NPTEL Video Course - Chemistry and Biochemistry - NOC:Organo Metallic Chemistry

Subject Co-ordinator - Prof.Debabrata Maiti

Co-ordinating Institute - IIT - Bombay

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemical and Biological Thermodynamics: Principles to A

Subject Co-ordinator - Prof. Nand Kishore

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Biological standard states and pH
Lecture 31 - Tutorial 1 - Equilibrium constant
Lecture 32 - Tutorial 2 - Equilibrium constant
Lecture 33 - Acids and bases and Equilibrium concepts
Lecture 34 - pH Scale Strong and weak acids and bases
Lecture 35 - Strong and weak acids and bases
Lecture 36 - Acid-base titrations
Lecture 37 - pH curve for titration of weak acid with strong base Buffers and indicators
Lecture 38 - Thermodynamics in systems of biological interest
Lecture 39 - Calorimetry
Lecture 40 - Differential scanning calorimetry (DSC)
Lecture 41 - Further discussion on Differential Scanning Calorimetry (DSC)
Lecture 42 - Explaining Differential Scanning Calorimetric Profiles (DSC Profiles)
Lecture 43 - Applications of DSC in thermal unfolding of proteins and protein-solvent interactions
Lecture 44 - Further discussion on applications of DSC in thermal unfolding of proteins and protein-solvent i
Lecture 45 - Isothermal Titration calorimetry (ITC)
Lecture 46 - Further discussion on Isothermal Titration calorimetry (ITC)
Lecture 47 - ITC Experimental Design and Isothermal Titration Calorimetry (ITC) in Drug Design
Lecture 48 - Isothermal Titration Calorimetry (ITC) in Drug Design
Lecture 49 - Isothermal Titration Calorimetry (ITC) in Engineering Binding Affinity
Lecture 50 - Calorimetry in identifying partially folded states of proteins (Molten Globule State)
Lecture 51 - Thermodynamic Characterization of Partially Folded States of Proteins
Lecture 52 - Quantitative Thermodynamic Characterization of Partially Folded States of Proteins
Lecture 53 - ITC in Drug-Protein Interactions
Lecture 54 - Identifying sites for Drug-Protein Interactions by ITC
Lecture 55 - Identifying sites for Drug-Protein Interactions, DSC of Protein-Ligand Complexes. Enthalpy-Entro
Lecture 56 - Estimation of Binding Constants in Strong to Ultratight Protein-Ligand, Interactions Using Diffe
Lecture 57 - Continuation of discussion on... Estimation of Binding Constants in Strong to UltratightProtein-
Lecture 58 - Thermal unfolding of protein by non-calorimetric methods, Addressing thermodynamics of the proce
Lecture 59 - Titration Calorimetry as a tool to determine thermodynamic and Kinetic parameters of enzymes
Lecture 60 - Summary of the course on

NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemistry of Main Group Elements

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

Co-ordinating Institute - IIT - Bombay

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Transition Metal Organometallic Chemistry - Principles

Subject Co-ordinator - Prof. P. Ghosh

Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - History of Organometallic Compounds
Lecture 2 - Polarity and Reactivity of Mâ C bonds
Lecture 3 - Reactivity of Organometallic Compounds
Lecture 4 - Reactivity of Organometallic Compounds
Lecture 5 - 18 Valence Electron Rule and Classification
Lecture 6 - 18 Valence Electron Rule and Classification
Lecture 7 - Reactivity and types of Organometallic compounds
Lecture 8 - Sigma-Donor Ligands
Lecture 9 - Preparation of Sigma-Alkyl Compounds
Lecture 10 - Preparation and Properties of Sigma-Alkyl Compounds
Lecture 11 - Properties of Sigma-Alkyl Compounds
Lecture 12 - Î²â elimination in Sigma-Alkyl Compounds
Lecture 13 - Î²â elimination in Detail
Lecture 14 - TM Sigma-Alkyl Complexes and its Application
Lecture 15 - TM Sigma-Alkyl Complexes and its Application
Lecture 16 - Câ H Activation
Lecture 17 - Câ H Activation in Details
Lecture 18 - Câ H Activation in Details
Lecture 19 - Characterization of Câ H Activation
Lecture 20 - Bonding in Câ H Activation
Lecture 21 - Câ C Bond Activation
Lecture 22 - Câ C Bond Activation
Lecture 23 - Câ C Bond Activation in Details
Lecture 24 - Transition Metal Perfluoroalkyl (RFâ TM) Complexes
Lecture 25 - Preparation of Transition Metal Perfluoroalkyl (RFâ TM) Complexes
Lecture 26 - Câ F Activation
Lecture 27 - Transition Metal Alkenyl/Aryl Complexes
Lecture 28 - Transition Metal Aryl Complexes
Lecture 29 - Transition Metal Aryl/Alkyne Complexes

NPTEL Video Course - Chemistry and Biochemistry - NOC:Metal Mediated Synthesis-I

Subject Co-ordinator - Prof.Debabrata Maiti

Co-ordinating Institute - IIT - Bombay

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Inorganic Chemistry of Life: Principles and Perspective

Subject Co-ordinator - Prof. C.P. Rao

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Role of Iron in life - Mono-and di-oxygenases
Lecture 31 - Role of Iron in life - Reductases
Lecture 32 - Role of Iron in life - Reductases and Phosphatases
Lecture 33 - Role of Iron in life - Reductases and Phosphatases (Continued...)
Lecture 34 - Role of Cobalt in life
Lecture 35 - Role of Nickel in life - General perspectives
Lecture 36 - Role of Nickel in life - Hydrolase, hydrogenase and SOD
Lecture 37 - Role of Nickel in life - Carbonmonoxide dehydrogenase (CODH)
Lecture 38 - Role of Copper in life - General perspectives
Lecture 39 - Role of Copper in life - Type I and Type 2 copper enzymes
Lecture 40 - Role of Copper in life - Multicenter copper oxidases and SOD
Lecture 41 - Role of Zinc in life - General perspectives including oxidoreductases and hydrolases
Lecture 42 - Role of Zinc in life - Carbonic anhydrase and carboxypeptidase
Lecture 43 - Role of Zinc in life - Transferases, ligages and isomerases
Lecture 44 - Role of Molybdenum in life - Introductory aspects
Lecture 45 - Role of Molybdenum in life - Nitrogenase
Lecture 46 - Role of Molybdenum in life - Oxidoreductases
Lecture 47 - Role of Mercury in the environment - Mercury reductase
Lecture 48 - Role of Selenium in life - Glutathione perioxidase
Lecture 49 - Inorganics in medicine - Introductory aspects and cis-platin
Lecture 50 - Inorganics in medicine - Apoptosis
Lecture 51 - Inorganics in medicine - PDT, MRI and Barium tests
Lecture 52 - Inorganics in medicine - Titanium in biomedical
Lecture 53 - Highlights of the course - Part I
Lecture 54 - Highlights of the course - Part II
Lecture 55 - Highlights of the course - Part III
Lecture 56 - Highlights of the course - Part IV
Lecture 57 - Tutorials - Part I
Lecture 58 - Tutorials - Part II
Lecture 59 - Tutorials - Part III
Lecture 60 - Tutorials - Part IV and overall

NPTEL Video Course - Chemistry and Biochemistry - NOC:Symmetry and Group Theory

Subject Co-ordinator - Prof. Anindya Datta

Co-ordinating Institute - IIT - Bombay

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Computational Chemistry and Classical Molecular Dynamic

Subject Co-ordinator - Prof. B.L. Tembe

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Classical Molecular Dynamics-3, Force Fields and MD Algorithms
Lecture 31 - Classical MD-4 Thermodynamic Properties and Distribution Functions.
Lecture 32 - Classical MD-5, Execution of programs on liquid argon
Lecture 33 - Molecular Dynamics using Gromacs-1
Lecture 34 - Molecular Dynamics using Gromacs-2
Lecture 35 - Molecular Dynamics using Gromacs-3
Lecture 36 - Molecular Dynamics using Gromacs-4
Lecture 37 - Molecular Dynamics using Gromacs-5
Lecture 38 - Molecular Dynamics using Gromacs-6
Lecture 39 - Molecular Dynamics using Gromacs-7
Lecture 40 - Molecular Dynamics using Gromacs-8
Lecture 41 - Molecular Dynamics using Gromacs-9

NPTEL Video Course - Chemistry and Biochemistry - NOC:Molecular Spectroscopy: A Physical Chemists Perspective

Subject Co-ordinator - Prof. Anindya Datta

Co-ordinating Institute - IIT - Bombay

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Advanced Transition Metal Organometallic Chemistry

Subject Co-ordinator - Prof. P. Ghosh

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Transition Metal C7H7 Complexes
Lecture 31 - Transition Metal C7H7 Complexes
Lecture 32 - Transition Metal C8H8 and C7H7 Complexes
Lecture 33 - Transition Metal C8H8 Complexes
Lecture 34 - Transition Metal Ã•â ¬- complexes of heterocycles
Lecture 35 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 36 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 37 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 38 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 39 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 40 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 41 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 42 - CÃ¢â ¬â C Cross Coupling Reactions
Lecture 43 - Hydrocyanation Reactions
Lecture 44 - CÃ¢Ë â heteroatom Coupling
Lecture 45 - CÃ¢Ë â heteroatom Coupling
Lecture 46 - CÃ¢Ë â Heteroatom Coupling
Lecture 47 - CÃ¢Ë â Heteroatom Coupling
Lecture 48 - CÃ¢Ë â Heteroatom Coupling
Lecture 49 - Organometallic Catalysis Reactions
Lecture 50 - Organometallic Catalysis Reactions
Lecture 51 - Organometallic Catalysis Reactions
Lecture 52 - Organometallic Catalysis Reactions
Lecture 53 - Organometallic Catalysis Reactions
Lecture 54 - Organometallic Catalysis Reactions
Lecture 55 - Organometallic Catalysis Reactions
Lecture 56 - Organometallic Catalysis Reactions
Lecture 57 - Organometallic Catalysis Reactions
Lecture 58 - Organometallic Catalysis Reactions
Lecture 59 - Organometallic Catalysis Reactions
Lecture 60 - Summary of Advanced Transition Metal Organometallic Chemistry

NPTEL Video Course - Chemistry and Biochemistry - NOC:Mechanisms in Organic Chemistry

Subject Co-ordinator - Prof. Nandita Madhavan

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Trapping Intermediates - Part C
Lecture 31 - Checking for Common Intermediates
Lecture 32 - Catalysis - Part A
Lecture 33 - Catalysis - Part B
Lecture 34 - Specific Catalysis
Lecture 35 - General Catalysis - Part A
Lecture 36 - General Catalysis - Part B
Lecture 37 - Enzyme Catalysis
Lecture 38 - Electrophilic Catalysis
Lecture 39 - Other Types of Catalysis
Lecture 40 - Course Summary

NPTEL Video Course - Chemistry and Biochemistry - NOC:Metals in Biology

Subject Co-ordinator - Prof.Debabrata Maiti

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Dinuclear Iron active sites for CH4 to CH4OH conversion and its Mechanism
Lecture 31 - Concerted Vs radical pathway for CH4 to CH4OH conversion
Lecture 32 - Photosynthesis - Part I
Lecture 33 - Photosynthesis - Part II
Lecture 34 - Pumps and channels
Lecture 35 - Quick summary on O2 transport
Lecture 36 - Summary of Dioxygen reactivity in copper
Lecture 37 - Summary of Dioxygen reactivity in iron
Lecture 38 - Summary of Fe-O2 chemistry

NPTEL Video Course - Chemistry and Biochemistry - NOC:NMR Spectroscopy for Chemists and Biologists

Subject Co-ordinator - Prof. Ashutosh Kumar

Co-ordinating Institute - IIT - Bombay

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Basics in Inorganic Chemistry

Subject Co-ordinator - Prof.Debabrata Maiti

Co-ordinating Institute - IIT - Bombay

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Ultrafast Laser Spectroscopy

Subject Co-ordinator - Prof. Anindya Datta

Co-ordinating Institute - IIT - Bombay

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Transition Metal Organometallics in Catalysis and Biolo

Subject Co-ordinator - Prof. Prasenjit Ghosh

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Alkene Alkyne Metathesis - Part 2
Lecture 31 - Alkene Alkyne Metathesis - Part 3
Lecture 32 - Ring Closing Eneyne Metathesis (RCEYM) - Part 1
Lecture 33 - Ring Closing Eneyne Metathesis (RCEYM) - Part 2
Lecture 34 - Ring Closing Eneyne Metathesis (RCEYM) and Alkenes and Alkynes oligomerization reactions
Lecture 35 - Oligomerization of alkenes and alkynes - Part 1
Lecture 36 - Oligomerization of alkenes and alkynes - Part 2
Lecture 37 - Oligomerization of alkenes and alkynes - Part 3
Lecture 38 - Oligomerization of alkenes and alkynes - Part 4
Lecture 39 - Alkene oligomerization and Polymerization.
Lecture 40 - Olefin Polymerization - Part 1
Lecture 41 - Olefin Polymerization - Part 2
Lecture 42 - Olefin Polymerization - Part 3
Lecture 43 - Olefin Polymerization - Part 4
Lecture 44 - Olefin Polymerization - Part 5
Lecture 45 - Olefin Polymerization - Part 6
Lecture 46 - Olefin Polymerization - Part 7
Lecture 47 - Olefin Polymerization - Part 8
Lecture 48 - Olefin Polymerization - Part 9
Lecture 49 - Olefin Polymerization - Part 10
Lecture 50 - Olefin Polymerization - Part 11
Lecture 51 - Olefin Polymerization - Part 12
Lecture 52 - Olefin Polymerization - Part 13
Lecture 53 - Olefin Polymerization - Part 14
Lecture 54 - Olefin Polymerization - Part 15
Lecture 55 - Olefin Polymerization - Part 16
Lecture 56 - Homo and Copolymerization; Functionalized olefins, Cycloolefins and Diolefins
Lecture 57 - Non- Group IV Metal based olefin polymerization catalysts
Lecture 58 - Non- Group IV Metal based olefin polymerization catalysts
Lecture 59 - Bioorganometallic Chemistry
Lecture 60 - Overall summary of Transition metal organometallics in catalysis and biology

NPTEL Video Course - Chemistry and Biochemistry - NOC:Quantum Chemistry of Atoms and Molecules

Subject Co-ordinator - Prof. Anindya Datta

Co-ordinating Institute - IIT - Bombay

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Basic Statistical Mechanics

Subject Co-ordinator - Prof. Biman Bagchi

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Cluster Expansion and Mayerâ s Theory of Condensation - Part 3
Lecture 31 - Cluster Expansion and Mayerâ s Theory of Condensation - Part 4
Lecture 32 - Cluster Expansion and Mayerâ s Theory of Condensation - Part 5
Lecture 33 - Cluster Expansion and Mayerâ s Theory of Condensation - Part 6
Lecture 34 - Phase Transition and Landau Theory - Part 1
Lecture 35 - Phase Transition and Landau Theory - Part 2
Lecture 36 - Phase Transition and Landau Theory - Part 3
Lecture 37 - Comments on some important Concepts of Statistical Mechanics
Lecture 38 - Nucleation Part 1
Lecture 39 - Nucleation Part 2
Lecture 40 - Nucleation Part 3
Lecture 41 - Nucleation Part 4
Lecture 42 - Spinodal Decomposition and Pattern Formation
Lecture 43 - Spinodal Decomposition and Pattern Formation
Lecture 44 - Ising Model and Other Lattice Models - Part 1
Lecture 45 - Ising Model and Other Lattice Models - Part 2
Lecture 46 - Ising Model and Other Lattice Models - Part 3
Lecture 47 - Ising Model and Other Lattice Models - Part 4
Lecture 48 - Ising Model and Other Lattice Models - Part 5
Lecture 49 - Binary Mixtures
Lecture 50 - Binary Mixtures
Lecture 51 - Theory of Liquids - Part 1
Lecture 52 - Theory of Liquids - Part 2
Lecture 53 - Theory of Liquids - Part 3
Lecture 54 - Theory of Liquids - Part 4
Lecture 55 - Polymers in Solution and Polymer Collapse - Part 1
Lecture 56 - Polymers in Solution and Polymer Collapse - Part 2
Lecture 57 - Polymers in Solution and Polymer Collapse - Part 3
Lecture 58 - Polymers in Solution and Polymer Collapse - Part 4
Lecture 59 - Computer Simulation Methods in Statistical Mechanics - Part 1
Lecture 60 - Computer Simulation Methods in Statistical Mechanics - Part 2
Lecture 61 - Conclusion

NPTEL Video Course - Chemistry and Biochemistry - NOC:Quantum Mechanics and Molecular Spectroscopy

Subject Co-ordinator - Prof. Naresh Patwari

Co-ordinating Institute - IIT - Bombay

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Essentials of Oxidation, Reduction and C_C Bond Formati

Subject Co-ordinator - Prof. Yashwant D Vankar

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Stereochemistry and mechanistic aspects of McMurry coupling and metal mediated reductions of alp
Lecture 31 - Silanes [R3SiH, including polymethylhydrosiloxanes (PMHS)] as reducing agents
Lecture 32 - Further aspects of silanes as reducing agents and Barton-McCombie deoxygenation
Lecture 33 - Tributyltinhydride (n-Bu3SnH) based radical based reductions and C-C bond formations
Lecture 34 - Asymmetric synthesis: An introduction
Lecture 35 - Sharpless asymmetric epoxidation: Mechanism, stereochemistry and kinetic resolution
Lecture 36 - Synthetic utility of chiral 2,3-epoxy alcohols obtained from Sharpless epoxidation
Lecture 37 - Katsuki-Jacobsen epoxidation: Mechanism and stereochemistry
Lecture 38 - Further aspects of Katsuki-Jacobsen epoxidation, and Introduction to Sharpless Asymmetric Dihydr
Lecture 39 - Mechanism, stereochemical aspects and synthetic applications of Sharpless Asymmetric Dihydroxyla
Lecture 40 - Asymmetric hydrogenations and reductions using rhodium and ruthenium derived chiral catalysts
Lecture 41 - Asymmetric reduction with oxazaborilidines
Lecture 42 - C-C bond formations: Introduction to enolate, enamine and enol silyl ether based chemistry
Lecture 43 - C-C bond formations using enol silyl ether and imine based chemistry including SAMP and RAMP bas
Lecture 44 - Asymmetric C-C bond formations using Oppolzerâ s camphorsultams and introduction to directed Al
Lecture 45 - Further aspects of Aldol chemistry including the use of boron and silicon enolates
Lecture 46 - C-C bond formations using Evansâ oxazolidinone based chemistry
Lecture 47 - Ireland-Claisen rearrangement: Emphasis of enolate geometry on the stereochemical outcome, and C
Lecture 48 - Aromatic Claisen rearrangement, Johnson-Claisen rearrangement and Eschenmoser-Claisen rearrangem
Lecture 49 - Bellus-Claisen rearrangement, Aza-Claisen rearrangement, Thia-Claisen rearrangement, Chen-Mapp r
Lecture 50 - Zwitterionic-Claisen rearrangement, Overmann rearrangement, Bamford- Stevens and Shapiro reactio
Lecture 51 - Introduction to allyl metal additions for C-C bond formation
Lecture 52 - Allylindium chemistry: Mechanism, stereochemistry and synthetic applications
Lecture 53 - Allyltin chemistry: Mechanism, stereochemistry and synthetic applications
Lecture 54 - Chemistry of allylsilanes: Mechanism, stereochemistry and synthetic applications - Part 1
Lecture 55 - Further synthetic aspects of the chemistry of allylsilanes - Part 2
Lecture 56 - Further synthetic aspects of the chemistry of allylsilanes - Part 3
Lecture 57 - Chemistry of Vinylsilanes: Mechanism, Stereochemistry and Synthetic Applications
Lecture 58 - Peterson olefination and further synthetic aspects of vinylsilane chemistry
Lecture 59 - Simmons Smith cyclopropanation: Mechanism, stereochemistry and synthetic applications
Lecture 60 - Course Summary and Conclusion

NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemical Kinetics and Transition State Theory

Subject Co-ordinator - Prof. Amber Jain

Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Rate: the reaction velocity
Lecture 2 - Its elementary - rate law equations
Lecture 3 - Arrhenius equation: what's the fuss about?
Lecture 4 - Dance of atoms: from Newton to Hamilton
Lecture 5 - Boltzmann distribution: a story of Hamilton, Liouville and Boltzmann
Lecture 6 - Maxwell Boltzmann distribution: how fast are molecules moving?
Lecture 7 - Kinetic theory of collisions: initial estimate
Lecture 8 - Boltzmann distribution and kinetic theory of collisions
Lecture 9 - Kinetic theory of collisions: a discussion
Lecture 10 - Kinetic theory of collisions: reactive cross section
Lecture 11 - Problem solving session - 1
Lecture 12 - Problem solving session - 2
Lecture 13 - Kinetic theory of collision and equilibrium constant
Lecture 14 - Critique of kinetic theory of collisions
Lecture 15 - Transition state theory and partition functions
Lecture 16 - Partitioning the partition function
Lecture 17 - Translating, rotating and vibrating quantum mechanically
Lecture 18 - Partition function and equilibrium constant
Lecture 19 - What is a transition state?
Lecture 20 - A puzzle: cars on highway
Lecture 21 - Transition state theory: derivation 1
Lecture 22 - Practical calculation of TST rate
Lecture 23 - Calculating TST rate for the reaction H+HBr
Lecture 24 - Collision theory as a special case of TST
Lecture 25 - TST: an intuitive proof in one dimension
Lecture 26 - Rate as a flux across a dividing surface
Lecture 27 - Transition state theory: derivation 2 from dynamical perspective
Lecture 28 - Discussion of the assumptions of TST
Lecture 29 - Thermodynamic formulation of TST

Lecture 30 - Problem solving session - 3
Lecture 31 - Problem solving session - 4
Lecture 32 - Hills and valleys of potential energy surfaces
Lecture 33 - Molecular dynamics: rolling spheres on potential energy surfaces
Lecture 34 - Predictions from potential energy surfaces - rotational vs vibrational energies
Lecture 35 - Free energy and potential of mean force
Lecture 36 - Transmission coefficient and molecualr dynamics
Lecture 37 - Problem solving session - 5
Lecture 38 - Microcanonical rate constant: putting balls in jars
Lecture 39 - Microcanonical rate constant: RRK model
Lecture 40 - Microcanonical rate constant: magic of Marcus - RRKM model
Lecture 41 - Canonical TST from micrononical RRKM model
Lecture 42 - Sum and density of states
Lecture 43 - Unimolecular decay - revisited
Lecture 44 - Unimolecular decay: RRK's approach
Lecture 45 - Unimolecular decay: RRKM's approach
Lecture 46 - Problem solving session - 6

NPTEL Video Course - Chemistry and Biochemistry - NOC:Concepts of Chemistry for Engineering

Subject Co-ordinator - Prof. Anindya Datta

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Crystal Field Theory: Octahedral Complex
Lecture 31 - Crystal Field Theory: Tetrahedral Complex
Lecture 32 - Crystal Field Theory: Octahedral vs. Tetrahedral Complex
Lecture 33 - Application of CFSE: Spinel and J-T Distortion
Lecture 34 - Introduction to Molecular Magnetism
Lecture 35 - Problem Solving Approach
Lecture 36 - Magnetism
Lecture 37 - Spectroscopic Term Symbol
Lecture 38 - Magnetic States of Matter: Paramagnetic, Ferro and Antiferromagnetic
Lecture 39 - Band structures of solid materials
Lecture 40 - Density of states and doping in semiconductors
Lecture 41 - Introduction to molecular spectroscopy
Lecture 42 - Rotational spectroscopy
Lecture 43 - Vibrational spectroscopy
Lecture 44 - Electronic Spectroscopy - I
Lecture 45 - Electronic Spectroscopy - II
Lecture 46 - Electronic Spectroscopy - III
Lecture 47 - Fluorescence Spectroscopy
Lecture 48 - Fundamentals of NMR spectroscopy and MRI
Lecture 49 - Surface characterization techniques
Lecture 50 - Introduction to thermodynamics: Work, heat and energy
Lecture 51 - First law of thermodynamics: Diathermic and adiabatic systems,exothermic and endothermic process
Lecture 52 - Enthalpy, Hess's law
Lecture 53 - Second law of thermodynamics: Entropy and third law of thermodynamics
Lecture 54 - Helmholtz and Gibbs free energies, Concept of spontaneity
Lecture 55 - Electrochemical equilibrium, Nernst equation
Lecture 56 - Acid base and solubility equilibria
Lecture 57 - Corrosion
Lecture 58 - Extraction of metals
Lecture 59 - Ellingham Diagram
Lecture 60 - Problems From Thermodynamics
Lecture 61 - Intermolecular forces: Electrostatic and Ion-Dipole Interaction
Lecture 62 - Intermolecular forces: Dipole-dipole, hydrogen bonding
Lecture 63 - Real gases - Part 1
Lecture 64 - Real gases - Part 2
Lecture 65 - Introduction to Potential Energy Surfaces
Lecture 66 - Potential energy surface of H3 system
Lecture 67 - Salient features of H3 potential energy surface
Lecture 68 - Potential Energy Surfaces of HCN and H2F system

Lecture 69 - Representation of three dimensional structures
Lecture 70 - Structural isomers and stereoisomers
Lecture 71 - Configurations, Symmetry and Chirality
Lecture 72 - Enantiomers and Diastereomers
Lecture 73 - Optical activity, Conformational analysis, and absolute configuration
Lecture 74 - Substitution reactions
Lecture 75 - Elimination reactions
Lecture 76 - Addition, Oxidation and Reduction reactions
Lecture 77 - Synthesis of a drug molecule

NPTEL Video Course - Chemistry and Biochemistry - NOC:Classics in Total Synthesis-I

Subject Co-ordinator - Prof. Krishna P Kaliappan

Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Overview - 1
Lecture 2 - Overview - 2
Lecture 3 - Overview - 3
Lecture 4 - Illudin M (Kinder) Illudin C (Funk)
Lecture 5 - Total Synthesis of FR900848 (Barrett)
Lecture 6 - Total Synthesis of Cubane
Lecture 7 - Total Synthesis of Endiandric acids
Lecture 8 - Total Synthesis of Penicilin
Lecture 9 - Total Synthesis of Thienamycin
Lecture 10 - Total Synthesis of Prostaglandin (Corey)
Lecture 11 - Total Synthesis of Prostaglandin (Johnson and Stork)
Lecture 12 - Total Synthesis of Biotin and Lactacystin (i) Corey, (ii) Baldwin
Lecture 13 - Total Synthesis of Triquinanes: Isocomene 1) M. Pirrung 2) Fitjer
Lecture 14 - Total Synthesis of Triquinanes: Isocomene and Silphipherfol-6-en-5-one (Rawal)
Lecture 15 - Total synthesis of Triquinanes by radical cyclisation - I (Curran)
Lecture 16 - Total synthesis of Triquinanes by radical cyclisation - II
Lecture 17 - Total synthesis of Triquinanes by photochemical reaction - I
Lecture 18 - Total synthesis of Triquinanes by photochemical reaction - II
Lecture 19 - Total synthesis of Triquinanes by Thermal Metathesis (Mehta)
Lecture 20 - Total synthesis of Triquinanes by other reactions
Lecture 21 - Total synthesis of Longifolene (Corey and Oppolzer)
Lecture 22 - Total synthesis of Carpanone (Chapman)
Lecture 23 - Total synthesis of Mevinolin (Clive)
Lecture 24 - Total synthesis of Gibberellic Acid (Corey)
Lecture 25 - Total synthesis of Gibberellic Acid (Yamada)
Lecture 26 - Total synthesis of Perhydrohistrionicotoxin (Corey)
Lecture 27 - Total synthesis of Strychnine (Woodward)
Lecture 28 - Total synthesis of Strychnine (Rawal and Overman)
Lecture 29 - Total synthesis of Strychnine (Kuehne)

Lecture 30 - Total synthesis of Reserpine (Woodward)
Lecture 31 - Total synthesis of Yohimbine (Tamelen and Momose)
Lecture 32 - Total synthesis of Quinine (Woodward and Stork)
Lecture 33 - Total synthesis of Dendrobine (Livinghouse)
Lecture 34 - Total synthesis of Morphine (Gates and Overman)
Lecture 35 - Total synthesis of Morphine (Parker and White)
Lecture 36 - Total synthesis of Methylhomosecodaphniphyllate (Heathcock)
Lecture 37 - Total synthesis of Lysergic acid (Woodward and Oppolzer)
Lecture 38 - Total synthesis of Galanthamine (Barton and Kirby)
Lecture 39 - Total synthesis of Epibatidine (Trost and Evans)
Lecture 40 - Total synthesis of Swainsonine (Hashimoto)
Lecture 41 - Total synthesis of Staurosporine (Danishefsky and Wood)
Lecture 42 - Total synthesis of Manzamine A (Winkler)
Lecture 43 - Total synthesis of Progesterone (Johnson)
Lecture 44 - Total synthesis of Progesterone from Diosgenin (Marker)
Lecture 45 - Total synthesis of Estrone (Torgov)
Lecture 46 - Total synthesis of Taxol (Nicolaou)
Lecture 47 - Total synthesis of Taxol (Holton)
Lecture 48 - Total synthesis of Taxol (Danishefsky)
Lecture 49 - Total synthesis of Taxol (Wender)
Lecture 50 - Total synthesis of Eleutherobin (Nicolaou)
Lecture 51 - Total synthesis of Eleutherobin (Danishefsky)
Lecture 52 - Total synthesis of Phorbol (Wender)
Lecture 53 - Total synthesis of Periplanone (Still and Schreiber)
Lecture 54 - Total synthesis of Discodermolide (Schreiber)
Lecture 55 - Total synthesis of Epothilones I (Nicolaou)
Lecture 56 - Total synthesis of Epothilones II (Schinzer and Danishefsky)
Lecture 57 - Total synthesis of Vineomycinone B2 (Tius and Danishefsky)
Lecture 58 - Total synthesis of Zaragozic acid C (Carreira)

NPTEL Video Course - Chemistry and Biochemistry - NOC:Circular Dichroism (CD) and Mossbauer Spectroscopy for

Subject Co-ordinator - Prof. Arnab Dutta

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Applications of CD spectroscopy - II
Lecture 31 - Applications of CD spectroscopy - III
Lecture 32 - Applications of CD spectroscopy - IV
Lecture 33 - Applications of CD spectroscopy - V
Lecture 34 - Applications of CD spectroscopy - VI
Lecture 35 - CD spectroscopy: Conclusion
Lecture 36 - MÃ Â¶ssbauer Spectroscopy: Introduction
Lecture 37 - MÃ Â¶ssbauer Spectroscopy Fundamentals - I
Lecture 38 - MÃ Â¶ssbauer Spectroscopy
Lecture 39 - MÃ Â¶ssbauer Spectroscopy Fundamentals - II
Lecture 40 - MÃ Â¶ssbauer Spectroscopy Fundamentals - III
Lecture 41 - MÃ Â¶ssbauer Spectroscopy Fundamentals - IV
Lecture 42 - MÃ Â¶ssbauer Spectroscopy: Isomer shift - I
Lecture 43 - MÃ Â¶ssbauer Spectroscopy: Isomer shift - II
Lecture 44 - MÃ Â¶ssbauer Spectroscopy: Isomer shift - III
Lecture 45 - MÃ Â¶ssbauer Spectroscopy: Quadrupolar splitting - I
Lecture 46 - MÃ Â¶ssbauer Spectroscopy: Quadrupolar splitting - II
Lecture 47 - MÃ Â¶ssbauer Spectroscopy: Applications - I
Lecture 48 - MÃ Â¶ssbauer Spectroscopy: Applications - II
Lecture 49 - MÃ Â¶ssbauer Spectroscopy: Applications - III
Lecture 50 - MÃ Â¶ssbauer Spectroscopy: Data measurement
Lecture 51 - MÃ Â¶ssbauer Spectroscopy: Applications - IV
Lecture 52 - MÃ Â¶ssbauer Spectroscopy: Effect of ligands - I
Lecture 53 - MÃ Â¶ssbauer Spectroscopy: Effect of ligands - II
Lecture 54 - MÃ Â¶ssbauer Spectroscopy: Applications - V
Lecture 55 - MÃ Â¶ssbauer Spectroscopy: Probing ferrocenes - I
Lecture 56 - MÃ Â¶ssbauer Spectroscopy: Probing ferrocenes - II
Lecture 57 - MÃ Â¶ssbauer Spectroscopy: Probing ferrocenes - III
Lecture 58 - MÃ Â¶ssbauer Spectroscopy: Mixed valent complexes - I
Lecture 59 - MÃ Â¶ssbauer Spectroscopy: Mixed valent complexes - II
Lecture 60 - MÃ Â¶ssbauer Spectroscopy: Mixed valent complexes - III
Lecture 61 - Conclusion section: CD spectroscopy
Lecture 62 - Conclusion section: MÃ Â¶ssbauer Spectroscopy

NPTEL Video Course - Chemistry and Biochemistry - NOC:NMR Spectroscopy for Structural Biology

Subject Co-ordinator - Prof. Ashutosh Kumar, Prof. R. V Hosur

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Application of NMR in the area of structural Biology: Structure of DNA and RNA - 7
Lecture 31 - Determination of Structure and Dynamics of Proteins - 1
Lecture 32 - Determination of Structure and Dynamics of Proteins - 2
Lecture 33 - Determination of Structure and Dynamics of Proteins - 3
Lecture 34 - Determination of Structure and Dynamics of Proteins - 4
Lecture 35 - Determination of Structure and Dynamics of Proteins - 5
Lecture 36 - Determination of Structure and Dynamics of Proteins - 6
Lecture 37 - NMR Analysis of Protein Dynamics - I
Lecture 38 - NMR Analysis of Protein Dynamics - II
Lecture 39 - NMR Analysis of Protein Dynamics - III
Lecture 40 - NMR Analysis of Protein Dynamics - IV
Lecture 41 - Protein-Ligand and Protein-Protein Interaction
Lecture 42 - NMR Analysis of Ligand specific parameters in a Protein-Ligand Interaction - I
Lecture 43 - NMR Analysis of Ligand specific parameters in a Protein-Ligand Interaction - II
Lecture 44 - NMR Analysis of Protein Specific Parameters in a Protein-Ligand Interaction - I
Lecture 45 - NMR Analysis of Protein Specific Parameters in a Protein-Ligand Interaction - II
Lecture 46 - NMR in Drug Design
Lecture 47 - NMR in Drug Discovery
Lecture 48 - NMR in Drug metabolism - I
Lecture 49 - NMR in Drug metabolism - II
Lecture 50 - NMR in Drug metabolism - III
Lecture 51 - Probing Protein Dynamics by NMR Spectroscopy - I
Lecture 52 - Probing Protein Dynamics by NMR Spectroscopy - II
Lecture 53 - Probing Protein Dynamics by NMR Spectroscopy - III
Lecture 54 - Probing Protein Dynamics by NMR Spectroscopy - IV
Lecture 55 - Probing Protein Dynamics by NMR Spectroscopy - V
Lecture 56 - Basics of solid state NMR spectroscopy - I
Lecture 57 - Basics of solid state NMR spectroscopy - II
Lecture 58 - Basics of solid state NMR spectroscopy - III
Lecture 59 - Basics of solid state NMR spectroscopy - IV
Lecture 60 - Basics of solid state NMR spectroscopy - V

NPTEL Video Course - Chemistry and Biochemistry - NOC:Transition Metal Chemistry

Subject Co-ordinator - Prof. M S Balakrishna

Co-ordinating Institute - IIT - Bombay

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Nuclear and Radiochemistry

Subject Co-ordinator - Prof. B.S.Tomar, Prof. P.K.Mohapatra

Co-ordinating Institute - IIT - Bombay

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

Lecture 1 - Radioactivity
Lecture 2 - Radioactive decay
Lecture 3 - Radioactive decay chain
Lecture 4 - Radioactive equilibria
Lecture 5 - Nuclear structure and stability
Lecture 6 - Nuclear force and nuclear properties
Lecture 7 - Liquid drop model
Lecture 8 - Applications of Liquid drop model
Lecture 9 - Nuclear Shell model
Lecture 10
Lecture 11 - Alpha decay
Lecture 12 - Beta decay
Lecture 13 - Gamma decay
Lecture 14 - Interaction of radiations with matter
Lecture 15 - Interaction of fast electrons with matter
Lecture 16 - Interaction of electromegnetic radiations with matter
Lecture 17 - Principles of radiation detectors
Lecture 18 - Gas filled detectors
Lecture 19 - Scintillator detectors
Lecture 20 - Semiconductor detectors
Lecture 21
Lecture 22
Lecture 23
Lecture 24
Lecture 25
Lecture 26 - Compound nucleus reactions
Lecture 27 - Nuclear fission
Lecture 28 - Nuclear fusion
Lecture 29 - Production of radioisotopes using neutrons

Lecture 30 - Radioisotope production using charged particles
Lecture 31 - Radiochemical practices
Lecture 32 - Radioanalytical techniques and applications
Lecture 33 - Nuclear analytical techniques
Lecture 34 - Applications of neutron activation analysis
Lecture 35 - Ion beam analysis
Lecture 36 - Nuclear reaction analysis and particle induced gamma emission
Lecture 37 - Nuclear Probes: Positron annihilation spectroscopy
Lecture 38 - Perturbed angular corelation
Lecture 39 - Radioisotope applications in healthcare
Lecture 40 - Radioisotope applications in Industry, agriculture and food technology
Lecture 41 - History of actinides
Lecture 42 - Actinide concept
Lecture 43 - Actinide ionic species in water
Lecture 44 - Actinide hydration and Hydrolysis
Lecture 45 - pH-pE concept
Lecture 46 - Ln/An absorption spectroscopy - I
Lecture 47 - Ln/An absorption spectroscopy - II
Lecture 48 - Ln/An emission spectroscopy - I
Lecture 49 - Ln/An emission spectroscopy - II
Lecture 50 - Solution chemistry Actinides
Lecture 51 - Complexation of actinides - I
Lecture 52 - Complexation of actinides - II
Lecture 53 - Solvent extraction of actinides - I
Lecture 54 - Solvent extraction of actinides - II
Lecture 55 - Actinide partitioning
Lecture 56 - Analytical chemistry of actinides
Lecture 57 - Transactinides
Lecture 58 - Fast radiochemical separations
Lecture 59 - Actinides in the environment
Lecture 60 - Actinides sorption and migration

NPTEL Video Course - Chemistry and Biochemistry - NOC:Fundamentals of Statistical Thermodynamics

Subject Co-ordinator - Prof. Nand Kishore

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - The Rotational Contribution to Molecular Partition Function (Nonlinear Rotor)
Lecture 31 - The Rotational Contribution to Molecular Partition Function
Lecture 32 - Rotational Partition Function
Lecture 33 - Vibrational Partition Function - I
Lecture 34 - Vibrational Partition Function - II
Lecture 35 - Vibrational Partition Function - Applications
Lecture 36 - Electronic Partition Function
Lecture 37 - Mean Energies
Lecture 38 - Mean Energies (Continued...)
Lecture 39 - Heat Capacity
Lecture 40 - Heat Capacity (Continued...)
Lecture 41 - Mean Energies (Applications)
Lecture 42 - Problem Solving
Lecture 43 - Residual Entropy
Lecture 44 - Residual Entropy (Continued...)
Lecture 45 - Relation between equilibrium constant K and partition function q
Lecture 46 - Relation between equilibrium constant K and partition function q (Continued...)
Lecture 47 - Relation between equilibrium constant K and partition function q (Applications-1)
Lecture 48 - Relation between equilibrium constant K and partition function q (Applications-2)
Lecture 49 - Contributions to equilibrium constant
Lecture 50 - Contributions to equilibrium constant (Continued...)
Lecture 51 - Contributions to equilibrium constant (Continued...) and Problems Solving
Lecture 52 - Problem Solving
Lecture 53 - Problem Solving (Continued...)
Lecture 54 - Equations of state
Lecture 55 - Bose-Einstein Statistics
Lecture 56 - Problem Solving
Lecture 57 - FERMI-DIRAC Statistics
Lecture 58 - Radial Distribution Function
Lecture 59 - Recap - 1
Lecture 60 - Recap - 2

NPTEL Video Course - Chemistry and Biochemistry - NOC:Interpretative Molecular Spectroscopy

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

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - Introduction to IR Spectroscopy - 2
Lecture 31 - Interpretation of IR Spectra
Lecture 32 - IR stretching frequencies for various functional groups
Lecture 33 - Hook's Law - Numericals
Lecture 34 - IR Spectra of carbonyl compounds - 1
Lecture 35 - IR Spectra of carbonyl compounds - 2
Lecture 36 - Numerical Problems related to IR Spectroscopy - 1
Lecture 37 - Numerical Problems related to IR Spectroscopy - 2
Lecture 38 - Introduction to Mass Spectrometry
Lecture 39 - Isotope Peaks in Mass Spectrometry
Lecture 40 - Hydrogen deficiency Index
Lecture 41 - EI Mass Spectra of various molecules - 1
Lecture 42 - EI Mass Spectra of various molecules - 2
Lecture 43 - EI Mass Spectra of various molecules - 3
Lecture 44 - Types of Mass Spectrometry
Lecture 45 - Introduction to EPR Spectroscopy - 1
Lecture 46 - Introduction to EPR Spectroscopy - 2
Lecture 47 - Hyperfine Interactions
Lecture 48 - Examples of Hyperfine Interactions
Lecture 49 - Introduction to MÃ Â¶ssbauer Spectroscopy (MÃ Â¶s)
Lecture 50 - More discussion, problems and solutions (MÃ Â¶s)
Lecture 51 - Problems and Solutions - 1
Lecture 52 - Problems and Solutions - 2
Lecture 53 - Problems and Solutions - 3
Lecture 54 - Problems and Solutions - 4
Lecture 55 - Problems and Solutions - 5
Lecture 56 - Rule of Thirteen and Nitrogen Rule
Lecture 57 - Problems and Solutions - 6
Lecture 58 - Problems and Solutions - 7
Lecture 59 - Problems and Solutions - 8
Lecture 60 - Summary and conclusion

NPTEL Video Course - Chemistry and Biochemistry - NOC:Many Body Methods in Quantum Chemistry

Subject Co-ordinator - Prof. Sourav Pal, Prof. Achintya Kumar Dutta

Co-ordinating Institute - IIT - Bombay

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

Lecture 30 - HF Roothan equation in terms of atomic orbitals
Lecture 31 - Koopmans' IP for molecules
Lecture 32 - Koopmans' EA for molecules
Lecture 33 - Roothaan equation in orthonormalized basis
Lecture 34 - Review of Hartree-Fock theory
Lecture 35 - Charge density, Bond order and Population analysis
Lecture 36 - Dipole Moment
Lecture 37 - Introduction to basis set
Lecture 38 - Dunning and Pople basis set
Lecture 39 - Polarization and diffuse function
Lecture 40 - Brillouin's theorem and Slater's rule type-2
Lecture 41 - Slater rule type-2
Lecture 42 - Spin adapted determinant
Lecture 43 - Dissociation of Hydrogen molecule problem
Lecture 44 - Inadequacies of restricted Hartree-Fock theory
Lecture 45 - Hartree-Fock perturbation theory and correlation correction
Lecture 46 - Hartree-Fock perturbation theory (Continued...)
Lecture 47 - Introduction of 2nd order perturbation theory
Lecture 48 - Intermediate normalization and an expression for the Correlation energy
Lecture 49 - Slater rule -3 and derivation of 2-nd order perturbation energy
Lecture 50 - Physical insight of pair correlation theory
Lecture 51 - Introduction to configuration intercation (CI)
Lecture 52 - Determine the parameter of CI
Lecture 53 - Construction of CIS hamiltonian matrix
Lecture 54 - Importance of doubly excited determinants in correlation contribution
Lecture 55 - Intermediate normalization and an expression for the Correlation energy
Lecture 56 - CI equation in terms of Normal-Ordered hamiltonian
Lecture 57 - Doubly excited CI function (D-CI)
Lecture 58 - Matrix structure of CISD (singly and doubly excited CI)
Lecture 59 - Some illustrative example
Lecture 60 - Effects of singly excited determinant in the calculation
Lecture 61 - D-CI for non-interacting hydrogen molecules
Lecture 62 - Size consistency problem in truncated CI
Lecture 63 - N-dependence of D-CI correlation energy
Lecture 64 - problem of truncating CI
Lecture 65 - Introduction of second quantization operator in quantum mechanics
Lecture 66 - Creation and annihilation operator and their properties
Lecture 67 - Operators in second quantization
Lecture 68 - Some basic examples related with second quantization operator

Lecture 69 - Hole-Particle formalism
Lecture 70 - Hugenholtz rule for diagrammatic construction of MP perturbation theory
Lecture 71 - Linked cluster diagram
Lecture 72 - Energy expression for higher order Moller-Plasset perturbation theory
Lecture 73 - Diagrammatic representation of MP3 energy and some practice problem
Lecture 74 - Overview of the some other correlation calculation method
Lecture 75 - A brief introduction to Coupled cluster theory

NPTEL Video Course - Chemistry and Biochemistry - Bio-Physical Chemistry

Subject Co-ordinator - Dr. P.K. Chowdhury

Co-ordinating Institute - IIT - Delhi

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Spectroscopic Techniques for Pharmaceutical and Biophar

Subject Co-ordinator - Dr. Shashank Deep

Co-ordinating Institute - IIT - Delhi

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

Lecture 30 - Principle of NMR
Lecture 31 - NMR data processing and Chemical shift
Lecture 32 - Structure Informations from NMR
Lecture 33 - Structure Calculation and 2D-NMR Spectroscopy
Lecture 34 - Mass Spectroscopy

NPTEL Video Course - Chemistry and Biochemistry - NOC:Introductory Non-Linear Dynamics

Subject Co-ordinator - Prof. Ramakrishna Ramaswamy

Co-ordinating Institute - IIT - Delhi

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Principles of Organic Synthesis

Subject Co-ordinator - Prof. T. Punniyamurthy

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Aldol Reaction
Lecture 2 - Perkin, Claisen and Thorpe Reactions
Lecture 3 - Reaction of Enolates
Lecture 4 - Mannich Reaction
Lecture 5 - Reaction of Alkenes and Carbonyl Compounds
Lecture 6 - Friedel-Crafts and Prins Reactions
Lecture 7 - Grignard Reagents
Lecture 8 - Organolithium Reagents
Lecture 9 - Organocopper, Organozinc and Organomercury Reagents
Lecture 10 - Ritter Reaction and Gabriel Synthesis
Lecture 11 - Reactions of imines and enamines, synthesis of alkaloids and amino acids
Lecture 12 - Reactions of electrophilic and nucleophilic nitrogens, synthesis of amino acids and peptides
Lecture 13 - Principles, effect of substituents and carbon-carbon bond formation
Lecture 14 - Formylation/acylation and related reactions
Lecture 15 - Nitration, Sulfonation and other reactions
Lecture 16 - Principle, Substitution mechanism and reactions of Benzyne
Lecture 17 - Schiemann Reaction, Ullmann reaction and Stephens-Castro coupling
Lecture 18 - Ziegler Alkylation, Chichibabin Reaction, Von Richter Rearrangement, Smiles Rearrangement, Bambe
Lecture 19 - Preparation, properties and reactions
Lecture 20 - Coupling reactions, Japp-Klingemann reaction and Tiffeneau-Demjanov rearrangement
Lecture 21 - Applications of diazonium salts
Lecture 22 - Wagner-Meerwein rearrangment, Pinacol rearrangment, Benzilic acid rearrangment and Arndt-Eistert
Lecture 23 - Rearrangement of halogen, oxygen, sulfur and nitrogen containing centre
Lecture 24 - Rearrangement to electron-Rich carbon
Lecture 25 - Reactivity and several reactions
Lecture 26 - Reactions of sulfur and silicon containing reagents
Lecture 27 - Preparation and reactions of organoborane and organotin reagents
Lecture 28 - Formation of carbon-carbon and carbon-halogen bonds
Lecture 29 - Cu, Mn, Sm, and Sn Based Reactions, Acyloin Condensation

Lecture 30 - C-N, C-O bond formation and decarboxylation

NPTEL Video Course - Chemistry and Biochemistry - NOC:Reagents in Organic Synthesis

Subject Co-ordinator - Prof.Subhas Chandra

Co-ordinating Institute - IIT - Guwahati

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

Lecture 30 - Introduction to Lanthanides and Sm Based Reagents
Lecture 31 - Samarium(Ii) Iodide Based Reagents in Organic Synthesis
Lecture 32 - Sm and Yb Based Reagents in Organic Synthesis

NPTEL Video Course - Chemistry and Biochemistry - NOC:Thermodynamics: Classical to Statistical

Subject Co-ordinator - Prof. Sandip Paul

Co-ordinating Institute - IIT - Guwahati

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

Lecture 1 - Cocepts of heat and work; First Law of Thermodynamics
Lecture 2 - Concepts of enthalpy and heat capacity
Lecture 3 - Introduction to entropy
Lecture 4 - Calculation of entropy for various processes
Lecture 5 - Gibbs and Helmholtz free energy
Lecture 6 - Introduction to chemical potential
Lecture 7 - Clapeyron equation and phase transition; concept of fugacity
Lecture 8 - Calculation of fugacity; free energy of mixing
Lecture 9 - Partial molar quantities; excess thermodynamic quantities
Lecture 10 - Concept of activity and activity coefficients; Debye-Huckel limiting law
Lecture 11 - Phase Diagram of one component systems
Lecture 12 - Phase Diagram of two component systems
Lecture 13 - Phase Diagram of three component system; one dimensional random walk
Lecture 14 - Macroscopic and microscopic states; Boltzmann distribution; Canonical partition function
Lecture 15 - Calculation of different thermodynamical quantities using canonical partition function
Lecture 16 - Introduction to molecular partition function
Lecture 17 - Translational, electronic and nuclear partition function
Lecture 18 - Rotational partition function
Lecture 19 - Vibrational partitition function; Introduction to grand canonical ensemble
Lecture 20 - Grand canonical distribution; Introduction to microcanonical ensemble
Lecture 21 - Problems on classical thermodynamics - 1
Lecture 22 - Problems on classical thermodynamics - 2
Lecture 23 - Problems on statistical thermodynamics - 1
Lecture 24 - Problems on statistical thermodynamics - 2
Lecture 25 - Problems on statistical thermodynamics - 3
Lecture 26 - Fermi-Dirac and Bose-Einstein statistics
Lecture 27 - Ideal Fermi gas
Lecture 28 - Ideal Bose gas;Introduction to Bose-Einstein condensation
Lecture 29 - Bose-Einstein condensations

Lecture 30 - Nuclear spin statistics; Ortho- and para-hydrogens
Lecture 31 - Specific Heats of solids
Lecture 32 - Problems on statistical thermodynamics - 4
Lecture 33 - Advance problems - 1
Lecture 34 - Advance Problems - 2
Lecture 35 - Advance Problems - 3
Lecture 36 - Advance Problems - 4
Lecture 37 - Advance Problems - 5

NPTEL Video Course - Chemistry and Biochemistry - NOC:Essentials of Biomolecules: Nucleic Acids and Peptides

Subject Co-ordinator - Prof. Lal Mohan Kundu

Co-ordinating Institute - IIT - Guwahati

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

Lecture 30 - Purification techniques - II and Characteriation techniques of biomolecules
Lecture 31 - Molecular probes
Lecture 32 - Molecular Probes
Lecture 33 - Carbohydrate chemistry - I
Lecture 34 - Carbohydrate chemistry - II
Lecture 35 - Carbohydrate chemistry - III

NPTEL Video Course - Chemistry and Biochemistry - Chemistry of Materials

Subject Co-ordinator - Prof. S. Sundar Manoharan

Co-ordinating Institute - IIT - Kanpur

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

NPTEL Video Course - Chemistry and Biochemistry - Mathematics for Chemistry

Subject Co-ordinator - Dr. Madhav Ranganathan, Dr. P.P. Thankachan

Co-ordinating Institute - IIT - Kanpur | IIT - Roorkee

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

Lecture 1 - Mathematics for Chemistry
Lecture 2 - Mathematics for Chemistry
Lecture 3 - Mathematics for Chemistry
Lecture 4 - Mathematics for Chemistry
Lecture 5 - Mathematics for Chemistry
Lecture 6 - Mathematics for Chemistry
Lecture 7 - Mathematics for Chemistry
Lecture 8 - Mathematics for Chemistry
Lecture 9 - Mathematics for Chemistry
Lecture 10 - Mathematics for Chemistry
Lecture 11 - Mathematics for Chemistry
Lecture 12 - Mathematics for Chemistry
Lecture 13 - Mathematics for Chemistry
Lecture 14 - Mathematics for Chemistry
Lecture 15 - Mathematics for Chemistry
Lecture 16 - Mathematics for Chemistry
Lecture 17 - Mathematics for Chemistry
Lecture 18 - Mathematics for Chemistry
Lecture 19 - Mathematics for Chemistry
Lecture 20 - Mathematics for Chemistry
Lecture 21 - Mathematics for Chemistry
Lecture 22 - Mathematics for Chemistry
Lecture 23 - Mathematics for Chemistry
Lecture 24 - Mathematics for Chemistry
Lecture 25 - Mathematics for Chemistry
Lecture 26 - Mathematics for Chemistry
Lecture 27 - Mathematics for Chemistry
Lecture 28 - Mathematics for Chemistry
Lecture 29 - Mathematics for Chemistry

Lecture 30 - Mathematics for Chemistry
Lecture 31 - Mathematics for Chemistry
Lecture 32 - Mathematics for Chemistry
Lecture 33 - Mathematics for Chemistry
Lecture 34 - Mathematics for Chemistry
Lecture 35 - Mathematics for Chemistry
Lecture 36 - Mathematics for Chemistry
Lecture 37 - Mathematics for Chemistry
Lecture 38 - Mathematics for Chemistry
Lecture 39 - Mathematics for Chemistry
Lecture 40 - Mathematics for Chemistry

NPTEL Video Course - Chemistry and Biochemistry - Advance Analytical Course

Subject Co-ordinator - Dr. Padma S Vankar

Co-ordinating Institute - IIT - Kanpur

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

Lecture 30 - Advance Analytical Course
Lecture 31 - Advance Analytical Course
Lecture 32 - Advance Analytical Course
Lecture 33 - Advance Analytical Course
Lecture 34 - Advance Analytical Course
Lecture 35 - Advance Analytical Course
Lecture 36 - Advance Analytical Course
Lecture 37 - Advance Analytical Course
Lecture 38 - Advance Analytical Course
Lecture 39 - Advance Analytical Course
Lecture 40 - Advance Analytical Course

NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemical Applications of Symmetry and Group Theory

Subject Co-ordinator - Prof. Manabendra Chandra

Co-ordinating Institute - IIT - Kanpur

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

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Mathematics for Chemistry

Subject Co-ordinator - Dr. Madhav Ranganathan

Co-ordinating Institute - IIT - Kanpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Quantum Computing

Subject Co-ordinator - Prof. Debabrata Goswami

Co-ordinating Institute - IIT - Kanpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Basics of Fluroscence Spectroscopy

Subject Co-ordinator - Prof. Pratik Sen

Co-ordinating Institute - IIT - Kanpur

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

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Laser: Fundamentals and Applications

Subject Co-ordinator - Prof. Manabendra Chandra

Co-ordinating Institute - IIT - Kanpur

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

Lecture 30 - 2nd order Nonlinear optics
Lecture 31 - Non-linear optical processes
Lecture 32 - Aspects of SHG and Application of non-linear optics
Lecture 33 - Application of LASER
Lecture 34 - Application of Laser
Lecture 35 - Application of Laser
Lecture 36 - Laser Induced Chemistry
Lecture 37 - Laser Induced Chemistry and Ultrafast chemical Dynamics
Lecture 38 - Lasers in Medical Sciences
Lecture 39 - Lasers in Material sciences and engineering and Optical Communications
Lecture 40 - Laser safety and summary

NPTEL Video Course - Chemistry and Biochemistry - NOC:Advanced Mathematical Methods for Chemistry

Subject Co-ordinator - Prof. Madhav Ranganathan

Co-ordinating Institute - IIT - Kanpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Solid State Chemistry

Subject Co-ordinator - Prof. Madhav Ranganathan

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Nature of solid state and the solid state materials
Lecture 2 - Thermodynamics of solids
Lecture 3 - Crystallisation Kinetics
Lecture 4 - Synthetic Strategy
Lecture 5 - Review of week 1 and Practice problems
Lecture 6 - Unit Cells
Lecture 7 - Conventional Unit Cell and Primitive Unit Cell
Lecture 8 - Bravais Lattices
Lecture 9 - Bravais Lattices, Basis and crystal
Lecture 10 - Summery of week 2 and Practices Problems
Lecture 11 - Symmetry In Crystals, Point Symmetries
Lecture 12 - Reflections, Inversions and Rotoinversions
Lecture 13 - Schonflies and Hermann-Mauguin Conventions
Lecture 14 - Fractional Coordinates, Planer Visualization
Lecture 15 - Review of week 3 And Practice Problems
Lecture 16 - Combining symmetry operations, translational symmetries
Lecture 17 - Screw Axis
Lecture 18 - Glide Planes
Lecture 19 - Symmetry and Symmetry Notations
Lecture 20 - Summary of week 4 and Practice Problems
Lecture 21 - Crystal Systems
Lecture 22 - Crystal Systems and Unit Cells
Lecture 23 - Point Groups
Lecture 24 - Space Groups
Lecture 25 - Week 5 Summary and Practice Problems
Lecture 26 - 32 Crystal Classes Based on Symmetry
Lecture 27 - Notation for 32 Crystal Classes
Lecture 28 - Short Form of Hermann-Mauguin Notations
Lecture 29 - Hermann - Mauguin notation for Space Groups

Lecture 30 - Summary and Practice Problems
Lecture 31 - Coordination number, Voids
Lecture 32 - Lattice Imperfections and Crystals
Lecture 33 - Line Planner and Bulk defects and crystals
Lecture 34 - Thermodynamics of defects in crystals
Lecture 35 - Review of Week 7,Practice Problems
Lecture 36 - Miller Planes, Miller Indices
Lecture 37 - Miller Indices for Hexagonal Systems, Distance between Planes
Lecture 38 - X-ray diffraction, Bragg's Law, Reciprocal Lattice
Lecture 39 - Reciprocal Lattice, XRD instrumentation
Lecture 40 - Review of week 8, Practice Problems
Lecture 41 - XRD - Analysis of Pattern
Lecture 42 - Geometric Structure Factor - Missing Peaks
Lecture 43 - X-Ray Crystallography
Lecture 44 - Electron Microscopy
Lecture 45 - Review of Week 9. Practice Problems
Lecture 46 - Closed - Packed Structures and Voids
Lecture 47 - Crystal Structures of Binary Compounds
Lecture 48 - Perovskites and Spinals
Lecture 49 - Space filling Polyhedra, Alloys
Lecture 50 - Summary of Week 10 and Practice Problems
Lecture 51 - Free electron Models
Lecture 52 - Bloch Theorem
Lecture 53 - Band Theory of Solids
Lecture 54 - Bands in Higher Dimensions
Lecture 55 - Summary of Week 11 and Practice Problems
Lecture 56 - More about Band Theory, Crystal Momentum
Lecture 57 - Density of States
Lecture 58 - Metals, Insulators and Semiconductors
Lecture 59 - Band Gap and Optical Properties
Lecture 60 - Summary of Week 12 and Practice Problems

NPTEL Video Course - Chemistry and Biochemistry - NOC:Bioinorganic Chemistry

Subject Co-ordinator - Prof. S. P. Rath

Co-ordinating Institute - IIT - Kanpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemistry and Physics of Surfaces and Interfaces

Subject Co-ordinator - Prof. Thiruvancheril G. Gopakumar

Co-ordinating Institute - IIT - Kanpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Supramolecular Chemistry-I

Subject Co-ordinator - Prof. Parimal Kanti Bharadwaj

Co-ordinating Institute - IIT - Kanpur

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

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

NPTEL Video Course - Chemistry and Biochemistry - Bio-inorganic chemistry

Subject Co-ordinator - Prof. D. Ray

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 30 - Tungsten Enzymes - II
Lecture 31 - Tungsten Enzymes - III
Lecture 32 - Tungsten Enzymes - IV
Lecture 33 - Vanadium Enzymes - I
Lecture 34 - Vanadium Enzymes - II
Lecture 35 - Vanadium Enzymes - III
Lecture 36 - Vanadium Enzymes - IV
Lecture 37 - Non-metals in Biology - I
Lecture 38 - Non-metals in Biology - II
Lecture 39 - Non-metals in Biology - III
Lecture 40 - Non-metals in Biology - IV

NPTEL Video Course - Chemistry and Biochemistry - Co-ordination chemistry (chemistry of transition elements)

Subject Co-ordinator - Prof. D. Ray

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Chemistry and Biochemistry - Heterocyclic Chemistry

Subject Co-ordinator - Prof. D.R. Mal

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 30 - Pyrrole Synthesis - I
Lecture 31 - Pyrrole Synthesis - II
Lecture 32 - Indole Synthesis - I
Lecture 33 - Indole Synthesis - II
Lecture 34 - Furan Synthesis
Lecture 35 - Thiophene Synthesis
Lecture 36 - Oxazole, Imidazole and Thiazole Synthesis
Lecture 37 - Pyridine Synthesis
Lecture 38 - Synthesis of Quinolines and Isoquinolines
Lecture 39 - Bycyclic Polyheteroatomic Heterocycles
Lecture 40 - Heterocyclic Rearrangements

NPTEL Video Course - Chemistry and Biochemistry - Organic photochemistry and pericyclic reactions

Subject Co-ordinator - Dr. N.D. Pradeep Singh

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Introduction to Organic Photochemistry
Lecture 2 - Introduction to Organic Photochemistry (Continued...)
Lecture 3 - Reactivity of n-pi*
Lecture 4 - Î± - cleavage - I
Lecture 5 - Î± - cleavage - II
Lecture 6 - Î± - cleavage - III
Lecture 7 - Î² - cleavage
Lecture 8 - Intramolecular Hydrogen Abstraction - I
Lecture 9 - Intramolecular Hydrogen Abstraction - II
Lecture 10 - Intramolecular Hydrogen Abstraction - III
Lecture 11 - Intramolecular Hydrogen Abstraction
Lecture 12 - Addition to Î - System
Lecture 13 - Intramolecular Paterno-Buchi Reaction
Lecture 14 - Energy of Electron Transfer Reaction
Lecture 15 - Reactivity of Î - Î *
Lecture 16 - Addition Reaction of Î - Î *
Lecture 17 - Addition Reaction of Î - Î * (Continued...)
Lecture 18 - Di-Pi Methane Rearrangement
Lecture 19 - Photochemistry of Cyclohexanone
Lecture 20 - Singlet Oxygen Chemistry
Lecture 21 - Carbenes and Nitrenes
Lecture 22 - Remote Functionalisation
Lecture 23 - Introduction to Pericyclic Reaction
Lecture 24 - Sigmatropic Reactions - I
Lecture 25 - Sigmatropic Reactions - II
Lecture 26 - Sigmatropic Reactions - III
Lecture 27 - Cycloaddition Reactions - I
Lecture 28 - Cycloaddition Reactions - II
Lecture 29 - Cycloaddition - Diels-Alder Reactions

NPTEL Video Course - Chemistry and Biochemistry - Polymer Chemistry

Subject Co-ordinator - Dr. D. Dhara

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Chemistry and Biochemistry - Rate processes

Subject Co-ordinator - Dr. M. Halder

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 30 - Ultrafast Process (Continued...)
Lecture 31 - Reaction Dynamics
Lecture 32 - Reaction Dynamics (Continued...)
Lecture 33 - Reaction Dynamics (Continued...)
Lecture 34 - Reaction Dynamics
Lecture 35 - Reaction Dynamics
Lecture 36 - Reaction Dynamics
Lecture 37 - Reaction Dynamics
Lecture 38 - Reaction Dynamics
Lecture 39 - Reaction Dynamics
Lecture 40 - Concluding Remarks

NPTEL Video Course - Chemistry and Biochemistry - NOC:Biochemistry

Subject Co-ordinator - Prof. S. Dasgupta

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Amino Acid - I
Lecture 2 - Amino Acid - II
Lecture 3 - Protein Structure - I
Lecture 4 - Protein Structure - II
Lecture 5 - Protein Structure - III
Lecture 6 - Protein Structure - IV
Lecture 7 - Enzymes - I
Lecture 8 - Enzymes - II
Lecture 9 - Enzymes - III
Lecture 10 - Enzyme Mechanisms - I
Lecture 11 - Enzyme Mechanisms - II
Lecture 12 - Myoglobin and Hemoglobin
Lecture 13 - Lipids and Membranes - I
Lecture 14 - Lipids and Membranes - II
Lecture 15 - Membrane Transport
Lecture 16 - Nucleic Acids - I
Lecture 17 - Nucleic Acids - II
Lecture 18 - Nucleic Acids - III
Lecture 19 - Vitamins and Coenzymes - I
Lecture 20 - Vitamins and Coenzymes - II
Lecture 21 - Carbohydrates - I
Lecture 22 - Carbohydrates - II
Lecture 23 - Bioenergetics - I
Lecture 24 - Bioenergetics - II
Lecture 25 - Metabolism - I
Lecture 26 - Metabolism - II
Lecture 27 - Metabolism - III

NPTEL Video Course - Chemistry and Biochemistry - NOC:Analytical Chemistry

Subject Co-ordinator - Prof. Debashis Ray

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Co-ordination Chemistry (Chemistry of Transition Elemer

Subject Co-ordinator - Prof. Debashis Ray

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Stereochemistry

Subject Co-ordinator - Prof. A. Basak

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 1 - Constitution and Configuration
Lecture 2 - Chirality, Symmetry Elements
Lecture 3 - Project Ion Formulae Rules for Drawing
Lecture 4 - Chirotopicity and Stereogenicity
Lecture 5 - Newmann Projection, Saw Horse Projection, Wedge Formula
Lecture 6 - Chirotopicity and Stereogenicity
Lecture 7 - Absolute Configuration
Lecture 8 - Absolute Configuration (Continued...)
Lecture 9 - Problems on the above topics
Lecture 10 - Topicity
Lecture 11 - Axial Chirality in Allenes, Biphenyls
Lecture 12 - Relative Configuration, Prochiral Faces and Prochiral Centres
Lecture 13 - Chirality in Heteroatom Systems
Lecture 14 - Conformations and Conformers
Lecture 15 - Conformational Analysis of Acyclic Molecules
Lecture 16 - Conformational Analysis of Acyclic Molecules (Continued...)
Lecture 17 - Conformations of Acyclic Molecues Containing Heteroatoms
Lecture 18 - Conformations of Cyclic Systems
Lecture 19 - Conformations of Cyclic Systems (Continued...)
Lecture 20 - Conformation of Cyclobutane and Cyclopentane
Lecture 21 - Conformation of Cyclohexane
Lecture 22 - Energy Changes During Flipping
Lecture 23 - Energy Comparison between Chair and Boat Conformations
Lecture 24 - Conformational Analysis of Substituted Cyclohexanes
Lecture 25 - Conformational Analysis of Substituted Cyclohexanes (Continued...)
Lecture 26 - Conformational Analysis of Substituted Cyclohexanes (Continued...)
Lecture 27 - Conformational Analysis of Substituted Cyclohexanes (Continued...)
Lecture 28 - Conformational Analysis of Systems with Preference for Axial Groups
Lecture 29 - Conformation and Reactivity

NPTEL Video Course - Chemistry and Biochemistry - NOC:A Study Guide in Organic Retrosynthesis - Problem Solvi

Subject Co-ordinator - Prof. Samik Nanda

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Introduction to Molecular Thermodynamics

Subject Co-ordinator - Prof. Srabani Taraphder

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Molecules in Motion

Subject Co-ordinator - Prof. Amita Pathak Mahanty

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 30 - Molecular motion in Liquids (Continued...)
Lecture 31 - Molecular motion in Liquids (Continued...)
Lecture 32 - Molecular motion in Liquids (Continued...)
Lecture 33 - Molecular motion in Liquids (Continued...)
Lecture 34 - Molecular motion in Liquids (Continued...)
Lecture 35 - Molecular motion in Liquids (Continued...)
Lecture 36 - Molecular motion in Liquids (Continued...)
Lecture 37 - Molecular motion in Liquids (Continued...)
Lecture 38 - Molecular motion in gases
Lecture 39 - Molecular motion in gases
Lecture 40 - Molecular motion in gases

NPTEL Video Course - Chemistry and Biochemistry - NOC:Experimental Biochemistry

Subject Co-ordinator - Prof. Soumya De, Prof. Swagata Dasgupta

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Industrial Inorganic Chemistry

Subject Co-ordinator - Prof. Debashis Ray

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 30 - Bromine and bromine compounds
Lecture 31 - Hydrogen bromide and alkali bromates
Lecture 32 - Iodine and iodine compounds
Lecture 33 - Mineral fertilizers
Lecture 34 - Nitrogen fertilizer and Urea
Lecture 35 - Potassium fertilizer
Lecture 36 - Metals and their compounds
Lecture 37 - Sodium and its compounds
Lecture 38 - Potassium and its compounds
Lecture 39 - Magnesium and its compounds
Lecture 40 - Calcium and its compounds
Lecture 41 - Barium and its compounds
Lecture 42 - Chromium and its compounds
Lecture 43 - Manganese and its industrially important compounds
Lecture 44 - Silicon and its compounds
Lecture 45 - Organosilicon compounds, organoalkoxysilanes
Lecture 46 - Organomercapto silanes and silicones
Lecture 47 - Silicone rubber
Lecture 48 - Inorganic solids
Lecture 49 - Zeolites
Lecture 50 - Inorganic Fibres
Lecture 51 - Glass fibre production and construction materials
Lecture 52 - Ceramics and its manufacturing processes
Lecture 53 - Specialty ceramic products
Lecture 54 - Ferrites and porcelain enamel
Lecture 55 - Layers of enamelling
Lecture 56 - Carbon modifications
Lecture 57 - Activated carbon
Lecture 58 - Metallic hard materials
Lecture 59 - Fillers and inorganic pigments
Lecture 60 - Oxide pigments, luminescent pigments, corrosion protection pigments, magnetic pigments

NPTEL Video Course - Chemistry and Biochemistry - NOC:Reactive Intermediates Carbene and Nitrene

Subject Co-ordinator - Prof. Rajarshi Samanta

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Organic Chemistry in Biology and Drug Development

Subject Co-ordinator - Prof. A. Basak

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 30 - Central dogma
Lecture 31 - Central dogma
Lecture 32 - Central dogma
Lecture 33 - Molecular Biology
Lecture 34 - Molecular Biology (Continued...)
Lecture 35 - Chemistry of cofactors/coenzymes
Lecture 36 - Chemistry of cofactors/coenzymes (Continued...)
Lecture 37 - Chemistry of cofactors/coenzymes (Continued...)
Lecture 38 - Chemistry of cofactors/coenzymes (Continued...)
Lecture 39 - Chemistry of cofactors/coenzymes (Continued...)
Lecture 40 - Chemistry of cofactors/coenzymes (Continued...)
Lecture 41 - Introduction to Drug Discovery Process
Lecture 42 - Fundamental Principles of Drug Development Process
Lecture 43 - Combinatorial chemistry
Lecture 44 - Neurotransmitters
Lecture 45 - Catechol amine based and GABA neurotransmitters
Lecture 46 - Hypertension
Lecture 47 - Inhibitor design of angiotensin converting enzyme
Lecture 48 - Antimicrobial drugs
Lecture 49 - Chemistry of penicillins
Lecture 50 - Resistance to beta-lactam antibiotics
Lecture 51 - Mechanistic studies of beta-lactamase
Lecture 52 - Non beta-lactam antibiotics
Lecture 53 - Mechanistic enzymology of Isopenicillin N synthase
Lecture 54 - Polyketide Biosynthesis
Lecture 55 - Biosynthesis of macrolide polyketides and introduction to virus
Lecture 56 - Anti-viral drugs
Lecture 57 - Cancer and Chemotherapy
Lecture 58 - Anti-cancer drugs (Continued...)
Lecture 59 - Aromatase inhibition and Anti-ulcer drugs
Lecture 60 - Cholesterol lowering agents
Lecture 61 - Cholesterol Biosynthesis
Lecture 62 - Pharmakinetics and pharmadynamics
Lecture 63 - QSAR principles

NPTEL Video Course - Chemistry and Biochemistry - NOC:Introduction to Polymer Science

Subject Co-ordinator - Dr. D. Dhara

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Structure, Stereochemistry and Reactivity of Organic Co

Subject Co-ordinator - Prof. A. Basak

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Approximate Methods in Quantum Chemistry

Subject Co-ordinator - Prof. Sabyashachi Mishra

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Biological Inorganic Chemistry

Subject Co-ordinator - Prof. Debashis Ray

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 30 - Cell signaling by (Ca2+) binding and sensing
Lecture 31 - Functions of iron ions and iron ion proteins
Lecture 32 - Heme proteins for (O2) transport and storage
Lecture 33 - Activators of (O2) and electron transport proteins
Lecture 34 - Iron-sulfur proteins
Lecture 35 - Mononuclear and dinuclear non-heme enzymes
Lecture 36 - Oxygen transport and SOD activity
Lecture 37 - Type 1 blue copper proteins
Lecture 38 - Type 2 non-blue copper proteins
Lecture 39 - Type 3 dinuclear copper proteins
Lecture 40 - Multicopper and mixed-copper enzymes
Lecture 41 - Coordination chemistry and function of zinc ions
Lecture 42 - Carbonic anhydrase and lyases
Lecture 43 - Carboxypeptidase and metalloproteinases
Lecture 44 - Alcohol dehydrogenase and Beta-lactamase
Lecture 45 - Redox catalysis by manganese ions
Lecture 46 - Redox catalysis by manganese ions
Lecture 47 - Catalysis by manganese and cobalt ions
Lecture 48 - Cobalt ion dependent proteins and enzymes
Lecture 49 - Nickel proteins and enzymes
Lecture 50 - More nickel ion bearing enzymes
Lecture 51 - Carbon, hydrogen and oxygen
Lecture 52 - Nitrogen and Silicon
Lecture 53 - Phosphorus
Lecture 54 - Sulfur and Selenium
Lecture 55 - Chlorine and Iodine
Lecture 56 - Brain and blood-brain barrier (BBB)
Lecture 57 - Zinc and copper ions
Lecture 58 - Iron ions
Lecture 59 - Metal ion based drugs and metallotherapeutics
Lecture 60 - Chemotherapy, radiotherapy and contrast agents

NPTEL Video Course - Chemistry and Biochemistry - NOC:Principles and Applications of Enolate Alkylation

Subject Co-ordinator - Prof. Samik Nanda

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 30 - Tricycloiminolactone as chiral glycine equivalents
Lecture 31 - Najera's auxiliary, Davies diketopoperazine and related system
Lecture 32 - EnderÃ¢'s RAMP/SAMP,ColtartÃ¢'s cyclic carbamate hydrazone,EllmanÃ¢'s sulfinamide and related
Lecture 33 - EnderÃ¢'s RAMP/SAMP based systems
Lecture 34 - EnderÃ¢'s RAMP/SAMP based systems
Lecture 35 - EnderÃ¢'s RAMP/SAMP, ColtartÃ¢'s cyclic carbamate hydrazone,EllmanÃ¢'s sulfinamide
Lecture 36 - ColtartÃ¢'s cyclic carbamate hydrazone and its exploration
Lecture 37 - Memory of chirality in enolate alkylation
Lecture 38 - Organocatalytic methods for enolate alkylation (SOMO activation)
Lecture 39 - Enantioselective alkylation with chiral PTC
Lecture 40 - Overall analysis of the entire discussion

NPTEL Video Course - Chemistry and Biochemistry - NOC:Overview and Integration of Cellular Metabolism

Subject Co-ordinator - Dr. Arindam Ghosh, Dr. Aritri Bir

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 30 - Cholesterol Metabolism
Lecture 31 - Digestion and absorption of Protein
Lecture 32 - Transformation of Amino acids
Lecture 33 - Metabolism of Ammonia and ammonia toxicity
Lecture 34 - Urea cycle - Steps, Significance and Energetics
Lecture 35 - Urea Cycle - Regulation and Enzyme Deficiency Disorders
Lecture 36 - Metabolism of Phenylalanine and Associated Disorders
Lecture 37 - Tyrosine Metabolism - I
Lecture 38 - Tyrosine Metabolism - II (Catecholamines)
Lecture 39 - Tyrosine Metabolism - III
Lecture 40 - Tryptophan Metabolism
Lecture 41 - Metabolism of Sulphur containing Amino acids (Methionine and Cysteine)
Lecture 42 - Metabolism of Glycine and its disorders
Lecture 43 - Metabolism of Serine, Threonine and Alanine
Lecture 44 - Branched chain amino acid metabolism and their disorders
Lecture 45 - Metabolism of Histidine, Proline, Arginine and Lysine
Lecture 46 - Heme Metabolism - I (Heme Synthesis and Regulation)
Lecture 47 - Heme Metabolism - II (Disorders of Heme Synthesis - Porphyrias)
Lecture 48 - Heme Metabolism - III (Heme Degradation, Transport and Bilirubin Metabolism)
Lecture 49 - Disorders of Bilirubin Metabolism
Lecture 50 - Nucleotide Metabolism - I (Purine Metabolism)
Lecture 51 - Nucleotide Metabolism - II (Disorders of Purine Metabolism)
Lecture 52 - Nucleotide Metabolism - III (Pyrimidine Metabolism and Disorders)
Lecture 53 - Inborn errors of Metabolism
Lecture 54 - Integration of Metabolism - I (Cellular and Organ level integration)
Lecture 55 - Integration of Metabolism - II (Starve feed cycle)
Lecture 56 - Integration of Metabolism - III (Metabolic Control Analysis)
Lecture 57 - Obesity, Metabolic Syndrome and Role of Adipokines
Lecture 58 - Fatty Liver and alcohol metabolism
Lecture 59 - Energy metabolism and Nutritional disorders, Protein Energy Malnutrition and Dietary
Lecture 60 - Metabolism in Cancer Cells

NPTEL Video Course - Chemistry and Biochemistry - NOC:Elementary Thermodynamics for All

Subject Co-ordinator - Prof. Srabani Taraphder

Co-ordinating Institute - IIT - Kharagpur

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Molecular Rearrangements and Reactive Intermediates in

Subject Co-ordinator - Prof. Santanu Panda

Co-ordinating Institute - IIT - Kharagpur

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

Lecture 30 - Benzyne (Continued...)
Lecture 31 - Benzyne question answer discussion
Lecture 32 - Organolithium
Lecture 33 - Organolithium (Continued...)
Lecture 34 - Organolithium (Continued...)
Lecture 35 - Organolithium (Continued...)
Lecture 36 - Organolithium (Continued...)
Lecture 37 - Grignard
Lecture 38 - Grignard (Continued...)
Lecture 39 - Organocopper
Lecture 40 - Organozinc
Lecture 41 - Organoboron Chemistry
Lecture 42 - Organoboron Chemistry (Continued...)
Lecture 43 - Organoboron Chemistry (Continued...)
Lecture 44 - Organoboron Chemistry (Continued...)
Lecture 45 - Organoboron
Lecture 46 - Organoboron Chemistry
Lecture 47 - Organosilicon Chemistry
Lecture 48 - Organosilicon Chemistry (Continued...)
Lecture 49 - Organosilicon Chemistry (Continued...)
Lecture 50 - Organosulfur Chemistry
Lecture 51 - Organosulfur
Lecture 52 - Organosulfur (Continued...)
Lecture 53 - Organosulfur (Continued...)
Lecture 54 - Organophosphorus Chemistry
Lecture 55 - Organophosphorus Chemistry (Continued...)
Lecture 56 - Tutorial 1
Lecture 57 - Tutorial 2
Lecture 58 - Tutorial 3
Lecture 59 - Tutorial 4
Lecture 60 - Tutorial 5
Lecture 61 - Tutorial 6

NPTEL Video Course - Chemistry and Biochemistry - Principles and Application of Electron Paramagnetic Resonar

Subject Co-ordinator - Prof. Ranjan Das

Co-ordinating Institute - TIFR

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemistry-I

Subject Co-ordinator - Prof. K. Mangala Sunder

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemistry-II

Subject Co-ordinator - Prof. K. Mangala Sunder

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Application of Spectroscopic Methods in Molecular Struc

Subject Co-ordinator - Prof. S. Sankararaman

Co-ordinating Institute - IIT - Madras

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

Module 30
Module 31
Module 32
Module 33
Module 34
Module 35
Module 36

NPTEL Video Course - Chemistry and Biochemistry - NOC:Pericyclic Reactions and Organic Photochemistry

Subject Co-ordinator - Prof. S. Sankararaman

Co-ordinating Institute - IIT - Madras

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

Lecture 30 - Photochemistry of carbonyl compounds, Norrish type1 and 2 reactions
Lecture 31 - Photochemistry of carbonyl compounds, enone and dienone photochemistry
Lecture 32 - Photochemistry of Nitrogen compounds
Lecture 33 - Photochemistry of aromatic compounds
Lecture 34 - Photoinduced electron transfer reactions

NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemistry I:Introduction To Quantum Chemistry And Molec

Subject Co-ordinator - Prof. K. Mangala Sunder

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Lecture 1 - Historical context and experiments: Introducing the SchrÃ¶dinger equation
Lecture 2 - Lecture 2 - Bohr's atom, De Broglie Matter Waves and Schrodinger equation
Lecture 3 - Lecture 3 - Electromagnetic Radiation
Lecture 4 - Lecture 4 - Interaction of Radiation with Matter
Lecture 5 - Lecture 5 - Molecular Spectroscopy
Lecture 6 - Lecture 6 - Elementary Mathematical Functions 1
Lecture 7 - Lecture 7 - Review of Properties of Elementary Functions II
Lecture 8 - Lecture 8 - Time Dependent SchrÃ¶dinger Equation & Time Independent SchrÃ¶dinger Equation
Lecture 9 - Lecture 9 - SchrÃ¶dinger Equation Particle in a One-dimensional Box : Part I
Lecture 10 - Lecture 10 - SchrÃ¶dinger Equation Particle in a One-dimensional Box : Part II
Lecture 11 - Lecture 11 - SchrÃ¶dinger Equation Particle in Two-dimensional Box : Part I
Lecture 12 - Lecture 12 - Particle in Two-dimensional Box : Part II Uncertainty Principle
Lecture 13 - Lecture 13 - Particle in Two-dimensional Box : Part III Expectation Values
Lecture 14 - Lecture 14 - The Quantum Mechanics of Hydrogen Atom - Part I
Lecture 15 - Lecture 15 - The Quantum Mechanics of Hydrogen Atom - Part II
Lecture 16 - Lecture 16 - The Quantum Mechanics of Hydrogen Atom - Part III
Lecture 17 - Lecture 17 - The Quantum Mechanics of Hydrogen Atom - Part IV
Lecture 18 - Lecture 18 - The Quantum Mechanics of Hydrogen Atom - Part V
Lecture 19 - Lecture 19A - Assignment 1 Solution/Hints
Lecture 20 - Lecture 19B - Assignment 1 Solution/Hints
Lecture 21 - Lecture 19C - Assignment 1 Solution/Hints
Lecture 22 - Lecture 19D - Assignment 1 Solution/Hints
Lecture 23 - Lecture 19E - Assignment 1 Solution/Hints
Lecture 24 - Lecture 20 Harmonic Oscillator Model - Part I
Lecture 25 - Lecture 21 Harmonic Oscillator Model - Part II
Lecture 26 - Lecture 22 Harmonic Oscillator Model - Part III
Lecture 27 - Lecture 23 Harmonic Oscillator Model - Part IV
Lecture 28 - Lecture 24 Particle on a Ring - Part I
Lecture 29 - Lecture 25 Particle on a Ring - Part II

Lecture 30 - Lecture 26 - HeisenbergÂ s Uncertainty Relation
Lecture 31 - Lecture 27A - Operators, Commutators, Eigenvalues and Eigenvectors
Lecture 32 - Lecture 27B - Operators, Commutators, Eigenvalues and Eigenvectors
Lecture 33 - Lecture 28 - Introduction to Chemical Applications
Lecture 34 - Lecture 29 - Radiation Densities and EinsteinÂ s Semiclassical model
Lecture 35 - Lecture 30 - Born Oppenheimer Approximation
Lecture 36 - Lecture 31 - Beer Lambert Law
Lecture 37 - Lecture 32 - Diatomic Vibrational Spectra Harmonic Model
Lecture 38 - Lecture 33 - Diatomic Vibration Morse Oscillator Model
Lecture 39 - Lecture 34 - Molecular Vibrations in Polyatomic Molecules - Qualitative Account
Lecture 40 - Lecture 35 - Polyatomic Vibrations - Illustrative examples of normal vibrations

NPTEL Video Course - Chemistry and Biochemistry - NOC:Introduction to Chemical Thermodynamics and Kinetics

Subject Co-ordinator - Prof.Arijit Kumar De

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemical Crystallography

Subject Co-ordinator - Prof.Angshuman Roy Choudhury

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Advanced Chemical Thermodynamics and Kinetics

Subject Co-ordinator - Prof.Arijit Kumar De

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemistry: Atomic Structure and Chemical Bonding

Subject Co-ordinator - Prof. K. Mangala Sunder

Co-ordinating Institute - IIT - Madras

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

Lecture 30 - Legendre and Associated Legendre Equation
Lecture 31 - Born-Oppenheimer Approximation
Lecture 32 - Introduction to Angular Momentum
Lecture 33 - Spin Â½ Angular Momentum
Lecture 34 - Spin Angular Momentum and Coupling of Two Spin-1/2 Angular Momenta
Lecture 35 - Coupling of Two Angular Momenta
Lecture 36 - Video Tutorial for Hermite polynomials and hydrogen atom - Part 1
Lecture 37 - Video Tutorials - Part 2
Lecture 38 - Variational Principle in Quantum Chemistry
Lecture 39 - Introduction to Variational Principle in Quantum Chemistry
Lecture 40 - Variational Method
Lecture 41 - Hydrogen Molecule Ion
Lecture 42 - Hydrogen Molecule Ion
Lecture 43 - Hydrogen Molecule
Lecture 44 - Hydrogen Molecule
Lecture 45 - Video Tutorials on Angular Momentum (Orbital and Spin) and Variational Method - Part 1
Lecture 46 - Video Tutorials on Angular Momentum (Orbital and Spin) and Variational Method - Part 2
Lecture 47 - Introduction to Quantum Mechanical Perturbation Theory
Lecture 48 - First Order Time Independent perturbation Theory for Non-Degenerate states
Lecture 49 - First and Second Order Time Independent Perturbation Theory for Non-Degenerate States
Lecture 50 - First and Second Order Time Independent Perturbation Theory
Lecture 51 - Time Independent Perturbation Theory for Degenerate States
Lecture 52 - General MO method for Homonuclear Diatomic Molecules
Lecture 53 - General MO method for Heteronuclear Diatomic Molecules
Lecture 54 - Introduction to Hybridization and Valence Bond for Polyatomic Molecules
Lecture 55 - HÃ ckel Molecular Orbital Theory - I
Lecture 56 - HÃ ckel Molecular Orbital Theory - II

NPTEL Video Course - Chemistry and Biochemistry - NOC:Electrochemical Impedance Spectroscopy

Subject Co-ordinator - Dr. S. Ramanathan

Co-ordinating Institute - IIT - Madras

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

Lecture 30 - Challenges in RMA
Lecture 31 - Patterns Reported in Experiments
Lecture 32 - Warburg part - 1
Lecture 33 - Warburg part - 2
Lecture 34 - Warburg part - 3
Lecture 35 - Bounded Warburg
Lecture 36 - CPE
Lecture 37 - Porous electrodes
Lecture 38 - Films, PDM
Lecture 39 - PDM
Lecture 40 - Applications
Lecture 41 - NLEIS. Introduction and mathematical background
Lecture 42 - Electron Transfer reaction
Lecture 43 - Two step reaction
Lecture 44 - Two step reaction (Continued...)
Lecture 45 - Rt and Rp estimation
Lecture 46 - Galvanostatic simulations
Lecture 47 - Instabilities
Lecture 48 - Solution resistance effects
Lecture 49 - Detection on nonlinearities using KKT
Lecture 50 - Frumkin and Temkin isotherms
Lecture 51 - NLEIS Experimental aspects. FFT, PSD, THD
Lecture 52 - Application - other techniques HA, EFM

NPTEL Video Course - Chemistry and Biochemistry - NOC:Medicinal Chemistry

Subject Co-ordinator - Prof. Harinath Chakrapani

Co-ordinating Institute - IIT - Madras

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

Lecture 30 - Mechanisms in Biological Chemistry - Part II
Lecture 31 - Mechanisms in Biological Chemistry - Part III
Lecture 32 - Pharmacokinetics - Part I
Lecture 33 - Pharmacokinetics - Part II
Lecture 34 - Drug Metabolism - Part I
Lecture 35 - Drug Metabolism - Part II
Lecture 36 - Drug Metabolism - Part III
Lecture 37 - Drug Metabolism - Part IV
Lecture 38 - Tutorial 10 - ADME
Lecture 39 - Drug Administration Routes - Part I
Lecture 40 - Drug Administration Routes - Part II
Lecture 41 - Finding a Lead - Part I
Lecture 42 - Finding a Lead - Part II
Lecture 43 - Drug Screening
Lecture 44 - Tutorial 11 - Drug administration routes and finding a lead
Lecture 45 - Optimizing Drug-Target Interactions - Part I
Lecture 46 - Optimizing Drug-Target Interactions - Part II
Lecture 47 - Optimizing Drug-Target Interactions - Part III
Lecture 48 - Optimizing Drug-Target Interactions - Part IV
Lecture 49 - Tutorial 12
Lecture 50 - Optimizing Access to the Target
Lecture 51 - Prodrugs
Lecture 52 - Prodrugs and Drug Alliances
Lecture 53 - Endogenous Compounds, Peptidomimetics and Oligonucleotides as Drugs
Lecture 54 - Tutorial 13- Optimizing Access-Prodrugs
Lecture 55 - Combinatorial and parallel synthesis
Lecture 56 - Computer in Medicinal Chemistry
Lecture 57 - Antibacterial agents - 1
Lecture 58 - Antibacterial agents - 2
Lecture 59 - Tutorial14-Combinatorial and parallel synthesis, computers in med chem and anti-bacterial agents
Lecture 60 - Anti-viral agents - 1
Lecture 61 - Anti-viral agents - 2
Lecture 62 - Anti-cancer agents - 1
Lecture 63 - Anti-cancer agents - 2
Lecture 64 - Cholinergics
Lecture 65 - Anti-ulcer agents
Lecture 66 - QSAR - 1
Lecture 67 - QSAR - 2
Lecture 68 - QSAR - 3

Lecture 69 - Drug Resistance and Synergy

NPTEL Video Course - Chemistry and Biochemistry - NOC:Chemical Principles-II

Subject Co-ordinator - Prof. Arnab Mukherjee

Co-ordinating Institute - IIT - Madras

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

Lecture 30 - Thermodynamic Temperature
Lecture 31 - Definition of Entropy
Lecture 32 - Tutorial Problem - 3
Lecture 33 - Tutorial Problem - 4
Lecture 34 - Tutorial Problem - 5
Lecture 35 - Tutorial Problem - 6
Lecture 36 - Tutorial Problem - 7
Lecture 37 - Tutorial Problem - 8
Lecture 38 - Statistical Formulation of the Second Law
Lecture 39 - Probability
Lecture 40 - Microstates and Distributions
Lecture 41 - Permutation and Combination
Lecture 42 - Two-Level Systems
Lecture 43 - Most Probable Distribution
Lecture 44 - Calculation with Multi-Level systems
Lecture 45 - Calculation with Multi-Level systems with fixed energy - Part 1
Lecture 46 - Calculation with Multi-Level systems with fixed energy - Part 2
Lecture 47 - Calculation with Multi-Level systems with fixed energy - Part 3
Lecture 48 - Bose-Einstein, Fermi-Dirac and Maxwell-Boltzmann distribution
Lecture 49 - Most Probable Distribution is the Boltzmann Distribution
Lecture 50 - Demonstration of Boltzmann Distribution
Lecture 51 - Estimating Entropy for Various Processes
Lecture 52 - Microscopic equivalent of Heat and Work
Lecture 53 - Probability and Boltzmann Distribution
Lecture 54 - Thermodynamic Observables
Lecture 55 - Tutorial Problem - 9
Lecture 56 - Tutorial Problem - 10
Lecture 57 - Tutorial Problem - 11
Lecture 58 - Tutorial Problem - 12
Lecture 59 - Thermodynamic free energy
Lecture 60 - Condition for Spontaneity
Lecture 61 - Legendre Transformation of Thermodynamic Potentials
Lecture 62 - Maxwell Relations and Applications
Lecture 63 - Thermodynamic Relations using Jacobian Method - Part 1
Lecture 64 - Thermodynamic Relations using Jacobian Method - Part 2
Lecture 65 - Tutorial Problem - 13
Lecture 66 - Tutorial Problem - 14
Lecture 67 - Tutorial Problem - 15
Lecture 68 - Tutorial Problem - 16

Lecture 69 - Chemical Principle II - Overview and Road Ahead

NPTEL Video Course - Chemistry and Biochemistry - Organic Chemistry Lab Certification

Subject Co-ordinator - Prof. Harinath Chakrapani

Co-ordinating Institute - IISER PUNE

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

Lecture 1 - Feedback on Techniques in Organic Chemistry
Lecture 2 - Introduction to Claesen - Condensation
Lecture 3 - Introduction to Claesen - Condensation
Lecture 4 - How to separate different components from a mixture using column chromatography
Lecture 5 - Flurescence phenomenon
Lecture 6 - Reaction Mechanism and Sterochemistry
Lecture 7 - Chemiluminescence Phenomenon
Lecture 8 - Post Lab Questions

NPTEL Video Course - Chemistry and Biochemistry - NOC:Introductory Organic Chemistry-I

Subject Co-ordinator - Prof. Harinath Chakrapani

Co-ordinating Institute - IIT - Madras

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

Lecture 30 - Tutorial 05 - Part 2
Lecture 31 - Learning Objectives for week 6
Lecture 32 - Reactions of Alkenes - Part 4
Lecture 33 - Reactions of Alkenes - Part 5
Lecture 34 - Alkynes
Lecture 35 - Reactions of Alkynes - Part 1
Lecture 36 - Reactions of Alkynes - Part 2
Lecture 37 - Tutorial-6
Lecture 38 - Learning Objectives for week 7
Lecture 39 - Substitution and Elimination - Part 1
Lecture 40 - Substitution and Elimination - Part 2
Lecture 41 - Substitution and Elimination - Part 3
Lecture 42 - Substitution and Elimination - Part 4
Lecture 43 - Substitution and Elimination - Part 5
Lecture 44 - Tutorial-7
Lecture 45 - Learning Objectives for week 8
Lecture 46 - Alcohols - Part 1
Lecture 47 - Alcohols - Part 2
Lecture 48 - Alcohols - Part 3
Lecture 49 - Ethers and Epoxides - Part 1
Lecture 50 - Ethers and Epoxides - Part 2
Lecture 51 - Aromaticity
Lecture 52 - Tutorial-8

NPTEL Video Course - Chemistry and Biochemistry - NOC:Quantitative Methods in Chemistry

Subject Co-ordinator - Prof. Aasheesh Srivastava, Prof. Bharathwaj Sathyamoorthy

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Fundamentals of Spectroscopy

Subject Co-ordinator - Prof. Sayan Bagchi, Prof. Anirban Hazra

Co-ordinating Institute - IIT - Madras

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

Lecture 30 - Harmonic Oscillator Eigenvalues and Eigenfunctions - II
Lecture 31 - Vibration of a Diatomic Molecule and Derivation of the Vibrational Selection Rule
Lecture 32 - Ro-vibrational Spectrum - III
Lecture 33 - Vibration of Polyatomic Molecules - I
Lecture 34 - Vibration of Polyatomic Molecules - II
Lecture 35 - Vibration of Polyatomic Molecules - III
Lecture 36 - Normal Mode Coordinates
Lecture 37 - Introduction to Raman Spectroscopy
Lecture 38 - Quantum theory of Raman effect
Lecture 39 - Rotational Raman Spectroscopy
Lecture 40 - Nuclear Spin Statistics
Lecture 41 - Polarizability and Polarizability Ellipsoid
Lecture 42 - Raman Activity of Vibrations
Lecture 43 - Vibrational Raman Spectroscopy
Lecture 44 - Polarization Effects and Numericals
Lecture 45 - Resonance Spectroscopy - Introduction 1
Lecture 46 - Resonance Spectroscopy - Introduction 2
Lecture 47 - NMR Spectroscopy - 1
Lecture 48 - NMR Spectroscopy - 2
Lecture 49 - NMR Spectroscopy - 3
Lecture 50 - NMR Spectroscopy - 4
Lecture 51 - NMR Spectroscopy - 5
Lecture 52 - NMR Spectroscopy - 6
Lecture 53 - ESR Spectroscopy - 1
Lecture 54 - ESR Spectroscopy - 2
Lecture 55 - ESR Spectroscopy - 3
Lecture 56 - ESR Spectroscopy - 4
Lecture 57 - Electronic Spectroscopy - 1
Lecture 58 - Electronic Spectroscopy - 2
Lecture 59 - Electronic Spectroscopy - 3
Lecture 60 - Electronic Spectroscopy - 4
Lecture 61 - Electronic Spectroscopy - 5

NPTEL Video Course - Chemistry and Biochemistry - NOC:Symmetry, Stereochemistry and Applications

Subject Co-ordinator - Prof. Angshuman Roy Choudhury

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Symmetry and Group Theory (2021)

Subject Co-ordinator - Prof. Jeetender Chugh

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Introductory Organic Chemistry - II

Subject Co-ordinator - Prof. Harinath Chakrapani

Co-ordinating Institute - IISER - Pune

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

Lecture 30 - Alcohols, Ethers, and Epoxides
Lecture 31 - Tutorial - 4
Lecture 32 - Special Topic - E1CB reaction
Lecture 33 - Introduction - 5
Lecture 34 - Enols and Enolates_Intro
Lecture 35 - Enols and Enolates_Molecular Orbital Picture
Lecture 36 - Reactions of Enols and Enolates
Lecture 37 - Tutorial - 5A
Lecture 38 - Tutorial - 5B
Lecture 39 - Introduction - 6
Lecture 40 - Active methylene group
Lecture 41 - Aldol and related Reactions
Lecture 42 - Aldol Reactions: Specific enol equivalents - Part 1
Lecture 43 - Aldol Reactions: Specific enol equivalents - Part 2
Lecture 44 - Tutorial - 6
Lecture 45 - Introduction - 7
Lecture 46 - Conjugate Addition:1,2-addition and 1,4-addition
Lecture 47 - Conjugate Addition: Kinetic versus thermodynamic products
Lecture 48 - Conjugate Addition: Hard and Soft nucleophiles
Lecture 49 - Enol and Enolate alkylation
Lecture 50 - Regioselectivity of alkylation reactions
Lecture 51 - Acylation of enol/enolates and related Name Reactions
Lecture 52 - Tutorial-7: Felkin-Ahn Problems
Lecture 53 - Introduction - 8
Lecture 54 - Rearrangements - Part 1
Lecture 55 - Rearrangements - Part 2
Lecture 56 - Rearrangements - Part 3
Lecture 57 - Rearrangements - Part 4
Lecture 58 - Named Reactions - Part 1
Lecture 59 - Named Reactions - Part 2
Lecture 60 - Tutorial - 8
Lecture 61 - Conclusion

NPTEL Video Course - Chemistry and Biochemistry - NOC:Elementary Electrochemistry

Subject Co-ordinator - Prof. Angshuman Roy Choudhury

Co-ordinating Institute - IIT - Madras

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Organic Chemistry-I (Tamil)

Subject Co-ordinator - Prof. Srinivasan Venkataraman

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Phenols Structure, Preparation, Properties and Reactions - Part 1
Lecture 2 - Phenols Structure, Preparation, Properties and Reactions - Part 2
Lecture 3 - Phenols Structure, Preparation, Properties and Reactions - Part 3
Lecture 4 - Phenols Structure, Preparation, Properties and Reactions - Part 4
Lecture 5 - Phenols Structure, Preparation, Properties and Reactions - Part 5
Lecture 6 - Phenols Structure, Preparation, Properties and Reactions - Part 6
Lecture 7 - Phenol Assignment I and II - Part 7
Lecture 8 - Carbonyl Compounds - Part 1
Lecture 9 - Carbonyl Compounds - Part 2 (Continued...)
Lecture 10 - Carbonyl Compounds - Part 3 (Continued...)
Lecture 11 - Carbonyl Compounds - Part 4 (Continued...)
Lecture 12 - Carbonyl Compounds Assignment I and II - Part 5
Lecture 13 - Carboxylic Acids - Part 1
Lecture 14 - Functional Derivatives - Part 2
Lecture 15 - Appendices I and II - Part 3
Lecture 16 - Carboxylic Acids - Assignment I and II - Part 4
Lecture 17 - Nitro Compounds
Lecture 18 - Amines Structure, Preparation and Properties - Part 1
Lecture 19 - Amines Appendices I to IV - Part 1 (Continued...)
Lecture 20 - Assignments I to II - Part 2
Lecture 21 - Green Chemistry Introduction - Part 1
Lecture 22 - Green Chemistry Terminologies and strategies in green chemistry - Part 2 (Continued...)
Lecture 23 - Approches to Less Polluting Reactions - Part 3
Lecture 24 - Biocatalysis - Part 4
Lecture 25 - Microwave mediated and photochemical reactions and conclusion - Part 5
Lecture 26 - Acknowledgement

NPTEL Video Course - Chemistry and Biochemistry - Essentials in Immunolgy

Subject Co-ordinator - Prof. Anjali Karande, Dr. Dipankar Nandi, Dr. R. Manjunath

Co-ordinating Institute - IISc - Bangalore

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

Lecture 30 - Cytokines - Part 1
Lecture 31 - Cytokines - Part 2
Lecture 32 - Autoimmunity
Lecture 33 - Immunodeficiency
Lecture 34 - Host response mechanisms during infectious diseases - Part 1
Lecture 35 - Host response mechanisms during infectious diseases - Part 2
Lecture 36 - Transplantation immunology
Lecture 37 - Vaccines
Lecture 38 - Antigens and Immunogens
Lecture 39 - Synthetic vaccines
Lecture 40 - Evolution of the immune system

NPTEL Video Course - Chemistry and Biochemistry - Eukaryotic Gene Expression - basics and benefits

Subject Co-ordinator - Prof. P.N. Rangarajan

Co-ordinating Institute - IISc - Bangalore

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

Lecture 30 - Eukaryotic protein expression systems - I
Lecture 31 - Eukaryotic protein expression systems - II
Lecture 32 - Eukaryotic protein expression systems - III
Lecture 33 - Human Gene Therapy
Lecture 34 - DNA vaccines
Lecture 35 - Transgenic animals
Lecture 36 - Transgenic plants
Lecture 37 - Knockout mic
Lecture 38 - Regulation of Eukaryotic Gene Expression by Small RNAs (RNA Interference, RNAi)
Lecture 39 - Genomics & Proteomics
Lecture 40 - Metabolic Engineering & Synthetic Biology

NPTEL Video Course - Chemistry and Biochemistry - Introductory Quantum Chemistry

Subject Co-ordinator - Prof. K.L. Sebastian

Co-ordinating Institute - IISc - Bangalore

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

NPTEL Video Course - Chemistry and Biochemistry - Introduction to Organometallic Chemistry

Subject Co-ordinator - Prof. A.G. Samuelson

Co-ordinating Institute - IISc - Bangalore

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:Principles and Applications of NMR Spectroscopy

Subject Co-ordinator - Prof. Hanudatta S. Atreya

Co-ordinating Institute - IISc - Bangalore

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

Lecture 1 - Introduction to NMR spectroscopy
Lecture 2 - The alignment of nuclear spins in presence of magnetic field
Lecture 3 - Introduction to rotating frame
Lecture 4 - Free induction decay and Fourier transformation of FID
Lecture 5 - NMR Hardware
Lecture 6 - The concept of chemical shift
Lecture 7 - Factors that affect chemical shifts
Lecture 8 - Chemical shift referencing
Lecture 9 - J-coupling
Lecture 10 - Recap of basics
Lecture 11 - Introduction to general one dimensional NMR experiment
Lecture 12 - Practical aspects of recording a 1D NMR experiment - I
Lecture 13 - Practical aspects of recording a 1D NMR experiment - II
Lecture 14 - Practical aspects of recording a 1D NMR experiment - III
Lecture 15 - NMR Data processing
Lecture 16 - Basic aspects of 1D proton NMR analysis
Lecture 17 - Analysis of an example 1D proton spectrum
Lecture 18 - Analysis of 1D 1H NMR spectra of molecules - I
Lecture 19 - Analysis of 1D 1H NMR spectra of molecules - II
Lecture 20 - 1D 13C NMR
Lecture 21 - Why do we need 2D NMR
Lecture 22 - A qualitative explanation of how 2D NMR experiment works
Lecture 23 - Principles of 2D COSY and Total correlation spectroscopy (2D TOCSY)
Lecture 24 - 2D NOE-spectroscopy
Lecture 25 - 2D NOESY and 2D ROESY
Lecture 26 - What is heteronuclear correlation NMR spectroscopy
Lecture 27 - Sensitivity enhancement of heternuclei via polarization transfer
Lecture 28 - Heteronucler multiple quantum NMR spectroscopy (2D HMQC) and Heteronuclear single quantum NMR sp
Lecture 29 - Practical aspects of recording and processing 2D HMQC or HSQC

Lecture 30 - HMBC and its utility
Lecture 31 - 2D HSQC TOCSY and its analysis with examples
Lecture 32 - Structure determination of molecules by NMR
Lecture 33 - Structure determination of peptides - I
Lecture 34 - Structure determination of peptides - II
Lecture 35 - Structure determination of peptides - III
Lecture 36 - Chemical exchange
Lecture 37 - Hydrogen or deuterium exchange
Lecture 38 - Diffusion ordered spectroscopy DOSY I
Lecture 39 - DOSY II
Lecture 40 - STD NMR for drug target interactions

NPTEL Video Course - Chemistry and Biochemistry - NOC:Multidimensional NMR Spectroscopy for Structural Studie

Subject Co-ordinator - Prof. Hanudatta S. Atreya

Co-ordinating Institute - IISc - Bangalore

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

Lecture 30 - Resonance assignments of Proteins - Part III
Lecture 31 - Determination of protein secondary structure from NMR data
Lecture 32 - Determination of protein secondary structure from NMR data
Lecture 33 - Determination of protein tertiary structure from NMR data - Part I
Lecture 34 - 3D NOESY HSQC
Lecture 35 - Determination of protein tertiary structure from NMR data - Part II
Lecture 36 - Understanding Protein ligand interaction by NMR
Lecture 37 - Understanding Protein ligand interaction by NMR
Lecture 38 - Understanding Protein ligand interaction by NMR
Lecture 39 - Understanding Protein ligand interaction by NMR
Lecture 40 - Understanding Protein ligand interaction by NMR
Lecture 41 - Understanding Protein ligand interaction by NMR
Lecture 42 - Understanding Protein ligand interaction by NMR

NPTEL Video Course - Chemistry and Biochemistry - NOC:Symmetry and Structure in the Solid State

Subject Co-ordinator - Prof. T. N. Guru Row

Co-ordinating Institute - IISc - Bangalore

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

Lecture 30 - Crystallographic Directions and Planes
Lecture 31 - Interference of Waves
Lecture 32 - X Ray Scattering ; optical Analogy
Lecture 33 - X Ray Scattering ; Fourier transforms
Lecture 34 - X Ray Scattering ; Deriving Laue Conditions from scattering theory
Lecture 35 - X Ray Scattering ; Laue conditions to Bragg Ã¢â ¬Ë s Law, Introduction to Reciprocal lattice
Lecture 36 - Bragg's Law in Reciprocal Space - 1
Lecture 37 - Bragg's Law in Reciprocal Space - 2
Lecture 38 - Calculation of Intensities - 1
Lecture 39 - Calculation of Intensities - 2
Lecture 40 - Conversion from Direct to reciprocal space, the inverse relations
Lecture 41 - Diffraction and Reciprocal Space (Continued...)
Lecture 42 - Limits of Resolution
Lecture 43 - Concept of Structure Factors
Lecture 44 - Systematic Absences - 1
Lecture 45 - Systematic Absences - 2
Lecture 46 - Systematic Absences - 3
Lecture 47 - Friedel's Law and Laue classes
Lecture 48 - Experimental Aspects of Data Collection
Lecture 49 - Structure Determination - 1
Lecture 50 - Structure Determination - 2
Lecture 51 - Data Reduction
Lecture 52 - Fourier Syntheses
Lecture 53 - Patterson Method - 1
Lecture 54 - Patterson Method - 2
Lecture 55 - Direct Method
Lecture 56 - Powder Diffraction - 1
Lecture 57 - Powder Diffraction - 2
Lecture 58 - Powder Diffraction - 3
Lecture 59 - Quantum Crystallography - 1
Lecture 60 - Quantum Crystallography - 2
Lecture 61 - Intermolecular Interactions

NPTEL Video Course - Chemistry and Biochemistry - NOC:Ultrafast Optics and Spectroscopy

Subject Co-ordinator - Prof. Atanu Bhattacharya

Co-ordinating Institute - IISc - Bangalore

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:One and two dimensional NMR Spectroscopy for Chemists

Subject Co-ordinator - Prof. N. Suryaprakash

Co-ordinating Institute - IISc - Bangalore

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

Lecture 30 - Analysis of Strongly coupled spin systems
Lecture 31 - Eigen values of A2 and AMX spin systems
Lecture 32 - Analysis of Three spin coupled systems
Lecture 33 - Analysis of Proton NMR spectra - 1
Lecture 34 - Analysis of Proton NMR spectra - 2
Lecture 35 - Analysis of Proton NMR spectra - 3
Lecture 36 - Basics of 13C-NMR
Lecture 37 - Coupled and Decoupled 13C-Spectra
Lecture 38 - Broadband decoupling in 13C-NMR
Lecture 39 - Analysis of 13C spectra and DEPT
Lecture 40 - Heteronuclear couplings and satellite analysis - 1
Lecture 41 - Heteronuclear couplings and satellite analysis - 2
Lecture 42 - Coupling among magnetic equivalent nuclei and isotope effect
Lecture 43 - Analysis of spectra of other nuclei
Lecture 44 - Spin Echoes
Lecture 45 - Polarization transfer techniques
Lecture 46 - INEPT and DEPT
Lecture 47 - Decoupling and NOE
Lecture 48 - NOE-2
Lecture 49 - Introduction to 2D NMR
Lecture 50 - Two-dimensional NMR
Lecture 51 - Two dimensional NMR
Lecture 52 - Two dimensional COSY
Lecture 53 - COSY and examples
Lecture 54 - Variants of COSY and TOCSY spectra
Lecture 55 - Heteronuclear correlation and inverse detection
Lecture 56 - Coupled and decoupled HSQC and HMBC
Lecture 57 - NMR data acquisition - 1
Lecture 58 - NMR data acquisition - 2
Lecture 59 - Practical considerations of 1D NMR
Lecture 60 - NMR Data processing
Lecture 61 - NMR Data processing
Lecture 62 - NMR Instrumentation - 1
Lecture 63 - NMR Instrumentation - 2
Lecture 64 - Relaxation processes - 1
Lecture 65 - Relaxation processes - 2

NPTEL Video Course - Chemistry and Biochemistry - NOC:Time Dependent Quantum Chemistry

Subject Co-ordinator - Prof. Atanu Bhattacharya

Co-ordinating Institute - IISc - Bangalore

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

NPTEL Video Course - Chemistry and Biochemistry - NOC:One and Two Dimensional NMR Spectroscopy: Concepts and

Subject Co-ordinator - Prof. N. Suryaprakash

Co-ordinating Institute - IISc - Bangalore

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

Lecture 30 - Analysis of spectra of Heteronuclei
Lecture 31 - Heteronuclear spectral analysis
Lecture 32 - Spin Echoes - I
Lecture 33 - Spin Echoes - II
Lecture 34 - Sensitivity enhancement
Lecture 35 - Polarization transfer
Lecture 36 - INEPT
Lecture 37 - 2D NMR - I
Lecture 38 - 2D NMR - II
Lecture 39 - 2D-COSY - I
Lecture 40 - 2D COSY - II
Lecture 41 - Types of COSY spectra
Lecture 42 - TOCSY
Lecture 43 - HSQC - I
Lecture 44 - HSQC - II
Lecture 45 - me-HSQC
Lecture 46 - HSQC and HMBC
Lecture 47 - HMBC - II
Lecture 48 - 2D INADEQUATE
Lecture 49 - 2D-INADEQUATE and 2D J-Resolved
Lecture 50 - Homo and Heteronuclear J-resolved
Lecture 51 - Conceptual understanding of NOE
Lecture 52 - Positive and negative NOE
Lecture 53 - NOE and correlation times
Lecture 54 - Complications in NOE, Steady state NOE
Lecture 55 - ROESY and Tr NOE
Lecture 56 - Combined utility of COSY, TOCSY, HSQC, NOESY
Lecture 57 - Steady State NOE
Lecture 58 - 1D NOE, 1D TOCSY
Lecture 59 - 1D-TOCSY, PURESHIFT
Lecture 60 - PURSHIFT NMR