A 30 hours Short Term Online certificate Course (**Lectures and Hands-On Sessions**) on

Data-Driven Frontiers: Blockchain, Social Network and Multimedia

June 1 -10, 2025

Indian Institute of Technology, Roorkee, Uttarakhand, India

About the Course

The primary goal of this short-term course is to provide foundational knowledge in Blockchain Technology, Multimedia Signal Processing, and Social Network Analysis. Participants will explore key concepts such as blockchain architecture, consensus mechanisms, and their real-world applications. The course will also cover essential topics in multimedia, including signal fundamentals, compression techniques, and modern approaches to quality assessment using AI.

In the context of social networks, attendees will learn about data modeling, anomaly detection, and strategies for influence maximization. Industry professionals and academic experts will offer valuable insights through interactive sessions that blend theoretical knowledge with field-relevant practices.

Practical lab sessions will further enhance learning by offering hands-on experience in implementing compression methods and evaluating multimedia quality, ensuring that participants can translate theoretical concepts into actionable skills.

*Please note that all classes and lab sessions will be conducted live in **online mode**. An e-certificate will be issued upon successful completion of the course, subject to maintaining more than 80% attendance.

Key Topic

- **Blockchain Technology:**
  - Fundamentals, components, working mechanisms, and types of blockchain networks
- **Consensus Protocols:**
  - Overview and types of consensus mechanisms
- **Social Network Analysis:**
  - Network modeling, anomaly detection, diffusion, and influence maximization
- **Multimedia Signal Processing:**
  - Audio, image, and video fundamentals; compression techniques; and transmission challenges
- **Quality Assessment:**
  - Traditional and AI-based methods for evaluating multimedia quality
- **Lab Sessions:**
  - Hands-on implementation of compression and quality assessment techniques

Speakers

- Dr. Tushar Shinde, IIT Madras (Zanzibar)
- Dr. Pradumn K. Pandey, IIT Roorkee
- Dr. Satendra Kumar, IIT Patna

Course Content

Social Network

- **Searching**: The process of exploring data or structures to find specific elements, solutions, or paths using algorithms.
- **Modeling**: Building mathematical or computational representations of real-world phenomena to make predictions or understand data behavior.
- **Network Data Synthesis**: Generating or simulating network data (e.g., social, communication networks) to test algorithms or models.
- **Anomaly Detection**: Identifying unusual patterns or outliers in data that do not conform to expected behavior.
- **Introduction to Basic ML**: Learning fundamental machine learning techniques for classifying, predicting, and understanding data.
- **Influence Maximization**: Finding the most influential nodes in a network to maximize the spread of information or influence.

Blockchain Technology

- What is a blockchain?
- Components of Blockchain
- Working mechanism of Blockchain
- Types of Blockchain networks

Consensus Protocols

- What is a Consensus Mechanism?
- Types of Consensus Mechanism

Multimedia Signal Processing

- **Fundamentals**: Basics of audio, image, and video signals
- **Challenges**: Issues in storage and transmission
- **Compression Need**: Importance of compression for efficient data handling
- **Compression Techniques:**
  - Overview of methods
  - Lossless vs. lossy approaches
  - Effects on image and video quality
- **Quality Assessment:**
  - Traditional vs. neural network-based methods
  - Evaluation of AI-generated content (AIGC)

Registration Fee

Rs 9,500/- (Including GST)

Registration Link:

Click Here

Pay using QR

Last date for registration: 25th May, 2025

For further queries contact:

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