NPTEL Video Course - Biotechnology - Biomathematics

Subject Co-ordinator - Dr. Ranjith Padinhateeri

Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Introduction
Lecture 2 - Graphs and functions - I
Lecture 3 - Graphs and functions - II
Lecture 4 - Functions and derivatives
Lecture 5 - Calculation of derivatives
Lecture 6 - Differentiation and its application in Biology - I
Lecture 7 - Differentiation and its application in Biology - II
Lecture 8 - Differentiation and its application in Biology - III
Lecture 9 - Differentiation and its application in Biology - IV
Lecture 10 - Integration - I
Lecture 11 - Integration - II
Lecture 12 - Differential equations - I
Lecture 13 - Differential equations - II
Lecture 14 - Vectors - I
Lecture 15 - Vectors - II
Lecture 16 - Vectors - III
Lecture 17 - Nernst equation
Lecture 18 - Diffusion - I
Lecture 19 - Diffusion - II
Lecture 20 - Diffusion - III
Lecture 21 - Statistics
Lecture 22 - Statistics
Lecture 23 - Understanding Normal distribution
Lecture 24 - Fitting a function to experimental data
Lecture 25 - Size of a flexible protein
Lecture 26 - Uniform and Poisson distributions; Knudsonâ¬â¬â¬â¬¬s analysis
Lecture 27 - Fourier Series - I
Lecture 28 - Fourier Series - II
Lecture 29 - Fourier transform

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Lecture 30 - Master equation
Lecture 31 - Evolution
Lecture 32 - Tutorial - I
Lecture 33 - Tutorial - II
Lecture 34 - Temperature, Energy and Entropy
Lecture 35 - Partition function, Free energy
Lecture 36 - Bending fluctuations of DNA and spring-like proteins
Lecture 37 - Force-extension and looping of DNA
Lecture 38 - Thermodynamics of protein organization along DNA
Lecture 39 - Learning mathematics with the help of a computer
Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Biotechnology - NOC:Proteins and Gel-Based Proteomics

Subject Co-ordinator - Prof. Sanjeeva Srivastava
Co-ordinating Institute - IIT - Bombay
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 0 - Proteins and Gel-Based Proteomics; Course Introduction
Lecture 1 - Introduction to amino acids
Lecture 2 - Introduction to proteins
Lecture 3 - Protein folding & misfolding
Lecture 4 - Protein purification techniques
Lecture 5 - Introduction to proteomics
Lecture 6 - Systems biology and proteomics
Lecture 7 - Sample preparation and pre-analytical factors
Lecture 8 - Sample preparation
Lecture 9 - Sample preparation
Lecture 10 - One-dimensional electrophoresis
Lecture 11 - 2-DE
Lecture 12 - 2-DE
Lecture 13 - 2-DE
Lecture 14 - 2-DE
Lecture 15 - 2-DE
Lecture 16 - 2D-DIGE
Lecture 17 - 2D-DIGE
Lecture 18 - 2D-DIGE
Lecture 19 - Protein identification using MALDI-TOF/TOF
Lecture 20 - Proteomics experiment data analysis & challenges

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NPTEL Video Course - Biotechnology - NOC: Mass spectrometry based proteomics

Subject Co-ordinator - Prof. Sanjeeva Srivastava
Co-ordinating Institute - IIT - Bombay

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

Lecture 0 - Introductory lecture
Lecture 1 - Introduction to proteomics
Lecture 2 - Proteomics and sample preparation
Lecture 3 - Bacterial protein extraction
Lecture 4 - In-gel digestion
Lecture 5 - Fundamentals of mass spectrometry
Lecture 6 - Chromatography technologies
Lecture 7 - Liquid chromatography
Lecture 8 - Mass spectrometry
Lecture 9 - Mass spectrometry
Lecture 10 - MALDI sample preparation and analysis
Lecture 11 - Introduction to quantitative proteomics
Lecture 12 - Hybrid mass spectrometry configurations
Lecture 13 - SILAC
Lecture 14 - iTRAQ
Lecture 15 - TMT
Lecture 16 - Quantitative proteomics data analysis
Lecture 17 - Proteomics and Systems biology I
Lecture 18 - Proteomics & Systems biology II
Lecture 19 - Proteomics applications
Lecture 20 - Advances and challenges in proteomics

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NPTEL Video Course - Biotechnology - NOC:Interactomics: Protein Arrays and Label-free Biosensors

Subject Co-ordinator - Prof. Sanjeeva Srivastava

Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Introduction to Interactomics
Lecture 2 - An overview of label-free technologies
Lecture 3 - An overview of surface plasmon resonance (SPR)
Lecture 4 - An overview of surface plasmon resonance imaging (SPRi)
Lecture 5 - Basics of SPR
Lecture 6 - Basics of SPR
Lecture 7 - Protein immobilization for protein-protein interaction studies
Lecture 8 - Protein-protein interaction study
Lecture 9 - Protein-protein interaction study
Lecture 10 - Protein-small molecule interaction study
Lecture 11 - Protein-small molecule interaction study
Lecture 12 - SPR
Lecture 13 - SPR
Lecture 14 - An overview of ellipsometry and interferometry techniques
Lecture 15 - An introduction to BioLayer Interferometry (BLI) and its applications in protein research
Lecture 16 - Kinetic analysis of protein-protein interaction using BLI
Lecture 17 - Label-free quantification of proteins using BLI
Lecture 18 - Diffraction-based biosensors - I
Lecture 19 - Diffraction-based biosensors - II
Lecture 20 - Nanotechniques in proteomics - I
Lecture 21 - Nanotechniques in proteomics - II
Lecture 22 - High throughput platforms of interactomics
Lecture 23 - Conventional label based detection techniques for Protein microarrays
Lecture 24 - Novel detection techniques for Protein microarrays
Lecture 25 - Recombinational cloning and its application for Protein microarrays
Lecture 26 - An introduction to Cell-free protein synthesis
Lecture 27 - Cell-free synthesis based protein microarrays
Lecture 28 - Cell-free synthesis based protein microarrays
Lecture 29 - Digging deeper into NAPPA
Lecture 30 - Digging deeper into NAPPA
Lecture 31 - Application of cell free expression protein microarrays in biomarker discovery
Lecture 32 - Application of cell free expression protein microarrays in immunological studies
Lecture 33 - Basics of microarray image scanning
Lecture 34 - Software for Image scanning and data processing
Lecture 35 - Microarray Data Analysis - Part I
Lecture 36 - Microarray Data Analysis - Part II
Lecture 37 - Application of protein microarray in biomarker discovery - I
Lecture 38 - Application of protein microarray in biomarker discovery - II
Lecture 39 - Systems biology and networks
Lecture 40 - Challenges in proteomics
NPTEL Video Course - Biotechnology - NOC: Introduction to Proteomics

Subject Co-ordinator - Prof. Sanjeeva Srivastava
Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Introduction to amino acids
Lecture 2 - Introduction to proteins
Lecture 3 - Protein folding and misfolding
Lecture 4 - Introduction to proteomics
Lecture 5 - Lab session - Protein-protein interaction using label-free biosensors
Lecture 6 - Sample preparation and pre-analytical factors
Lecture 7 - Sample preparation
Lecture 8 - Sample preparation
Lecture 9 - One-dimensional electrophoresis
Lecture 10 - Introduction to 2-DE
Lecture 11 - 2-DE
Lecture 12 - 2-DE
Lecture 13 - 2-DE Applications
Lecture 14 - 2-DE Applications (Continued...) and Challenges
Lecture 15 - Lab session - Protein/peptide pre-fractionation using OFFGEL FRACTIONATOR and data analysis
Lecture 16 - 2D-DIGE
Lecture 17 - 2D-DIGE
Lecture 18 - 2D-DIGE
Lecture 19 - Systems biology and proteomics - I
Lecture 20 - Systems biology and proteomics - II
Lecture 21 - Fundamentals of mass spectrometry
Lecture 22 - Chromatography technologies
Lecture 23 - Liquid chromatography
Lecture 24 - Mass spectrometry
Lecture 25 - Mass spectrometry
Lecture 26 - MALDI sample preparation and analysis
Lecture 27 - Hybrid mass spectrometry configurations
Lecture 28 - Lab session - Demonstration of Q-TOF MS technology
Lecture 29 - In-gel and in-solution digestion

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Lecture 30 - Lab session - Sample preparation
Lecture 31 - Introduction to quantitative proteomics
Lecture 32 - SILAC
Lecture 33 - iTRAQ
Lecture 34 - TMT
Lecture 35 - Quantitative proteomics data analysis
Lecture 36 - Proteomics applications
Lecture 37 - Challenges in proteomics
Lecture 38 - OMICS and translational research
Lecture 39 - Lab session - Targeted proteomics using triple quadrupole mass spectrometry
Lecture 40 - Lab session - Targeted proteomics
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Biotechnology - NOC: Introduction to Biostatistics

Subject Co-ordinator - Prof. Shamik Sen
Co-ordinating Institute - IIT - Bombay
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to the course
Lecture 2 - Data representation and plotting
Lecture 3 - Arithmetic mean
Lecture 4 - Geometric mean
Lecture 5 - Measure of Variability, Standard deviation
Lecture 6 - SME, Z-Score, Box plot
Lecture 7 - Moments, Skewness
Lecture 8 - Kurtosis, R programming
Lecture 9 - R programming
Lecture 10 - Correlation
Lecture 11 - Correlation and Regression - Part-I
Lecture 12 - Correlation and Regression - Part-II
Lecture 13 - Interpolation and extrapolation
Lecture 14 - Nonlinear data fitting
Lecture 15 - Concept of Probability
Lecture 16 - Counting principle, Permutations, and Combinations
Lecture 17 - Conditional probability
Lecture 18 - Conditional probability and Random variables
Lecture 19 - Random variables, Probability mass function, and Probability density function
Lecture 20 - Expectation, Variance and Covariance - Part-I
Lecture 21 - Expectation, Variance and Covariance - Part-II
Lecture 22 - Binomial random variables and Moment generating function
Lecture 23 - Probability distribution
Lecture 24 - Uniform distribution Part-II and Normal distribution Part-I
Lecture 25 - Normal distribution Part-II and Exponential distribution
Lecture 26 - Sampling distributions and Central limit theorem - Part-I
Lecture 27 - Sampling distributions and Central limit theorem - Part-II
Lecture 28 - Central limit theorem - Part-III and Sampling distributions of sample mean
Lecture 29 - Central limit theorem - Part-IV and Confidence intervals

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Lecture 30 - Confidence intervals Part- II
Lecture 31 - Test of Hypothesis - 1
Lecture 32 - Test of Hypothesis - 2 (1 tailed and 2 tailed Test of Hypothesis, p-value)
Lecture 33 - Test of Hypothesis - 3 (1 tailed and 2 tailed Test of Hypothesis, p-value)
Lecture 34 - Test of Hypothesis - 4 (Type -1 and Type -2 error)
Lecture 35 - T-test
Lecture 36 - 1 tailed and 2 tailed T-distribution, Chi-square test
Lecture 37 - ANOVA - 1
Lecture 38 - ANOVA - 2
Lecture 39 - ANOVA - 3
Lecture 40 - ANOVA for linear regression, Block Design
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Biotechnology - NOC: Introduction to Mechanobiology

Subject Co-ordinator - Prof. Shamik Sen
Co-ordinating Institute - IIT - Bombay
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Need to Study Mechanobiology
Lecture 2 - Cell as a Tent, Individual Components
Lecture 3 - Cell-ECM Crosstalk
Lecture 4 - ECM Proteins
Lecture 5 - Measuring Properties of Collagen Networks
Lecture 6 - Properties of Collagen Networks
Lecture 7 - Rheology
Lecture 8 - Rheology of Biopolymer Networks
Lecture 9 - Atomic Force Microscopy (AFM)
Lecture 10 - Design of Protein Constructs for AFM
Lecture 11 - Protein Unfolding using AFM
Lecture 12 - Protein Unfolding using AFM
Lecture 13 - Focal Adhesions
Lecture 14 - Focal Adhesion Organization
Lecture 15 - Focal Adhesions
Lecture 16 - Cytoskeleton
Lecture 17 - Force-velocity Relationships of Actin Networks
Lecture 18 - Mesenchymal Cell Migration
Lecture 19 - Actin Dynamics during Mesenchymal Migration
Lecture 20 - Actin Dynamics during Mesenchymal Migration
Lecture 21 - Adhesion Independent Migration
Lecture 22 - Adhesion Independent and Collective Cell Migration
Lecture 23 - Collective Cell Migration
Lecture 24 - Mechanobiology of Stem Cell Fate - I
Lecture 25 - Mechanobiology of Stem Cell Fate - II
Lecture 26 - Mechanobiology of Stem Cell Fate - III
Lecture 27 - Mechanobiology of Diseases
Lecture 28 - Mechanobiology of Diseases
Lecture 29 - Mechanobiology of Diseases

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| Lecture 30 | Mechanobiology of Diseases |
| Lecture 31 | Mechanobiology of Diseases |
| Lecture 32 | Nuclear Mechanotransduction |
| Lecture 33 | Nuclear Mechanotransduction |
| Lecture 34 | Nuclear Mechanotransduction |
| Lecture 35 | Mechanical Forces and DNA damage |
| Lecture 36 | Techniques in Mechanobiology |
| Lecture 37 | Techniques in Mechanobiology |
| Lecture 38 | Techniques in Mechanobiology |
| Lecture 39 | Techniques in Mechanobiology |
| Lecture 40 | Techniques in Mechanobiology |
NPTEL Video Course - Biotechnology - NOC: Introductory Mathematical Methods for Biologists

Subject Co-ordinator - Dr. Ranjith Padinhateeri

Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Introduction
Lecture 2 - Graphs and Functions
Lecture 3 - Equations as Graphs
Lecture 4 - Graphs
Lecture 5 - Graphs
Lecture 6 - Images as 2D/3D Functions
Lecture 7 - Functions and its Derivatives
Lecture 8 - Computing Derivatives of Curves
Lecture 9 - Rules for Calculating Derivatives
Lecture 10 - Understanding Derivatives
Lecture 11 - Curvature and Second Derivative
Lecture 12 - Plotting Curves
Lecture 13 - Numerical Calculation of Derivatives
Lecture 14 - Function, Derivatives and Series Expansion
Lecture 15 - L'Hopital's Rule and Partial Derivatives
Lecture 16 - Integration
Lecture 17 - Integration
Lecture 18 - Integration
Lecture 19 - Integration
Lecture 20 - Integration
Lecture 21 - Exponential Growth and Decay
Lecture 22 - Scalars and Vectors
Lecture 23 - Vectors
Lecture 24 - Cell Symmetry
Lecture 25 - Gradient, Forces and Flows
Lecture 26 - Gradient, Forces and Flows
Lecture 27 - Understanding Diffusion
Lecture 28 - Diffusion Constant and Einstein Relation 1905
Lecture 29 - Diffusion Equation

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Lecture 30 - Diffusion vs. Active Transport
Lecture 31 - Nernst Equation
Lecture 32 - Fourier Series
Lecture 33 - Fourier Series
Lecture 34 - Fourier Transform
Lecture 35 - Introduction to Statistics
Lecture 36 - Mean, Standard deviation and Distribution
Lecture 37 - Frequency Distribution and Probability Distribution
Lecture 38 - Binomial Distribution
Lecture 39 - Normal Distribution
Lecture 40 - Hypothesis Testing and Mathematical Modeling

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NPTEL Video Course - Biotechnology - NOC:Bioengineering: An Interface with Biology and Medicine

Subject Co-ordinator - Prof. Sanjeeva Srivastava

Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Why biology for engineers - Part I
Lecture 2 - Why biology for engineers - Part II
Lecture 3 - Life processes and Cell
Lecture 4 - Cell and its properties
Lecture 5 - Clinician’s Perspective - I
Lecture 6 - Nucleic Acid and Central Dogma
Lecture 7 - DNA Tools
Lecture 8 - DNA Tools
Lecture 9 - DNA Tools and Biotechnology - I
Lecture 10 - DNA Tools and Biotechnology - II
Lecture 11 - DNA Tools and Biotechnology - III
Lecture 12 - DNA Tools and Biotechnology - IV
Lecture 13 - DNA Tools and Biotechnology - V
Lecture 14 - DNA Tools and Biotechnology - VI
Lecture 15 - Clinician’s Perspective - II
Lecture 16 - Genetics - I
Lecture 17 - Genetics - II
Lecture 18 - Genetics - III
Lecture 19 - Genetics - IV
Lecture 20 - Clinician’s Perspective - III
Lecture 21 - Chromosomal basis of inheritance
Lecture 22 - Linkage, chromosomal disorders
Lecture 23 - Classical Genetics Experiments
Lecture 24 - Bacteria and Viruses
Lecture 25 - Clinician’s Perspective - IV
Lecture 26 - Cell cycle disregulation and Cancer
Lecture 27 - Developmental Biology
Lecture 28 - Principles and application of Animal Cloning
Lecture 29 - Evolution

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Lecture 30 - Clinician's Perspective - V
Lecture 31 - Amino acids and proteins
Lecture 32 - Proteins and Proteomics
Lecture 33 - Techniques to Study Protein and Proteome - I
Lecture 34 - Techniques to Study Protein and Proteome - II
Lecture 35 - Bioinformatics - I
Lecture 36 - Techniques to Study Protein and Proteome - III
Lecture 37 - Protein Interactions and Microarrays
Lecture 38 - Protein interactions and Systems biology
Lecture 39 - Bioinformatics - II
Lecture 40 - Ethics in Research and Publications
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course – Biotechnology – NOC: Applications of Interactomics using Genomics and Proteomics Technologies

Subject Co-ordinator - Prof. Sanjeeva Srivastava

Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Introduction to Interactomics and Protein Arrays
Lecture 2 - NAPPA Technology and Protein Arrays – I
Lecture 3 - NAPPA Technology and Protein Arrays – II
Lecture 4 - Biomarkers
Lecture 5 - Biomarkers
Lecture 6 - Biomarkers
Lecture 7 - NAPPA and its applications in study of antibody immune response in disease and in drug Screening
Lecture 8 - NAPPA and its applications in study of antibody immune response in disease and in drug screening
Lecture 9 - NAPPA and its applications in study of antibody immune response in disease and in drug screening
Lecture 10 - Using functional proteomics to identify biomarkers and therapeutic targets – I
Lecture 11 - Using functional proteomics to identify biomarkers and therapeutic targets – II
Lecture 12 - Applications of protein microarrays in Malaria Research – I
Lecture 13 - Applications of protein microarrays in Malaria Research – II
Lecture 14 - Applications of protein microarrays in Cancer Research – I
Lecture 15 - Applications of protein microarrays in Cancer Research – II
Lecture 16 - Introduction to Bioprinting and Irisâ‡’ Optical QC Benefits – I
Lecture 17 - Introduction to Bioprinting and Irisâ‡’ Optical QC Benefits – II
Lecture 18 - Basics and Applications of Reverse Phase Protein Arrays – I
Lecture 19 - Basics and Applications of Reverse Phase Protein Arrays – II
Lecture 20 - Basics and Applications of Reverse Phase Protein Arrays – III
Lecture 21 - Antibody signatures defined by high-content peptide microarray analysis
Lecture 22 - An overview of label-free technologies – I
Lecture 23 - An overview of label-free technologies – II
Lecture 24 - Mass Spectrometry coupled Interactomics – I
Lecture 25 - Mass Spectrometry coupled Interactomics – II
Lecture 26 - Biomolecular interactions using Bio-Layer Interferometry (BLI) – I
Lecture 27 - Biomolecular interactions using Bio-Layer Interferometry (BLI) – II
Lecture 28 - Biomolecular interaction analytics using MicroScale Thermophoresis
Lecture 29 - Surface Plasmon Resonance- Principles and Assays – I

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Lecture 30 - Surface Plasmon Resonance- Principles and Assays - II
Lecture 31 - Use of SPR in unravelling domain motif interactions of proteasomal assembly chaperones
Lecture 32 - Next-Generation Sequencing Technology- Ion Torrent
Lecture 33 - NGS Technology- Bioinformatics and data analysis - I
Lecture 34 - NGS Technology- Bioinformatics and data analysis - II
Lecture 35 - Next-Generation Sequencing Technology-MiSeq System
Lecture 36 - NGS target enrichment workflow for exomes, targeted panels and beyond
Lecture 37 - The Human Pathology Atlas
Lecture 38 - The Human Pathology Atlas
Lecture 39 - Conclusions and Overview - I (Statistical analysis - I)
Lecture 40 - Conclusions and overview - II (Statistical analysis - II)
Lecture 30 - Hypothesis testing
Lecture 31 - ProTIGY - I
Lecture 32 - ProTIGY - II
Lecture 33 - Proteomics Data Analysis
Lecture 34 - Proteomics Lab Demonstration - I
Lecture 35 - Proteomics Lab Demonstration - II
Lecture 36 - Workflow to Automated Data Processing
Lecture 37 - Introduction to Fire Cloud
Lecture 38 - FireCloud and Data Model
Lecture 39 - Bioinformatics solutions for Big Data Analysis - I
Lecture 40 - Bioinformatics solutions for Big Data Analysis - II
Lecture 41 - Introduction to Targeted Proteomics
Lecture 42 - Data analysis using Skyline
Lecture 43 - Large-scale data Science - I
Lecture 44 - Large-scale data Science - II
Lecture 45 - Large-scale data Science - III
Lecture 46 - DIA-SWATH Atlas - I
Lecture 47 - DIA-SWATH Atlas - II
Lecture 48 - Prediction Analysis
Lecture 49 - Pathway Enrichment and Network Analysis
Lecture 50 - Human Protein Atlas - I
Lecture 51 - Human Protein Atlas - II
Lecture 52 - Affinity based proteomics & HPA
Lecture 53 - Clinical Considerations for OMICS - I
Lecture 54 - Clinical Considerations for OMICS - II
Lecture 55 - Topics in Proteogenomics
Lecture 56 - Integrative Genomics Viewer (IGV)
Lecture 57 - Introduction to Proteogenomics - I
Lecture 58 - Introduction to Proteogenomics - II
Lecture 59 - Sequence centric proteogenomics
Lecture 60 - Variant Analysis
Lecture 61 - Proteomics - Clinical Applications
Lecture 62 - Perspectives in Proteogenomics - II
Lecture 63 - Predictive Analysis - I
Lecture 64 - Predictive Analysis - II
Lecture 65 - Association/ Marker Selection
Lecture 66 - WebGestalt - I
Lecture 67 - WebGestalt - II
Lecture 68 - Perspectives in Proteogenomics - III
Lecture 69 - Network Analysis - I
Lecture 70 - Network Analysis - II
Lecture 71 - Mutations and Signaling - I
Lecture 72 - Mutations and Signaling - II
Lecture 73 - Pathway Enrichment - I
Lecture 74 - Perspectives in Proteogenomics - IV
Lecture 75 - Pathway Enrichment - II
Lecture 76 - Sequence - GSEA
Lecture 77 - Linked Omics - I
Lecture 78 - Linked Omics - II
Lecture 79 - Proteogenomics - Opportunities and Challenges
Lecture 80 - Perspectives in Proteogenomics - V
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Biotechnology - Enzyme Science and Engineering

Subject Co-ordinator - Prof. Subhash Chand

Co-ordinating Institute - IIT - Delhi

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

Lecture 1 - Introduction and Scope to Enzyme Science and Engineering
Lecture 2 - Characteristic Features of Enzymes
Lecture 3 - Enzymes as Biocatalysts
Lecture 4 - Enzymatic Catalysis
Lecture 5 - Specificity of Enzyme Action
Lecture 6 - Kinetics of Enzyme Catalyzed Reactions
Lecture 7 - Kinetics of Enzyme Catalyzed Reactions
Lecture 8 - Deviation from Hyperbolic Enzyme Kinetics
Lecture 9 - Role of Effector Molecules in Enzyme Kinetics
Lecture 10 - Reversible Inhibition
Lecture 11 - Effect of PH and Temperature on Enzyme
Lecture 12 - Kinetics of Bi substrate Enzyme
Lecture 13 - Kinetics of Bi substrate Enzyme
Lecture 14 - Immobilized Enzymes - I
Lecture 15 - Immobilized Enzymes - II
Lecture 16 - Immobilized Enzymes - III
Lecture 17 - Immobilization of Enzymes by Entrapment
Lecture 18 - Effect of Immobilization
Lecture 19 - Reactors for Enzyme Catalyzed Reactions
Lecture 20 - Idealized Enzyme Reactor Performance
Lecture 21 - Idealized Enzyme Reactor Performance
Lecture 22 - Kinetic Parameters for IME Systems
Lecture 23 - Steady State Analysis of Mass Transfer
Lecture 24 - Steady State Analysis of Mass Transfer
Lecture 25 - Non Ideal Flow in Continuous Immobilized Enzyme
Lecture 26 - Applications of Immobilized Enzymes in Process
Lecture 27 - Analytical Applications
Lecture 28 - Enzyme Technology Challenges

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NPTEL Video Course - Biotechnology - NOC: Introduction to Dynamical Models in Biology

Subject Co-ordinator - Prof. Biplab Bose

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Mathematical modeling in Biology
Lecture 2 - How to Start Modeling
Lecture 3 - Modeling the spread of infectious disease
Lecture 4 - Modeling population growth
Lecture 5 - Numerical solution of ODE-1
Lecture 6 - Numerical solution of ODE-2
Lecture 7 - Simulating ODE-based models
Lecture 8 - Simulating ODE-based models
Lecture 9 - Steady state and stability analysis
Lecture 10 - Steady state and stability analysis
Lecture 11 - Phase Plane Analysis - I
Lecture 12 - Phase Plane Analysis - II
Lecture 13 - Concepts of Bifurcation
Lecture 14 - Concepts of Bifurcation
Lecture 15 - Modeling Molecular Processes in Cell
Lecture 16 - Modeling Molecular Processes in Cell
Lecture 17 - Modeling Molecular Processes in Cell
Lecture 18 - Modeling Molecular Processes in Cell
Lecture 19 - Modeling Cell Signaling
Lecture 20 - Modeling Cell Signaling
Lecture 21 - Modeling Cell Signaling
Lecture 22 - Modeling Transcriptional Circuits-1
Lecture 23 - Modeling Transcriptional Circuits-2
Lecture 24 - Online Resources for Mathematical Modeling in Biology
Lecture 30 - Affinity Chromatography - Part 4
Lecture 31 - Electrophoresis - Part 1
Lecture 32 - Electrophoresis - Part 2
Lecture 33 - Electrophoresis - Part 3
Lecture 34 - Protein Sequencing
Lecture 35 - Spectroscopy - Part I
Lecture 36 - Spectroscopy - Part II
Lecture 37 - Biotechnology Applications - Part 1
Lecture 38 - Biotechnology Applications - Part 2
Lecture 39 - Biotechnology Applications - Part 3
Lecture 40 - Summary and Conclusions - Part 1
Lecture 41 - Summary and Conclusions - Part 2
NPTEL Video Course - Biotechnology - Animal Physiology

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Animal Physiology
Lecture 2 - Animal Physiology
Lecture 3 - Animal Physiology
Lecture 4 - Animal Physiology
Lecture 5 - Animal Physiology
Lecture 6 - Animal Physiology
Lecture 7 - Animal Physiology
Lecture 8 - Animal Physiology
Lecture 9 - Animal Physiology
Lecture 10 - Animal Physiology
Lecture 11 - Animal Physiology
Lecture 12 - Animal Physiology
Lecture 13 - Animal Physiology
Lecture 14 - Animal Physiology
Lecture 15 - Animal Physiology
Lecture 16 - Animal Physiology
Lecture 17 - Animal Physiology
Lecture 18 - Animal Physiology
Lecture 19 - Animal Physiology
Lecture 20 - Animal Physiology
Lecture 21 - Animal Physiology
Lecture 22 - Animal Physiology
Lecture 23 - Animal Physiology
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NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Biotechnology - Bio electricity

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

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

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

NPTEL Video Course - Biotechnology - NOC: Human Molecular Genetics

Subject Co-ordinator - Mr. S. Ganesh
Co-ordinating Institute - IIT - Kanpur
Sub-Titles - Available / Unavailable  |  MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Fundamentals of central dogma, Part 1
Lecture 2 - Fundamentals of central dogma, Part 2
Lecture 3 - Fundamentals of central dogma, Part 3
Lecture 4 - Chromosome Structure and Function
Lecture 5 - Pedigree Analysis
Lecture 6 - Complications in Mendelian Pedigree Patterns
Lecture 7 - DNA Cloning and Hybridization Techniques - Part 1
Lecture 8 - DNA Cloning and Hybridization Techniques - Part 2
Lecture 9 - Practice Session 1
Lecture 10 - Practice Session 2
Lecture 11 - Mutations and instability of human DNA (Part 1)
Lecture 12 - Mutations and instability of human DNA (Part 2)
Lecture 13 - Animal Models for Human Diseases
Lecture 14 - Positional cloning of genes for monogenic disorders
Lecture 15 - Human Genome Project and HapMap project
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Biotechnology - NOC:Functional Genomics

Subject Co-ordinator - S. Ganesh
Co-ordinating Institute - IIT - Kanpur
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

 Lecture 1 - Introduction to Functional Genomics
 Lecture 2 - The Genomics Era
 Lecture 3 - Epigenetics
 Lecture 4 - Forward Genetics vs Reverse Genetics
 Lecture 5 - Genome Editing Approaches - Part 1
 Lecture 6 - Genome Editing Approaches - Part 2
 Lecture 7 - Transcriptomics - Part 1
 Lecture 8 - Transcriptomics - Part 2
 Lecture 9 - Genome Sequence Databases
 Lecture 10 - DNA Sequencing Methods - Part 1
 Lecture 11 - DNA Sequencing Methods - Part 2
 Lecture 12 - Applications of Next-Generation Sequencing (NGS)
 Lecture 13 - Tutorial - Session 1
 Lecture 14 - Tutorial - Session 2
 Lecture 15 - Genomic Insight into Evolution
 Lecture 16 - Genome sequence
 Lecture 17 - Outcome of Comparative Genomics
 Lecture 18 - Laboratory - Session 1
 Lecture 19 - Laboratory - Session 2
# NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Biotechnology - NOC:Bioenergy

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

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Lecture 31 - Introduction of Gasification
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Lecture 33 - Feed Stock Treatment of Gasification
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NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Biotechnology - NOC:Animal Physiology

Subject Co-ordinator - Prof. Mainak Das
Co-ordinating Institute - IIT - Kanpur

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Lecture 31 - Alzheimers disease
Lecture 32 - Parkinsons disease
Lecture 33 - Amyotrophic lateral sclerosis
Lecture 34 - Spinal cord injury
Lecture 35 - Glial cells
Lecture 36 - Stretch reflex circuit - I
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Lecture 39 - Hearing system
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NPTEL Video Course - Biotechnology - NOC: Cell Culture Technologies

Subject Co-ordinator - Prof. Mainak Das
Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Introduction of Cell Culture Technology
Lecture 2 - Philosophy and complexity in cell culture
Lecture 3 - To grow the cell outside the body
Lecture 4 - Cell cycle concept
Lecture 5 - Dividing cells
Lecture 6 - Biology of cell culture
Lecture 7 - Layout(s) and design(s) of cell culture facility
Lecture 8 - Precautions during designing the lab layout - I
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Lecture 11 - State of the art facility in cell culture lab - I
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Lecture 14 - Interaction of cell and glass/polycarbonate surface - I
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Lecture 30 - Cell separation and in vitro myelination cell culture mode - V
Lecture 31 - Fluorescent assisted cell sorting
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NPTEL Video Course - Biotechnology - NOC: Forest Biometry

Subject Co-ordinator - Prof. Mainak Das, Dr. Ankur Awadhiya

Co-ordinating Institute - IIT - Kanpur

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

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Lecture 2 - Recap of formulae
Lecture 3 - Recap of trigonometry
Lecture 4 - Measurement of central tendency and dispersion
Lecture 5 - Graphical presentation of data
Lecture 6 - Shape of a tree
Lecture 7 - Metzgers theory
Lecture 8 - Form factor and form quotients
Lecture 9 - Taper equations
Lecture 10 - Making the cuts
Lecture 11 - Cross-section of a tree
Lecture 12 - Where to measure the diameter
Lecture 13 - Callipers - Usages and Issues
Lecture 14 - Tape
Lecture 15 - Measurement of bark and growth rings
Lecture 16 - Tree height
Lecture 17 - Method of similar triangles
Lecture 18 - Distance measurements
Lecture 19 - Angular measurement
Lecture 20 - LIDAR
Lecture 21 - Canopy attributes - Part I
Lecture 22 - Canopy attributes - Part II
Lecture 23 - Canopy attributes - Part III
Lecture 24 - Canopy cover and closure
Lecture 25 - Photogrammetry
Lecture 26 - Basal area of a tree and stand
Lecture 27 - Stand basal area, crop diameter and crop age
Lecture 28 - Point sampling - I
Lecture 29 - Point sampling - II

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Lecture 30 - Number density and sample calculations
Lecture 31 - Volume
Lecture 32 - The Quarter - girth formula
Lecture 33 - Volume computations in the field
Lecture 34 - Volume Table
Lecture 35 - Forest Sampling
Lecture 36 - Density and mass measurement
Lecture 37 - Normalized difference vegetation Index (NDVI)
Lecture 38 - Site quality
Lecture 39 - Recap - I
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NPTEL Video Course - Biotechnology - NOC: Introduction to Professional and Scientific Communication

Subject Co-ordinator - Mr. S. Ganesh
Co-ordinating Institute - IIT - Kanpur

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Lecture 1 - Introduction to the topic
Lecture 2 - Where do research ideas come from?
Lecture 3 - Inductive vs Deductive Reasoning
Lecture 4 - Scientific Hypothesis
Lecture 5 - Scientific Hypothesis (Continued...)
Lecture 6 - Testing the Hypothesis
Lecture 7 - Introduction to Scientific Writing
Lecture 8 - Writing an Abstract
Lecture 9 - Title for a Research Paper
Lecture 10 - Title and Keywords
Lecture 11 - Mileposts for the Article Writing
Lecture 12 - Writing the Methods Section
Lecture 13 - Writing the Results Section
Lecture 14 - Writing Results Section (Continued...)
Lecture 15 - How to Prepare Figures
Lecture 16 - How to Prepare Schematics
Lecture 17 - How to write Introduction and Discussion Sections
Lecture 18 - Finalizing the Manuscript and Ethics in Research
Lecture 19 - Writing a Research Proposal and Preparing for a Presentation
Lecture 20 - Tutorial Session
NPTEL Video Course - Biotechnology - NOC: Bioelectrochemistry

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

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

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Lecture 2 - Basic Concepts - II
Lecture 3 - Key Terms
Lecture 4 - Galvanic Cells - I
Lecture 5 - Galvanic Cells - II
Lecture 6 - Salt Bridge
Lecture 7 - Standard Potentials - I
Lecture 8 - Standard Potentials - II
Lecture 9 - Standard Potentials - III
Lecture 10 - Nernst Equation
Lecture 11 - Relationship between Standard electrode potential (E°) and Equilibrium constant (K)
Lecture 12 - Cell as chemical probe and Biochemist's formal potential
Lecture 13 - Concept of Concentration Cell - I
Lecture 14 - Concept of Concentration Cell - II
Lecture 15 - Bio-electrochemistry of excitable cells (nerve cells)
Lecture 16 - Types of electrodes
Lecture 17 - Critical care profile and metal electrode
Lecture 18 - pH measurement
Lecture 19 - Redox indicators amperometry
Lecture 20 - Redox proteins, Metalloproteins and Cyclic Voltammetry

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NPTEL Video Course - Biotechnology - NOC: Bioenergetics of Life Processes

Subject Co-ordinator - Prof. Mainak Das

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Bioenergetics of Life Processes
Lecture 2 - Bioenergetics
Lecture 3 - Iron-Sulfur world
Lecture 4 - Evolution of complex cellular membranes
Lecture 5 - Charge transfer across membrane
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Lecture 7 - Biological order and energy - II
Lecture 8 - Biological order and energy - III
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Lecture 10 - Summary of thermodynamical parameters - II
Lecture 11 - Photosynthesis - I
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Lecture 15 - Photosynthesis - V
Lecture 16 - Photosynthesis - VI
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Lecture 18 - Photosynthesis - VIII
Lecture 19 - ATP Synthesis
Lecture 20 - Mitochondria and Chemiosmotic hypothesis

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NPTEL Video Course - Biotechnology - NOC:WildLife Conservation

Subject Co-ordinator - Dr. Ankur Awadhiya

Co-ordinating Institute - IIT - Kanpur

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

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Lecture 2 - A closer look at Biodiversity
Lecture 3 - Economics Valuation of Biodiversity
Lecture 4 - Threats to Biodiversity
Lecture 5 - Preliminaries
Lecture 6 - Basics of Sampling
Lecture 7 - Distance Sampling - I
Lecture 8 - Distance Sampling - II
Lecture 9 - Radio-telemetry
Lecture 10 - Behavioural monitoring
Lecture 11 - What is a habitat
Lecture 12 - Habitat degradation, loss, fragmentation and displacement
Lecture 13 - Reserve selection and design
Lecture 14 - Habitat management and improvement
Lecture 15 - Some terminologies
Lecture 16 - Some common wildlife diseases
Lecture 17 - Principles of disease management
Lecture 18 - Preliminaries
Lecture 19 - Mechanical capture
Lecture 20 - Chemical capture
Lecture 21 - Capture myopathy
Lecture 22 - Care of immobilised animal
Lecture 23 - Legal aspects of capture and restraint
Lecture 24 - Other topics in capture and restraint
Lecture 25 - Preliminaries and introduction to genetics
Lecture 26 - Population genetics
Lecture 27 - Chromosomal and genetic disorders, inbreeding
Lecture 28 - Population viability analysis
Lecture 29 - Reintroductions and outbreeding

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Lecture 30 - Fundamentals
Lecture 31 - Zoos and their management
Lecture 32 - Botanical gardens
Lecture 33 - Other aspects
Lecture 34 - Impacts of climate change
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Lecture 38 - Revision - I
Lecture 39 - Revision - II
Lecture 40 - Revision - III
NPTEL Video Course - Biotechnology - NOC: Nanotechnology in Agriculture

Subject Co-ordinator - Prof. Mainak Das
Co-ordinating Institute - IIT - Kanpur

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Lecture 2 - What is Nanotechnology
Lecture 3 - An outline
Lecture 4 - Agriculture
Lecture 5 - Modern Agriculture
Lecture 6 - A Restart
Lecture 7 - Classifying nanomaterials Based on Shape and Geometry
Lecture 8 - Classifying Nanomaterials Based on Chemical Nature
Lecture 9 - Physical Approaches to Nanomaterial Synthesis
Lecture 10 - Biological and Chemical Approaches to Nanomaterial Synthesis
Lecture 11 - Detailed Physical Techniques - I
Lecture 12 - Detailed Physical Techniques - II
Lecture 13 - Detailed Chemical Techniques
Lecture 14 - Detailed Biological Techniques
Lecture 15 - Basic Characterisation Techniques of Nanomaterials
Lecture 16 - Characterisation techniques for physical and chemical surface properties of a material
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Lecture 18 - Iron pyrite and seed pre-treatment
Lecture 19 - nano-Pyrite and its lab trial with chickpea
Lecture 20 - nano-Pyrite field trial with spinach and its mechanistic details
Lecture 21 - Mechanistic details of the action of Pyrite nano-particle
Lecture 22 - Application of Pyrite nano-particle in different crops
Lecture 23 - Application of different nano-particles in Agriculture - I
Lecture 24 - Benefits of nanoparticles in Agriculture
Lecture 25 - Nanotechnology in animal production
Lecture 26 - Antioxidant nanomaterial in animal production - I
Lecture 27 - Antioxidant nanomaterial in animal production - II
Lecture 28 - Antioxidant nanomaterial in animal production - III
Lecture 29 - Antioxidant nanomaterial in skeletal muscle development - I

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Lecture 30 - Antioxidant nanomaterial in skeletal muscle development - II
Lecture 31 - Skeletal muscle development and nanomaterial intervention
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Lecture 33 - Summarising role of nanomaterials in animal production
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NPTEL Video Course - Biotechnology - NOC:Wild Life Ecology

Subject Co-ordinator - Dr. Ankur Awadhiya, Prof. Mainak Das
Co-ordinating Institute - IIT - Kanpur
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Lecture 2 - A historical overview of Ecology
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Lecture 4 - The levels of organisation
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Lecture 7 - Positive Interactions
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Lecture 9 - Study of Behaviour and Behavioral Ecology
Lecture 10 - Food chains, Food webs and trophic levels
Lecture 11 - Primary Production
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Lecture 13 - Population parameters and demographic techniques
Lecture 14 - Population growth and regulation
Lecture 15 - Population studies and applications
Lecture 16 - Community nature and parameters
Lecture 17 - Community changes and ecological succession
Lecture 18 - Community organisation
Lecture 19 - Biography
Lecture 20 - Why are things where they are?
Lecture 21 - Some push and pull factors in greater detail
Lecture 22 - Threats to species
Lecture 23 - In-situ conservation
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Lecture 25 - Introduction and impacts
Lecture 26 - Human population growth and food requirements
Lecture 27 - Sustainable development
Lecture 28 - Oil spills
Lecture 29 - Plastic and biodiversity

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Lecture 30 - Impacts of climate change
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Lecture 36 - Revision
NPTEL Video Course - Chemistry and Biochemistry - BioChemistry I

Subject Co-ordinator - Prof. S. Dasgupta
Co-ordinating Institute - IIT - Kharagpur

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Lecture 10 - Enzymes Mechanisms - I
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Lecture 13 - Lipids and Membranes - I
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Lecture 16 - Carbohydrates - I
Lecture 17 - Carbohydrates - II
Lecture 18 - Vitamins and Coenzymes - I
Lecture 19 - Vitamins and Coenzymes - II
Lecture 20 - Nucleic Acids - I
Lecture 21 - Nucleic Acids - II
Lecture 22 - Nucleic Acids - III
Lecture 23 - Bioenergetics - I
Lecture 24 - Bioenergetics - II
Lecture 25 - Metabolism - I
Lecture 26 - Metabolism - II
Lecture 27 - Metabolism - III
Lecture 28 - Overview of the Course
NPTEL Video Course - Biotechnology - NOC: Industrial Biotechnology

Subject Co-ordinator - Prof. Debabrata Das

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Industrial Biotechnology
Lecture 2 - Development of industrial strain
Lecture 3 - Medium characteristics and biochemical pathways
Lecture 4 - Chemical reaction kinetics
Lecture 5 - Chemical reaction analysis (Continued...)
Lecture 6 - Different types of reactors
Lecture 7 - Reactor analysis
Lecture 8 - Reactor analysis (Continued...)
Lecture 9 - Stoichiometry of bioprocesses
Lecture 10 - Stoichiometry of bioprocesses (Continued...)
Lecture 11 - Enzymatic reaction Kinetics
Lecture 12 - Enzymatic reaction Kinetics (Continued...)
Lecture 13 - Immobilization techniques
Lecture 14 - Immobilization techniques (Continued...)
Lecture 15 - Life cycle of the microbial cell, Microbial growth kinetics, product formation and substrate degradation
Lecture 16 - Microbial growth kinetics, product formation and substrate degradation (Continued...)
Lecture 17 - Microbial growth kinetics, product formation and substrate degradation (Continued...)
Lecture 18 - Overview of the fermenter
Lecture 19 - Flow diagrams and pumps and valves used in fermentation industries
Lecture 20 - Flow diagrams and pumps and valves used in fermentation industries (Continued...)
Lecture 21 - Upstream processing
Lecture 22 - Upstream processing
Lecture 23 - Upstream processing
Lecture 24 - Downstream processing
Lecture 25 - Downstream processing
Lecture 26 - Downstream processing
Lecture 27 - Ethanol fermentation
Lecture 28 - Ethanol fermentation (Continued...)
Lecture 29 - Brewing industry

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Lecture 30 - Brewing industry (Continued...)
Lecture 31 - Wine industry
Lecture 32 - Vinegar production
Lecture 33 - Citric acid production
Lecture 34 - Citric acid production (Continued...)
Lecture 35 - Citric acid production (Continued...)
Lecture 36 - Lactic acid production
Lecture 37 - Lactic acid production (Continued...)
Lecture 38 - Glutamic acid production
Lecture 39 - Penicillin production
Lecture 40 - Penicillin production (Continued...)
Lecture 41 - Cephalosporin production
Lecture 42 - Streptomycin production
Lecture 43 - Bakerâ’s yeast fermentation
Lecture 44 - Bakerâ’s yeast fermentation (Continued...)
Lecture 45 - Fodder yeast production
Lecture 46 - Spirulina production
Lecture 47 - Alpha amylase production
Lecture 48 - High fructose corn syrup production
Lecture 49 - Metal leaching
Lecture 50 - Cheese production
Lecture 51 - Cheese production (Continued...)
Lecture 52 - Biodiesel production
Lecture 53 - Butanol production
Lecture 54 - Biofertilizer
Lecture 55 - Aerobic effluent treatment process
Lecture 56 - Aerobic effluent treatment process (Continued...)
Lecture 57 - Anaerobic effluent treatment process
Lecture 58 - Anaerobic effluent treatment process
Lecture 59 - 10 m^3 Pilot Plant operation for Biohydrogen production
Lecture 60 - Summary and conclusion
NPTEL Video Course - Biotechnology - NOC:Biomicrofluidics

Subject Co-ordinator - Prof. Tapas Kumar Maiti, Prof. Suman Chakraborty

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction to Biomicrofluidics
Lecture 2 - Introduction to Biomicrofluidics (Continued...)
Lecture 3 - Engineers' guide to the cell
Lecture 4 - Fluidics in living systems and mechanobiology
Lecture 5 - Pressure Driven Flows
Lecture 6 - Surface tension driven flows
Lecture 7 - Modulating surface tension
Lecture 8 - Lab on a CD
Lecture 9 - Introduction to Electrokinetics - Part I
Lecture 10 - Introduction to Electrokinetics - Part II
Lecture 11 - Microfluidic cell culture - Part I
Lecture 12 - Microfluidic cell culture - Part II
Lecture 13 - On-chip cellular assay techniques - Part I
Lecture 14 - On-chip cellular assay techniques - Part II
Lecture 15 - Microfluidics for understanding biology
Lecture 16 - Organ-on-a-chip
Lecture 17 - Lab-on-a-chip for genetic analysis
Lecture 18 - Microfluidic technology for monoclonal antibody production
Lecture 19 - Microfluidics for Healthcare
Lecture 20 - Microfluidics for Healthcare

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NPTEL Video Course - Biotechnology - Downstream Processing

Subject Co-ordinator - Prof. Mukesh Doble
Co-ordinating Institute - IIT - Madras
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 3 - Costing
Lecture 4 - Costing (Continued...) Physical and Chemical Principles in Down Stream
Lecture 5 - Problems in Mass Balance, Flow sheet
Lecture 6 - Cell Breakage
Lecture 7 - Cell Breakage (Continued...)
Lecture 8 - Solid Liquid Separation
Lecture 9 - Solid Liquid Separation (Continued...)
Lecture 10 - Solid Liquid Separation - Problems
Lecture 11 - Pre-Treatment and Filters
Lecture 12 - Adsorption
Lecture 13 - Adsorption (Continued...)
Lecture 14 - Adsorption (Continued...)
Lecture 15 - Adsorption (Continued...)
Lecture 16 - Liquid Liquid Extraction
Lecture 17 - Liquid Liquid Extraction (Continued...)
Lecture 18 - Liquid Liquid Extraction (Continued...)
Lecture 19 - Liquid Liquid Extraction (Continued...)
Lecture 20 - Reversed Micellar and Aqueous Two Phase Extraction
Lecture 21 - Membranes
Lecture 22 - Membranes (Continued...)
Lecture 23 - Membranes (Continued...)
Lecture 24 - Membranes (Continued...)
Lecture 25 - Precipitation
Lecture 26 - Chromatography
Lecture 27 - Chromatography (Continued...)
Lecture 28 - Chromatography (Continued...)
Lecture 29 - Chromatography (Continued...)

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Lecture 30 - Chromatography (Continued...)
Lecture 31 - Chromatography (Continued...)
Lecture 32 - Chromatography (Continued...)
Lecture 33 - HPLC
Lecture 34 - HPLC
Lecture 35 - Crystallisation
Lecture 36 - Drying
Lecture 37 - Drying and Distillation
Lecture 38 - Stabilisation, Utilities and Other Auxiliary Processes And Absorption
Lecture 39 - Absorption, Electrophoresis/SDS PAGE
Lecture 40 - Future Trends, Summary of Course
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Biotechnology - Thermodynamics

Subject Co-ordinator - Prof. G.K. Suraishkumar
Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction and Review
Lecture 2 - Need for Analysis Additional Thermodynamic Functions State and Path Variables
Lecture 3 - Equations for a Closed system Chemical Potential Concept Gibbs-Duhem Equation
Lecture 4 - Maxwell's relations
Lecture 5 - Inter-Relationships between Thermodynamic Variables
Lecture 6 - Some Useful Mathematical Manipulations
Lecture 7 - Thermodynamic Relations for a Closed System with 1 mole of a pure Substances
Lecture 8 - Maximum Work, Lost Work Review of Closed Systems
Lecture 9 - Open Systems
Lecture 10 - Equations of State - Virial Equations
Lecture 11 - Equations of State - Cubic Equations
Lecture 12 - Volume Estimation
Lecture 13 - Volume Estimation (Continued...) Generalized correlations
Lecture 14 - Generalized correlations (Continued...) Residual Properties
Lecture 15 - Residual Properties (Continued...)
Lecture 16 - Generalized Correlations and Residual Properties
Lecture 17 - Fugacity Coefficient Estimation
Lecture 18 - Review of Module 3
Lecture 19 - Learning Aspects Chemical Potential Formulations
Lecture 20 - Lewis and Randall rule partial Molar Properties
Lecture 21 - Partial Molar Property Estimation from Mixing Experiments
Lecture 22 - Partial Molar Property Estimation (Continued...) Excess Property
Lecture 23 - Activity Coefficient from Excess Property
Lecture 24 - Activity Coefficient from Excess Property (Continued...)
Lecture 25 - Activity Coefficient from Excess Property (Continued...) Models for Activity Coefficient in Binary Systems
Lecture 26 - Models for Activity Coefficient in Binary Systems (Continued...)
Lecture 27 - Review of Module 4
Lecture 28 - Criteria for Phase Equilibrium Phase Rule for Non-reacting Biosystems
Lecture 29 - Clausius - Clayperon Equation

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Lecture 30 - Clausius - Clayperon Equation (Continued...) vapour-Liquid Equilibrium
Lecture 31 - Vapour-Liquid Equilibrium (Continued...) Estimation of Fugacity coefficient from Equilibrium P-V-T
Lecture 32 - Liquid/Liquid and Solid/Liquid Equilibria
Lecture 33 - Review of Module 5
Lecture 34 - Criteria for Bio-reaction Equilibria
Lecture 35 - Phase rule for Reacting Biosystems Equilibrium constants
Lecture 36 - Effect of Temperature and Pressure on the Equilibrium constants
Lecture 37 - Reaction in Liquid or Solid Phases
Lecture 38 - Free energy Changes for some Bioreactions
Lecture 39 - Electrolytes
Lecture 40 - Course Review
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Biotechnology - NOC:Biostatistics and Design of Experiments

Subject Co-ordinator - Prof. Mukesh Doble
Co-ordinating Institute - IIT - Madras
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Experimental Design Strategy
Lecture 3 - Data types
Lecture 4 - Poisson Distribution
Lecture 5 - Normal Distribution
Lecture 6 - Standardized Normal Distribution / t-distribution
Lecture 7 - t-distribution/confidence interval
Lecture 8 - Statistical tests
Lecture 9 - t-Test
Lecture 10 - t-Tests
Lecture 11 - t-test
Lecture 12 - F-tests
Lecture 13 - F-tests
Lecture 14 - ANOVA
Lecture 15 - ANOVA
Lecture 16 - Anova
Lecture 17 - Anova
Lecture 18 - Anova
Lecture 19 - Anova
Lecture 20 - Anova
Lecture 21 - Normality test / Odds ratio
Lecture 22 - Chi square distribution
Lecture 23 - Chi square distribution / test
Lecture 24 - Chi square test
Lecture 25 - Chi square test and Weibull Distribution
Lecture 26 - Weibull Distribution
Lecture 27 - Weibull distribution.
Lecture 28 - Non-parametric test
Lecture 29 - Non parametric test/homogeneity of variance / beta distribution

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Lecture 30 - Exponential / hypergeometric distributions
Lecture 31 - Hypergeometric / Log norma distribution
Lecture 32 - Design of experiments (DOE) - Introduction
Lecture 33 - Factorial Design
Lecture 34 - Full factorial design
Lecture 35 - Fractional factorial design
Lecture 36 - Other designs
Lecture 37 - Second order designs
Lecture 38 - Second order design
Lecture 39 - Regression analysis
Lecture 40 - Control charts
NPTEL Video Course - Biotechnology - NOC:Bioreactors

Subject Co-ordinator - Prof. G.K. Suraishkumar

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction
Lecture 2 - Sterilization
Lecture 3 - Solution to PP 1.1
Lecture 4 - Some important concepts
Lecture 5 - Enzyme bioreactors, enzyme kinetics
Lecture 6 - Solution to PP 2.1
Lecture 7 - Inhibited enzyme kinetics
Lecture 8 - Solution to PP 2.2
Lecture 9 - Measurement principles and methods
Lecture 10 - Batch growth kinetics
Lecture 11 - Solution to PP 3.1
Lecture 12 - Bioreactor analysis
Lecture 13 - Solution to PP 3.2
Lecture 14 - Bioreactor environment parameters
Lecture 15 - Bioreactor env. par. (DO)
Lecture 16 - Solution to PP 4.1
Lecture 17 - Shear stress, scale-up, scale-down
Lecture 18 - Cell view
Lecture 19 - Solution to PP 5.1
Lecture 20 - Culture status, metabolic flux analysis
Lecture 21 - Course summary
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Biotechnology - NOC:Medical Biomaterials

Subject Co-ordinator - Prof. Mukesh Doble
Co-ordinating Institute - IIT - Madras
Sub-Titles - Available / Unavailable  |  MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Biomaterials
Lecture 2 - Background history
Lecture 3 - History
Lecture 4 - Properties - Mechanical and Physico-chemical
Lecture 5 - Properties - Mechanical and Physico-chemical
Lecture 6 - Mechanical properties
Lecture 7 - Mechanical Properties (Continued...)
Lecture 8 - Resorbability, biodegradation
Lecture 9 - Resorbability, biodegradation (Continued...)
Lecture 10 - Biofilm
Lecture 11 - Biofilm (Continued...)
Lecture 12 - Biofilm (Continued...)
Lecture 13 - Biofilm (Continued...)
Lecture 14 - Material characterization - Analytical instruments
Lecture 15 - Analytical instruments
Lecture 16 - Analytical instruments (Continued...)
Lecture 17 - Analytical instruments (Continued...)
Lecture 18 - Biological responses, compatibility, cytotoxicity
Lecture 19 - Proteins, Tissue and blood Response
Lecture 20 - Cell-biomaterial interaction
Lecture 21 - Animal trials (in vivo)
Lecture 22 - Animal trials
Lecture 23 - Metals-types, classifications, applications
Lecture 24 - Metals - properties
Lecture 25 - Metals - properties (Continued...)
Lecture 26 - Metals - properties (Continued...)
Lecture 27 - Metals
Lecture 28 - Polymers-types, classifications, applications
Lecture 29 - Polymers

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Lecture 30 - Polymers (Continued...)
Lecture 31 - Polymer blends
Lecture 32 - Natural biopolymers
Lecture 33 - Natural biopolymers - (Continued...)
Lecture 34 - Biopolymers - proteins / hydrogels
Lecture 35 - Hydrogels
Lecture 36 - Experiments
Lecture 37 - surface modification - Demonstration
Lecture 38 - Ceramics
Lecture 39 - Cardiovascular and ocular biomaterials
Lecture 40 - Sterilisation/Device failure
NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Biotechnology - NOC:BioInformatics - Algorithms and Applications
Subject Co-ordinator - Prof. M. Michael Gromiha
Co-ordinating Institute - IIT - Madras
Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Concepts and importance of Bioinformatics
Lecture 2 - Complexities in biological systems
Lecture 3 - DNA sequence analysis
Lecture 4 - Sequence based parameters
Lecture 5 - Database
Lecture 6 - Database categories
Lecture 7 - Protein structure and function - I
Lecture 8 - Protein structure and function - II
Lecture 9 - Protein sequence databases - I
Lecture 10 - Protein sequence databases - II
Lecture 11 - Pairwise alignment - I
Lecture 12 - Pairwise alignment - II
Lecture 13 - Uniprot Demo
Lecture 14 - Sequence alignment - I
Lecture 15 - Sequence alignment - II
Lecture 16 - Sequence alignment
Lecture 17 - Sequence alignment
Lecture 18 - Conservation score - I
Lecture 19 - Conservation score - II
Lecture 20 - Blast Demo
Lecture 21 - Phylogenetic trees - I
Lecture 22 - Phylogenetic trees - II
Lecture 23 - Protein sequence analysis - I
Lecture 24 - Protein sequence analysis - II
Lecture 25 - Hydrophobicity profiles
Lecture 26 - Patterns and PSSM profiles
Lecture 27 - Construction of Non-redundant datasets - I
Lecture 28 - Non-redundant datasets - II
Lecture 29 - Protein secondary structure

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Lecture 30 - Secondary structure prediction - I
Lecture 31 - Secondary structure prediction - II
Lecture 32 - Secondary structure prediction - III
Lecture 33 - Protein tertiary structure - I
Lecture 34 - Protein tertiary structure - II
Lecture 35 - Protein structure analysis - I
Lecture 36 - Protein structure analysis - II
Lecture 37 - Protein structure analysis - III
Lecture 38 - Demo
Lecture 39 - Protein structure analysis - IV
Lecture 40 - Protein structure prediction - I
Lecture 41 - Protein structure prediction - II
Lecture 42 - Protein stability - I
Lecture 43 - Protein stability - II
Lecture 44 - Demo
Lecture 45 - Stabilizing residues
Lecture 46 - Thermodynamic database
Lecture 47 - Stability of proteins upon mutations - I
Lecture 48 - Stability of proteins upon mutations - II
Lecture 49 - Demo
Lecture 50 - Protein folding rate - I
Lecture 51 - Protein folding rate - II
Lecture 52 - Protein interactions - I
Lecture 53 - Protein interactions - II
Lecture 54 - Computer aided drug design - I
Lecture 55 - Computer aided drug design - II
Lecture 56 - Virtual screening - I
Lecture 57 - Virtual screening - II
Lecture 58 - QSAR - I
Lecture 59 - QSAR - II
Lecture 60 - Demo
Lecture 61 - awk programming - I
Lecture 62 - awk programming - II
Lecture 63 - Development of algorithms - I
Lecture 64 - Development of algorithms - II
Lecture 65 - Applications of bioinformatics - I
Lecture 66 - Applications of bioinformatics - II
Lecture 67 - Overview - I
Lecture 68 - Overview - II
Lecture 69 - Demo

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NPTEL Video Course - Biotechnology - NOC:Demystifying the Brain

Subject Co-ordinator - Dr. V Srinivasa Chakravarthy

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - The Whole and Its Parts
Lecture 2 - Understanding Brain’s Shape - Segment 1 - Brain size and intelligence
Lecture 3 - Understanding Brain’s Shape - Segment 2 - Save Wire Principle
Lecture 4 - Understanding Brain’s Shape - Segment 3 - Brain Evolution
Lecture 5 - Neurons and Neural Signaling
Lecture 6 - Neural Signalling
Lecture 7 - Networks that Learn - Segment 1
Lecture 8 - Multilayer Perceptrons Applications in Psychology and Neuroscience
Lecture 9 - Organization of the Central Nervous System-Segment 1 - Cortex
Lecture 10 - Organization of the Central Nervous System-Segment 2 - Subcortical Structures
Lecture 11 - Maps in the Brain - Segment 1
Lecture 12 - Maps in the Brain - Segment 2
Lecture 13 - Emotions in the Brain - Segment 1
Lecture 14 - Emotions in the Brain - Segment 2
Lecture 15 - Memories and Holograms - Segment 1
Lecture 16 - Memories and Holograms - Segment 2
Lecture 17 - Consciousness - Segment 1
Lecture 18 - Consciousness - Segment 2

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NPTEL Video Course - Biotechnology - NOC: Computational Systems Biology

Subject Co-ordinator - Prof. Karthik Raman

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction
Lecture 2 - Introduction to Modelling
Lecture 3 - Introduction to Modelling
Lecture 4 - Fundamentals of Mathematical Modelling
Lecture 5 - Fundamentals of Mathematical Modelling
Lecture 6 - Fundamentals of Mathematical Modelling
Lecture 7 - Some Example Models
Lecture 8 - Representation of Biological Networks
Lecture 9 - Lab
Lecture 10 - Lab
Lecture 11 - Lab
Lecture 12 - Lab
Lecture 13 - Introduction to Networks
Lecture 14 - Introduction to Networks
Lecture 15 - Introduction to Network Biology
Lecture 16 - Introduction to Network Biology
Lecture 17 - Introduction to Network Biology
Lecture 18 - Network Biology
Lecture 19 - Network Models
Lecture 20 - Network Models
Lecture 21 - Biological Networks
Lecture 22 - Network Perturbations
Lecture 23 - Community Detection
Lecture 24 - Network Motifs
Lecture 25 - Lab
Lecture 26 - Lab
Lecture 27 - Lab
Lecture 28 - Network Biology
Lecture 29 - Lab

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Lecture 30 - Lab
Lecture 31 - Reconstruction of Gene Regulatory Networks
Lecture 32 - Reconstruction of Protein Networks
Lecture 33 - Reconstruction of Signalling Networks
Lecture 34 - Reconstruction of Signalling Networks
Lecture 35 - Introduction to Dynamic Modelling
Lecture 36 - Introduction to Dynamic Modelling
Lecture 37 - Introduction to Dynamic Modelling
Lecture 38 - Lab
Lecture 39 - Lab
Lecture 40 - Parameter Estimation
Lecture 41 - Parameter Estimation
Lecture 42 - Parameter Estimation
Lecture 43 - Methods for Parameter Estimation
Lecture 44 - Direct Search Methods
Lecture 45 - Genetic Algorithms
Lecture 46 - Genetic Algorithms
Lecture 47 - Other Evolutionary Algorithms
Lecture 48 - PyGMO
Lecture 49 - Dynamic Modelling Recap
Lecture 50 - Lab
Lecture 51 - Guest Lecture
Lecture 52 - Guest Lecture
Lecture 53 - Guest Lecture
Lecture 54 - Guest Lecture
Lecture 55 - Guest Lecture
Lecture 56 - Constraint-based Modelling of Metabolic Networks
Lecture 57 - Flux Balance Analysis
Lecture 58 - Flux Balance Analysis
Lecture 59 - Flux Balance Analysis
Lecture 60 - Other Constraint-Based Approaches
Lecture 61 - Other Constraint-Based Approaches
Lecture 62 - Lab
Lecture 63 - Perturbations to Metabolic Networks
Lecture 64 - Lab
Lecture 65 - Understanding FBA
Lecture 66 - Understanding FBA
Lecture 67 - Perturbations to Metabolic Networks
Lecture 68 - Perturbations to Metabolic Networks
Lecture 69 - Perturbations to Metabolic Networks
Lecture 70 - Constraint-based Modelling of Metabolic Networks
Lecture 71 - Lab
Lecture 72 - Integrating Regulatory Information into Constraint-Based Models
Lecture 73 - Elementary Modes
Lecture 74 - Elementary Modes
Lecture 75 - Constraint-based Modelling of Metabolic Networks
Lecture 76 - Constraint-based Modelling of Metabolic Networks
Lecture 77 - Constraint-based Modelling of Metabolic Networks
Lecture 78 - Lab
Lecture 79 - Constraint-based Modelling of Metabolic Networks
Lecture 80 - Constraint-based Modelling of Metabolic Networks
Lecture 81 - Constraint-based Modelling of Metabolic Networks
Lecture 82 - $^{13}$C-Metabolic Flux Analysis using Mass Spectrometry
Lecture 83 - $^{13}$C-Metabolic Flux Analysis using Mass Spectrometry
Lecture 84 - $^{13}$C-Metabolic Flux Analysis using Mass Spectrometry
Lecture 85 - Lab
Lecture 86 - Modelling Gene Regulatory Networks
Lecture 87 - Modelling Gene Regulatory Networks
Lecture 88 - Modelling Gene Regulatory Networks
Lecture 89 - Lab
Lecture 90 - Lab
Lecture 91 - Computational Modelling of Host-Pathogen Interactions
Lecture 92 - Computational Modelling of Host-Pathogen Interactions
Lecture 93 - Robustness in Biological Systems
Lecture 94 - Robustness in Biological Systems
Lecture 95 - Robustness in Biological Systems
Lecture 96 - Robustness in Biological Systems
Lecture 97 - Obustness and Evolvability
Lecture 98 - obustness and Evolvability
Lecture 99 - Introduction to Synthetic Biology
Lecture 100 - Advanced Topics
Lecture 101 - Advanced Topics
Lecture 102 - Advanced Topics
Lecture 103 - Course Recap

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Lecture 30 - Material Balance
Lecture 31 - The Unreasonable Effectiveness of Material Balance
Lecture 32 - Constraint-based modelling
Lecture 33 - Flux balance analysis - Part 1
Lecture 34 - Flux balance analysis - Part 2
Lecture 35 - Energy Balance Terminologies and Concepts
Lecture 36 - Introduction to Energy Balances - Part 1
Lecture 37 - Introduction to Energy Balances - Part 2
Lecture 38 - Introduction to Energy Balances
Lecture 39 - Mechanical Energy Balances
Lecture 40 - Mechanical Energy Balances
Lecture 41 - Energy Balance Objectives and Procedures
Lecture 42 - Introduction to Nonreactive Processes Without Phase Change
Lecture 43 - Energy Balances on Single-Phase Nonreactive Processes
Lecture 44 - Energy Balances on Single-Phase Nonreactive Processes
Lecture 45 - Fundamentals of Nonreactive Phase Change Processes
Lecture 46 - Estimating Latent Heats
Lecture 47 - Energy Balances on Nonreactive Processes With Phase Change
Lecture 48 - Energy Balances on Nonreactive Processes With Phase Change
Lecture 49 - Energy Balances on Nonreactive Processes With Phase Change
Lecture 50 - Psychrometric Charts
Lecture 51 - Energy Balances Using Psychrometric Charts
Lecture 52 - Mixing and Solution
Lecture 53 - Mixing and Solution
Lecture 54 - Mixing and Solution
Lecture 55 - Fundamentals for Energy Balances on Reactive Processes - Part 1
Lecture 56 - Fundamentals for Energy Balances on Reactive Processes - Part 1 and Part 2
Lecture 57 - Fundamentals for Energy Balances on Reactive Processes - Tutorials
Lecture 58 - Energy Balances on Reactive Processes - Part 1
Lecture 59 - Energy Balances on Reactive Processes - Part 2
Lecture 60 - Energy Balances on Reactive Processes - Part 3
Lecture 61 - Energy Balances on Reactive Processes - Part 4
Lecture 62 - Energy Balances on Reactive Processes - Part 5
Lecture 63 - Energy Balances on Reactive Processes - Part 6
Lecture 64 - Energy Balances
Lecture 65 - Energy Balances
Lecture 66 - Energy Balances
Lecture 67 - Energy Balances
Lecture 68 - Unsteady State Material Balances

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Lecture 69 - Unsteady State Energy Balances
NPTEL Video Course - Biotechnology - NOC: Computer Aided Drug Design

Subject Co-ordinator - Prof. Mukesh Doble

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction
Lecture 2 - Drug Discovery - Issues
Lecture 3 - Target and Lead Identification
Lecture 4 - Drug And Data bases
Lecture 5 - Drug Properties
Lecture 6 - Drug - Properties / SMILES
Lecture 7 - Drug Solubility
Lecture 8 - Drug Solubility / permeability
Lecture 9 - ADME
Lecture 10 - Drug - ADME
Lecture 11 - Drug - ADME
Lecture 12 - Drug - BBB
Lecture 13 - Pgp efflux/Drug Likeness
Lecture 14 - Drug Likeness
Lecture 15 - Molecular Modelling
Lecture 16 - Molecular Mechanics / Force Field
Lecture 17 - Molecular Mechanics / Force Field
Lecture 18 - Molecular Mechanics / Force Field
Lecture 19 - Molecular Mechanics / Force Field
Lecture 20 - ODES and Numerical methods
Lecture 21 - ODES and Numerical methods
Lecture 22 - Conformational Search / MD
Lecture 23 - Quantum Mechanics
Lecture 24 - Quantum Mechanics
Lecture 25 - Quantitative Struture Activity Relationship (QSAR)
Lecture 26 - Quantitative Struture Activity Relationship (QSAR)
Lecture 27 - Quantitative Struture Activity Relationship (QSAR)
Lecture 28 - Quantitative Struture Activity Relationship (QSAR)
Lecture 29 - Quantitative Struture Activity Relationship (QSAR)
Lecture 30 - Quantitative Structure Activity Relationship (QSAR)
Lecture 31 - 3D QSAR
Lecture 32 - Pharmacophore modelling
Lecture 33 - Target based drug design
Lecture 34 - Target based drug design
Lecture 35 - Target based drug design
Lecture 36 - Target based drug design
Lecture 37 - Docking
Lecture 38 - Docking
Lecture 39 - Pharmacokinetics / pharmacodynamics
Lecture 40 - Pharmacokinetics / pharmacodynamics
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NPTEL Video Course - Biotechnology - NOC: Plant Cell Bioprocessing

Subject Co-ordinator - Prof. Smita Srivastava

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction to plant cell technology
Lecture 2 - History of plant cell and tissue culture
Lecture 3 - Anatomy of plant cells
Lecture 4 - Plant tissues and functions
Lecture 5 - Photosynthesis and Photorespiration
Lecture 6 - In-vitro culture initiation
Lecture 7 - Nutritional requirements of plant cells
Lecture 8 - Organogenesis and Regeneration
Lecture 9 - Somaclonal variation and Micropropagation
Lecture 10 - Somatic embryogenesis and Protoplast culture
Lecture 11 - Synthetic seeds, Cryopreservation and Freezing methods
Lecture 12 - Secondary metabolism in plant cells - Part 1
Lecture 13 - Secondary metabolism in plant cells - Part 2
Lecture 14 - Secondary metabolism in plant cells - Part 3
Lecture 15 - Secondary metabolism in plant cells - Part 4
Lecture 16 - Optimization strategies - Part 1
Lecture 17 - Optimization strategies - Part 2
Lecture 18 - Optimization strategies - Part 3
Lecture 19 - Optimization strategies - Part 4
Lecture 20 - Biotransformation in plant cultures
Lecture 21 - Immobilization of plant cells
Lecture 22 - Genetic transformations in plant cells - Part 1
Lecture 23 - Genetic transformations in plant cells - Part 2
Lecture 24 - Genetic transformations in plant cells - Part 3
Lecture 25 - Plant Cell Bioreactors - Part 1
Lecture 26 - Plant Cell Bioreactors - Part 2
Lecture 27 - Bioreactors for Hairy Root cultures
Lecture 28 - Case study - Part 1
Lecture 29 - Case study - Part 2

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NPTEL Video Course - Biotechnology - NOC:Tissue Engineering

Subject Co-ordinator - Prof. Vignesh Muthuvijayan

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Introduction to Tissue Engineering - Part 1
Lecture 2 - Introduction to Tissue Engineering - Part 2
Lecture 3 - Introduction to Tissue Engineering - Part 3
Lecture 4 - Scaffolds
Lecture 5 - Scaffolds
Lecture 6 - Scaffolds
Lecture 7 - Hydrogels - Part 1
Lecture 8 - Hydrogels - Part 2
Lecture 9 - Bioceramics
Lecture 10 - Scaffold fabrication strategies
Lecture 11 - Self Assembly
Lecture 12 - 3D Bioprinting
Lecture 13 - Material Characterization - Part 1
Lecture 14 - Material Characterization - Part 2
Lecture 15 - Material Characterization - Part 3
Lecture 16 - Cell Source
Lecture 17 - Cell Isolation - Part 1
Lecture 18 - Cell Isolation - Part 2
Lecture 19 - Tissue Dynamics
Lecture 20 - Cell Differentiation
Lecture 21 - Cell Adhesion
Lecture 22 - Cell Migration
Lecture 23 - Signaling and biomolecule delivery in Tissue Engineering
Lecture 24 - Bioreactors in Tissue Engineering
Lecture 25 - Challenges in Tissue Engineering
Lecture 26 - Host integration and immune responses - Part 1
Lecture 27 - Host integration and immune responses - Part 2
Lecture 28 - Bioethics of Tissue Engineering - Part 1
Lecture 29 - Bioethics of Tissue Engineering - Part 2

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Lecture 30 - Skin Tissue Engineering - Part 1
Lecture 31 - Skin Tissue Engineering - Part 2
Lecture 32 - Bone Tissue Engineering - Part 1
Lecture 33 - Bone Tissue Engineering - Part 2
Lecture 34 - Bone Tissue Engineering - Part 3
Lecture 35 - Vascular Tissue Engineering
Lecture 36 - Corneal Tissue Engineering - Part 1
Lecture 37 - Corneal Tissue Engineering - Part 2
NPTEL Video Course - Biotechnology - Analytical Technologies in Biotechnology

Subject Co-ordinator - Dr. Ashwani K. Sharma

Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Basic concepts in microscopy - 1
Lecture 2 - Basic concepts in microscopy - 2
Lecture 3 - Dark-field and phase contrast microscopy
Lecture 4 - Differential interference contrast and polarization
Lecture 5 - Fluorescence and confocal microscopy
Lecture 6 - Transmission electron microscopy
Lecture 7 - Transmission electron microscopy cont. and scanning electron microscopy
Lecture 8 - Basic concepts - 1
Lecture 9 - Basic concepts - 2
Lecture 10 - GM counting and Scintillation counting
Lecture 11 - Scintillation counting continued
Lecture 12 - Autoradiography and RIA
Lecture 13 - Safety aspects and applications
Lecture 14 - Introduction and Basic concepts in chromatography - 1
Lecture 15 - Basic concepts in chromatography - 2
Lecture 16 - Low-pressure liquid chromatography (LPLC) and high performance liquid chromatography (HPLC)
Lecture 17 - Ion-exchange chromatography
Lecture 18 - Gel-filtration chromatography
Lecture 19 - Affinity chromatography
Lecture 20 - Gas-liquid chromatography
Lecture 21 - Basic concepts in electrophoresis
Lecture 22 - Horizontal and vertical gel electrophoresis
Lecture 23 - Native gel electrophoresis and SDS-PAGE
Lecture 24 - Isoelectric focusing (IEF), 2-D gel electrophoresis and protein detection methods
Lecture 25 - Electrophoresis of nucleic acids
Lecture 26 - Immuno-electrophoresis and capillary electrophoresis
Lecture 27 - Introduction and Basic Concepts - 1
Lecture 28 - Basic concepts - 2
Lecture 29 - Types of centrifuges and analytical ultracentrifugation method

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Lecture 30 - Separation methods in preparative ultracentrifuges
Lecture 31 - Types of rotors
Lecture 32 - Types of rotors cont. and care of rotors
Lecture 33 - Introduction and basic concepts
Lecture 34 - UV-Visible spectroscopy
Lecture 35 - Infrared and fluorescence spectroscopy
Lecture 36 - Circular dichroism (CD) spectroscopy
Lecture 37 - Nuclear magnetic resonance (NMR) spectroscopy and X-ray crystallography
Lecture 38 - Atomic spectroscopy and mass spectrometry
Lecture 39 - Polymerase chain reaction (PCR)
Lecture 40 - DNA sequencing methods
Lecture 41 - Enzyme linked immunosorbent assay (ELISA)
NPTEL Video Course - Biotechnology - NOC:Biomedical Nanotechnology

Subject Co-ordinator - Prof. P.Gopinath
Co-ordinating Institute - IIT - Roorkee
Sub-Titles - Available / Unavailable  |  MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Nano
Lecture 2 - Nano-Biomimicry
Lecture 3 - Synthesis of nanomaterials by Physical and Chemical Methods
Lecture 4 - Synthesis of nanomaterials by Biological Methods
Lecture 5 - Characterisation of Nanomaterials
Lecture 6 - DNA Nanotechnology
Lecture 7 - Protein and Glyco Nanotechnology
Lecture 8 - Lipid Nanotechnology
Lecture 9 - Bio-Nanomachines
Lecture 10 - Carbon nanotubes and Its Bio-Applications
Lecture 11 - Nanomaterials for Cancer Diagnosis
Lecture 12 - Nanomaterials for Cancer therapy
Lecture 13 - Nanotechnology in Tissue Engineering
Lecture 14 - Nano artificial cells
Lecture 15 - Nanotechnology in Organ Printing
Lecture 16 - Nanotechnology in Point-of-Care Diagnostics
Lecture 17 - Nano-Pharmacology and Drug Targeting
Lecture 18 - Cellular uptake mechanisms of nanomaterials
Lecture 19 - In vitro Methods to study antibacterial and anticancer properties of nanomaterials
Lecture 20 - Nanotoxicology

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NPTEL Video Course - Biotechnology - NOC: Plant Developmental Biology

Subject Co-ordinator - Prof. Shri Ram Yadav
Co-ordinating Institute - IIT - Roorkee

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

Lecture 1 - Life Cycle of an Angiosperm
Lecture 2 - Characteristics of Plant Growth and Development - I
Lecture 3 - Characteristics of Plant Growth and Development - II
Lecture 4 - Molecular Genetics of Plant Development - I
Lecture 5 - Molecular Genetics of Plant Development - II
Lecture 6 - Molecular Genetics of Plant Development - III
Lecture 7 - Molecular Genetics of Plant Development - IV
Lecture 8 - Molecular Genetics of Plant Development (Continued...) - I
Lecture 9 - Molecular Genetics of Plant Development (Continued...) - II
Lecture 10 - Molecular Genetics of Plant Development (Continued...) - III
Lecture 11 - Root Development
Lecture 12 - Root Development (Continued...)
Lecture 13 - Root Development (Vascular Development)
Lecture 14 - Root Branching
Lecture 15 - Shoot Development
Lecture 16 - Shoot Development
Lecture 17 - Shoot Development
Lecture 18 - Shoot Development
Lecture 19 - Cell-Cell Communication During Plant Development
Lecture 20 - Techniques Used in Lab

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NPTEL Video Course - Biotechnology - NOC: Learning about Learning: A Course on Neurobiology of Learning and Memory

Subject Co-ordinator - Prof. Balaji Jayaprakash

Co-ordinating Institute - IISc - Bangalore

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

Lecture 1 - Introduction to Learning and Memory - I
Lecture 2 - Introduction to Learning and Memory - II
Lecture 3 - Associative Learning I
Lecture 4 - Associative learning II
Lecture 5 - Introduction to the Rescorla Wagner Model
Lecture 6 - Application of Rescorla Wagner Model - I
Lecture 7 - Application of Rescorla Wagner Model - II
Lecture 8 - Application of Rescorla Wagner Model - III
Lecture 9 - Application of Rescorla Wagner Model - IV
Lecture 10 - Limitations of Rescorla Wagner Model
Lecture 11 - Introduction of Reinforcement Learning - I
Lecture 12 - Introduction of Reinforcement Learning - II
Lecture 13 - Introduction of Reinforcement Learning - III
Lecture 14 - Sign Tracking vs Goal Oriented/Tracking; Linking complex behaviors to simple molecules
Lecture 15 - Sign Tracking vs Goal Oriented; Learning Linking complex behaviors to simple molecules - II
Lecture 16 - Memory in Molecular Terms - I
Lecture 17 - Memory in Molecular Terms - II
Lecture 18 - Memory in Molecular Terms - III
Lecture 19 - Memory in Molecular Terms - IV
Lecture 20 - Memory in Molecular Terms - V
NPTEL Video Course - Biotechnology - NOC: Drug Delivery: Principles and Engineering

Subject Co-ordinator - Rachit Agarwal

Co-ordinating Institute - IISc - Bangalore

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

Lecture 1 - Drug Delivery Introduction and Pharmacokinetics
Lecture 2 - Pharmacokinetics (Continued...)
Lecture 3 - Pro-drugs and Polymers Introduction
Lecture 4 - Polymers - Synthesis
Lecture 5 - Polymers - Properties
Lecture 6 - Biomedical Polymers
Lecture 7 - Biodegradable Polymers and Polymer Drug Conjugates - I
Lecture 8 - Polymer Drug Conjugates - II
Lecture 9 - Research Paper Discussion and Diffusion Controlled Systems
Lecture 10 - Controlled Release
Lecture 11 - Controlled Release
Lecture 12 - Controlled Release
Lecture 13 - Math Exercise
Lecture 14 - Hydrogels - I
Lecture 15 - Hydrogels - II
Lecture 16 - Hydrogels - III
Lecture 17 - Hydrogels - IV
Lecture 18 - Nano and Micro-particles - I
Lecture 19 - Nano and Micro-particles - II
Lecture 20 - Nano and Micro-particles - III
Lecture 21 - Nano and Micro-particles - IV
Lecture 22 - Nano and Micro-particles - V
Lecture 23 - Nano and Micro-particles - VI
Lecture 24 - Nano and Micro-particles - VII
Lecture 25 - Protein Adsorption - I
Lecture 26 - Protein Adsorption - II
Lecture 27 - Protein Adsorption - III
Lecture 28 - Tissue Engineering - I
Lecture 29 - Tissue Engineering - II

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NPTEL Video Course - Biotechnology - NOC:Fundamentals of Micro and Nanofabrication

Subject Co-ordinator - Prof. Shankar Selvaraja

Co-ordinating Institute - IISc - Bangalore

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

Lecture 1 - Introduction
Lecture 2 - Substrate
Lecture 3 - Substrate (Continued...)
Lecture 4 - Introduction to cleanroom
Lecture 5 - Contamination and surface cleaning
Lecture 6 - Advanced cleaning techniques
Lecture 7 - Defects
Lecture 8 - Diffusion
Lecture 9 - Diffusion - Advanced Concepts
Lecture 10 - Ion Implantation
Lecture 11 - Ion Implantation (Continued...)
Lecture 12 - Native Films
Lecture 13 - Native Films
Lecture 14 - Native Films
Lecture 15 - Methods and Some Definitions
Lecture 16 - Chemical Vapor Deposition
Lecture 17 - Chemical Vapor Deposition
Lecture 18 - Chemical Vapor Deposition
Lecture 19 - Chemical Vapor Deposition
Lecture 20 - Chemical Vapor Deposition
Lecture 21 - Atomic Layer Deposition
Lecture 22 - Atomic Layer Deposition (Continued...)
Lecture 23 - Physical Vapor Deposition
Lecture 24 - Physical Vapor Deposition
Lecture 25 - Physical Vapor Deposition
Lecture 26 - Metalization
Lecture 27 - Metalization
Lecture 28 - Pattern Transfer Basics
Lecture 29 - Optical lithography basics

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Lecture 30 - Optical lithography basics
Lecture 31 - Optical Lithography
Lecture 32 - Optical Lithography
Lecture 33 - Projection Lithography
Lecture 34 - Projection Lithography
Lecture 35 - Optical lithography
Lecture 36 - Optical Lithography
Lecture 37 - Lithography process technology glossary
Lecture 38 - Optical Lithography
Lecture 39 - Electron beam lithography
Lecture 40 - Electron beam lithography
Lecture 41 - Emerging lithography techniques
Lecture 42 - Etching Figures of Merit
Lecture 43 - Wet etching Basics
Lecture 44 - Wet Etching Recipes
Lecture 45 - Wet Etching Recipes
Lecture 46 - Dry etch
Lecture 47 - Dry etch
Lecture 48 - Dry etch
Lecture 49 - Dry etch
Lecture 50 - Dry etch
Lecture 51 - Chemical Mechanical Polishing (CMP)
Lecture 52 - Chemical Mechanical Polishing (CMP)
Lecture 53 - Design for Manufacturability - 1
Lecture 54 - Design for Manufacturability - 2
Lecture 55 - Design for Manufacturability
Lecture 56 - Process integration
Lecture 57 - PV integration
Lecture 58 - CMOS integration
Lecture 59 - Lab demo
Lecture 60 - Lab demo
Lecture 61 - CMOS process for photonics application