

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**NAME OF DEPARTMENT:** Department of Computer Science and Engineering**Subject Code:** CST-104**Course Title:** Applications of ML**L-T-P:** 0-0-4**Credits:** 2**Subject Area:** TEB

Course Outlines: Machine learning techniques - Supervised learning techniques, un-supervised learning techniques, regression, application of machine learning on text data, application of machine learning for image recognition, application of machine learning in recommendation systems, application of machine learning in social media data.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT: Department of Computer Science and Engineering

Subject Code: CST-105

Course Title: Applications of DL

L-T-P: 0-0-4

Credits: 2

Subject Area: TEB

Course Outlines: Deep learning frameworks, Neural networks, Convolutional neural networks, Image classification, Object detection and localization, Image segmentation, Advanced topics in deep learning.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT/CENTRE/SCHOOL: Department of Computer Science and Engineering

Subject Code: CSC-201

Course Title: Computer Organization & Architecture

L-T-P: 3-1-0

Credits: 4

Subject Area: PCC

Course Outlines: Digital logic and data representation, instruction set architecture, processor design, memory systems, storage systems, and input/output systems, parallel architectures, pipelines, recent advances.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT/CENTRE/SCHOOL: Department of Computer Science and Engineering

Subject Code: CSC-203

Course Title: Design and Analysis of Algorithms

L-T-P: 3-1-0

Credits: 4

Subject Area: PCC

Course Outlines: Algorithm Analysis techniques consisting of asymptotic analysis, recursive functions, and amortized analysis. Algorithm design techniques covering the divide and conquer strategy, greedy algorithms, and dynamic programming. with applications to standard problems. An introduction to complexity classes P, NP, and NP-complete. Introduction to NP-complete problems.

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NAME OF DEPARTMENT/CENTRE/SCHOOL: Department of Computer Science and Engineering

Subject Code: CST-101 **Course Title:** Cyber Physical Systems

L-T-P: 0-0-4

Credits: 2

Subject Area: TEB

Course Outlines: Hardware platforms, software platforms, operating systems, sensors, communication protocols, storage approaches, cloud services, data analytics tools, edge computing, use cases.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT/CENTRE/SCHOOL: Department of Computer Science and Engineering

Subject Code: CST-102

Course Title: Linux Programming

L-T-P: 0-0-4

Credits: 2

Subject Area: TEB

Course Outlines: Use of Linux functions / system calls for I/O, process creation / termination and process control. Relationship between processes, Inter process communication: Signals, pipes, FIFO, message queues, semaphores, sockets etc. Writing Daemon processes. Various types of Linux shells and writing shell scripts.

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NAME OF DEPARTMENT/CENTRE/SCHOOL: Department of Computer Science and Engineering

Subject Code: CST-103

Course Title: System Programming

L-T-P: 0-0-4

Credits: 2

Subject Area: TEB

Course Outlines: Linux systems: Unix programming environment, Unix commands, Emacs text editor, file system, processes, Unix shell and basic shell commands, Shell scripting, Systems calls, IPC, networking, and concurrency; C/C++ programming language: makefile, debugging tools such as gdb and valgrind; Version control tools: CVS, Git, GitHub; Other tools: LaTeX, GNU Plot, FTP, WinSCP, VirtualBox, Docker, etc.; Embedded device programming in robotics, digital agriculture, Internet of Things, etc. Sensors and actuators deployed with some microcontroller boards

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT/CENTRE/SCHOOL: Department of Computer Science and Engineering

Subject Code: CST-108

Course Title: Secure Socket Programming

L-T-P: 0-0-4

Credits: 2

Subject Area: TEB

Course Outlines: Client-server programs using BSD Socket API – Stream and Datagram sockets, Symmetric / asymmetric encryption, SSL / TLS, DTLS. Writing secure applications using open source TLS / SSL libraries such as OpenSSL, wolfSSL etc.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT/CENTRE/SCHOOL: Department of Computer Science and Engineering

Subject Code: CST-109

Course Title: Cloud Security

L-T-P: 0-0-4

Credits: 2

Subject Area: TEB

Course Outlines: Cloud platforms, security platforms, virtualization tools, containers, IAM, access controls, secure configurations, data protection, multi-cloud security, secure services, network traffic patterns, related tools, use cases.