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Lecture 21 - Neural Networks Session - 4

Lecture 22 - Neural Networks Session - 5

Lecture 23 - Enterprise Applications of ML Session - 1

Lecture 24 - Basic of Algorithm Design Session - 1

Lecture 25 - Basic of Algorithm Design Session - 2

Lecture 26 - Basic of Algorithm Design Session - 3

Lecture 27 - Basic of Algorithm Design Session - 4

Lecture 28 - Introduction to Optimization Session - 1

Lecture 29 - Introduction to Optimization Session - 2

Lecture 30 - Introduction to Reinforcement Learning Session - 1

Lecture 31 - Introduction to Reinforcement Learning Session - 2

[Lecture 32 - Introduction to Reinforcement Learning Session - 3](#)

[Lecture 33 - Introduction to Reinforcement Learning Session - 4](#)

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[Lecture 35 - Introduction to Reinforcement Learning Session - 6](#)

[Lecture 36 - Introduction to Reinforcement Learning Session - 7](#)

[Lecture 37 - Introduction of Cryptography Session - 1](#)

[Lecture 38 - Introduction of Cryptography Session - 2](#)

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[Lecture 40 - Compressive Sensing Session - 1](#)

[Lecture 41 - Compressive Sensing Session - 2](#)

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[Lecture 47 - Compressive Sensing Session - 8](#)

Lecture 1 - Department Introduction

Lecture 2 - Introduction to Cloud Computing - Part 1

Lecture 3 - Introduction to Cloud Computing - Part 2

Lecture 4 - Cloud IaaS and Virtualization

Lecture 5 - System Virtualization

Lecture 6 - Mechanisms for System Virtualization

Lecture 7 - Containers - Part 1

Lecture 8 - Containers - Part 2

Lecture 9 - AI and Hybrid Cloud

Lecture 10 - Container Orchestration - Part 1

Lecture 11 - Container Orchestration - Part 2

Lecture 12 - Container Orchestration - Part 3

Lecture 13 - Application Devops - Part 1

Lecture 14 - Application Devops - Part 2

Lecture 15 - Application Devops - Part 3

Lecture 16 - Application Devops - Part 4

Lecture 17 - Application Devops - Part 5

Lecture 18 - Application Devops - Part 6

Lecture 19 - Cloud as Distributed System - Part 1

Lecture 20 - Cloud as Distributed System - Part 2

DIGIMAT - The No.1 Learning Management Platform for Creative Learning

NPTEL : ACM Indian Summer School on Programming Languages: Principles and Practice (Special Lecture Series)

Co-ordinators : Dr. Abhijat Vichare

- Lecture 1 - Review of Basic Concepts - Dr. Abhijat Vichare - Session - 1
- Lecture 2 - Review of Basic Concepts - Dr. Abhijat Vichare - Session - 2
- Lecture 3 - Review of Basic Concepts - Dr. Abhijat Vichare - Session - 3
- Lecture 4 - Introduction to Lex and Yacc - Sameera Deshpande - Session - 1
- Lecture 5 - Introduction to Lex and Yacc - Sameera Deshpande - Session - 2
- Lecture 6 - Hello world, Revisiting the first program we write in c - Siddhesh Poyarekar - Session - 1
- Lecture 7 - Compiler as system - Vivek Buzruk - Session - 1
- Lecture 8 - Compiler as system - Vivek Buzruk - Session - 2
- Lecture 9 - Introduction to Data Flow Analysis - Prof. Uday Khedker - Session - 1
- Lecture 10 - Introduction to Data Flow Analysis - Prof. Uday Khedker - Session - 2
- Lecture 11 - Introduction to Data Flow Analysis - Prof. Uday Khedker - Session - 3
- Lecture 12 - Introduction to Data Flow Analysis - Prof. Uday Khedker - Session - 4
- Lecture 13 - Introduction to Data Flow Analysis - Prof. Uday Khedker - Session - 5
- Lecture 14 - Introduction to Data Flow Analysis - Prof. Uday Khedker - Session - 6
- Lecture 15 - Undefined Behavior Compiler Optimization - Prathamesh K Session - 1
- Lecture 16 - Program Semantics - Prof. Subhajit Roy Session - 1
- Lecture 17 - Program Semantics - Prof. Subhajit Roy Session - 2
- Lecture 18 - Program Semantics - Prof. Subhajit Roy Session - 3
- Lecture 19 - Program Semantics - Prof. Subhajit Roy Session - 4
- Lecture 20 - Program Semantics - Prof. Subhajit Roy Session - 5
- Lecture 21 - Program Semantics - Prof. Subhajit Roy Session - 6
- Lecture 22 - Program Semantics - Prof. Subhajit Roy Session - 7
- Lecture 23 - Program Semantics - Prof. Subhajit Roy Session - 8
- Lecture 24 - Introduction to Optimizations - Prof. V. Krishna N Session - 1
- Lecture 25 - Introduction to Optimizations - Prof. V. Krishna N Session - 2
- Lecture 26 - Introduction to Optimizations - Prof. V. Krishna N Session - 3
- Lecture 27 - Introduction to Optimizations - Prof. V. Krishna N Session - 4
- Lecture 28 - Compiler as system - Vivek S. Buzruk Session - 1
- Lecture 29 - Compiler as system - Vivek S. Buzruk Session - 2

DIGIMAT - The No.1 Learning Management Platform for Creative Learning

NPTEL : ACM Winter School 2019 on High Performance Computing (Special Lecture Series)

Co-ordinators : Dr. Mainak Chaudhuri

- Lecture 1 - Basics of Computer Architecture and OS
- Lecture 2 - An Introduction to High Performance Computing
- Lecture 3 - Introduction to OpenMP
- Lecture 4 - Advanced OpenMP
- Lecture 5 - Introduction to MPI
- Lecture 6 - Advanced MPI
- Lecture 7 - Supercomputing in India
- Lecture 8 - Job Scheduling
- Lecture 9 - Introduction to GPU
- Lecture 10 - Introduction to Open ACC
- Lecture 11 - CPU and GPU Memory
- Lecture 12 - Optimizations and GPU Profiling
- Lecture 13 - CUDA C
- Lecture 14 - HPC Networking - I
- Lecture 15 - HPC Networking - II
- Lecture 16 - Research in HPS
- Lecture 17 - Case Study - Parallel Graph Algorithms
- Lecture 18 - Case Study - Solving PDEs at Extreme Scale

Lecture 1 - Basic thermodynamic functions: Enthalpy, entropy, configurational entropy, Gibbs free energy

Lecture 2 - State of equilibrium: Chemical potential, activity, equilibrium between solutions

Lecture 3 - Case study: Mechanical alloying, alloying by deformation.

Lecture 4 - Computer calculation of phase diagrams

Lecture 5 - Thermodynamics of irreversible processes: Multiple irreversible processes

Lecture 6 - Quasichemical solutions

- Lecture 1 - ACM Summer School on Program Execution - Introduction
- Lecture 2 - Basics of Architecture - Part 1
- Lecture 3 - Basics of Architecture - Part 2
- Lecture 4 - Basics of Architecture - Part 3
- Lecture 5 - Basics of Architecture - Part 4
- Lecture 6 - A Review of Architectural Features for supporting Program Execution - Part 1
- Lecture 7 - A Review of Architectural Features for supporting Program Execution - Part 2
- Lecture 8 - A Review of Architectural Features for supporting Program Execution - Part 3
- Lecture 9 - A Review of Architectural Features for supporting Program Execution - Part 4
- Lecture 10 - Review of OS - IPC and beyond - Part 1
- Lecture 11 - Review of OS - IPC and beyond - Part 2
- Lecture 12 - From Programs to Processes (and threads) - Part 1
- Lecture 13 - From Programs to Processes (and threads) - Part 2
- Lecture 14 - Network Protocol Fundamentals
- Lecture 15 - Web protocols and Web Software - Part 1
- Lecture 16 - Web protocols and Web Software - Part 2
- Lecture 17 - Storage Systems - Part 1
- Lecture 18 - Storage Systems - Part 2
- Lecture 19 - Storage Systems - Part 3
- Lecture 20 - Basics of High Performance Computing - Part 1
- Lecture 21 - Basics of High Performance Computing - Part 2
- Lecture 22 - Basics of High Performance Computing - Part 3
- Lecture 23 - The Evolution of Linux as an Enterprise Operating System
- Lecture 24 - The Hypervisor - Lord of the Rings - Part 1
- Lecture 25 - The Hypervisor - Lord of the Rings - Part 2
- Lecture 26 - Hands on Lab - Create a VM and Play
- Lecture 27 - Containers and Kubernetes Era - Part 1
- Lecture 28 - Containers and Kubernetes Era - Part 2
- Lecture 29 - Containers and Kubernetes Era - Part 3
- Lecture 30 - The Future of Compute - Part 1
- Lecture 31 - The Future of Compute - Part 2

[Lecture 1 - Panel Discussion Q and A - Part 1](#)

[Lecture 2 - Panel Discussion Q and A - Part 2](#)

[Lecture 3 - Runtime and Linkers - Discussion - 1](#)

[Lecture 4 - Runtime and Linkers - Discussion - 2](#)

[Lecture 5 - Runtime and Linkers - Linkers](#)

[Lecture 6 - Runtime and Linkers - Program Execution - Loader](#)

[Lecture 7 - Runtime and Linkers - Static Libraries - Dynamic Linking](#)

[Lecture 8 - Code Generation and Backend - An Introduction to LLVM Backend](#)

[Lecture 9 - Code Generation and Backend - An Introduction to Loop Backend](#)

[Lecture 10 - Code Generation and Backend - Code Generation with LLVM - Part 1](#)

[Lecture 11 - Code Generation and Backend - Code Generation with LLVM - Part 2](#)

[Lecture 12 - Machine Independent Optimizations - High Level Optimizations - 1](#)

[Lecture 13 - Machine Independent optimizations - High Level Optimizations - 2](#)

[Lecture 14 - Machine Independent optimizations - High Level Optimizations - 3](#)

[Lecture 15 - Machine Independent optimizations - High Level Optimizations - 4](#)

[Lecture 16 - Machine Independent optimizations - High Level Optimizations - 5](#)

[Lecture 17 - Machine Independent optimizations - High Level Optimizations - 6](#)

[Lecture 18 - Machine Architecture and Machine Dependent Optimizations - Machine Architecture - 1](#)

[Lecture 19 - Machine Architecture and Machine Dependent Optimizations - Machine Architecture - 2](#)

[Lecture 20 - Machine Architecture and Machine Dependent Optimizations - Machine Architecture - 3](#)

[Lecture 21 - Machine Architecture and Machine Dependent Optimizations - Register Allocation - 1](#)

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[Lecture 23 - Machine Architecture and Machine Dependent Optimizations - Register Allocation - 3](#)

[Lecture 24 - Machine Architecture and Machine Dependent Optimizations - Instruction Scheduling - 1](#)

[Lecture 25 - Machine Architecture and Machine Dependent Optimizations - Instruction Scheduling - 2](#)

[Lecture 26 - Machine Dependent Optimizations - Dependence Analysis and Loop transformations - 1](#)

[Lecture 27 - Machine Dependent Optimizations - Dependence Analysis and Loop transformations - 2](#)

[Lecture 28 - Control-Flow Analyses and Static Single Assignment form - Control Flow Analysis - 1](#)

[Lecture 29 - Control-Flow Analyses and Static Single Assignment form - Control Flow Analysis - 2](#)

[Lecture 30 - Control-Flow Analyses and Static Single Assignment form - Depth First Analysis of Flow Graphs](#)

[Lecture 31 - Control-Flow Analyses and Static Single Assignment form - Dominators](#)

- [Lecture 32 - Control-Flow Analyses and Static Single Assignment form - Natural Loops \(for Reducible Flow-Graphs\)](#)
- [Lecture 33 - Control-Flow Analyses and Static Single Assignment form - The Static Single Assignment SSA Form - 1](#)
- [Lecture 34 - Control-Flow Analyses and Static Single Assignment form - The Static Single Assignment SSA Form - 2](#)
- [Lecture 35 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I Part 1](#)
- [Lecture 36 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I Part 2](#)
- [Lecture 37 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I - Part 3](#)
- [Lecture 38 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I - Part 4](#)
- [Lecture 39 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I - Part 5](#)
- [Lecture 40 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I - Part 6](#)
- [Lecture 41 - Polyhedral Compilation and Loop Optimizations - Polyhedral Compilation I - Part 7](#)
- [Lecture 42 - Polyhedral Compilation and Loop Optimizations - Affine Control Loops](#)
- [Lecture 43 - Polyhedral Compilation and Loop Optimizations - Siplifying Reductions Revised - 1](#)
- [Lecture 44 - Polyhedral Compilation and Loop Optimizations - Siplifying Reductions Revised - 2](#)
- [Lecture 45 - Polyhedral Compilation and Loop Optimizations - Siplifying Reductions Revised - 3](#)
- [Lecture 46 - Polyhedral Compilation and Loop Optimizations - Classical Optimization](#)
- [Lecture 47 - Polyhedral Compilation and Loop Optimizations - What is Program Analysis](#)
- [Lecture 48 - Polyhedral Compilation and Loop Optimizations - Live Variable Analysis - 1](#)
- [Lecture 49 - Polyhedral Compilation and Loop Optimizations - Live Variable Analysis - 2](#)
- [Lecture 50 - Polyhedral Compilation and Loop Optimizations - Available Expression Analysis](#)
- [Lecture 51 - Polyhedral Compilation and Loop Optimizations - Common Features of Bit Vector Frameworks](#)
- [Lecture 52 - Polyhedral Compilation and Loop Optimizations - The Birth of a Compiler - 1](#)
- [Lecture 53 - Polyhedral Compilation and Loop Optimizations - The Birth of a Compiler - 2](#)
- [Lecture 54 - Polyhedral Compilation and Loop Optimizations - The Structure of Modern Compiler Modern Challenges](#)
- [Lecture 55 - Polyhedral Compilation and Loop Optimizations - Conclusion](#)

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[Lecture 5 - Curvature - Part 1](#)

[Lecture 6 - Curvature - Part 2](#)

[Lecture 7 - Curvature - Part 3](#)

[Lecture 8 - Introduction To Parametric Curves and Surfaces - 1](#)

[Lecture 9 - Introduction To Parametric Curves and Surfaces - 2](#)

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[Lecture 11 - Introduction To Parametric Curves and Surfaces - 4](#)

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[Lecture 14 - Introduction To Parametric Curves and Surfaces - 7](#)

[Lecture 15 - Introduction To Parametric Curves and Surfaces - 8](#)

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[Lecture 24 - Discrete Surface - Part 1](#)

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[Lecture 28 - Discrete Surface - Part 5](#)

[Lecture 29 - Laplace Beltrami on Manifolds and Meshes with Applications - Part 1](#)

[Lecture 30 - Laplace Beltrami on Manifolds and Meshes with Applications - Part 2](#)

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[Lecture 33 - Laplace Beltrami on Manifolds and Meshes with Applications - Part 5](#)

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[Lecture 35 - Internal Digital R and I - Part 1](#)

[Lecture 36 - Internal Digital R and I - Part 2](#)

[Lecture 37 - Internal Digital R and I - Part 3](#)

[Lecture 38 - Rigid and Non rigid Shape Matching - Part 1](#)

[Lecture 39 - Rigid and Non rigid Shape Matching - Part 2](#)

[Lecture 40 - Rigid and Non rigid Shape Matching - Part 3](#)

[Lecture 41 - Rigid and Non rigid Shape Matching - Part 4](#)

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[Lecture 49 - Geometric Deep Learning - Lab 2](#)

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[Lecture 1 - ACM India Summer School on Shape Modelling - Introduction](#)

[Lecture 2 - Linear Algebra and Optimization Refresher - 1](#)

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[Lecture 4 - Linear Algebra and Optimization Refresher - 3](#)

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[Lecture 7 - Overview of Python 3 + {Numpy, Scipy, Matplotlib} - Part 2](#)

[Lecture 8 - Curves and Surfaces - Part 1](#)

[Lecture 9 - Curves and Surfaces - Part 2](#)

[Lecture 10 - Curves and Surfaces - Part 3](#)

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[Lecture 13 - Curves and Surfaces - Part 6](#)

[Lecture 14 - Curves and Surfaces - Part 7](#)

[Lecture 15 - Algorithms in Computational Geometry - Part 1](#)

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[Lecture 17 - Algorithms in Computational Geometry - Part 3](#)

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[Lecture 23 - Discrete Surfaces - Part 1](#)

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[Lecture 31 - Discrete Laplace Beltrami Operator - Part 1](#)

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- [Lecture 35 - Discrete Laplace Beltrami Operator - Part 5](#)
- [Lecture 36 - Discrete Laplace Beltrami Operator - Part 6](#)
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- [Lecture 38 - Lab Libigl-Python-Blindings - Part 2](#)
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- [Lecture 42 - Procrustes Shape Analysis - Part 4](#)
- [Lecture 43 - Lab Procrustes Shape Analysis Template - Part 1](#)
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- [Lecture 46 - Shape Deformation/Animation, Shape Matching - Part 1](#)
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- [Lecture 50 - Shape Deformation/Animation, Shape Matching - Part 5](#)
- [Lecture 51 - Geometric Deep Learning - Part 1](#)
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- [Lecture 57 - Topological Descriptors For Data and Shape Analysis - Part 1](#)
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- [Lecture 61 - Panel Discussion On Shape Modelling In Academia and Industry - Part 1](#)
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Lecture 2 - ACM Day 1 Session 2 - Part I

Lecture 3 - ACM Day 1 Session 2 - Part II

Lecture 4 - ACM Day 1 Session 3 - Part I

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Lecture 6 - ACM Day 2 Session 1 - Part I

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Lecture 9 - ACM Day 2 Session 2 - Part II

Lecture 10 - ACM Day 3 Session 1 - Part 1

Lecture 11 - ACM Day 3 Session 1 - Part 2

Lecture 12 - ACM Day 3 Session 2 - Part 1

Lecture 13 - ACM Day 3 Session 2 - Part 2

Lecture 14 - ACM Day 3 Session 3 - Part I

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Lecture 17 - ACM Day 3 Session 4 - Part II

Lecture 18 - ACM Day 4 session 1 - Part I

Lecture 19 - ACM Day 4 session 1 - Part II

Lecture 20 - ACM Day 4 session 2 - Part I

Lecture 21 - ACM Day 4 session 2 - Part II

Lecture 22 - ACM Day 5 session 1 - Part 1

Lecture 23 - ACM Day 5 session 1 - Part 2

Lecture 24 - ACM Day 5 session 2 - Part 1

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Lecture 26 - ACM Day 6 session 1 - Part 1

Lecture 27 - ACM Day 6 session 1 - Part 2

Lecture 28 - ACM Day 6 session 2 - Part 1

Lecture 29 - ACM Day 6 session 2 - Part 2

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[Lecture 32 - ACM Day 7 Session 2](#)

[Lecture 33 - ACM Day 8 Session 1](#)

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[Lecture 44 - ACM Day 10 Session 2 - Part 1](#)

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[Lecture 46 - ACM Day 10 Session 3 - Part 1](#)

[Lecture 47 - ACM Day 10 Session 3 - Part 2](#)

DIGIMAT - The No.1 Learning Management Platform for Creative Learning

NPTEL : ACM Winter School on Design, Implementation and Verification of Computer Systems (Special Lecture Series)

Co-ordinators : Multi-Faculty

Lecture 1 - Mathematical Logic - Session 1

Lecture 2 - Mathematical Logic - Session 2

Lecture 3 - Industry Perspectives on Compiler Design

Lecture 4 - Processor Datapath and Introduction to ILP Architecture - Session 1

Lecture 5 - Processor Datapath and Introduction to ILP Architecture - Session 2

Lecture 6 - Instruction Level Parallelism - Session 1

Lecture 7 - Multithreading and Multicores

Lecture 8 - Instruction Level Parallelism - Session 2

Lecture 9 - DRAM Memory Organization

Lecture 10 - Reactive Synthesis: A High-Level Introduction - Session 1

Lecture 11 - Reactive Synthesis: A High-Level Introduction - Session 2

Lecture 12 - Reactive Synthesis: A High-Level Introduction - Session 3

Lecture 13 - Reactive Synthesis: A High-Level Introduction - Session 4

Lecture 14 - Reduced Ordered Binary Decision Diagrams and And-Inverter Graphs - Session 1

Lecture 15 - Reduced Ordered Binary Decision Diagrams and And-Inverter Graphs - Session 2

Lecture 16 - Reduced Ordered Binary Decision Diagrams and And-Inverter Graphs - Session 3

Lecture 17 - Runtime Environments - I

Lecture 18 - Runtime Environments - II

Lecture 19 - Hexagon DSPs in Snapdragon

Lecture 20 - Types and Program Analysis

Lecture 21 - Local and Global Optimizations

Lecture 22 - Introduction to Data-Flow and Control-Flow Analyses

Lecture 23 - Code Generation and Register Allocation

Lecture 24 - The Static Single Assignment Form and Application to Program Optimizations

Lecture 25 - Garbage Collection

Lecture 26 - Program Testing and Verification - Session 1

Lecture 27 - Program Testing and Verification - Session 2

[Lecture 1 - NP-Completeness](#)

[Lecture 2 - Hilbert's Tenth Problem](#)

[Lecture 3 - SAT Solvers](#)

[Lecture 4 - Polynomial Identity Testing](#)

[Lecture 5 - Finite Graphs for Infinite Functions](#)

[Lecture 6 - A Panorama of Computational Problems](#)

DIGIMAT - The No.1 Learning Management Platform for Creative Learning

NPTEL : NPTEL Special Lectures Series (Special Lecture Series)

Co-ordinators : Mr. Ravikrishnan .A, Srivastava, Raman .K

Lecture 1 - Microbial Social Networks: From Deep Sea to Outer Space

Lecture 2 - Data-Driven Analysis to Improve Road Safety

Lecture 3 - The Power of Generative AI: AI that can see and talk

Lecture 4 - Astronomical Challenges in Atomic Scale chip Manufacturing

Lecture 5 - Evaluating Fault - Tolerant Schemes for noisy hardware

Lecture 6 - Tighter and Stronger Quantum Speed Limits for General Quantum States

Lecture 7 - Robust, bright photon sources for quantum communication and quantum sensing applications

Lecture 8 - Particle transport problems at different scales: From circulating fluidized beds to dry powder

Lecture 9 - Simulation and Data: 6 Steps from Theory to Impact through Disasters, Engineering and Heritage

Lecture 10 - The Attosecond Worldâ€”there's plenty of time at the bottom

Lecture 11 - Quantum diffusion during cosmic inflation

Lecture 12 - Squashed quantum non-Markovianity: a measure of genuine quantum non-Markovianity in states

Lecture 13 - Gravitational-Wave Astronomy: New discoveries, puzzles and prospects

Lecture 14 - Bounds on the Superconducting Transition Temperature

Lecture 15 - Probing the primordial universe with electromagnetic and gravitational waves

Lecture 16 - Elephants have a bigger brain than humans, so how come they don't study you

Lecture 17 - Investigating quantum speed limits with superconducting qubits

Lecture 18 - Orbital Angular Momentum Entanglement

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NPTEL : ACM India Summer School on IoT and Embedded Systems (Special Lecture Series)

Co-ordinators : Prof. Meenakshi DSouza

[Lecture 1 - ACM India Summer School on IoT and Embedded Systems - Introduction](#)

[Lecture 2 - Embedded Sysyem: An Introduction](#)

[Lecture 3 - Introdeduction to Embedded Sysyems](#)

[Lecture 4 - Introduction to IoT](#)

[Lecture 5 - AWS IoT: Tutorial and demonstration](#)

[Lecture 6 - IoT: Components, operating systems and protocols](#)

[Lecture 7 - Arduino programming](#)

[Lecture 8 - Arduino programming: Tutorial](#)

[Lecture 9 - IoT Applications](#)

[Lecture 10 - IoT Applications: Tutorial and demonstration - 1](#)

[Lecture 11 - IoT Applications: Tutorial and demonstration - 2](#)

[Lecture 12 - Cloud, edge and fog computing for IoT - Part I](#)

[Lecture 13 - Cloud, edge and fog computing for IoT - Part II](#)

[Lecture 14 - IoT Communication](#)

DIGIMAT - The No.1 Learning Management Platform for Creative Learning

NPTEL : ACM India Summer School on Algorithms for Data Science (2023) (Special Lecture Series)

Co-ordinators : Multi-Faculty

Lecture 1 - Introduction - ACM India Summer School on Algorithms for Data Science

Lecture 2 - Introduction to Probability

Lecture 3 - Selection Problems

Lecture 4 - Median from Read-Only Memory

Lecture 5 - Majority and Heavy Hitters

Lecture 6 - Introduction to Probability Tail inequalities

Lecture 7 - Chernoff Bounds

Lecture 8 - Quickselect and Quicksort

Lecture 9 - Introduction to Randomized Algorithms: Graph Minimum Cut

Lecture 10 - Introduction to Streaming Algorithm and Reservoir Sampling

Lecture 11 - Approximate Counting in Streaming: MORRIS Counter

Lecture 12 - Median of Means Technique Applied to Approximate Counting

Lecture 13 - Counting Distinct Elements in Streaming

Lecture 14 - 2-Universal Hashing and Applications for Derandomizing

Lecture 15 - Approximate Heavy Hitters

Lecture 16 - Frequency Moments

Lecture 17 - Graph Streaming Algorithms

Lecture 18 - Locality Sensitive Hashing - Part 1

Lecture 19 - Locality Sensitive Hashing - Part 2

Lecture 20 - Locality Sensitive Hashing - Part 3

Lecture 21 - Graph Streaming Lower Bounds

Lecture 22 - Bloom Filters

Lecture 23 - Frequent Pattern Mining - Part 1

Lecture 24 - Frequent Pattern Mining - Part 2

Lecture 25 - Is AI ready for The real world?

Lecture 26 - Online Learning and Multiarmed Bandits - Part 1

Lecture 27 - Online Learning and Multiarmed Bandits - Part 2

Lecture 28 - Reinforcement Learning - Part 1

Lecture 29 - Reinforcement Learning - Part 2

Lecture 30 - Singular Value Decomposition - Part 1

Lecture 31 - Singular Value Decomposition - Part 2

[Lecture 32 - Graph Centralities](#)

[Lecture 33 - Johnson Lindenstrauss Lemma](#)

[Lecture 34 - Graph Centralities Clustering and Partition](#)

[Lecture 1 - Mathamatical Foundation for Cryptography - Part 1](#)

[Lecture 2 - Mathamatical Foundation for Cryptography - Part 2](#)

[Lecture 3 - Modern Cryptography](#)

[Lecture 4 - Modern Cryptography](#)

[Lecture 5 - Modern Cryptography - Asymmetric Cryptography](#)

[Lecture 6 - Network Security protocols and mechanisms - Part 1](#)

[Lecture 7 - Network Security protocols and mechanisms - Part 2](#)

[Lecture 8 - IOT Security Protocols - Part 1](#)

[Lecture 9 - IOT Security Protocols - Part 2](#)

[Lecture 10 - Introduction to Ethical Hacking - Part 1](#)

[Lecture 11 - Introduction to Ethical Hacking - Part 2](#)

[Lecture 12 - DevSecOps Embedding Security into DevOps - Part 1](#)

[Lecture 13 - Web App Security](#)

[Lecture 14 - Navigating the privacy landscape](#)

[Lecture 15 - Hardware security](#)

[Lecture 16 - Introduction to Blockchain](#)

[Lecture 17 - Social Engineering and OSINT - Part 1](#)

[Lecture 18 - Social Engineering and OSINT - Part 2](#)

[Lecture 19 - Cloud Security and Secure Coding Practices - Part 1](#)

[Lecture 20 - Cloud Security and Secure Coding Practices - Part 2](#)

[Lecture 21 - Career Opportunities, Challenges and Support](#)

[Lecture 22 - Quantum Cryptography - Part 1](#)

[Lecture 23 - Quantum Cryptography - Part 2](#)

[Lecture 24 - AI in cybersecurity](#)

- Lecture 1 - Introduction to Cryptography
- Lecture 2 - Classical Ciphers - Part 1
- Lecture 3 - Classical Ciphers - Part 2
- Lecture 4 - Foundations of Cryptography - Part 1
- Lecture 5 - Foundations of Cryptography - Part 2
- Lecture 6 - Foundations of Cryptography - Part 3
- Lecture 7 - Block and Stream ciphers, Feistel Networks
- Lecture 8 - Data Encryption Standard
- Lecture 9 - Cybersecurity - Part 1
- Lecture 10 - Cybersecurity - Part 2
- Lecture 11 - Enterprise Security - Part 1
- Lecture 12 - Enterprise Security - Part 2
- Lecture 13 - Advanced Encryption Standard
- Lecture 14 - Information Gathering and Social Engineering
- Lecture 15 - Cybersecurity : A Practical Approach - Part 1
- Lecture 16 - Cybersecurity : A Practical Approach - Part 2
- Lecture 17 - Cybersecurity : A Practical Approach - Part 3
- Lecture 18 - Cybersecurity : A Practical Approach - Part 4
- Lecture 19 - Cybersecurity : A Practical Approach - Part 5
- Lecture 20 - Public Key Cryptography
- Lecture 21 - Network Security - Firewalls, ACL, NAT, AAA, FTD - Part 1
- Lecture 22 - Network Security - Firewalls, ACL, NAT, AAA, FTD - Part 2
- Lecture 23 - Network Security - VPN, PKI, Certificates, SSL,SAML - Part 1
- Lecture 24 - Network Security - VPN, PKI, Certificates, SSL,SAML - Part 2
- Lecture 25 - Virtual Private Networks (VPN)
- Lecture 26 - Hash Functions, Digital Signatures and Quantum Cryptography
- Lecture 27 - Packets, Protocols and Attacks in Cyberspace - Part 1
- Lecture 28 - Packets, Protocols and Attacks in Cyberspace - Part 2

[Lecture 1 - Representing Networks](#)

[Lecture 2 - Strategic Network Formation - Session 1](#)

[Lecture 3 - Strategic Network Formation - Session 2](#)

[Lecture 4 - Strategic Network Formation - Session 3](#)

[Lecture 5 - Strategic Network Formation - Session 4](#)

[Lecture 6 - Network Visualization - Session 1](#)

[Lecture 7 - Network Visualization - Session 2](#)

[Lecture 8 - Social Network Analysis](#)

[Lecture 9 - Neural Networks - Basics](#)

[Lecture 10 - Network Analysis in Telecom](#)

[Lecture 11 - Strong and Weak Ties](#)

[Lecture 12 - Link Analysis](#)

[Lecture 13 - Statistical Mechanics of Complex Networks - Session 1](#)

[Lecture 14 - Statistical Mechanics of Complex Networks - Session 2](#)

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[Lecture 17 - Hate Speech - Session 1](#)

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[Lecture 19 - Dynamics on Networks - Session 1](#)

[Lecture 20 - Dynamics on Networks - Session 2](#)

[Lecture 21 - Dynamics on Networks - Session 3](#)

[Lecture 22 - Dynamics on Networks - Session 4](#)

[Lecture 23 - Causal Discovery and Network Science](#)

[Lecture 24 - Games and Networks - Session 1](#)

[Lecture 25 - Games and Networks - Session 2](#)

DIGIMAT - The No.1 Learning Management Platform for Creative Learning

NPTEL : ACM Winter School on Recent Trends in AI and ML (Special Lecture Series)

Co-ordinators : Dr. Chandranath Adak

Lecture 1 - NLP Foundation - Part I

Lecture 2 - NLP Foundation - Part II

Lecture 3 - Fundamentals of Machine Learning - Part I

Lecture 4 - Fundamentals of Machine Learning - Part II

Lecture 5 - Artificial Intelligence - An Introduction

Lecture 6 - Logistic Regression and Neural Networks

Lecture 7 - Large Scale SVM Algorithms and Applications

Lecture 8 - Ensemble Deep Learning For Alzheimer's Disease Dianosis

Lecture 9 - From Smart Sensing to Smart Living - The Era of IoT, AI:ML and Data Science

Lecture 10 - Machine Learning - Naive Bayes Classification

Lecture 11 - Cluster Analysis - Basic Concepts and Algorithms

Lecture 12 - Algorithms of Unsupervised Learning

Lecture 13 - Backbone functions of Deep Neural Networks Activation, Loss, Optimization functions

Lecture 14 - Convolutional Neural Networks

Lecture 15 - Reinforcement Learning - Experience, Adapt, Excel - Part I

Lecture 16 - Neoteric Frontiers in cloud, edge and Quantum Computing for Bigdata, IoT and AI Applications

Lecture 17 - Reinforcement Learning - Experience, Adapt, Excel - Part II

Lecture 18 - Economic Impact of New Category Recommendation Evidence from a Randomized Field Experiment

Lecture 19 - Neural Text Generation

Lecture 20 - RL Algorithms

Lecture 21 - An Overview of AI, NLP, ML Research Activities

Lecture 22 - LLMs and Ethics

Lecture 23 - Reinforcement Learning with Human Feedback

Lecture 24 - The LLM Journey

Lecture 25 - Representation Learning for Large Scale Pretrained Models

Lecture 26 - Computer Vision Application

DIGIMAT - The No.1 Learning Management Platform for Creative Learning

NPTEL : ACM India Pingala Interactions in Computing (PIC) 2024 (Special Lecture Series)

Co-ordinators : Multi-Faculty

Lecture 1 - PIC 2024 Inauguration

Lecture 2 - Exciting Trends in Machine Learning

Lecture 3 - Towards Inclusive and Responsible Language Technologies

Lecture 4 - Chat with Jeffrey Dean and Partha Talukdar

Lecture 5 - Indo-International Collaboration Case Studies - 1

Lecture 6 - Indo-International Collaboration Case Studies - 2

Lecture 7 - Indo-International Collaboration Case Studies - 3

Lecture 8 - Connectivity is the Thing

Lecture 9 - Chat with Robert Metcalfe

Lecture 10 - Bad Algorithms

Lecture 11 - Chat with Saket Saurabh

Lecture 12 - Converting Research to Business

Lecture 13 - Robust Query Processing: Where Geometry Beats ML !

Lecture 14 - Data, More Data, Too Much Data

Lecture 15 - Chat with Jayant Haritsa and Tova Milo

Lecture 16 - Efficient Verification of Computation on Untrusted Platforms

Lecture 17 - Cryptography: the Art of Paradox

Lecture 18 - Chat with Shweta Agrawal and Yael Kalai

Lecture 19 - ACM: Goals, Priorities, Initiatives

Lecture 20 - Valedictory Function

Lecture 1 - Welcome and Opening Remarks

Lecture 2 - Keynote 1

Lecture 3 - Lightning Talks - Part 1

Lecture 4 - Academia Industry Career Opportunities - Sitare-University

Lecture 5 - Academia Industry Career Opportunities - Flame University

Lecture 6 - Academia Industry Career Opportunities - Processor Research Labs

Lecture 7 - ACMI-W Panel Discussion

Lecture 8 - ACMI-W OCCW-Award

Lecture 9 - ACM-India Activities for PhD-Students

Lecture 10 - Keynote 2

Lecture 11 - Lightning Talks - Part 2

Lecture 12 - ECR Award Talk - Siddharth Barman

Lecture 13 - Doctoral Dissertation Award Talks 1

Lecture 14 - Doctoral Dissertation Award Talks 2

Lecture 15 - ECR Talk 1 - Manas-Thakur

Lecture 16 - ECR Talk 2 - Deeksha-Bhartiya

Lecture 17 - ECR Talk 3 - Shikhar-Patranabais

DIGIMAT - The No.1 Learning Management Platform for Creative Learning

NPTEL : ACM INDIA Annual Event 2024 (Special Lecture Series)

Co-ordinators : Meenakshi D'Souza, Hirendra Nath Ghosh

[Lecture 1 - Inauguration - Meenakshi D'Souza, Hirendra Nath Ghosh](#)

[Lecture 2 - ACM: Goals, Priorities, Initiatives - Yannis Ioannidis](#)

[Lecture 3 - ACM India at a Glance - Venkatesh Raman](#)

[Lecture 4 - Fireside Chat with Robert Metcalfe - Robert Metcalfe, Pravin Bhagwat](#)

[Lecture 5 - Human Factors of Formal Methods - Shriram Krishnamurthi](#)

[Lecture 6 - ACM India Awards Ceremony 1 - Hemant Pande](#)

[Lecture 7 - ACM India Awards Ceremony 2 - Hemant Pande](#)

[Lecture 8 - Efficient Verification of Computation on Untrusted Platforms - Yael Kalai](#)

[Lecture 9 - The Story of 14Trees - Pravin Bhagwat](#)

- Lecture 1 - Introduction to Full-Stack Networking School
- Lecture 2 - Linux Networking Stack, Evolution of NICs, Evolution of Network packet processors
- Lecture 3 - Demo Session 1: Hands on with basic Linux networking commands
- Lecture 4 - Demo Session 2: Netfilter and iptables
- Lecture 5 - Intro to virtualization containers
- Lecture 6 - Demo session 1: Hands on with Docker
- Lecture 7 - Demo session 1: Hands on with Containers
- Lecture 8 - Demo session 1: Hands on with Kubernetes
- Lecture 9 - Container Networking : CNI service mesh, L7 Proxies, Overlay networks
- Lecture 10 - Container Networking : AWS, VPC, NAT, gateways
- Lecture 11 - Demo Session 1
- Lecture 12 - Multicloud
- Lecture 13 - Invited talk- Research Career
- Lecture 14 - eBPF
- Lecture 15 - eBPF for Networking
- Lecture 16 - Invited talks: Application Connectivity for the Multi-Cloud Era
- Lecture 17 - Application layer networking
- Lecture 18 - Invited talk: Performance Measurement and Optimization
- Lecture 19 - Invited talk: Chaos Engineering
- Lecture 20 - Websockets
- Lecture 21 - RPC: Remote Procedure Calls
- Lecture 22 - Invited talk: TiHAN Edge cloud testbed with WiFi/5G
- Lecture 23 - Demo Session: Application Layer Networking
- Lecture 24 - Message Queues
- Lecture 25 - Invited talks: Towards Expressive and Performant Service Meshes
- Lecture 26 - Advanced HTTP
- Lecture 27 - WiFi Tuned
- Lecture 28 - Multipath Networking
- Lecture 29 - Demo Session - Multipath networking