 25 - Particle Separation by Electrostatic Precipitator

Lecture 26 - Separation by Industrial Fabric (Bag) Filters

Lecture 27 - Wet Scrubber for Particle Removal

Lecture 28 - Filtration

Lecture 29 - Dead-End and Continuous Filtration

Lecture 30 - Reverse Osmosis

Lecture 31 - Introduction to Nanoparticles

NPTEL : NOC:Energy Conversion Technologies (Biomass and Coal) (Chemical Engineering)

Co-ordinators : Prof. Vaibhav V. Goud

NPTEL : NOC:Petroleum Reservoir Engineering (Chemical Engineering)

Co-ordinators : Dr. Pankaj Tiwari

Lecture 1 - Introduction to Petroleum Reservoir Engineering

Lecture 2 - Petroleum Reserves

Lecture 3 - Petroleum Geology

Lecture 4 - Well Drilling Methods

Lecture 5 - Thermodynamics of Hydrocarbons

Lecture 6 - Natural Gas Properties

Lecture 7 - Properties of Crude Oil

Lecture 8 - Reservoir Rock Properties

Lecture 9 - Relative Permeability

Lecture 10 - Primary Drive Mechanisms

Lecture 11 - General Material (Volumetric) Balance

Lecture 12 - Volumetric Balance in Oil and Gas Reservoir

Lecture 13 - Fundamentals of Reservoir Fluid Flow

Lecture 14 - General Equations for radial Flow in Reservoir

Lecture 15 - Inflow Performance Relationship for Reservoir Fluids

Lecture 16 - Well Testing and Performance - I

Lecture 17 - Well Testing and Performance - II

Lecture 18 - Secondary Oil Recovery Methods

Lecture 19 - Enhanced Oil Recovery Methods

Lecture 20 - Introduction to Reservoir Simulation

Lecture 21 - Unconventional Natural Gas Production

NPTEL : NOC:Applied Statistical Thermodynamics (Chemical Engineering)

Co-ordinators : Prof. Tamal Banerjee

NPTEL : Fluid Mechanics (Chemical Engineering)

Co-ordinators : Dr. V. Shankar

NPTEL : Mass Transfer II (Chemical Engineering)

Co-ordinators : Prof. Nishith Verma

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

NPTEL : Plantwide Control of Chemical Processes (Chemical Engineering)

Co-ordinators : Dr. Nitin Kaistha

NPTEL : NOC:Thermodynamics Of Fluid Phase Equilibria (Chemical Engineering)

Co-ordinators : Dr. Jayant K. Singh

NPTEL : NOC:Chemical Engineering Thermodynamics (2019) (Chemical Engineering)

Co-ordinators : Dr. Jayant K. Singh

NPTEL : Biochemical Engineering (Chemical Engineering)

Co-ordinators : Dr. Saikat Chakraborty, Dr. Rintu Banerjee

NPTEL : Microscale Transport Processes (Chemical Engineering)

Co-ordinators : Dr. Somnath Ganguly, Prof. S. Dasgupta

Lecture 1 - Introduction

Lecture 2 - Introduction (Continued...)

Lecture 3 - Lab on Chip

Lecture 4 - Lab on Chip (Continued...)

Lecture 5 - Microscale manufacturing practices

Lecture 6 - Photolithography

Lecture 7 - Photolithography (Continued...)

Lecture 8 - Deposition

Lecture 9 - Plastic microfluidic devices

Lecture 10 - Mixing

Lecture 11 - Micro Heat Pipes

Lecture 12 - Mixing (Continued...)

Lecture 13 - Mixing (Continued...)

Lecture 14 - Micro Heat Pipes (Continued...)

Lecture 15 - Mixing (Continued...)

Lecture 16 - Dispersion

Lecture 17 - Dispersion (Continued...)

Lecture 18 - Dispersion (Continued...)

Lecture 19 - Electrowetting

Lecture 20 - Electro osmosis

Lecture 21 - Electrowetting (Continued...)

Lecture 22 - Electro osmosis (Continued...)

Lecture 23 - Dielectrophoresis

Lecture 24 - Dielectrophoresis (Continued...)

Lecture 25 - Dielectrophoresis (Continued...)

Lecture 26 - Scaling dimension and issues

Lecture 27 - Slip flow

Lecture 28 - Microstructured reactor

Lecture 29 - Immiscible flow in microchannel

Lecture 30 - Immiscible flow in microchannel (Continued...)

Lecture 31 - Immiscible flow in microchannel (Continued...)

NPTEL : Multiphase Flow (Chemical Engineering)

Co-ordinators : Prof. P.K. Das, Prof. Gargi Das

NPTEL : Novel Separation Processes (Chemical Engineering)

Co-ordinators : Prof. S. De

Lecture 1 - Fundamentals of Separation Processes

Lecture 2 - Identification of Novel Separation Processes

Lecture 3 - Membrane Separation Processes

Lecture 4 - Membrane Separation Processes (Continued...1)

Lecture 5 - Membrane Separation Processes (Continued...2)

Lecture 6 - Membrane Separation Processes (Continued...3)

Lecture 7 - Membrane Separation Processes (Continued...4)

Lecture 8 - Membrane Separation Processes (Continued...5)

Lecture 9 - Membrane Separation Processes (Continued...6)

Lecture 10 - Membrane Separation Processes (Continued...7)

Lecture 11 - Membrane Separation Processes (Continued...8)

Lecture 12 - Membrane Separation Processes (Continued...9)

Lecture 13 - Membrane Separation Processes (Continued...10)

Lecture 14 - Membrane Separation Processes (Continued...11)

Lecture 15 - Membrane Separation Processes (Continued...12)

Lecture 16 - Membrane Separation Processes (Continued...13)

Lecture 17 - Membrane Separation Processes (Continued...14)

Lecture 18 - Membrane Separation Processes (Continued...15)

Lecture 19 - Membrane Separation Processes (Continued...16)

Lecture 20 - Membrane Separation Processes (Continued...17)

Lecture 21 - Membrane Separation Processes (Continued...18)

Lecture 22 - External Field Induced Membrane Separation Processes

Lecture 23 - External Field Induced Membrane Separation Processes (Continued...1)

Lecture 24 - External Field Induced Membrane Separation Processes (Continued...2)

Lecture 25 - External Field Induced Membrane Separation Processes (Continued...3)

Lecture 26 - External Field Induced Membrane Separation Processes (Continued...4)

Lecture 27 - Gas Separation

Lecture 28 - Gas Separation (Continued...)

Lecture 29 - Surfactant Based Separation Processes

Lecture 30 - Surfactant Based Separation Processes (Continued...)

Lecture 31 - Micellar Enhanced Ultrafiltration

NPTEL : Process Control and Instrumentation (Chemical Engineering)

Co-ordinators : Dr. D. Sarkar, Dr. A.K. Jana

NPTEL : Instability and Patterning of Thin Polymer Films (Chemical Engineering)

Co-ordinators : Dr. R. Mukherjee

NPTEL : Advanced Mathematical Techniques in Chemical Engineering (Chemical Engineering)

Co-ordinators : Prof. S. De

NPTEL : NOC:Introduction to Process Modeling in Membrane Separation Process (Chemical Engineering)

Co-ordinators : Prof. S. De

NPTEL : NOC:Soft Nano Technology (Chemical Engineering)

Co-ordinators : Dr. R. Mukherjee

Lecture 32 - VdW Interaction Between Two Surfaces

Lecture 33 - Interaction Between Two Surfaces - 2

Lecture 34 - Interaction Between Two Surfaces - 3

Lecture 35 - Dewetting - 3

Lecture 36 - Pattern Directed Dewetting - I

Lecture 37 - Pattern Directed Dewetting - II

Lecture 38 - Spin Dewetting

Lecture 39 - Elastic Contact Instability - I

Lecture 40 - Elastic Contact Instability - II

NPTEL : NOC:Adiabatic Two-Phase Flow & Flow Boiling in Microchannel (Chemical Engineering)

Co-ordinators : Prof. Gargi Das

NPTEL : NOC:Phase Equilibrium Thermodynamics (Chemical Engineering)

Co-ordinators : Prof. Gargi Das

Lecture 65 - Miscellaneous concepts on Reaction Equilibrium

NPTEL : NOC:Transport Phenomena (Chemical Engineering)

Co-ordinators : Prof. Sunando Dasgupta

NPTEL : NOC:Chemical Process Instrumentation (Chemical Engineering)

Co-ordinators : Prof. Debasis Sarkar

Lecture 1 - General Principles and Representation of Instruments

Lecture 2 - General Principles and Representation of Instruments (Continued...)

Lecture 3 - General Principles and Representation of Instruments (Continued...)

Lecture 4 - General Principles and Representation of Instruments (Continued...)

Lecture 5 - General Principles and Representation of Instruments (Continued...)

Lecture 6 - Performance Characteristics of Instruments and Data Analysis - I

Lecture 7 - Performance Characteristics of Instruments and Data Analysis - I (Continued...)

Lecture 8 - Performance Characteristics of Instruments and Data Analysis - I (Continued...)

Lecture 9 - Performance Characteristics of Instruments and Data Analysis - I (Continued...)

Lecture 10 - Performance Characteristics of Instruments and Data Analysis - I (Continued...)

Lecture 11 - Performance Characteristics of Instruments and Data Analysis - II

Lecture 12 - Performance Characteristics of Instruments and Data Analysis - II (Continued...)

Lecture 13 - Performance Characteristics of Instruments and Data Analysis - II (Continued...)

Lecture 14 - Performance Characteristics of Instruments and Data Analysis - II (Continued...)

Lecture 15 - Performance Characteristics of Instruments and Data Analysis - II (Continued...)

Lecture 16 - Transducer Elements

Lecture 17 - Transducer Elements (Continued...)

Lecture 18 - Transducer Elements (Continued...)

Lecture 19 - Transducer Elements (Continued...)

Lecture 20 - Transducer Elements (Continued...)

Lecture 21 - Pressure Measurement: Moderate and High Pressure Measuring Instruments

Lecture 22 - Pressure Measurement: Moderate and High Pressure Measuring Instruments (Continued...)

Lecture 23 - Pressure Measurement: Moderate and High Pressure Measuring Instruments (Continued...)

Lecture 24 - Pressure Measurement: Moderate and High Pressure Measuring Instruments (Continued...)

Lecture 25 - Pressure Measurement: Moderate and High Pressure Measuring Instruments (Continued...)

Lecture 26 - High Vacuum Measurement

Lecture 27 - High Vacuum Measurement (Continued...)

Lecture 28 - High Vacuum Measurement (Continued...)

Lecture 29 - High Vacuum Measurement (Continued...)

Lecture 30 - Pressure Measurement

Lecture 31 - Temperature Measurement

NPTEL : NOC:Optimization in Chemical Engineering (Chemical Engineering)

Co-ordinators : Prof. Debasis Sarkar

NPTEL : NOC:Heat Transfer (2018) (Chemical Engineering)

Co-ordinators : Prof. Sunando Dasgupta

Lecture 1 - Introduction to Heat Transfer

Lecture 2 - Introduction to Heat Transfer

Lecture 3 - Heat Diffusion Equation

Lecture 4 - Relevant Boundary Conditions in Conduction

Lecture 5 - One Dimensional Steady State Conduction

Lecture 6 - Temperature Distribution in Radial Systems

Lecture 7 - Tutorial Problem on Critical Insulation Thickness

Lecture 8 - Heat Source Systems

Lecture 9 - Tutorial Problems of Heat Generating Systems

Lecture 10 - Transient Conduction

Lecture 11 - Lumped Capacitance (Continued...) and Tutorial Problem

Lecture 12 - Transient heat Conduction

Lecture 13 - Transient Conduction - Heisler Chart

Lecture 14 - Heat Transfer from Extended Surface

Lecture 15 - Fins and General Conduction Analysis

Lecture 16 - Fundamentals of Convection

Lecture 17 - Equations of Change for Non-isothermal Systems

Lecture 18 - Equations of Change for Non-isothermal Systems (Continued...)

Lecture 19 - Tutorial on the Application of Energy Equation

Lecture 20 - Nusselt Number of a heated sphere in Stagnant Air

Lecture 21 - Momentum and Thermal Boundary Layers

Lecture 22 - The Flat Plate in Parallel Flow - Hydrodynamics and Momentum Transfer

Lecture 23 - The Flat Plate in Parallel Flow - Heat Transfer

Lecture 24 - The Effects of Turbulence

Lecture 25 - Turbulent External Flow

Lecture 26 - Heat and Momentum Transfer Analogy

Lecture 27 - Mixed Boundary Layers

Lecture 28 - Tutorial Problem on External Flow and Behavior of Heat Transfer Coefficient

Lecture 29 - Tutorial Problem in External Flow and Convection

Lecture 30 - Tutorial Problem in External Flow and Convection

Lecture 31 - Tutorial Problem in External Flow and Convection

NPTEL : NOC:Flow through Porous Media (Chemical Engineering)

Co-ordinators : Dr. Somnath Ganguly

Lecture 1 - Introduction (Definition Of Porous Media)

Lecture 2 - Introduction (Conceptual Flow Models)

Lecture 3 - Introduction (Applications)

Lecture 4 - Mass Continuity (Introduction)

Lecture 5 - Mass Continuity (Cartesian Coordinates)

Lecture 6 - Mass Continuity (Cylindrical Coordinates)

Lecture 7 - Mass Continuity (Radial Flow)

Lecture 8 - Mass Continuity (Non-Uniform Permeability)

Lecture 9 - Mass Continuity (Continued...)

Lecture 10 - Mass Continuity (Streamlines And Potential Lines)

Lecture 11 - Mass Continuity (Elementary Flow)

Lecture 12 - Mass Continuity (Source/Sink)

Lecture 13 - Mass Continuity (Superposition Of Elementary Flow)

Lecture 14 - Mass Continuity (Superposition Of Elementary Flow) (Continued...)

Lecture 15 - Transport Mechanisms (Introduction)

Lecture 16 - Transport Mechanisms (Combined Mode)

Lecture 17 - Transport Mechanisms (Adsorption/Pore Condensation)

Lecture 18 - Transport Mechanisms (Continued...)

Lecture 19 - Flow Equation (Introduction)

Lecture 20 - Flow Equations (Continued...)

Lecture 21 - Flow Equations (Viscous Flow in Capillary)

Lecture 22 - Flow Equations (Packed Bed)

Lecture 23 - Flow Equations (Fluidized Bed)

Lecture 24 - Miscible Displacement (Uniform Velocity Over Capillary Cross-Section)

Lecture 25 - Miscible Displacement (Laminar Flow in Capillary)

Lecture 26 - Miscible Displacement (Movement of Concentration Pulse)

Lecture 27 - Miscible Displacement (Step Change in Concentration)

Lecture 28 - Miscible Displacement (Continued...)

Lecture 29 - Miscible Displacement (Continued...)

Lecture 30 - Miscible Displacement (Continued...)

Lecture 31 - Miscible Displacement (Continued...)

Lecture 32 - Miscible Displacement (Fractured Porous Media)

Lecture 33 - Miscible Displacement (Viscous Front)

Lecture 34 - Immiscible Flow

Lecture 35 - Immiscible Flow (Continued...)

Lecture 36 - Immiscible Flow (Continued...)

Lecture 37 - Immiscible Flow (Continued...)

Lecture 38 - Immiscible Flow (Continued...)

Lecture 39 - Immiscible Flow (Continued...)

Lecture 40 - Immiscible Flow (Continued...)

Lecture 41 - IMMISCIBLE FLOW (Continued...)

Lecture 42 - Immiscible Flow (Continued...)

Lecture 43 - Immiscible Flow (Continued...)

Lecture 44 - Immiscible Flow (Continued...)

Lecture 45 - Immiscible Flow (Continued...)

Lecture 46 - Immiscible Flow (Continued...)

Lecture 47 - Interception Of Suspended Solids

Lecture 48 - Interception Of Suspended Solids (Continued...)

Lecture 49 - Interception Of Suspended Solids (Continued...)

Lecture 50 - Interception Of Suspended Solids (Continued...)

Lecture 51 - Interception Of Suspended Solids (Continued...)

Lecture 52 - Interception Of Suspended Solids (Continued...)

Lecture 53 - Deformable Porous Media

Lecture 54 - Deformable Porous Media (Continued...)

Lecture 55 - Deformable Porous Media (Continued...)

Lecture 56 - Heat Transfer With Fluid Flow

Lecture 57 - Heat Transfer With Fluid Flow (Continued...)

Lecture 58 - Heat Transfer With Fluid Flow (Continued...)

Lecture 59 - Characterization

Lecture 60 - Characterization (Continued...)

NPTEL : NOC:Fundamentals of Particle and Fluid Solid Processing (Chemical Engineering)

Co-ordinators : Prof. Arnab Atta

NPTEL : NOC:Plant Design and Economics (Chemical Engineering)

Co-ordinators : Prof. Debasis Sarkar

Lecture 1 - Introduction

Lecture 2 - Typical Design Steps

Lecture 3 - Flow Diagram

Lecture 4 - Flow Diagram - Mass and Energy Balance

Lecture 5 - Piping and Instrumentation Diagram

Lecture 6 - Selection of Process Equipment

Lecture 7 - Process Utilities

Lecture 8 - Plant Location

Lecture 9 - Site and Plant Layout

Lecture 10 - Heuristics in Process Synthesis and Design

Lecture 11 - Capital Investment

Lecture 12 - Capital Cost Estimates

Lecture 13 - Cost Components in Capital Investments

Lecture 14 - Methods of Capital Cost Estimates

Lecture 15 - Estimation of Total Product Cost

Lecture 16 - Different Types of Interest

Lecture 17 - Continuous Interest, Cash Flow Diagram, Time Value of Money

Lecture 18 - Uniform Cash Flows and Continuous Flows

Lecture 19 - Income Tax and Depreciation

Lecture 20 - Depreciation

Lecture 21 - Cumulative Cash Flow and Profitability Standards

Lecture 22 - Profitability Analysis

Lecture 23 - Profitability Analysis (Continued...)

Lecture 24 - Profitability Analysis (Continued...)

Lecture 25 - Alternative Investment, Replacement and Sensitivity Analysis

Lecture 26 - Introduction to Process Synthesis

Lecture 27 - Hierarchical Approach to Process Synthesis - I

Lecture 28 - Hierarchical Approach to Process Synthesis - II

Lecture 29 - Hierarchical Approach to Process Synthesis - III

Lecture 30 - Hierarchical Approach to Process Synthesis - IV

Lecture 31 - Basic Reactor Principles

NPTEL : NOC:Material and Energy Balance Computations (Chemical Engineering)

Co-ordinators : Prof. Arnab Atta

Lecture 32 - Introduction to Energy Balance - II

Lecture 33 - Introduction to Energy Balance - III

Lecture 34 - Introduction to Energy Balance - IV

Lecture 35 - Introduction to Energy Balance - V

Lecture 36 - Introduction to Energy Balance - VI

Lecture 37 - Introduction to Energy Balance - VII

Lecture 38 - Introduction to Energy Balance - VIII

Lecture 39 - Introduction to Energy Balance - IX

Lecture 40 - Introduction to Energy Balance - X

Lecture 41 - Introduction to Energy Balance - XI

Lecture 42 - Estimation of Physical Properties - I

Lecture 43 - Estimation of Physical Properties - II

Lecture 44 - Estimation of Physical Properties - III

Lecture 45 - Tutorial - I

Lecture 46 - Tutorial - II

Lecture 47 - Tutorial - III

Lecture 48 - Tutorial - IV

Lecture 49 - Estimation of Physical Parameters - IV

Lecture 50 - Estimation of Physical Parameters - V

Lecture 51 - Energy Balance with Chemical Reactions - I

Lecture 52 - Energy Balance with Chemical Reactions - II

Lecture 53 - Energy Balance with Chemical Reactions - III

Lecture 54 - Energy Balance with Chemical Reactions - IV

Lecture 55 - Energy Balance with Chemical Reactions - V

Lecture 56 - Energy Balance with Chemical Reactions - VI

Lecture 57 - Humidity and Psychrometric Chart - I

Lecture 58 - Humidity and Psychrometric Chart - II

Lecture 59 - Humidity and Psychrometric Chart - III

Lecture 60 - Humidity and Psychrometric Chart - IV

NPTEL : NOC:Principles and Practices of Process Equipment and Plant Design (Chemical Engineering)

Co-ordinators : Prof. Gargi Das

NPTEL : NOC:Mathematical Modelling and Simulation of Chemical Engineering Process (Chemical Engineering)

Co-ordinators : Prof. Sourav Mondal

Lecture 1 - Introduction

Lecture 2 - Introduction (Continued...)

Lecture 3 - Constitutive relations

Lecture 4 - Constitutive relations - Mass transfer and thermodynamics

Lecture 5 - Process diagrams

Lecture 6 - Special functions

Lecture 7 - Partial differential equations

Lecture 8 - Partial differential equations - Separation of variables

Lecture 9 - PDE - Separation of variables (Continued...)

Lecture 10 - PDE - Integral transforms

Lecture 11 - Numerical techniques of solving PDE - Discretization

Lecture 12 - Stability of finite difference schemes

Lecture 13 - Numerical solution of PDE - Method of lines

Lecture 14 - Numerical solution of implicit formulation - Tridiagonal matrix

Lecture 15 - Numerical solution of PDE - Finite volume method

Lecture 16 - Perturbation methods

Lecture 17 - Asymptotics

Lecture 18 - Matched Asymptotics

Lecture 19 - Stability of dynamical systems

Lecture 20 - Stability of dynamical systems (Continued...)

Lecture 21 - Modelling transport phenomena problems - Part 1

Lecture 22 - Modelling transport phenomena problems - Part 2

Lecture 23 - Modelling transport phenomena problems - Part 3

Lecture 24 - Modelling transport phenomena problems - Part 4

Lecture 25 - Modelling transport phenomena problems - Part 5

Lecture 26 - Modelling reaction systems - Packed bed catalytic reactor

Lecture 27 - Modelling intraparticle transport and catalysis

Lecture 28 - Modelling pore diffusion and reaction

Lecture 29 - Modelling enzymatic reactions

Lecture 30 - Demonstration of COMSOL Multiphysics

Lecture 31 - Modelling of multistage distillation process

Lecture 32 - FUG method of stage calculations

Lecture 33 - MESH equations and DOF analysis

Lecture 34 - Tearing method

Lecture 35 - Bubble point method stage calculations

Lecture 36 - Simultaneous correction method

Lecture 37 - Block tridiagonal matrix

Lecture 38 - Simple binary batch distillation

Lecture 39 - Multistage batch distillation

Lecture 40 - Heat exchanger network design pinch analysis

Lecture 41 - Pinch point temperature

Lecture 42 - Heat exchanger network synthesis

Lecture 43 - Solving a distillation column using Aspen plus

Lecture 44 - Solving two unit operations using Aspen Plus

Lecture 45 - Solving multiple units using Aspen Plus

Lecture 46 - Dispersed phase modelling - Introduction

Lecture 47 - Population balance equation

Lecture 48 - Dispersed phase modelling - Breakage process

Lecture 49 - Drop size distribution in lean mixtures

Lecture 50 - Mass transfer in lean liquid-liquid dispersion

Lecture 51 - Dispersed phase modelling - Aggregation

Lecture 52 - Dispersed phase modelling - Aerosol dynamics

Lecture 53 - Dispersed phase modelling - Aerosol dynamics (Continued...)

Lecture 54 - Solution of the population balance equation

Lecture 55 - Numerical solution of the population balance equation

Lecture 56 - Kinetic monte carlo simulation

Lecture 57 - Response surface methodology

Lecture 58 - Design of experiments

Lecture 59 - Artificial neural network

Lecture 60 - Supervised training

NPTEL : NOC:Advanced Process Dynamics (Chemical Engineering)

Co-ordinators : Prof. Parag A. Deshpande

Lecture 1 - Introduction and motivation

Lecture 2 - Dynamics of linear first order autonomous systems

Lecture 3 - Dynamics of linear first order autonomous systems (Continued...)

Lecture 4 - Lumped parameter analysis of cooling of a body

Lecture 5 - Lumped parameter analysis of cooling of a body (Continued...)

Lecture 6 - Introduction to higher order systems

Lecture 7 - Phase plane analysis of linear autonomous second order systems

Lecture 8 - Phase plane analysis of linear autonomous second order systems (Continued...)

Lecture 9 - Analysis of a free spring-mass system

Lecture 10 - Analysis of a free spring-mass system (Continued...)

Lecture 11 - Dynamics of non-autonomous systems

Lecture 12 - Similarity solution for non-autonomous higher order dynamics

Lecture 13 - Similarity solution for non-autonomous higher order dynamics (Continued...)

Lecture 14 - Analysis of a forced spring-mass system

Lecture 15 - Analysis of a forced spring-mass system (Continued...)

Lecture 16 - Phase portraits of linear autonomous systems of order three and higher

Lecture 17 - Phase portraits of linear autonomous systems of order three and higher (Continued...)

Lecture 18 - Analysis of complex reaction systems

Lecture 19 - Analysis of complex reaction systems (Continued...)

Lecture 20 - Analysis of complex reaction systems (Continued...)

Lecture 21 - Introduction to non-linear systems

Lecture 22 - Logistic population growth model

Lecture 23 - Logistic population growth model (Continued...)

Lecture 24 - Logistic population growth with harvesting

Lecture 25 - Logistic population growth with harvesting (Continued...)

Lecture 26 - Logistic population growth with threshold population

Lecture 27 - Logistic population growth with threshold population (Continued...)

Lecture 28 - Analysis of population dynamics in discrete domain

Lecture 29 - Analysis of fixed points and bifurcation in discrete domain

Lecture 30 - Analysis of fixed points and bifurcation in discrete domain (Continued...)

Lecture 31 - More on bifurcations in non-linear systems

NPTEL : NOC:Metallocene and Metal-Carbene based Organometallic Compounds as Industrially Important Advanced Polyolefin Catalysts (Chemical Engineering)

Co-ordinators : Prof. Sanjib K. Patra

Lecture 1 - A Brief Introduction to Polymers

Lecture 2 - A Brief Introduction to Polymers (Continued...)

Lecture 3 - Polyethylene and Polypropylene: Chemical structure and properties

Lecture 4 - Polyethylene and Polypropylene: Chemical structure and properties (Continued...)

Lecture 5 - Common polymerization protocol and mechanism

Lecture 6 - Common polymerization protocol and mechanism (Continued...)

Lecture 7 - Common polymerization protocol and mechanism: Controlled Polymerization

Lecture 8 - Anionic living polymerization and Coordination polymerization

Lecture 9 - Transition metal/Organometallic complexes: Unique reactions

Lecture 10 - Metallocene compounds: Structure and Bonding

Lecture 11 - Metallocene compounds: Structure and Bonding (Continued...)

Lecture 12 - Bonding in Metallocene, MOT and Electronic nature

Lecture 13 - Bonding and Electronic nature in Bent Metallocene

Lecture 14 - Bonding and Electronic nature in Bent Metallocene (Continued...)

Lecture 15 - General Synthetic Strategies for Metallocenes (Parallel and Bent)

Lecture 16 - Properties and Unique Reactivities of parallel and bent Metallocenes

Lecture 17 - Unique Reactivities of bent Metallocenes

Lecture 18 - Unique Reactivities of bent Metallocenes (Continued...)

Lecture 19 - Coordination polymerization of olefin and stereoregularity

Lecture 20 - Olefin polymerization by Zeigler Natta Catalyst: Important features

Lecture 21 - Coordination polymerization of olefin by Metallocene Catalysts: A new avenue in polyolefin catalysts

Lecture 22 - Coordination polymerization of olefin by Metallocene Catalysts: A new avenue in polyolefin catalysts (Continued...)

Lecture 23 - Symmetry of metallocene and Stereoregularity in polyolefin

Lecture 24 - Symmetry of metallocene and Stereoregularity in polyolefin (Continued...)

Lecture 25 - Metallocene to Post-metallocene catalysts for olefin polymerization

Lecture 26 - Metallocene to Post-metallocene catalysts for olefin polymerization (Continued...)

Lecture 27 - Polymerization strategy for industrial preparation of LLDPE

Lecture 28 - Polymerization strategy for industrial preparation of LLDPE (Continued...)

Lecture 29 - Metallocene and Post-metallocene Catalysts: Homogeneous to Heterogeneous and Lab to Industry

Lecture 30 - Metallocene and Post-metallocene Catalysts: Homogeneous to Heterogeneous and Lab to Industry (Continued...)

Lecture 31 - Depolymerization of synthetic polymers: Role of organometallic and metallocene based catalysts

Lecture 32 - Depolymerization of synthetic polymers: Role of organometallic and metallocene based catalysts

Lecture 33 - Metal-carbene complexes as versatile catalysts for multiple useful reactions: A short introduction

Lecture 34 - Metal-carbene complexes as versatile catalysts for multiple useful reactions: A short introduction (Continued...)

Lecture 35 - Bonding and Electronic properties in Metal-carbene complexes

Lecture 36 - General synthetic protocol of Metal-carbene complexes

Lecture 37 - N-Heterocyclic carbene (NHC) complex: Bonding and General synthetic protocol

Lecture 38 - Alkene metathesis by metal-carbene catalysts and its mechanism

Lecture 39 - Utility of metal-carbene catalysts in alkene polymerization

Lecture 40 - Industrially important polymers by ROMP: Recent development and scope; Overall summary of this course

NPTEL : NOC:Chemical Engineering Fluid Dynamics and Heat Transfer (Chemical Engineering)

Co-ordinators : Prof. Rabibrata Mukherjee, Prof. Arnab Atta

NPTEL : NOC:Characterization of Polymers, Elastomers and Composites (Chemical Engineering)

Co-ordinators : Prof. Santanu Chattopadhyay

Lecture 1 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 1

Lecture 2 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 1

Lecture 3 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 1

Lecture 4 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 1

Lecture 5 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 1

Lecture 6 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 2

Lecture 7 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 2

Lecture 8 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 2

Lecture 9 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 2

Lecture 10 - Introduction of Structure-Property-Process Correlation of Polymer, Elastomer and Composite - 2

Lecture 11 - Identification by Chemical Techniques, Implication of National and International Standards alongwith Practical Demonstration

Lecture 12 - Identification by Chemical Techniques, Implication of National and International Standards alongwith Practical Demonstration (Continued...)

Lecture 13 - Identification by Chemical Techniques, Implication of National and International Standards alongwith Practical Demonstration (Continued...)

Lecture 14 - Identification by Chemical Techniques, Implication of National and International Standards alongwith Practical Demonstration (Continued...)

Lecture 15 - Identification by Chemical Techniques, Implication of National and International Standards alongwith Practical Demonstration (Continued...)

Lecture 16 - Introduction of UV-Vis and infrared spectroscopy for polymers, elastomers and composites

Lecture 17 - Introduction of UV-Vis and infrared spectroscopy for polymers, elastomers and composites (Continued...)

Lecture 18 - Introduction of UV-Vis and infrared spectroscopy for polymers, elastomers and composites (Continued...)

Lecture 19 - Introduction of UV-Vis and infrared spectroscopy for polymers, elastomers and composites (Continued...)

Lecture 20 - Introduction of UV-Vis and infrared spectroscopy for polymers, elastomers and composites (Continued...)

Lecture 21 - Application of infrared spectroscopy for blends, modification of polymers, compatibilizaion, coupling etc.

Lecture 22 - Application of infrared spectroscopy for blends, modification of polymers, compatibilizaion, coupling etc.

Lecture 23 - Application of infrared spectroscopy for blends, modification of polymers, compatibilizaion, coupling etc.

Lecture 24 - Practical demonstration on UV-Visible spectroscopy

Lecture 25 - Practical demonstration on FTIR spectroscopy and Sulphur analyzer

Lecture 26 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectroscopy and Electron spin response (ESR) spectroscopy

Lecture 27 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectroscopy and Electron spin response (ESR) spectroscopy (Continued...)

Lecture 28 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectroscopy and Electron spin response (ESR) spectroscopy (Continued...)

Lecture 29 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectroscopy and Electron spin response (ESR) spectroscopy (Continued...)

Lecture 30 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectroscopy and Electron spin response (ESR) spectroscopy (Continued...)

Lecture 31 - NMR Spectroscopy- principles and fundamentals. Application of NMR in polymer, elastomer and composites

Lecture 32 - NMR Spectroscopy- principles and fundamentals. Application of NMR in polymer, elastomer and composites (Continued...)

Lecture 33 - NMR Spectroscopy- principles and fundamentals. Application of NMR in polymer, elastomer and composites (Continued...)

Lecture 34 - NMR Spectroscopy- principles and fundamentals. Application of NMR in polymer, elastomer and composites (Continued...)

Lecture 35 - NMR Spectroscopy- principles and fundamentals. Application of NMR in polymer, elastomer and composites (Continued...)

Lecture 36 - Thermal analysis techniques and application in polymer, elastomer and composites

Lecture 37 - Thermal analysis techniques and application in polymer, elastomer and composites (Continued...)

Lecture 38 - Thermal analysis techniques and application in polymer, elastomer and composites (Continued...)

Lecture 39 - Practical demostration on TGA, DSC and DMA

Lecture 40 - XRD, XPS and XRF. Principles, Fundamentals and Application in Polymer, Elastomer and Composites

Lecture 41 - XRD, XPS and XRF. Principles, Fundamentals and Application in Polymer, Elastomer and Composites (Continued...)

Lecture 42 - XRD, XPS and XRF. Principles, Fundamentals and Application in Polymer, Elastomer and Composites (Continued...)

Lecture 43 - XRD, XPS and XRF. Principles, Fundamentals and Application in Polymer, Elastomer and Composites (Continued...)

Lecture 44 - XRD, XPS and XRF. Principles, Fundamentals and Application in Polymer, Elastomer and Composites (Continued...)

Lecture 45 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FESEM and HRTEM)

Lecture 46 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FESEM and HRTEM) (Continued...)

Lecture 47 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FESEM and HRTEM) (Continued...)

Lecture 48 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FESEM and HRTEM) (Continued...)

Lecture 49 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FESEM and HRTEM) (Continued...)

Lecture 50 - Applications of microscopy in polymers, elastomers and composites

Lecture 51 - Applications of microscopy in polymers, elastomers and composites (Continued...)

Lecture 52 - Practical demonstration on optical microscopy

Lecture 53 - Practical demonstration on atomic force microscopy (AFM)

Lecture 54 - Practical demonstration on image processing using standard software (Image)

Lecture 55 - Chromatography, DETA, Quantification from Rate Dependent Methods, Reverse Engineering and Recent Advances

NPTEL : NOC:Matlab-Based Programming Lab in Chemical Engineering (Chemical Engineering)

Co-ordinators : Prof. Parag A. Deshpande

Lecture 32 - LAB 5 - Analysis of unsteady-state operation of cascade CSTR's Theory and Solution ...

Lecture 33 - LAB 5 - Analysis of unsteady-state operation of cascade CSTR's Solution of the Problem

Lecture 34 - LAB 5 - Analysis of unsteady-state operation of cascade CSTR's Solution of the problem

Lecture 35 - LAB 5 - Analysis of unsteady-state operation of cascade CSTR's Presentation ...

Lecture 36 - LAB 6 - Analysis of Steady-state Heat Conduction in a 1-D rod

Lecture 37 - LAB 6 - Analysis of Steady-state Heat Conduction in a 1-D rod

Lecture 38 - LAB 6 - Analysis of steady-state Heat Conduction in a 1-D rod

Lecture 39 - LAB 6 - Analysis of steady-state Heat Conduction in a 1-D rod

Lecture 40 - LAB 6 - Analysis of steady-state Heat Conduction in a 1-D rod

Lecture 41 - LAB 7 - Reaction-diffusion in a spherical catalyst pallet Problem definition and ...

Lecture 42 - LAB 7 - Reaction-diffusion in a spherical catalyst pallet Theory and solution strategy

Lecture 43 - LAB 7 - Reaction-diffusion in a spherical catalyst pallet Solution of the problem ...

Lecture 44 - LAB 7 - Reaction-diffusion in a spherical catalyst pallet Solution of the problem ...

Lecture 45 - LAB 7 - Reaction-diffusion in a spherical catalyst pallet Analysis and interpretation ...

Lecture 46 - LAB 8 - Heat conduction in higher dimensions Problem definition and analysis

Lecture 47 - LAB 8 - Heat conduction in higher dimensions Background theory and solution strategy

Lecture 48 - LAB 8 - Heat conduction in higher dimensions Problem solution

Lecture 49 - LAB 8 - Heat conduction in higher dimensions Problem solution (Continued...)

Lecture 50 - LAB 8 - Heat conduction in higher dimensions Problem solution and analysis

Lecture 51 - LAB 9 - Process economics and optimisation Problem definition and analysis

Lecture 52 - LAB 9 - Process economics and optimisation Theory and solution strategy

Lecture 53 - LAB 9 - Process economics and optimisation Solution of the problem

Lecture 54 - LAB 9 - Process economics and optimisation Solution of the problem (Continued...)

Lecture 55 - LAB 9 - Process economics and optimisation Solution of the problem and analysis of ...

Lecture 56 - LAB 10 - Regression and curve - fitting of data Problem definition and analysis

Lecture 57 - LAB 10 - Regression and curve - fitting of data Background theory and solution strategy

Lecture 58 - LAB 10 - Regression and curve - fitting of data Problem solution

Lecture 59 - LAB 10 - Regression and curve - fitting of data Problem solution (Continued...)

Lecture 60 - Review of the course

NPTEL : NOC:Petroleum Technology (Chemical Engineering)

Co-ordinators : Dr. Sonali Sengupta

Lecture 1 - What is Petroleum How it is stored under the earth Exploration of petroleum underground

Lecture 2 - Concept of Seismic Reflection, Introduction to Drilling

Lecture 3 - Drilling Mud and Mechanisms of Recovery of Petroleum

Lecture 4 - Composition of Crude Petroleum and Evaluation of Oil Stocks

Lecture 5 - Evaluation of Oil Stocks: Vaporization Characteristics

Lecture 6 - Primary Processing of Crude Oil: Desalting

Lecture 7 - Primary Processing of Crude Oil: Atmospheric Distillation Unit (ADU)

Lecture 8 - Primary Processing of Crude Oil: Reflux Systems, Vacuum Distillation Unit (VDU)

Lecture 9 - Products and Process Utilities in Primary Processing, Pipe Still Heater

Lecture 10 - Refinery Units

Lecture 11 - Secondary Processing: Decomposition of Residues: Thermal Cracking

Lecture 12 - Coking, Gasification and Steam Cracking

Lecture 13 - Secondary Processing: Decomposition of Residues: Hydrocracking

Lecture 14 - Secondary Processing: Decomposition of Residues: Catalytic Cracking

Lecture 15 - Secondary Processing: Decomposition of Residues: Process description of FCC

Lecture 16 - Properties and Testing of Petroleum Products

Lecture 17 - Properties and Testing of Petroleum Products (Continued...)

Lecture 18 - Properties and Testing of Petroleum Products (Continued...)

Lecture 19 - Properties and Testing of Petroleum Products (Continued...)

Lecture 20 - Properties and Testing of Petroleum Products (Continued...)

Lecture 21 - Petroleum fractions from distillation units

Lecture 22 - Petroleum fractions from distillation units (Continued...)

Lecture 23 - Petroleum fractions from distillation units (Continued...)

Lecture 24 - Petroleum fractions from distillation units (Continued...)

Lecture 25 - Petroleum fractions from distillation units (Continued...)

Lecture 26 - Upgradation of straight run cuts from atmospheric distillation unit

Lecture 27 - Upgradation of straight run cuts from atmospheric distillation unit (Continued...)

Lecture 28 - Upgradation of straight run cuts from atmospheric distillation unit (Continued...)

Lecture 29 - Upgradation of straight run cuts from atmospheric distillation unit (Continued...)

Lecture 30 - Upgradation of straight run cuts from distillation unit

Lecture 31 - Purification processes

NPTEL : NOC:Rheology and Processing of Paints, Plastic and Elastomer Based Composites (Chemical Engineering)

Co-ordinators : Prof. Santanu Chattopadhyay

Lecture 1 - Basic Introduction to Polymer

Lecture 2 - Structure Process Correlation

Lecture 3 - Basic Rheology

Lecture 4 - Classification of Fluids

Lecture 5 - Flow of Liquids Through Various Channels - 1

Lecture 6 - Flow of Liquids Through Various Channels - 2

Lecture 7 - Flow of Liquids Through Various Channels - 3

Lecture 8 - Introduction to Viscometers and Rheometers

Lecture 9 - Ostwald Viscometer, Brookfield Viscometer, Falling Piston Viscometers

Lecture 10 - ODR, MDR, RPA, PPR

Lecture 11 - DMA -In-Light of rheology

Lecture 12 - Master Curve and its Implications

Lecture 13 - Capillary Rheometer

Lecture 14 - Introduction to Paints and importance of rheology in paints

Lecture 15 - Rheology of paints - 1

Lecture 16 - Rheology of paints - 2

Lecture 17 - Rheology of Adhesives and Sealants

Lecture 18 - Rheology of Fiber and Plastics

Lecture 19 - Practical demonstration on Brookfield viscometer and Oswald viscometer

Lecture 20 - Practical demonstration on Mooney viscometer, ODR and MDR

Lecture 21 - Practical demonstration on RPA

Lecture 22 - Practical demonstration on PPR and DMA

Lecture 23 - Practical demonstration on Capillary Rheometer

Lecture 24 - Numeriacal Problems related to basic rhelogy

Lecture 25 - Importance of compounding and introduction to various compounding ingredients

Lecture 26 - Properties and role of various compounding ingredients

Lecture 27 - Surface treatment of reinforcing elements

Lecture 28 - Rhelogy of Elastomers

Lecture 29 - Importance of die swell (correlating with normal force differences)

Lecture 30 - Melt Fracture and other ectrudate instabilities

Lecture 31 - Introduction to plastic and rubber mixing and blending

NPTEL : NOC:Petroleum Formation Evaluation (Chemical Engineering)

Co-ordinators : Dr. Neetish Kumar Maurya, Dr. Sayantan Ghosh

NPTEL : NOC:Momentum Transfer in Fluids (Chemical Engineering)

Co-ordinators : Prof. Somenath Ganguly, Prof. Sunando DasGupta

NPTEL : NOC:Enhanced Oil Recovery Techniques (Chemical Engineering)

Co-ordinators : Prof. Ajay Mandal

NPTEL : NOC:Adsorption Science and Technology: Fundamentals and Applications (Chemical Engineering)

Co-ordinators : Prof. Sourav Mondal

NPTEL : Chemical Engineering Thermodynamics (Chemical Engineering)

Co-ordinators : Prof. M.S. Ananth

NPTEL : Computational Fluid Dynamics (Chemical Engineering)

Co-ordinators : Prof. Sreenivas Jayanti

Lecture 26 - Convergence analysis of basic iterative schemes; Diagonal dominance condition for convergence; Influence of source terms on the diagonal dominance condition; Rate of convergence

Lecture 27 - Application to the Laplace equation

Lecture 28 - Advanced iterative methods: Alternating Direction Implicit Method; Operator splitting

Lecture 29 - Advanced iterative methods; Strongly Implicit Proc edure; Conjugate gradient method; Multigrid method

Lecture 30 - Illustration of the Multigrid method for the Laplace equation

Lecture 31 - Overview of the approach of numerical solution of NS equations for simple domains; Introduction to complexity arising from physics and geometry

Lecture 32 - Derivation of the energy conservation equation

Lecture 33 - Derivation of the species conservation equation; dealing with chemical reactions

Lecture 34 - Turbulence; Characteri stics of turbulent flow; Dealing with fluctuations and the concept of time-averaging

Lecture 35 - Derivation of the Reynolds -averaged Navier -Stokes equations; identification of the closure problem of turbulence; Boussinesq hypothesis and eddy viscosity

Lecture 36 - Reynol ds stresses in turbulent flow; Time and length scales of turbulence; Energy cascade; Mixing length model for eddy viscosity

Lecture 37 - One-equation model for turbulent flow

Lecture 38 - Two -equation model for turbulent flow; Numerical calculation of turbulent reacting flows

Lecture 39 - Calculation of near-wall region in turbulent flow; wall function approach; near-wall turbulence models

Lecture 40 - Need for special methods for dealing with irregular flow geometry; Outline of the Body-fitted grid approach ; Coordinate transformation to a general, 3-D curvilinear system

Lecture 41 - Transformation of the governing equations; Illustration for the Laplace equation; Appearance and significance of cross -derivative terms; Concepts of structured and unstructured grids.

Lecture 42 - Finite vol ume method for complicated flow domain; Illustration for the case of flow through a duct of triangular cross -section.

Lecture 43 - Finite volume method for the general case

Lecture 44 - Generation of a structured grid for irregular flow domain; Algebraic methods; Elliptic grid generation method

Lecture 45 - Unstructured grid generation; Domain nodalization; Advancing front method for triangulation

Lecture 46 - Delaunay triangulation method for unstructured grid generation

Lecture 47 - Co -located grid approach for irregular geometries; Pressure correction equation for a co -located structured grid; Pressure correction equation for a co-located unstructured grid.

NPTEL : Computational Techniques (Chemical Engineering)

Co-ordinators : Dr. Niket S. Kaisare

Lecture 1 - Introduction

Lecture 2 - Computational and Error Analysis

Lecture 3 - Linear Equations - Part 1

Lecture 4 - Linear Equations - Part 2

Lecture 5 - Linear Equations - Part 3

Lecture 6 - Linear Equations - Part 4

Lecture 7 - Linear Equations - Part 5

Lecture 8 - Linear Equations - Part 6

Lecture 9 - Non Linear Algebraic Equations - Part 1

Lecture 10 - Non Linear Algebraic Equations - Part 2

Lecture 11 - Non Linear Algebraic Equations - Part 3

Lecture 12 - Non Linear Algebraic Equations - Part 4

Lecture 13 - Non Linear Algebraic Equations - Part 5

Lecture 14 - Non Linear Algebraic Equations - Part 6

Lecture 15 - Regression and Interpolation - Part 1

Lecture 16 - Regression and Interpolation - Part 2

Lecture 17 - Regression and Interpolation - Part 3

Lecture 18 - Regression and Interpolation - Part 4

Lecture 19 - Regression and Interpolation - Part 5

Lecture 20 - Differentiation and Integration - Part 1

Lecture 21 - Differentiation and Integration - Part 2

Lecture 22 - Differentiation and Integration - Part 3

Lecture 23 - Differentiation and Integration - Part 4

Lecture 24 - Differentiation and Integration - Part 5

Lecture 25 - Ordinary Differential Equations (initial value problems) - Part 1

Lecture 26 - Ordinary Differential Equations (initial value problems) - Part 2

Lecture 27 - Ordinary Differential Equations (initial value problems) - Part 3

Lecture 28 - Ordinary Differential Equations (initial value problems) - Part 4

Lecture 29 - Ordinary Differential Equations (initial value problems) - Part 5

Lecture 30 - Ordinary Differential Equations (initial value problems) - Part 6

Lecture 31 - Ordinary Differential Equations (initial value problems) - Part 7

NPTEL : Particle Characterization (PG) (Chemical Engineering)

Co-ordinators : Dr. R. Nagarajan

Lecture 1 - Introduction: Why study particle characterization?

Lecture 2 - Introduction: Classification of particle characteristics

Lecture 3 - Morphological Characterization: Shape analysis methods

Lecture 4 - Morphological Characterization: Techniques of shape assessment

Lecture 5 - Morphological Characterization: Decision rules

Lecture 6 - Morphological Characterization: Static vs dynamic methods of size analysis

Lecture 7 - Morphological Characterization: Static methods of size analysis

Lecture 8 - Morphological Characterization: Light scattering from spherical particles

Lecture 9 - Morphological Characterization: Particle counters

Lecture 10 - Morphological Characterization: Particle size distributions

Lecture 11 - Morphological Characterization: Acoustic Attenuation Spectroscopy

Lecture 12 - Morphological Characterization: Nano-particle size analysis

Lecture 13 - Structural Characterization

Lecture 14 - Interfacial Characterization

Lecture 15 - Surface Adhesion: Forces

Lecture 16 - Surface Adhesion: Electrostatic & Surface-Tension Forces

Lecture 17 - Surface Adhesion: Adhesion Force Measurement

Lecture 18 - Particle Removal: Methods

Lecture 19 - Particle Removal: Wet Cleaning

Lecture 20 - Particle Cohesion: Forces

Lecture 21 - Particle Cohesion: Flowability Implications

Lecture 22 - Transport Properties: Diffusion & Electrostatic Field Effects

Lecture 23 - Transport Properties: Drag & Inertia

Lecture 24 - Transport Properties: Deposition Fluxes & Rates

Lecture 25 - Transport Properties: Illustrative Application

Lecture 26 - Chemical & Compositional Characterization: Reactivity

Lecture 27 - Chemical & Compositional Characterization: Analytical Methods

Lecture 28 - Chemical & Compositional Characterization: XRD & AFM

Lecture 29 - Nano-particle Characterization: Bottom-Up Synthesis Methods

Lecture 30 - Nano-particle Characterization: Top-Down Synthesis Methods

Lecture 31 - Nano-particle Characterization: Dispersion

NPTEL : Statistics for Experimentalists (Chemical Engineering)

Co-ordinators : Dr. A. Kannan

NPTEL : Multiphase flows:Analytical solutions and Stability Analysis (Chemical Engineering)

Co-ordinators : Prof. S. Pushpavanam

NPTEL : NOC:Introduction to Time-Frequency Analysis and Wavelet Transforms (Chemical Engineering)

Co-ordinators : Dr. Arun K.Tangirala

Lecture 32 - Cohens class and smoothed WVD

Lecture 33 - Cohens class and Ambiguity functions

Lecture 34 - Affine class and closing remarks

Lecture 35 - Continuous Wavelet Transform

Lecture 36 - Continuous Wavelet Transforms

Lecture 37 - Scale to Frequency

Lecture 38 - Computational aspects of CWT

Lecture 39 - Scalogram and MATLAB demonstration

Lecture 40 - Scalogram and MATLAB demonstration

Lecture 41 - Scaling function

Lecture 42 - Scaling Function

Lecture 43 - Wavelets

Lecture 44 - Wavelets

Lecture 45 - Applications of CWT

Lecture 46 - Applications of CWT

Lecture 47 - Discrete Wavelet Transform

Lecture 48 - Discrete Wavelet Transform.

Lecture 49 - Orthogonal scaling function bases and MRA

Lecture 50 - Orthogonal scaling function bases and MRA.

Lecture 51 - Wavelet Filters and Fast DWT Algorithm

Lecture 52 - Wavelet Filters and Fast DWT Algorithm (Continued...)

Lecture 53 - Wavelet Filters and Fast DWT Algorithm (Continued...)

Lecture 54 - Wavelets for DWT

Lecture 55 - Wavelets for DWT (Continued...)

Lecture 56 - Wavelets for DWT (Continued...)

Lecture 57 - DWT computation

Lecture 58 - DWT computation (Continued...)

Lecture 59 - DWT computation (Continued...)

NPTEL : Chemical Engineering Principles of CVD Processes (Chemical Engineering)

Co-ordinators : Dr. R. Nagarajan

Lecture 1 - Introduction

Lecture 2 - CVD Reactor and Process Design Fundamentals

Lecture 3 - Overview of CVD Process Fundamentals

Lecture 4 - Basics of Chemical Equilibrium Calculations and Flow Dynamics

Lecture 5 - Introduction to CVD Films

Lecture 6 - Film Structure and Properties

Lecture 7 - Pressure Effects on CVD Processes

Lecture 8 - CVD of Metals

Lecture 9 - CVD of Coatings

Lecture 10 - CVD Film Property Measurements

Lecture 11 - CVD Film Property Measurements: Qualitative and Quantitative

Lecture 12 - CVD in Tungsten Filament Lamps

Lecture 13 - CVD in Tungsten Filament Lamps: Design Aspects

Lecture 14 - CVD in Hot Corrosion

Lecture 15 - CVD Transport Phenomena: Conservation Equations

Lecture 16 - CVD Transport Phenomena: Constitutive Laws

Lecture 17 - CVD Transport Phenomena: Mass Transfer Mechanisms

Lecture 18 - CVD Transport Phenomena: Mass Transfer Analogy Condition (MTAC)

Lecture 19 - CVD Transport Phenomena: Effect of Homogeneous Reactions on MTAC

Lecture 20 - CVD Applications: Hot Filament CVD (HFCVD)

Lecture 21 - CVD Applications: Aerosol CVD (ACVD)

Lecture 22 - CVD Applications: CVD of Silicon

Lecture 23 - CVD Applications: CVD in Free-Molecular Flow Regime (FMFR)

Lecture 24 - CVD Applications: CVD of nano-Structured Films

Lecture 25 - CVD Overview

Lecture 26 - Review of CVD Basics: Part-I (PDF Lecture)

Lecture 27 - Review of CVD Basics: Part-II (PDF Lecture)

Lecture 28 - CVD Question Bank (PDF Lecture)

Lecture 29 - Basics of Nano-Structured Material Synthesis: Part-I

Lecture 30 - Basics of Nano-Structured Material Synthesis: Part-II

Lecture 31 - Undesirable CVD: Bulb-Blackening (Adobe Presenter)

NPTEL : Chemical Reaction Engineering 1 (Homogeneous Reactors) (Chemical Engineering)

Co-ordinators : Prof K. Krishnaiah

Lecture 1 - Motivation and Introduction - Part I

Lecture 2 - Motivation and Introduction - Part II

Lecture 3 - What is Chemical Engineering - Part I

Lecture 4 - What is Chemical Engineering - Part II

Lecture 5 - What is Chemical Reaction Engineering - Part I

Lecture 6 - What is Chemical Reaction Engineering - Part II

Lecture 7 - Homogeneous and Heterogeneous Reactions - Part I

Lecture 8 - Homogeneous and Heterogeneous Reactions - Part II

Lecture 9 - Basics of Kinetics and Contacting

Lecture 10 - Design of Batch reactors - Part I

Lecture 11 - Design of Batch reactors - Part II

Lecture 12 - Basics of Plug Flow Reactor - Part I

Lecture 13 - Basics of Plug Flow Reactor - Part II

Lecture 14 - Design of Plug Flow Reactors - Part I

Lecture 15 - Design of Plug Flow Reactors - Part II

Lecture 16 - Basics of Mixed Flow Reactors

Lecture 17 - Design of Mixed Flow Reactors

Lecture 18 - Basics of Kinetics

Lecture 19 - Kinetics of Heterogeneous reactions - Part I

Lecture 20 - Kinetics of Heterogeneous reactions - Part II

Lecture 21 - Kinetics of Heterogeneous reactions - Part III

Lecture 22 - Kinetics of Homogeneous reactions

Lecture 23 - Reaction rate for Homogeneous reactions

Lecture 24 - Gas Phase Homogeneous reactions

Lecture 25 - (Continued...) And later Reactor Design of PFR

Lecture 26 - Reactor Design for MFR and Combination of reactors

Lecture 27 - PFR and MFR in series.

Lecture 28 - Unsteady state MFR and PFR

Lecture 29 - Recycle Reactors

Lecture 30 - Recycle Reactors (Autocatalytic reactions) - Part I

Lecture 31 - Recycle Reactors (Autocatalytic reactions) - Part II

NPTEL : Chemical Reaction Engineering 2 (Heterogeneous Reactors) (Chemical Engineering)

Co-ordinators : Prof K. Krishnaiah

NPTEL : NOC:MATLAB Programming for Numerical Computation (Chemical Engineering)

Co-ordinators : Dr. Niket S.Kaisare

NPTEL : NOC:Computational Fluid Dynamics (Chemical Engineering)

Co-ordinators : Prof. Sreenivas Jayanti

Lecture 31 - Tutorial on Stability Analysis

Lecture 32 - Analysis of Generic 1-d scalar transport equation

Lecture 33 - Introduction to the solution of coupled N-S equations

Lecture 34 - N-S equation in compressible flow- Mac Cormack Scheme

Lecture 35 - Stability limits of Mac-Cormack Scheme and the intro to Beam-Warming Scheme

Lecture 36 - Implicit Beam-Warming Scheme

Lecture 37 - Compressible flow to Incompressible flow

Lecture 38 - Solution of coupled equations: Incompressible flow

Lecture 39 - Artificial compressiblity method, Stream function-vorticity method

Lecture 40 - Pressure equation method, Staggered grid system

Lecture 41 - Pressure Correction Method

Lecture 42 - Tutorial on Pressure Correction Method

Lecture 43 - Tutorial on Pressure Correction Method (Continued...)

Lecture 44 - Introduction to the basic numerical methods

Lecture 45 - Direct Methods: solution of the system of algebraic equations

Lecture 46 - Tri-diagonal Matrix Algorithm: Derivation

Lecture 47 - TDMA and other iterative methods

Lecture 48 - Recap of basic iterative methods.

Lecture 49 - Convergence analysis of basic iterative methods

Lecture 50 - Successive Over Relaxation (SOR) method

Lecture 51 - Alternating Direction Implicit (ADI) method

Lecture 52 - Strongly Implicit Procedure (ILU) method

Lecture 53 - Multigrid method

Lecture 54 - Body Fitted Grid Approach

Lecture 55 - Formulation Of Finite Volume Method

Lecture 56 - Methods For Unstructured Grid Generation

Lecture 57 - Triangulation: The Advancing Front Method

Lecture 58 - The Advancing Front Method continuation

Lecture 59 - Time and length scale of turbulance

Lecture 60 - The turbulent closure problem

Lecture 61 - The generic formulation for turbulence

Lecture 62 - More generic formulation and summary

NPTEL : NOC:Introduction to Statistical Hypothesis Testing (Chemical Engineering)

Co-ordinators : Dr. Arun K.Tangirala

Lecture 1 - Motivation

Lecture 2 - Probability and statistics: Review - Part 1

Lecture 3 - Probability and Statistics: Review - Part 2

Lecture 4 - R Tutorial 1

Lecture 5 - Statistics for Hypothesis Testing - Part 1

Lecture 6 - Statistics for Hypothesis Testing - Part 2

Lecture 7 - Statistics for sample mean

Lecture 8 - Statistics for Variance and Proportion

Lecture 9 - Type I and Type II errors

Lecture 10 - p value

Lecture 11 - Hypothesis testing of means

Lecture 12 - Hypothesis testing of variance and proportions

Lecture 13 - Confidence interval construction

Lecture 14 - Hypothesis testing using confidence interval

Lecture 15 - Hypothesis testing of correlation

Lecture 16 - Statistic for linear regression

Lecture 17 - Hypothesis testing in linear regression

Lecture 18 - Power of hypothesis test

Lecture 19 - Factors affecting hypothesis test

NPTEL : NOC:Applied Time-Series Analysis (Chemical Engineering)

Co-ordinators : Dr. Arun K.Tangirala

Lecture 32 - Lecture 14 - Part 1 - Autocovariance & Autocorrelation Functions 7

Lecture 33 - Lecture 14 - Part 2 - Autocovariance & Autocorrelation Functions 8

Lecture 34 - Lecture 15 - Part 1 - Autocovariance & Autocorrelation Functions 9

Lecture 35 - Lecture 15 - Part 2 - Partial Autocorrelation Functions

Lecture 36 - Lecture 16 - Part 1 - Autocorrelation and Partial-autocorrelation Functions (with R Demonstration)

Lecture 37 - Lecture 16 - Part 2 - Models for Linear Stationary Processes 1

Lecture 38 - Lecture 17 - Part 1 - Models for Linear Stationary Processes 2

Lecture 39 - Lecture 17 - Part 2 - Models for Linear Stationary Processes 3

Lecture 40 - Lecture 18 - Part 1 - Models for Linear Stationary Processes 4

Lecture 41 - Lecture 18 - Part 2 - Models for Linear Stationary Processes 5

Lecture 42 - Lecture 18 - Part 3 - Models for Linear Stationary Processes 6

Lecture 43 - Lecture 19 - Part 1 - Models for Linear Stationary Processes 7

Lecture 44 - Lecture 19 - Part 2 - Models for Linear Stationary Processes 8

Lecture 45 - Lecture 19 - Part 3 - Models for Linear Stationary Processes 9

Lecture 46 - Lecture 20 - Part 1 - Models for Linear Stationary Processes 10

Lecture 47 - Lecture 20 - Part 2 - Models for Linear Stationary Processes 11

Lecture 48 - Lecture 21 - Part 1 - Models for Linear Stationary Processes 12

Lecture 49 - Lecture 21 - Part 2 - Models for Linear Stationary Processes 13

Lecture 50 - Lecture 22 - Part 1 - Models for Linear Stationary Processes 14 (with R Demonstrations)

Lecture 51 - Lecture 22 - Part 2 - Models for Linear Stationary Processes 15 (with R Demonstrations)

Lecture 52 - Lecture 22 - Part 3 - Models for Linear Stationary Processes 16 (with R Demonstrations)

Lecture 53 - Lecture 23 - Part 1 - Models for Linear Non-stationary Processes 1

Lecture 54 - Lecture 23 - Part 2 - Models for Linear Non-stationary Processes 2 (with R Demonstrations)

Lecture 55 - Lecture 24 - Part 1 - Models for Linear Non-stationary Processes 3 (with R Demonstrations)

Lecture 56 - Lecture 24 - Part 2 - Models for Linear Non-stationary Processes 4

Lecture 57 - Lecture 25 - Part 1 - Models for Linear Non-stationary Processes 5

Lecture 58 - Lecture 25 - Part 2 - Models for Linear Non-stationary Processes 6 (with R Demonstrations)

Lecture 59 - Lecture 26 - Part 1 - Fourier Transforms for Deterministic Signals 1

Lecture 60 - Lecture 26 - Part 2 - Fourier Transforms for Deterministic Signals 2

Lecture 61 - Lecture 27 - Part 1 - Fourier Transforms for Deterministic Signals 3

Lecture 62 - Lecture 27 - Part 2 - Fourier Transforms for Deterministic Signals 4

Lecture 63 - Lecture 28 - Part 1 - Fourier Transforms for Deterministic Signals 5

Lecture 64 - Lecture 28 - Part 2 - Fourier Transforms for Deterministic Signals 6

Lecture 98 - Lecture 42C - Estimation Methods 1 - 5

Lecture 99 - Lecture 43A - Estimation Methods 1 - 6 (with R demonstrations)

Lecture 100 - Lecture 43B - Estimation Methods 1 - 7 (with R demonstrations)

Lecture 101 - Lecture 44A - Estimation Methods 1 - 8

Lecture 102 - Lecture 44B - Estimation Methods 1 - 9

Lecture 103 - Lecture 44C - Estimation Methods 2 - 1

Lecture 104 - Lecture 45A - Estimation Methods 2 - 2

Lecture 105 - Lecture 45B - Estimation Methods 2 - 3

Lecture 106 - Lecture 46A - MLE and Bayesian Estimation - 1

Lecture 107 - Lecture 46B - MLE and Bayesian Estimation - 2

Lecture 108 - Lecture 47A - MLE and Bayesian Estimation - 3

Lecture 109 - Lecture 47B - MLE and Bayesian Estimation - 4

Lecture 110 - Lecture 48A - Estimation of Time Domain Statistics - 1

Lecture 111 - Lecture 48B - Estimation of Time Domain Statistics - 2

Lecture 112 - Lecture 49 - Periodogram as PSD Estimator

NPTEL : NOC:Rheology of Complex Materials (Chemical Engineering)

Co-ordinators : Dr. Abhijit P. Deshpande

NPTEL : NOC:Process Control - Design, Analysis and Assessment (Chemical Engineering)

Co-ordinators : Prof. Ragunathan Rengasamy

Lecture 1 - Introduction

Lecture 2 - Introductory Concepts

Lecture 3 - Introduction to Modeling

Lecture 4 - Introduction to Control Structures

Lecture 5 - Process Modelling

Lecture 6 - State Space Modeling

Lecture 7 - State Space Solution

Lecture 8 - Laplace Transforms - Part 1

Lecture 9 - Laplace Transforms - Part 2

Lecture 10 - Analysis of transfer function models - Part 1

Lecture 11 - Analysis of transfer function models - Part 2

Lecture 12 - Stability

Lecture 13 - MATLAB Tutorial 1: Process Modelling

Lecture 14 - MATLAB Tutorial 2: Time domain analysis of first order process

Lecture 15 - Controller Equations

Lecture 16 - Controllers and analysis of closed loop transfer functions

Lecture 17 - P, PI and PID Controllers

Lecture 18 - Stability analysis of closed loop systems

Lecture 19 - Controller design and tuning - Part 1

Lecture 20 - Controller design and tuning - Part 2

Lecture 21 - Traditional Advanced Control - Part 1

Lecture 22 - Traditional Advanced Control - Part 2

Lecture 23 - Frequency Response Analysis - Part 1

Lecture 24 - Frequency Response Analysis - Part 2

Lecture 25 - Traditional Advanced Control - Part 3

Lecture 26 - Traditional Advanced Control - Part 4

Lecture 27 - Traditional Advanced Control - Part 5

Lecture 28 - Understanding PID Gains

Lecture 29 - Nyquist Stability Criterion - Part 1

Lecture 30 - Nyquist Stability Criterion - Part 2

Lecture 31 - Nyquist Stability Criterion - Part 3

NPTEL : System Identification (Chemical Engineering)

Co-ordinators : Dr. Arun K.Tangirala

Lecture 32 - Response-based Description 10

Lecture 33 - Response-based Description 11

Lecture 34 - Response-based Description 12

Lecture 35 - Response-based Description 13

Lecture 36 - Discrete time LTI system 1

Lecture 37 - Discrete time LTI system 2

Lecture 38 - z-Domain Descriptions 1

Lecture 39 - z-Domain Descriptions 2

Lecture 40 - z-Domain Descriptions 3

Lecture 41 - z-Domain Descriptions 4

Lecture 42 - z-Domain Descriptions 5

Lecture 43 - z-Domain Descriptions 6

Lecture 44 - State Space Representation 1

Lecture 45 - State Space Representation 2

Lecture 46 - State Space Representation 3

Lecture 47 - State Space Representation 4

Lecture 48 - Sampled - Data Systems 1

Lecture 49 - Sampled - Data Systems 2

Lecture 50 - Sampled - Data Systems 3

Lecture 51 - Sampled - Data Systems 4

Lecture 52 - Sampled - Data Systems 5

Lecture 53 - Sampled - Data Systems 6

Lecture 54 - Sampled - Data Systems 7

Lecture 55 - Sampled - Data Systems 8

Lecture 56 - Probability_Random variables and moments - Review 1

Lecture 57 - Probability_Random variables and moments - Review 2

Lecture 58 - Probability_Random variables and moments - Review 3

Lecture 59 - Probability_Random variables and moments - Review 4

Lecture 60 - Probability_Random variables and moments - Review 5

Lecture 61 - Probability_Random variables and moments - Review 6

Lecture 62 - Random Processes - Review 1

Lecture 63 - Random Processes - Review 2

Lecture 64 - Random Processes - Review 3

Lecture 65 - Random Processes - Review 4

Lecture 66 - Random Processes - Review 5

Lecture 67 - Random Processes - Review 6 (MATLAB)

Lecture 68 - Random Processes - Review 7

Lecture 69 - Random Processes - Review 8

Lecture 70 - Spectral Representation 1

Lecture 71 - Spectral Representation 2

Lecture 72 - Spectral Representation 3

Lecture 73 - Models for Identification 1

Lecture 74 - Models for Identification 2

Lecture 75 - Models for Identification 3

Lecture 76 - Models for Identification 4

Lecture 77 - One step and multi-step ahead prediction 1

Lecture 78 - One step and multi-step ahead prediction 2

Lecture 79 - One step and multi-step ahead prediction 3

Lecture 80 - One step and multi-step ahead prediction 4

Lecture 81 - One step and multi-step ahead prediction 5

Lecture 82 - Introduction to estimation theory 1

Lecture 83 - Introduction to estimation theory 2

Lecture 84 - Fisher's information and properties of estimators 1

Lecture 85 - Fisher's information and properties of estimators 2

Lecture 86 - Fisher's information and properties of estimators 3

Lecture 87 - Fisher's information and properties of estimators 4

Lecture 88 - Fisher's information and properties of estimators 5

Lecture 89 - Fisher's information and properties of estimators 6

Lecture 90 - Fisher's information and properties of estimators 7

Lecture 91 - Fisher's information and properties of estimators 8

Lecture 92 - Fisher's information and properties of estimators 9

Lecture 93 - Fisher's information and properties of estimators 10

Lecture 94 - Fisher's information and properties of estimators 11

Lecture 95 - Fisher's information and properties of estimators 12

Lecture 96 - Fisher's information and properties of estimators 13

Lecture 97 - Fisher's information and properties of estimators 14

NPTEL : NOC:Fluid and Particle Mechanics (Chemical Engineering)

Co-ordinators : Prof. Basavaraju

NPTEL : NOC:Continuum Mechanics and Transport Phenomena (Chemical Engineering)

Co-ordinators : Prof. T. Renganathan

Lecture 65 - Strain Rate Velocity Gradient Relation

Lecture 66 - Volumetric Strain Rate

Lecture 67 - Velocity Gradient Tenso

Lecture 68 - Strain Rate : Example 1

Lecture 69 - Strain Rate : Example 2

Lecture 70 - Stress Strain Relation : Introduction

Lecture 71 - Material Properties

Lecture 72 - Hookeâ€™s Law - Strain-stress Relation

Lecture 73 - Relation Between Material Properties

Lecture 74 - Hookeâ€™s Law - Stress-strain Relation

Lecture 75 - Hookeâ€™s Law : Examples

Lecture 76 - Stress Strain Rate Relation : Introduction

Lecture 77 - Newtonâ€™s Law of Viscosity : 1D Form

Lecture 78 - Newtonâ€™s Law of Viscosity : 3D Form

Lecture 79 - Navier Stokes Equation

Lecture 80 - Fluid at Rest : Pressure Distribution

Lecture 81 - Hydrostatic Pressure Distribution in Liquid

Lecture 82 - Hydrostatic Pressure Distribution in Gas

Lecture 83 - Fluid in Rigid Body Motion : Pressure Distribution

Lecture 84 - Flow Regimes : Laminar and Turbulent flow

Lecture 85 - Euler Equation

Lecture 86 - Bernoulli Equation : Inviscid Flow

Lecture 87 - Bernoulli Equation : Example 1

Lecture 88 - Bernoulli Equation : Irrotational Flow

Lecture 89 - Bernoulli Equation : Example 2

Lecture 90 - Planar Couette Flow - Governing Equations

Lecture 91 - Planar Couette Flow - Velocity and Pressure Distribution

Lecture 92 - Planar Couette Flow - Shear Force

Lecture 93 - Planar Poiseuille Flow : Governing Equations

Lecture 94 - Planar Poiseuille Flow : Velocity and Pressure Distribution

Lecture 95 - Planar Poiseuille Flow : Shear force

Lecture 96 - Planar Poiseuille Flow : Shear Stress Distribution

Lecture 97 - Viscous Stress vs. Molecular Momentum Flux - Part 1

NPTEL : NOC:Environmental Quality Monitoring and Analysis (Chemical Engineering)

Co-ordinators : Dr. R. Ravi Krishna

Lecture 1 - Introduction

Lecture 2 - Chemicals of Concern

Lecture 3 - Water Quality Screening Parameters

Lecture 4 - Water Quality Parameters

Lecture 5 - Air quality parameters; Sustainability

Lecture 6 - PM - Particulate Matter

Lecture 7 - Physical/Chemical properties of interest

Lecture 8 - Partition Constants

Lecture 9 - Soil-air partition constants

Lecture 10 - Application/Example of Equilibrium Partitioning

Lecture 11 - Introduction to Environmental Monitoring and Sampling

Lecture 12 - Environmental Sampling

Lecture 13 - Environmental Analysis: Quality Control - Part 1

Lecture 14 - Environmental Analysis: Quality Control - Part 2

Lecture 15 - Environmental Analysis of Organics in Water

Lecture 16 - Environmental Analysis: Quality Control - Part 3

Lecture 17 - Tutorial

Lecture 18 - Tutorial (Continued...)

Lecture 19 - Analysis Methods - Introduction and Water Quality Parameters

Lecture 20 - Analysis Methods - Water Quality Parameters

Lecture 21 - Analysis Methods - Review of Standard Methods

Lecture 22 - Analysis Methods - Organics in water

Lecture 23 - Analysis Methods - Overall Methodology for Organics

Lecture 24 - Analysis Methods - Chromatography Fundamentals

Lecture 25 - Analysis Methods - Gas Chromatography

Lecture 26 - Analysis Methods - Gas Chromatography (Mass Spectrometry)

Lecture 27 - Analysis Methods - Liquid Chromatography

Lecture 28 - Monitoring methods for Air - PM - Part 1

Lecture 29 - Monitoring methods for Air - PM - Part 2

Lecture 30 - Monitoring methods for Air - Vapor - Part 1

Lecture 31 - Monitoring methods for Air - Vapor - Part 2

Lecture 32 - Monitoring methods for Air - Vapor - Part 3

Lecture 33 - Monitoring and Measurement of Microorganisms

Lecture 34 - Transport of Pollutants - Introduction

Lecture 35 - Transport of Pollutants - Box Models in Water

Lecture 36 - Transport of Pollutants - Box Models in Air

Lecture 37 - Transport of Pollutants - Dispersion

Lecture 38 - Transport of Pollutants - Gaussian Dispersion Model

Lecture 39 - Dispersion Model - Parameters - Part 1

Lecture 40 - Dispersion Model - Parameters - Part 2

Lecture 41 - Gaussian Dispersion Model

Lecture 42 - Gaussian Dispersion Model - Example, Additional topics

Lecture 43 - Regulatory Models

Lecture 44 - Introduction to Interphase Mass Transfer

Lecture 45 - Interphase mass transfer - Application to Environmental Interfaces

Lecture 46 - Interphase mass transfer - Flux and mass transfer resistance

Lecture 47 - Interphase mass transfer - Boundary Layer and Mass Transfer Coefficient

Lecture 48 - Interphase mass transfer - Individual and Overall Mass Transfer Coefficients

Lecture 49 - Overall Mass Transfer Coefficient

Lecture 50 - Estimation of the Mass Transfer Coefficients

Lecture 51 - Air-Water Exchange

Lecture 52 - Evaporation from different surfaces

Lecture 53 - Sediment-Water exchange

Lecture 54 - Application of Interphase mass transfer

Lecture 55 - Contamination of Sediments

Lecture 56 - Release from Sediments

Lecture 57 - Unsteady state release from sediments

Lecture 58 - Other mechanisms of chemical release from sediments - Part 1

Lecture 59 - Other mechanisms of chemical release from sediments - Part 2

Lecture 60 - Soil - Air Transfer

Lecture 61 - Remediation of contaminated sediments - Application of transport models

NPTEL : Synthetic and Natural Supramolecular Architectures: An Approach Towards Molecular Technology (Chemical Engineering)

Co-ordinators : Prof. ChebroluPulla Rao

NPTEL : NOC:Artificial Lift (Chemical Engineering)

Co-ordinators : Prof. Abdus Samad

Lecture 1 - Introduction to oil and gas

Lecture 2 - Drilling and Completion

Lecture 3 - Well completion

Lecture 4 - Oil and gas production systems

Lecture 5 - Pumps, compressors and flow through pipes

Lecture 6 - Reservoir fluid

Lecture 7 - Fluid properties and Phase diagram - Part 1

Lecture 8 - Fluid properties and Phase diagram - Part 2

Lecture 9 - Nodal analysis

Lecture 10 - Reservoir deliverability - Single phase flow

Lecture 11 - Reservoir deliverability - Two phase flow

Lecture 12 - Flow over a flat surface or flow through pipe - Part 1

Lecture 13 - Flow over a flat surface or flow through pipe - Part 2

Lecture 14 - Single-Phase, Multi-Phase-Emulsion

Lecture 15 - Emulsification and demulsification

Lecture 16 - Single and Multi Phase flow-flow regimes

Lecture 17 - Multi phase flow-flow models

Lecture 18 - Choke Performance

Lecture 19 - Pump classifications

Lecture 20 - Classification of artificial lifts - Part 1

Lecture 21 - Classification of artificial lifts - Part 2

Lecture 22 - Sucker rod pump (SRP) - Part 1

Lecture 23 - Sucker rod pump (SRP) - Part 2

Lecture 24 - Sucker rod pump (SRP) - Part 3

Lecture 25 - Sucker rod pump (SRP) - Part 4

Lecture 26 - Sucker rod pump (SRP) - Part 5

Lecture 27 - Sucker rod pump (SRP) - Part 6

Lecture 28 - SRP-Pump performance analysis - Part 1

Lecture 29 - SRP-Pump performance analysis - Part 2

Lecture 30 - SRP-Pump performance analysis - Part 3

Lecture 31 - Introduction to progressive cavity punp

Lecture 32 - Progressive cavity Pump - Part 1

Lecture 33 - Progressive cavity Pump - Part 2

Lecture 34 - Progressive cavity Pump - Part 3

Lecture 35 - Progressive cavity Pump - Part 4

Lecture 36 - Progressive cavity Pump - Part 5

Lecture 37 - Electric submersible pump - Part 1

Lecture 38 - Electric submersible pump - Part 2

Lecture 39 - Electric submersible pump - Part 3

Lecture 40 - ESP- basic electrical systems - Part 1

Lecture 41 - ESP- basic electrical systems - Part 2

Lecture 42 - ESP- basic electrical systems - Part 3

Lecture 43 - ESP- numerical problems - Part 1

Lecture 44 - ESP- numerical problems - Part 2

Lecture 45 - ESP- numerical problems - Part 3

Lecture 46 - ESP- numerical problems - Part 1

Lecture 47 - ESP- numerical problems - Part 2

Lecture 48 - Gas lift basics - Part 1

Lecture 49 - Gas lift basics - Part 2

Lecture 50 - Gas lift valves and installartion - Part 1

Lecture 51 - Gas lift valves and installartion - Part 2

Lecture 52 - Plunger lift and design

Lecture 53 - Hydraulic jet pump fundamentals - Part 1

Lecture 54 - Hydraulic jet pump fundamentals - Part 2

Lecture 55 - Hydraulic engine pumps and design - Part 1

Lecture 56 - Hydraulic engine pumps and design - Part 2

Lecture 57 - Surface pump units for jet pump - Part 1

Lecture 58 - Surface pump units for jet pump - Part 2

Lecture 59 - Surface pump units for jet pump - Part 3

Lecture 60 - Surface compressor for gas lift - Part 1

Lecture 61 - Surface compressor for gas lift - Part 2

Lecture 62 - Surface compressor for gas lift - Part 3

NPTEL : Chemical Technology - I (Chemical Engineering)

Co-ordinators : Dr. I.D. Mall

Lecture 1 - Introduction to Chemical process Industries

Lecture 2 - Raw material for Organic Chemical Industries

Lecture 3 - Unit processes and unit operations in organic chemical Industries

Lecture 4 - Coal and coal as chemicals feed stock

Lecture 5 - Coal carbonization and Coke oven plant

Lecture 6 - Gasification of Coal,Petrocoke and Biomass

Lecture 7 - Introduction to Pulp and paper Industry, Raw material for paper industry and Technological development

Lecture 8 - Pulping and Bleaching

Lecture 9 - Recovery of Chemicals

Lecture 10 - Stock preparation and paper making

Lecture 11 - Introduction to Soap and detergent, Soap making and Recovery of Glycerine

Lecture 12 - Synthetic detergent and Linear alkyl benzene

Lecture 13 - Sugar and Fermentation industry

Lecture 14 - Ethanol as Biofuel and Chemical feed stock

Lecture 15 - Introduction : Staus of Petroleum refinery, Crude oil and Natural gas origin, occurrence, exploration, drilling and processing, Fuel norms

Lecture 16 - Evaluation of Crude oil,Petroleum Products and Apetrochemicals

Lecture 17 - Crude oil Distillation

Lecture 18 - Thermal Cracking: Visbreaking and Delayed Coking

Lecture 19 - Catalytic cracking: Fluid Catalytic cracking and Hydro cracking

Lecture 20 - Catalytic reforming

Lecture 21 - Alkylation, Isomerisation and Polymerisation

Lecture 22 - Desulphurisation Processes and Recovery of Sulphur

Lecture 23 - Profile of petrochemical Industry and its structure

Lecture 24 - Naphtha and gas cracking for production of olefins

Lecture 25 - Recovery of chemicals from FCC and steam cracking

Lecture 26 - Synthesis gas and its derivatives: Hydrogen, CO, Methanol, Formaldehyde

Lecture 27 - Ethylene derivatives: Ethylene Oxide, Ethylene glycol, Ethylene dichloride and Vinyl chloride

Lecture 28 - Propylene, Propylene oxide and Isopropanol

Lecture 29 - Aromatics Production

Lecture 30 - Aromatics product profile, Ethyl benzene & Styrene, Cumene and phenol, Bisphenol, Aniline

NPTEL : Process Integration (Chemical Engineering)

Co-ordinators : Dr. B. Mohanty

Lecture 1 - Process integration, methods and area of application

Lecture 2 - Fundamental concepts related to heat integration - Part 1

Lecture 3 - Fundamental concepts related to heat integration - Part 2

Lecture 4 - Data extraction

Lecture 5 - Hot composite curves

Lecture 6 - Cold composite curves

Lecture 7 - Hot and cold composite curves and the pinch

Lecture 8 - Threshold problems

Lecture 9 - Energy targeting procedure

Lecture 10 - Problem Table Algorithm - Part 1

Lecture 11 - Grand composite curve

Lecture 12 - Problem Table Algorithm - Part 2

Lecture 13 - Number of units target

Lecture 14 - Shell targeting - Part 1

Lecture 15 - Area targeting - Part 1

Lecture 16 - Area targeting - Part 2

Lecture 17 - Coast targeting - Part 1

Lecture 18 - Coast targeting - Part 2

Lecture 19 - Supertargeting- optimization of Î” t min

Lecture 20 - Global & stream specific Î”t min and its relevance

Lecture 21 - Topology Trap

Lecture 22 - Rules for Pinch Design Method (PDM) - Part 1

Lecture 23 - Rules for Pinch Design Method (PDM) - Part 2

Lecture 24 - Application of PDM for MER Hen Synthesis

Lecture 25 - Design for threshold problems

Lecture 26 - Design for single pinch problems

Lecture 27 - Design for multi pinch problems

Lecture 28 - HEN optimization

Lecture 29 - Remaining problem analysis

Lecture 30 - Driving Force Plot

Lecture 31 - Low Temperature process Design - Part 1

Lecture 32 - Low Temperature process Design - Part 2

Lecture 33 - Integration of Gas turbine with process - Part 1

Lecture 34 - Integration of Gas turbine with process - Part 2

Lecture 35 - Placement and Integration of Distillation Column

Lecture 36 - Heat Integration of evaporators

Lecture 37 - Integration of heat pump

Lecture 38 - Placement of Heat Engine, Heat pump and Reactors

Lecture 39 - Integration of Furnace

Lecture 40 - Problem solving using HINT Software - Part 1

Lecture 41 - Problem solving using HINT Software - Part 2

Lecture 42 - Problem solving using HINT Software - Part 3

Lecture 43 - Problem solving using HINT Software - Part 4

NPTEL : Mechanical Operations (Chemical Engineering)

Co-ordinators : Prof. Shabina Khanam

NPTEL : NOC:Waste to Energy Conversion (Chemical Engineering)

Co-ordinators : Prof. P. Mondal

Lecture 1 - Introduction - 1

Lecture 2 - Introduction - 2

Lecture 3 - Characterization of wastes - 1

Lecture 4 - Characterization of wastes - 2

Lecture 5 - Characterization of wastes - 3

Lecture 6 - Tutorial on Chatacterization of wastes

Lecture 7 - Energy production from wastes through incineration - 1

Lecture 8 - Energy production from wastes through incineration - 2

Lecture 9 - Tutorial on incineration

Lecture 10 - Energy production from wastes through gasification - 1

Lecture 11 - Energy production from wastes through gasification - 2

Lecture 12 - Syngas utilization - 1

Lecture 13 - Syngas utilization - 2

Lecture 14 - Energy production from wastes through pyrolysis - 1

Lecture 15 - Energy production from wastes through pyrolysis - 2

Lecture 16 - Tutorial on gasification

Lecture 17 - Tutorial on Pyrolysis

Lecture 18 - Densification of solids - 1

Lecture 19 - Densification of solids - 2

Lecture 20 - Efficiency improvement of power plant - 1

Lecture 21 - Efficiency improvement of power plant - 2

Lecture 22 - Energy production from waste plastics - 1

Lecture 23 - Energy production from waste plastics - 2

Lecture 24 - Gas clean up - 1

Lecture 25 - Gas clean up - 2

Lecture 26 - Energy production from organic wastes through anaerobic digestion - 1

Lecture 27 - Energy production from organic wastes through anaerobic digestion - 2

Lecture 28 - Design of anaerobic digester

Lecture 29 - Introduction to Microbial fuel cells

Lecture 30 - Energy production from organic wastes through fermentation - 1

Lecture 31 - Energy production from organic wastes through fermentation - 2

NPTEL : NOC:Unit Operations of Particulate Matter (Chemical Engineering)

Co-ordinators : Prof. Shabina Khanam

NPTEL : NOC:Introduction to Polymer Physics (IIT-R) (Chemical Engineering)

Co-ordinators : Prof. Prateek Kumar Jha

NPTEL : NOC:Equipment Design: Mechanical Aspects (Chemical Engineering)

Co-ordinators : Prof. Shabina Khanam

Lecture 1 - Introduction

Lecture 2 - Stress and Strain Relationship - 1

Lecture 3 - Stress and Strain Relationship - 2

Lecture 4 - Terminologies

Lecture 5 - Design of shell

Lecture 6 - Design of heads - 1

Lecture 7 - Design of heads - 2

Lecture 8 - Design of heads - 3

Lecture 9 - Compensation for Opening - 1

Lecture 10 - Compensation for Opening - 2

Lecture 11 - L D ratio

Lecture 12 - Design of Flanges - 1.1

Lecture 13 - Design of Flanges - 1.2

Lecture 14 - Design of Flanges - 2.1

Lecture 15 - Design of Flanges - 2.2

Lecture 16 - Design of support - 1

Lecture 17 - Design of support - 2

Lecture 18 - Vessel under external pressure - 1

Lecture 19 - Vessel under external pressure - 2

Lecture 20 - Vessel under very high pressure

NPTEL : NOC:Chemical Process Safety (Chemical Engineering)

Co-ordinators : Dr. Shishir Sinha

NPTEL : NOC:Technologies for Clean and Renewable Energy Production (Chemical Engineering)

Co-ordinators : Prof. P. Mondal

Lecture 1 - Introduction

Lecture 2 - Coal as a Source of Energy

Lecture 3 - Characterization of Coal

Lecture 4 - Conventional Route for Energy Production from Coal

Lecture 5 - Tutorial 1

Lecture 6 - Cleaner Route for Energy Production from Coal

Lecture 7 - Gasification of Coal - 1

Lecture 8 - Gasification of Coal - 2

Lecture 9 - Direct Liquefaction of Coal

Lecture 10 - Tutorial 2

Lecture 11 - Petroleum as a Source of Energy

Lecture 12 - Characteristics of Crude Oil and Petroleum Products

Lecture 13 - Refining of Crude Oil for Liquid Fuels Production

Lecture 14 - Conversion of Intermediate Products

Lecture 15 - Tutorial 3

Lecture 16 - Impurities Removal from Liquid Fuels

Lecture 17 - Residue Upgradation - 1

Lecture 18 - Residue Upgradation - 2

Lecture 19 - Heavy Crude Oil Processing

Lecture 20 - Tutorial 4

Lecture 21 - Properties and Routes for Energy Production

Lecture 22 - Syn Gas Production from Natural Gas

Lecture 23 - Syn Gas to Liquid Fuel Production

Lecture 24 - Hydrogen Production from Natural Gas

Lecture 25 - Tutorial 5

Lecture 26 - Solar Energy - 1

Lecture 27 - Solar Energy - 2

Lecture 28 - Wind Energy - 1

Lecture 29 - Wind Energy - 2

Lecture 30 - Tutorial 6

Lecture 31 - Hydro Energy - 1

NPTEL : NOC:Polymer Reaction Engineering (Chemical Engineering)

Co-ordinators : Prof. Shishir Sinha

Lecture 32 - Radical Chain Polymerization Introduction

Lecture 33 - Radical Chain Polymerization Comparison with Ionic Chain Polymerization

Lecture 34 - Radical Chain Polymerization Mode of Propagation

Lecture 35 - Radical Chain Polymerization Rate of Polymerization

Lecture 36 - Radical Chain Polymerization Rate Expression

Lecture 37 - Radical Chain Polymerization Process Analysis - I

Lecture 38 - Radical Chain Polymerization Process Analysis - II

Lecture 39 - Radical Chain Polymerization Half-life, Propagation and Termination - I

Lecture 40 - Radical Chain Polymerization Half-life, Propagation and Termination - II

Lecture 41 - Radical Chain Polymerization Redox Initiation

Lecture 42 - Radical Chain Polymerization Photochemical and Ionization Initiation

Lecture 43 - Radical Chain Polymerization Other Initiation Techniques - I

Lecture 44 - Radical Chain Polymerization Other Initiation Techniques - II

Lecture 45 - Heterogeneous Polymerization Introduction - I

Lecture 46 - Heterogeneous Polymerization Introduction - II

Lecture 47 - Population Balance Modeling Other Techniques - I

Lecture 48 - Population Balance Modeling Other Techniques - II

Lecture 49 - Emulsion Polymerization Batch Polymerization

Lecture 50 - Emulsion Polymerization Semi-continuous polymerization

Lecture 51 - Emulsion Polymerization Nucleation, Morphology and Reactor Types - I

Lecture 52 - Emulsion Polymerization Nucleation, Morphology and Reactor Types - II

Lecture 53 - Emulsion Polymerization PSD and Implementation of the Process - I

Lecture 54 - Emulsion Polymerization PSD and Implementation of the Process - II

Lecture 55 - Living and dormant Polymerization

Lecture 56 - Ionic Polymerization - I

Lecture 57 - Ionic Polymerization - II

Lecture 58 - Ionic Polymerization - III

Lecture 59 - Ionic Polymerization - IV

Lecture 60 - Ionic Polymerization - V

NPTEL : NOC:Process Equipment Design (Chemical Engineering)

Co-ordinators : Prof. Shabina Khanam

Lecture 1 - Introduction

Lecture 2 - Classification of exchangers - 1

Lecture 3 - Classification of exchangers - 2

Lecture 4 - Basic Design Parameters - 1

Lecture 5 - Basic Design Parameters - 2

Lecture 6 - Double Pipe Heat Exchanger - 1

Lecture 7 - Double Pipe Heat Exchanger - 2

Lecture 8 - Double Pipe Heat Exchanger - 3

Lecture 9 - Types of Shell and Tube exchangers

Lecture 10 - Exchanger Tubes

Lecture 11 - Exchanger Shell

Lecture 12 - STE design - Kernâ€™s method - 1

Lecture 13 - STE design - Kernâ€™s method - 2

Lecture 14 - STE design - Kernâ€™s method - 3

Lecture 15 - STE design - Kernâ€™s method: Example - 4

Lecture 16 - STE design - Kernâ€™s method: Example - 5

Lecture 17 - STE design - Bellâ€™s method - 1

Lecture 18 - STE design - Bellâ€™s method - 2

Lecture 19 - STE design - Bellâ€™s method - 3

Lecture 20 - STE design - Bellâ€™s method: Example - 4

Lecture 21 - STE design - Bellâ€™s method: Example - 5

Lecture 22 - Design of Condenser - 1

Lecture 23 - Design of Condenser - 2

Lecture 24 - Design of Condenser - 3

Lecture 25 - Design of Condenser - 4

Lecture 26 - Design of Condenser - 5

Lecture 27 - Design of Reboiler - 1

Lecture 28 - Design of Reboiler - 2

Lecture 29 - Design of Reboiler - 3

Lecture 30 - Design of Reboiler - 4

Lecture 31 - Design of Reboiler - 5

NPTEL : NOC:Advanced Thermodynamics and Molecular Simulations (Chemical Engineering)

Co-ordinators : Prof. Prateek Kumar Jha

NPTEL : NOC:Chemical Process Utilities (Chemical Engineering)

Co-ordinators : Prof. Shishir Sinha

Lecture 1 - Introduction to Chemical Process Utilities

Lecture 2 - Energy Perspective to the Utilities

Lecture 3 - Power Cycle

Lecture 4 - Fuel Analysis

Lecture 5 - Practice problems related to power cycle and fuel analysis

Lecture 6 - Heat Transfer Utilities - I

Lecture 7 - Heat Transfer Utilities - II

Lecture 8 - Plate and Frame Heat Exchangers Types

Lecture 9 - Solar Energy - I

Lecture 10 - Solar Energy - II

Lecture 11 - Heat Transfer Media and Solar energy

Lecture 12 - Water

Lecture 13 - Water Chemistry

Lecture 14 - Inhibition and Water Treatment

Lecture 15 - Boiler Water treatment

Lecture 16 - Water Governance

Lecture 17 - Water Quality standards - I

Lecture 18 - Water Quality Standards - II

Lecture 19 - Steam

Lecture 20 - Boilers

Lecture 21 - Industrial Boiler Types

Lecture 22 - Boilers

Lecture 23 - Boilers- Question Practice

Lecture 24 - Steam Generation Unit

Lecture 25 - Steam Generation Unit-Heaters

Lecture 26 - Attemperator and Steam Drum

Lecture 27 - Steam Traps, Centralization, and Fuel Selection

Lecture 28 - Economizer, Super heaters, and Safety devices

Lecture 29

Lecture 30 - Insulation of Steam Generators

Lecture 31 - Air

Lecture 32 - Air Filtration and Pneumatic Conveying

Lecture 33 - Introduction to Pneumatic Conveying System

Lecture 34 - Conveying System Types

Lecture 35 - Material Properties and Pipeline Feeding Devices

Lecture 36 - Feeding devices

Lecture 37 - Gas-solid flows

Lecture 38 - Design of Pipelines Elements of Pipeline Design

Lecture 39 - Natural Gas Transmission - I

Lecture 40 - Natural Gas Transmission - II

Lecture 41 - Natural Gas Transmission - III

Lecture 42 - Pipeline Mechanical design - Natural Gas Transmission - IV

Lecture 43 - Cooling Tower; Theory and Some Basic Calculations

Lecture 44 - Concept of Heat Transfer in Cooling Tower and itâ€™s Components

Lecture 45 - Types and Components of Cooling Tower

Lecture 46 - Components and Materials of Construction and Applications of Cooling Tower

Lecture 47 - Control and Maintenance in cooling towers

Lecture 48 - Pressure Levels and Terminology - I

Lecture 49 - Pressure Levels and Terminology - II

Lecture 50 - Gauges for Pressure Measurement

Lecture 51 - Refrigerants and Refrigeration

Lecture 52 - Introduction to Refrigeration

Lecture 53 - Refrigeration System Components

Lecture 54 - Refrigeration System Components and Refrigeration Cycle

Lecture 55 - Refrigeration Systems

Lecture 56 - Refractories

Lecture 57 - Thermodynamic Principles and Corrosion in Refractories

Lecture 58 - Slag Attack and Kinds of Refractories in Uses

Lecture 59 - Brief history of Insulations and itâ€™s fundamental principles

Lecture 60 - Heat transfer in Insulations materials

NPTEL : NOC:Physico-Chemical Processes for Waste Water Treatment (Chemical Engineering)

Co-ordinators : Prof. Vimal Chandra Srivastava

Lecture 32 - Adsorption - II

Lecture 33 - Adsorption - III

Lecture 34 - Adsorption - IV

Lecture 35 - Adsorption - V

Lecture 36 - Adsorption - VI

Lecture 37 - Ion-exchange - I

Lecture 38 - Ion-exchange - II

Lecture 39 - Ion-exchange - III

Lecture 40 - Ion-exchange - IV

Lecture 41 - Wastewater treatment by membrane processes - I

Lecture 42 - Wastewater treatment by membrane processes - II

Lecture 43 - Wastewater treatment by membrane processes - III

Lecture 44 - Wastewater treatment by membrane processes - IV

Lecture 45 - Wastewater treatment by membrane processes - V

Lecture 46 - Advanced Oxidation Processes (AOP) - Introduction

Lecture 47 - AOP - Photocatalytic wastewater treatment

Lecture 48 - AOP - Fenton, ozone and catalytic treatment

Lecture 49 - AOP - Electrochemical wastewater treatment - I

Lecture 50 - AOP - Electrochemical wastewater treatment - II

Lecture 51 - AOP - Sono-hybrid wastewater treatment

Lecture 52 - Disinfection - I

Lecture 53 - Disinfection - II

Lecture 54 - Disinfection - III

Lecture 55 - Case Study - Wastewater treatment in sugar industry

Lecture 56 - Case Study - Wastewater treatment in distillery

Lecture 57 - Case Study - Wastewater treatment in fertilizer industry

Lecture 58 - Case Study - Wastewater treatment in petroleum refining industry

Lecture 59 - Case Study - Common effluent treatment plant (CETP)

Lecture 60 - Choice of technology and summary

NPTEL : NOC:Basic Environmental Engineering and Pollution Abatement (Chemical Engineering)

Co-ordinators : Prof. P. Mondal

Lecture 1 - Introduction

Lecture 2 - Ecology, Environment and Biodiversity

Lecture 3 - Ecosystem services and its risks - 1

Lecture 4 - Ecosystem services and its risks - 2

Lecture 5 - Tutorial-1

Lecture 6 - Pollution types and sources

Lecture 7 - Pollution: Impacts/Consequences

Lecture 8 - Transmission of pollutants in environment - 1

Lecture 9 - Transmission of pollutants in environment - 2

Lecture 10 - Tutorial-2

Lecture 11 - Environmental quality and standards - 1

Lecture 12 - Environmental quality and standards - 2

Lecture 13 - Instrumental techniques of environmental analysis - 1

Lecture 14 - Instrumental techniques of environmental analysis - 2

Lecture 15 - Tutorial-3

Lecture 16 - Sampling and characterization - 1 (Gas, air ,emission)

Lecture 17 - Sampling and characterization - 2 (water, wastewater, effluents)

Lecture 18 - Sampling and characterization - 3 (solid waste and soil)

Lecture 19 - Environmental laws and regulatory framework

Lecture 20 - Tutorial-4

Lecture 21 - Air pollution control - 1

Lecture 22 - Air pollution control - 2

Lecture 23 - Air pollution control - 3

Lecture 24 - Air pollution control - 4

Lecture 25 - Tutorial-5

Lecture 26 - Treatment of surface and ground water for drinking water generation

Lecture 27 - Treatment of domestic and industrial wastewater: Schemes

Lecture 28 - Primary treatment equipment

Lecture 29 - Secondary treatment processes

Lecture 30 - Tutorial-6

Lecture 31 - Secondary treatment equipment - 1

Lecture 32 - Secondary treatment equipment - 2

Lecture 33 - Advanced secondary processes - 1

Lecture 34 - Advanced secondary processes - 2

Lecture 35 - Tutorial-7

Lecture 36 - Advanced secondary processes - 3

Lecture 37 - Tertiary treatment - 1

Lecture 38 - Tertiary treatment - 2

Lecture 39 - Tertiary treatment - 3

Lecture 40 - Tutorial-8

Lecture 41 - Sludge management - 1

Lecture 42 - Sludge management - 2

Lecture 43 - Sludge management - 3

Lecture 44 - Industrial Pollution Control in GPI - 1 (General aspect and pollution control in sugar industry)

Lecture 45 - Tutorial-9

Lecture 46 - Industrial Pollution Control in GPI - 2 (Pollution control in Distillery)

Lecture 47 - Industrial Pollution Control in GPI - 3 (Pollution control in Tannery)

Lecture 48 - Pollution control in Petroleum refinery and petrochemicals industry

Lecture 49 - Industrial Pollution Control in GPI - 4

Lecture 50 - Tutorial 10

Lecture 51 - Solid waste and hazardous waste management - 1

Lecture 52 - Solid waste and hazardous waste management - 2

Lecture 53 - Solid waste and hazardous waste management - 3

Lecture 54 - Solid waste and hazardous waste management - 4

Lecture 55 - Tutorial-11

Lecture 56 - Air Pollution Management, Air quality survey, NAAQI - 1

Lecture 57 - Air Pollution Management, Air quality survey, NAAQI - 2

Lecture 58 - Management of special category wastes - 1

Lecture 59 - Management of special category wastes - 2

Lecture 60 - Tutorial-12

NPTEL : NOC:Biological Process Design for Wastewater Treatment (Chemical Engineering)

Co-ordinators : Prof. Vimal Chandra Srivastava

Lecture 32 - Sludge Management - II

Lecture 33 - Sludge Management - III

Lecture 34 - Sludge Management - IV

Lecture 35 - Sludge Management - V

Lecture 36 - Sludge Management - VI

Lecture 37 - Sustainable Development and Environmental Impact Assessment

Lecture 38 - Management of Wastewater from Dairy Industry

Lecture 39 - Management of Wastewater from Slaughterhouse

Lecture 40 - Common Effluent Treatment Plant (CETP)

NPTEL : NOC:Advanced Reaction Engineering (Chemical Engineering)

Co-ordinators : Prof. Taraknath Das

NPTEL : NOC:Polymer Process Engineering (Chemical Engineering)

Co-ordinators : Prof. Shishir Sinha

Lecture 1 - Introduction to Polymers

Lecture 2 - Polymers and Polymerization Techniques

Lecture 3 - Characteristics of Polymers - I

Lecture 4 - Characteristics of Polymers - II

Lecture 5 - Applications of Polymers

Lecture 6 - Thermodynamics of Polymer Systems - I

Lecture 7 - Thermodynamics of Polymer Systems - II

Lecture 8 - Thermodynamics of Polymer Systems - III

Lecture 9 - Thermodynamics of Polymer Systems - IV

Lecture 10 - Thermodynamics of Polymer Systems - V

Lecture 11 - Applied polymer rheology: Fluid behavior

Lecture 12 - Applied polymer rheology: Structure and properties of deforming polymer

Lecture 13 - Applied polymer rheology: Flow of polymers with supermolecular structure

Lecture 14 - Applied polymer rheology: Transport phenomena

Lecture 15 - Applied polymer rheology: Rheometry

Lecture 16 - Heat Transfer Phenomenon in polymer systems: Introduction

Lecture 17 - Heat Transfer Phenomenon in polymer systems: Thermal properties

Lecture 18 - Heat Transfer Phenomenon in polymer systems: Thermal properties and conduction

Lecture 19 - Heat Transfer Phenomenon in polymer systems: Conduction and Convection

Lecture 20 - Heat Transfer Phenomenon in polymer systems: Convection and Radiation

Lecture 21 - Mass Transfer Phenomenon in Polymers: Introduction

Lecture 22 - Steady State Diffusion in Polymers

Lecture 23 - Mass transfer coefficient and dimensionless numbers

Lecture 24 - Mass transfer phenomenon in polymers: Laminar flow and boundary layer conditions

Lecture 25 - Mass transfer phenomenon in polymers: Diffusivity and solubility of gases

Lecture 26 - Chemical reaction engineering in polymers: Introduction

Lecture 27 - Chemical reaction engineering in polymers: Condensation (Step-growth) polymerization

Lecture 28 - Chemical reaction engineering in polymers: Addition (Chain-Growth) Polymerization - I

Lecture 29 - Chemical reaction engineering in polymers: Addition (Chain-Growth) Polymerization - II

Lecture 30 - Chemical reaction engineering in polymers: Addition (Chain-Growth) Polymerization - III

Lecture 31 - Injection Moulding - 1

Lecture 32 - Injection Moulding - 2

Lecture 33 - Extrusion

Lecture 34 - Blow moulding

Lecture 35 - Calendaring and Fiber spinning

Lecture 36 - Polymer Testing - 1

Lecture 37 - Polymer testing - 2 (Standardization, Sample preparation)

Lecture 38 - Polymer testing - 3

Lecture 39 - Polymer testing - 4 (Measuring of rheological properties)

Lecture 40 - Polymer testing - 5 (Mechanical properties; Hardness, tensile and compression)

Lecture 41 - Polymer testing - 6

Lecture 42 - Polymer Testing - 7

Lecture 43 - Polymer Testing - 8

Lecture 44 - Polymer Testing - 9

Lecture 45 - Polymer Testing - 10

Lecture 46 - Polymeric Materials Used in Electronics

Lecture 47 - Polymers in Electronics: Epoxies

Lecture 48 - Epoxies, Phenoxies, and Silicones

Lecture 49 - Polyimides

Lecture 50 - Fluorocarbons, Polyxylyenes, and Polyesters

Lecture 51 - Polymer Materials in Electronics

Lecture 52 - Functions of Coatings - I

Lecture 53 - Functions of Coatings - II

Lecture 54 - Natural fibers reinforced composites - I

Lecture 55 - Natural fibers reinforced composites - II

Lecture 56 - NFRCs and Polymer Applications

Lecture 57 - Polymer Applications in Building Materials

Lecture 58 - Polymer applications in different fields: Polymer in textile

Lecture 59 - Polymer applications in different fields: Polymer in cosmetics

Lecture 60 - Polymer applications in different fields: Polymer and food packaging

NPTEL : Chemical Reaction Engineering (Chemical Engineering)

Co-ordinators : Prof. Jayant M Modak

Lecture 1 - Introduction & Overview

Lecture 2 - Basic concepts : Representation of Chemical Reactions

Lecture 3 - Thermodynamics of Chemical Reactions - Part I

Lecture 4 - Thermodynamics of Chemical Reactions - Part II

Lecture 5 - Chemical Reaction Kinetics - Overview

Lecture 6 - Chemical Reaction Kinetics & Reactor Design

Lecture 7 - Chemical Reactor Design

Lecture 8 - Problem Solving: Thermodynamics & Kinetics

Lecture 9 - Complec Reactions - Introduction

Lecture 10 - Complex Reactions - Yield & Selectivity

Lecture 11 - Complex Reactions - Quasi Steady State and Quasi Equilibrium Approximations

Lecture 12 - Complex Reactions - Kinetics of Chain Reactions & polymerization

Lecture 13 - Catalytic reactions - Introduction

Lecture 14 - Catalytic reactions - Adsorption & Desorption

Lecture 15 - Catalytic reactions - Kinetics

Lecture 16 - Monomolecular Reaction Network & Lumping Analysis

Lecture 17 - Problem solving: Complex reactions

Lecture 18 - Gas-solid Catalytic Reactions - External diffusion

Lecture 19 - Gas-solid Catalytic Reactions - Transport in Catalyst Pellet

Lecture 20 - Gas-solid Catalytic Reactions - Diffusion & Reaction - I

Lecture 21 - Gas-solid Catalytic Reactions - Diffusion & Reaction - II

Lecture 22 - Gas-solid Catalytic Reactions - Diffusion & Reaction - III

Lecture 23 - Gas-solid Catalytic Reactions - Nonisothermal effects

Lecture 24 - Gas-solid Noncatalytic Reactions

Lecture 25 - Gas-Liquid Reactions

Lecture 26 - Problem solving: Heterogenous reactions

Lecture 27 - Chemical Reactor Design: Mass & Energy Balances

Lecture 28 - Chemical Reactor Design: Mass & Energy Balances for Heterogenous Reactions

Lecture 29 - Nonisothermal Reactor Operation

Lecture 30 - Case Study - Ethane dehyrogenation

Lecture 31 - Case Study - Hydrogenation of Oil

Lecture 32 - Case Study - Ammonia Synthesis

Lecture 33 - Autothermal reactors

Lecture 34 - Parametric Sensitivity

Lecture 35 - CSTR - multiple steady states

Lecture 36 - Stability Analysis - Basics

Lecture 37 - Stability Analysis - Examples

Lecture 38 - Nonideal flow and reactor performance - I

Lecture 39 - Nonideal flow and reactor performance - II

Lecture 40 - Problem solving: Reactor Design

NPTEL : Fundamentals of Transport Processes (Chemical Engineering)

Co-ordinators : Prof. V. Kumaran

NPTEL : Fundamentals of Transport Processes - II (Chemical Engineering)

Co-ordinators : Prof. V. Kumaran

Lecture 1 - Review of Fundamentals of Transport Processors I

Lecture 2 - Introduction

Lecture 3 - Vectors and Tensors

Lecture 4 - Vector calculus

Lecture 5 - Vector calculus

Lecture 6 - Curvilinear co-ordinates

Lecture 7 - Kinematics

Lecture 8 - Rate of deformation tensor

Lecture 9 - Mass conservation equation

Lecture 10 - Momentum conservation equation

Lecture 11 - Angular momentum conservation equation

Lecture 12 - Boundary conditions

Lecture 13 - Mechanical energy conservation

Lecture 14 - Unidirectional flow

Lecture 15 - Viscous flows

Lecture 16 - Viscous flows

Lecture 17 - Flow around a sphere

Lecture 18 - Force on moving sphere

Lecture 19 - Torque on rotating sphere

Lecture 20 - Effective viscosity of a suspension

Lecture 21 - Flow in a corner

Lecture 22 - Lubrication flow

Lecture 23 - Lubrication flow

Lecture 24 - Inertia of a low Reynolds number

Lecture 25 - Potential flow

Lecture 26 - Potential flow around a sphere

Lecture 27 - Two-dimensional potential flow

Lecture 28 - Two-dimensional potential flow

Lecture 29 - Flow around a cylinder

Lecture 30 - Conformal transforms in potential flow

Lecture 31 - Boundary layer theory

NPTEL : Modern Instrumental Methods of Analysis (Chemical Engineering)

Co-ordinators : Dr. J.R. Mudakavi

NPTEL : NOC:Transport Processes I: Heat and Mass Transfer (Chemical Engineering)

Co-ordinators : Prof. V. Kumaran

Lecture 1 - Transport by convection and diffusion

Lecture 2 - Non-dimensional analysis of beams

Lecture 3 - Dimensional analysis: Force on a particle settling in a fluid

Lecture 4 - Dimensional analysis: Heat transfer in a heat exchanger

Lecture 5 - Dimensional analysis: Mass transfer from a particle suspended in a fluid

Lecture 6 - Dimensional analysis: Power of an impeller

Lecture 7 - Dimensional analysis: Scaling up of an impeller

Lecture 8 - Dimensional analysis: Convection and diffusion

Lecture 9 - Dimensional analysis: Physical interpretation of dimensionless groups

Lecture 10 - Dimensional analysis: Correlations for dimensionless groups

Lecture 11 - Dimensional analysis: Natural and forced convection

Lecture 12 - Continuum description of fluids

Lecture 13 - Conservation equations and constitutive relations

Lecture 14 - Diffusion: Mechanism of mass diffusion in gases

Lecture 15 - Diffusion: Estimation of mass diffusion coefficient

Lecture 16 - Diffusion: Momentum diffusion coefficient

Lecture 17 - Diffusion: Thermal diffusion coefficient

Lecture 18 - Unidirectional transport: Conservation equation for heat and mass transfer

Lecture 19 - Unidirectional transport: Conservation equation for momentum transfer

Lecture 20 - Unidirectional transport: Similarity solution for infinite domain

Lecture 21 - Unidirectional transport: Similarity solution for infinite domain (Continued...)

Lecture 22 - Unidirectional transport: Similarity solution for mass transfer into a falling film

Lecture 23 - Unidirectional transport: Similarity solution for decay of a pulse

Lecture 24 - Unidirectional transport: Similarity solution for decay of a pulse (Continued...)

Lecture 25 - Unidirectional transport: Separation of variables for transport in a finite domain

Lecture 26 - Unidirectional transport: Separation of variables for transport in a finite domain (Continued...)

Lecture 27 - Unidirectional transport: Separation of variables for transport in a finite domain (Continued...)

Lecture 28 - Unidirectional transport: Separation of variables for transport in a finite domain (Continued...)

Lecture 29 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Heat transfer across the wall of a pipe

Lecture 30 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Unsteady heat conduction from a cylinder

Lecture 31 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Unsteady heat conduction from a cylinder (Continued...)

Lecture 32 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Unsteady heat conduction from a cylinder (Continued...)

Lecture 33 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Similarity solution for heat conduction from a wire

Lecture 34 - Unidirectional transport: Effect of body force in momentum transfer. Falling film

Lecture 35 - Unidirectional transport: Effect of pressure in momentum transfer. Flow in a pipe

Lecture 36 - Unidirectional transport: Friction factor for flow in a pipe

Lecture 37 - Unidirectional transport: Laminar and turbulent flow in a pipe

Lecture 38 - Unidirectional transport: Laminar and turbulent flow in a pipe

Lecture 39 - Unidirectional transport: Oscillatory flow in a pipe. Solution using complex variables

Lecture 40 - Unidirectional transport: Oscillatory flow in a pipe. Solution using complex variables

Lecture 41 - Unidirectional transport: Oscillatory flow in a pipe. Solution using complex variables (Continued...)

Lecture 42 - Unidirectional transport: Oscillatory flow in a pipe. Low and high Reynolds number solutions

Lecture 43 - Unidirectional transport: Spherical co-ordiantes. Heat conduction from a sphere

Lecture 44 - Mass and energy balance equations in Cartesian co-ordinates

Lecture 45 - Mass and energy balance equations in Cartesian co-ordinates

Lecture 46 - Mass and energy balance equations in spherical co-ordinates

Lecture 47 - Mass and energy balance equations in spherical co-ordinates

Lecture 48 - Momentum balance: Incompressible Navier-Stokes equations

Lecture 49 - Balance equation: Convection and diffusion dominated regimes

Lecture 50 - Diffusion equation: Heat conduction in a rectangular solid

Lecture 51 - Diffusion equation: Heat conduction in a rectangular solid (Continued...)

Lecture 52 - Diffusion equation: Heat conduction around a sphereical inclusion

Lecture 53 - Diffusion equation: Heat conduction around a spherial inclusion

Lecture 54 - Diffusion equation: Effective conductivity of a composite

Lecture 55 - Diffusion equation: Spherical harmonic solutions

Lecture 56 - Diffusion equation: Conduction from a point source

Lecture 57 - Diffusion equation: Method of Greens functions

Lecture 58 - Diffusion equation: Method of images

Lecture 59 - Diffusion equation: Equivalence of spherical harmonics and multipole expansion

Lecture 60 - High Peclet number forced convection: Boundary layer in flow past a heated plate

Lecture 61 - High Peclet number forced convection: Boundary layer in flow past a heated plate (Continued...)

Lecture 62 - High Peclet number forced convection: Flow past a heated sphere

Lecture 63 - High Peclet number forced convection: Flow past a heated sphere (Continued...)

Lecture 64 - High Peclet number forced convection: Transport to a falling film

Lecture 65 - High Peclet number forced convection: Transport to a spherical bubble

Lecture 66 - High Peclet number forced convection: Solutions for an arbitrary geometry

Lecture 67 - High Peclet number forced convection: Taylor dispersion

Lecture 68 - Natural convection: Boussinesq equations for heat transfer

Lecture 69 - Natural convection: Boundary layer equations

Lecture 70 - Natural convection: Boundary layer equations convection

Lecture 71 - Natural convection: Heat transfer correlations

NPTEL : NOC:Atomic and Molecular Absorption Spectrometry for Pollution Monitoring (Chemical Engineering)

Co-ordinators : Dr. J.R. Mudakavi

NPTEL : NOC:Trace and Ultra-trace Analysis of Metals using Atomic Absorption Spectrometry (Chemical Engineering)

Co-ordinators : Dr. J.R. Mudakavi

NPTEL : NOC:Inductive Couple Plasma Atomic Emmission Spectrometry for Pollution Monitoring (Chemical Engineering)

Co-ordinators : Dr. J.R. Mudakavi

NPTEL : NOC:Infrared Spectroscopy for Pollution Monitoring (Chemical Engineering)

Co-ordinators : Dr. J.R. Mudakavi

NPTEL : NOC:Electrochemical Technology in Pollution Control (Chemical Engineering)

Co-ordinators : Prof. J. R. Mudakavi

Lecture 1 - Introduction to Electrochemical technology in Pollution Control

Lecture 2 - Atomic structure - 1

Lecture 3 - Atomic structure - 2

Lecture 4 - Properties of solution - 1

Lecture 5 - Properties of solution - 2

Lecture 6 - Properties of solution - 3

Lecture 7 - Electrogravimetry

Lecture 8 - Conductometry - 1

Lecture 9 - Conductometry - 2

Lecture 10 - Potentiometry - Electrolytic cells - 1

Lecture 11 - Potentiometry - Types of electrode - 2

Lecture 12 - Potentiometry - 3

Lecture 13 - Potentiometry - 4

Lecture 14 - Potentiometry - 5

Lecture 15 - Potentiometry - 6

Lecture 16 - Voltametry and Polarography - 1

Lecture 17 - Voltametry and Polarography - 2

Lecture 18 - Voltametry and Polarography - 3

Lecture 19 - Voltametry and Polarography - 4

Lecture 20 - Karl-Fisher titration - 1, Ion selective electrodes - 1

Lecture 21 - Ion selective electrodes - 2

Lecture 22 - Ion selective electrodes - 3

Lecture 23 - Electrochemical sensors - 1

Lecture 24 - Electrochemical sensors - 2

Lecture 25 - Process waste handling - 1

Lecture 26 - Process waste handling - 2

Lecture 27 - Process waste handling - 3

Lecture 28 - Electroplating - 1

Lecture 29 - Electroplating - 2

Lecture 30 - Electroplating - 3

Lecture 31 - Electroplating - 4

NPTEL : NOC:Transport Processes (Chemical Engineering)

Co-ordinators : Prof. V Kumaran

Lecture 32 - Steady solutions, constant diffusivity, parallel and series conduction

Lecture 33 - Steady solutions, internal source, viscous heating

Lecture 34 - Steady solutions, flow down inclined plane

Lecture 35 - Steady solutions, internal source, electrokinetic flow

Lecture 36 - Steady solutions, internal source, electrokinetic flow

Lecture 37 - Steady solutions, internal source, diffusion-reaction

Lecture 38 - Binary diffusion

Lecture 39 - Binary diffusion

Lecture 40 - Correlations in balance equations. Transport by diffusion

Lecture 41 - Correlations in balance equations. Transport by diffusion

Lecture 42 - Correlations in balance equations. Forced convection

Lecture 43 - Correlations in balance equations. Forced convection

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