

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

NPTEL Video Course - Mathematics - NOC:Algebra - I

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Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Permutations  
Lecture 2 - Group Axioms  
Lecture 3 - Order and Conjugacy  
Lecture 4 - Subgroups  
Lecture 5 - Problem solving  
Lecture 6 - Group Actions  
Lecture 7 - Cosets  
Lecture 8 - Group Homomorphisms  
Lecture 9 - Normal subgroups  
Lecture 10 - Quotient Groups  
Lecture 11 - Product and Chinese Remainder Theorem  
Lecture 12 - Dihedral Groups  
Lecture 13 - Semidirect products  
Lecture 14 - Problem solving  
Lecture 15 - The Orbit Counting Theorem  
Lecture 16 - Fixed points of group actions  
Lecture 17 - Second application  
Lecture 18 - Sylow Theorem - a preliminary proposition  
Lecture 19 - Sylow Theorem - I  
Lecture 20 - Problem solving - I  
Lecture 21 - Problem solving - II  
Lecture 22 - Sylow Theorem - II  
Lecture 23 - Sylow Theorem - III  
Lecture 24 - Problem solving - I  
Lecture 25 - Problem solving - II  
Lecture 26 - Free Groups - I  
Lecture 27 - Free Groups - IIa  
Lecture 28 - Free Groups - IIb  
Lecture 29 - Free Groups - III

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- Lecture 30 - Free Groups - IV
- Lecture 31 - Problem Solving/Examples
- Lecture 32 - Generators and relations for symmetric groups  $\hat{A}_n$  I
- Lecture 33 - Generators and relations for symmetric groups  $\hat{A}_n$  II
- Lecture 34 - Definition of a Ring
- Lecture 35 - Euclidean Domains
- Lecture 36 - Gaussian Integers
- Lecture 37 - The Fundamental Theorem of Arithmetic
- Lecture 38 - Divisibility and Ideals
- Lecture 39 - Factorization and the Noetherian Condition
- Lecture 40 - Examples of Ideals in Commutative Rings
- Lecture 41 - Problem Solving/Examples
- Lecture 42 - The Ring of Formal Power Series
- Lecture 43 - Fraction Fields
- Lecture 44 - Path Algebra of a Quiver
- Lecture 45 - Ideals In Non-Commutative Rings
- Lecture 46 - Product of Rings
- Lecture 47 - Ring Homomorphisms
- Lecture 48 - Quotient Rings
- Lecture 49 - Problem solving
- Lecture 50 - Tensor and Exterior Algebras
- Lecture 51 - Modules
- Lecture 52 - Modules over polynomial rings  $K[x]$
- Lecture 53 - Modules
- Lecture 54 - Modules
- Lecture 55 - Submodules
- Lecture 56 - General constructions of submodules
- Lecture 57 - Problem Solving
- Lecture 58 - Quotient modules
- Lecture 59 - Homomorphisms
- Lecture 60 - More examples of homomorphisms
- Lecture 61 - First isomorphism theorem
- Lecture 62 - Direct sums of modules
- Lecture 63 - Complementary submodules
- Lecture 64 - Change of ring
- Lecture 65 - Problem solving
- Lecture 66 - Free Modules (finitely generated)
- Lecture 67 - Determinants
- Lecture 68 - Primary Decomposition

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- Lecture 69 - Problem solving
- Lecture 70 - Finitely generated modules and the Noetherian condition
- Lecture 71 - Counterexamples to the Noetherian condition
- Lecture 72 - Generators and relations for Finitely Generated Modules
- Lecture 73 - General Linear Group over a Commutative Ring
- Lecture 74 - Equivalence of Matrices
- Lecture 75 - Smith Canonical Form for a Euclidean domain
- Lecture 76 - solved\_problems1
- Lecture 77 - Smith Canonical Form for PID
- Lecture 78 - Structure of finitely generated modules over a PID
- Lecture 79 - Structure of a finitely generated abelian group
- Lecture 80 - Similarity of Matrices
- Lecture 81 - Deciding Similarity
- Lecture 82 - Rational Canonical Form
- Lecture 83 - Jordan Canonical Form