

## 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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- 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 Approximation 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 Galerkin 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 Algebraic

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

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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 - Kirchoff'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 - 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  
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Lecture 29

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## 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, Theories
- 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 - 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 coefficient 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>m</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

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## 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

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# 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

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## 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

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## 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 - Capillary Viscometers

Lecture 5 - Capillary Viscometers

Lecture 6 - Rotational Viscometers

Lecture 7 - Equations of Change for Isothermal Systems

Lecture 8 - Equation of Change for Non-Isothermal Systems

Lecture 9 - Time Independent Non-Newtonian Fluids Flow Through Pipes - 1

Lecture 10 - Time Independent Non-Newtonian Fluids Flow Through Pipes - 2

Lecture 11 - Transition from Laminar to Turbulent Flow in Pipes for GNF

Lecture 12 - Power-law and Bingham Plastic Fluids Flow Between Two Infinite Parallel Plates

Lecture 13 - Flow of Ellis Model and Bingham Plastic Fluids along Inclined and Vertical Plates

Lecture 14 - Power-law Fluids Flow in Concentric Annulus

Lecture 15 - Flow of Non-Newtonian Fluids through Beds of Particles

Lecture 16 - Dispersion in Beds of Particles

Lecture 17 - Liquid-Solid Fluidization by Power-law Liquids

Lecture 18 - Free Convection between Two Vertical Plates

Lecture 19 - Viscous Heat Generation in Coaxial Cylinders

Lecture 20 - (a) Viscous Heating in Slit Flow with Constant Wall Flux Boundary Condition (b) Temperature Dist

Lecture 21 - Temperature Distribution in Fluids Confined Between Two Cylinders

Lecture 22 - Heat Conduction from Sphere Without and With Reaction; and in Spherical Shell

Lecture 23 - Transpiration Cooling

Lecture 24 - Mass Transfer Phenomena of Non-Newtonian Fluids

Lecture 25 - Diffusion through A Stagnant Gas Film; Diffusion into A Falling Liquid Film

Lecture 26 - Diffusion through A Non-Isothermal Spherical Film

Lecture 27 - Simultaneous Heat and Mass Transfer with Multicomponent Diffusion

Lecture 28 - Diffusion Combined with Heterogeneous and Homogeneous Chemical Reactions

Lecture 29 - Combustion of a Carbon Particle

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

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- Lecture 30 - Evaporation of Column of Liquid; Melting of Spherical Crystal
- Lecture 31 - Freezing of Salt Water; Effect of Mass Transfer on Heat Transfer Coefficient
- Lecture 32 - Evaporation of a Water Droplet
- Lecture 33 - Boundary Layer Flows and Derivation of Integral Momentum and Energy Equations
- Lecture 34 - Momentum Boundary Layer Thickness for Flow of Power-law Liquids
- Lecture 35 - Thermal Boundary Layer Thickness for Flow of Power-law Liquids

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

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

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

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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 - Flootation - 1
- Lecture 37 - Flootation - 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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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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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 - Concentrating solar collectors
- Lecture 9 - Practice problems - Part I
- Lecture 10 - Practice problems - Part II
- Lecture 11 - Practice problems - Part III
- Lecture 12 - Thermal energy storage systems - Part I
- Lecture 13 - Thermal energy storage systems - Part II
- Lecture 14 - Solar energy utilization methods
- Lecture 15 - Classification of energy resources
- Lecture 16 - Broad classification and compositional analysis
- Lecture 17 - Characteristics and properties of biomass
- Lecture 18 - Properties and structural components of biomass
- Lecture 19 - Biomass residues and energy conversion routes
- Lecture 20 - Utilisation of biomass through bio-chemical and thermo-chemical routes
- Lecture 21 - Conversion mechanism of biomass to biogas and its properties
- Lecture 22 - Classification of biogas plants
- Lecture 23 - Practice problems
- Lecture 24 - Practice problems
- Lecture 25 - Bioconversion of substrates into alcohol
- Lecture 26 - Thermo-chemical conversion, torrefaction and combustion processes
- Lecture 27 - Thermo-chemical conversion of biomass to solid, liquid and gaseous fuels
- Lecture 28 - Gasification process
- Lecture 29 - Thermo-chemical conversion processes: pyrolysis, liquefaction and conversion processes

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

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- Lecture 30 - Practice problems
- Lecture 31 - Practice problems
- Lecture 32 - Turbine terms, types and theories - Part I
- Lecture 33 - Turbine terms, types and theories - Part II
- Lecture 34 - Characteristics and Power Generation from Wind Energy - Part I
- Lecture 35 - Characteristics and Power Generation from Wind Energy - Part II
- Lecture 36 - 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 - 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  
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

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## 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  
Lecture 15  
Lecture 16  
Lecture 17  
Lecture 18  
Lecture 19  
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Lecture 23  
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Lecture 25  
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

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## 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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## NPTTEL 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 - 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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- 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 - Rayleish 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 Process

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

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

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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
- Lecture 47 - Tutorial
- Lecture 48
- Lecture 49
- Lecture 50
- Lecture 51
- Lecture 52

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

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

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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 derivative
- 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; ITP
- 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  $\hat{a}$  heavy over light  $\hat{a}$  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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- 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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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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

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

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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

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

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

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

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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

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- 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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Lecture 69 - Laminar and Turbulent Boundary Layer  
Lecture 70 - Tutorial 9

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## 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  
Lecture 13 - Visualization of Flow Patterns  
Lecture 14 - Streamline, Pathline  
Lecture 15 - Streamline, Pathline, Streakline  
Lecture 16 - System and Control Volume  
Lecture 17 - Reynolds transport theorem  
Lecture 18 - Reynolds transport theorem  
Lecture 19 - Reynolds transport theorem  
Lecture 20 - Reynolds transport theorem  
Lecture 21 - Integral and differential balances  
Lecture 22 - Integral total mass balance  
Lecture 23 - Integral total mass balance  
Lecture 24 - Integral total mass balance  
Lecture 25 - Differential total mass balance - Part 1  
Lecture 26 - Differential total mass balance - Part 2  
Lecture 27 - Differential total mass balance  
Lecture 28 - Differential total mass balance  
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
- Lecture 32 - Integral linear momentum balance
- Lecture 33 - Integral linear momentum balance
- Lecture 34 - Differential linear momentum balance
- Lecture 35 - Differential linear momentum balance
- 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
- 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
- Lecture 48 - Differential linear momentum balance
- Lecture 49 - Convective momentum flux tensor
- Lecture 50 - Differential linear momentum balance
- 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
- Lecture 56 - Strain Displacement Gradient Relation
- Lecture 57 - Strain Displacement Gradient Relation
- Lecture 58 - Strain Displacement Gradient Relation
- 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
- 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

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

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- Lecture 69 - Strain Rate
- Lecture 70 - Stress Strain Relation
- Lecture 71 - Material Properties
- Lecture 72 - Hooke's Law
- Lecture 73 - Relation Between Material Properties
- Lecture 74 - Hooke's Law
- Lecture 75 - Hooke's Law
- Lecture 76 - Stress Strain Rate Relation
- Lecture 77 - Newton's Law of Viscosity
- Lecture 78 - Newton's Law of Viscosity
- Lecture 79 - Navier Stokes Equation
- Lecture 80 - Fluid at Rest
- Lecture 81 - Hydrostatic Pressure Distribution in Liquid
- Lecture 82 - Hydrostatic Pressure Distribution in Gas
- Lecture 83 - Fluid in Rigid Body Motion
- Lecture 84 - Flow Regimes
- Lecture 85 - Euler Equation
- Lecture 86 - Bernoulli Equation
- Lecture 87 - Bernoulli Equation
- Lecture 88 - Bernoulli Equation
- Lecture 89 - Bernoulli Equation
- Lecture 90 - Planar Couette Flow
- Lecture 91 - Planar Couette Flow
- Lecture 92 - Planar Couette Flow
- Lecture 93 - Planar Poiseuille Flow
- Lecture 94 - Planar Poiseuille Flow
- Lecture 95 - Planar Poiseuille Flow
- Lecture 96 - Planar Poiseuille Flow
- 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
- Lecture 100 - Linear Momentum Balance
- 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

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

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

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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 Fibre, 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  $\hat{I} \ t \ min$

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

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## 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

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## 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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## NPTTEL 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

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

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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 - Kernâ s method - 1  
Lecture 13 - STE design - Kernâ s method - 2  
Lecture 14 - STE design - Kernâ s method - 3  
Lecture 15 - STE design - Kernâ s method: Example - 4  
Lecture 16 - STE design - Kernâ s method: Example - 5  
Lecture 17 - STE design - Bellâ s method - 1  
Lecture 18 - STE design - Bellâ s method - 2  
Lecture 19 - STE design - Bellâ s method - 3  
Lecture 20 - STE design - Bellâ s method: Example - 4  
Lecture 21 - STE design - Bellâ s method: Example - 5  
Lecture 22 - Design of Condenser - 1  
Lecture 23 - Design of Condenser - 2  
Lecture 24 - Design of Condenser - 3  
Lecture 25 - Design of Condenser - 4  
Lecture 26 - Design of Condenser - 5  
Lecture 27 - Design of Reboiler - 1  
Lecture 28 - Design of Reboiler - 2  
Lecture 29 - Design of Reboiler - 3

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

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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 identities
- Lecture 17 - Partition function of a dense gas; grand canonical ensemble: partition function, most probable distribution
- 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 phase rule
- 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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- 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
- 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 - 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 Separation 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 - Why do we study transport processes?

Lecture 2 - Transport by convection and diffusion

Lecture 3 - Non-dimensional analysis of beams

Lecture 4 - Dimensional analysis: Force on a particle settling in a fluid

Lecture 5 - Dimensional analysis: Heat transfer in a heat exchanger

Lecture 6 - Dimensional analysis: Mass transfer from a particle suspended in a fluid

Lecture 7 - Dimensional analysis: Power of an impeller

Lecture 8 - Dimensional analysis: Scaling up of an impeller

Lecture 9 - Dimensional analysis: Convection and diffusion

Lecture 10 - Dimensional analysis: Physical interpretation of dimensionless groups

Lecture 11 - Dimensional analysis: Correlations for dimensionless groups

Lecture 12 - Dimensional analysis: Natural and forced convection

Lecture 13 - Continuum description of fluids

Lecture 14 - Conservation equations and constitutive relations

Lecture 15 - Diffusion: Mechanism of mass diffusion in gases

Lecture 16 - Diffusion: Estimation of mass diffusion coefficient

Lecture 17 - Diffusion: Momentum diffusion coefficient

Lecture 18 - Diffusion: Thermal diffusion coefficient

Lecture 19 - Unidirectional transport: Conservation equation for heat and mass transfer

Lecture 20 - Unidirectional transport: Conservation equation for momentum transfer

Lecture 21 - Unidirectional transport: Similarity solution for infinite domain

Lecture 22 - Unidirectional transport: Similarity solution for infinite domain continued

Lecture 23 - Unidirectional transport: Similarity solution for mass transfer into a falling film

Lecture 24 - Unidirectional transport: Similarity solution for decay of a pulse

Lecture 25 - Unidirectional transport: Similarity solution for decay of a pulse continued

Lecture 26 - Unidirectional transport: Separation of variables for transport in a finite domain

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: Separation of variables for transport in a finite domain (Continued...)

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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. Heat transfer across the wall
- Lecture 31 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Unsteady heat conduction from a wall
- Lecture 32 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Unsteady heat conduction from a wall
- Lecture 33 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Unsteady heat conduction from a wall
- Lecture 34 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Similarity solution for heat transfer
- Lecture 35 - Unidirectional transport: Effect of body force in momentum transfer. Falling film
- Lecture 36 - Unidirectional transport: Effect of pressure in momentum transfer. Flow in a pipe.
- Lecture 37 - Unidirectional transport: Friction factor for flow in a pipe
- Lecture 38 - Unidirectional transport: Laminar and turbulent flow in a pipe
- Lecture 39 - Unidirectional transport: Laminar and turbulent flow in a pipe
- 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
- Lecture 42 - Unidirectional transport: Oscillatory flow in a pipe. Solution using complex variables (Continued)
- Lecture 43 - Unidirectional transport: Oscillatory flow in a pipe. Low and high Reynolds number solutions
- Lecture 44 - Unidirectional transport: Spherical co-ordinates. Heat conduction from a sphere
- Lecture 45 - Mass and energy balance equations in Cartesian co-ordinates
- Lecture 46 - Mass and energy balance equations in Cartesian co-ordinates Vector notation
- Lecture 47 - Mass and energy balance equations in spherical co-ordinates
- Lecture 48 - Mass and energy balance equations in spherical co-ordinates
- Lecture 49 - Momentum balance: Incompressible Navier-Stokes equations
- Lecture 50 - Balance equation: Convection and diffusion dominated regimes
- Lecture 51 - Diffusion equation: Heat conduction in a rectangular solid
- Lecture 52 - Diffusion equation: Heat conduction in a rectangular solid (Continued...)
- Lecture 53 - Diffusion equation: Heat conduction around a spherical inclusion
- Lecture 54 - Diffusion equation: Heat conduction around a spherical inclusion
- Lecture 55 - Diffusion equation: Effective conductivity of a composite
- Lecture 56 - Diffusion equation: Spherical harmonic solutions
- Lecture 57 - Diffusion equation: Conduction from a point source
- Lecture 58 - Diffusion equation: Method of Greens functions
- Lecture 59 - Diffusion equation: Method of images
- Lecture 60 - Diffusion equation: Equivalence of spherical harmonics and multipole expansion

## 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  $\hat{A}$  property relationship of organic compounds

Lecture 11 - Woodward Fieser rules, structure  $\hat{A}$  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  $\hat{A}$  I

Lecture 18 - Quantitative analysis  $\hat{A}$  II

Lecture 19 - Quantitative analysis  $\hat{A}$  III

Lecture 20 - Quantitative analysis  $\hat{A}$  IV

Lecture 21 - Fluorescence spectrophotometry  $\hat{A}$  I

Lecture 22 - Fluorescence spectrophotometry - II

Lecture 23 - Fluorescence spectrophotometry - III

Lecture 24 - Instrumentation

Lecture 25 - Chemical analysis, applications

Lecture 26 - Chemiluminescence, 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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- 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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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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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:Colloids and Surfaces

Subject Co-ordinator - Prof. Basavaraj Madivala Gurappa

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction and motivation

Lecture 2 - Colloidal dispersions, terminology and classification

Lecture 3 - Stability in colloids

Lecture 4 - Source, synthesis and characterisation of colloids

Lecture 5 - Characterisation of colloidal particles - I

Lecture 6 - Characterisation of colloidal particles - II

Lecture 7 - Introduction to forces acting on an individual colloidal particle

Lecture 8 - Introduction to interaction between colloidal particles

Lecture 9 - Application of Brownian force

Lecture 10 - Radiation used to study colloidal systems

Lecture 11 - Radiation used to study colloidal systems

Lecture 12 - Molecular origin of Van der waals forces

Lecture 13 - Vanderwaal interactions between particles

Lecture 14 - Problem on scaling of Vanderwaal interactions

Lecture 15 - Calculation of Vanderwaal's forces between semi-infinite blocks and Hamaker constant - I

Lecture 16 - Calculation of Vanderwaal's forces between semi-infinite blocks and Hamaker constant - II

Lecture 17 - Theories of Vanderwaal forces based on bulk properties and calculation of Hamaker constant using

Lecture 18 - Effect of medium on Vanderwaal's interactions - I

Lecture 19 - Effect of medium on Vanderwaal's interactions - II

Lecture 20 - Colloid Polymer mixtures

Lecture 21 - Colloid polymer mixtures

Lecture 22 - Colloid polymer mixtures

Lecture 23 - Colloid polymer mixtures

Lecture 24 - Depletion interactions

Lecture 25 - Steric interactions/osmotic repulsion

Lecture 26 - Tutorial problem on depletion interactions

Lecture 27 - Colloidal Interactions

Lecture 28 - Introduction to models of electrical double layer

Lecture 29 - Review and summary of Helmholtz model (or capacitor model) of electrical double layer

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

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- Lecture 30 - Models of electrical double layer
- Lecture 31 - Potential distribution near planar surfaces
- Lecture 32 - Potential distribution near planar surfaces
- Lecture 33 - Potential distribution near spherical surfaces
- Lecture 34 - Comparison of Capacitor model and Diffuse double layer model
- Lecture 35 - Models of electrical double layer
- Lecture 36 - Models of electrical double layer
- Lecture 37 - Structure of Electrical double layer
- Lecture 38 - Force of Repulsion between interacting surfaces
- Lecture 39 - Potential Energy of repulsion between Planar double layers and DLVO Theory
- Lecture 40 - Zeta Potential and Electrophoretic mobility of an ion
- Lecture 41 - Electrokinetic Phenomena
- Lecture 42 - Relation between Electrophoretic mobility and Zeta potential - I
- Lecture 43 - Relation between Electrophoretic mobility and Zeta potential - II
- Lecture 44 - Colloidal particles at interfaces
- Lecture 45 - Characterization of Particles at interface
- Lecture 46 - Experimental Observations -Concept of Electrostatic interactions and Stability at interfaces
- Lecture 47 - Implications from Surface energy balances and Estimation of energy required for detachment
- Lecture 48 - Colloidal interactions at interface

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

NPTEL Video Course - Chemical Engineering - NOC:Polymers: Concepts, Properties, Uses and Sustainability

Subject Co-ordinator - Dr. Abhijit P. Deshpande

Co-ordinating Institute - IIT - Madras

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

- Lecture 1 - Why are polymers so common?
- Lecture 2 - Polymers
- Lecture 3 - Process, structure, property
- Lecture 4 - Biopolymers
- Lecture 5 - Molecular weight and distribution
- Lecture 6 - Polymerization
- Lecture 7 - Macromolecular nature
- Lecture 8 - Renewable sources for polymers
- Lecture 9 - Polymerization/depolymerization
- Lecture 10 - States of interest
- Lecture 11 - Application based terms
- Lecture 12 - Reuse and repurpose
- Lecture 13 - Molecular conformations
- Lecture 14 - Size, mobility and flexibility
- Lecture 15 - Polyelectrolytes
- Lecture 16 - Structures in biopolymers
- Lecture 17 - Amorphous/crystalline states - 1
- Lecture 18 - Amorphous/crystalline states - 2
- Lecture 19 - Orientation
- Lecture 20 - Interactions
- Lecture 21 - Kinetics of crystallization
- Lecture 22 - Glass transition - 1
- Lecture 23 - Glass transition - 2
- Lecture 24 - States in environment
- Lecture 25 - Liquid crystalline polymers
- Lecture 26 - Copolymers - 1
- Lecture 27 - Copolymers - 2
- Lecture 28 - Blends - 1
- Lecture 29 - Blends - 2

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

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- Lecture 30 - Microstructure in polymers
- Lecture 31 - Composites
- Lecture 32 - Stress strain response
- Lecture 33 - Additives for polymeric systems
- Lecture 34 - Blends/composites in recycling
- Lecture 35 - Physical/chemical crosslinking
- Lecture 36 - Mechanical properties - I
- Lecture 37 - Mechanical properties - II
- Lecture 38 - Physical and chemical aging
- Lecture 39 - Solutions
- Lecture 40 - Conducting polymers
- Lecture 41 - Dielectric response - I
- Lecture 42 - Dielectric response - II
- Lecture 43 - Plasticity
- Lecture 44 - Properties of composites
- Lecture 45 - Viscoelasticity
- Lecture 46 - Thermal response
- Lecture 47 - Viscoelasticity
- Lecture 48 - Viscoelasticity
- Lecture 49 - Dynamic Mechanical analysis
- Lecture 50 - Damping Applications
- Lecture 51 - Time Temperature superposition
- Lecture 52 - Impact and energy absorption
- Lecture 53 - Testing for applications
- Lecture 54 - Properties of blends
- Lecture 55 - Biomimetic polymers
- Lecture 56 - Advanced mechanics
- Lecture 57 - Viscoelastic response
- Lecture 58 - Polymer packaging
- Lecture 59 - Porous polymers/membranes
- Lecture 60 - Polymer at interfaces
- Lecture 61 - Diffusion in polymers
- Lecture 62 - Compatibilizers
- Lecture 63 - Biopolymer applications
- Lecture 64 - Adhesives and Paints
- Lecture 65 - Dissolution and recovery
- Lecture 66 - Polymerization kinetics
- Lecture 67 - Polymerization reactors
- Lecture 68 - Polymer processing - I

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

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- Lecture 69 - Polymer processing - II
- Lecture 70 - Polymer processing - III
- Lecture 71 - Flow simulations
- Lecture 72 - Processing for recycling
- Lecture 73 - Recycle, up-down cycling - I
- Lecture 74 - Recycle, up-down cycling - II
- Lecture 75 - Flow behaviour - rheology
- Lecture 76 - Crosslinking
- Lecture 77 - Conversion of polymers
- Lecture 78 - Rheology and entanglement
- Lecture 79 - Rheological models
- Lecture 80 - Rheology and processing
- Lecture 81 - Absorption and leaching
- Lecture 82 - Swelling of polymers
- Lecture 83 - Viscosity for polymer processing
- Lecture 84 - Microplastics, aerosols, sediments
- Lecture 85 - Biodegradation of polymers
- Lecture 86 - Biodegradable polymers - 1
- Lecture 87 - Biodegradable polymers - 2