INDIAN INSTITUTE OF TECHNOLOGY MANDI
भारतीय प्रौद्योगिकी संस्थान मंडी

Centre for Continuing Education

N·S·D·C
RE IMAGINE FUTURE

Minor in Artificial Intelligence & Data Science

from CCE, IIT Mandi

PROGRAM OVERVIEW

The Artificial Intelligence and Data Science Program by CCE, IIT Mandi, offers a comprehensive curriculum that begins with foundational programming, mathematics, and statistics, and progresses to advanced topics like machine learning, neural networks, and big data analytics. Designed for beginners with basic knowledge, it is taught by renowned IIT professors, ensuring high-quality learning and career-ready skills. The program includes practical applications, capstone projects, and expertise in cutting-edge AI and data science techniques, preparing students for high-demand roles in this transformative field.

Skills you will gain:

- **Programming Proficiency**
- **Data Analysis and Visualization**
- **Machine Learning Expertise**
- **Big Data Handling**
- **Deep Learning Skills**
- **Problem-Solving with AI**

WHY CHOOSE THIS COURSE?

- **Expert Faculty:** Learn from IIT Mandi's top professors with industry experience
- **Comprehensive Curriculum:** Covers foundational to advanced AI & DS topics.
- **Beginner-Friendly:** Suitable for students with basic programming and math knowledge.
- **Job-Ready Skills:** Gain expertise in machine learning, data analytics, and more.
- **Capstone Project:** Apply knowledge to real-world problems and connect with peers.
- **Showcase IIT Certificate:** Receive an official certificate from CCE, IIT Mandi to enhance your career prospects.

COURSE DETAILS

Term Duration
9 months, 3 trimester

Course Credits
15 Credits

Commitment
10 hrs per week

Term Break
2 Weeks

TRIMESTER 1

MTH101 : Mathematics for Data Science

Master the mathematical backbone of AI and Data Science, exploring linear algebra, calculus, probability, and optimization to build a strong analytical foundation for modeling, problem-solving, and decision-making in complex data-driven scenarios.

TRIMESTER 2

DS201 : Data Science and Machine Learning Foundations

Dive into the foundational concepts of Machine Learning, mastering supervised and unsupervised learning, ensemble methods, and evaluation metrics. Learn to build, tune, and validate predictive models, gaining the skills to tackle real-world machine learning problems with confidence.

TRIMESTER 3

AI301 : Advanced Deep Learning and AI Applications

Explore advanced AI concepts and deep learning architectures, including CNNs, RNNs, transformers, and generative models like GANs and VAEs. Gain hands-on experience with state-of-the-art techniques in reinforcement learning, NLP, and computer vision while diving into the research frontiers shaping the future of AI.

PROJECT EXAMPLES

Projects 1: Personal Loan Approval Prediction System

Develop a machine learning model to predict whether a loan application will be approved based on applicant details, enabling efficient decision-making in financial institutions.

- **Supervised Learning:** Classification techniques (Logistic Regression, Decision Trees, SVMs)
- **Model Evaluation:** Precision, Recall, F1-score, ROC-AUC
- **Feature Engineering:** Handling categorical data, outliers, and missing values
- **Cross-Validation & Hyperparameter Tuning:** Ensuring robust and optimized models
- **Industry Application:** Credit risk analysis and customer evaluation in finance

Projects 2: Customer Churn Prediction for SaaS Platforms

Build a machine learning model to predict whether a customer will stop using a subscription-based service, helping companies improve retention strategies.

- **Supervised Learning:** Classification methods (Random Forests, Gradient Boosting, Logistic Regression)
- **Feature Engineering:** Temporal features, behavior tracking, and interaction patterns
- **Ensemble Learning:** Techniques like bagging and boosting for improved accuracy
- **Evaluation Metrics:** Accuracy, Precision-Recall Curve, ROC-AUC
- **Business Impact:** Insights into customer behavior and retention improvement

Projects 3: Real-Time Traffic Pattern Clustering

Create an unsupervised learning model to cluster traffic patterns using real-world traffic data, aiding in congestion management and route optimization.

- **Unsupervised Learning:** Clustering algorithms (K-Means, Gaussian Mixture Models)
- **Dimensionality Reduction:** PCA for visualization and feature compression
- **Model Validation:** Silhouette score, Elbow Method
- **Data Handling:** Preprocessing large-scale time-series traffic data
- **Practical Utility:** Applications in smart cities and transportation systems

Projects 4: Intelligent Image Captioning System

Develop a deep learning-based system to generate descriptive captions for images by integrating Convolutional Neural Networks (CNNs) with Recurrent Neural Networks (RNNs).

- **Deep Learning Architectures:** CNNs for feature extraction, RNNs/LSTMs for sequence generation
- **Transformers:** Incorporating attention mechanisms for improved accuracy
- **Generative Models:** Image-to-text mapping using sequence modeling
- **Practical Applications:** AI-powered image description in accessibility tools and media platforms
- **Frameworks:** PyTorch or TensorFlow for implementation

Projects 5: AI-Powered Chatbot for Sentiment-Aware Customer Support

Build a machine learning model to predict whether a customer will stop using a subscription-based service, helping companies improve retention strategies.

- **NLP Techniques:** Tokenization, word embeddings, and transformer-based models (e.g., BERT, GPT)
- **Reinforcement Learning:** Fine-tuning response generation for improved interaction quality
- **Evaluation Metrics:** BLEU score, perplexity, and sentiment classification accuracy
- **Practical Applications:** Customer service automation with sentiment aware responses
- **Industry Relevance:** High demand in e-commerce and SaaS sectors.

Projects 6: Real-Time Object Detection and Tracking

Build a real-time object detection and tracking system using YOLO (You Only Look Once) and apply it to scenarios like traffic monitoring or surveillance.

- **Deep Learning Architectures:** CNNs for detection and feature extraction
- **Advanced Techniques:** YOLO/SSD for real-time performance
- **Computer Vision Applications:** Object tracking, bounding box prediction, and classification
- **Optimization:** Model quantization for deployment on edge devices
- **Industry Application:** Smart cities, autonomous vehicles, and security systems

MEET OUR INSTRUCTORS

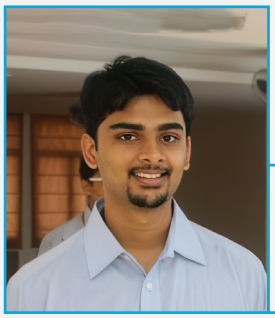
Dr. Indu Joshi
Assistant Professor, IIT Mandi

Experience: 4+ yrs
Citation: 293

INDUSTRY EXPERTS

Arul Francis
Associate Director Global Commercial Data Science & AI Engineering, AstraZeneca

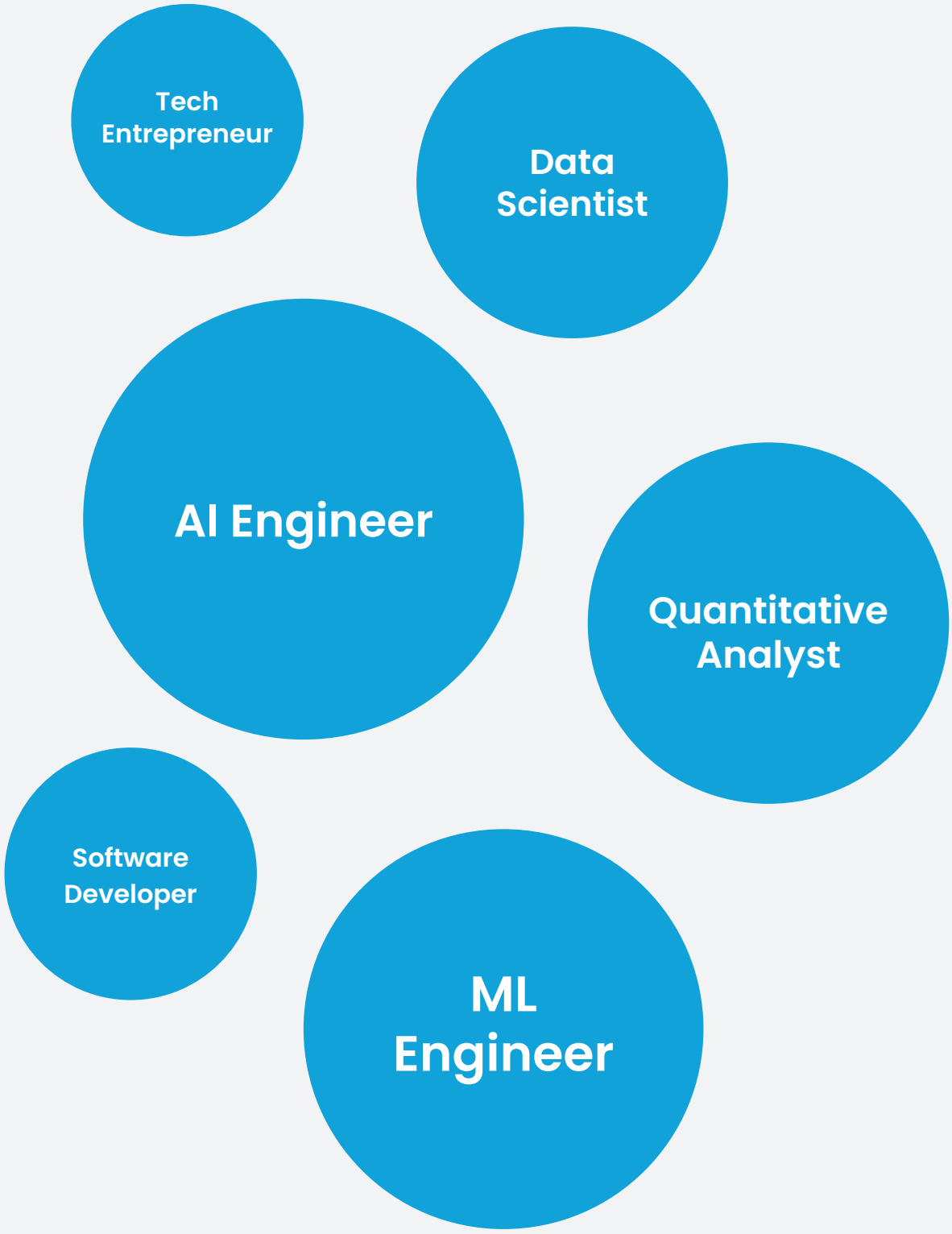
Gaurav Kandel
Data Scientist, FinBox



Sriram Desai
Software Engineer, ByteDance

Saket Dwivedi
Stadd ML Engineer, Cureskin

YOUR CAREER PATHWAYS



ADMISSON PROCESS

Clear Qualifier Test
You must pass the exam to confirm your seat for the program.

Complete Onboarding
Only shortlisted candidates go through the onboarding process.

Start Learning
Learn from India's top educators and stand out from the crowd.

FEES STRUCTURE

Qualifier Test Fee (Non-Refundable)	**₹99**

	Option 1	Option 2
	Upfront	**EMI** Through our NBFC partners
Secure Seat Fee (Non-Refundable)	₹4,000	₹4,000
Remaining Course Fee (Non-Refundable)	₹66,000	₹8,800 x 9 months
Total Program Fee	₹70,000	₹83,200

For More Queries

info.cce@iitmandi.ac.in