

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

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

Subject Co-ordinator - Prof. V. Kumaran

Co-ordinating Institute - IISc - Bangalore

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

Lecture 1 - Transport by convection and diffusion

Lecture 2 - Non-dimensional analysis of beams

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

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

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

Lecture 6 - Dimensional analysis: Power of an impeller

Lecture 7 - Dimensional analysis: Scaling up of an impeller

Lecture 8 - Dimensional analysis: Convection and diffusion

Lecture 9 - Dimensional analysis: Physical interpretation of dimensionless groups

Lecture 10 - Dimensional analysis: Correlations for dimensionless groups

Lecture 11 - Dimensional analysis: Natural and forced convection

Lecture 12 - Continuum description of fluids

Lecture 13 - Conservation equations and constitutive relations

Lecture 14 - Diffusion: Mechanism of mass diffusion in gases

Lecture 15 - Diffusion: Estimation of mass diffusion coefficient

Lecture 16 - Diffusion: Momentum diffusion coefficient

Lecture 17 - Diffusion: Thermal diffusion coefficient

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

Lecture 19 - Unidirectional transport: Conservation equation for momentum transfer

Lecture 20 - Unidirectional transport: Similarity solution for infinite domain

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

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

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

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

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

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

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

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

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

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- Lecture 30 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Unsteady heat conduction from a cylinder
- Lecture 31 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Unsteady heat conduction from a cylinder
- Lecture 32 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Unsteady heat conduction from a cylinder
- Lecture 33 - Unidirectional transport: Balance laws in cylindrical co-ordinates. Similarity solution for heat conduction from a cylinder
- Lecture 34 - Unidirectional transport: Effect of body force in momentum transfer. Falling film
- Lecture 35 - Unidirectional transport: Effect of pressure in momentum transfer. Flow in a pipe
- Lecture 36 - Unidirectional transport: Friction factor for flow in a pipe
- Lecture 37 - Unidirectional transport: Laminar and turbulent flow in a pipe
- Lecture 38 - Unidirectional transport: Laminar and turbulent flow in a pipe
- Lecture 39 - Unidirectional transport: Oscillatory flow in a pipe. Solution using complex variables
- Lecture 40 - Unidirectional transport: Oscillatory flow in a pipe. Solution using complex variables
- Lecture 41 - Unidirectional transport: Oscillatory flow in a pipe. Solution using complex variables (Continued...)
- Lecture 42 - Unidirectional transport: Oscillatory flow in a pipe. Low and high Reynolds number solutions
- Lecture 43 - Unidirectional transport: Spherical co-ordinates. Heat conduction from a sphere
- Lecture 44 - Mass and energy balance equations in Cartesian co-ordinates
- Lecture 45 - Mass and energy balance equations in Cartesian co-ordinates
- Lecture 46 - Mass and energy balance equations in spherical co-ordinates
- Lecture 47 - Mass and energy balance equations in spherical co-ordinates
- Lecture 48 - Momentum balance: Incompressible Navier-Stokes equations
- Lecture 49 - Balance equation: Convection and diffusion dominated regimes
- Lecture 50 - Diffusion equation: Heat conduction in a rectangular solid
- Lecture 51 - Diffusion equation: Heat conduction in a rectangular solid (Continued...)
- Lecture 52 - Diffusion equation: Heat conduction around a spherical inclusion
- Lecture 53 - Diffusion equation: Heat conduction around a spherical inclusion
- Lecture 54 - Diffusion equation: Effective conductivity of a composite
- Lecture 55 - Diffusion equation: Spherical harmonic solutions
- Lecture 56 - Diffusion equation: Conduction from a point source
- Lecture 57 - Diffusion equation: Method of Green's functions
- Lecture 58 - Diffusion equation: Method of images
- Lecture 59 - Diffusion equation: Equivalence of spherical harmonics and multipole expansion
- Lecture 60 - High Peclet number forced convection: Boundary layer in flow past a heated plate
- Lecture 61 - High Peclet number forced convection: Boundary layer in flow past a heated plate (Continued...)
- Lecture 62 - High Peclet number forced convection: Flow past a heated sphere
- Lecture 63 - High Peclet number forced convection: Flow past a heated sphere (Continued...)
- Lecture 64 - High Peclet number forced convection: Transport to a falling film
- Lecture 65 - High Peclet number forced convection: Transport to a spherical bubble
- Lecture 66 - High Peclet number forced convection: Solutions for an arbitrary geometry
- Lecture 67 - High Peclet number forced convection: Taylor dispersion
- Lecture 68 - Natural convection: Boussinesq equations for heat transfer

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

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