

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Advanced Chemical Reaction Engineering (PG)

Subject Co-ordinator - Prof. H.S. Shankar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Overview - I  
Lecture 2 - Course Overview - II  
Lecture 3 - Design Equations - I  
Lecture 4 - Design Equations - Illustrative Examples  
Lecture 5 - Design Equations - II  
Lecture 6 - Illustrative Examples  
Lecture 7 - Illustrative Examples  
Lecture 8 - Multiple Reactions - II  
Lecture 9 - Modelling Multiple Reactions in Soil Environment - III  
Lecture 10 - Semi Continuous Reactor Operation  
Lecture 11 - Catalyst Deactivation - I  
Lecture 12 - Catalyst Deactivation - II  
Lecture 13 - Illustrative Example  
Lecture 14 - Energy Balance - I  
Lecture 15 - Energy Balance - II  
Lecture 16 - Reacting Fluids as Energy Carrier  
Lecture 17 - Illustrative Example  
Lecture 18 - Energy Balance - III  
Lecture 19 - Energy Balance - IV  
Lecture 20 - Energy Balance - V  
Lecture 21 - Illustrative Example  
Lecture 22 - Energy Balance - VI  
Lecture 23 - Illustrative Example  
Lecture 24 - Illustrative Example  
Lecture 25 - Illustrative Example  
Lecture 26 - Residence Time Distribution Methods  
Lecture 27 - Residence Time Distribution Models  
Lecture 28 - Shrinking core Gas-Solid reactions Model  
Lecture 29 - Shrinking core Ash Diffusion Model & Combination of Resistances

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- Lecture 30 - 1) Gas Solid Reactions Temperature Effects on Rate & Equilibria 2) Introduction to Population Balance
- Lecture 31 - Illustrative Example
- Lecture 32 - Population Balance Modelling - II
- Lecture 33 - Population Balance Modelling - III
- Lecture 34 - Illustrative Examples
- Lecture 35 - Introduction to Environmental Reactions
- Lecture 36 - Reaction Engineering Examples in Biochemical & Environmental Engineering
- Lecture 37 - Illustrative Examples
- Lecture 38 - Illustrative Examples
- Lecture 39 - Oxygen Sag Analysis in Rivers
- Lecture 40 - Illustrative Examples
- Lecture 41 - Illustrative Example

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Advanced Process Control

Subject Co-ordinator - Prof. Sachin C. Patwardhan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Motivation  
Lecture 2 - Linearization of Mechanistic Models  
Lecture 3 - Linearization of Mechanistic Models (Continued...)  
Lecture 4 - Introduction to z-transforms and Development of Grey-box models  
Lecture 5 - Introduction to Stability Analysis and Development of Output Error Models  
Lecture 6 - Introduction to Stochastic Processes  
Lecture 7 - Introduction to Stochastic Processes (Continued...)  
Lecture 8 - Development of ARX models  
Lecture 9 - Statistical Properties of ARX models and Development of ARMAX models  
Lecture 10 - Development of ARMAX models (Continued...) and Issues in Model Development  
Lecture 11 - Model Structure Selection and Issues in Model Development (Continued...)  
Lecture 12 - Issues in Model Development (Continued...) and State Realizations of Transfer Function Models  
Lecture 13 - Stability Analysis of Discrete Time Systems  
Lecture 14 - Lyapunov Functions and Interaction Analysis and Multi-loop Control  
Lecture 15 - Interaction Analysis and Multi-loop Control (Continued...)  
Lecture 16 - Multivariable Decoupling Control and Soft Sensing and State Estimation  
Lecture 17 - Development of Luenberger Observer  
Lecture 18 - Development of Luenberger Observer (Continued...) and Introduction to Kalman Filtering  
Lecture 19 - Kalman Filtering  
Lecture 20 - Kalman Filtering (Continued...)  
Lecture 21 - Kalman Filtering (Continued...)  
Lecture 22 - Pole Placement State Feedback Control Design and Introduction to Linear Quadratic Gaussian (LQG)  
Lecture 23 - Linear Quadratic Gaussian (LQG) Regulator Design  
Lecture 24 - Linear Quadratic Gaussian (LQG) Controller Design  
Lecture 25 - Model Predictive Control (MPC)  
Lecture 26 - Model Predictive Control (Continued...)

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Chemical Reaction Engineering II

Subject Co-ordinator - Prof. A.K. Suresh, Prof. Ganesh A. Viswanathan, Prof. Sanjay M. Mahajani

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to catalysts and catalysis  
Lecture 2 - Steps in catalytic reaction  
Lecture 3 - Derivation of the rate equation  
Lecture 4 - Heterogenous data analysis for reactor design - I  
Lecture 5 - Heterogenous data analysis for reactor design - II  
Lecture 6 - Catalyst deactivation and accounting for it in design - I  
Lecture 7 - Catalyst deactivation and accounting for it in design - II  
Lecture 8 - Synthesize the rate equation  
Lecture 9 - Introduction to intraparticle diffusion  
Lecture 10 - Intraparticle diffusion  
Lecture 11 - Intraparticle diffusion  
Lecture 12 - Intraparticle diffusion  
Lecture 13 - Effectiveness factor and Introduction to external mass transfer  
Lecture 14 - External Mass Transfer  
Lecture 15 - Implications to rate data interpretation and design - I  
Lecture 16 - Implications to rate data interpretation and design - II  
Lecture 17 - Packed-bed reactor design  
Lecture 18 - Fluidized bed reactor design - I  
Lecture 19 - Fluidized bed reactor design - II  
Lecture 20 - Gas-liquid reactions-1  
Lecture 21 - GLR-2  
Lecture 22 - GLR-3  
Lecture 23 - GLR-4  
Lecture 24 - GLR-5  
Lecture 25 - GLR-6  
Lecture 26 - GLR-7  
Lecture 27 - Fluid-solid non-catalytic reactions - I  
Lecture 28 - Fluid-solid non-catalytic reactions - II  
Lecture 29 - Fluid-solid non-catalytic reactions - III

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Distribution of residence time
- Lecture 31 - Measurement of residence time distribution
- Lecture 32 - Residence time distribution function
- Lecture 33 - Reactor diagnostics and troubleshooting
- Lecture 34 - Modeling non-ideal reactors
- Lecture 35 - Residence time distribution
- Lecture 36 - Non-ideal Reactors
- Lecture 37 - Non-ideal Reactors
- Lecture 38 - Non-ideal Reactors
- Lecture 39 - Non-ideal Reactors

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Advanced Numerical Analysis

Subject Co-ordinator - Prof. Sachin C. Patwardhan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Overview

Lecture 2 - Fundamentals of Vector Spaces

Lecture 3 - Basic Dimension and Sub-space of a Vector Space

Lecture 4 - Introduction to Normed Vector Spaces

Lecture 5 - Examples of Norms, Cauchy Sequence and Convergence, Introduction to Banach Spaces

Lecture 6 - Introduction to Inner Product Spaces

Lecture 7 - Cauchy Schwarz Inequality and Orthogonal Sets

Lecture 8 - Gram-Schmidt Process and Generation of Orthogonal Sets

Lecture 9 - Problem Discretization Using Appropriation Theory

Lecture 10 - Weierstrass Theorem and Polynomial Approximation

Lecture 11 - Taylor Series Approximation and Newton's Method

Lecture 12 - Solving ODE - BVPs Using Finite Difference Method

Lecture 13 - Solving ODE - BVPs and PDEs Using Finite Difference Method

Lecture 14 - Finite Difference Method (Continued...) and Polynomial Interpolations

Lecture 15 - Polynomial and Function Interpolations, Orthogonal Collocations Method for Solving ODE -BVPs

Lecture 16 - Orthogonal Collocations Method for Solving ODE - BVPs and PDEs

Lecture 17 - Least Square Approximations, Necessary and Sufficient Conditions for Unconstrained Optimization

Lecture 18 - Least Square Approximations -Necessary and Sufficient Conditions for Unconstrained Optimization

Lecture 19 - Linear Least Square Estimation and Geometric Interpretation of the Least Square Solution

Lecture 20 - Geometric Interpretation of the Least Square Solution (Continued...) and Projection Theorem in a

Lecture 21 - Projection Theorem in a Hilbert Spaces (Continued...) and Approximation Using Orthogonal Basis

Lecture 22 - Discretization of ODE-BVP using Least Square Approximation

Lecture 23 - Discretization of ODE-BVP using Least Square Approximation and Gelarkin Method

Lecture 24 - Model Parameter Estimation using Gauss-Newton Method

Lecture 25 - Solving Linear Algebraic Equations and Methods of Sparse Linear Systems

Lecture 26 - Methods of Sparse Linear Systems (Continued...) and Iterative Methods for Solving Linear Algebra

Lecture 27 - Iterative Methods for Solving Linear Algebraic Equations

Lecture 28 - Iterative Methods for Solving Linear Algebraic Equations

Lecture 29 - Iterative Methods for Solving Linear Algebraic Equations

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Iterative Methods for Solving Linear Algebraic Equations
- Lecture 31 - Iterative Methods for Solving Linear Algebraic Equations
- Lecture 32 - Optimization Based Methods for Solving Linear Algebraic Equations
- Lecture 33 - Conjugate Gradient Method, Matrix Conditioning and Solutions of Linear Algebraic Equations
- Lecture 34 - Matrix Conditioning and Solutions and Linear Algebraic Equations (Continued...)
- Lecture 35 - Matrix Conditioning (Continued...) and Solving Nonlinear Algebraic Equations
- Lecture 36 - Solving Nonlinear Algebraic Equations
- Lecture 37 - Solving Nonlinear Algebraic Equations
- Lecture 38 - Solving Nonlinear Algebraic Equations
- Lecture 39 - Solving Nonlinear Algebraic Equations
- Lecture 40 - Solving Ordinary Differential Equations - Initial Value Problems (ODE-IVPs)
- Lecture 41 - Solving Ordinary Differential Equations - Initial Value Problems (ODE-IVPs)
- Lecture 42 - Solving ODE-IVPs
- Lecture 43 - Solving ODE-IVPs
- Lecture 44 - Solving ODE-IVPs
- Lecture 45 - Solving ODE-IVPs
- Lecture 46 - Solving ODE-IVPs
- Lecture 47 - Solving ODE-IVPs
- Lecture 48 - Methods for Solving System of Differential Algebraic Equations
- Lecture 49 - Methods for Solving System of Differential Algebraic Equations (Continued...) and Concluding Remarks

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Introduction to Evolutionary Dynamics

Subject Co-ordinator - Prof. Supreet Saini

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - History of the theory of Natural Selection - 1  
Lecture 2 - History of the theory of Natural Selection - 2  
Lecture 3 - Exponential growth models  
Lecture 4 - Logistic Growth Models - 1  
Lecture 5 - Logistic Growth Models - 2  
Lecture 6 - Modelling selection - 1  
Lecture 7 - Modelling Selection - 2  
Lecture 8 - Modelling Selection - 3  
Lecture 9 - Modelling Mutations - 1  
Lecture 10 - Modelling Mutations - 2  
Lecture 11 - Modelling Mutations - 3  
Lecture 12 - Genetic Code and Sequence Spaces  
Lecture 13 - Sequence Spaces as Networks  
Lecture 14 - Sequence Space to Fitness Landscape  
Lecture 15 - Properties of Fitness Landscapes and Quasi-species  
Lecture 16 - Integrating Reproduction, Selection and Mutation  
Lecture 17 - Obtaining Fitness Landscapes Experimentally  
Lecture 18 - NK Model of Fitness Landscape  
Lecture 19 - Modelling Evolution on Fitness Landscapes - 1  
Lecture 20 - Modelling Evolution on Fitness Landscapes - 2  
Lecture 21 - Modelling Evolution on Fitness Landscapes - 3  
Lecture 22 - Role of Randomness in Evolution  
Lecture 23 - Genetic Drift in Evolution of Microbial Populations  
Lecture 24 - Dynamics of a Moran Process without Selection  
Lecture 25 - Dynamics of a Moran Process without Selection  
Lecture 26 - Evolution, Selection, and Genetic Drift  
Lecture 27 - Representing Microbial Evolution  
Lecture 28 - Estimating Timescales of Evolution  
Lecture 29 - Estimating the Speed of Microbial Evolution

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- Lecture 30 - Evolutionary Dynamics when Mutations are Rare
- Lecture 31 - Evolutionary Dynamics when Mutations are Rapid - 1
- Lecture 32 - Evolutionary Dynamics when Mutations are Rapid - 2
- Lecture 33 - Evolutionary Dynamics when Mutations are Rapid - 3
- Lecture 34 - Evolutionary Game Theory - 1
- Lecture 35 - Evolutionary Game Theory - 2
- Lecture 36 - Evolutionary Game Theory - 3
- Lecture 37 - Evolutionary Game Theory - 4
- Lecture 38 - Evolutionary Game Theory Applied to Moran Process
- Lecture 39 - Evolutionary Games During Weak Selection
- Lecture 40 - Evolutionary Dynamics of HIV

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Heat Transfer

Subject Co-ordinator - Prof. Ganesh A. Viswanathan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Introduction to Conduction  
Lecture 3 - Energy Balance  
Lecture 4 - 1D Steadystate Conduction - Resistance Concept  
Lecture 5 - Resistances in Composite Wall Case  
Lecture 6 - Resistances in Radial Systems  
Lecture 7 - Heat Generation - I Plane and Cylindrical Wall  
Lecture 8 - Heat Generation - II Problem; Introduction to Extended Surfaces  
Lecture 9 - Extended Surfaces I - General Formulation  
Lecture 10 - Extended Surfaces II - Fixed Cross-section Area  
Lecture 11 - Extended Surfaces III - Varying Cross-section Area  
Lecture 12 - 2D Plane Wall  
Lecture 13 - Transient Analyses I  
Lecture 14 - Transient Analyses II  
Lecture 15 - Transient Analyses  
Lecture 16 - Introduction to Convective Heat Transfer  
Lecture 17 - Heat and Mass Transport Coefficients  
Lecture 18 - Boundary Layer  
Lecture 19 - Laminar and Turbulent Flows; Momentum Balance  
Lecture 20 - Energy and Mass Balances; Boundary Layer Approximations  
Lecture 21 - Order of Magnitude Analysis  
Lecture 22 - Transport Coefficients  
Lecture 23 - Relationship between Momentum, Thermal and Concentration Boundary Layer  
Lecture 24 - Reynolds and Chilton-Colburn Analogies  
Lecture 25 - Forced Convection  
Lecture 26 - Flow Past Flat Plate I - Method of Blasius  
Lecture 27 - Flow Past Flat Plate II - Correlations for Heat and Mass Transport  
Lecture 28 - Flow Past Cylinders  
Lecture 29 - Flow through Pipes - I

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- Lecture 30 - Flow through Pipes - II
- Lecture 31 - Flow through Pipes - III
- Lecture 32 - Flow through Pipes - IV - Mixing-cup Temperature
- Lecture 33 - Flow through Pipes - V - Log mean Temperature Difference
- Lecture 34 - Flow through Pipes - VI - Correlations for Laminar and Turbulent Conditions
- Lecture 35 - Example problems
- Lecture 36 - Introduction to Free/Natural Convection
- Lecture 37 - Heated Plate in a Quiescent Fluid - I
- Lecture 38 - Heated Plate in a Quiescent Fluid - II
- Lecture 39 - Boiling - I
- Lecture 40 - Boiling - II
- Lecture 41 - Condensation - I
- Lecture 42 - Condensation - II
- Lecture 43 - Radiation
- Lecture 44 - Spectral Intensity
- Lecture 45 - Radiation
- Lecture 46 - Properties of a Blackbody
- Lecture 47 - Surface Adsorption
- Lecture 48 - Kirchhoff's Law
- Lecture 49 - Radiation Exchange - View Factor
- Lecture 50 - View Factor Examples
- Lecture 51 - View Factor - Inside Sphere Method, Blackbody Radiation Exchange
- Lecture 52 - Diffuse, Gray Surfaces in an Enclosure
- Lecture 53 - Resistances - Oppenheim Matrix Method
- Lecture 54 - Resistances - Examples
- Lecture 55 - More Examples
- Lecture 56 - Introduction and Examples
- Lecture 57 - Parallel Flow Heat Exchangers
- Lecture 58 - LMTD I
- Lecture 59 - Shell and Tube Heat Exchangers
- Lecture 60 - Epsilon-NTU Method

## NPTEL Video Lecture Topic List - Created by Linuxpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Chemical Reaction Engineering-II

Subject Co-ordinator - Prof. Ganesh Vishwanathan

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Introduction to catalysis and catalytic processes  
Lecture 3 - Catalyst properties and classification  
Lecture 4 - Steps in catalysis  
Lecture 5 - Adsorption isotherm  
Lecture 6 - Surface reaction  
Lecture 7 - Rate controlling steps and Rate law  
Lecture 8 - Rate law  
Lecture 9 - Heterogeneous data analysis for reactor design - I  
Lecture 10 - Heterogeneous data analysis for reactor design - II  
Lecture 11 - Design of reactors  
Lecture 12 - Case study  
Lecture 13 - Catalyst deactivation - I  
Lecture 14 - Catalyst deactivation - II  
Lecture 15 - Catalyst deactivation - III  
Lecture 16 - Catalyst deactivation - IV  
Lecture 17 - Diffusional effects  
Lecture 18 - Internal diffusion effects  
Lecture 19 - Non-dimensionalization  
Lecture 20 - Concentration profile  
Lecture 21 - Internal effectiveness factor - I  
Lecture 22 - Internal effectiveness factor - II  
Lecture 23 - Internal effectiveness factor - III  
Lecture 24 - Falsification of kinetics  
Lecture 25 - External mass transport limitations  
Lecture 26 - Estimation of mass transfer coefficient  
Lecture 27 - Mass transfer to a single particle with reaction  
Lecture 28 - Packed-bed reactor design  
Lecture 29 - Mass transfer coefficient in Packed-beds

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- Lecture 30 - Estimation of conversion in Packed-bed reactor
- Lecture 31 - Overall effectiveness factor - I
- 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
- 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)
- Lecture 50 - RTD
- 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
- Lecture 60 - Non-ideal reactors

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Chemical Process Control

Subject Co-ordinator - Prof. Sujit Jogwar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation for process control  
Lecture 2 - Functions of process control system  
Lecture 3 - Common control strategies  
Lecture 4 - Components of process control system  
Lecture 5 - Introduction to process dynamics  
Lecture 6 - First principle dynamic models  
Lecture 7 - Empirical and gray box models  
Lecture 8 - Degree of freedom analysis  
Lecture 9 - Introduction to first order dynamical systems  
Lecture 10 - Linearization of process dynamics  
Lecture 11 - Response to step input  
Lecture 12 - Response to sinusoidal input  
Lecture 13 - Introduction to second order dynamical systems  
Lecture 14 - Examples of second order dynamical systems  
Lecture 15 - Response to step input  
Lecture 16 - Effect of damping coefficient  
Lecture 17 - Higher order dynamics  
Lecture 18 - Approximation as FOPDT model  
Lecture 19 - Numerator dynamics  
Lecture 20 - Prediction of step response  
Lecture 21 - Block diagram representation  
Lecture 22 - ON-OFF control  
Lecture 23 - Proportional control  
Lecture 24 - Proportional-Integral control  
Lecture 25 - PID control  
Lecture 26 - Limitations of PID controllers  
Lecture 27 - Stability of dynamical processes  
Lecture 28 - Laplace domain analysis - Part I  
Lecture 29 - Laplace domain analysis - Part II

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Frequency response
- Lecture 31 - Frequency domain analysis
- Lecture 32 - Synthesis problem
- Lecture 33 - Selection problem
- Lecture 34 - Criteria-based controller tuning
- Lecture 35 - Heuristics-based controller tuning
- Lecture 36 - Direct synthesis-based controller tuning
- Lecture 37 - Frequency response-based controller tuning
- Lecture 38 - Cascade control
- Lecture 39 - Split range control and override control
- Lecture 40 - Auctioneering, ratio and inferential control
- Lecture 41 - Openloop control and Internal model control
- Lecture 42 - Dynamic Matrix and Model predictive control
- Lecture 43 - Introduction to multivariable control
- Lecture 44 - Input-output pairing
- Lecture 45 - Tuning of multi-loop SISO controller
- Lecture 46 - Introduction to batch process control
- Lecture 47 - Programmable logic control
- Lecture 48 - Batch to batch control

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Introduction to Interfacial Waves

Subject Co-ordinator - Prof. Ratul Dasgupta

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

- 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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Hydrogen Energy: Production, Storage, Transportation and Safe

Subject Co-ordinator - Prof. Pratibha Sharma

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- 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 H<sub>2</sub> 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
- Lecture 65 - Properties of Hydrogen Associated with Accidents
- Lecture 66 - Classification of Hydrogen related Hazards
- Lecture 67 - Compressed and Liquid Hydrogen Related Hazards
- Lecture 68 - Regulations, Codes and Standards

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Lecture 69 - Utilisation in Different Sectors, Global Status and Future Directions

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Modeling Stochastic Phenomena for Engineering Applications: E

Subject Co-ordinator - Prof. Yelia Shankaranarayana Mayya

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Stirling's Approximation  
Lecture 2 - Fourier Transforms and characteristic function  
Lecture 3 - Dirac Delta function  
Lecture 4 - Applications of delta function and Generating functions  
Lecture 5 - Laplace Transforms and Convolution theorem  
Lecture 6 - Generating function for discrete variables and Binomial distribution  
Lecture 7 - Bernoulli and Poisson distributions  
Lecture 8 - Waiting time distributions; Gaussian approximation to Poisson distribution  
Lecture 9 - Introduction to Central Limit Theorem  
Lecture 10 - Proof of Central Limit Theorem (CLT)  
Lecture 11 - Universality of Normal distribution and Exceptions  
Lecture 12 - Introduction to Random Walk: Extension of Central Limit Theorem  
Lecture 13 - Random walk and Diffusion coefficient: Conditional and Transition  
Lecture 14 - Characteristics of Stochastic Phenomena: Markov Processes  
Lecture 15 - Propagating Markov processes via Transition Probability Matrix with  
Lecture 16 - Chapman-Kolmogorov Equation for Multistep Transition probability and solution  
Lecture 17 - Transient solutions and Continuous time Markov process  
Lecture 18 - Exact solution to Symmetric (or unbiased) one-dimensional Random walk (1-D RW)  
Lecture 19 - Properties of the solution for 1-D unbiased RW  
Lecture 20 - 1-D unbiased RW: Asymptotic form of occupancy probability and transition  
Lecture 21 - Solution to the problem of 1-D Random Walk with Bias  
Lecture 22 - Generalized Random Walk with Bias and Pausing  
Lecture 23 - Effect of Pausing on Mean and Variance of Random walk  
Lecture 24 - Random-walk in the presence of reflecting barrier  
Lecture 25 - Boundary conditions for reflected Random-Walk and formulating absorbing  
Lecture 26 - The survival probability and first-passage time distribution for Random walker  
Lecture 27 - Random Walk with Bias and Absorber  
Lecture 28 - Drift and Survival probability for Random walk with bias and absorber  
Lecture 29 - Introduction to gambler's ruin problem

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Solution for ultimate winning probability in Gambler's ruin problem
- Lecture 31 - Solution to gambler's ruin problem with site dependent jump probabilities
- Lecture 32 - Fourier transform method of solving lattice Random walks
- Lecture 33 - Two and higher dimensional Random walks
- Lecture 34 - Formulating the problem of Probability of Return to the origin
- Lecture 35 - Relationship between occupancy probability and first-time-return probability
- Lecture 36 - Proof of Polya's theorem on the probability of return
- Lecture 37 - Return probability estimates in various dimensions and effect of bias in 1-D
- Lecture 38 - Dependence of first time return probability ( $P_k$ ) on steps
- Lecture 39 - Equilibrium solutions in lattice random walk models
- Lecture 40 - Equilibrium solution to Ehrenfest's flea model
- Lecture 41 - Differential equation formulation of stochastic phenomena
- Lecture 42 - Derivation of Fokker-Planck equation
- Lecture 43 - Generalized transition probability functions for Fokker-Planck equation
- Lecture 44 - Solution to 1-D Fokker-Planck equation for free particle: Method of Fourier
- Lecture 45 - General non-gaussian solution to translationally invariant Chapman-Kolmogorov
- Lecture 46 - Cauchy distribution, power-law and other non-gaussian solutions
- Lecture 47 - Wiener process and solution to absorbing barrier problems from Fokker-Planck
- Lecture 48 - Application of Fourier Sine transform for single absorber problem
- Lecture 49 - Setting up Langevin equation for velocity fluctuations of Brownian particles
- Lecture 50 - Understanding the origin of systematic and random parts of force from kinetic
- Lecture 51 - Kinetic derivation of a formula for delta-correlated random force
- Lecture 52 - Mean square velocity, thermal equilibrium and relationship between relaxation
- Lecture 53 - Velocity autocorrelation in Brownian motion
- Lecture 54 - Derivation of Stokes-Einstein relationship between diffusion coefficient and
- Lecture 55 - Alternative derivation of Stokes-Einstein relationship and Brownian motion with
- Lecture 56 - Numerical simulation of the Langevin equation
- Lecture 57 - Derivation of Klein-Kramers equation from Langevin equation for joint
- Lecture 58 - Illustrative solutions to the Klein-Kramers equation
- Lecture 59 - Numerical simulation: Sampling from general distributions and Central
- Lecture 60 - Numerical simulation of Random walk trajectories and method of solving Fokker

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Computational Quantum Chemistry

Subject Co-ordinator - Prof. Achintya Kumar Dutta

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Why Computational Chemistry  
Lecture 2 - Revisiting Quantum Mechanics - I  
Lecture 3 - Revisiting Quantum Mechanics - II  
Lecture 4 - Introduction to ORCA, Quantum Chemistry Package  
Lecture 5 - The Hartree-Fock Approximation  
Lecture 6 - Introduction to GUI - I  
Lecture 7 - Introduction to GUI - II  
Lecture 8 - Introduction to GUI - III  
Lecture 9 - Open-Shell Systems - I  
Lecture 10 - Open-Shell Systems - II  
Lecture 11 - Open-Shell Systems - III  
Lecture 12 - Solving Homework Problems of HF  
Lecture 13 - Solving Homework Problems of Open-Shell  
Lecture 14 - Introduction to Basis set - I  
Lecture 15 - Introduction to Basis set - II  
Lecture 16 - Introduction to Basis set - III  
Lecture 17 - Basis Set Superposition Error and Counterpoise Correction  
Lecture 18 - Introduction to Electron Correlation  
Lecture 19 - Møller Plesset Perturbation Theory  
Lecture 20 - Configuration Interaction  
Lecture 21 - Coupled Cluster Theory  
Lecture 22 - Solving Homework Problems of MP2  
Lecture 23 - Solving Homework Problems of Coupled Cluster  
Lecture 24 - Lower Scaling Approximation - I (Density Fitting and Chain of Sphere)  
Lecture 25 - Lower Scaling Approximation - II (Local Orbital and Natural Orbital)  
Lecture 26 - Complete Basis Set Extrapolation  
Lecture 27 - Exact Density Functional Theory - I  
Lecture 28 - Exact Density Functional Theory - II  
Lecture 29 - Practical Density Functional Theory - I

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Lecture 30 - Practical Density Functional Theory - II  
Lecture 31 - Hybrid Density Functional Theory - I  
Lecture 32 - Hybrid Density Functional Theory - II  
Lecture 33 - Hybrid Density Functional Theory - III  
Lecture 34 - Hybrid Density Functional Theory - IV  
Lecture 35 - Homework Problem of DFT  
Lecture 36 - Potential Energy Surface - I  
Lecture 37 - Potential Energy Surface - II  
Lecture 38 - Potential Energy Surface - III  
Lecture 39 - IR and Raman Spectroscopy - I  
Lecture 40 - IR and Raman Spectroscopy - II  
Lecture 41 - Homework problem of Potential Energy Surface  
Lecture 42 - Thermochemistry - I  
Lecture 43 - Thermochemistry - II  
Lecture 44 - Thermochemistry - III  
Lecture 45 - Transition state search - I  
Lecture 46 - Transition state search - II  
Lecture 47 - Transition state search - III  
Lecture 48 - Transition state search - IV  
Lecture 49 - Homework problem of Transition State Search  
Lecture 50 - Multi-layer Modelling - Molecular Mechanics  
Lecture 51 - QM/MM - I  
Lecture 52 - QM/MM - II  
Lecture 53 - QM/MM - III  
Lecture 54 - QM/MM - IV  
Lecture 55 - QM/MM - V  
Lecture 56 - Homework problem of QM/MM  
Lecture 57 - Excited state methods - CIS and TDDFT  
Lecture 58 - Excited state methods (Continued...)  
Lecture 59 - Excited state method - EOMCCSD  
Lecture 60 - Charge transfer excitation  
Lecture 61 - X-Ray Spectroscopy  
Lecture 62 - Homework problem of Excited State Spectra  
Lecture 63 - Solvation models - I  
Lecture 64 - Solvation models - II  
Lecture 65 - Solvation models - III  
Lecture 66 - Explicit solvation - I  
Lecture 67 - Explicit solvation - II  
Lecture 68 - Additional Homework Problem of Week 7

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Lecture 69 - NMR  
Lecture 70 - Relativistic Quantum Chemistry  
Lecture 71 - CASSCF - I  
Lecture 72 - CASSCF - II  
Lecture 73 - CASSCF - III

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Heterogeneous Catalysis and Catalytic Processes

Subject Co-ordinator - Dr. K.K. Pant

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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Lecture 30  
Lecture 31  
Lecture 32  
Lecture 33  
Lecture 34  
Lecture 35  
Lecture 36  
Lecture 37  
Lecture 38  
Lecture 39  
Lecture 40

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Interfacial Engineering

Subject Co-ordinator - Prof. A.N. Bhaskarwar

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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  
Lecture 15 - Surface and Interfacial Tensions  
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 Compression  
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  
Lecture 27 - Surface waves and ripples, velocity effect of surface tension and surface compressional modulus  
Lecture 28 - Shear Elastic Moduli, Yield Stress Fibres from MLs, Surface Reactions  
Lecture 29 - Surface Reactions, Comparison with Bulk-Phase Reactions Steric Factors, Inhibition

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- Lecture 30 - Hydrolyses of Esters by Alkali Acid or Enzyme Photochemical Reactions in Monolayers Polymerization
- Lecture 31 - Catalytic Effects Reactions in Emulsions Complex Formation
- Lecture 32 - Complex Formation Penetration into Monolayers Thermodynamics of Penetration Adsorption from Vapor
- Lecture 33 - Introductory Concepts Resistances and their Magnitudes Evaporation and its Retardation
- Lecture 34 - Evaporation and its Retardation Resistances and their Analysis Diffusional Resistance in Gas Phase
- Lecture 35 - Resistances in Liquid Phase and Interface and Their Importance Some Effects and Applications, TH
- Lecture 36 - Surface Instability Theories of Mass Transfer Experiments on static and Dynamic Systems
- Lecture 37 - Colloids, Aerosols, Emulsions Foams, Coagulation Smoluchowski's Theory

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Fluid Mechanics and its Applications

Subject Co-ordinator - Prof. Vijay Gupta

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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)

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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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Computational Process Design

Subject Co-ordinator - Prof. Manojkumar Ramteke, Prof. Hariprasad Kodamana

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Heat Transfer

Subject Co-ordinator - Prof. A.K. Ghoshal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Introduction to heat transfer
- Lecture 2 - General heat conduction equation
- Lecture 3 - One dimensional steady state conduction in rectangular coordinate
- Lecture 4 - One dimensional steady state conduction in cylindrical and spherical coordinate
- Lecture 5 - Critical and optimum insulation
- Lecture 6 - Extended surface heat transfer - 1
- Lecture 7 - Extended surface heat transfer - 2
- Lecture 8 - Analysis of lumped parameter model
- Lecture 9 - Transient heat flow in semi infinite solid
- Lecture 10 - Infinite body subjected to sudden convective
- Lecture 11 - Graphical solutions of unsteady state heat conduction problem
- Lecture 12 - Dimensional analysis for forced convection
- Lecture 13 - Dimensional analysis for free convection
- Lecture 14 - Heat transfer co-relations for laminar and internal flows
- Lecture 15 - Heat transfer co-relations for turbulent and internal flows
- Lecture 16 - Co-relation for turbulent and external flows
- Lecture 17 - Heat transfer co-relations for flow across tube banks
- Lecture 18 - Momentum and heat transfer analogies
- Lecture 19 - Boundary layer heat transfer
- Lecture 20 - Boundary layer equations
- Lecture 21 - Approximate analysis in boundary layer
- Lecture 22 - Theoretical concepts of natural / free convention heat transfer
- Lecture 23 - Empirical relations for free convention heat transfer
- Lecture 24 - Condensation heat transfer over vertical plate
- Lecture 25 - Condensation heat transfer for various conditions and geometries
- Lecture 26 - Fundamentals of boiling heat transfer
- Lecture 27 - Boiling heat transfer co-relations
- Lecture 28 - Classification of heat exchangers
- Lecture 29 - Various types of shell and tube heat exchangers

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Various types of compact heat exchangers
- Lecture 31 - Effectiveness-NTU, method of heat exchanger analysis
- Lecture 32 - Design of double pipe heat exchanger
- Lecture 33 - Design of shell and tube heat exchanger
- Lecture 34 - Introduction to evaporation and evaporators
- Lecture 35 - Evaporation principles and evaporator performance
- Lecture 36 - Evaporator calculations
- Lecture 37 - Introduction to radiation heat transfer
- Lecture 38 - Radiation intensity and radiation view factor
- Lecture 39 - Radiation heat exchange
- Lecture 40 - Radiation shield and gas radiation

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Mass Transfer Operations I

Subject Co-ordinator - Dr. B. Mandal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Mass Transfer  
Lecture 2 - Molecular Diffusion  
Lecture 3 - Fick's Law of Diffusion  
Lecture 4 - Steady state molecular diffusion in fluids - Part I  
Lecture 5 - Steady state molecular diffusion in fluids - Part II  
Lecture 6 - Diffusion coefficient  
Lecture 7 - Diffusion Coefficient  
Lecture 8 - Multicomponent Diffusion and Diffusivity in Solids  
Lecture 9 - Concept of Mass Transfer Coefficient  
Lecture 10 - Dimensionless Groups and Co-relations for Convective  
Lecture 11 - Mass Transfer co-efficient in Laminar Flow Condition  
Lecture 12 - Boundary Layer Theory and Film Theory in Mass Transfer  
Lecture 13 - Mass Transfer Coefficients in Turbulent Flow  
Lecture 14 - Interphase Mass Transfer and Mass Transfer Theories - Part I  
Lecture 15 - Interphase Mass Transfer and Mass Transfer Theories - Part II  
Lecture 16 - Interphase Mass Transfer and Mass Transfer Theories - Part III  
Lecture 17 - Agitated and Sparged Vessels  
Lecture 18 - Tray Column - Part I  
Lecture 19 - Tray Column - Part II  
Lecture 20 - Packed Tower  
Lecture 21 - Introduction to Absorption and Solvent selection  
Lecture 22 - Packed Tower Design - Part I  
Lecture 23 - Packed Tower Design - Part II  
Lecture 24 - Packed Tower Design - Part III  
Lecture 25 - Mass Transfer Coefficients Correlation and HETP Concept  
Lecture 26 - Tray Tower Design and Introduction to Multicomponent System  
Lecture 27 - Introduction to Distillation and Phase diagrams  
Lecture 28 - Azeotropes and Enthalpy Concentration Diagrams  
Lecture 29 - Flash Distillation

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Batch and Steam Distillation
- Lecture 31 - Fractional Distillation
- Lecture 32 - Fractional Distillation
- Lecture 33 - Fractional Distillation
- Lecture 34 - Fractional Distillation
- Lecture 35 - Fractional Distillation
- Lecture 36 - Multistage Batch Distillation with Reflux
- Lecture 37 - Fractional Distillation
- Lecture 38 - Ponchan and Savarit Method and Packed Tower Distillation
- Lecture 39 - Multicomponent Distillation

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Process Design Decisions and Project Economics

Subject Co-ordinator - Dr. Vijay S. Moholkar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - General Introduction to the Course and Syllabus  
Lecture 2 - Hierarchical Approach to Process Design - I  
Lecture 3 - Hierarchical Approach to Process Design - Examples  
Lecture 4 - Input Information and Design Aspects of Batch vs. Continuous Process  
Lecture 5 - Input / Output Structure of Flowsheet - Part I  
Lecture 6 - Input / Output Structure of Flowsheet - Part II  
Lecture 7 - Input / Output Structure of Flowsheet - Part III and Recycle Structure of Flowsheet - Part I  
Lecture 8 - Recycle Structure of Flowsheet - Part II  
Lecture 9 - Recycle Structure of Flowsheet - Part III  
Lecture 10 - Recycle Structure of Flowsheet - Part IV and Tutorial - Part I  
Lecture 11 - Tutorial - Part II  
Lecture 12 - Tutorial - Part III  
Lecture 13 - Algorithm and Basic Principles of Reactor Design  
Lecture 14 - Reactor Non-ideality, Residence Time Distribution (RTD) and Types of Chemical Reactions & Catalysis  
Lecture 15 - Types of Reactors and Selection Criteria  
Lecture 16 - Tutorial on Reactor Design and Cost Estimation  
Lecture 17 - General Introduction (Types of Separation Processes and Criteria for Selection of the Processes)  
Lecture 18 - Guidelines for Design of Separation Systems  
Lecture 19 - Design of Distillation Columns - Part I (Sequencing of Columns, Energy Integration / Thermal Coupling)  
Lecture 20 - Design of Distillation Columns - Part II (Plate and Packed Towers, Number of Plates, Diameter and Height)  
Lecture 21 - Tutorial - Part I (Design of Absorption Column)  
Lecture 22 - Tutorial - Part II (Design of Distillation Column)  
Lecture 23 - Concepts and Basic Principles of Energy (or Heat) Integration - Part 1 (Composite Curves and ?T<sub>min</sub>)  
Lecture 24 - Concepts and Basic Principles of Heat Integration - Part 2 (Problem Table Algorithm and Identification of Heat Recovery Targets)  
Lecture 25 - Identification of Area and Cost Targets  
Lecture 26 - Pinch Technology for Heat Exchanger Network Design  
Lecture 27 - Tutorial - I (Composite Curves, Problem Table Algorithm and Enthalpy Intervals)  
Lecture 28 - Tutorial - II (Heat Exchanger Network Synthesis Using Pinch Technology)  
Lecture 29 - Selection of Process, Design of Flowsheet and Materials Balance

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Energy Balance, Process Alternatives and Design of the Absorber
- Lecture 31 - Rules of Thumb & Their Limitations and Tutorial
- Lecture 32 - General Concepts & Principles and Cost Allocation Procedure
- Lecture 33 - Lumped Cost Diagram and Cost Allocation Diagram (Case Study of Hydro-dealkylation Process)
- Lecture 34 - Assessment of Process Alternatives with Cost Allocation Diagram (Case Study of Hydrodealkylation)
- Lecture 35 - Tutorial on Lumped Cost Diagram and Cost Allocation Diagram
- Lecture 36 - Introduction to Chemical Projects and Their Economic Aspects
- Lecture 37 - Selection of the Process and Project Site - Part I
- Lecture 38 - Selection of the Process and Project Site - Part II
- Lecture 39 - Project Cost Estimation - Part I
- Lecture 40 - Project Cost Estimation - Part II
- Lecture 41 - Simplified Cost Model and Depreciation
- Lecture 42 - Time Value of Money
- Lecture 43 - Measures of Profitability and Project Evaluation - Part I
- Lecture 44 - Measures of Profitability and Project Evaluation - Part II
- Lecture 45 - Tutorial on Project Economics - Part I
- Lecture 46 - Tutorial on Project Economics - Part II

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Fluidization Engineering

Subject Co-ordinator - Dr. S.K. Majumder

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Particle properties  
Lecture 3 - Particle / Powder Classifications  
Lecture 4 - Minimum Fluidization Velocity  
Lecture 5 - Minimum Fluidization Velocity  
Lecture 6 - Flow regime and its map  
Lecture 7 - Flow regime and its map  
Lecture 8 - Frictional pressure drop in fluidized bed-fluid-solid system  
Lecture 9 - Frictional pressure drop in fluidized Bed-Gas-liquid-solid system  
Lecture 10 - Analysis of Frictional Pressure Drop in Fluidized Bed By Different Models  
Lecture 11 - Gas Distribution Through Distributor  
Lecture 12 - Calculation of gas pumping power consumption in fluidized bed  
Lecture 13 - Bubbling Fluidization Part 1  
Lecture 14 - Bubbling Fluidization Part 2  
Lecture 15 - Bubbling Fluidization Part 3  
Lecture 16 - Bubbling Fluidization Part 4  
Lecture 17 - Bubbling Fluidization Part 5  
Lecture 18 - Bubbling Fluidization Part 6  
Lecture 19 - Entrainment Characteristics (Part 1)  
Lecture 20 - Entrainment Characteristics (Part 2)  
Lecture 21 - Entrainment Characteristics (Part 2)  
Lecture 22 - Entrainment Characteristics (Part 2)  
Lecture 23 - Attrition in Fluidized Bed (Part 2)  
Lecture 24 - Solid movement, mixing  
Lecture 25 - Solid segregation  
Lecture 26 - Solid mixing and segregation  
Lecture 27 - Gas Dispersion and Interchange  
Lecture 28 - Mass transfer in fluidized Bed-Gas-solid system  
Lecture 29 - Mass transfer in fluidized Bed-Gas-liquid-solid system (Continued...)

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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Lecture 30 - Heat transfer Characteristics

Lecture 31 - Fluidized bed reactor design and its performance



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:An Introduction to Cardiovascular Fluid Mechanics

Subject Co-ordinator - Dr. Raghvendra Gupta

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - An Introduction

Lecture 2 - Fluid Mechanics

Lecture 3 - Solid Mechanics

Lecture 4 - Rheology of blood

Lecture 5 - Blood morphology

Lecture 6 - Blood flow in a channel

Lecture 7 - Viscometers and Rheometers

Lecture 8 - Viscoelasticity

Lecture 9 - Flow Bifurcation

Lecture 10 - Pulsatile Flow 1

Lecture 11 - Pulsatile Flow 2

Lecture 12 - Flow in Elastic Tubes

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Multiphase Microfluidics

Subject Co-ordinator - Dr. Raghvendra Gupta

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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  
Lecture 12 - Ideal annular Flow  
Lecture 13 - Taylor Flow  
Lecture 14 - Taylor Flow  
Lecture 15 - Taylor Flow  
Lecture 16 - Taylor Flow  
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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Measurement Technique in Multiphase Flows

Subject Co-ordinator - Prof. Rajesh Kumar Upadhyay

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Multiphase flow Measurement Techniques  
Lecture 2 - Invasive and Non-invasive Techniques  
Lecture 3 - Hot Wire Anemometry  
Lecture 4 - Optical Fiber Probe  
Lecture 5 - Laser Doppler Anemometry (LDA)  
Lecture 6 - LDA Post Processing and Particle Image Velocimetry (PIV)  
Lecture 7 - PIV and Positron Emission Particle Tracking  
Lecture 8 - Radioactive Particle Tracking - I  
Lecture 9 - Radioactive Particle Tracking - II  
Lecture 10 - Capacitance Probe, Optical Fiber Probe and ECT  
Lecture 11 - Gamma-ray and X-ray Tomography, MRI  
Lecture 12 - Summary

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Multiphase Flows

Subject Co-ordinator - Prof. Rajesh Kumar Upadhyay

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Multiphase flow introduction
- Lecture 2 - Fundamental definitions and terminology used in Multiphase - I
- Lecture 3 - Fundamental definitions and terminology used in Multiphase - II
- Lecture 4 - Flow Regime Map for Gas-Liquid System
- Lecture 5 - Flow Regime Map for Fluid-Solid System
- Lecture 6 - Pneumatic Conveying
- Lecture 7 - Momentum Equation through Reynolds Transport Theorem
- Lecture 8 - Lockhart Martinelli Correlation
- Lecture 9 - Pressure Drop Calculation for Homogeneous Flow
- Lecture 10 - Pressure Drop Calculation for Separated and Annular Flow Regime
- Lecture 11 - Lagrangian Tracking of Single Particle Under Different Forces
- Lecture 12 - Multiphase Interactions
- Lecture 13 - Multiphase Interactions
- Lecture 14 - Introduction to Multiphase Flow Modeling
- Lecture 15 - Algebraic Slip Method and Euler-Euler Method
- Lecture 16 - KTGF and Euler-Lagrangian Model
- Lecture 17 - Measurement Techniques
- Lecture 18 - Measurement Techniques
- Lecture 19 - Bubble Column
- Lecture 20 - Packed Bed Reactor
- Lecture 21 - Fluidized Bed Reactor
- Lecture 22 - Summary

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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

Subject Co-ordinator - Prof. Amit Kumar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Polymers  
Lecture 2 - Ideal Chain Models  
Lecture 3 - Ideal and Real Chains  
Lecture 4 - Thermodynamics of Polymer Solutions - I  
Lecture 5 - Thermodynamics of Polymer Solutions - II  
Lecture 6 - Thermodynamics of Polymer Solutions - III  
Lecture 7 - Phase Behaviour of Polymer Solutions and Blends  
Lecture 8 - Phase Behaviour of Polymer Blends and Copolymers  
Lecture 9 - Determination of Polymer Molar Mass  
Lecture 10 - Determination of Polymer Molar Mass  
Lecture 11 - Determination of Polymer Molar Mass  
Lecture 12 - Determination of Polymer Molar Mass  
Lecture 13 - Branching  
Lecture 14 - Branching, Network Formation and Gelation  
Lecture 15 - Gelation and Swelling of Network Polymers  
Lecture 16 - Amorphous State of Polymers  
Lecture 17 - Crystalline State of Polymers  
Lecture 18 - Mechanical Properties of Polymers  
Lecture 19 - Viscoelasticity  
Lecture 20 - Viscoelasticity, Dynamic Mechanical Analysis and Rheology  
Lecture 21 - Rubber Elasticity  
Lecture 22 - Unentangled Polymer Dynamics  
Lecture 23 - Entangled Polymer Dynamics  
Lecture 24 - Review

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Natural Gas Engineering

Subject Co-ordinator - Prof. Pankaj Tiwari

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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 - Sweetening 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

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Chemical Engineering Thermodynamics

Subject Co-ordinator - Prof. Sasidhar Gumma

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - First law for closed systems  
Lecture 3 - First law for open systems  
Lecture 4 - Simple processes  
Lecture 5 - Processes involving liquids and ideal gases  
Lecture 6 - Temperature dependency of  $C_p$  in an ideal gas  
Lecture 7 - Efficiency of Heat engines and Statement of Second Law  
Lecture 8 - Entropy  
Lecture 9 - Lost Work  
Lecture 10 - Maxwell's Relations  
Lecture 11 - Thermodynamic Diagrams  
Lecture 12 - Thermodynamic Tables, Residual Properties  
Lecture 13 - Virial Equation of State  
Lecture 14 - Residual property relations from EoS  
Lecture 15 - Cubic Equation of State  
Lecture 16 - Cubic Equation of State  
Lecture 17 - Thermodynamic Tables  
Lecture 18 - Correlations for Liquids  
Lecture 19 - Process Involving Phase Changes  
Lecture 20 - Chemical potential  
Lecture 21 - Partial molar properties  
Lecture 22 - Examples  
Lecture 23 - Ideal Solutions  
Lecture 24 - Excess Properties  
Lecture 25 - Fugacity  
Lecture 26 - Calculation of Fugacity using EoS - Part 1  
Lecture 27 - Calculation of Fugacity using EoS - Part 2  
Lecture 28 - Calculation of Fugacity in Mixtures using Cubic EoS  
Lecture 29 - Fugacity in Liquids, Activity Coefficient

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- Lecture 30 - Models for Excess Gibbs free energy - Part 1
- Lecture 31 - Models for Excess Gibbs free energy - Part 2
- Lecture 32 - Vapor Liquid Equilibrium - Part 1
- Lecture 33 - Vapor Liquid Equilibrium - Part 2
- Lecture 34 - Azeotropes
- Lecture 35 - Gamma/Phi Formulation
- Lecture 36 - LLE
- Lecture 37 - VLLE
- Lecture 38 - Enthalpy changes upon reaction
- Lecture 39 - Reaction coordinate
- Lecture 40 - Equilibrium constant
- Lecture 41 - Examples
- Lecture 42 - Conclusion



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Mass Transfer Operations-I

Subject Co-ordinator - Dr. B. Mandal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Introduction and Overview of Mass Transfer Operation
- Lecture 2 - Molecular and Eddy Diffusion, Diffusion Velocities and Fluxes
- Lecture 3 - Fick's First and Second Law
- Lecture 4 - Steady State Molecular Diffusion in fluids under stagnant and laminar flow conditions
- Lecture 5 - Diffusion through variable cross-sectional area
- Lecture 6 - Gas Phase Diffusion Coefficient measurement
- Lecture 7 - Gas Phase Diffusion Coefficient prediction and liquid phase diffusion coefficient measurement and
- Lecture 8 - Multicomponent diffusion and diffusivity in solids
- Lecture 9 - Mass transfer coefficient concept and classifications
- Lecture 10 - Dimensionless groups and correlations for convective mass transfer coefficients
- Lecture 11 - Mass transfer coefficient in laminar flow
- Lecture 12 - Boundary Layer Theory and mass transfer coefficients in turbulent flow
- Lecture 13 - Mass transfer theories
- Lecture 14 - Interphase mass transfer
- Lecture 15 - Interphase mass transfer and material balance for operating line
- Lecture 16 - Number of ideal stages in counter current operation
- Lecture 17 - Introduction, classification, Sparged and agitated vessels design
- Lecture 18 - Gas dispersed
- Lecture 19 - Sieve Tray
- Lecture 20 - Liquid dispersed
- Lecture 21 - Introduction to absorption, Equilibrium in gas-liquid system, and minimum liquid rate
- Lecture 22 - Design of packed column absorber based on the Individual Mass Transfer Coefficient
- Lecture 23 - Design of packed column absorber based on the Overall Mass Transfer Coefficient
- Lecture 24 - Height Equivalent to a Theoretical Plate (HETP), Design of packed column absorber for dilute and
- Lecture 25 - Absorption in plate column
- Lecture 26 - Introduction to distillation, binary equilibrium diagrams and concept of relative volatility
- Lecture 27 - Distillation in non-ideal systems and concept of enthalpy-concentration diagram
- Lecture 28 - Flash distillation
- Lecture 29 - Batch and steam distillation

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Continuous multistate fractionation
- Lecture 31 - Number of trays by McCabe and Thiele for distillation
- Lecture 32 - Pinch Points and minimum reflux
- Lecture 33 - Reflux below its bubble point
- Lecture 34 - Multiple feeds, multiple product withdrawal or side streams
- Lecture 35 - Multistage batch distillation with reflux
- Lecture 36 - The Ponchon-Savarit method
- Lecture 37 - The Ponchon-Savarit method
- Lecture 38 - Packed Distillation
- Lecture 39 - Introduction to multicomponent distillation and multicomponent flash distillation
- Lecture 40 - Minimum stages and minimum reflux in multicomponent distillation
- Lecture 41 - Multicomponent batch distillation

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Transport Phenomena of Non-Newtonian Fluids

Subject Co-ordinator - Prof. N. Kishore

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Introduction and Basic Concepts
- Lecture 2 - Classification of Non-Newtonian Fluids
- Lecture 3 - Mathematical Models for Non-Newtonian Fluids
- Lecture 4 - Viscoelastic Non-Newtonian Fluids
- Lecture 5 - Capillary Viscometers: Sources of Errors and Correction Methods
- Lecture 6 - Rotational Viscometers
- Lecture 7 - Capillary Viscometers - Errors and Corrections II
- Lecture 8 - Equation of Change for Non-Isothermal Systems
- Lecture 9 - Rotational Viscometers - II
- Lecture 10 - Rotational Viscometers - III
- Lecture 11 - Transition from Laminar to Turbulent Flow in Pipes for GNF
- Lecture 12 - Equations of Change for Isothermal Systems
- Lecture 13 - Equations of Change for Non-Isothermal Systems
- Lecture 14 - Power-law Fluids Flow in Concentric Annulus
- Lecture 15 - Power-law and Ellis Model Fluids Flow Through Pipes
- Lecture 16 - Bingham Plastic Fluids Flow through Pipes
- Lecture 17 - Herschel Bulkley Fluids Flow through Pipes
- Lecture 18 - Transition and Turbulent Flow of GNF in Pipes - I
- Lecture 19 - Transition and Turbulent Flow of GNF in Pipes - II
- Lecture 20 - Laminar flow of GNFs between Parallel Plates and along Inclined Surface
- Lecture 21 - Laminar flow of GNFs along Inclined Surface and Concentric Annulus
- Lecture 22 - Flow of Non-Newtonian Fluids through Packed Beds
- Lecture 23 - Dispersion in Packed Beds: Non-Newtonian Effects
- Lecture 24 - Liquid-Solid Fluidization by Power-law Liquids
- Lecture 25 - Free Convection between Two Vertical Plates
- Lecture 26 - Viscous Heat Generation
- Lecture 27 - Temperature distribution in fluids confined between co-axial cylinders
- Lecture 28 - Temperature distribution for FDF of Newtonian fluids in tubes
- Lecture 29 - Heat Transfer Combined with Chemical Reactions

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Transpiration Cooling
- Lecture 31 - Basics of MT; Diffusion Through Stagnant Gas Film
- Lecture 32 - Non-Isothermal Diffusive MT and Forced Convective MT
- Lecture 33 - Simultaneous Heat and Mass Transfer
- Lecture 34 - Mass Transfer Combined with Chemical Reactions
- Lecture 35 - Quasi-Steady Analysis of Simultaneous HT, MT and Chemical Reaction
- Lecture 36 - Quasi-Steady Analysis of Simultaneous HT and MT - I
- Lecture 37 - Quasi-Steady Analysis of Simultaneous HT and MT - II
- Lecture 38 - Quasi-Steady Analysis of Simultaneous HT and MT - III
- Lecture 39 - Momentum and Thermal Boundary Layer Flows
- Lecture 40 - Momentum Boundary Layer Thickness of Non-Newtonian Fluids
- Lecture 41 - Thermal and Concentration Boundary Layer Thickness of Non-Newtonian Fluids

## NPTEL Video Lecture Topic List - Created by Linuxpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Fluid Flow Operations

Subject Co-ordinator - Dr. S.K. Majumder

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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  
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

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- Lecture 30 - Introduction to multiphase flow
- Lecture 31 - Hydrodynamics in multiphase flow
- Lecture 32 - Hydrodynamics in multiphase flow (Continued...)
- Lecture 33 - Applications of multiphase flow

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Chemical Process Intensification

Subject Co-ordinator - Dr. S.K. Majumder

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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 - Cavitation 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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Supercritical extraction for process intensification
- Lecture 31 - Introduction to membrane and its principles
- Lecture 32 - Membrane engineering in process intensification
- Lecture 33 - Introduction to microprocess technology
- Lecture 34 - Process Intensification by Microreactors
- Lecture 35 - Hydrodynamics and transport in microchannel based microreactor



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Chemical Reaction Engineering-I

Subject Co-ordinator - Dr. B. Mandal

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Overview on Reaction Engineering  
Lecture 2 - Kinetics of Homogeneous Reactions  
Lecture 3 - Kinetic Model and Temperature Dependency  
Lecture 4 - Introduction and Stoichiometry for the Batch System  
Lecture 5 - Stoichiometry for Constant Volume Flow and Variable Volume Batch Systems  
Lecture 6 - Stoichiometry for Variable Volume Flow System  
Lecture 7 - Analysis of Batch Reactor Kinetic Data  
Lecture 8 - Integral Method of Analysis of Batch Reactor Data - Part 1  
Lecture 9 - Integral Method of Analysis of Batch Reactor Data - Part 2  
Lecture 10 - Differential Method of Analysis and Variable Volume Batch Reactor Data  
Lecture 11 - Introduction and Ideal Batch Reactor Design  
Lecture 12 - Ideal Mixed Flow Reactor Design  
Lecture 13 - Ideal Plug Flow Reactor Design  
Lecture 14 - Size Comparison of Single and Multiple Reactors  
Lecture 15 - Size Comparison Multiple Reactors  
Lecture 16 - Recycle and Autocatalytic Reactors  
Lecture 17 - Design for Parallel Reactions  
Lecture 18 - Design for Series Reactions  
Lecture 19 - Design for Series-Parallel Reactions  
Lecture 20 - Denbigh Reactions and Their Special Cases  
Lecture 21 - Heats of Reaction and Equilibrium Conversion from Thermodynamics  
Lecture 22 - General Graphical Reactor Design Procedure  
Lecture 23 - Material and Energy Balances in Batch Reactor  
Lecture 24 - Optimum Temperature Progression in Batch Reactor  
Lecture 25 - Material and Energy Balances in Plug Flow and Mixed Flow Reactors  
Lecture 26 - Ideal and Non-Ideal Mixed Flow Reactor Design and Multiple Steady States  
Lecture 27 - Non-Ideal Reactors and Residence Time Distribution  
Lecture 28 - RTD Measurement and Moments of RTD  
Lecture 29 - RTD in Ideal Reactors

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Lecture 30 - Reactor Modeling using the RTD

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Mass Transfer Operations-II

Subject Co-ordinator - Dr. Chandan Das

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Basic concepts, Adiabatic saturation temperature  
Lecture 2 - Design calculations of cooling tower  
Lecture 3 - Design of cooling tower  
Lecture 4 - Design of cooling tower  
Lecture 5 - Air conditioning, Example problems on dehumidification  
Lecture 6 - Mechanism of drying and drying equilibria, drying rate curve  
Lecture 7 - Drying  
Lecture 8 - Drying  
Lecture 9 - Drying time calculation from drying rate curve  
Lecture 10 - Introduction to liquid-liquid extraction, liquid-liquid equilibria  
Lecture 11 - Effect of temperature on LLE and Design of single stage extraction  
Lecture 12 - Design Calculation of Multistage Operation  
Lecture 13 - Design calculation of multistage cross-current extraction  
Lecture 14 - Design calculation of multistage counter-current extraction, Selection of extractors  
Lecture 15 - Leaching  
Lecture 16 - Leaching  
Lecture 17 - Supercritical Fluid Extraction, equipment for leaching  
Lecture 18 - Fundamentals of membrane separation processes  
Lecture 19 - Manufacturing of membranes, advantages and limitations  
Lecture 20 - Various models and applications  
Lecture 21 - Various models and applications  
Lecture 22 - Electric field enhanced membrane separation processes  
Lecture 23 - Micellar-enhanced ultrafiltration  
Lecture 24 - Adsorption  
Lecture 25 - Stage wise and continuous adsorption  
Lecture 26 - Fluidized bed and teeter bed  
Lecture 27 - Unsteady state fixed bed adsorbers, ion exchange  
Lecture 28 - Crystallization, types of crystal geometry  
Lecture 29 - Solid-liquid phase equilibrium, Theory of crystallization

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Lecture 30 - Design of crystallizer, crystallization equipment

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Mechanical Unit Operations

Subject Co-ordinator - Prof. Nanda Kishore

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Particulate Solids  
Lecture 2 - Particle Size  
Lecture 3 - Particle Shape and Density  
Lecture 4 - Screening  
Lecture 5 - Size Analysis by Screening  
Lecture 6 - Screening Equipment, Effectiveness and Capacity  
Lecture 7 - Methods of Size Reduction  
Lecture 8 - Equipment for Size Reduction - Crushers  
Lecture 9 - Equipment for Size Reduction - Gridners  
Lecture 10 - Equipment for Size Reduction - Ultrafine Grinders and Cutting Machines  
Lecture 11 - Storage of Bulk Solids  
Lecture 12 - Solids Flow Out and their Flow Patterns  
Lecture 13 - Conveying of Bulk Solids  
Lecture 14 - Size Enlargement Methods  
Lecture 15 - Size Enlargement Equipment - 1  
Lecture 16 - Size Enlargement Equipment - 2  
Lecture 17 - Flow past Immersed Solid Objects  
Lecture 18 - Motion of Particles through Fluids - 1  
Lecture 19 - Motion of Particles through Fluids - 2  
Lecture 20 - Motion of Particles through Fluids - 3  
Lecture 21 - Flow through Beds of Solids - 1  
Lecture 22 - Flow through Beds of Solids - 2  
Lecture 23 - Flow through Fluidized Beds - 1  
Lecture 24 - Flow through Fluidized Beds - 2  
Lecture 25 - Filtration  
Lecture 26 - Principles of Cake Filtration - 1  
Lecture 27 - Principles of Cake Filtration - 2  
Lecture 28 - Filtration Equipment  
Lecture 29 - Cross Flow Filtration - 1

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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Lecture 30 - Cross Flow Filtration - 2  
Lecture 31 - Gravity Sedimentation - Classifiers  
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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Advanced Thermodynamics

Subject Co-ordinator - Prof. Nanda Kishore

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction of Phase Equilibrium  
Lecture 2 - Classical Thermodynamics of Phase Equilibria - 1  
Lecture 3 - Classical Thermodynamics of Phase Equilibria - 2  
Lecture 4 - Thermodynamic Properties from Volumetric Data  
Lecture 5 - Fugacity from Volumetric Data - 1  
Lecture 6 - Fugacity from Volumetric Data - 2  
Lecture 7 - Intermolecular Forces and Non-Ideal Behaviour  
Lecture 8 - Intermolecular Forces-Potential Energy Functions  
Lecture 9 - Molecular Theory of Corresponding States - 1  
Lecture 10 - Molecular Theory of Corresponding States - 2  
Lecture 11 - Intermolecular Potential and EoS  
Lecture 12 - Virial Coefficients from Potential Functions  
Lecture 13 - Virial Coefficients from Corresponding States Theory  
Lecture 14 - Fugacities in Gaseous Mixtures - 1  
Lecture 15 - Fugacities in Gaseous Mixtures - 2  
Lecture 16 - Fugacities in Gaseous Mixtures - 3  
Lecture 17 - Liquid Mixtures and Excess Functions  
Lecture 18 - Excess Functions and Activity Coefficients  
Lecture 19 - Activity Coefficients and Thermodynamic Consistency  
Lecture 20 - Models for Excess Gibbs Energy - 1  
Lecture 21 - Models for Excess Gibbs Energy - 2  
Lecture 22 - Models for Excess Gibbs Energy - 3  
Lecture 23 - Vapour-Liquid Equilibrium - 1  
Lecture 24 - Vapour-Liquid Equilibrium - 2  
Lecture 25 - Vapour-Liquid Equilibrium - 3  
Lecture 26 - Liquid-Liquid Equilibrium - 1  
Lecture 27 - Liquid-Liquid Equilibrium - 2  
Lecture 28 - Vapour-Liquid-Liquid Equilibrium - 1  
Lecture 29 - Vapour-Liquid-Liquid Equilibrium - 2

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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Lecture 30 - Solid-Liquid Equilibrium - 1  
Lecture 31 - Solid-Liquid Equilibrium - 2



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Membrane Technology

Subject Co-ordinator - Prof. Kaustubha Mohanty

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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  
Lecture 8 - Inorganic membranes  
Lecture 9 - Porous and non-porous membranes, characterization of porous membranes and MF membrane  
Lecture 10 - MF membrane characterization  
Lecture 11 - UF membrane characterization  
Lecture 12 - Passive transport, active transport, description of transport process  
Lecture 13 - Transport through porous membrane and nonporous membrane  
Lecture 14 - Concept of osmosis and reverse osmosis, thermodynamic analysis  
Lecture 15 - Revision of concepts and fundamentals  
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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- 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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Computer Aided Applied Single Objective Optimization

Subject Co-ordinator - Prof. Prakash Kotecha

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Optimization  
Lecture 2 - Linear Regression  
Lecture 3 - Multiple, Polynomial and General Linear Least Square Regression  
Lecture 4 - Nonlinear Regression  
Lecture 5 - Regression  
Lecture 6 - Teaching Learning Based Optimization  
Lecture 7 - Implementation of TLBO in MATLAB  
Lecture 8 - Supplementary  
Lecture 9 - Supplementary  
Lecture 10 - Particle Swarm Optimization  
Lecture 11 - Implementation of Particle Swarm Optimization using MATLAB  
Lecture 12 - Differential Evolution  
Lecture 13 - Implementation of Differential Evolution using MATLAB  
Lecture 14 - Binary Coded Genetic Algorithm  
Lecture 15 - Real Coded Genetic Algorithm  
Lecture 16 - Implementation of Real Coded Genetic Algorithm using MATLAB  
Lecture 17 - Artificial Bee Colony Algorithm  
Lecture 18 - Working of Artificial Bee Colony Algorithm  
Lecture 19 - Implementation of Artificial Bee Colony using MATLAB  
Lecture 20 - Comparison of Variation Operators and Survival Strategies  
Lecture 21 - Black-Box Optimization Problems  
Lecture 22 - Constraint-Handling in Metaheuristic Techniques  
Lecture 23 - Case Study  
Lecture 24 - Case Study  
Lecture 25 - Parallelization and Vectorization of Fitness Function  
Lecture 26 - Constraint-Handling using Correction Approach  
Lecture 27 - MATLAB inbuilt functions  
Lecture 28 - MATLAB inbuilt functions  
Lecture 29 - MATLAB Optimization Tool

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- Lecture 30 - MATLAB inbuilt functions
- Lecture 31 - Simplex Method for LP
- Lecture 32 - Branch and Bound Method for MILP
- Lecture 33 - MILP formulation of Production Planning Problem
- Lecture 34 - Generalized Algebraic Modelling System
- Lecture 35 - Solution of Production Planning Problem using GAMS and NEOS, MIRO

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Basic Principles and Calculations in Chemical Engineering

Subject Co-ordinator - Prof. Subrata Kumar Majumdar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Definition, History, Role of Chemical Engineer  
Lecture 2 - Basic Features of Chemical Process  
Lecture 3 - Unit systems and dimensions  
Lecture 4 - Variables and Properties of Material in System  
Lecture 5 - Pressure and Temperature of Flow Process  
Lecture 6 - Rate of Process  
Lecture 7 - Principles of material balance and calculation  
Lecture 8 - Material Balances on Processes with Recycle and Bypass  
Lecture 9 - Material balances on reactive processes  
Lecture 10 - Material balances on combustion reactions  
Lecture 11 - State Equation of Ideal Gas and Calculation  
Lecture 12 - State Equation of non-Ideal Gas and Calculation  
Lecture 13 - Phase equilibrium  
Lecture 14 - Equilibrium Laws, Humidity and Saturation  
Lecture 15 - Humidity, Saturation Psychrometric chart  
Lecture 16 - Process of phase change  
Lecture 17 - Principles of Energy  
Lecture 18 - Laws and properties of thermodynamics  
Lecture 19 - Standard Heat of Formation  
Lecture 20 - The mechanical energy balance  
Lecture 21 - Enthalpy balances without reaction  
Lecture 22 - Energy balance with multiple streams without reaction  
Lecture 23 - Energy balance on heat of solution  
Lecture 24 - Energy balance with heat of reaction  
Lecture 25 - Energy balance with heat of reaction (Continued...)  
Lecture 26 - Energy balance with heat of combustion  
Lecture 27 - Material balance of transient process  
Lecture 28 - Unsteady state energy balance  
Lecture 29 - Least Square Method Linear equation fitting

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Non-linear algebraic equation system
- Lecture 31 - Numerical Integration
- Lecture 32 - Process Degrees of Freedom
- Lecture 33 - Process Flowsheeting and codes
- Lecture 34 - Case Study
- Lecture 35 - Case Study

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Renewable Energy Engineering: Solar, Wind and Biomass Energy

Subject Co-ordinator - Prof. R. Anandalakshmi, Prof. Vaibhav Vasant Goud

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Solar Energy: An overview of thermal applications

Lecture 2 - Solar radiation

Lecture 3 - Practice problems - Part I

Lecture 4 - Practice problems - Part II

Lecture 5 - Non-concentrating solar collectors - Part I

Lecture 6 - Non-concentrating solar collectors - Part II

Lecture 7 - Non-concentrating solar collectors - Part III

Lecture 8 - Practice problems - Part I

Lecture 9 - Practice problems - Part II

Lecture 10 - Practice problems - Part III

Lecture 11 - Parabolic solar collectors

Lecture 12 - Practice problems

Lecture 13 - Thermal energy storage systems - Part I

Lecture 14 - Thermal energy storage systems - Part II

Lecture 15 - Solar energy utilization methods

Lecture 16 - Classification of energy resources

Lecture 17 - Broad classification and compositional analysis

Lecture 18 - Characteristics and properties of biomass

Lecture 19 - Properties and structural components of biomass

Lecture 20 - Biomass residues and energy conversion routes

Lecture 21 - Utilisation of biomass through bio-chemical and thermo-chemical routes

Lecture 22 - Conversion mechanism of biomass to biogas and its properties

Lecture 23 - Classification of biogas plants

Lecture 24 - Practice problems - I

Lecture 25 - Practice problems - II

Lecture 26 - Practice problems - III

Lecture 27 - Bioconversion of substrates into alcohol

Lecture 28 - Thermo-chemical conversion, torrefaction and combustion processes

Lecture 29 - Thermo-chemical conversion of biomass to solid, liquid and gaseous fuels

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Gasification process
- Lecture 31 - Thermo-chemical conversion processes: pyrolysis, liquefaction and conversion processes
- Lecture 32 - Practice problems - I
- Lecture 33 - Practice problems - II
- Lecture 34 - Turbine terms, types and theories - Part I
- Lecture 35 - Turbine terms, types and theories - Part II
- Lecture 36 - Characteristics and Power Generation from Wind Energy - Part I
- Lecture 37 - Characteristics and Power Generation from Wind Energy - Part II
- Lecture 38 - Practice problems



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC: Biomass Conversion and Biorefinery

Subject Co-ordinator - Prof. Kaustubha Mohanty

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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 crops 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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- 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-butanediol, 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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Aspen Plus® Simulation Software - A basic course for beginners

Subject Co-ordinator - Prof. Prabirkumar Saha

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Significance of software with example - Simulation on pen and paper vs simulation on Aspen Plus
- Lecture 2 - Understanding Resources and My Exchange, Start using Aspen Plus
- Lecture 3 - Overview of setting up of property environment
- Lecture 4 - Using Model Palette - Mixers/Splitters, Separators
- Lecture 5 - Using Model Palette - Exchangers
- Lecture 6 - Using Model Palette - Columns
- Lecture 7 - Using Model Palette - Reactors
- Lecture 8 - Using Model Palette - Pressure Changers
- Lecture 9 - Example: Hydrocarbon Treatment - Part 1
- Lecture 10 - Example: Hydrocarbon Treatment - Part 2
- Lecture 11 - Setup, Components
- Lecture 12 - Property Methods
- Lecture 13 - Property Methods and Property Sets with example
- Lecture 14 - Analysis tools (Pure Components and Binary mixtures)
- Lecture 15 - Analysis tools (Ternary mixtures), Data and Regression (Part 1)
- Lecture 16 - Data and Regression (Part 2), Property Estimation
- Lecture 17 - Practice problems on pure components
- Lecture 18 - Practice problems on binary mixtures
- Lecture 19 - Miscellaneous practice problems and case studies
- Lecture 20 - Model Analysis Tools
- Lecture 21 - Separation of Hydrocarbon Mixture
- Lecture 22 - Synthesis of Acetaldehyde from Ethanol
- Lecture 23 - BTX Separation through Distillation
- Lecture 24 - Synthesis of Methanol from Syngas
- Lecture 25 - Synthesis of Dimethyl Ether from Carbon Dioxide and Hydrogen
- Lecture 26 - Synthesis of Ammonia in Cryogenic Process
- Lecture 27 - Production of Cumene
- Lecture 28 - Design, Rating and Simulation of Heat Exchanger
- Lecture 29 - Absorption and Distillation - Part 1

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Absorption and Distillation - Part 2
- Lecture 31 - Hydrodealkylation of Toluene
- Lecture 32 - Isobutene Production Plant
- Lecture 33 - Nitric Oxide Production Plant
- Lecture 34 - Plant Economy and Utilities
- Lecture 35 - Plant Dynamics and Control

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Physical and Electrochemical Characterizations in Chemical En

Subject Co-ordinator - Prof. Tamal Banerjee

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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 Fundamentals  
Lecture 8 - Chemical Shifts  
Lecture 9 - Factors Affecting Chemical Shift and 2D NMR  
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 Curvature  
Lecture 17 - Rheology: Fundamentals and Principles  
Lecture 18 - Complex Fluids and their Properties  
Lecture 19 - Rheology: Case Study on Hydrogel Synthesis  
Lecture 20 - Electron Spectroscopy for Surface Analysis  
Lecture 21 - Quantification in XRF and XPS Spectroscopy  
Lecture 22 - XPS Instrument and Application  
Lecture 23 - Introduction to Electrochemical Characterization Techniques  
Lecture 24 - Electrode Potential, Kinetics and Mass Transfer Resistance  
Lecture 25 - Voltammetry and Galvanostatic Charge-Discharge

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Chemical Process Technology

Subject Co-ordinator - Prof. Tamal Banerjee

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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 - SO<sub>2</sub> 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

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- Lecture 30 - Fischer Tropsch Process: SASOL and SDMS
- Lecture 31 - Methanol to Gasoline: Haldor Topsoe and TIGAS
- Lecture 32 - Fuel Additives
- Lecture 33 - Homogenous Catalysis
- Lecture 34 - Methanol Carbonylation for Acetic Acid Production
- Lecture 35 - Hydroformylation Reactions
- Lecture 36 - Hydroformylation of Propene and Higher Alkenes
- Lecture 37 - Ethene Oligomerization
- Lecture 38 - Dimethyl Terephthalate and Terephthalic Acid Production
- Lecture 39 - Bio-refinery products and Process Design
- Lecture 40 - Optimal Synthesis of Sustainable Bio-refineries
- Lecture 41 - Bio-based Fuels
- Lecture 42 - Bio-based Chemicals
- Lecture 43 - Bio-refinery Feedstock: Food Waste as a Renewable Raw Material

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Inorganic Chemical Technology

Subject Co-ordinator - Prof. Nanda Kishore

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Unit Processes  
Lecture 2 - Introduction of Unit Operations  
Lecture 3 - Unit Operations and Other General Principles  
Lecture 4 - General Principles and Chemical Plant Design  
Lecture 5 - Fuel Gases  
Lecture 6 - Natural Gas, LPG and Syngas  
Lecture 7 - Synthesis gas  
Lecture 8 - Industrial Gases  
Lecture 9 - Industrial Gases - Carbon Dioxide  
Lecture 10 - Industrial Gases - Hydrogen  
Lecture 11 - Sulfur Industry  
Lecture 12 - Sulfur and sulfuric acid  
Lecture 13 - Sulfuric Acid  
Lecture 14 - Nitrogen Industries - Ammonia  
Lecture 15 - Nitrogen Industries - Nitric Acid  
Lecture 16 - Nitrogen Industries - Urea  
Lecture 17 - Nitrogen Industries - Ammonium Nitrate  
Lecture 18 - Phosphorus Industries - Phosphorus and Phosphoric Acid Production  
Lecture 19 - Phosphorus Industries - Phosphoric Acid Production by Wet Processes  
Lecture 20 - Phosphorus Industries - Phosphates  
Lecture 21 - Potassium Industries - 1  
Lecture 22 - Potassium Industries - 2  
Lecture 23 - Chlor-Alkali Industry - Soda Ash  
Lecture 24 - Chlor-Alkali Industry - Chlorine and Caustic Soda  
Lecture 25 - Cement and Lime Industry - Cement  
Lecture 26 - Cement and Lime Industry - Lime  
Lecture 27 - Glass Industries  
Lecture 28 - Surface Coating Industry  
Lecture 29 - Paints and Pigments

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- Lecture 30 - Varnishes, Lacquers and Industrial Coatings
- Lecture 31 - Raw Materials and Basic Ceramic Chemistry
- Lecture 32 - Whitewares and Structural Clay Products
- Lecture 33 - Refractories, Specialized Ceramic Products and Vitreous Enamel
- Lecture 34 - Metallurgical Industries - I
- Lecture 35 - Metallurgical Industries - II

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Organic Chemical Technology

Subject Co-ordinator - Prof. Nanda Kishore

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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Lecture 30 - Chemicals from Aromatic Compounds - Phenol  
Lecture 31 - Chemicals from Aromatic Compounds - 3  
Lecture 32 - Polymer Industry  
Lecture 33 - Polymer Industry - 2  
Lecture 34 - Rubber Industry  
Lecture 35 - Rubber Industry - 2

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Solid-Fluid Operations

Subject Co-ordinator - Prof. Subrata Kumar Majumder

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Reverse Osmosis
- Lecture 31 - Introduction to Nanoparticles
- Lecture 32 - Synthesis of Nanoparticles - Physical Method
- Lecture 33 - Synthesis of Nanoparticles (Chemical Methods)
- Lecture 34 - Adsorption: Principle and Applications
- Lecture 35 - Analysis of Adsorption by Isotherms
- Lecture 36 - Adsorption Kinetics

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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

Subject Co-ordinator - Prof. Vaibhav V. Goud

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Sources of energy  
Lecture 2 - Sources of energy  
Lecture 3 - Energy scenario  
Lecture 4 - Environmental aspects of energy  
Lecture 5 - Environmental aspects of energy  
Lecture 6 - Environmental aspects of energy  
Lecture 7 - Environmental aspects of energy  
Lecture 8 - Solid fuels - Part I  
Lecture 9 - Solid fuels - Part II  
Lecture 10 - Liquid fuels - Part I  
Lecture 11 - Liquid fuels - Part II  
Lecture 12 - Practice problems - Part I  
Lecture 13 - Practice problems - Part II  
Lecture 14 - Energy from Bio-based Feedstock  
Lecture 15 - Thermal/Thermochemical processes  
Lecture 16 - Practice problems (Pelletization)  
Lecture 17 - Practice problems (Torrefaction Mass and Energy Yield)  
Lecture 18 - Pyrolysis and Hydrothermal Liquefaction  
Lecture 19 - Gasification  
Lecture 20 - Practice examples (Pyrolysis, Gasification)  
Lecture 21 - Biochemical conversion processes - Anaerobic Digestion in Landfills  
Lecture 22 - Bioethanol Production  
Lecture 23 - Practice examples (Biogas and Bio-ethanol production)  
Lecture 24 - Chemical Conversion Processes - Types of Feedstock and Pretreatment  
Lecture 25 - Mechanism of trans-esterification and biodiesel production  
Lecture 26 - Green diesel synthesis from bio-based feedstocks  
Lecture 27 - Energy from Coal (Carbonization, Gasification and Liquefaction)  
Lecture 28 - Practice Example (Combustion of Biomass and Coal)  
Lecture 29 - Combustion Process (Biomass and Coal)

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Lecture 30 - Concept of integration of energy system

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Petroleum Reservoir Engineering

Subject Co-ordinator - Dr. Pankaj Tiwari

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Applied Statistical Thermodynamics

Subject Co-ordinator - Prof. Tamal Banerjee

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Introduction to Statistical Thermodynamics
- Lecture 2 - Postulates and Boltzmann Distribution
- Lecture 3 - Properties of Canonical Partition Function
- Lecture 4 - Canonical Partition Function and Thermodynamic Properties
- Lecture 5 - Thermodynamic Properties of Ideal Monoatomic Gases
- Lecture 6 - Monoatomic Gases and Gibbs Entropy Equation
- Lecture 7 - Energy Fluctuations for Monoatomic Gases
- Lecture 8 - Partition Function for Diatomic Gases
- Lecture 9 - Vibrational Partition Function
- Lecture 10 - Partition Function for Ideal Polyatomic Gas
- Lecture 11 - Normal Mode Analysis
- Lecture 12 - Illustrations
- Lecture 13 - Non-reacting Ideal Gas Mixture
- Lecture 14 - Chemically Reacting Gas Mixture
- Lecture 15 - Degree of Ionization of Gas Molecules
- Lecture 16 - Problems on Ionization of Gas Molecules
- Lecture 17 - Microcanonical and Grand Canonical Ensemble
- Lecture 18 - Isobaric Isothermal Ensemble
- Lecture 19 - Fluctuations in Grand canonical and Isothermal Isobaric Ensembles
- Lecture 20 - Semi Grand Canonical Ensemble and Comparison of Ensembles
- Lecture 21 - Problems and Adsorption Isotherms
- Lecture 22 - Virial Equation of State for Polyatomic Molecules
- Lecture 23 - Virial Equation of State
- Lecture 24 - Virial Equation of State with Higher Order Terms
- Lecture 25 - Thermodynamic Properties from Virial Equation of State
- Lecture 26 - Interaction Potentials for Spherical Molecules
- Lecture 27 - Inferences from Intermolecular Potentials
- Lecture 28 - Engineering Application of Virial Equation of State
- Lecture 29 - Einstein Model

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- Lecture 30 - Einstein Model (Continued...)
- Lecture 31 - Debye Model
- Lecture 32 - Sublimation Pressure and Enthalpy of Crystals
- Lecture 33 - Flory Huggin's Model
- Lecture 34 - Ising Model
- Lecture 35 - Radial Distribution Function
- Lecture 36 - Radial Distribution Function
- Lecture 37 - Molecular Dynamics Simulations
- Lecture 38 - Square well Potential and Barker Henderson Perturbation Theory

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Fluid Mechanics

Subject Co-ordinator - Dr. V. Shankar

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1  
Lecture 2  
Lecture 3  
Lecture 4  
Lecture 5  
Lecture 6  
Lecture 7  
Lecture 8  
Lecture 9  
Lecture 10  
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Lecture 12  
Lecture 13  
Lecture 14  
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Lecture 26  
Lecture 27  
Lecture 28  
Lecture 29

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Lecture 30  
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Lecture 35  
Lecture 36  
Lecture 37  
Lecture 38  
Lecture 39  
Lecture 40

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Mass Transfer II

Subject Co-ordinator - Prof. Nishith Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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  
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Lecture 26  
Lecture 27  
Lecture 28  
Lecture 29

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Lecture 30  
Lecture 31  
Lecture 32  
Lecture 33  
Lecture 34  
Lecture 35  
Lecture 36  
Lecture 37  
Lecture 38  
Lecture 39  
Lecture 40

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Plantwide Control of Chemical Processes

Subject Co-ordinator - Dr. Nitin Kaistha

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course  
Lecture 2 - Process Dynamics and Negative Feedback  
Lecture 3 - PID control  
Lecture 4 - Common Industrial Control Loops and advanced loops  
Lecture 5 - Advanced loops (Continued...) and multivariable systems  
Lecture 6 - Systematic Tuning Using Frequency Domain Analysis  
Lecture 7 - Frequency Domain Analysis  
Lecture 8 - Multivariable Systems  
Lecture 9 - RGA and dynamic decoupling  
Lecture 10 - Model based control  
Lecture 11 - Dynamic Matrix Control  
Lecture 12 - Control of Distillation Columns  
Lecture 13 - Temperature inferential distillation control  
Lecture 14 - Considerations in temperature inferential control  
Lecture 15 - Control of Complex Column Configurations  
Lecture 16 - Control of Heat Integrated Columns  
Lecture 17 - Homogenous extractive distillation  
Lecture 18 - More on complex columns and reactive distillation  
Lecture 19 - Control of reactors  
Lecture 20 - PFR controls (Continued..) & CSTRs  
Lecture 21 - CSTR heat management  
Lecture 22 - Heat Exchangers and Miscellaneous Systems  
Lecture 23 - Degrees of freedom analysis  
Lecture 24 - Degrees of freedom (Continued...)  
Lecture 25 - Illustration of considerations in control structure synthesis  
Lecture 26 - Two column recycle process  
Lecture 27 - Throughput manipulator selection  
Lecture 28 - Plantwide control structure design  
Lecture 29 - Systematizing plantwide control design

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - The Luyben design procedure
- Lecture 31 - Role of equipment capacity constraints
- Lecture 32 - Recycle process case study
- Lecture 33 - Recycle process case study (Continued...)
- Lecture 34 - C4 isomerization process case study
- Lecture 35 - C4 isomerization process case study (Continued...)
- Lecture 36 - C4 isomerization process case study
- Lecture 37 - Systematic economic plantwide control design procedure
- Lecture 38 - Ethyl benzene process case study
- Lecture 39 - C4 isomerization process revisited
- Lecture 40 - Contrasting conventional and top-down approach
- Lecture 41 - Cumene process plantwide control



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Thermodynamics Of Fluid Phase Equilibria

Subject Co-ordinator - Dr. Jayant K. Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review - 1  
Lecture 2 - Review - Temperature and Pressure  
Lecture 3 - Review - Energy Conservation  
Lecture 4 - Properties - Part 1  
Lecture 5 - Properties - Part 2  
Lecture 6 - Mass-energy analysis of open system  
Lecture 7 - Energy analysis of closed system  
Lecture 8 - The Second Law of Thermodynamics  
Lecture 9 - Entropy  
Lecture 10 - Thermodynamic Calculus - 1  
Lecture 11 - Thermodynamic Calculus - 2  
Lecture 12 - Thermodynamic Calculus - 3  
Lecture 13 - Thermodynamic Calculus - 4  
Lecture 14 - Legendre Transformation and Free-energy  
Lecture 15 - Criteria for phase equilibria  
Lecture 16 - Maxwell Relation  
Lecture 17 - Stability Criteria  
Lecture 18 - Thermodynamics of phase equilibrium  
Lecture 19 - Chemical potential and fugacity  
Lecture 20 - General discussion on fugacity  
Lecture 21 - Ideal Gas Mixture - Part 1  
Lecture 22 - Ideal Gas Mixture - Part 2  
Lecture 23 - Partial Molar Properties  
Lecture 24 - Partial Molar Properties from experimental data  
Lecture 25 - Thermodynamics properties from volumetric data - 1  
Lecture 26 - Thermodynamics properties from volumetric data - 2  
Lecture 27 - Fugacity of pure liquids and solids  
Lecture 28 - Thermodynamics properties from volumetric data  
Lecture 29 - Approaches to phase equilibria calculation

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Traditional Approaches to phase equilibria calculations
- Lecture 31 - Algorithms for vapor-liquid equilibria
- Lecture 32 - Probability and Multiplicity
- Lecture 33 - Multiplicity and maximising the multiplicity
- Lecture 34 - Introduction to statistical mechanics
- Lecture 35 - Partition function for independent particles
- Lecture 36 - Lecture 36
- Lecture 37 - Models of Molecular Pair Potentials
- Lecture 38 - Molecular Theory of Corresponding States
- Lecture 39 - Molecular Interactions in Dense Fluid Media
- Lecture 40 - Models for Electrolyte Systems
- Lecture 41 - Membrane Osmometry
- Lecture 42 - Fugacity of liquid mixture - 1
- Lecture 43 - Fugacity of liquid mixture - 2
- Lecture 44 - Models for fugacity of liquid mixtures - 1
- Lecture 45 - Models for fugacity of liquid mixtures - 2
- Lecture 46 - Examples of Fugacity of liquids
- Lecture 47 - Stability of the Fluid Phases
- Lecture 48 - Theories of Solution - I
- Lecture 49 - Theories of Solution - II
- Lecture 50 - Polymer Solutions
- Lecture 51 - Example Problems on Polymer Solutions

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Chemical Engineering Thermodynamics (2019)

Subject Co-ordinator - Dr. Jayant K. Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Measurability and controllability of energy  
Lecture 3 - Postulates of thermodynamics - I  
Lecture 4 - Postulates of thermodynamics - II  
Lecture 5 - Definition of intensive variables and driving forces for temperature and pressure flow  
Lecture 6 - Driving force for the matter flow  
Lecture 7 - Basic properties, phase diagram, and thermodynamic table  
Lecture 8 - Work, and heat  
Lecture 9 - First law of thermodynamics for closed system  
Lecture 10 - First law of thermodynamics  
Lecture 11 - First law of thermodynamics for open system  
Lecture 12 - First law of thermodynamics  
Lecture 13 - The second law of the thermodynamics  
Lecture 14 - Carnot cycle and thermodynamic temperature  
Lecture 15 - The concept of entropy  
Lecture 16 - Maximum work and entropy of ideal gas  
Lecture 17 - Power cycles and examples  
Lecture 18 - Mathematical properties of fundamental equations  
Lecture 19 - Generalized thermodynamic potential - I  
Lecture 20 - Generalized thermodynamic potential - II  
Lecture 21 - Multivariable Calculus  
Lecture 22 - Maxwell's relations and examples  
Lecture 23 - Jacobian method and its applications  
Lecture 24 - Equilibrium and stability - I  
Lecture 25 - Equilibrium and stability - II  
Lecture 26 - Stability criteria  
Lecture 27 - Intrinsic stability of thermodynamic system  
Lecture 28 - Phase transitions  
Lecture 29 - Clapeyron Equation and Vapour Pressure Correlations

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Equation of state
- Lecture 31 - Equation of state (Continued...)
- Lecture 32 - Repulsive Interaction
- Lecture 33 - Fugacity
- Lecture 34 - Thermodynamics of mixtures
- Lecture 35 - Partial molar properties and examples
- Lecture 36 - Examples of partial molar properties for real processes
- Lecture 37 - Obtaining the partial molar properties from experimental data
- Lecture 38 - Partial molar properties of ideal gas mixtures
- Lecture 39 - Chemical potential of ideal gas mixtures
- Lecture 40 - Fugacity coefficient in terms of measurable properties
- Lecture 41 - Fugacity coefficient for mixtures
- Lecture 42 - Fugacity coefficient for ideal mixtures
- Lecture 43 - Activity coefficient for mixtures
- Lecture 44 - Gibbs - Duhem relations and its impacts on the activity
- Lecture 45 - Excess Gibbs free energy model - I
- Lecture 46 - Two suffix Margules equation
- Lecture 47 - Excess Gibbs free energy model - II
- Lecture 48 - Vapor Liquid Equilibria
- Lecture 49 - Vapor Liquid Equilibria (examples)
- Lecture 50 - Vapor Liquid Equilibria (non-ideal mixtures - I)
- Lecture 51 - Vapor Liquid Equilibria (non-ideal mixtures - II)
- Lecture 52 - Azeotropes
- Lecture 53 - Azeotrope (binary mixture)
- Lecture 54 - Liquid-Liquid equilibria - 1
- Lecture 55 - liquid-liquid equilibria (Continued...) and solid-liquid equilibria
- Lecture 56 - Solid-liquid equilibria (Continued...)
- Lecture 57 - Solid-liquid equilibria examples and properties
- Lecture 58 - Examples of boiling point elevation
- Lecture 59 - Solubility of gases in the liquid
- Lecture 60 - Chemical reaction equilibria - I
- Lecture 61 - Chemical reaction equilibria - II
- Lecture 62 - Chemical reaction equilibria - III
- Lecture 63 - Chemical reaction equilibria - IV

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Methods of Adhesion Measurement for Pressure Sensitive Adhesives

Subject Co-ordinator - Prof. Animangsu Ghatak

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Introduction of Strain and Stress Equilibrium
- Lecture 2 - Introduction of Strain and Stress Equilibrium (Continued...)
- Lecture 3 - Stress-Strain Relation
- Lecture 4 - Plane Strain and Plane Stress Approximations
- Lecture 5 - Introduction to Contact Mechanics
- Lecture 6 - Loading on Elastic Half-Space
- Lecture 7 - Distributed Normal Load and Shear Load on an elastic half space
- Lecture 8 - Uniformly Distributed normal load on an elastic half space
- Lecture 9 - Indentation on an elastic half-space using a curved bottom punch
- Lecture 10 - Spatially varying normal load on an elastic half-space
- Lecture 11 - Axi-symmetric loading on an elastic half space
- Lecture 12 - Axi-symmetric loading on an elastic half space (Continued...)
- Lecture 13 - Axi-symmetric loading on an elastic half space (Continued...)
- Lecture 14 - Uniform loading on a triangular area of contact
- Lecture 15 - Hertzian Mechanics
- Lecture 16 - Hertzian Mechanics (Continued...)
- Lecture 17 - Concepts of Surface and interfacial energy
- Lecture 18 - Estimation of Surface and interfacial energy
- Lecture 19 - Estimation of Surface and interfacial energy (Continued...)
- Lecture 20 - Estimation of Surface and interfacial energy (Continued...)
- Lecture 21 - Surface tension of liquid using Young's Equation
- Lecture 22 - Indentation of an elastic half space with interaction
- Lecture 23 - JKR contact mechanics between two spheres with adhesion
- Lecture 24 - JKR contact mechanics between two spheres with adhesion (Continued...)
- Lecture 25 - JKR contact mechanics between two spheres with adhesion (Continued...)
- Lecture 26 - JKR contact mechanics between two cylinders
- Lecture 27 - JKR contact mechanics between two cylinders (Continued...)
- Lecture 28 - Estimation of adhesion hysteresis using rolling contact mechanics
- Lecture 29 - Estimation of adhesion hysteresis using rolling contact mechanics (Continued...)

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Adhesion of a rigid punch with convex head on an elastic half-space
- Lecture 31 - Adhesion of a rigid punch with convex head on an elastic half-space (Continued...)
- Lecture 32 - Indentation of an elastic half space using a concave indenter
- Lecture 33 - Indentation of an elastic half space using a concave indenter: Comparison with a flat plate indenter
- Lecture 34 - Numerical Problems on Indentation of an elastic half space using a concave indenter
- Lecture 35 - Indentation of an elastic half space using a concave indenter having general ellipsoidal shape:
- Lecture 36 - Multiplicity of indenters / Contact Area splitting: Adhesion between two rigid spheres and Effect of surface energy
- Lecture 37 - JKR vs. DMT model
- Lecture 38 - Numerical Problems on JKR vs. DMT model
- Lecture 39 - Thin, elastic film sandwiched between two rigid parallel plates
- Lecture 40 - Thin, elastic film sandwiched between two rigid parallel plates (Continued...)
- Lecture 41 - Thin, elastic film sandwiched between two rigid parallel plates (Continued...)
- Lecture 42 - Estimation of load required to pull a rigid plate from a thin, elastic adhesive bonded system
- Lecture 43 - Estimation of load required to pull a rigid plate from a thin, elastic adhesive bonded system (Continued...)
- Lecture 44 - A thin elastic adhesive sandwiched between two parallel plates (perfect slippage at interface between adhesive and plates)
- Lecture 45 - A thin elastic adhesive sandwiched between two parallel disks (perfect slippage at interface between adhesive and disks)
- Lecture 46 - Adhesive layer sandwiched between two parallel disks
- Lecture 47 - Peel experiment
- Lecture 48 - Peel experiment (Continued...)
- Lecture 49 - Bending of thin plate
- Lecture 50 - Bending of thin plate (Continued...)
- Lecture 51 - Lift-off experiment for measuring adhesion strength
- Lecture 52 - Lift-off experiment for measuring adhesion strength (Continued...)
- Lecture 53 - Lift-off experiment for measuring adhesion strength (Continued...)
- Lecture 54 - Physical Mechanisms of Enhancing Adhesion without using Viscoelastic Effect
- Lecture 55 - Physical Mechanisms of Enhancing Adhesion without using Viscoelastic Effect (Continued...)
- Lecture 56 - Adhesive Layer with Spatially varying Thickness and Modulus
- Lecture 57 - Adhesion of Viscoelastic Spheres
- Lecture 58 - Adhesion of Viscoelastic Spheres (Continued...)
- Lecture 59 - Adhesion on Rough Surface
- Lecture 60 - Adhesion on a Randomly Rough Surface and Summary of the Course content covered

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Biochemical Engineering

Subject Co-ordinator - Dr. Saikat Chakraborty, Dr. Rintu Banerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Biology & Biotechnology  
Lecture 2 - Glimpses of Microbial World - Bacteria  
Lecture 3 - Virus and Cell Organelles  
Lecture 4 - Carbohydrate  
Lecture 5 - Nucleic Acid  
Lecture 6 - Lipids  
Lecture 7 - Proteins  
Lecture 8 - Biochemistry & Thermodynamics of Enzymes  
Lecture 9 - Enzyme Kinetics  
Lecture 10 - Regulation of Enzyme Activity  
Lecture 11 - Regulation of Enzyme Activity  
Lecture 12 - Effects of Substrate and Inhibition, pH and Temperature on Enzyme Activity  
Lecture 13 - Immobilized Enzymes  
Lecture 14 - Immobilized Enzymes (Continued...)  
Lecture 15 - Interphase Mass Transfer and Reaction in Immobilized Enzymes  
Lecture 16 - Interphase Mass Transfer and Reaction in Immobilized Enzymes (Continued...)  
Lecture 17 - Effectiveness Factor in Immobilized Enzymes  
Lecture 18 - Bioenergetics and Glycolysis  
Lecture 19 - TCA Cycle  
Lecture 20 - Electron Transport Chain & Oxidative Phosphorylation  
Lecture 21 - Pentose Phosphate Pathways Glycogenesis & Glycogenolysis  
Lecture 22 - Urea Cycle, Gluconeogenesis and Glyoxalate Cycle  
Lecture 23 - Microbial Growth  
Lecture 24 - Effect of Mass Transfer on Microbial & Fungal Growth  
Lecture 25 - Effect of Multiple Substrates and Inhibition on Microbial Growth  
Lecture 26 - Design of Bioreactors  
Lecture 27 - Design of Chemostats  
Lecture 28 - Stability of Bioreactors  
Lecture 29 - Stability of Bioreactors (Continued...)

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Introduction to Receptor - Ligand Binding
- Lecture 31 - Effects of Ligand Depletion and Multiple Receptors on Binding Kinetics
- Lecture 32 - Effects of Ligand Depletion and Multiple Receptors on Binding Kinetics (Continued...)
- Lecture 33 - Receptors-Mediated Endocytosis
- Lecture 34 - Kinetics of Receptor-Mediated Endocytosis
- Lecture 35 - General Model for Receptor-Mediated Endocytosis
- Lecture 36 - Multiple Interacting Microbial Population
- Lecture 37 - Manufacture of Biochemicals
- Lecture 38 - Manufacture of Biochemicals (Continued...) & Strategies for Biomolecules Separation
- Lecture 39 - Strategies for Biomolecules Separation (Continued...)
- Lecture 40 - Strategies for Biomolecules Separation (Continued...)



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Microscale Transport Processes

Subject Co-ordinator - Dr. Somnath Ganguly, Prof. S. Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Immiscible flow in microchannel (Continued...)
- Lecture 31 - Immiscible flow in microchannel (Continued...)
- Lecture 32 - Scaling dimension and issues (Continued...)
- Lecture 33 - Immiscible flow in microchannel (Continued...)
- Lecture 34 - Plastic device making
- Lecture 35 - Transport processes and their descriptions
- Lecture 36 - Convective fluid dynamics in microchannels
- Lecture 37 - Microfluidic networks
- Lecture 38 - Electrohydrodynamic atomization
- Lecture 39 - Electrohydrodynamic atomization (Continued...)
- Lecture 40 - Interfacial phenomena in thin liquid films

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Multiphase Flow

Subject Co-ordinator - Prof. P.K. Das, Prof. Gargi Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Estimation of Flow Patterns  
Lecture 3 - Estimation of Flow Patterns (Continued...)  
Lecture 4 - Flow Pattern Maps Fascinating Taylor Bubbles  
Lecture 5 - Definitions and Common Terminologies  
Lecture 6 - Definitions and Common Terminologies (Continued...)  
Lecture 7 - Simple Analytical Models  
Lecture 8 - The Homogeneous Flow Theory  
Lecture 9 - The Homogeneous Flow Theory (Continued...)  
Lecture 10 - Compressible Flow A Recapitulation  
Lecture 11 - Compressible Flow A Recapitulation (Continued...)  
Lecture 12 - Choked Flow Condition for Homogeneous Flow  
Lecture 13 - Drift Flux Model  
Lecture 14 - Drift Flux Model (Continued...)  
Lecture 15 - Drift Flux Model (Continued...)  
Lecture 16 - Drift Flux Model (Continued...)  
Lecture 17 - Separated Flow Model  
Lecture 18 - Separated Flow Model (Continued...)  
Lecture 19 - Separated Flow Model (Continued...)  
Lecture 20 - Separated Flow Model - Condition of Choking  
Lecture 21 - Separated Flow Model - Condition of Choking (Continued...)  
Lecture 22 - Separated Flow Model - Estimation of Frictional Pressure Drop and Void Fraction  
Lecture 23 - Separated Flow Model - Estimation of Frictional Pressure Drop and Void Fraction (Continued...)  
Lecture 24 - Separated Flow Model - Estimation of Frictional Pressure Drop and Void Fraction (Continued...)  
Lecture 25 - Separated Flow Model - Estimation of Frictional Pressure Drop and Void Fraction (Continued...)  
Lecture 26 - Analysis of Specific Flow Regimes  
Lecture 27 - Analysis of Specific Flow Regimes (Continued...)  
Lecture 28 - Analysis of Specific Flow Regimes - Slug Flow (Continued...)  
Lecture 29 - Two Phase Flow with Phase Change - An Introduction to Boiling Heat Transfer

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Bubble Growth
- Lecture 31 - Different Types of Nucleation
- Lecture 32 - Ibullition from Hot Surfaces
- Lecture 33 - Cycle of Bubble Growth and Departure
- Lecture 34 - Heat Transfer in Different Regimes of Boiling
- Lecture 35 - Heat Transfer in Different Regimes of Boiling (Continued...)
- Lecture 36 - Critical Heat Flux, Film Boiling
- Lecture 37 - Measurement Techniques for Two Phase flow Parameters
- Lecture 38 - Measurement Techniques for Two Phase flow Parameters - Void Fraction Measurement
- Lecture 39 - Measurement Techniques for Two Phase flow Parameters - Void Fraction Measurement (Continued...)
- Lecture 40 - Measurement Techniques for Two Phase flow Parameters - Estimation of Flow Patterns

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Novel Separation Processes

Subject Co-ordinator - Prof. S. De

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Surfactant Based Separation Processes (Continued...)
- Lecture 31 - Micellar Enhanced Ultrafiltration
- Lecture 32 - Micellar Enhanced Ultrafiltration (Continued...)
- Lecture 33 - Liquid Membranes
- Lecture 34 - Liquid Membranes (Continued...)
- Lecture 35 - Centrifugal Separation Processes
- Lecture 36 - Chromatographic Separation Processes
- Lecture 37 - Chromatographic Separation Processes (Continued...)
- Lecture 38 - Ion Exchange Processes
- Lecture 39 - Electrophoretic Separation Methods
- Lecture 40 - Electrophoretic Separation Methods (Continued...)
- Lecture 41 - Supercritical Fluid Extraction

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Process Control and Instrumentation

Subject Co-ordinator - Dr. D. Sarkar, Dr. A.K. Jana

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Process Control  
Lecture 2 - Introduction to Process Control (Continued...)  
Lecture 3 - Mathematical Modeling (Continued...1)  
Lecture 4 - Mathematical Modeling (Continued...2)  
Lecture 5 - Mathematical Modeling (Continued...3)  
Lecture 6 - Dynamic Behavior of Chemical Processes  
Lecture 7 - Dynamic Behavior of Chemical Processes (Continued...1)  
Lecture 8 - Dynamic Behavior of Chemical Processes (Continued...2)  
Lecture 9 - Dynamic Behavior of Chemical Processes (Continued...3)  
Lecture 10 - Dynamic Behavior of Chemical Processes (Continued...4)  
Lecture 11 - Dynamic Behavior of Chemical Processes (Continued...5)  
Lecture 12 - Dynamic Behavior of Chemical Processes (Continued...6)  
Lecture 13 - Dynamic Behavior of Chemical Processes (Continued...7)  
Lecture 14 - Dynamic Behavior of Chemical Processes (Continued...8)  
Lecture 15 - Feedback Control Schemes  
Lecture 16 - Feedback Control Schemes (Continued...1)  
Lecture 17 - Feedback Control Schemes (Continued...2)  
Lecture 18 - Feedback Control Schemes (Continued...3)  
Lecture 19 - Feedback Control Schemes (Continued...4)  
Lecture 20 - Feedback Control Schemes (Continued...5)  
Lecture 21 - Feedback Control Schemes (Continued...6)  
Lecture 22 - Feedback Control Schemes (Continued...7)  
Lecture 23 - Feedback Control Schemes (Continued...8)  
Lecture 24 - Feedback Control Schemes (Continued...9)  
Lecture 25 - Feedback Control Schemes (Continued...10)  
Lecture 26 - Feedback Control Schemes (Continued...11)  
Lecture 27 - Feedback Control Schemes (Continued...12)  
Lecture 28 - Feedback Control Schemes (Continued...13)  
Lecture 29 - Feedback Control Schemes (Continued...14)

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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Lecture 30 - Advanced Control Schemes  
Lecture 31 - Advanced Control Schemes (Continued...1)  
Lecture 32 - Advanced Control Schemes (Continued...2)  
Lecture 33 - Advanced Control Schemes (Continued...3)  
Lecture 34 - Advanced Control Schemes (Continued...4)  
Lecture 35 - Instrumentation  
Lecture 36 - Instrumentation  
Lecture 37 - Instrumentation  
Lecture 38 - Instrumentation  
Lecture 39 - Instrumentation  
Lecture 40 - Instrumentation  
Lecture 41 - Transducer Elements  
Lecture 42 - Pressure Measurement  
Lecture 43 - Pressure Measurement (Continued...1)  
Lecture 44 - Pressure Measurement (Continued...2)



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Instability and Patterning of Thin Polymer Films

Subject Co-ordinator - Dr. R. Mukherjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Introduction (Continued...)  
Lecture 3 - Some Fundamental Surface Related Concepts - I  
Lecture 4 - Surface Tension (in terms of molecular interactions)  
Lecture 5 - Effect Surface Tension  
Lecture 6 - Young Laplace Equation  
Lecture 7 - Rayleigh Instability  
Lecture 8 - Meso Scale Fabrication Approaches  
Lecture 9 - Photo Lithography - I  
Lecture 10 - Photo Lithography - II  
Lecture 11 - Photo Lithography - III  
Lecture 12 - Photo Lithography - IV  
Lecture 13 - Photo Lithography - V  
Lecture 14 - Nano Imprint Lithography  
Lecture 15 - Nano Imprint Lithography (Continued...)  
Lecture 16 - Soft Lithography - I  
Lecture 17 - Soft Lithography - II  
Lecture 18 - Soft Lithography - III  
Lecture 19 - Soft Lithography - IV  
Lecture 20 - Soft Lithography - V  
Lecture 21 - Soft Lithography - VI  
Lecture 22 - Atomic Force Microscope - I  
Lecture 23 - Atomic Force Microscope - II  
Lecture 24 - Atomic Force Microscope - III  
Lecture 25 - Atomic Force Microscope - IV  
Lecture 26 - Atomic Force Microscope - V  
Lecture 27 - Intermolecular Forces between Particles and Surfaces - I  
Lecture 28 - Intermolecular Forces between Particles and Surfaces - II  
Lecture 29 - Intermolecular Forces between Particles and Surfaces - III

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Intermolecular Forces between Particles and Surfaces - IV
- Lecture 31 - Spontaneous instability and dewetting of thin polymer film - I
- Lecture 32 - Spontaneous instability and dewetting of thin polymer film - II
- Lecture 33 - Spontaneous instability and dewetting of thin polymer film - III
- Lecture 34 - Spontaneous instability and dewetting of thin polymer film - IV
- Lecture 35 - Spontaneous instability and dewetting of thin polymer film - V
- Lecture 36 - Spontaneous instability and dewetting of thin polymer film - VI
- Lecture 37 - Spontaneous instability and dewetting of thin polymer film - VII
- Lecture 38 - Template Guided Dewetting
- Lecture 39 - Elastic Contact Instability and Lithography
- Lecture 40 - Gradient Surfaces

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Advanced Mathematical Techniques in Chemical Engineering

Subject Co-ordinator - Prof. S. De

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to vector space  
Lecture 2 - Introduction to vector space (Continued...)  
Lecture 3 - Onto, into, one to one function  
Lecture 4 - Vectors  
Lecture 5 - Vectors (Continued...)  
Lecture 6 - Contraction Mapping  
Lecture 7 - Contraction Mapping (Continued...)  
Lecture 8 - Matrix, Determinant  
Lecture 9 - Eigenvalue Problem in Discrete Domain  
Lecture 10 - Eigenvalue Problem in Discrete Domain (Continued...)  
Lecture 11 - Eigenvalue Problem in Discrete Domain (Continued...)  
Lecture 12 - Eigenvalue Problem in Discrete Domain (Continued...)  
Lecture 13 - Stability Analysis  
Lecture 14 - Stability Analysis (Continued...)  
Lecture 15 - Stability Analysis (Continued...)  
Lecture 16 - More Examples  
Lecture 17 - Partial Differential Equations  
Lecture 18 - Partial Differential Equations (Continued...)  
Lecture 19 - Eigenvalue Problem in Continuous Domain  
Lecture 20 - Special ODEs  
Lecture 21 - Adjoint Operator  
Lecture 22 - Theorems of Eigenvalues and Eigenfunction  
Lecture 23 - Solution PDE  
Lecture 24 - Solution of Parabolic PDE  
Lecture 25 - Solution of Parabolic PDE  
Lecture 26 - Solution of Higher Dimensional PDEs  
Lecture 27 - Solution of Higher Dimensional PDEs (Continued...)  
Lecture 28 - Four Dimensional Parabolic PDE  
Lecture 29 - Solution of Elliptic and Hyperbolic PDE

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Solution of Elliptic and Hyperbolic PDE (Continued...)
- Lecture 31 - PDE in Cylindrical and Spherical Coordinate
- Lecture 32 - Solution of non-homogeneous PDE
- Lecture 33 - Solution of non-homogeneous PDE (Continued...)
- Lecture 34 - Solution of non-homogeneous Parabolic PDE
- Lecture 35 - Solution of non-homogeneous Elliptic PDE
- Lecture 36 - Solution of non-homogeneous Elliptic PDE (Continued...)
- Lecture 37 - Similarity Solution
- Lecture 38 - Similarity Solution (Continued...)
- Lecture 39 - Integral Method
- Lecture 40 - Laplace Transform
- Lecture 41 - Fourier Transform

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Introduction to Process Modeling in Membrane Separation Processes

Subject Co-ordinator - Prof. S. De

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of Separation Processes and Introduction of Membrane System  
Lecture 2 - Fundamentals of Separation Processes and Introduction of Membrane System (Continued...)  
Lecture 3 - Fundamentals of Separation Processes and Introduction of Membrane System (Continued...)  
Lecture 4 - Fundamentals of Separation Processes and Introduction of Membrane System (Continued...)  
Lecture 5 - Modeling of Reverse Osmosis  
Lecture 6 - Concentration Polarization  
Lecture 7 - Osmotic Pressure Controlling Filtration  
Lecture 8 - Osmotic Pressure Controlling Filtration (Continued...)  
Lecture 9 - Osmotic Pressure Controlling Filtration (Continued...)  
Lecture 10 - Osmotic Pressure Controlling Filtration (Continued...)  
Lecture 11 - Osmotic Pressure Controlling Filtration (Continued...)  
Lecture 12 - Osmotic Pressure Controlling Filtration (Continued...)  
Lecture 13 - Modeling of Gel Layer Controlling Filtration  
Lecture 14 - Modeling of Gel Layer Controlling Filtration (Continued...)  
Lecture 15 - Modeling of Gel Layer Controlling Filtration (Continued...) and Resistance in Series Models  
Lecture 16 - Design of Membrane Module  
Lecture 17 - Design of Membrane Module (Continued...)  
Lecture 18 - Design of Membrane Module (Continued...)  
Lecture 19 - Modeling of Dialysis  
Lecture 20 - Modeling of Dialysis (Continued...)

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Soft Nano Technology

Subject Co-ordinator - Dr. R. Mukherjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - 1  
Lecture 2 - Introduction - 2  
Lecture 3 - Introduction - 3  
Lecture 4 - Fundamental Concepts Related to Surface Tension - 1  
Lecture 5 - Fundamental Concepts Related to Surface Tension - 2  
Lecture 6 - Fundamental Concepts Related to Surface Tension - 3  
Lecture 7 - Fundamental Concepts Related to Surface Tension - 4  
Lecture 8 - Components of Surface Tension - 1  
Lecture 9 - Components of Surface Tension - 2  
Lecture 10 - Self Assembly of Surfactant Molecules  
Lecture 11 - Laplace Pressure  
Lecture 12 - Photo Lithography - 1  
Lecture 13 - Photo Lithography - 2  
Lecture 14 - Photo Lithography - 3  
Lecture 15 - Photo Lithography - 4  
Lecture 16 - Photo Lithography - 5  
Lecture 17 - Photo Lithography - 6  
Lecture 18 - Soft Lithography - I  
Lecture 19 - Soft Lithography - 2  
Lecture 20 - Soft Lithography - 3  
Lecture 21 - Soft Lithography - 4  
Lecture 22 - Soft Lithography - 5  
Lecture 23 - Soft Lithography - 6  
Lecture 24 - Atomic Force Microscope - 1  
Lecture 25 - Atomic Force Microscope - 2  
Lecture 26 - Atomic Force Microscope - 3  
Lecture 27 - Atomic Force Microscope - 4  
Lecture 28 - Atomic Force Microscope - 5  
Lecture 29 - Atomic Force Microscope - 6

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- Lecture 30 - Dewetting - 1
- Lecture 31 - Dewetting - 2
- 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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Adiabatic Two-Phase Flow and Flow Boiling in Microchannel

Subject Co-ordinator - Prof. Gargi Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Brief Introduction to Multiphase Flow
- Lecture 2 - Brief Introduction to Multiphase Flow (Continued...)
- Lecture 3 - Two Phase Flow through Micro Channels
- Lecture 4 - Two Phase Flow through Micro Channels (Continued...)
- Lecture 5 - Criteria for Confinement for in Case of Two Phase Flow
- Lecture 6 - Pertinent Dimensionless Numbers in Two Phase
- Lecture 7 - Flow Pattern Maps for Milli and Micro Systems
- Lecture 8 - Pattern Transition from Energy Minimisation Principle
- Lecture 9 - Experimental Identification of Flow Regimes
- Lecture 10 - Experimental Identification of Flow Regimes (Continued...)
- Lecture 11 - Flow Regimes and Void Fraction Estimation
- Lecture 12 - Influence of Operating Parameter on Flow Patterns
- Lecture 13 - Influence of Operating Parameter on Flow Patterns (Continued...)
- Lecture 14 - Influence of Operating Parameter on Flow Patterns (Continued...)
- Lecture 15 - Influence of Operating Parameter on Flow Patterns (Continued...)
- Lecture 16 - Void Fraction Characteristic Mini and Micro Channel
- Lecture 17 - Void Fraction and Pressure Drop in Reduced Dimensions - Experimental results
- Lecture 18 - Void Fraction and Pressure Drop in Reduced Dimensions - Experimental results (Continued...)
- Lecture 19 - Theoretical Analysis of Two Phase Flow in Reduced Dimensions
- Lecture 20 - Theoretical Analysis of Two Phase Flow in Reduced Dimensions (Continued...)
- Lecture 21 - Flow Pattern based Analysis in Micro Systems - Drift Flux Model
- Lecture 22 - Flow Pattern based Modelling - Slug Flow Model
- Lecture 23 - Flow Boiling in Microchannels
- Lecture 24 - Tutorial - I
- Lecture 25 - Tutorial - II

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Phase Equilibrium Thermodynamics

Subject Co-ordinator - Prof. Gargi Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Introduction (Continued...)  
Lecture 3 - First Law of Thermodynamics  
Lecture 4 - Second Law of Thermodynamics  
Lecture 5 - Second Law of Thermodynamics (Continued...)  
Lecture 6 - Entropy Change during Spontaneous Processes  
Lecture 7 - Criteria of Spontaneity  
Lecture 8 - Criteria of Spontaneity (Continued...)  
Lecture 9 - Thermodynamic Network  
Lecture 10 - Thermodynamic Network (Continued...)  
Lecture 11 - Tutorial 1  
Lecture 12 - Gibbs free energy as a function of temperature and pressure  
Lecture 13 - P-v-T behaviour of gases  
Lecture 14 - P-v-T behaviour (Continued...)  
Lecture 15 - P-v-T behaviour (Continued...)  
Lecture 16 - P-v-T behaviour (Continued...)  
Lecture 17 - Tutorial 2  
Lecture 18 - Property estimation from P-v-T behaviour  
Lecture 19 - Property estimation (Continued...)  
Lecture 20 - Concept of chemical potential  
Lecture 21 - Chemical potential (Continued...)  
Lecture 22 - Homogeneous open systems  
Lecture 23 - Homogeneous open systems (Continued...)  
Lecture 24 - Heterogeneous Closed Systems  
Lecture 25 - Tutorial 3  
Lecture 26 - Concept of fugacity  
Lecture 27 - Fugacity (Continued...)  
Lecture 28 - Estimation of fugacity coefficients  
Lecture 29 - Fugacity of condensed phase

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Lecture 30 - Mixtures  
Lecture 31 - Mixtures (Continued...)  
Lecture 32 - Tutorial 4  
Lecture 33 - Partial molar properties  
Lecture 34 - Partial molar properties (Continued...)  
Lecture 35 - Partial molar fugacity  
Lecture 36 - Ideal solutions  
Lecture 37 - Ideal solutions (Continued...)  
Lecture 38 - Ideal solutions (Continued...)  
Lecture 39 - Ideal solutions (Continued...)  
Lecture 40 - Non-ideal solutions  
Lecture 41 - Non-ideal solutions (Continued...)  
Lecture 42 - Non-ideal solutions (Continued...)  
Lecture 43 - Non-ideal solutions (Continued...)  
Lecture 44 - Non-ideal solutions (Continued...)  
Lecture 45 - Deviations from ideal dilute solutions  
Lecture 46 - Tutorial 5  
Lecture 47 - Tutorial 6  
Lecture 48 - Thermodynamics Consistency Test of VLE Data  
Lecture 49 - Retrograde Condensation  
Lecture 50 - Partial and Complete Immiscibility of Liquid Mixtures  
Lecture 51 - Partial and Complete Immiscibility of Liquid Mixtures (Continued...)  
Lecture 52 - Phase Equilibrium for Mass Transfer Processes  
Lecture 53 - Control Mass Analysis of Transient process  
Lecture 54 - Control Volume Analysis  
Lecture 55 - Throttling and problem  
Lecture 56 - Tutorial 7  
Lecture 57 - First Law for reacting systems  
Lecture 58 - Estimation of standard heat of reaction  
Lecture 59 - Effect of operating variables on heat of reaction  
Lecture 60 - Chemical Reaction Equilibrium  
Lecture 61 - Equilibrium constant and its estimation  
Lecture 62 - Relation of Equilibrium constant to composition  
Lecture 63 - Effect of operating conditions on equilibrium conversion  
Lecture 64 - Relation of Equilibrium constant to composition (Continued...)  
Lecture 65 - Miscellaneous concepts on Reaction Equilibrium

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Transport Phenomena

Subject Co-ordinator - Prof. Sunando Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Fourier and Fick's Laws  
Lecture 3 - Shell Momentum Balance  
Lecture 4 - Example of Shell Momentum Balance  
Lecture 5 - Example of Shell Momentum Balance (Continued...)  
Lecture 6 - Example of Shell Momentum Balance (Continued...)  
Lecture 7 - Example of Shell Momentum Balance (Continued...)  
Lecture 8 - Example of Shell Momentum Balance (Continued...)  
Lecture 9 - Equations of Change for Isothermal Systems  
Lecture 10 - Equations of Change for Isothermal Systems (Continued...)  
Lecture 11 - Equations of Change for Isothermal Systems (Continued...)  
Lecture 12 - Equations of Change for Isothermal Systems (Continued...)  
Lecture 13 - Equations of Change for Isothermal Systems (Continued...)  
Lecture 14 - Equations of Change for Isothermal Systems (Continued...)  
Lecture 15 - Unsteady Flow  
Lecture 16 - Boundary Layers  
Lecture 17 - Boundary Layers (Continued...)  
Lecture 18 - Boundary Layers (Continued...)  
Lecture 19 - Boundary Layers (Continued...)  
Lecture 20 - Boundary Layers (Continued...)  
Lecture 21 - Boundary Layers (Continued...)  
Lecture 22 - Boundary Layers (Continued...)  
Lecture 23 - Boundary Layers (Continued...)  
Lecture 24 - Boundary Layers (Continued...)  
Lecture 25 - Turbulent Boundary Layers  
Lecture 26 - Turbulent Boundary Layers (Continued...)  
Lecture 27 - Turbulent Boundary Layers (Continued...)  
Lecture 28 - Drag  
Lecture 29 - Drag (Continued...)

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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Lecture 30 - Heat Transfer Basics  
Lecture 31 - Heat Transfer Basics (Continued...)  
Lecture 32 - 1-D Heat Conduction - Temperature Distributions  
Lecture 33 - 1-D Heat Conduction - Shell Heat Balance  
Lecture 34 - Shell Heat Balance  
Lecture 35 - Viscous Dissipation  
Lecture 36 - Transient Conduction  
Lecture 37 - Transient Conduction (Continued...)  
Lecture 38 - Forced Convection  
Lecture 39 - Energy Equation  
Lecture 40 - Energy Equation (Continued...)  
Lecture 41 - Free Convection  
Lecture 42 - Thermal Boundary Layer  
Lecture 43 - Mass Transfer  
Lecture 44 - Mass Transfer (Continued...)  
Lecture 45 - Mass Transfer (Continued...)  
Lecture 46 - Mass Transfer (Continued...)  
Lecture 47 - Mass Transfer (Continued...)  
Lecture 48 - Mass Transfer (Continued...)  
Lecture 49 - Mass Transfer (Continued...)  
Lecture 50 - Mass Transfer (Continued...)  
Lecture 51 - (Lecture Missing)  
Lecture 52 - Boundary Layer Similarity  
Lecture 53 - Boundary Layer - Analogy  
Lecture 54 - Analogy - Tutorial I  
Lecture 55 - Analogy - Tutorial II

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Chemical Process Instrumentation

Subject Co-ordinator - Prof. Debasis Sarkar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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  
Lecture 22 - Pressure Measurement  
Lecture 23 - Pressure Measurement  
Lecture 24 - Pressure Measurement  
Lecture 25 - Pressure Measurement  
Lecture 26 - High Vacuum Measurement  
Lecture 27 - High Vacuum Measurement (Continued...)  
Lecture 28 - High Vacuum Measurement (Continued...)  
Lecture 29 - High Vacuum Measurement (Continued...)

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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Lecture 30 - Pressure Measurement  
Lecture 31 - Temperature Measurement  
Lecture 32 - Temperature Measurement (Continued...)  
Lecture 33 - Temperature Measurement (Continued...)  
Lecture 34 - Temperature Measurement (Continued...)  
Lecture 35 - Temperature Measurement (Continued...)  
Lecture 36 - Temperature Measurement (Continued...)  
Lecture 37 - Temperature Measurement (Continued...)  
Lecture 38 - Temperature Measurement (Continued...)  
Lecture 39 - Temperature Measurement (Continued...)  
Lecture 40 - Temperature Measurement (Continued...)  
Lecture 41 - Flow Measurement  
Lecture 42 - Flow Measurement (Continued...)  
Lecture 43 - Flow Measurement (Continued...)  
Lecture 44 - Flow Measurement (Continued...)  
Lecture 45 - Flow Measurement (Continued...)  
Lecture 46 - Level Measurement  
Lecture 47 - Level Measurement (Continued...)  
Lecture 48 - Level Measurement (Continued...)  
Lecture 49 - Level Measurement (Continued...)  
Lecture 50 - Level Measurement (Continued...)  
Lecture 51 - Miscellaneous Measurements  
Lecture 52 - Miscellaneous Measurements  
Lecture 53 - Miscellaneous Measurements  
Lecture 54 - Miscellaneous Measurements  
Lecture 55 - Miscellaneous Measurements  
Lecture 56 - Pneumatic Control Valve  
Lecture 57 - Pneumatic Control Valve (Continued...)  
Lecture 58 - Pneumatic Control Valve (Continued...) and P&ID  
Lecture 59 - GATE Questions  
Lecture 60 - GATE Questions (Continued...)

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Optimization in Chemical Engineering

Subject Co-ordinator - Prof. Debasis Sarkar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Optimization  
Lecture 2 - Introduction to Optimization (Continued...)  
Lecture 3 - Introduction to Optimization (Continued...)  
Lecture 4 - Introduction of Optimization (Continued...)  
Lecture 5 - Introduction of Optimization (Continued...)  
Lecture 6 - Optimization Problem Formulation  
Lecture 7 - Optimization Problem Formulation (Continued...)  
Lecture 8 - Optimization Problem Formulation (Continued...)  
Lecture 9 - Optimization Problem Formulation (Continued...)  
Lecture 10 - Optimization Problem Formulation (Continued...)  
Lecture 11 - Basic Concepts of Optimization - I  
Lecture 12 - Basic Concepts of Optimization - I (Continued...)  
Lecture 13 - Basic Concepts of Optimization - I (Continued...)  
Lecture 14 - Basic Concepts of Optimization - I (Continued...)  
Lecture 15 - Basic Concepts of Optimization - I (Continued...)  
Lecture 16 - Basic Concepts of Optimization - II  
Lecture 17 - Basic Concepts of Optimization - II (Continued...)  
Lecture 18 - Basic Concepts of Optimization - II (Continued...)  
Lecture 19 - Basic Concepts of Optimization - II (Continued...)  
Lecture 20 - Basic Concepts of Optimization - II (Continued...)  
Lecture 21 - Unconstrained Single Variable Optimization  
Lecture 22 - Unconstrained Single Variable Optimization  
Lecture 23 - Unconstrained Single Variable Optimization  
Lecture 24 - Unconstrained Single Variable Optimization  
Lecture 25 - Unconstrained Single Variable Optimization  
Lecture 26 - Unconstrained Multivariable Optimization  
Lecture 27 - Unconstrained Multivariable Optimization  
Lecture 28 - Unconstrained Multivariable Optimization  
Lecture 29 - Unconstrained Multivariable Optimization

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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Lecture 30 - Unconstrained Multivariable Optimization  
Lecture 31 - Unconstrained Multivariable Optimization  
Lecture 32 - Unconstrained Multivariable Optimization  
Lecture 33 - Unconstrained Multivariable Optimization  
Lecture 34 - Unconstrained Multivariable Optimization  
Lecture 35 - Unconstrained Multivariable Optimization  
Lecture 36 - Introduction to Linear Programming  
Lecture 37 - Introduction to Linear Programming (Continued...)  
Lecture 38 - Introduction to Linear Programming (Continued...)  
Lecture 39 - Introduction to Linear Programming (Continued...)  
Lecture 40 - Introduction to Linear Programming (Continued...)  
Lecture 41 - Linear Programming - The Simplex Method  
Lecture 42 - Linear Programming - The Simplex Method (Continued...)  
Lecture 43 - Linear Programming - The Simplex Method (Continued...)  
Lecture 44 - Linear Programming - The Simplex Method (Continued...)  
Lecture 45 - Linear Programming - The Simplex Method (Continued...)  
Lecture 46 - Constrained Nonlinear Programming  
Lecture 47 - Constrained Nonlinear Programming (Continued...)  
Lecture 48 - Constrained Nonlinear Programming (Continued...)  
Lecture 49 - Constrained Nonlinear Programming (Continued...)  
Lecture 50 - Constrained Nonlinear Programming (Continued...)  
Lecture 51 - Applications of Optimization  
Lecture 52 - Applications of Optimization (Continued...)  
Lecture 53 - Applications of Optimization (Continued...)  
Lecture 54 - Applications of Optimization (Continued...)  
Lecture 55 - Applications of Optimization (Continued...)  
Lecture 56 - Software Tools for Optimization  
Lecture 57 - Software Tools for Optimization (Continued...)  
Lecture 58 - Software Tools for Optimization (Continued...)  
Lecture 59 - Software Tools for Optimization (Continued...)  
Lecture 60 - Software Tools for Optimization (Continued...)



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Heat Transfer (2018)

Subject Co-ordinator - Prof. Sunando Dasgupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Tutorial Problem in External Flow and Convection
- Lecture 31 - Tutorial Problem in External Flow and Convection
- Lecture 32 - Internal Flow Heat Transfer
- Lecture 33 - Internal Flow Heat Transfer (Continued...)
- Lecture 34 - Internal Flow Heat Transfer (Continued...)
- Lecture 35 - Internal Flow and Heat Transfer (Continued...)
- Lecture 36 - Internal Flow and Heat Transfer (Tutorial)
- Lecture 37 - Free Convection
- Lecture 38 - Heat Exchangers
- Lecture 39 - Heat Exchangers
- Lecture 40 - Heat Exchangers
- Lecture 41 - Tutorial Problems on Heat Exchanger Calculations
- Lecture 42 - Tutorial Problem on LMTD and Dirt Factor
- Lecture 43 - Epsilon-NTU Method - 1
- Lecture 44 - Epsilon-NTU Method - 1 (Continued...)
- Lecture 45 - Tutorial Problems on Epsilon - NTU Methods
- Lecture 46 - Tutorial Problems on Epsilon - NTU Methods
- Lecture 47 - Boiling, Evaporation and Evaporators
- Lecture 48 - Radiation - Fundamental Concepts
- Lecture 49 - Spectral Blackbody Radiation Intensity and Emissive Power
- Lecture 50 - Wein's Law, Stephen Boltzmann Law, Blackbody Radiation Function, Tutorial Problem
- Lecture 51 - Kirchhoff's Law
- Lecture 52 - Tutorial on Emissivity, Absorptivity and Blackbody Radiation Functions
- Lecture 53 - Solar Radiation and the Concept of View Factors
- Lecture 54 - Determination of View Factors
- Lecture 55 - Radiosity Blackbody Radiation Exchanges, Relevant Problem
- Lecture 56 - Network Method for Radiation Exchange in an Enclosure
- Lecture 57 - Network Method - Two and Three Zone Enclosures
- Lecture 58 - Tutorial Problem on Radiation Exchange using the Network Method
- Lecture 59 - Radiation Shields
- Lecture 60 - Gaseous Radiation (Participating Medium)

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Flow through Porous Media

Subject Co-ordinator - Dr. Somnath Ganguly

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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...)

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC: Fundamentals of Particle and Fluid Solid Processing

Subject Co-ordinator - Prof. Arnab Atta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Solid particle characterization  
Lecture 2 - Solid particle characterization (Continued...)  
Lecture 3 - Particle size distribution  
Lecture 4 - Particle size distribution (Continued...)  
Lecture 5 - Particle size distribution (Continued...)  
Lecture 6 - Fluid - particle mechanics  
Lecture 7 - Fluid - particle mechanics (Continued...)  
Lecture 8 - Fluid - particle mechanics (Continued...)  
Lecture 9 - Fluid - particle mechanics (Continued...)  
Lecture 10 - Fluid - particle mechanics (Continued...)  
Lecture 11 - Fluid - particle mechanics (Continued...)  
Lecture 12 - Fluid - particle mechanics (Continued...)  
Lecture 13 - Fluid - particle mechanics (Continued...)  
Lecture 14 - Fluid - particle mechanics (Continued...)  
Lecture 15 - Fluid - particle mechanics (Continued...)  
Lecture 16 - Flow through packed beds  
Lecture 17 - Flow through packed beds (Continued...)  
Lecture 18 - Flow through packed beds (Continued...)  
Lecture 19 - Flow through packed beds (Continued...)  
Lecture 20 - Flow through packed beds (Continued...)  
Lecture 21 - Fluidization  
Lecture 22 - Fluidization (Continued...)  
Lecture 23 - Fluidization (Continued...)  
Lecture 24 - Fluidization (Continued...)  
Lecture 25 - Fluidization (Continued...)  
Lecture 26 - Sedimentation  
Lecture 27 - Sedimentation (Continued...)  
Lecture 28 - Sedimentation (Continued...)  
Lecture 29 - Sedimentation (Continued...)

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Lecture 30 - Sedimentation (Continued...)  
Lecture 31 - Filtration  
Lecture 32 - Filtration (Continued...)  
Lecture 33 - Filtration (Continued...)  
Lecture 34 - Filtration (Continued...)  
Lecture 35 - Filtration (Continued...)  
Lecture 36 - Centrifugal Separation  
Lecture 37 - Centrifugal Separation (Continued...)  
Lecture 38 - Centrifugal Separation (Continued...)  
Lecture 39 - Centrifugal Separation (Continued...)  
Lecture 40 - Centrifugal Separation (Continued...)  
Lecture 41 - Particle size reduction  
Lecture 42 - Particle size reduction (Continued...)  
Lecture 43 - Particle size reduction (Continued...)  
Lecture 44 - Particle size reduction (Continued...)  
Lecture 45 - Particle size reduction (Continued...)  
Lecture 46 - Particle size reduction (Continued...)  
Lecture 47 - Particle size enlargement  
Lecture 48 - Particle size enlargement (Continued...)  
Lecture 49 - Particle size enlargement (Continued...)  
Lecture 50 - Particle size enlargement (Continued...)  
Lecture 51 - Fluid - solid transport  
Lecture 52 - Fluid - solid transport (Continued...)  
Lecture 53 - Fluid - solid transport (Continued...)  
Lecture 54 - Fluid - solid transport (Continued...)  
Lecture 55 - Fluid - solid transport (Continued...)  
Lecture 56 - Colloids and nanoparticles  
Lecture 57 - Colloids and nanoparticles (Continued...)  
Lecture 58 - Colloids and nanoparticles (Continued...)  
Lecture 59 - Colloids and nanoparticles (Continued...)  
Lecture 60 - Colloids and nanoparticles (Continued...)

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Plant Design and Economics

Subject Co-ordinator - Prof. Debasis Sarkar

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Hierarchical Approach to Process Synthesis - IV
- Lecture 31 - Basic Reactor Principles
- Lecture 32 - Reactor Synthesis for Complex Reactions by Attainable Region
- Lecture 33 - Reactor Synthesis for Complex Reactions by Attainable Region
- Lecture 34 - Reactor Synthesis for Complex Reactions by Attainable Region
- Lecture 35 - General Procedure for Reactor Design and Cost Estimation
- Lecture 36 - Introduction to Separation Systems
- Lecture 37 - Selection Criteria for Separation Processes
- Lecture 38 - Design of Multi-component Distillation Column
- Lecture 39 - Design of Multi-component Distillation Column
- Lecture 40 - Introduction to Sequencing of Ordinary Distillation Columns
- Lecture 41 - Sequences for Simple Nonintegrated Distillation Columns
- Lecture 42 - Distillation Sequencing using Columns with Sidestreams
- Lecture 43 - Distillation Sequencing using Thermal Coupling
- Lecture 44 - Azeotropic Distillation
- Lecture 45 - Azeotropic Distillation Methods and Cost Estimation
- Lecture 46 - Introduction to Pinch Technology
- Lecture 47 - Composite Curves
- Lecture 48 - The Problem Table Method
- Lecture 49 - The Heat Recovery Pinch and The Grand Composite Curve
- Lecture 50 - Heat Exchanger Network Design
- Lecture 51 - Introduction
- Lecture 52 - Fires and Explosions
- Lecture 53 - Fires and Explosions
- Lecture 54 - Toxic Release, Hazard Identification and MSDS
- Lecture 55 - Inherently Safer Design
- Lecture 56 - Optimality Criteria for Unconstrained Functions
- Lecture 57 - Examples
- Lecture 58 - Equality Constrained Problems
- Lecture 59 - Linear Programming Problems
- Lecture 60 - Batch Process Scheduling



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Material and Energy Balance Computations

Subject Co-ordinator - Prof. Arnab Atta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Engineering Calculations  
Lecture 2 - Introduction to Engineering Calculations (Continued...)  
Lecture 3 - Introduction to Engineering Calculations (Continued...)  
Lecture 4 - Introduction to Processes and Process Variables  
Lecture 5 - Introduction to Processes and Process Variables (Continued...)  
Lecture 6 - Fundamentals of Material Balance  
Lecture 7 - Fundamentals of Material Balance (Continued...)  
Lecture 8 - Fundamentals of Material Balance (Continued...)  
Lecture 9 - Fundamentals of Material Balance (Continued...)  
Lecture 10 - Material Balance of Single-unit  
Lecture 11 - Material Balance of Multiple Units  
Lecture 12 - Material Balance of Multiple Units (Continued...)  
Lecture 13 - Material Balance of Multiple Units (Continued...)  
Lecture 14 - Material Balance of Multiple Units (Continued...)  
Lecture 15 - Material Balance of Multiple Units - Recycle  
Lecture 16 - Material Balance of Recycle and Bypass Units  
Lecture 17 - Material Balance of Recycle and Bypass Units (Continued...)  
Lecture 18 - Introduction  
Lecture 19 - Introduction (Continued...)  
Lecture 20 - Introduction (Continued...)  
Lecture 21 - Multiple reactions and reactive process balance  
Lecture 22 - Reactive process balance  
Lecture 23 - Multiple reactions and reactive process balance  
Lecture 24 - Reactive process balance (Continued...)  
Lecture 25 - Reactive process balance (Continued...)  
Lecture 26 - Combustion reactions balance  
Lecture 27 - Combustion reactions balance (Continued...)  
Lecture 28 - Single-phase systems  
Lecture 29 - Single phase systems (Continued...)

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

Lecture 30 - Single-phase problems and concept of multi-phase system  
Lecture 31 - Introduction to Energy Balance - I  
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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Principles and Practices of Process Equipment and Plant Design

Subject Co-ordinator - Prof. Gargi Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Introduction (Continued...)  
Lecture 3 - Optimum design and design documentation  
Lecture 4 - Introduction to Mass Transfer Processes  
Lecture 5 - Phase Equilibrium  
Lecture 6 - Phase Equilibrium (Continued...)  
Lecture 7 - Phase Equilibrium (Continued...)  
Lecture 8 - Distillation  
Lecture 9 - Flash Distillation and Design problem  
Lecture 10 - Fractionation  
Lecture 11 - Fractionation (Continued...)  
Lecture 12 - McCabe-Thiele construction for number of ideal stages  
Lecture 13 - Optimum Design  
Lecture 14 - Multi-component fractionation design  
Lecture 15 - Batch Distillation  
Lecture 16 - Practical issues in designing distillation processes  
Lecture 17 - Design of absorbers  
Lecture 18 - Design of absorbers (Continued...)  
Lecture 19 - Design of absorbers (Continued...)  
Lecture 20 - Tower and Tower internals  
Lecture 21 - Tower and Tower internals (Continued...)  
Lecture 22 - Tower and Tower internals (Continued...)  
Lecture 23 - Sieve Tray Design  
Lecture 24 - Sieve Tray Design (Continued...)  
Lecture 25 - Sieve Tray Design (Continued...)  
Lecture 26 - Bubble Cap Tray Design  
Lecture 27 - Bubble Cap Tray Design (Continued...)  
Lecture 28 - Bubble Cap Tray Design (Continued...)  
Lecture 29 - Tower and Tower internals (Packed Tower Design)

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

- Lecture 30 - Tower and Tower internals (Packed Tower Design) (Continued...)
- Lecture 31 - Adsorption
- Lecture 32 - Packed bed adsorption
- Lecture 33 - Packed bed adsorber design
- Lecture 34 - Packed bed adsorber design (Continued...)
- Lecture 35 - Liquid-liquid extraction (LLE)
- Lecture 36 - Liquid-liquid extraction (L2)
- Lecture 37 - Liquid-liquid extraction (L3)
- Lecture 38 - Liquid-liquid extraction (L4)
- Lecture 39 - Liquid-liquid extraction (L5)
- Lecture 40 - Design of Mass Transfer Processes (Review)
- Lecture 41 - Design of Heat Transfer Processes - Introduction
- Lecture 42 - Double Pipe Heat exchanger
- Lecture 43 - Double Pipe Heat exchanger (Continued...)
- Lecture 44 - Double Pipe Heat exchanger (Continued...)
- Lecture 45 - Design of Shell and Tube Heat Exchangers - a general overview
- Lecture 46 - Design of Shell and Tube Heat Exchangers - a general overview (Continued...)
- Lecture 47 - Shell and Tube Heat Exchanger - Design
- Lecture 48 - Shell and Tube Heat Exchanger - Design
- Lecture 49 - Heat exchanger Network Analysis
- Lecture 50 - Heat exchanger Network Analysis (Continued...)
- Lecture 51 - Heat exchanger Network Analysis (Continued...)
- Lecture 52 - Heat exchanger Network Analysis (Continued...)
- Lecture 53 - Heat exchanger Network Analysis (Continued...)
- Lecture 54 - Plant Hydraulics
- Lecture 55 - Plant Hydraulics (Continued...)
- Lecture 56 - Plant Hydraulics (Continued...)
- Lecture 57 - Plant Hydraulics (End)
- Lecture 58 - Process Vessels
- Lecture 59 - Process Instrumentation and Control
- Lecture 60 - Engineered Safety
- Lecture 61 - Process Utilities
- Lecture 62 - Process Design using Simulators
- Lecture 63 - Process Packages
- Lecture 64 - Design of a 10 TPD Mono-nitrotoluene plant

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Mathematical Modelling and Simulation of Chemical Engineering

Subject Co-ordinator - Prof. Sourav Mondal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- 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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Advanced Process Dynamics

Subject Co-ordinator - Prof. Parag A. Deshpande

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- 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

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- Lecture 30 - Analysis of fixed points and bifurcation in discrete domain (Continued...)
- Lecture 31 - More on bifurcations in non-linear systems
- Lecture 32 - Non-linear systems in higher dimensions
- Lecture 33 - Reactor stability analysis
- Lecture 34 - Reactor stability analysis (Continued...)
- Lecture 35 - Reactor stability analysis (Continued...)
- Lecture 36 - Analysis of infectious disease dynamics
- Lecture 37 - Analysis of infectious disease dynamics (Continued...)
- Lecture 38 - Analysis of infectious disease dynamics (Continued...)
- Lecture 39 - Analysis of atmosphere dynamics using Lorenz equations
- Lecture 40 - Analysis of atmosphere dynamics using Lorenz equations (Continued...)
- Lecture 41 - Analysis of system dynamics in transform domain
- Lecture 42 - Analysis of first order system subjected to ideal forcing functions
- Lecture 43 - Analysis of first order system subjected to ideal forcing functions (Continued...)
- Lecture 44 - Analysis of response of second order systems
- Lecture 45 - Analysis of response of second order systems (Continued...)
- Lecture 46 - Analysis of (p,q) order systems
- Lecture 47 - Analysis of (p,q) order systems (Continued...)
- Lecture 48 - Analysis of multiple input - multiple output systems
- Lecture 49 - Block diagrams and inter-conversion of state-space and transform domain models
- Lecture 50 - Analysis of inverse response systems
- Lecture 51 - Analysis of dynamics of discrete-time systems
- Lecture 52 - Sampling and reconstruction of continuous signals
- Lecture 53 - Conversion of continuous models to discrete-time models
- Lecture 54 - Introduction to z-transforms
- Lecture 55 - z-transforms Continued
- Lecture 56 - Response of discrete-time systems
- Lecture 57 - Response of discrete-time systems (Continued...)
- Lecture 58 - Response of discrete-time systems (Continued...)
- Lecture 59 - Stability analysis in transform domain
- Lecture 60 - Review of the course



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Metallocene and Metal-Carbene based Organometallic Compounds

Subject Co-ordinator - Prof. Sanjib K. Patra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- 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 catal
- Lecture 22 - Coordination polymerization of olefin by Metallocene Catalysts: A new avenue in polyolefin catal
- 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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Metallocene and Post-metallocene Catalysts: Homogeneous to Heterogeneous and Lab to Industry (Co
- 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
- 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 c

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Chemical Engineering Fluid Dynamics and Heat Transfer

Subject Co-ordinator - Prof. Rabibrata Mukherjee, Prof. Arnab Atta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction Basic Concepts and Kinematics - 1  
Lecture 2 - Kinematics - 2  
Lecture 3 - Kinematics - 3  
Lecture 4 - Kinematics - 4  
Lecture 5 - Kinematics - 5 - Shear Stress  
Lecture 6 - Kinematics - 6 and Conservation Equation - 1  
Lecture 7 - Conservation Equation - 2  
Lecture 8 - Conservation Equation - 3 - Conservation of Momentum  
Lecture 9 - Conservation Equation - 4 - Conservation of Momentum - 2  
Lecture 10 - Conservation Equation - 5 - Conservation of Momentum - 3  
Lecture 11 - Exact Solution - 1  
Lecture 12 - Exact Solution - 2  
Lecture 13 - Exact Solution - 3  
Lecture 14 - Exact Solution - 4  
Lecture 15 - Boundary Layer Analysis - 1  
Lecture 16 - Boundary Layer Analysis - 2  
Lecture 17 - Boundary Layer Analysis - 3  
Lecture 18 - Boundary Layer Analysis - 4: Blasius Solution - 1  
Lecture 19 - Boundary Layer Analysis - 4: Blasius Solution - 2  
Lecture 20 - Boundary Layer Analysis - 5: Momentum Integral Method - 1  
Lecture 21 - Boundary Layer Analysis - 6: Momentum Integral Method - 2  
Lecture 22 - Boundary Layer Analysis - 6: Momentum Integral Method - 3  
Lecture 23 - Turbulence - 1  
Lecture 24 - Turbulence - 2  
Lecture 25 - Turbulence - 3  
Lecture 26 - Turbulence - 4  
Lecture 27 - Turbulence - 5  
Lecture 28 - Turbulence - 6  
Lecture 29 - Turbulence - 7

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- Lecture 30 - Turbulence - 8 and Final Wrap-up
- Lecture 31 - Fundamentals and Mechanism of Heat Transfer
- Lecture 32 - Fundamentals and Mechanism of Heat Transfer (Continued...)
- Lecture 33 - Fundamentals and Mechanism of Heat Transfer (Continued...)
- Lecture 34 - Fundamentals and Mechanism of Heat Transfer (Continued...)
- Lecture 35 - Fundamentals and Mechanism of Heat Transfer (Continued...)
- Lecture 36 - One-dimensional Heat Conduction
- Lecture 37 - One-dimensional Heat Conduction (Continued...)
- Lecture 38 - One-dimensional Heat Conduction (Continued...)
- Lecture 39 - One-dimensional Heat Conduction (Continued...)
- Lecture 40 - One-dimensional Heat Conduction (Continued...)
- Lecture 41 - One-dimensional Heat Conduction (Continued...)
- Lecture 42 - One-dimensional Heat Conduction (Continued...)
- Lecture 43 - Transient Heat Conduction
- Lecture 44 - Transient Heat Conduction (Continued...)
- Lecture 45 - Transient Heat Conduction (Continued...)
- Lecture 46 - Forced Convection
- Lecture 47 - Forced Convection (Continued...)
- Lecture 48 - Forced Convection (Continued...)
- Lecture 49 - Forced Convection (Continued...)
- Lecture 50 - Forced Convection (Continued...)
- Lecture 51 - Internal Forced Convection
- Lecture 52 - Internal Forced Convection (Continued...)
- Lecture 53 - Internal Forced Convection (Continued...)
- Lecture 54 - Internal Forced Convection (Continued...)
- Lecture 55 - Internal Forced Convection (Continued...)
- Lecture 56 - Natural Convection
- Lecture 57 - Natural Convection (Continued...)
- Lecture 58 - Boiling and Condensation
- Lecture 59 - Radiation
- Lecture 60 - Radiation (Continued...)

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Characterization of Polymers, Elastomers and Composites

Subject Co-ordinator - Prof. Santanu Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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 along  
Lecture 12 - Identification by Chemical Techniques, Implication of National and International Standards along  
Lecture 13 - Identification by Chemical Techniques, Implication of National and International Standards along  
Lecture 14 - Identification by Chemical Techniques, Implication of National and International Standards along  
Lecture 15 - Identification by Chemical Techniques, Implication of National and International Standards along  
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 (Contin  
Lecture 18 - Introduction of UV-Vis and infrared spectroscopy for polymers, elastomers and composites (Contin  
Lecture 19 - Introduction of UV-Vis and infrared spectroscopy for polymers, elastomers and composites (Contin  
Lecture 20 - Introduction of UV-Vis and infrared spectroscopy for polymers, elastomers and composites (Contin  
Lecture 21 - Application of infrared spectroscopy for blends, modification of polymers, compatibilizaion, cou  
Lecture 22 - Application of infrared spectroscopy for blends, modification of polymers, compatibilizaion, cou  
Lecture 23 - Application of infrared spectroscopy for blends, modification of polymers, compatibilizaion, cou  
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 spectrosc  
Lecture 27 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectrosc  
Lecture 28 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectrosc  
Lecture 29 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectrosc

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- Lecture 30 - Introduction to Photoacoustic spectroscopy (PA), Raman spectroscopy, Atomic absorption spectroscopy
- 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
- Lecture 33 - NMR Spectroscopy- principles and fundamentals. Application of NMR in polymer, elastomer and composites
- Lecture 34 - NMR Spectroscopy- principles and fundamentals. Application of NMR in polymer, elastomer and composites
- Lecture 35 - NMR Spectroscopy- principles and fundamentals. Application of NMR in polymer, elastomer and composites
- 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 demonstration 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
- Lecture 42 - XRD, XPS and XRF. Principles, Fundamentals and Application in Polymer, Elastomer and Composites
- Lecture 43 - XRD, XPS and XRF. Principles, Fundamentals and Application in Polymer, Elastomer and Composites
- Lecture 44 - XRD, XPS and XRF. Principles, Fundamentals and Application in Polymer, Elastomer and Composites
- Lecture 45 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FE-SEM)
- Lecture 46 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FE-SEM)
- Lecture 47 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FE-SEM)
- Lecture 48 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FE-SEM)
- Lecture 49 - Introduction to microscopy (Optical, AFM) with special reference to electron microscopy (SEM, FE-SEM)
- 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 (ImageJ)
- Lecture 55 - Chromatography, DETA, Quantification from Rate Dependent Methods, Reverse Engineering and Recent Advances
- Lecture 56 - Chromatography, DETA, Quantification from Rate Dependent Methods, Reverse Engineering and Recent Advances
- Lecture 57 - Chromatography, DETA, Quantification from Rate Dependent Methods, Reverse Engineering and Recent Advances
- Lecture 58 - Chromatography, DETA, Quantification from Rate Dependent Methods, Reverse Engineering and Recent Advances
- Lecture 59 - Chromatography, DETA, Quantification from Rate Dependent Methods, Reverse Engineering and Recent Advances
- Lecture 60 - Chromatography, DETA, Quantification from Rate Dependent Methods, Reverse Engineering and Recent Advances

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Matlab-Based Programming Lab in Chemical Engineering

Subject Co-ordinator - Prof. Parag A. Deshpande

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation for the Lab Course  
Lecture 2 - Analysis of the Need of Computers in Process Industries  
Lecture 3 - Analysis of the Need of Computers in Process Industries (Continued...)  
Lecture 4 - Discussion on Computational Tools available to Chemical Engineers  
Lecture 5 - Analysis and Comparison of different Programming Languages  
Lecture 6 - MATLAB Primer - Basic Features  
Lecture 7 - MATLAB Primer - Writing Codes  
Lecture 8 - MATLAB Primer - Coding (Continued...)  
Lecture 9 - MATLAB Primer - Coding (Continued...)  
Lecture 10 - MATLAB Primer - Plotting and Presentation of Results  
Lecture 11 - LAB 1 - Analysis of Frictional Losses in Pipe Flows Problem Definition and Analysis  
Lecture 12 - LAB 1 - Analysis of Frictional Losses in Pipe Flows Theory and Solution Strategy  
Lecture 13 - LAB 1 - Analysis of Frictional Losses in Pipe Flows Solution of the Problem under ...  
Lecture 14 - LAB 1 - Analysis of Frictional Losses in Pipe Flows Solution of the Problem under ...  
Lecture 15 - LAB 1 - Analysis of Frictional Losses in Pipe Flows Presentation and Interpretation ...  
Lecture 16 - LAB 2 - Steady-state Operation of a Diabatic CSTR Problem Definition and Analysis  
Lecture 17 - LAB 2 - Steady-state Operation of a Diabatic CSTR Theory and Solution Strategy  
Lecture 18 - LAB 2 - Steady-state Operation of a Diabatic CSTR Solution of the Problem under ...  
Lecture 19 - LAB 2 - Steady-state Operation of a Diabatic CSTR Solution of the Problem under ...  
Lecture 20 - LAB 2 - Steady-state Operation of a Diabatic CSTR Analysis and Presentation ...  
Lecture 21 - LAB 3 - Analysis of multicomponent distillation Problem definition and analysis  
Lecture 22 - LAB 3 - Analysis of Multicomponent Distillation Theory and Solution Strategy  
Lecture 23 - LAB 3 - Analysis of Multicomponent Distillation Solution of the Problem under Various ...  
Lecture 24 - LAB 3 - Analysis of Multicomponent Distillation Solution of the Problem under Various ...  
Lecture 25 - LAB 3 - Analysis of Multicomponent Distillation Presentation and Analysis of Results  
Lecture 26 - LAB 4 - Analysis of Cooling of a Solid Body in a Reservoir Problem Definition ...  
Lecture 27 - LAB 4 - Analysis of Cooling of a Solid Body in a Reservoir Theory and Solution ...  
Lecture 28 - LAB 4 - Analysis of Cooling of a Solid Body in a Reservoir Solution of the Problem ...  
Lecture 29 - LAB 4 - Analysis of Cooling of a Solid Body in a Reservoir Solution of the Problem ...

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Lecture 30 - LAB 4 - Analysis of cooling of a solid body in a reservoir Presentation ...  
Lecture 31 - LAB 5 - Analysis of unsteady-state operation of cascade CSTR's Problem Definition ...  
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 pellet Problem definition and ...  
Lecture 42 - LAB 7 - Reaction-diffusion in a spherical catalyst pellet Theory and solution strategy ...  
Lecture 43 - LAB 7 - Reaction-diffusion in a spherical catalyst pellet Solution of the problem ...  
Lecture 44 - LAB 7 - Reaction-diffusion in a spherical catalyst pellet Solution of the problem ...  
Lecture 45 - LAB 7 - Reaction-diffusion in a spherical catalyst pellet 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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Petroleum Technology

Subject Co-ordinator - Dr. Sonali Sengupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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...)

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Upgradation of straight run cuts from distillation unit
- Lecture 31 - Purification processes
- Lecture 32 - Purification processes (Continued...)
- Lecture 33 - Bitumen preparation processes
- Lecture 34 - Grease: preparation, description and application
- Lecture 35 - Emission control and effluent treatment in refinery
- Lecture 36 - Fundamentals of thermochemistry: Combustion
- Lecture 37 - Fundamentals of thermochemistry: Flame
- Lecture 38 - Fundamentals of thermochemistry: Adiabatic flame temperature
- Lecture 39 - Fundamentals of thermochemistry: Burner
- Lecture 40 - Fundamentals of thermochemistry: Internal Combustion engine

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Rheology and Processing of Paints, Plastic and Elastomer Base

Subject Co-ordinator - Prof. Santanu Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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 - Numerical Problems related to basic rheology  
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 - Rheology of Elastomers  
Lecture 29 - Importance of die swell (correlating with normal force differences)

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- Lecture 30 - Melt Fracture and other extrudate instabilities
- Lecture 31 - Introduction to plastic and rubber mixing and blending
- Lecture 32 - Various mixing equipment and their importance
- Lecture 33 - Introduction to Two-Roll Mill and Mixing on Two - Roll Mill 1
- Lecture 34 - Introduction to Two-Roll Mill and Mixing on Two - Roll Mill 2
- Lecture 35 - Introduction to Internal mixture Kneaders and Mixing using Internal mixture and Kneaders
- Lecture 36 - Practical demonstration of Rubber mixing on a two roll and using an internal mixer
- Lecture 37 - Molding Techniques
- Lecture 38 - Calendering
- Lecture 39 - Extrusion
- Lecture 40 - Rheology of Injection moulding process
- Lecture 41 - Plastic and fiber-related processing
- Lecture 42 - Numerical problems related to various processing techniques
- Lecture 43 - Wire coating, Garvey die, Profile Extrusion
- Lecture 44 - Introduction to FEA based computational fluid mechanics on extrusion - 1
- Lecture 45 - Introduction to FEA based computational fluid mechanics on extrusion - 2
- Lecture 46 - Introduction to FEA based computational fluid mechanics on extrusion - 3
- Lecture 47 - Practical demonstration on FEA
- Lecture 48 - Concluding remarks and comments on applied rheology for advanced learners

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Petroleum Formation Evaluation

Subject Co-ordinator - Dr. Neetish Kumar Maurya, Dr. Sayantan Ghosh

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Petroleum Formation Evaluation  
Lecture 2 - Mud Logging  
Lecture 3 - Mud Logging (Continued...)  
Lecture 4 - Coring Operations  
Lecture 5 - Coring Operations (Continued...)  
Lecture 6 - Wireline Logging  
Lecture 7 - Resistivity Log  
Lecture 8 - Resistivity Log (Continued...)  
Lecture 9 - Resistivity Log (Continued...)  
Lecture 10 - Resistivity Log (Continued...)  
Lecture 11 - Resistivity Log (Continued...)  
Lecture 12 - Resistivity Log (Continued...)  
Lecture 13 - Resistivity Log (Continued...)  
Lecture 14 - Resistivity Log (Continued...)  
Lecture 15 - Resistivity Log (Continued...)  
Lecture 16 - Spontaneous Potential Log  
Lecture 17 - Spontaneous Potential Log (Continued...)  
Lecture 18 - Petrophysical Model  
Lecture 19 - Petrophysical Model (Continued...)  
Lecture 20 - Gamma Ray Log  
Lecture 21 - Gamma Ray Log (Continued...)  
Lecture 22 - Gamma Ray Log (Continued...)  
Lecture 23 - Caliper Log  
Lecture 24 - Porosity Logs  
Lecture 25 - Density Porosity Log  
Lecture 26 - Density Porosity Log (Continued...)  
Lecture 27 - Density Porosity Log (Continued...)  
Lecture 28 - Density Porosity Log (Continued...)  
Lecture 29 - Density Porosity Log (Continued...)

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Lecture 30 - Neutron Porosity Log  
Lecture 31 - Neutron Porosity Log (Continued...)  
Lecture 32 - Neutron Porosity Log (Continued...)  
Lecture 33 - Neutron Porosity Log (Continued...)  
Lecture 34 - Neutron Porosity Log (Continued...)  
Lecture 35 - Sonic (Acoustic) Porosity Log  
Lecture 36 - Sonic Porosity Log (Continued...)  
Lecture 37 - Sonic Porosity Log (Continued...)  
Lecture 38 - Sonic Porosity Log (Continued...)  
Lecture 39 - Sonic Porosity Log (Continued...)  
Lecture 40 - NMR Log  
Lecture 41 - NMR Log (Continued...)  
Lecture 42 - Well Log interpretation  
Lecture 43 - Well Log interpretation (Continued...)  
Lecture 44 - Well Log interpretation (Continued...)  
Lecture 45 - Well Log interpretation (Continued...)  
Lecture 46 - Well Log Interpretation (Continued...)  
Lecture 47 - Well Log Interpretation (Continued...)  
Lecture 48 - Well Log Interpretation (Continued...)  
Lecture 49 - Well Log Interpretation (Continued...)  
Lecture 50 - Well Log Interpretation (Continued...)  
Lecture 51 - Formation Evaluation (well log analysis) Practical  
Lecture 52 - Formation tops and Core Data  
Lecture 53 - Formation Temperature and Shaliness  
Lecture 54 - Formation porosity and Water Saturation  
Lecture 55 - Permeability and Effective Porosity  
Lecture 56 - Determination of Archie Equation Parameters  
Lecture 57 - Lithology Determination  
Lecture 58 - Net Pay and Well Diagram  
Lecture 59 - Rock Typing  
Lecture 60 - Miscellaneous Topics

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Momentum Transfer in Fluids

Subject Co-ordinator - Prof. Somenath Ganguly, Prof. Sunando DasGupta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Basic Concepts  
Lecture 2 - Elementary Framework  
Lecture 3 - Elementary Framework (Continued...)  
Lecture 4 - Elementary Framework (Continued...)  
Lecture 5 - Elementary Framework (Continued...)  
Lecture 6 - Shell Momentum Balance - 1  
Lecture 7 - Shell Momentum Balance - 2  
Lecture 8 - Shell Momentum Balance - 3  
Lecture 9 - Shell Momentum Balance - 4  
Lecture 10 - Limitations and General Approach - Continuity Equation  
Lecture 11 - Elements of Inviscid Flow  
Lecture 12 - Elements of Inviscid Flow (Continued...)  
Lecture 13 - Elements of Inviscid Flow (Continued...)  
Lecture 14 - Elements of Inviscid Flow (Continued...)  
Lecture 15 - Elements of Inviscid Flow (Continued...)  
Lecture 16 - Equations of Motion - Conceptual Derivation of NS Equations  
Lecture 17 - Use of NS Equation for Solving Previous Problems  
Lecture 18 - Equations of Motion and Applications - 1  
Lecture 19 - Equations of Motion and Applications - 2  
Lecture 20 - Equations of Motion and Applications - 3  
Lecture 21 - Motion of fluid particles  
Lecture 22 - Motion of fluid particles (Continued...)  
Lecture 23 - Motion of fluid particles (Continued...)  
Lecture 24 - Stream Function and Potential Function  
Lecture 25 - Stream Function and Potential Function (Continued... )  
Lecture 26 - Equations of Motion and Applications - 4  
Lecture 27 - Equations of Motion and Applications - 5  
Lecture 28 - Basic Equations in Integral Form - 1  
Lecture 29 - Basic Equations in Integral Form - 2

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Lecture 30 - Basic Equations in Integral Form - 3  
Lecture 31 - Complex Potential  
Lecture 32 - Complex Potential (Continued...)  
Lecture 33 - Complex Potential (Continued...)  
Lecture 34 - Complex Potential (Continued...)  
Lecture 35 - Complex Potential (Continued...)  
Lecture 36 - Basic Equations in Integral Form - 4  
Lecture 37 - Basic Equations in Integral Form - 5  
Lecture 38 - Basic Equations in Integral Form - 6  
Lecture 39 - Bernoulli's Equation Fundamentals - 1  
Lecture 40 - Bernoulli's Equation Fundamentals - 2  
Lecture 41 - Elements of Fluid Statics and Associated Problems  
Lecture 42 - Elements of Fluid Statics and Associated Problems (Continued... )  
Lecture 43 - Elements of Fluid Statics and Associated Problems (Continued... )  
Lecture 44 - Dimensional Analysis and Similitude  
Lecture 45 - Dimensional Analysis and Similitude (Continued...)  
Lecture 46 - Bernoulli's Equation Application - 1  
Lecture 47 - Bernoulli's Equation Application - 2  
Lecture 48 - Bernoulli's Equation Application - 3  
Lecture 49 - Bernoulli's Equation Application - 4  
Lecture 50 - Bernoulli's Equation Application - 5  
Lecture 51 - Bernoulli's Equation Application - 6  
Lecture 52 - Flow meters  
Lecture 53 - Pumps  
Lecture 54 - Recap of Fluid Dynamics  
Lecture 55 - Cavitation and Net Positive Suction Head  
Lecture 56 - Flow Metering and Associated Problems  
Lecture 57 - Flow Metering and Associated Problems (Continued... )  
Lecture 58 - Flow Metering and Associated Problems (Continued... )  
Lecture 59 - Turbulence  
Lecture 60 - Flow Through Porous Media



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Enhanced Oil Recovery Techniques

Subject Co-ordinator - Prof. Ajay Mandal

Co-ordinating Institute - IIT-ISM Dhanbad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Principles of Enhanced Oil Recovery (EOR); Difference of Tertiary recovery  
Lecture 2 - Pressure maintenance and Well Patterns  
Lecture 3 - Need for EOR and Screening Methods  
Lecture 4 - Sweep and Displacement Efficiencies  
Lecture 5 - Fundamental of immiscible fluid displacement processes  
Lecture 6 - Buckley Leverette Theorem for one dimensional immiscible displacement  
Lecture 7 - Welge Method for Oil Recovery Calculation  
Lecture 8 - Effects of various parameters on recovery by water flood  
Lecture 9 - Chemical Enhanced Oil Recovery Methods  
Lecture 10 - Enhanced Oil Recovery by Polymer Flooding - I  
Lecture 11 - Enhanced Oil Recovery by Polymer Flooding - II  
Lecture 12 - Enhanced Oil Recovery by Polymer Flooding - III  
Lecture 13 - Oil Recovery by Polymer Flooding: Lab Study and Recovery Calculations  
Lecture 14 - Surfactant Flooding: Properties of Surfactants  
Lecture 15 - Surfactant Flooding for Enhanced Oil recovery - I  
Lecture 16 - Surfactant Flooding for Enhanced Oil recovery - II  
Lecture 17 - Phase Behaviour of Surfactant Stabilized Microemulsions  
Lecture 18 - Surfactant Flooding and Screening Criteria  
Lecture 19 - Micellar - Polymer Flooding  
Lecture 20 - Microemulsion Flooding  
Lecture 21 - Nanoemulsion and Pickering Emulsion for EOR  
Lecture 22 - Alkali Flooding for EOR and Monitoring of Chemical Flooding  
Lecture 23 - Foam Flooding for EOR  
Lecture 24 - Introduction to Miscible Flooding, Thermodynamics of miscibility  
Lecture 25 - Thermodynamics of miscibility and Mechanisms of Miscible Displacement  
Lecture 26 - Minimum Miscibility Pressure (MMP)  
Lecture 27 - Mechanisms of Miscible flooding  
Lecture 28 - Enriched Gas Injection/Condensing Gas Drive  
Lecture 29 - CO<sub>2</sub> Sequestration, utilisation and storage

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

- Lecture 30 - Mechanisms of CO2 Miscible flooding
- Lecture 31 - Immiscible flooding Mechanisms of CO2
- Lecture 32 - Thermal Oil Recovery Methods
- Lecture 33 - Mechanisms of Thermal Oil Recovery
- Lecture 34 - Thermal Oil Recovery: Hot Water and Steam flooding
- Lecture 35 - Steam Flooding for EOR
- Lecture 36 - Steam Assisted Gravity Drainage and Hybrid Steam Injection
- Lecture 37 - Thermal Oil Recovery-In-Situ Combustion
- Lecture 38 - Air Requirement in In-situ Combustion
- Lecture 39 - Electromagnetic heating and Ultrasonication for Enhanced Oil Recovery
- Lecture 40 - Low salinity water flooding
- Lecture 41 - Low salinity water flooding (Continued...)
- Lecture 42 - Low salinity water flooding (Continued...)
- Lecture 43 - Low salinity water flooding (Continued...)
- Lecture 44 - Low salinity water flooding in Carbonate Reservoir - Smart Water Flooding
- Lecture 45 - Nanotechnology based EOR
- Lecture 46 - Nanotechnology based EOR (Continued...)
- Lecture 47 - Microbial Enhanced Oil Recovery
- Lecture 48 - Carbonated water injection (CWI) for EOR
- Lecture 49 - Plasma pulse technology and Exothermic Chemical Treatment (ECT) in EOR
- Lecture 50 - Enhanced Gas Recoveries
- Lecture 51 - Water Shutoff and Profile Modification
- Lecture 52 - Reservoir Simulation Studies for Enhanced Oil Recovery
- Lecture 53 - Introduction to Artificial Intelligence and Machine Learning in EOR
- Lecture 54 - Techno-economic feasibility analysis
- Lecture 55 - Review of Classes
- Lecture 56 - Review of Classes (Continued...)
- Lecture 57 - Review of Classes (Continued...)
- Lecture 58 - Case Studies of EOR Methods
- Lecture 59 - Case Studies of EOR Methods (Continued...)
- Lecture 60 - Role of Petroleum Engineering for design and operation of EOR Methods

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Adsorption Science and Technology: Fundamentals and Applications

Subject Co-ordinator - Prof. Sourav Mondal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Background of Adsorption  
Lecture 2 - Adsorbents  
Lecture 3 - Key Features of Adsorption, Thermodynamic Background  
Lecture 4 - Adsorption Isotherm  
Lecture 5 - Langmuir Isotherm  
Lecture 6 - Multicomponent Langmuir and Other Isotherms  
Lecture 7 - Other Important Isotherms (Continued...)  
Lecture 8 - Equilibrium Modelling - I  
Lecture 9 - Equilibrium Modelling - II  
Lecture 10 - Adsorption Kinetics  
Lecture 11 - BET Analysis  
Lecture 12 - Gas Sorption  
Lecture 13 - Surface Area Calculations  
Lecture 14 - Pore Size Analysis  
Lecture 15 - Limitations of BET Analysis  
Lecture 16 - Adsorption and Diffusion Models  
Lecture 17 - Film Diffusion  
Lecture 18 - Linear Driving Force Model  
Lecture 19 - Intraparticle Adsorption Diffusion Model  
Lecture 20 - Slurry Adsorption  
Lecture 21 - Fixed Bed Adsorption  
Lecture 22 - Mass Transfer Zone Modelling  
Lecture 23 - Fixed Bed Design: Thomas Model  
Lecture 24 - Fixed Bed Design: Adams-Bohart and Other Models  
Lecture 25 - Fixed Bed Design: Constant Pattern Behaviour  
Lecture 26 - Fixed Bed Design: Multi-Scale Model  
Lecture 27 - Fixed Bed Adsorption: Illustrative Problems  
Lecture 28 - Introduction to Pressure Swing Adsorption (PSA)  
Lecture 29 - Modelling PSA Systems

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Design of Medical Grade Oxygen Concentrator
- Lecture 31 - Introduction to Chromatography
- Lecture 32 - Chromatography: Principles
- Lecture 33 - Column Chromatography
- Lecture 34 - Chromatography: Illustrative Problems 1
- Lecture 35 - Chromatography: Illustrative Problems 2
- Lecture 36 - Ion Exchange: Principles
- Lecture 37 - Ion Exchange Adsorbents
- Lecture 38 - Ion Exchange: Illustrative Problem
- Lecture 39 - Ion Exchange Cycle
- Lecture 40 - Ion Exchange Cycle: Illustrative Problem

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Chemical Engineering Thermodynamics

Subject Co-ordinator - Prof. M.S. Ananth

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Thermodynamics and the Chemical Industry  
Lecture 2 - James Prescott Joule and the first law  
Lecture 3 - Sadi Carnot and the second law  
Lecture 4 - Equilibrium and Extrema in work  
Lecture 5 - Illustrative Calculations - I  
Lecture 6 - Properties of pure substances  
Lecture 7 - The p-h chart  
Lecture 8 - Work calculation  
Lecture 9 - Illustrative Calculations - II  
Lecture 10 - Heat-Work Interconversion Devices  
Lecture 11 - Refrigeration / Thermodynamics of mixtures  
Lecture 12 - The Gibbs Duhem equation  
Lecture 13 - Models for Excess Gibbs Free Energy  
Lecture 14 - Van Laar model  
Lecture 15 - Gaseous and liquid mixtures  
Lecture 16 - Separation Work / Equations of state  
Lecture 17 - Chemical potentials in gas and condensed phases  
Lecture 18 - Vapour Liquid Equilibria - I  
Lecture 19 - Vapour Liquid Equilibria - II  
Lecture 20 - Solvent-Solvent mixtures  
Lecture 21 - Solvent-Solute mixtures  
Lecture 22 - Liquid-liquid equilibria  
Lecture 23 - An industrial example  
Lecture 24 - Liquid-liquid equilibria / Reaction Equilibria  
Lecture 25 - Reaction Equilibria  
Lecture 26 - Illustrative Examples - I  
Lecture 27 - Illustrative Examples - II  
Lecture 28 - Illustrative Examples - III  
Lecture 29 - Simultaneous Relations

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- Lecture 30 - Thermodynamic Consistency / Reverse Osmosis
- Lecture 31 - Miscellaneous topics in phase equilibria
- Lecture 32 - Absorption Refrigeration
- Lecture 33 - Summary of Classical Thermodynamics
- Lecture 34 - Molecular basis of Thermodynamics - I
- Lecture 35 - Molecular basis of Thermodynamics - II

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Computational Fluid Dynamics

Subject Co-ordinator - Prof. Sreenivas Jayanti

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Motivation for CFD and Introduction to the CFD approach
- Lecture 2 - Illustration of the CFD approach through a worked out example
- Lecture 3 - Eulerian approach, Conservation Equation, Derivation of Mass Conservation Equation and Statement
- Lecture 4 - Forces acting on a control volume; Stress tensor; Derivation of the momentum conservation equation
- Lecture 5 - Kinematics of deformation in fluid flow; Stress vs strain rate relation; Derivation of the Navier-Stokes equation
- Lecture 6 - Equations governing flow of incompressible flow; Initial and boundary conditions; Wellposedness of the problem
- Lecture 7 - Equations for some simple cases; Generic scalar transport equation form of the governing equation
- Lecture 8 - cut out the first 30s; Spatial discretization of a simple flow domain; Taylor's series expansion
- Lecture 9 - Finite difference approximation of pth order of accuracy for qth order derivative; cross-derivatives
- Lecture 10 - One-sided high order accurate approximations; Explicit and implicit formulations for the time derivatives
- Lecture 11 - Numerical solution of the unsteady advection equation using different finite difference approximations
- Lecture 12 - Need for analysis of a discretization scheme; Concepts of consistency, stability and convergence
- Lecture 13 - Statement of the stability problem; von Neumann stability analysis of the first order wave equation
- Lecture 14 - Consistency and stability analysis of the unsteady diffusion equation; Analysis for two- and three-dimensional cases
- Lecture 15 - Interpretation of the stability condition; Stability analysis of the generic scalar equation and its extension to the vector case
- Lecture 16 - Template for the generic scalar transport equation and its extension to the solution of Navier-Stokes equations
- Lecture 17 - Illustration of application of the template using the MacCormack scheme for a three-dimensional flow
- Lecture 18 - Stability limits of MacCormack scheme; Limitations in extending compressible flow schemes to incompressible flow
- Lecture 19 - Artificial compressibility method and the streamfunction-vorticity method for the solution of NS equations
- Lecture 20 - Pressure equation method for the solution of NS equations
- Lecture 21 - Pressure-correction approach to the solution of NS equations on a staggered grid; SIMPLE and its variants
- Lecture 22 - Need for efficient solution of linear algebraic equations; Classification of approaches for the solution of linear algebraic equations
- Lecture 23 - Direct methods for linear algebraic equations; Gaussian elimination method
- Lecture 24 - Gauss-Jordan method; LU decomposition method; TDMA and Thomas algorithm
- Lecture 25 - Basic iterative methods for linear algebraic equations
- Lecture 26 - Convergence analysis of basic iterative schemes; Diagonal dominance condition for convergence; I and II
- Lecture 27 - Application to the Laplace equation
- Lecture 28 - Advanced iterative methods
- Lecture 29 - Advanced iterative methods; Strongly Implicit Procedure; Conjugate gradient method; Multigrid method

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- 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
- Lecture 32 - Derivation of the energy conservation equation
- Lecture 33 - Derivation of the species conservation equation; dealing with chemical reactions
- Lecture 34 - Turbulence; Characteristics of turbulent flow; Dealing with fluctuations and the concept of time
- Lecture 35 - Derivation of the Reynolds -averaged Navier -Stokes equations; identification of the closure problem
- Lecture 36 - Reynolds stresses in turbulent flow; Time and length scales of turbulence; Energy cascade; Mixing
- 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
- Lecture 40 - Need for special methods for dealing with irregular flow geometry; Outline of the Body-fitted grid
- Lecture 41 - Transformation of the governing equations; Illustration for the Laplace equation; Appearance and
- Lecture 42 - Finite volume method for complicated flow domain; Illustration for the case of flow through a duct
- 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
- 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



## NPTEL Video Lecture Topic List - Created by Linuxpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Computational Techniques

Subject Co-ordinator - Dr. Niket S. Kaisare

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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Lecture 30 - Ordinary Differential Equations (initial value problems) - Part 6  
Lecture 31 - Ordinary Differential Equations (initial value problems) - Part 7  
Lecture 32 - Ordinary Differential Equations (initial value problems) - Part 8  
Lecture 33 - Ordinary Differential Equations (initial value problems) - Part 9  
Lecture 34 - Ordinary Differential Equations (boundary value problems) - Part 1  
Lecture 35 - Ordinary Differential Equations (boundary value problems) - Part 2  
Lecture 36 - Ordinary Differential Equations (boundary value problems) - Part 3  
Lecture 37 - Partial Differential Equations - Part 1  
Lecture 38 - Partial Differential Equations - Part 2  
Lecture 39 - Partial Differential Equations - Part 3  
Lecture 40 - Partial Differential Equations - Part 4

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Particle Characterization (PG)

Subject Co-ordinator - Dr. R. Nagarajan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Introduction  
Lecture 3 - Morphological Characterization  
Lecture 4 - Morphological Characterization  
Lecture 5 - Morphological Characterization  
Lecture 6 - Morphological Characterization  
Lecture 7 - Morphological Characterization  
Lecture 8 - Morphological Characterization  
Lecture 9 - Morphological Characterization  
Lecture 10 - Morphological Characterization  
Lecture 11 - Morphological Characterization  
Lecture 12 - Morphological Characterization  
Lecture 13 - Structural Characterization  
Lecture 14 - Interfacial Characterization  
Lecture 15 - Surface Adhesion  
Lecture 16 - Surface Adhesion  
Lecture 17 - Surface Adhesion  
Lecture 18 - Particle Removal  
Lecture 19 - Particle Removal  
Lecture 20 - Particle Cohesion  
Lecture 21 - Particle Cohesion  
Lecture 22 - Transport Properties  
Lecture 23 - Transport Properties  
Lecture 24 - Transport Properties  
Lecture 25 - Transport Properties  
Lecture 26 - Chemical & Compositional Characterization  
Lecture 27 - Chemical & Compositional Characterization  
Lecture 28 - Chemical & Compositional Characterization  
Lecture 29 - Nano-particle Characterization

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Nano-particle Characterization
- Lecture 31 - Nano-particle Characterization
- Lecture 32 - Nano-particle Characterization
- Lecture 33 - Practical Relevance of Particle Characterization
- Lecture 34 - Practical Relevance of Particle Characterization
- Lecture 35 - Practical Relevance of Particle Characterization
- Lecture 36 - Practical Relevance of Particle Characterization
- Lecture 37 - Practical Relevance of Particle Characterization
- Lecture 38 - Practical Relevance of Particle Characterization
- Lecture 39 - Practical Relevance of Particle Characterization
- Lecture 40 - Summary

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Statistics for Experimentalists

Subject Co-ordinator - Dr. A. Kannan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Random Variables  
Lecture 3 - Discrete Probability Distributions  
Lecture 4 - Example Set - I  
Lecture 5 - Continuous probability distributions  
Lecture 6 - Normal probability distribution  
Lecture 7 - Exploratory Data Analysis - Part A  
Lecture 8 - Exploratory Data Analysis - Part B  
Lecture 9 - Example Set - II  
Lecture 10 - Example Set - III  
Lecture 11 - Random samples  
Lecture 12 - Random samples  
Lecture 13 - Point Estimation  
Lecture 14 - Sampling distributions and the Central Limit Theorem  
Lecture 15 - Example Set - IV Part A  
Lecture 16 - Estimation of Population Parameters Using Moments  
Lecture 17 - Confidence Intervals (Part A)  
Lecture 18 - Confidence Intervals (Part B)  
Lecture 19 - The T-distribution  
Lecture 20 - Chi-square distribution  
Lecture 21 - F-Distribution  
Lecture 22 - Example Set - V  
Lecture 23 - Hypothesis Testing - Part A  
Lecture 24 - Hypothesis Testing - Part B  
Lecture 25 - Hypothesis Testing - Part C  
Lecture 26 - Analysis of Experiments involving Single Factor - Part A  
Lecture 27 - Analysis of Experiments involving Single Factor - Part B  
Lecture 28 - Blocking and Randomization  
Lecture 29 - Example Set - VI - Part A

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Example Set - VI - Part B
- Lecture 31 - Factorial Design of Experiments - Part A
- Lecture 32 - Factorial Design of Experiments - Part B
- Lecture 33 - Fractional Factorial Design - Part A
- Lecture 34 - Fractional Factorial Design - Part B
- Lecture 35 - Factorial Design of Experiments
- Lecture 36 - Factorial Design of Experiments
- Lecture 37 - Factorial Design of Experiments
- Lecture 38 - Regression Analysis
- Lecture 39 - Regression Analysis
- Lecture 40 - Hypothesis Testing in Linear Regression
- Lecture 41 - Discussion on Regression Output
- Lecture 42 - Regression Analysis
- Lecture 43 - Regression Analysis
- Lecture 44 - Regression Analysis
- Lecture 45 - Orthogonal Model Fitting Concepts - Part A
- Lecture 46 - Orthogonal Model Fitting Concepts - Part B
- Lecture 47 - Experimental Design Strategies - A
- Lecture 48 - Experimental Design Strategies - B
- Lecture 49 - Experimental Design Strategies - C
- Lecture 50 - Response Surface Methodology - A
- Lecture 51 - Response Surface Methodology - B
- Lecture 52 - Optimal Designs - Part A
- Lecture 53 - Optimal Designs - Part B
- Lecture 54 - Statistics for Experimentalists - Summary Part A
- Lecture 55 - Statistics for Experimentalists - Summary Part B

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Multiphase Flows - Analytical solutions and Stability Analysis

Subject Co-ordinator - Prof. S. Pushpavanam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and overview of the course  
Lecture 2 - Stratified flow in a micro channel  
Lecture 3 - Stratified flow in a micro channel  
Lecture 4 - Flow regimes in microchannels  
Lecture 5 - Scaling Analysis  
Lecture 6 - Scaling Analysis  
Lecture 7 - Interfacial tension and its role in Multiphase flows  
Lecture 8 - Eulerian and Lagrangian approaches  
Lecture 9 - Reynolds Transport Theorem and the Equation of Continuity  
Lecture 10 - Derivation of Navier-Stokes equation  
Lecture 11 - Vector operations in general orthogonal coordinates  
Lecture 12 - Normal and shear stresses on arbitrary surfaces  
Lecture 13 - Normal and shear stresses on arbitrary surfaces  
Lecture 14 - Stresses on deforming surfaces  
Lecture 15 - Pulsatile flow  
Lecture 16 - Pulsatile flow  
Lecture 17 - Pulsatile flow  
Lecture 18 - Viscous heating  
Lecture 19 - Domain perturbation methods  
Lecture 20 - Flow between wavy walls  
Lecture 21 - Introduction to stability of dynamical systems  
Lecture 22 - Stability of distributed systems (PDEs)  
Lecture 23 - Stability of a reaction-diffusion system (Continued...)  
Lecture 24 - Rayleigh-Benard convection  
Lecture 25 - Rayleigh-Benard convection  
Lecture 26 - Rayleigh-Benard convection  
Lecture 27 - Rayleigh-Benard convection  
Lecture 28 - Rayleigh Benard convection  
Lecture 29 - Rayleigh-Taylor â heavy over lightâ instability

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## NPTEL Video Lecture Topic List - Created by Linuxpert Systems, Chennai

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- Lecture 30 - Rayleigh-Taylor instability (Continued...)
- Lecture 31 - Capillary jet instability
- Lecture 32 - Capillary jet instability
- Lecture 33 - Capillary jet instability
- Lecture 34 - Tutorial Session
- Lecture 35 - Turing patterns
- Lecture 36 - Turing patterns
- Lecture 37 - Marangoni convection
- Lecture 38 - Marangoni convection
- Lecture 39 - Flow in a circular curved channel
- Lecture 40 - Flow in a circular curved channel
- Lecture 41 - Stability of flow through curved channels
- Lecture 42 - Stability of flow through curved channels
- Lecture 43 - Viscous Fingering
- Lecture 44 - Viscous Fingering
- Lecture 45 - Shallow Cavity flows



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Introduction to Time-Frequency Analysis and Wavelet Transform

Subject Co-ordinator - Dr. Arun K.Tangirala

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - Lecture 1.1 A  
Lecture 2 - Introduction - Lecture 1.1 B  
Lecture 3 - Introduction - Lecture 1.2 A  
Lecture 4 - Introduction - Lecture 1.2 B  
Lecture 5 - Basic Definitions and concepts - Lecture 2.1 (Basic Definitions and concepts - Part I)  
Lecture 6 - Basic Definitions and concepts - Lecture 2.2 (Basic Definitions and concepts - Part II)  
Lecture 7 - Basic Definitions and concepts - Lecture 2.3 (Basic Definitions and concepts - Part III)  
Lecture 8 - A review of Fourier transforms - Lecture 3.1 (Continuous time Fourier series)  
Lecture 9 - A review of Fourier transforms - Lecture 3.2 (Continuous time Fourier transform)  
Lecture 10 - A review of Fourier transforms - Lecture 3.3 (Discrete time Fourier series)  
Lecture 11 - A review of Fourier transforms - Lecture 3.4 (Discrete time Fourier transform)  
Lecture 12 - A review of Fourier transforms - Lecture 3.5 (Properties of Fourier transforms)  
Lecture 13 - A review of Fourier transforms - Lecture 3.6 (Discrete Fourier transform)  
Lecture 14 - A review of Fourier transforms - MATLAB demo of Fourier transform and periodogram  
Lecture 15 - Duration and Bandwidth - Duration and Bandwidth  
Lecture 16 - Duration and Bandwidth - Bandwidth equation and Instantaneous frequency  
Lecture 17 - Duration and Bandwidth - Instantaneous frequency and analytic signals  
Lecture 18 - Duration and Bandwidth - Duration-Bandwidth principle  
Lecture 19 - Duration and Bandwidth - Requirements of time-frequency analysis techniques  
Lecture 20 - Duration and Bandwidth - Requirements of time-frequency analysis and techniques  
Lecture 21 - Short-time Fourier transform - Short-time Fourier transform  
Lecture 22 - Short-time Fourier transform - Auxillary (MATLAB demonstration)  
Lecture 23 - Short-time Fourier transform - Properties of STFT  
Lecture 24 - Practical aspects of STFT  
Lecture 25 - Closing Remarks  
Lecture 26 - Wigner-Ville Distributions  
Lecture 27 - Properties of WVD  
Lecture 28 - Properties of WVD 2  
Lecture 29 - Discrete WVD

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Pseudo and Smoothed WVD
- Lecture 31 - Cohens class and smoothed WVD
- 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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Chemical Engineering Principles of CVD Processes

Subject Co-ordinator - Dr. R. Nagarajan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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  
Lecture 12 - CVD in Tungsten Filament Lamps  
Lecture 13 - CVD in Tungsten Filament Lamps  
Lecture 14 - CVD in Hot Corrosion  
Lecture 15 - CVD Transport Phenomena  
Lecture 16 - CVD Transport Phenomena  
Lecture 17 - CVD Transport Phenomena  
Lecture 18 - CVD Transport Phenomena  
Lecture 19 - CVD Transport Phenomena  
Lecture 20 - CVD Applications  
Lecture 21 - CVD Applications  
Lecture 22 - CVD Applications  
Lecture 23 - CVD Applications  
Lecture 24 - CVD Applications  
Lecture 25 - CVD Overview  
Lecture 26 - Review of CVD Basics  
Lecture 27 - Review of CVD Basics  
Lecture 28 - CVD Question Bank  
Lecture 29 - Basics of Nano-Structured Material Synthesis

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Basics of Nano-Structured Material Synthesis
- Lecture 31 - Undesirable CVD
- Lecture 32 - Undesirable CVD
- Lecture 33 - Undesirable CVD
- Lecture 34 - Multi-component Transport Fundamentals
- Lecture 35 - Multi-component Transport Fundamentals
- Lecture 36 - Multi-component Transport Fundamentals
- Lecture 37 - Multi-component Transport Fundamentals
- Lecture 38 - Multi-component Transport Fundamentals
- Lecture 39 - Multi-component Transport Fundamentals

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Chemical Reaction Engineering 1 (Homogeneous Reactors)

Subject Co-ordinator - Prof K. Krishnaiah

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Recycle Reactors (Autocatalytic reactions) - Part I
- Lecture 31 - Recycle Reactors (Autocatalytic reactions) - Part II
- Lecture 32 - Multiple Reactions - Part I
- Lecture 33 - Multiple Reactions - Part II
- Lecture 34 - Multiple Reactions - Part III
- Lecture 35 - Multiple Reactions - Part IV
- Lecture 36 - Multiple Reactions - Part V
- Lecture 37 - Multiple Reactions - Part VI
- Lecture 38 - Non-Isothermal Reactors - Part I
- Lecture 39 - Non-Isothermal Reactors - Part II
- Lecture 40 - Non-Isothermal Reactors (Graphical Design)
- Lecture 41 - Non-Isothermal Reactors contd. & Adiabatic Reactors
- Lecture 42 - Non-Isothermal Reactors (Graphical Design) (Continued...)
- Lecture 43 - Non-Isothermal Batch Reactors
- Lecture 44 - Non-isothermal Plug Flow Reactors - Part I
- Lecture 45 - Non-isothermal Plug Flow Reactors - Part II
- Lecture 46 - Adiabatic Plug Flow Reactors
- Lecture 47 - Non-isothermal Mixed Flow Reactors
- Lecture 48 - Non-isothermal Mixed Flow Reactors (Continued...) (Multiple steady states) - Part I
- Lecture 49 - Non-isothermal Mixed Flow Reactors (Continued...) (Multiple steady states) - Part II
- Lecture 50 - Non-Ideal Flow and Residence Time Distributions (RTD) basics - Part I
- Lecture 51 - Non-Ideal Flow and Residence Time Distributions (RTD) basics - Part II
- Lecture 52 - RTD for various reactors (Continued...) Part I
- Lecture 53 - RTD for various reactors (Continued...) Part II
- Lecture 54 - Diagnosing the ills of equipments and Various RTD Models
- Lecture 55 - Dispersion Model
- Lecture 56 - Dispersion with reaction Model and Tanks in Series Model
- Lecture 57 - Multi-parameter model (MFR with dead space and bypass)
- Lecture 58 - Direct use of RTD to predict conversion (Macro and Micro-fluid as well as Macro & Micro-mixing C
- Lecture 59 - Direct use of RTD to predict conversion (Macro and Micro-fluid as well as Macro & Micro-mixing C
- Lecture 60 - Direct use of RTD to predict conversion (Macro and Micro-fluid as well as Macro & Micro-mixing C

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Chemical Reaction Engineering 2 (Heterogeneous Reactors)

Subject Co-ordinator - Prof K. Krishnaiah

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Kinetics (Gas solid non-catalytic reaction)  
Lecture 2 - Intro to Kinetics (Continued...) for catalytic reactions in different reactors  
Lecture 3 - Heterogeneous rate of reactions and different types of kinetic models for non-catalytic reactions  
Lecture 4 - Basics of Kinetics of type A & B reactions (Shrinking core model & Porous particle homogeneous model)  
Lecture 5 - Shrinking Core Model (Continued...)  
Lecture 6 - Shrinking Core Model (Continued...)  
Lecture 7 - (Continued...) & Proof of Pseudo steady state assumption  
Lecture 8 - Shrinking core model (Continued...) for type D reactions  
Lecture 9 - Shrinking core model (Continued...) for type D reactions (Continued...)  
Lecture 10 - Reactors, Homogeneous reaction model, Design of non-catalytic gas solid reactors  
Lecture 11 - Design of non-catalytic gas solid reactors (Continued...)  
Lecture 12 - Design of non-catalytic gas solid reactors (Continued...)  
Lecture 13 - Design equation for MF of solids, uniform gas composition, const. single particle size, Shrinking core model  
Lecture 14 - Design equation for MF of solids, mixture of particles for different sizes but unchanging size, Shrinking core model  
Lecture 15 - Design equation for MF of solids with elutriation, mixture of particles of different size, uniform gas composition  
Lecture 16 - General Performance equation for non-catalytic gas solid reactions  
Lecture 17 - Catalytic reactions (LHHW Kinetic model)  
Lecture 18 - LHHW Kinetic model (Continued...) - Part I  
Lecture 19 - LHHW Kinetic model (Continued...) - Part II  
Lecture 20 - Industrially important catalytic reaction models  
Lecture 21 - Inter and Intraphase effectiveness factor  
Lecture 22 - Interface effectiveness factor & Generalized nonisothermal effectiveness factor for external mass transfer  
Lecture 23 - Generalized nonisothermal effectiveness factor for external mass transfer step (Continued...)  
Lecture 24 - Mass transfer correlations for various reactors  
Lecture 25 - Isothermal intraphase effectiveness factor - Part I  
Lecture 26 - Isothermal intraphase effectiveness factor - Part II  
Lecture 27 - Non-isothermal intraphase effectiveness factor  
Lecture 28 - Inter and Intraphase effectiveness factor (Continued...)  
Lecture 29 - Inter and Intraphase Mass transfer

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- Lecture 30 - Packed (fixed) bed catalytic reactor design
- Lecture 31 - Graphical design of Fixed bed reactors
- Lecture 32 - Packed Bed Design (Continued...)
- Lecture 33 - Design equations for Packed bed reactor design
- Lecture 34 - Conservative Equations for Packed bed Reactor design
- Lecture 35 - Problem solving session
- Lecture 36 - Fluidized Bed Reactor Design - Part I
- Lecture 37 - Fluidized Bed Reactor Design - Part II
- Lecture 38 - Fluidized Bed Reactor Design - Part III
- Lecture 39 - Fluidized Bed Reactor Design - Part IV
- Lecture 40 - Continued... (Fluidized bed reactor Models)
- Lecture 41 - Continued... (Davidson Harrison model and Kunii Levenspiel model)
- Lecture 42 - Continued... (Kunii Levenspiel Model)
- Lecture 43 - Slurry Reactor Design



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:MATLAB Programming for Numerical Computation

Subject Co-ordinator - Dr. Niket S.Kaisare

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction  
Lecture 2 - Basics of Programming using MATLAB  
Lecture 3 - Array Operations in MATLAB  
Lecture 4 - Loops and Execution Control  
Lecture 5 - Tutorial  
Lecture 6 - MATLAB Files -- Scripts and Functions  
Lecture 7 - Plotting and Output  
Lecture 8 - How to submit MATLAB Assignment  
Lecture 9 - Errors in Numerical Computation  
Lecture 10 - Truncation Errors and Taylors Series  
Lecture 11 - Round-Off Errors; and Iterative Methods  
Lecture 12 - Step-wise Methods and Error Propagation  
Lecture 13 - How to get MATLAB Online access (for all enrolled students of this course)  
Lecture 14 - Differentiation in Single Variable  
Lecture 15 - Higher Order Differentiation Formulae  
Lecture 16 - Partial Differentials (Bonus)  
Lecture 17 - Numerical Integration  
Lecture 18 - Multiple Applications of Integration Formulae  
Lecture 19 - In-Build MATLAB Integration Functions  
Lecture 20 - Basics of Linear Algebra  
Lecture 21 - Gauss Elimination and Back-Substitution  
Lecture 22 - LU Decomposition and Partial Pivoting  
Lecture 23 - Gauss Siedel Method  
Lecture 24 - (Tutorial)  
Lecture 25 - Tri-Diagonal Matrix Algorithm  
Lecture 26 - Nonlinear Equations in Single Variable  
Lecture 27 - Using MATLAB command fzero  
Lecture 28 - Fixed Point Iteration in Single Variable  
Lecture 29 - Newton-Raphson (single variable)

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- Lecture 30 - Using MATLAB command fsolve (multi-variable)
- Lecture 31 - Newton-Raphson (multi Variable)
- Lecture 32 - Introduction
- Lecture 33 - Linear Least Squares Regression
- Lecture 34 - Nonlinear and Functional Regression
- Lecture 35 - Interpolation Functions in MATLAB
- Lecture 36 - Introduction and Euler's Method
- Lecture 37 - Runge-Kutta (RK-2) method
- Lecture 38 - MATLAB ode45 algorithm
- Lecture 39 - Higher order Runge-Kutta Methods
- Lecture 40 - Error Analysis
- Lecture 41 - Multi-Variable ODE
- Lecture 42 - Stiff Systems & Solution using ode15s
- Lecture 43 - Method of Lines for transient PDEs
- Lecture 44 - A Final Example
- Lecture 45 - Tutorial

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Computational Fluid Dynamics

Subject Co-ordinator - Prof. Sreenivas Jayanti

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation  
Lecture 2 - Flow in a rectangular duct  
Lecture 3 - Flow in a rectangular duct  
Lecture 4 - Tutorial 1  
Lecture 5 - Tutorial 1 (Continued...) Solution for algebraic equations using Gauss- Seidel Method  
Lecture 6 - Flow in a triangular duct  
Lecture 7 - Flow in a triangular duct  
Lecture 8 - Tutorial 2  
Lecture 9 - Tutorial 2 (Continued...) Description of FV method and solution using G-S Method  
Lecture 10 - Effect of grid spacing & upcoming course outline  
Lecture 11 - Mass conservation equations  
Lecture 12 - Momentum conservation equations  
Lecture 13 - Forces acting on control volume  
Lecture 14 - Kinematics of deformation in fluid flow  
Lecture 15 - Equations governing fluid flow in incompressible fluid  
Lecture 16 - Navier-Stokes equation for simple cases of flow  
Lecture 17 - Energy conservation equations  
Lecture 18 - Practical cases of fluid flow with heat transfer in CFD point of view  
Lecture 19 - Practical cases of fluid flow with mass transfer in CFD point of view  
Lecture 20 - Equations governing fluid flow with chemical reactions  
Lecture 21 - Concept of wellposedness of mathematical problems  
Lecture 22 - Introduction to finite difference methods  
Lecture 23 - Finite difference approximation on an uniform mesh  
Lecture 24 - Higher order and mixed derivatives  
Lecture 25 - Solution of Poisson equation in rectangular duct-Tutorial  
Lecture 26 - Discretization of time domain  
Lecture 27 - FD approx. on a non-uniform mesh and need of analysis of obtained discretization  
Lecture 28 - Need for the analysis of discretized equation  
Lecture 29 - Properties of Numerical Schemes

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- Lecture 30 - Properties of Numerical Schemes
- 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
- Lecture 39 - Artificial compressibility 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
- Lecture 46 - Tri-diagonal Matrix Algorithm
- 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
- Lecture 58 - The Advancing Front Method continuation
- Lecture 59 - Time and length scale of turbulence
- Lecture 60 - The turbulent closure problem
- Lecture 61 - The generic formulation for turbulence
- Lecture 62 - More generic formulation and summary

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Introduction to Statistical Hypothesis Testing

Subject Co-ordinator - Dr. Arun K.Tangirala

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation  
Lecture 2 - Probability and statistics  
Lecture 3 - Probability and Statistics  
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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Applied Time-Series Analysis

Subject Co-ordinator - Dr. Arun K.Tangirala

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Lecture 1 - Part 1 - Motivation and Overview 1  
Lecture 2 - Lecture 1 - Part 2 - Motivation and Overview 2  
Lecture 3 - Lecture 2 - Part 1 - Motivation and Overview 3  
Lecture 4 - Lecture 2 - Part 2 - Motivation and Overview 4  
Lecture 5 - Lecture 3 - Part 1 - Motivation and Overview 5  
Lecture 6 - Lecture 3 - Part 2 - Motivation and Overview 6  
Lecture 7 - Lecture 4 - Part 1 - Probability and Statistics Review 1A  
Lecture 8 - Lecture 4 - Part 2 - Probability and Statistics Review 1B  
Lecture 9 - Lecture 5 - Part 1 - Probability and Statistics Review 1C  
Lecture 10 - Lecture 5 - Part 2 - Probability and Statistics Review 1D  
Lecture 11 - Lecture 6 - Part 1 - Probability and Statistics Review 2A  
Lecture 12 - Lecture 6 - Part 2 - Probability and Statistics Review 2B  
Lecture 13 - Lecture 6 - Part 3 - Probability and Statistics Review 2C  
Lecture 14 - Lecture 7 - Part 1 - Probability and Statistics Review 2D  
Lecture 15 - Lecture 7 - Part 2 - Probability and Statistics Review 2E  
Lecture 16 - Lecture 7 - Part 3 - Probability and Statistics Review 2F  
Lecture 17 - Lecture 8 - Part 1 - Probability and Statistics Review 2G (with R Demonstration)  
Lecture 18 - Lecture 8 - Part 2 - Probability and Statistics Review 2H (with R Demonstration)  
Lecture 19 - Lecture 9 - Part 1 - Probability and Statistics Review 2I  
Lecture 20 - Lecture 9 - Part 2 - Probability and Statistics Review 2J  
Lecture 21 - Lecture 9 - Part 3 - Introduction to Random Processes 1  
Lecture 22 - Lecture 10 - Part 1 - Introduction to Random Processes 2  
Lecture 23 - Lecture 10 - Part 2 - Introduction to Random Processes 3  
Lecture 24 - Lecture 11 - Part 1 - Introduction to Random Processes 4  
Lecture 25 - Lecture 11 - Part 2 - Introduction to Random Processes 5  
Lecture 26 - Lecture 11 - Part 3 - Autocovariance & Autocorrelation Functions 1  
Lecture 27 - Lecture 12 - Part 1 - Autocovariance & Autocorrelation Functions 2  
Lecture 28 - Lecture 12 - Part 2 - Autocovariance & Autocorrelation Functions 3  
Lecture 29 - Lecture 13 - Part 1 - Autocovariance & Autocorrelation Functions 4

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Lecture 30	-	Lecture 13	-	Part 2	-	Autocovariance & Autocorrelation Functions	5
Lecture 31	-	Lecture 13	-	Part 3	-	Autocovariance & Autocorrelation Functions	6
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 Demonstrations)	
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 65	-	Lecture 29	-	Part 1	-	Fourier Transforms for Deterministic Signals	7
Lecture 66	-	Lecture 29	-	Part 2	-	Fourier Transforms for Deterministic Signals	8
Lecture 67	-	Lecture 30	-	Part 1	-	Fourier Transforms for Deterministic Signals	9
Lecture 68	-	Lecture 30	-	Part 2	-	DFT and Periodogram	1

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Lecture 69 - Lecture 31 - Part 1 - DFT and Periodogram 2  
Lecture 70 - Lecture 31 - Part 2 - DFT and Periodogram 3 (with R Demonstrations)  
Lecture 71 - Lecture 32 - Part 1 - Spectral Representations of Random Processes 1  
Lecture 72 - Lecture 32 - Part 2 - Spectral Representations of Random Processes 2  
Lecture 73 - Lecture 33 - Part 1 - Spectral Representations of Random Processes 3  
Lecture 74 - Lecture 33 - Part 2 - Spectral Representations of Random Processes 4  
Lecture 75 - Lecture 33 - Part 3 - Spectral Representations of Random Processes 5  
Lecture 76 - Lecture 34 - Part 1 - Spectral Representations of Random Processes 6  
Lecture 77 - Lecture 34 - Part 2 - Spectral Representations of Random Processes 7  
Lecture 78 - Lecture 35 - Part 1 - Introduction to Estimation Theory 1  
Lecture 79 - Lecture 35 - Part 2 - Introduction to Estimation Theory 2  
Lecture 80 - Lecture 35 - Part 3 - Introduction to Estimation Theory 3  
Lecture 81 - Lecture 36A - Introduction to Estimation Theory -4  
Lecture 82 - Lecture 36B - Goodness of Estimators 1 - 1  
Lecture 83 - Lecture 37A - Goodness of Estimators 1 - 2  
Lecture 84 - Lecture 37B - Goodness of Estimators 1 - 3  
Lecture 85 - Lecture 37C - Goodness of Estimators 1 - 4  
Lecture 86 - Lecture 38A - Goodness of Estimators 2 - 1  
Lecture 87 - Lecture 38B - Goodness of Estimators 2 - 2  
Lecture 88 - Lecture 38C - Goodness of Estimators 2 - 3  
Lecture 89 - Lecture 39A - Goodness of Estimators 2 - 4  
Lecture 90 - Lecture 39B - Goodness of Estimators 2 - 5 (with R demonstrations)  
Lecture 91 - Lecture 39C - Goodness of Estimators 2 - 6  
Lecture 92 - Lecture 40A - Goodness of Estimators 2 - 7  
Lecture 93 - Lecture 40B - Goodness of Estimators 2 - 8  
Lecture 94 - Lecture 41A - Estimation Methods 1 - 1  
Lecture 95 - Lecture 41B - Estimation Methods 1 - 2  
Lecture 96 - Lecture 42A - Estimation Methods 1 - 3  
Lecture 97 - Lecture 42B - Estimation Methods 1 - 4  
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

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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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Rheology of Complex Materials

Subject Co-ordinator - Dr. Abhijit P. Deshpande

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Flow phenomena in complex materials and Microstructure - 1  
Lecture 2 - Flow phenomena in complex materials and Microstructure - 2  
Lecture 3 - Applications of rheology  
Lecture 4 - Applications of rheology  
Lecture 5 - Applications of rheology  
Lecture 6 - Applications of rheology  
Lecture 7 - Stress and strain rate - 1  
Lecture 8 - Stress and strain rate - 2  
Lecture 9 - Velocity gradient and strain rate - 1  
Lecture 10 - Velocity gradient and strain rate 1 Stress and strain rate - 3  
Lecture 11 - Kinematics for simple flows - 1  
Lecture 12 - Kinematics for simple flows - 2  
Lecture 13 - Introduction to tensors  
Lecture 14 - Rheometric flows  
Lecture 15 - Viscous response - 1  
Lecture 16 - Viscous response - 2  
Lecture 17 - Viscoelasticity - Relaxation process  
Lecture 18 - Viscoelasticity - Maxwell model  
Lecture 19 - Linear viscoelasticity - oscillatory shear - 1  
Lecture 20 - Linear viscoelasticity - oscillatory shear - 2  
Lecture 21 - Introduction to tensors - 2  
Lecture 22 - Introduction to tensors - 3  
Lecture 23 - Rheometers - 1  
Lecture 24 - Rheometers - 2  
Lecture 25 - Rheometers - 3  
Lecture 26 - Rheometers - 4  
Lecture 27 - Rheometers - 5  
Lecture 28 - Governing equations for rheology - 1  
Lecture 29 - Governing equations for rheology - 2

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Lecture 30 - Relaxation time spectrum - 1  
Lecture 31 - Relaxation time spectrum - 2  
Lecture 32 - Linear viscoelasticity  
Lecture 33 - Time temperature superposition  
Lecture 34 - Linear viscoelasticity  
Lecture 35 - General linear viscoelasticity  
Lecture 36 - Rotational rheometry  
Lecture 37 - Review of material functions - 1  
Lecture 38 - Review of material functions - 2  
Lecture 39 - Survey of material functions for polymers - 1  
Lecture 40 - Survey of material functions for polymers - 2  
Lecture 41 - Survey of material functions for polymers - 3  
Lecture 42 - Survey of material functions for polymers - 4  
Lecture 43 - Survey of material functions for multiphase systems - 1  
Lecture 44 - Strain and convected rate - 1  
Lecture 45 - Strain and convected rate - 2  
Lecture 46 - Strain and convected rate - 3  
Lecture 47 - Strain and convected rate - 4  
Lecture 48 - Normal stresses - 1  
Lecture 49 - Normal stresses - 2  
Lecture 50 - Structured materials - yield stress  
Lecture 51 - Yield stress and thixotropic materials  
Lecture 52 - Normal stresses and stress growth  
Lecture 53 - Rheometer demonstration  
Lecture 54 - Review of material functions - 3  
Lecture 55 - Survey of material functions for multiphase macromolecular systems  
Lecture 56 - Problems during rheometry - example of cone and plate - 1  
Lecture 57 - Problems during rheometry - example of cone and plate - 2  
Lecture 58 - Strain, convected derivatives, non-linear models - 1  
Lecture 59 - Strain, convected derivatives, non-linear models - 2  
Lecture 60 - Rheometer demonstration  
Lecture 61 - Microscopic modeling of rheology - 1  
Lecture 62 - Microscopic modeling of rheology - 2  
Lecture 63 - Live Session

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Process Control - Design, Analysis and Assessment

Subject Co-ordinator - Prof. Ragunathan Rengasamy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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  
Lecture 14 - MATLAB Tutorial 2  
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

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Lecture 30 - Nyquist Stability Criterion - Part 2  
Lecture 31 - Nyquist Stability Criterion - Part 3  
Lecture 32 - Controllers for Unstable Systems  
Lecture 33 - Traditional Advanced Control - Part 6  
Lecture 34 - Traditional Advanced Control - Part 7  
Lecture 35 - Multivariable Control - Part 1  
Lecture 36 - Multivariable Control - Part 2  
Lecture 37 - Model Predictive Control - Part 1  
Lecture 38 - Model Predictive Control - Part 2  
Lecture 39 - Model Predictive Control-Mathematical Formulation - Part 1  
Lecture 40 - Model Predictive Control-Mathematical Formulation - Part 2  
Lecture 41 - Model Predictive Control - Discrete Model  
Lecture 42 - Model Predictive Control - Putting all these together  
Lecture 43 - Stability Analysis-Various methods - Part 1  
Lecture 44 - Stability Analysis-Various methods - Part 2  
Lecture 45 - Stability Analysis-Various methods - Part 3  
Lecture 46 - PID Tuning  
Lecture 47 - MATLAB Tutorial-Controller Tuning - Part 1  
Lecture 48 - MATLAB Tutorial-Controller Tuning - Part 2  
Lecture 49 - MATLAB Tutorial - Controller Design - Part 1  
Lecture 50 - MATLAB Tutorial - Controller Design - Part 2  
Lecture 51 - MATLAB Tutorial - Controller Design - Part 3  
Lecture 52 - Conclusion Lecture

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - System Identification

Subject Co-ordinator - Dr. Arun K.Tangirala

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation and Overview 1  
Lecture 2 - Motivation and Overview 2  
Lecture 3 - Motivation and Overview 3  
Lecture 4 - Motivation and Overview 4  
Lecture 5 - Journey into Identification 1  
Lecture 6 - Journey into Identification 2  
Lecture 7 - Journey into Identification 3  
Lecture 8 - Journey into Identification (Case Studies) 4  
Lecture 9 - Journey into Identification (Case Studies) 5  
Lecture 10 - Journey into Identification (Case Studies) 6  
Lecture 11 - Journey into Identification (Case Studies) 7  
Lecture 12 - Journey into Identification (Case Studies) 8  
Lecture 13 - Journey into Identification (Case Studies) 9  
Lecture 14 - Journey into Identification (Case Studies) 10  
Lecture 15 - Journey into Identification (Case Studies) 11  
Lecture 16 - Journey into Identification (Case Studies) 12  
Lecture 17 - Journey into Identification (Case Studies) 13  
Lecture 18 - Journey into Identification (Case Studies) 14  
Lecture 19 - Journey into Identification (Case Studies) 15  
Lecture 20 - Journey into Identification (Case Studies) 16  
Lecture 21 - Journey into Identification 17  
Lecture 22 - Journey into Identification 18  
Lecture 23 - Response-based Description 1  
Lecture 24 - Response-based Description 2  
Lecture 25 - Response-based Description 3  
Lecture 26 - Response-based Description 4  
Lecture 27 - Response-based Description 5  
Lecture 28 - Response-based Description 6  
Lecture 29 - Response-based Description 7

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Lecture 30	- Response-based Description	8
Lecture 31	- Response-based Description	9
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

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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  
Lecture 98 - Fisher's information and properties of estimators 15  
Lecture 99 - Estimation of non-parametric model 1  
Lecture 100 - Estimation of non-parametric model 2  
Lecture 101 - Estimation of non-parametric model 3  
Lecture 102 - Estimation of non-parametric model 4  
Lecture 103 - Estimation of non-parametric model 5  
Lecture 104 - Estimation of non-parametric model 3  
Lecture 105 - Estimation of non-parametric model 4  
Lecture 106 - Estimation of non-parametric model 5  
Lecture 107 - Estimation of parametric model 1

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## NPTEL Video Lecture Topic List - Created by Linuxpert Systems, Chennai

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Lecture 108 - Estimation of parametric model 2  
Lecture 109 - Estimation of parametric model 3  
Lecture 110 - Estimation of parametric model 4  
Lecture 111 - State-Space/Subspace identification 1  
Lecture 112 - State-Space/Subspace identification 2  
Lecture 113 - State-Space/Subspace identification 3  
Lecture 114 - State-Space/Subspace identification 4  
Lecture 115 - State-Space/Subspace identification 5  
Lecture 116 - State-Space/Subspace identification 6  
Lecture 117 - State-Space/Subspace identification 7  
Lecture 118 - State-Space/Subspace identification 8  
Lecture 119 - Input for Identification  
Lecture 120 - Input for Identification  
Lecture 121 - Input for Identification

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Fluid and Particle Mechanics

Subject Co-ordinator - Prof. Basavaraju

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Fluid Statics  
Lecture 3 - Newton Law of Viscosity  
Lecture 4 - Equation of Continuity Differential  
Lecture 5 - Equation of Linear Momentum - 1  
Lecture 6 - Equation of Linear Momentum - 2  
Lecture 7 - Bernoulli's Equation  
Lecture 8 - Solution of Navier Stokes - 1  
Lecture 9 - Solution of Navier Stokes - 1  
Lecture 10 - Introduction to cylindrical coordinate systems  
Lecture 11 - Continuity equation in cylindrical coordinates  
Lecture 12 - Solution of Navier Stokes in the Cylindrical co-ordinate system - 1  
Lecture 13 - Solution of Navier Stokes in the Cylindrical co-ordinate system - 2  
Lecture 14 - Circular poiseuille flow  
Lecture 15 - Shear Stress Distribution  
Lecture 16 - Flow between two concentric cylinder  
Lecture 17 - Taylor couette flow  
Lecture 18 - Viscosity and Momentum Transfer  
Lecture 19 - Device For Measuring Fluid Viscosity  
Lecture 20 - Fluid Properties And its Behaviour  
Lecture 21 - Tutorial 4  
Lecture 22 - Choice of Scaling Parameter  
Lecture 23 - Non Dimensional analysis  
Lecture 24 - Non-dimensional analysis - 2  
Lecture 25 - Non-dimensional analysis - 3 (Buckingham Pi Theorem)  
Lecture 26 - Non-dimensional analysis - 4 (Trinity test)  
Lecture 27 - Non-dimensional analysis - 5 (Concept of similarity)  
Lecture 28 - Characterization Of Particles - 1  
Lecture 29 - Characterization Of Particles - 2

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

Lecture 30 - Motion of a Particle in a fluid  
Lecture 31 - Brownian motion and electrophoresis  
Lecture 32 - Sedimentation and Separation  
Lecture 33 - Settling velocity - Stoke's regime and Newton's regime  
Lecture 34 - Applications of settling - I  
Lecture 35 - Applications of settling - II  
Lecture 36 - Colloidal aggregates - Introduction  
Lecture 37 - Settling of colloidal aggregates  
Lecture 38 - Tutorial 5  
Lecture 39 - Settling of colloidal aggregates - free settling  
Lecture 40 - Settling in Multiple Particles System  
Lecture 41 - Flow Through Packed Bed  
Lecture 42 - Pressure Drop Through Packed Bed  
Lecture 43 - Tutorial 6  
Lecture 44 - Pressure Drop Through Packed bed Continue  
Lecture 45 - Fluidized Bed - 1  
Lecture 46 - Fluidized Bed - 2  
Lecture 47 - Filtration - 1  
Lecture 48 - Filtration - 2  
Lecture 49 - Tutorial 7  
Lecture 50 - Laminar and Turbulent Flows - 1  
Lecture 51 - Laminar and Turbulent Flows - 2  
Lecture 52 - Laminar and Turbulent Flows - 3  
Lecture 53 - Turbulent Stress and Turbulent Shear Layer  
Lecture 54 - Turbulent Flow near a wall and in a pipe  
Lecture 55 - Effect of rough Walls  
Lecture 56 - Roughness in Turbulent Pipe Flow  
Lecture 57 - Pipes of non-circular cross section  
Lecture 58 - Minor Losses, Sudden Expansion and Contraction  
Lecture 59 - Friction Losses in Sudden Expansion  
Lecture 60 - Tutorial 8  
Lecture 61 - Momentum and Kinetic Energy Correction Factor  
Lecture 62 - pressure drop in pipes which connected in series  
Lecture 63 - Pressure Drop in Pipes Which Connected in Parallel  
Lecture 64 - Pressure Drop in Pipes Which Connected at Junction  
Lecture 65 - Boundary Layer  
Lecture 66 - Boundary Layer - Momentum Integral Analysis - 1  
Lecture 67 - Boundary Layer - Momentum Integral Analysis - 2  
Lecture 68 - Boundary Layer - Differential Approach

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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Lecture 69 - Laminar and Turbulent Boundary Layer

Lecture 70 - Tutorial 9

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Continuum Mechanics and Transport Phenomena

Subject Co-ordinator - Prof. T. Renganathan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Measurement and Prediction - Part 1  
Lecture 2 - Measurement and Prediction - Part 2  
Lecture 3 - Overview of Transport Phenomena  
Lecture 4 - Scope of Course  
Lecture 5 - Continuum Hypothesis  
Lecture 6 - Lagrangian and Eulerian Descriptions - Part 1  
Lecture 7 - Lagrangian and Eulerian Descriptions - Part 2  
Lecture 8 - Substantial Derivative - Part 1  
Lecture 9 - Substantial Derivative - Part 2  
Lecture 10 - Substantial Derivative Example - 1  
Lecture 11 - Substantial Derivative Example - 2  
Lecture 12 - Visualization of Flow Patterns: Streamline, Pathline  
Lecture 13 - Visualization of Flow Patterns: Streakline  
Lecture 14 - Streamline, Pathline: Steady Flow Example  
Lecture 15 - Streamline, Pathline, Streakline: Unsteady Flow Example  
Lecture 16 - System and Control Volume  
Lecture 17 - Reynolds transport theorem : Introduction  
Lecture 18 - Reynolds transport theorem : Simplified form  
Lecture 19 - Reynolds transport theorem : General form - Part 1  
Lecture 20 - Reynolds transport theorem : General form - Part 2  
Lecture 21 - Integral and differential balances  
Lecture 22 - Integral total mass balance  
Lecture 23 - Integral total mass balance : Simplification  
Lecture 24 - Integral total mass balance : Examples  
Lecture 25 - Differential total mass balance - Part 1  
Lecture 26 - Differential total mass balance - Part 2  
Lecture 27 - Differential total mass balance : Examples - Part 1  
Lecture 28 - Differential total mass balance : Examples - Part 2  
Lecture 29 - Integral linear momentum balance - Part 1

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Integral linear momentum balance - Part 2
- Lecture 31 - Integral linear momentum balance : Examples - Part 1
- Lecture 32 - Integral linear momentum balance : Examples - Part 2
- Lecture 33 - Integral linear momentum balance : Examples - Part 3
- Lecture 34 - Differential linear momentum balance : Introduction
- Lecture 35 - Differential linear momentum balance : Transient, convection and body force terms
- Lecture 36 - Stress vector - Part 1
- Lecture 37 - Stress vector - Part 2
- Lecture 38 - Stress tensor - Part 1
- Lecture 39 - Stress tensor - Part 2
- Lecture 40 - Cauchy's formula
- Lecture 41 - Components of Stress Vector : Example
- Lecture 42 - Properties of stress tensor - Part 1
- Lecture 43 - Properties of stress tensor - Part 2
- Lecture 44 - Total stress tensor for fluids
- Lecture 45 - Comparison of solids and fluids
- Lecture 46 - Fluids at rest
- Lecture 47 - Differential linear momentum balance : Surface force terms
- Lecture 48 - Differential linear momentum balance : All terms
- Lecture 49 - Convective momentum flux tensor
- Lecture 50 - Differential linear momentum balance : Closure problem
- Lecture 51 - Normal Strain and Shear Strain - Part 1
- Lecture 52 - Normal Strain and Shear Strain - Part 2
- Lecture 53 - Displacement Field and Displacement Gradient - Part 1
- Lecture 54 - Displacement Field and Displacement Gradient - Part 2
- Lecture 55 - Strain Displacement Gradient Relation : Example
- Lecture 56 - Strain Displacement Gradient Relation : Normal and shear strain
- Lecture 57 - Strain Displacement Gradient Relation : Rotation and volumetric strain
- Lecture 58 - Strain Displacement Gradient Relation : Examples
- Lecture 59 - Displacement Gradient Tensor
- Lecture 60 - Components of Total Displacement - Part 1
- Lecture 61 - Components of Total Displacement - Part 2
- Lecture 62 - Strain Tensor and Rotation Tensor - Part 1
- Lecture 63 - Components of Total Displacement : Example
- Lecture 64 - Normal and Shear Strain Rate
- Lecture 65 - Strain Rate Velocity Gradient Relation
- Lecture 66 - Volumetric Strain Rate
- Lecture 67 - Velocity Gradient Tensor
- Lecture 68 - Strain Rate : Example 1

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

- Lecture 69 - Strain Rate : Example 2
- Lecture 70 - Stress Strain Relation : Introduction
- Lecture 71 - Material Properties
- Lecture 72 - Hooke's Law - Strain-stress Relation
- Lecture 73 - Relation Between Material Properties
- Lecture 74 - Hooke's Law - Stress-strain Relation
- Lecture 75 - Hooke's Law : Examples
- Lecture 76 - Stress Strain Rate Relation : Introduction
- Lecture 77 - Newton's Law of Viscosity : 1D Form
- Lecture 78 - Newton'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
- Lecture 98 - Viscous Stress vs. Molecular Momentum Flux - Part 2
- Lecture 99 - Linear Momentum Balance : Fluid Mechanics vs. Momentum Transport - Part 1
- Lecture 100 - Linear Momentum Balance : Fluid Mechanics vs. Momentum Transport - Part 2
- Lecture 101 - Viscous Stress vs. Molecular Momentum Flux - Part 3
- Lecture 102 - Integral Energy Balance - Part 1
- Lecture 103 - Integral Energy Balance - Part 2
- Lecture 104 - Simplification of Integral Energy Balance
- Lecture 105 - Integral Energy Balance : Examples
- Lecture 106 - Differential Energy Balance : Introduction
- Lecture 107 - Differential Total Energy Balance - Part 1

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- Lecture 108 - Differential Total Energy Balance - Part 2
- Lecture 109 - Differential Energy Balance - Part 1
- Lecture 110 - Differential Energy Balance - Part 2
- Lecture 111 - Differential Energy Balance - Part 3
- Lecture 112 - Fourier's Law of Heat Conduction
- Lecture 113 - Simplifications of Differential Energy Balance
- Lecture 114 - Heat Conduction in Slab
- Lecture 115 - Heat Conduction in Furnace Wall
- Lecture 116 - Non Isothermal Planar Couette Flow



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Environmental Quality Monitoring and Analysis

Subject Co-ordinator - Dr. R. Ravi Krishna

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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  
Lecture 14 - Environmental Analysis  
Lecture 15 - Environmental Analysis of Organics in Water  
Lecture 16 - Environmental Analysis  
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

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- 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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Synthetic and Natural Supramolecular Architectures: An Approach T

Subject Co-ordinator - Prof. Chebrolu Pulla Rao

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Impetus  
Lecture 2 - Introduction to Supramolecular Science and Technology  
Lecture 3 - Introduction to Supramolecular Science and Technology  
Lecture 4 - A quickwalk - through the Supramolecular Architectures  
Lecture 5 - A quickwalk - through the Supramolecular Architectures  
Lecture 6 - A quickwalk - through the Supramolecular Architectures  
Lecture 7 - Weak intermolecular forces : What, Where, When and How?  
Lecture 8 - Weak intermolecular forces : What, Where, When and How?  
Lecture 9 - Weak intermolecular forces : What, Where, When and How?  
Lecture 10 - Weak intermolecular forces : What, Where, When and How?  
Lecture 11 - Weak intermolecular forces : What, Where, When and How?  
Lecture 12 - Weak intermolecular forces : What, Where, When and How?  
Lecture 13 - Chemistry concepts of Immediate relevance - Part 1  
Lecture 14 - Chemistry concepts of Immediate relevance - Part 2  
Lecture 15 - Chemistry concepts of Immediate relevance - Part 3  
Lecture 16 - Chemistry concepts of Immediate relevance - Part 4  
Lecture 17 - Chemistry concepts of Immediate relevance - Part 5  
Lecture 18 - Chemistry concepts of Immediate relevance - Part 6  
Lecture 19 - Chemistry concepts of Immediate relevance - Part 7  
Lecture 20 - Molecular recognition - Part 1  
Lecture 21 - Molecular recognition - Part 2  
Lecture 22 - Molecular recognition - Part 3  
Lecture 23 - Molecular recognition - Part 4  
Lecture 24 - Molecular recognition - Part 5  
Lecture 25 - Molecular recognition - Part 6  
Lecture 26 - Molecular recognition - Part 7  
Lecture 27 - Molecular recognition - Part 8  
Lecture 28 - Molecular recognition - Part 9  
Lecture 29 - Molecular recognition - Part 10

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- Lecture 30 - Property driven functions of Supramolecular assembly
- Lecture 31
- Lecture 32
- Lecture 33 - Metal coordinated architectures
- Lecture 34 - Engineering Supramolecular devices : Sensors,Switches,Devices and Molecules - Part 1
- Lecture 35 - Engineering Supramolecular devices : Sensors,Switches,Devices and Molecules - Part 2
- Lecture 36 - Engineering Supramolecular devices : Sensors,Switches,Devices and Molecules - Part 3
- Lecture 37 - Engineering Supramolecular devices : Sensors,Switches,Devices and Molecules - Part 4
- Lecture 38 - Engineering Supramolecular devices : Sensors,Switches,Devices and Molecules - Part 5
- Lecture 39 - Engineering Supramolecular devices : Sensors,Switches,Devices and Molecules - Part 6
- Lecture 40 - From molecules to machines : A glimpse at the travel

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Artificial Lift

Subject Co-ordinator - Prof. Abdus Samad

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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Lecture 30 - SRP-Pump performance analysis - Part 3  
Lecture 31 - Introduction to progressive cavity pump  
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 installation - Part 1  
Lecture 51 - Gas lift valves and installation - 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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Interfacial Engineering

Subject Co-ordinator - Prof. Manigandan

Co-ordinating Institute - IIT - Ropar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Introduction to interfaces
- Lecture 2 - Importance of surface; Application of interfaces
- Lecture 3 - Basics of classical and emerging tools
- Lecture 4 - Concepts of capillarity and surface tension (ST) and measurement of ST and contact angle
- Lecture 5 - Overview of various surface tension measurement techniques
- Lecture 6 - Young-Dupre equation; Tutorial
- Lecture 7 - Young-Laplace equation; Tutorial
- Lecture 8 - Kelvin equation; Tutorial
- Lecture 9 - Contact angle for ideal and non-ideal cases; Application of Young-Dupre
- Lecture 10 - Measurement of contact angle of surfaces at fluid-fluid interfaces
- Lecture 11 - Washburn approach; Tutorial
- Lecture 12 - Work of cohesion, adhesion, and spreading coefficient
- Lecture 13 - Girifalco-Good Fowkes equation; Tutorial
- Lecture 14 - Demonstration of force tensiometer
- Lecture 15 - Demonstration of optical tensiometer
- Lecture 16 - Shapes of micelles, critical micelle concentration (CMC); critical packing parameter (CPP)
- Lecture 17 - Thermodynamic principles of self-assembly
- Lecture 18 - Micellar-enhanced ultrafiltration (MEUF): A surfactant-based separation technique
- Lecture 19 - HLB guidelines; Debye plot
- Lecture 20 - Surface excess concepts and problem solving
- Lecture 21 - Gibbs adsorption isotherm equation
- Lecture 22 - Deposition of Langmuir Blodgett (LB) films; Adsorption from solution
- Lecture 23 - Demonstration of double barrier LB deposition technique
- Lecture 24 - Emulsion and microemulsion; Application of microemulsion
- Lecture 25 - Demonstration of emulsification using several emulsifying devices
- Lecture 26 - Demonstration of particle size analyzer
- Lecture 27 - Demonstration of particle/droplet tracking using an inverted microscope
- Lecture 28 - Introduction to colloids
- Lecture 29 - Understanding Intermolecular forces

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- Lecture 30 - van der Waals force
- Lecture 31 - Lifshitz approach
- Lecture 32 - Electrical double layer (EDL) interaction (Helmholtz)
- Lecture 33 - Gouy-Chapman EDL Model
- Lecture 34 - Gouy-Chapman-Stern EDL model
- Lecture 35 - Overlapping double layer interaction
- Lecture 36 - Derjaguin approximation; DLVO forces of interactions
- Lecture 37 - Force-measuring techniques: Direct and indirect measurements
- Lecture 38 - Steric (Polymer-mediated) forces
- Lecture 39 - Electrokinetic phenomena
- Lecture 40 - Demonstration of zeta potential measurements



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Building Towards a Career in Chemical Industry

Subject Co-ordinator - Prof. Nagarajan R, Prof. MS Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - Introduction and Need for this course
- Lecture 2 - Learning Objectives and schedule
- Lecture 3 - Sectors of Chemical Industry
- Lecture 4 - Understanding cost by Engineers
- Lecture 5 - Investment Cost
- Lecture 6 - Understanding Financial Performance of Companies
- Lecture 7 - Global perspective of Chemical Industry
- Lecture 8 - Nature and Development of Indian Chemical Industry
- Lecture 9 - Research, Tech development and Licensing
- Lecture 10 - Guest lecturer on skill development
- Lecture 11 - Technology Development Process
- Lecture 12 - Technology Readiness Level
- Lecture 13 - Evolution of Technology - Caustic soda example
- Lecture 14 - Evolution of Technology - Caustic soda example
- Lecture 15 - Case study of heat recovery
- Lecture 16 - Case study of Tech development- auto thermal gasification
- Lecture 17 - Guidelines on choosing and completing a project report on Technology Development
- Lecture 18 - Guidelines on choosing and completing a project report
- Lecture 19 - Example of a case study of an affordable potable water drinking technology described in detail
- Lecture 20 - Example of potable water technology through desalination of sea water
- Lecture 21 - Case study of manufacturing of Polysilicon in India as a example of Technology Development
- Lecture 22 - Case study of manufacturing of Polysilicon in India as a example of Technology Development (Cont
- Lecture 23 - Industrial R&D ecosystem in India
- Lecture 24 - Technology Transfer - prospects and challenges
- Lecture 25 - Guidelines on choosing and completing a project report
- Lecture 26 - Jobs and career options in Industry
- Lecture 27 - Continuation of Jobs and career options in Industry
- Lecture 28 - Application of Taguchi Quality Function analysis to industrial processes
- Lecture 29 - Course review and Introduction to Taguchi Quality Function Development

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Lecture 30 - Preparing for Job interviews

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Chemical Technology - I

Subject Co-ordinator - Dr. I.D. Mall

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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 developments  
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  
Lecture 16 - Evaluation of Crude oil, Petroleum Products and Petrochemicals  
Lecture 17 - Crude oil Distillation  
Lecture 18 - Thermal Cracking  
Lecture 19 - Catalytic 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  
Lecture 27 - Ethylene derivatives  
Lecture 28 - Propylene, Propylene oxide and Isopropanol  
Lecture 29 - Aromatics Production

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- Lecture 30 - Aromatics product profile, Ethyl benzene & Styrene, Cumene and phenol, Bisphenol, Aniline
- Lecture 31 - Introduction to polymer, Elastomer and Synthetic Fibre, Polymerisation
- Lecture 32 - Polymers
- Lecture 33 - Polyvinylchloride, polycarbonate, thermoset resin
- Lecture 34 - Elastomers
- Lecture 35 - Polyamides or Nylons(PA)
- Lecture 36 - DMT and Terephthalic Acid, Polyester, PET resin, PTB resin
- Lecture 37 - Acrylic Fibre, Modified Acrylic Fibre, Acrylonitrile, Acrolein, Propylene Finber, Polyurethane
- Lecture 38 - Viscose Rayon and Acetate rayon
- Lecture 39 - Pesticide
- Lecture 40 - Dye and Intermediates

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Process Integration

Subject Co-ordinator - Dr. B. Mohanty

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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  $\hat{I} \quad t \min$   
Lecture 20 - Global & stream specific  $\hat{I} \quad t \min$  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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- 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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Mechanical Operations

Subject Co-ordinator - Prof. Shabina Khanam

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Characterization of a single particle - 1  
Lecture 3 - Characterization of a single particle - 2  
Lecture 4 - Characterization of collection of particles - 1  
Lecture 5 - Characterization of collection of particles - 2  
Lecture 6 - Fine grain size distribution  
Lecture 7 - Effectiveness of screen - 1  
Lecture 8 - Effectiveness of screen - 2  
Lecture 9 - Industrial screening equipment  
Lecture 10 - Size reduction  
Lecture 11 - Laws of comminution  
Lecture 12 - Examples of Laws of comminution - 1  
Lecture 13 - Examples of Laws of comminution - 2  
Lecture 14 - Size reduction equipment - 1  
Lecture 15 - Size reduction equipment - 2  
Lecture 16 - Particle dynamics - 1  
Lecture 17 - Particle dynamics - 2  
Lecture 18 - Particle dynamics-Examples  
Lecture 19 - Classification and Jigging - 1  
Lecture 20 - Classification and Jigging - 2

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Waste to Energy Conversion

Subject Co-ordinator - Prof. P. Mondal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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 Characterization 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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Energy production from organic wastes through fermentation - 1
- Lecture 31 - Energy production from organic wastes through fermentation - 2
- Lecture 32 - Tutorial on anaerobic digestion
- Lecture 33 - Tutorial on fermentation
- Lecture 34 - Energy production from wastes through transesterification - 1
- Lecture 35 - Energy production from wastes through transesterification - 2
- Lecture 36 - Tutorial on transesterification
- Lecture 37 - Cultivation of algal biomass and treatment of waste water - 1
- Lecture 38 - Cultivation of algal biomass and treatment of waste water - 2
- Lecture 39 - Energy production form algal biomass - 1
- Lecture 40 - Energy production form algal biomass - 2

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Unit Operations of Particulate Matter

Subject Co-ordinator - Prof. Shabina Khanam

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Sedimentation and Batch Sedimentation Test - 1  
Lecture 3 - Sedimentation and Batch Sedimentation Test - 2  
Lecture 4 - Centrifugal Sedimentation and Equipment - 1  
Lecture 5 - Centrifugal Sedimentation and Equipment - 2  
Lecture 6 - Filtration - 1  
Lecture 7 - Filtration - 2  
Lecture 8 - Filtration - 3  
Lecture 9 - Continuous Filtration - 1  
Lecture 10 - Continuous Filtration - 2  
Lecture 11 - Fluidisation - 1  
Lecture 12 - Fluidisation - 2  
Lecture 13 - Liquid Fluidisation  
Lecture 14 - Gas Fluidisation - 1  
Lecture 15 - Gas Fluidisation - 2  
Lecture 16 - Flotation - 1  
Lecture 17 - Flotation - 2  
Lecture 18 - Transportaion of solids - 1  
Lecture 19 - Transportaion of solids - 2  
Lecture 20 - Transportaion of solids - 3

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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

Subject Co-ordinator - Prof. Prateek Kumar Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course, Macromolecules and Life, Molecular flexibility  
Lecture 2 - Classification of polymers, Types of polymerization, Average molecular weights and polydispersity  
Lecture 3 - Motivation to study polymer physics  
Lecture 4 - Random Walk Models of Single Chain I  
Lecture 5 - Random Walk Models of Single Chain II  
Lecture 6 - Random Walk Models of Single Chain III  
Lecture 7 - Models of semiflexible chains (Kratky Porod Model) - Part I  
Lecture 8 - Models of semiflexible chains (Kratky Porod Model) - Part II  
Lecture 9 - Probability density of an ideal chain - Part I  
Lecture 10 - Probability density of an ideal chain - Part II  
Lecture 11 - Entropic Elasticity, Bead-Spring Model, Simulations of random walk models  
Lecture 12 - Derivation of Diffusion equation, Einstein notation  
Lecture 13 - Definition of Radius of gyration  
Lecture 14 - Radius of gyration for an ideal chain, concept of ideality  
Lecture 15 - Nonbonded interactions, hydrophobic and hydrophilic behaviour  
Lecture 16 - Definition of excluded volume; good, bad, and theta solvent  
Lecture 17 - Virial expansion, Flory theory for good solvent  
Lecture 18 - Flory theory for bad solvent, self-similarity and fractal nature of polymers  
Lecture 19 - Derivation of fractal dimension, concentration regimes and overlap concentration  
Lecture 20 - Size, shape, and structure. Gyration tensor and measures of asphericity.  
Lecture 21 - Order-disorder transition  
Lecture 22 - Scattering experiments, Pair correlation function  
Lecture 23 - Structure of polymer chain, Introduction to Monte Carlo simulations of polymer chains  
Lecture 24 - Monte Carlo algorithm  
Lecture 25 - Practical aspects of Monte Carlo simulation  
Lecture 26 - Molecular Dynamics Simulations, Review of Thermodynamics  
Lecture 27 - Solution Thermodynamics - I  
Lecture 28 - Solution Thermodynamics - II  
Lecture 29 - Solution Thermodynamics - III

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Solution Thermodynamics - IV
- Lecture 31 - Phase separation regime, Introduction to lattice model of solutions
- Lecture 32 - Lattice Model of Solutions - I
- Lecture 33 - Lattice Model of Solutions - II
- Lecture 34 - Phase behaviour of liquid solutions
- Lecture 35 - Lattice models of polymeric systems
- Lecture 36 - Brownian motion - I
- Lecture 37 - Brownian motion - II
- Lecture 38 - Brownian motion - III
- Lecture 39 - Brownian motion - IV
- Lecture 40 - Brownian motion - V
- Lecture 41 - Rouse Model - I
- Lecture 42 - Rouse Model - II
- Lecture 43 - Rouse Model - III
- Lecture 44 - Rouse Model - IV
- Lecture 45 - Problems in Rouse Model, Hydrodynamic Interactions
- Lecture 46 - Zimm Model - I
- Lecture 47 - Zimm Model - II
- Lecture 48 - Continuum Mechanics - I
- Lecture 49 - Continuum Mechanics - II
- Lecture 50 - Kuhn's Theory of Rubber Elasticity
- Lecture 51 - Elasticity of polymer network
- Lecture 52 - Microscopic definition of stress tensor - I
- Lecture 53 - Microscopic definition of stress tensor - II, Dumbbell model, introduction to Rouse model
- Lecture 54 - Models for entangled polymeric systems - I
- Lecture 55 - Models for entangled polymeric systems - II
- Lecture 56 - Rheology of complex fluids
- Lecture 57 - Rheometers and rheological tests - I
- Lecture 58 - Rheometers and rheological tests - II
- Lecture 59 - Maxwell model - I
- Lecture 60 - Maxwell model - II, Closing notes

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Equipment Design: Mechanical Aspects

Subject Co-ordinator - Prof. Shabina Khanam

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Chemical Process Safety

Subject Co-ordinator - Dr. Shishir Sinha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Safety and Accident Loss Statistics  
Lecture 2 - Risk Management and Hazardous Substance Rules  
Lecture 3 - Nature of Accident and major disasters  
Lecture 4 - Fundamental Principles  
Lecture 5 - Problems related to Safety and Accident Loss Statistics  
Lecture 6 - Toxicology  
Lecture 7 - Toxicology  
Lecture 8 - Dose Response Relationship  
Lecture 9 - Dose Response and Threshold Dose  
Lecture 10 - Industrial Hygiene  
Lecture 11 - Material Safety Data Sheet - I  
Lecture 12 - Material Safety Data Sheet - II  
Lecture 13 - Industrial Hygiene  
Lecture 14 - Noise, vibration and Radiation  
Lecture 15 - Industrial Hygiene  
Lecture 16 - Problems related to Industrial Hygiene  
Lecture 17 - Introduction to Source Models  
Lecture 18 - Source Models for Gas  
Lecture 19 - Source Models for Pool Boiling  
Lecture 20 - Source Model Problems  
Lecture 21 - Fire and Explosions  
Lecture 22 - Fire and Explosions  
Lecture 23 - Explosion and its Classification - I  
Lecture 24 - Explosion and its Classification - II  
Lecture 25 - Fire Extinguishers - I  
Lecture 26 - Fire Extinguishers - II  
Lecture 27 - Problems related to Fire and Explosion  
Lecture 28 - Designs to prevent Fire and Explosion  
Lecture 29 - Designs to prevent Fire and Explosion

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - General Design Methods to prevent Fire
- Lecture 31 - Sprinklers - I
- Lecture 32 - Sprinklers - II
- Lecture 33 - Introduction to Reliefs
- Lecture 34 - Type of Reliefs
- Lecture 35 - Relief Scenario
- Lecture 36 - Relief Sizing
- Lecture 37 - Hazard and Hazard Identification
- Lecture 38 - Hazard Identification Methods and HAZOP
- Lecture 39 - Safety Reviews and Risk Assessment - I
- Lecture 40 - Risk Assessment - II
- Lecture 41 - Review of Probability Theory
- Lecture 42 - Event Trees
- Lecture 43 - Fault Trees
- Lecture 44 - Cause Consequence Analysis and Layer of Protection Analysis
- Lecture 45 - Bow-Tie Analysis
- Lecture 46 - Accident Research
- Lecture 47 - Accident Causation Theories
- Lecture 48 - Accident Investigation Procedure - I
- Lecture 49 - Accident Investigation Procedure - II
- Lecture 50 - Jaipur Terminal Fire, India
- Lecture 51 - The Flixborough UK, Cyclohexane Disaster
- Lecture 52 - Seveso Accident
- Lecture 53 - The Chernobyl Nuclear Disaster
- Lecture 54 - Bhopal Gas Tragedy
- Lecture 55 - Bhopal Gas Tragedy
- Lecture 56 - Nuclear Radiation
- Lecture 57 - Process Safety Management
- Lecture 58 - Personal Protective Equipments
- Lecture 59 - Safety
- Lecture 60 - Nuclear Disaster

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Technologies for Clean and Renewable Energy Production

Subject Co-ordinator - Prof. P. Mondal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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Lecture 30 - Tutorial 6  
Lecture 31 - Hydro Energy - 1  
Lecture 32 - Hydro Energy - 2  
Lecture 33 - Geothermal Energy  
Lecture 34 - Tidal Energy  
Lecture 35 - Tutorial 7  
Lecture 36 - Energy from Biomass and Wastes 1 (Biological Route)  
Lecture 37 - Energy from Biomass and Wastes 2 (Chemical Route)  
Lecture 38 - Energy from Biomass and Wastes 3 (Physical Route)  
Lecture 39 - Energy Conversations  
Lecture 40 - Tutorial 8

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Polymer Reaction Engineering

Subject Co-ordinator - Prof. Shishir Sinha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Polymerization Process - I  
Lecture 2 - Introduction to polymerization process - II  
Lecture 3 - A Short History of polymerization process, monomers and its distribution  
Lecture 4 - Gradient and graft copolymer, polymer and its compositions, isomerism in polymers - I  
Lecture 5 - Gradient and graft copolymer, polymer and its compositions, isomerism in polymers - II  
Lecture 6 - Bonding forces in polymers  
Lecture 7 - Molecular weight and its distribution  
Lecture 8 - Control on Polymer Synthesis - I  
Lecture 9 - Control on Polymer Synthesis - II  
Lecture 10 - Control on Polymer Synthesis - III  
Lecture 11 - Morphology of polymers  
Lecture 12 - Introduction to reactor design - I  
Lecture 13 - Introduction to reactor design - II  
Lecture 14 - Temperature dependent term and Interpretation of batch reactor data - I  
Lecture 15 - Temperature dependent term and Interpretation of batch reactor data - II  
Lecture 16 - Interpretation of batch reactor data - III  
Lecture 17 - Interpretation of batch reactor data - IV  
Lecture 18 - Design equation for ideal reactors  
Lecture 19 - Design Equation for Single Reaction System  
Lecture 20 - Multiple reactor system  
Lecture 21 - Recycle reactor and autocatalytic reaction  
Lecture 22 - Multiple reactions system - I  
Lecture 23 - Multiple reactions system - II  
Lecture 24 - Multiple reactions system - III  
Lecture 25 - Problem Solving - I  
Lecture 26 - Problem Solving - II  
Lecture 27 - Problem Solving - III  
Lecture 28 - Step-growth polymerization - I  
Lecture 29 - Step Growth Polymerization - II

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- Lecture 30 - Step Growth Polymerization - III
- Lecture 31 - Step Growth Polymerization - IV
- 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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Process Equipment Design

Subject Co-ordinator - Prof. Shabina Khanam

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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 - Kern's method - 1  
Lecture 13 - STE design - Kern's method - 2  
Lecture 14 - STE design - Kern's method - 3  
Lecture 15 - STE design - Kern's method: Example - 4  
Lecture 16 - STE design - Kern's method: Example - 5  
Lecture 17 - STE design - Bell's method - 1  
Lecture 18 - STE design - Bell's method - 2  
Lecture 19 - STE design - Bell's method - 3  
Lecture 20 - STE design - Bell's method: Example - 4  
Lecture 21 - STE design - Bell'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

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Lecture 30	- Design of Reboiler	- 4
Lecture 31	- Design of Reboiler	- 5
Lecture 32	- Design of Reboiler	- 6
Lecture 33	- Design of Reboiler	- 7
Lecture 34	- Design of Evaporator	- 1
Lecture 35	- Design of Evaporator	- 2
Lecture 36	- Design of Evaporator	- 3
Lecture 37	- Design of Evaporator	- 4
Lecture 38	- Design of Evaporator	- 5
Lecture 39	- Design of Crystallizer	- 1
Lecture 40	- Design of Crystallizer	- 2
Lecture 41	- Design of Crystallizer	- Examples
Lecture 42	- Design of Crystallizer	- Types
Lecture 43	- Design of Packed Column	- 1
Lecture 44	- Design of Packed Column	- 2
Lecture 45	- Design of Packed Column	- 3
Lecture 46	- Design of Packed Column	- 4
Lecture 47	- Design of Packed Column	- 5
Lecture 48	- Distillation Column	- 1
Lecture 49	- Distillation Column	- 2
Lecture 50	- Distillation Column	- 3
Lecture 51	- Distillation Column	- 4
Lecture 52	- Distillation Column	- 5
Lecture 53	- Distillation Column	- 6
Lecture 54	- Distillation Column	- 7
Lecture 55	- Distillation Column	- 8
Lecture 56	- Distillation Column - Mechanical Design	- 1
Lecture 57	- Distillation Column - Mechanical Design	- 2
Lecture 58	- Distillation Column - Mechanical Design	- 3
Lecture 59	- Distillation Column - Mechanical Design	- 4
Lecture 60	- Distillation Column - Mechanical Design	- 5

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Advanced Thermodynamics and Molecular Simulations

Subject Co-ordinator - Prof. Prateek Kumar Jha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course  
Lecture 2 - Molecular basis of energy and entropy  
Lecture 3 - Probability and probability distributions  
Lecture 4 - Probability distributions and thermodynamic equilibrium  
Lecture 5 - Energy distribution in molecular systems  
Lecture 6 - First and second law of thermodynamics  
Lecture 7 - Reversible and irreversible processes; third law of thermodynamics; legendre transformation; thermodynamic potentials  
Lecture 8 - Thermodynamic functions for multi-component systems; chemical potential; why do we minimize thermodynamic potentials  
Lecture 9 - Extensive and intensive variables; gibbs duhem relation; euler theorem; maxwell relations  
Lecture 10 - Discrete and continuous probabilities; stirling approximation  
Lecture 11 - Binomial distribution approaches Gaussian distribution for large n; definition of drunkard walk  
Lecture 12 - Solution of drunkard walk; Lagrange multipliers  
Lecture 13 - Energy distribution in molecular system revisited; introduction to thermodynamic ensembles  
Lecture 14 - Canonical ensemble: most probable distribution, partition function  
Lecture 15 - Definition of temperature; third law of thermodynamics  
Lecture 16 - Canonical ensemble: Helmholtz free energy, averages and fluctuations, specific heat, deriving id  
Lecture 17 - Partition function of a dense gas; grand canonical ensemble: partition function, most probable d  
Lecture 18 - Computing properties in grand canonical ensemble  
Lecture 19 - Isothermal isobaric ensemble  
Lecture 20 - Summary of thermodynamic ensembles; partition function of an ideal gas  
Lecture 21 - Mixing and phase separation, phase equilibrium of a multiphase multicomponent system, Gibbs phas  
Lecture 22 - Pure component phase diagram; solution thermodynamics: Helmholtz free energy density  
Lecture 23 - Characterizing mixing and phase separation using Helmholtz free energy density  
Lecture 24 - Common tangent construction, definition of binodal, spinodal, and critical point  
Lecture 25 - Osmotic pressure and chemical potential  
Lecture 26 - Lattice model of liquid solutions - I  
Lecture 27 - Lattice model of liquid solutions - II  
Lecture 28 - Lattice model of liquid solutions - III  
Lecture 29 - Critical review of Lattice model, theoretical basis of molecular dynamics simulation

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## NPTEL Video Lecture Topic List - Created by Linuxpert Systems, Chennai

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- Lecture 30 - Theoretical basis of molecular dynamics simulation
- Lecture 31 - Interaction energy and force field
- Lecture 32 - Liouville theorem; theoretical basis of Monte Carlo simulation
- Lecture 33 - Introduction to Monte Carlo simulation method
- Lecture 34 - Markov chain algorithm, condition for equilibrium and detailed balance
- Lecture 35 - Metropolis algorithm, periodic boundary condition
- Lecture 36 - Numerical implementation of Monte Carlo simulation: Python Examples - I
- Lecture 37 - Numerical implementation of Monte Carlo simulation: Python Examples - II
- Lecture 38 - Numerical implementation of Monte Carlo simulation: Python Examples - III
- Lecture 39 - Numerical implementation of Monte Carlo simulation: Python Examples - IV
- Lecture 40 - Numerical implementation of Monte Carlo simulation: Python Examples - V
- Lecture 41 - Particle simulations: comparison with quantum chemical and continuum simulations; bridging length scales
- Lecture 42 - Pair potentials
- Lecture 43 - Saving CPU time: short range and long range interactions
- Lecture 44 - Bonded and non-bonded interactions, force fields
- Lecture 45 - Practical aspects of molecular simulations
- Lecture 46 - Numerical implementation of MD; thermostat and barostat
- Lecture 47 - MD simulations - efficiency and parallelization, sampling and averaging, analysis of simulation
- Lecture 48 - MD simulations - analysis of simulation trajectories (continued), Case Studies - I
- Lecture 49 - MD simulations - Case Studies - II
- Lecture 50 - MD simulations - Case Studies - III
- Lecture 51 - Free energies and phase behavior; extension of canonical ensemble Monte Carlo to other ensembles
- Lecture 52 - Extension of canonical ensemble Monte Carlo to other ensembles (Continued...)
- Lecture 53 - Monte Carlo in Gibbs ensemble and semi-grand canonical ensemble, thermodynamic integration
- Lecture 54 - Thermodynamic integration (continued); Widom's particle insertion; overlapping distribution method
- Lecture 55 - Multiple histogram method; umbrella sampling; thermodynamic cycle; potential of mean force; pulling
- Lecture 56 - Tackling time scale issues (continued); nonequilibrium molecular dynamics; mesoscale simulations
- Lecture 57 - Multiparticle collision dynamics; lattice Boltzmann method; coarse-graining
- Lecture 58 - Case studies
- Lecture 59 - Simulations of chemical reactions using Kinetic Monte Carlo simulations
- Lecture 60 - Reactive force fields; Ab initio molecular dynamics and other advanced methods; molecular simulation

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Chemical Process Utilities

Subject Co-ordinator - Prof. Shishir Sinha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- 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 its 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 its fundamental principles
- Lecture 60 - Heat transfer in Insulations materials

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Physico-Chemical Processes for Waste Water Treatment

Subject Co-ordinator - Prof. Vimal Chandra Srivastava

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Water Pollution and Control  
Lecture 2 - Environmental Acts and Standards  
Lecture 3 - Water Quality Monitoring: Physical Parameters  
Lecture 4 - Water Quality Monitoring: Physical and Chemical Parameters  
Lecture 5 - Water Quality Monitoring: Chemical Parameters - I  
Lecture 6 - Water Quality Monitoring: Chemical Parameters - II  
Lecture 7 - Water Quality Monitoring: Biological/Biochemical Parameters - I  
Lecture 8 - Water Quality Monitoring: Biological/Biochemical Parameters - II  
Lecture 9 - Water Quality Monitoring: Bacteriological Parameters  
Lecture 10 - Treatment of Water and Wastewater  
Lecture 11 - Flow Equalization  
Lecture 12 - Aeration - I  
Lecture 13 - Aeration - II  
Lecture 14 - Aeration - III  
Lecture 15 - Aeration - IV  
Lecture 16 - Aeration - V  
Lecture 17 - Aeration - VI  
Lecture 18 - Coagulation and Flocculation - I  
Lecture 19 - Coagulation and Flocculation - II  
Lecture 20 - Coagulation and Flocculation - III  
Lecture 21 - Coagulation and Flocculation - IV  
Lecture 22 - Settling and Sedimentation - I  
Lecture 23 - Settling and Sedimentation - II  
Lecture 24 - Settling and Sedimentation - III  
Lecture 25 - Settling and Sedimentation - IV  
Lecture 26 - Settling and Sedimentation - V  
Lecture 27 - Settling and Sedimentation - VI  
Lecture 28 - Filtration - I  
Lecture 29 - Filtration - II

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Lecture 30 - Filtration - III  
Lecture 31 - Adsorption - I  
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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Basic Environmental Engineering and Pollution Abatement

Subject Co-ordinator - Prof. P. Mondal

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Biological Process Design for Wastewater Treatment

Subject Co-ordinator - Prof. Vimal Chandra Srivastava

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Biological Process Design for Wastewater Treatment  
Lecture 2 - Microorganisms in Biological Wastewater Treatment  
Lecture 3 - Fundamentals of Biochemical Operations  
Lecture 4 - Wastewater Characterization - I  
Lecture 5 - Wastewater Characterization - II  
Lecture 6 - Wastewater Characterization - III  
Lecture 7 - Wastewater Characterization - IV  
Lecture 8 - Wastewater Characterization - V  
Lecture 9 - Stoichiometry of Microbial Growth - I  
Lecture 10 - Stoichiometry of Microbial Growth - II  
Lecture 11 - Stoichiometry of Microbial Growth - III  
Lecture 12 - Reaction Kinetics  
Lecture 13 - Bacterial Growth Kinetics - I  
Lecture 14 - Bacterial Growth Kinetics - II  
Lecture 15 - Reactor Hydraulics - I  
Lecture 16 - Reactor Hydraulics - II  
Lecture 17 - Treatment of Water and Wastewater - I  
Lecture 18 - Treatment of Water and Wastewater - II  
Lecture 19 - Coagulation, Flocculation, and Sedimentation - I  
Lecture 20 - Coagulation, Flocculation, and Sedimentation - II  
Lecture 21 - Lagoon  
Lecture 22 - Activated Sludge Process  
Lecture 23 - Sequential Batch Reactor  
Lecture 24 - Trickling Filter  
Lecture 25 - Rotating Disc Reactor  
Lecture 26 - Up-flow Anaerobic Sludge Blanket (UASB) reactor  
Lecture 27 - UASB and Biotower  
Lecture 28 - Advanced Biological Wastewater Treatment: Fluidized Bed Bioreactors  
Lecture 29 - Advanced Biological Wastewater Treatment: Membrane Bioreactors

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Advanced Biological Wastewater Treatment: Moving Bed Biofilm Reactor (MBBR)
- Lecture 31 - Sludge Management - I
- 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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Advanced Reaction Engineering

Subject Co-ordinator - Prof. Taraknath Das

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Introduction\_Various Reactors\_BR  
Lecture 3 - Design Equation\_Continuous reactor (CSTR\_PFR\_PBR)  
Lecture 4 - Design Equation\_Continuous reactor (CSTR\_PFR\_PBR)\_Sizing  
Lecture 5 - Reaction Rate with Conversion, Temperature, and pressure (Batch/Flow system)  
Lecture 6 - Space time Space velocity and CSTRs in series/parallel  
Lecture 7 - Effect of Pressure Drop on reactor design (PBR)\_(X vs W) and (P vs W)  
Lecture 8 - Effect of Pressure Drop on Reactor design (PBR)\_(X vs W)\_ (P vs W)  
Lecture 9 - Effect of Pressure Drop in PBR reactor\_Analytical solution of Differential equation  
Lecture 10 - Effect of Pressure Drop in PBR reactor\_Analytical solution for Reaction With Pressure drop  
Lecture 11 - Effect of Pressure Drop in PBR reactor\_Example  
Lecture 12 - Differential Reactor\_rate of reaction\_catalyst deactivation  
Lecture 13 - Catalyst deactivation  
Lecture 14 - Catalyst Deactivation\_Temperature (T) - Time (t) trajectories  
Lecture 15 - Moving Bed Reactor\_Catalyst deactivation  
Lecture 16 - STTR\_Catalyst deactivation  
Lecture 17 - Multi phase reactors-1: Slurry reactor - 1  
Lecture 18 - Multi phase reactors-1: Slurry reactor - 2  
Lecture 19 - Multi phase reactors-1: Slurry reactor - 3  
Lecture 20 - Multi phase reactors-2: Trickle bed reactor - 1  
Lecture 21 - Multi phase reactors-2: Trickle bed reactor - 2  
Lecture 22 - Multi phase reactors-2: Trickle bed reactor - 3  
Lecture 23 - Bioreactor\_Cell Growth and Rate laws  
Lecture 24 - Bioreactors\_Stoichiometry\_Yield coefficients\_rate of substrate consumption  
Lecture 25 - Bioreactors\_Example\_Yield coefficients and rate law parameters estimation  
Lecture 26 - Bioreactors\_Mass Balances (Cell, Substrate, Product)  
Lecture 27 - Bioreactors\_Chemostats  
Lecture 28 - Steady State Non Isothermal reactor design\_EB equation  
Lecture 29 - Steady State Non Isothermal reactor design\_Example

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- Lecture 30 - SS Non Isothermal reactor design\_Reaction with Heat Exchange
- Lecture 31 - SS Non Isothermal reactor design\_Heat Exchange\_ T-profile for a few cases
- Lecture 32 - SS Non Isothermal reactor design\_Equilibrium conversion
- Lecture 33 - SS Non Isothermal reactor design\_Optimum feed temperature
- Lecture 34 - SS Non Isothermal reactor design\_Multiple Steady States
- Lecture 35 - SS Non Isothermal reactor design\_Ignition Extinction Curves
- Lecture 36 - SS Non Isothermal reactor design\_Runaway reaction in a CSTR
- Lecture 37 - SS Non Isothermal reactor design\_Energy Balance:Multiple rxn in a CSTR/PFR (Examples)
- Lecture 38 - Non-ideal flow - 1
- Lecture 39 - Basics of Non-ideal flow - 2
- Lecture 40 - Basics of Non-ideal flow - 3
- Lecture 41 - Non-ideal flow-Segregation model
- Lecture 42 - One parameter Model-Tank in Series model (TIS)
- Lecture 43 - Non-ideal flow-Dispersion model - Part 1
- Lecture 44 - Non-ideal flow-Dispersion model - Part 2
- Lecture 45 - Non-ideal flow-Dispersion model - Part 3
- Lecture 46 - Two parameter Models-Modeling real reactors with Combinations of Ideal Reactors
- Lecture 47 - Solid Catalyzed Reaction: Reaction and Diffusion - Part 1
- Lecture 48 - Solid Catalyzed Reaction: Reaction and Diffusion - Part 2
- Lecture 49 - Solid Catalyzed Reaction: Reaction and Diffusion - Part 3
- Lecture 50 - Catalysis and Catalytic Reactors - Part 1
- Lecture 51 - Catalysis and Catalytic Reactors - Part 2
- Lecture 52 - Catalysis and Catalytic Reactors - Part 3
- Lecture 53 - Collection and Analysis of Rate - Part 1
- Lecture 54 - Collection and Analysis of Rate - Part 2
- Lecture 55 - Collection and Analysis of Rate - Part 3
- Lecture 56 - Polymath and ODE solver
- Lecture 57 - Catalyst Synthesis - Part 1
- Lecture 58 - Catalyst Synthesis - Part 2
- Lecture 59 - Catalyst Characterization Techniques: BET, Pore size, Pore volume
- Lecture 60 - Catalyst Characterization Techniques

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Polymer Process Engineering

Subject Co-ordinator - Prof. Shishir Sinha

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

- 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 Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Chemical Reaction Engineering

Subject Co-ordinator - Prof. Jayant M Modak

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction & Overview  
Lecture 2 - Basic concepts  
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  
Lecture 9 - Complex 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  
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  
Lecture 27 - Chemical Reactor Design  
Lecture 28 - Chemical Reactor Design  
Lecture 29 - Nonisothermal Reactor Operation

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Case Study - Ethane dehydrogenation
- 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

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Fundamentals of Transport Processes

Subject Co-ordinator - Prof. V. Kumaran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction  
Lecture 2 - Dimensional Analysis  
Lecture 3 - Dimensional Analysis (Continued...)  
Lecture 4 - Dimensionless Groups  
Lecture 5 - Continuum description  
Lecture 6 - Mechanisms of diffusion - I  
Lecture 7 - Mechanisms of diffusion - II  
Lecture 8 - Unidirectional Transport Cartesian Coordinates - I  
Lecture 9 - Unidirectional Transport Cartesian Coordinates - II Similarity Solutions  
Lecture 10 - Unidirectional Transport Cartesian Coordinates - III Similarity Solutions  
Lecture 11 - Unidirectional Transport Cartesian Coordinates - IV Separation of Variables  
Lecture 12 - Unidirectional Transport Cartesian Coordinates - V Separation of Variables  
Lecture 13 - Unidirectional Transport Cartesian Coordinates - VI Oscillatory Flows  
Lecture 14 - Unidirectional Transport Cartesian Coordinates - VII Momentum Source in the Flow  
Lecture 15 - Unidirectional Transport Cartesian Coordinates - VIII Heat & Mass Sources  
Lecture 16 - Unidirectional Transport Cylindrical Coordinates - I Conservation Equations  
Lecture 17 - Unidirectional Transport Cylindrical Coordinates - II Similarity Solutions  
Lecture 18 - Unidirectional Transport Cylindrical Coordinates - III Separation of Variables  
Lecture 19 - Unidirectional Transport Cylindrical Coordinates - IV Steady flow in a pipe  
Lecture 20 - Unidirectional Transport Cylindrical Coordinates - V Oscillatory flow in a pipe  
Lecture 21 - Unidirectional Transport Cylindrical Coordinates - VI Oscillatory flow in a pipe Regular Perturbation  
Lecture 22 - Unidirectional Transport Cylindrical Coordinates - VII Oscillatory flow in a pipe Singular Perturbation  
Lecture 23 - Unidirectional Transport Spherical Coordinates - I Balance Equation  
Lecture 24 - Unidirectional Transport Spherical Coordinates - II Separation of Variables  
Lecture 25 - Mass & Energy Conservation Cartesian Coordinates  
Lecture 26 - Mass & Energy Conservation Cartesian Coordinates Heat Conduction in a Cube  
Lecture 27 - Mass & Energy Conservation Spherical Coordinates Balance Laws  
Lecture 28 - Mass & Energy Conservation Cylindrical Coordinates  
Lecture 29 - Diffusion Equation Spherical Co-ordinates Separation of Variables

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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Lecture 30 - Diffusion Equation Spherical Co-ordinates Seperation of Variables (Continued...)  
Lecture 31 - Diffusion Equation Spherical Co-ordinates Effective Conductivity of a Composite  
Lecture 32 - Diffusion Equation Spherical Harmonics  
Lecture 33 - Diffusion Equation Delta Functions  
Lecture 34 - Diffusion Equation Multipole Expansions  
Lecture 35 - Diffusion Equation Greens Function Formulations  
Lecture 36 - High Peclet Number Transport Flow Past a Flat Plate  
Lecture 37 - High Peclet Number Transport Heat Transfer from a Spherical Particle - I  
Lecture 38 - High Peclet Number Transport Heat Transfer from a Spherical Particle - II  
Lecture 39 - High Peclet Number Transport Heat Transfer from a Gas Bubble  
Lecture 40 - Summary

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Fundamentals of Transport Processes - II

Subject Co-ordinator - Prof. V. Kumaran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Review of Fundamentals of Transport Processes 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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Conformal transforms in potential flow
- Lecture 31 - Boundary layer theory
- Lecture 32 - Boundary layer past a flat plate
- Lecture 33 - Stagnation point flow
- Lecture 34 - Falkner-Skan Boundary Layer Solutions
- Lecture 35 - Falkner-Skan Boundary Layer Solutions
- Lecture 36 - Vorticity Dynamics
- Lecture 37 - Vorticity Dynamics
- Lecture 38 - Turbulence
- Lecture 39 - Turbulence
- Lecture 40 - Turbulent flow in a channel

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - Modern Instrumental Methods of Analysis

Subject Co-ordinator - Dr. J.R. Mudakavi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the Modern Instrumental Methods of Analysis  
Lecture 2 - Atomic Structure  
Lecture 3 - Physical Properties of Electromagnetic Radiation  
Lecture 4 - Interaction of Matter with Radiation  
Lecture 5 - Ultraviolet and Visible Spectrophotometry-1 (i. Theoretical Aspects)  
Lecture 6 - Ultraviolet and Visible Spectrophotometry-2 (ii. Theoretical Aspects)  
Lecture 7 - Ultraviolet and Visible Spectrophotometry-3 (iii. Theoretical Aspects)  
Lecture 8 - Ultraviolet and Visible Spectrophotometry-4 (iv. Instrumentation)  
Lecture 9 - Ultraviolet and Visible Spectrophotometry-5 (v. Instrumentation)  
Lecture 10 - Ultraviolet and Visible Spectrophotometry-6 (vi. Applications)  
Lecture 11 - Fluorescence and Phosphorescence Spectrophotometry-1 (i. Theoretical Aspects)  
Lecture 12 - Fluorescence and Phosphorescence Spectrophotometry-2 (ii. Instrumentation)  
Lecture 13 - Fluorescence and Phosphorescence Spectrophotometry-3 (iii. Application)  
Lecture 14 - Atomic Fluorescence (i. Theoretical aspects)  
Lecture 15 - X- Ray Analytical Techniques-1 (ii. Instrumentation)  
Lecture 16 - X- Ray Analytical Techniques-2 (iii. Applications)  
Lecture 17 - Atomic Absorption Spectrometry-1 (i. Theoretical Aspects)  
Lecture 18 - Atomic Absorption Spectrometry-2 (ii. Theoretical Aspects)  
Lecture 19 - Atomic Absorption Spectrometry-3 (iii. Instrumentation)  
Lecture 20 - Atomic Absorption Spectrometry-4 (iv. Instrumentation)  
Lecture 21 - Atomic Absorption Spectrometry-5 (v. Instrumentation)  
Lecture 22 - Atomic Absorption Spectrometry-6 (vi. Signal handling)  
Lecture 23 - Atomic Absorption Spectrometry-7 (vii. Interferences)  
Lecture 24 - Atomic Absorption Spectrometry-8 (viii. Hydride Generation AAS)  
Lecture 25 - Atomic Absorption Spectrometry-9 (ix. Cold Vapour Mercury AAS)  
Lecture 26 - Electrothermal Atomic Absorption Spectrometry-10 (x. Electrothermal Aspects)  
Lecture 27 - Electrothermal Atomic Absorption Spectrometry-11 (xi. Practical Aspects)  
Lecture 28 - Inductively Coupled Plasma Atomic Emission Spectrometry-1 (i. Theoretical Aspects)  
Lecture 29 - Inductively Coupled Plasma Atomic Emission Spectrometry-2 (ii. Instrumentation)

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Inductively Coupled Plasma Atomic Emission Spectrometry-3 (iii. Comparison of ICP & AAS)
- Lecture 31 - Infrared Spectroscopy-1 (i. Theoretical Aspects)
- Lecture 32 - Infrared Spectroscopy-2 (ii. Practical Aspects)
- Lecture 33 - Infrared Spectroscopy-3 (iii. Nondispersive IR, Mass spectrometer)
- Lecture 34 - Introduction to Mass Spectrometry
- Lecture 35 - Introduction to Nuclear Magnetic Resonance Spectroscopy
- Lecture 36 - Fundamentals of Electrochemical Techniques-1 (i. Introduction)
- Lecture 37 - Fundamentals of Electrochemical Techniques-2 (ii. Introduction) (Continued...)
- Lecture 38 - Polarography-1 (i. Introduction)
- Lecture 39 - Polarography-2 (ii. Applications)
- Lecture 40 - Chromatography-1 (i. Introduction)
- Lecture 41 - Gas chromatography-1 (i. Instrumentation)
- Lecture 42 - Gas chromatography-2 (ii. Applications)
- Lecture 43 - Gas chromatography-3 (iii. Applications)

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Transport Processes I: Heat and Mass Transfer

Subject Co-ordinator - Prof. V. Kumaran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- 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
- Lecture 32 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Unsteady heat conduction from a cylinder
- Lecture 33 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Similarity solution for heat conduction from a cylinder
- 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-ordinates. 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 spherical inclusion
- Lecture 53 - Diffusion equation: Heat conduction around a spherical 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 Green's 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

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Lecture 69 - Natural convection: Boundary layer equations  
Lecture 70 - Natural convection: Boundary layer equations convection  
Lecture 71 - Natural convection: Heat transfer correlations

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Atomic and Molecular Absorption Spectrometry for Pollution Mo

Subject Co-ordinator - Dr. J.R. Mudakavi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction  
Lecture 2 - Atomic structure  
Lecture 3 - Interaction of EM radiation with matter  
Lecture 4 - Atomic and molecular orbitals  
Lecture 5 - Interaction of EM radiation with matter - I  
Lecture 6 - Interaction of EM radiation with matter - II  
Lecture 7 - Interaction of interaction of EM radiation with matter - III  
Lecture 8 - Emission and absorption spectra  
Lecture 9 - MO theory  
Lecture 10 - Structure & property relationship of organic compounds  
Lecture 11 - Woodward Fieser rules, structure & property relationship  
Lecture 12 - Beer-Lamberts law  
Lecture 13 - Deviations from Beer-Lamberts law, relative concentration error, instrumentation - I  
Lecture 14 - UV-Visible spectrophotometry, instrumentation - II  
Lecture 15 - UV-Visible spectrophotometry, instrumentation - III  
Lecture 16 - UV-Visible spectrophotometry, instrumentation - IV  
Lecture 17 - Quantitative analysis & I  
Lecture 18 - Quantitative analysis & II  
Lecture 19 - Quantitative analysis & III  
Lecture 20 - Quantitative analysis & IV  
Lecture 21 - Fluorescence spectrophotometry & I  
Lecture 22 - Fluorescence spectrophotometry - II  
Lecture 23 - Fluorescence spectrophotometry - III  
Lecture 24 - Instrumentation  
Lecture 25 - Chemical analysis, applications  
Lecture 26 - Chemiluminiscence, principles  
Lecture 27 - Status of spectrophotometry vis a vis environment  
Lecture 28 - Separations methods  
Lecture 29 - Method development

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- Lecture 30 - Boron, chloride
- Lecture 31 - Fluoride
- Lecture 32 - Phenols
- Lecture 33 - Arsenic, Free chlorine
- Lecture 34 - Magnesium
- Lecture 35 - Nonionic surfactants, iron, phosphate
- Lecture 36 - Nitrite , manganese
- Lecture 37 - Cadmium, copper, lead
- Lecture 38 - Total hardness, zinc
- Lecture 39 - Nitrate, chromium
- Lecture 40 - Determination of aluminum, cyanide, sulphate
- Lecture 41 - Sulphate, ammonia, Conclusions



## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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

Subject Co-ordinator - Dr. J.R. Mudakavi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course Introduction  
Lecture 2 - Atomic structure - I  
Lecture 3 - Atomic structure - II  
Lecture 4 - Electronic arrangement in the Elements - I  
Lecture 5 - Electronic arrangement in the Elements - II  
Lecture 6 - Interaction of EM radiation with matter - I  
Lecture 7 - Interaction of EM radiation with matter - II  
Lecture 8 - Interaction of EM radiation with matter - III  
Lecture 9 - Interaction of EM radiation with matter - IV  
Lecture 10 - Theoretical basis of AAS - I  
Lecture 11 - Theoretical basis of AAS - II  
Lecture 12 - Theoretical basis of AAS - III  
Lecture 13 - Theoretical basis of AAS - IV  
Lecture 14 - Instrumentation in AAS - I  
Lecture 15 - Instrumentation in AAS - I (Continued...) Radiation Sources  
Lecture 16 - Instrumentation in AAS Radiation Sources  
Lecture 17 - Instrumentation in AAS - III  
Lecture 18 - Instrumentation in AAS - IV  
Lecture 19 - Instrumentation in AAS - V  
Lecture 20 - Instrumentation in AAS - VI  
Lecture 21 - Instrumentation in AAS - VII  
Lecture 22 - Interferences in AAS  
Lecture 23 - Background correction on flame AAS - I  
Lecture 24 - Interferences in AAS - II  
Lecture 25 - Interferences in AAS - III  
Lecture 26 - Hydride Generation AAS - I  
Lecture 27 - Hydride Generation AAS and Cold Vapour Hg AAS  
Lecture 28 - Cold vapor Hg AAS Flame Emission  
Lecture 29 - Mercury cold vapour technique, FAES and Electrothermal AAS

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 30 - Electrothermal AAS - II
- Lecture 31 - GF AAS Interferences - I
- Lecture 32 - GF AAS Interferences - II
- Lecture 33 - Interference in ETAAS GF AAS
- Lecture 34 - Individual Elements AAS
- Lecture 35 - Methods, Nomenclature and techniques
- Lecture 36 - Technology and Applications - I
- Lecture 37 - Technology and Applications - II
- Lecture 38 - Conclusions

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Inductive Couple Plasma Atomic Emmission Spectrometry for Pol

Subject Co-ordinator - Dr. J.R. Mudakavi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Course introduction and atomic structure - I  
Lecture 2 - Course introduction and atomic structure - II  
Lecture 3 - Course introduction and atomic structure - III  
Lecture 4 - Course introduction and atomic structure - IV  
Lecture 5 - Course introduction and atomic structure - V  
Lecture 6 - Course introduction and atomic structure - VI  
Lecture 7 - Nature of electromagnetic radiation  
Lecture 8 - Interaction of EM radiation with matter - I  
Lecture 9 - Interaction of EM radiation with matter - II  
Lecture 10 - Instrumentation for ICP AES - I  
Lecture 11 - Instrumentation for ICP AES - II  
Lecture 12 - Instrumentation for ICP AES - III  
Lecture 13 - Instrumentation for ICP AES - IV - Optical mountings  
Lecture 14 - Instrumentation for ICP AES - V - Detectors  
Lecture 15 - Instrumentation for ICP AES - VI - ICP Torches  
Lecture 16 - Instrumentation for ICP AES - VII - Plasma characteristics  
Lecture 17 - Instrumentation for ICP AES - VIII - Instruments  
Lecture 18 - Practice and Applications of ICP AES - I - Nebulizers  
Lecture 19 - Practice and Applications of ICP AES - II - Sample handling  
Lecture 20 - Practice and Applications of ICP AES - III - Chemical analysis  
Lecture 21 - Practice and Applications of ICP AES - IV - Chemical analysis  
Lecture 22 - Practice and Applications of ICP AES - V - Chemical analysis

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Infrared Spectroscopy for Pollution Monitoring

Subject Co-ordinator - Dr. J.R. Mudakavi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Analytical Science and Infrared Spectroscopy  
Lecture 2 - Environmental Analytical Science  
Lecture 3 - Techniques of Elemental Analysis  
Lecture 4 - Atomic Structure - I  
Lecture 5 - Atomic Structure - II  
Lecture 6 - Atomic Structure - III  
Lecture 7 - Atomic Structure - IV  
Lecture 8 - Interaction of electromagnetic radiation with matter - I  
Lecture 9 - Interaction of electromagnetic radiation with matter - II  
Lecture 10 - Interaction of electromagnetic radiation with matter - III  
Lecture 11 - Interaction of electromagnetic radiation with matter - IV  
Lecture 12 - Interaction of electromagnetic radiation with matter - V  
Lecture 13 - Interaction of electromagnetic radiation with matter - VI  
Lecture 14 - Infrared spectroscopy - Introduction  
Lecture 15 - Infra Red Instrumentation  
Lecture 16 - Fourier Transform Infrared Spectroscopy  
Lecture 17 - Sample Handling in IR  
Lecture 18 - Instrumentation in IR  
Lecture 19 - Applications of IR  
Lecture 20 - IR Spectra Interpretation  
Lecture 21 - IR Gas Analysers

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Electrochemical Technology in Pollution Control

Subject Co-ordinator - Prof. J. R. Mudakavi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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

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Lecture 30 - Electroplating - 3  
Lecture 31 - Electroplating - 4  
Lecture 32 - Batteries and fuel cells - 1  
Lecture 33 - Batteries and fuel cells - 2  
Lecture 34 - Batteries and fuel cells - 3  
Lecture 35 - Zero liquid discharge

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Chemical Engineering - NOC:Transport Processes

Subject Co-ordinator - Prof. V Kumaran

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Dimensions and units  
Lecture 2 - Dimensions and units, dimension of an equation  
Lecture 3 - Dimensional analysis, settling sphere  
Lecture 4 - Dimensional analysis, Brownian diffusivity, torque on a particle  
Lecture 5 - Mass transfer to suspended particles  
Lecture 6 - Heat transfer in a heat exchanger  
Lecture 7 - Momentum transfer, flow in a pipe, friction factor  
Lecture 8 - Dimensionless groups - ratio of convection and diffusion  
Lecture 9 - Dimensionless fluxes, other dimensionless groups  
Lecture 10 - Laminar and turbulent flow in a pipe  
Lecture 11 - Flow past flat plate  
Lecture 12 - Correlations for drag coefficient  
Lecture 13 - Correlations for drag coefficient  
Lecture 14 - Flow through packed column  
Lecture 15 - Unit operations for mixing  
Lecture 16 - Droplet breakup  
Lecture 17 - Heat and mass transfer, Colburn and Reynolds analogy  
Lecture 18 - Low Peclet number heat/mass transfer, high Peclet number laminar flow  
Lecture 19 - High Peclet number laminar/turbulent flows. Flow in pipe, flow past flat plate  
Lecture 20 - High Peclet number laminar/turbulent flows. Flow past particle  
Lecture 21 - Flow past mobile interfaces, flow in packed column  
Lecture 22 - Natural convection  
Lecture 23 - Mass diffusion in gases  
Lecture 24 - Mass diffusion in gases  
Lecture 25 - Mass diffusion in liquids  
Lecture 26 - Thermal diffusion  
Lecture 27 - Momentum diffusion  
Lecture 28 - Dispersion  
Lecture 29 - Turbulent dispersion, dispersion in packed column, Taylor dispersion

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

- Lecture 30 - Unidirectional transport. Shell balance
- Lecture 31 - Unidirectional transport. Common form of transport equations
- 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
- Lecture 44 - Correlations in balance equations. Natural convection
- Lecture 45 - Correlations in balance equations. Packed column
- Lecture 46 - Cylindrical co-ordinates. Balance equation
- Lecture 47 - Cylindrical co-ordinates. Steady conduction
- Lecture 48 - Cylindrical co-ordinates. Heat transfer resistance
- Lecture 49 - Cylindrical co-ordinates. Examples
- Lecture 50 - Spherical co-ordinates. Balance equation
- Lecture 51 - Spherical co-ordinates. Heat transfer resistance
- Lecture 52 - Laminar flow in a pipe. Momentum balance
- Lecture 53 - Laminar flow in a pipe. Velocity profile. Friction factor
- Lecture 54 - Laminar flow in a pipe. Friction factor correlation
- Lecture 55 - Laminar flow in a pipe. Examples
- Lecture 56 - Laminar flow in a pipe. Examples
- Lecture 57 - Turbulence. Instability and transition
- Lecture 58 - Turbulent flow in a pipe. Dissipation rate, turbulence scales
- Lecture 59 - Turbulent flow in a pipe. Turbulence cascade
- Lecture 60 - Turbulent flow in a pipe. Structure of turbulence