



भारतीय प्रौद्योगिकी संस्थान पटना
Indian Institute of Technology Patna

PROFESSIONAL CERTIFICATE PROGRAMME IN

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (AI & ML)

(BATCH: 04)



DIRECTOR'S MESSAGE

DEAR ASPIRING PROFESSIONALS

Welcome to the Professional Certificate Programme in Artificial Intelligence & Machine Learning at the Indian Institute of Technology, Patna. As we stand at the forefront of the Fourth Industrial Revolution, the demand for expertise in AI and ML continues to grow exponentially across various sectors. This programme is designed to equip you with the essential skills and knowledge required to thrive in this dynamic field.

At IIT Patna, we pride ourselves on our commitment to academic excellence and innovation. Our distinguished faculty, comprised of leading experts in AI and ML, will guide you through a rigorous curriculum that combines theoretical foundations with practical applications. You will engage in hands-on projects, collaborative learning, and real-world case studies, ensuring that you are well-prepared to tackle the challenges of tomorrow.

We believe that education is not just about imparting knowledge, but also about fostering critical thinking, creativity, and a passion for lifelong learning. By joining this programme, you are taking an important step towards becoming a leader in technology and driving meaningful change in society.

I encourage you to make the most of this opportunity. Collaborate with your peers, ask questions, and immerse yourself in the learning experience. Together, let us explore the limitless possibilities of AI and ML.

Welcome aboard, and I wish you all the best on this exciting journey!

Warm Regards,

Director: T. N. Singh
Indian Institute of Technology, Patna

INDUSTRY OVERVIEW

The AI market is expected to grow at a compound annual growth rate (CAGR) of 38.1% between 2022 and 2030.

01

AI jobs are plentiful, with hiring growing by 32% in the last couple of years. However, there is a high talent gap.

02

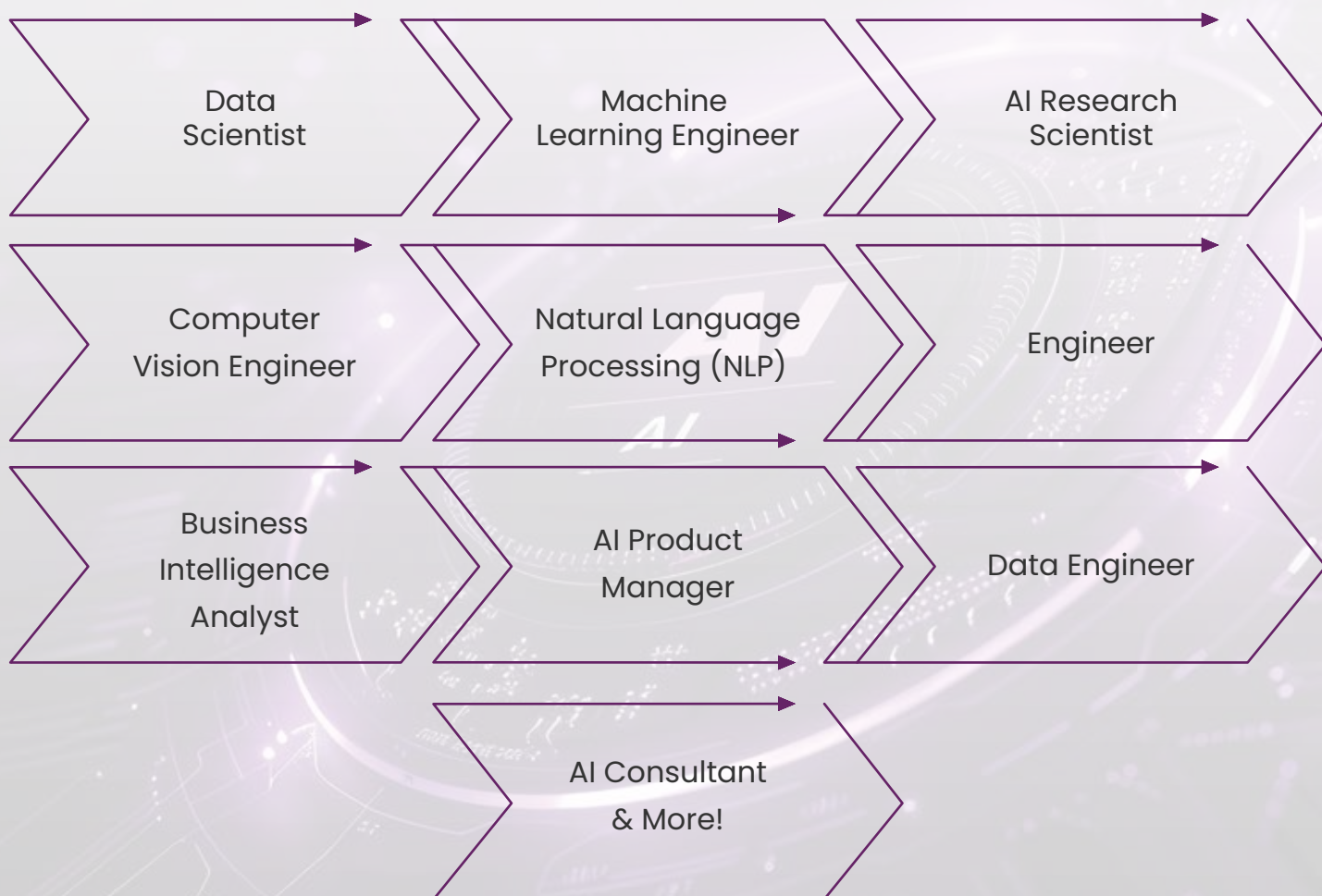
This advanced AI is expected to become the fastest-growing market segment between 2024 and 2030.

03

83% of companies say AI is a top priority in their business plans.

04

UNIQUE JOB ROLES



COURSE OBJECTIVE

The Professional Certification Programme in Artificial Intelligence and Machine Learning from IIT Patna is designed to equip participants with cutting-edge knowledge and practical skills in Artificial Intelligence and Machine Learning. The programme aims

Build strong foundations in Artificial Intelligence and Machine Learning concepts

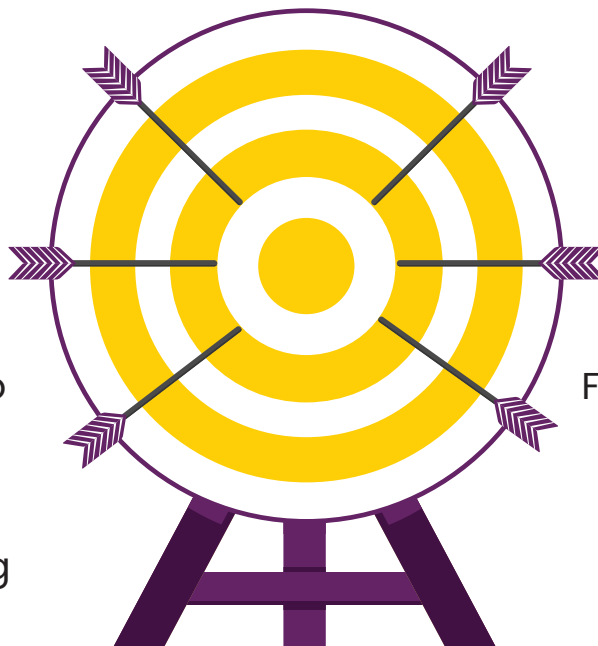
Enable understanding of supervised and unsupervised learning techniques

Develop practical capability in building, evaluating, and tuning ML models

Introduce deep learning methods for vision and NLP-based applications

Provide exposure to Generative AI, transformer architectures, and prompt engineering

Familiarize learners with production-level AI workflows and deployment considerations



LEARNING OUTCOMES

Upon successful completion of the Professional Certification programme in Artificial Intelligence and Machine Learning from IIT Patna, the following are the expected learning outcomes:

- ① **Explain core AI/ML concepts** including supervised and unsupervised learning
- ① **Build and evaluate machine learning models** using Python for classification, regression, and clustering.
- ① **Apply deep learning techniques** using TensorFlow for vision and NLP problems
- ① **Implement NLP solutions** such as text classification, summarization, and sentiment analysis
- ① **Understand Generative AI** fundamentals including LLMs, transformer models, and prompt engineering
- ① **Perform model benchmarking, tuning, and performance optimization**
- ① **Deploy AI/ML models** in basic production pipelines
- ① **Implement an end-to-end AI project** through a capstone assignment



WORLD-CLASS EXPERIENCE

Transformative Experience: The course has significantly influenced students by bridging the gap between their previous education and the academic expectations at IIT.

Focused Learning Modules: The course provides targeted modules that deepen students' comprehension.

Personalised Mentorship: Students benefit from tailored guidance that enhances their confidence and learning experience.

Practical Projects: Hands-on projects are included to reinforce foundational knowledge.

Enhanced Academic Performance: The course effectively prepares students for the challenges at IIT, resulting in improved academic outcomes.

Easier Transition: Students find the transition into the IIT curriculum smoother and provide positive feedback about the course.



PROGRAMME CURRICULUM

MODULE 1

Basic Statistical Learning for Analytics

- Introduction to Data Modelling for Business
- Fundamentals of Statistics
- Inferential Statistics
- Descriptive Statistics with R
- Concept and Application of Sampling Theory
- Hypothesis Testing with R
- Multivariate Analysis with R
- Principal Component Analysis and Linear Algebra

MODULE 3

Machine Learning: Concepts and Applications in Python

- Idea of Supervised and Unsupervised Machine Learning
- Simple & Multiple Linear Regression
- Logistic Regression
- Cross Validation and Hyperparameter Tuning
- Decision Trees and Random Forest
- Boosting Algorithms
- Support Vector Machines
- Feature Engineering, Model Evaluation Metrics
- Gradient Boosting (XGBoost)
- Handling Imbalance of Data Sets, Model Interpretability (SHAP / LIME)
- Clustering (K-means and Hierarchical)

MODULE 2

Applied Descriptive Analytics and Data Visualization for Business

- Data Analytics with Python
- Python Libraries: NumPy, Pandas, Matplotlib, Scikit, Seaborn, Plotly
- Dashboarding Concepts
- Data Visualization using Tableau
- KPI Design and Storytelling in Data

MODULE 4

Deep Learning Specialization

- Introduction to Deep Learning
- Artificial Neural Networks
- TensorFlow
- Model Optimization and Performance Improvement
- Natural Language Processing (NLP Testing, Embedding)
- Convolutional Neural Networks (CNNs)
- Object Detection
- Practical Models - AlexNet, VGG-Net, ResNet
- Transfer Learning
- Getting started with Autoencoders

MODULE 5

Essentials of Generative AI & Prompt Engineering & ChatGPT

- Introduction to Generative AI Models
- Types of GenAI Models
- Attention Mechanism and Transformers
- The Future of Generative AI
- Large Language Models (LLMs) and Architecture
- LLM Adaptation
- Full Fine-Tuning
- Introduction to Fine-Tuning
- Parameters Effecting Fine-Tuning
- Prompt Based Fine-Tuning
- Retrieval Augmented Generation (RAG)

MODULE 6

Advanced Generative AI

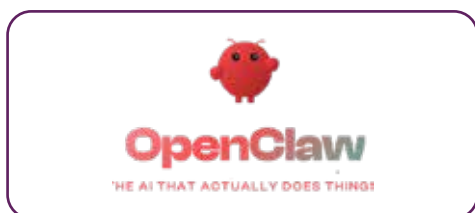
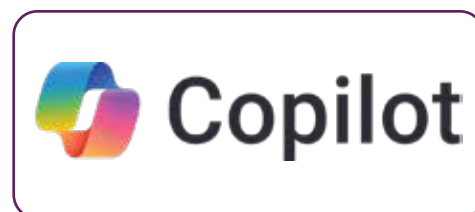
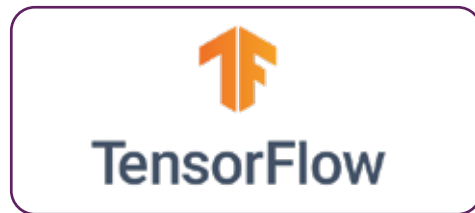
- Benchmarking & Evaluating Models
- Ethical Considerations and Responsible AI

MODULE 7

AI at Production Level

- ML Pipeline
- Production Environment
- Data Engineering and MLOps
- Versioning Data and Models
- Docker Basics
- Model Deployment (with FastAPI)

MASTER INDUSTRY TOOLS



★ Participants may note that the tools included in this programme will be taught collaboratively by IIT Patna Faculty Members and PW Experts.

PROGRAMME DETAILS

Eligibility (Admission Criteria)	<ul style="list-style-type: none"> • Graduates (10+2+3) or Diploma Holders (only 10+2+3) from a recognized university in any stream from any recognized University or Institution (B.E, B.Tech and BCA Participants) • Diploma Holders with at least 1 year of work experience • Students in their final year of graduation are also eligible (Only B.E, B.Tech Participants in 4th Year will be eligible)
Programme Duration	6 Months
Mode of Instruction	Online
Class Timing	Day: Sunday Session 1 : 09:00 AM – 10:30 AM Session 2 : 10:45 AM – 12:15 PM
Campus Immersion (optional)	2 Days in 6 months Campus Immersion is optional and, if applicable, all costs related to campus immersion (including but not limited to accommodation, boarding, logistics, and institute charges) are not included in the Programme fee. Such charges shall be borne by the participant and paid directly to the institute, as per the institute norms.

WHAT WILL YOU LEARN?



UNDERSTAND

The need for big data, challenges and different analytical architectures

LEARN

The history, types and applications of blockchain

ACQUIRE

Knowledge about cryptography and consensus algorithms

IDENTIFY

Network vulnerabilities and apply various security mechanisms

ANALYSE

Distributions and relationships of real-time data



(Disclaimer: The above certificate is only for reference purposes, the actual certificate from IIT Patna may differ.)

Policies for Refund of Fees

- 80% Refund: Before the 1st Day of instruction
- No Refund: On/After the 1st Day of Instruction

PROGRAMME FACULTIES



PROF. KULDEEP SINGH PATEL



PROF. SAMRAT MONDAL



PROF. JOYDEEP CHANDRA

PROGRAMME FEES & INSTALLMENT SCHEDULE

TOTAL FEES

PARTICULARS	AMOUNT (IN INR)
APPLICATION FEE (AT THE TIME OF REGISTRATION)	500/- + GST
TOTAL FEE (EXCLUDING APPLICATION FEE)	60,000/-

NOTE

- ✓ Collection of all the above fees will be done by IIT Patna
- ✓ In case the Applicant's profile is rejected by the Institute application charges of INR 500/- would be non-refundable

INSTALLMENT

PARTICULARS	INSTALLMENT I		INSTALLMENT II
	DATE	AT THE TIME OF REGISTRATION	WITHIN ONE WEEK OF OFFER ROLL OUT DATE
AMOUNT (IN INR)	INR 500/- + GST	INR 30,000/-	INR 30,000/-

*T&C applied. For refund policy details, kindly refer to the website.



THE IIT PATNA

ADVANTAGE

Founded in 2008, IIT Patna is India's newest and fastest-growing premier institution. The institute features ten departments: Computer Science & Engineering, Electrical Engineering, Mechanical Engineering, Chemical & Biochemical Engineering, Civil & Environmental Engineering, Materials Science & Engineering, Chemistry, Physics, Mathematics, and Humanities & Social Sciences. IIT Patna boasts modern facilities equipped with cutting-edge technology, including advanced software and machinery, used to train and educate students effectively. The institution has made significant contributions to high-quality, peer-reviewed national and international journals. Its faculty members possess diverse academic and research expertise, having trained at top-ranked institutions both domestically and internationally.

IIT Patna places a significant focus on entrepreneurship and innovation, fostering partnerships with industries and research organisations both in India and globally. The institute actively promotes start-ups and technological innovation through its incubation centre. It has a growing reputation for research in fields such as Artificial Intelligence, Robotics, and Renewable Energy.

Through its holistic education approach, IIT Patna aims to create well-rounded professionals who contribute to technological advancements and societal development, positioning itself as one of the top emerging IITs in India.

OVERVIEW OF

IIT PATNA

In Emerging Government
Colleges In A Best College
Ranking 2022 By India
Today-Mdra



RANKED 2nd

RANKED 9th

Best Government Engineering
College In The Performance
Category Overall



For Placement Records



RANKED 10th

2500+ ALUMNI



Serving National And
International Institutions At
Leadership Positions

M.tech Students



100+

10+



Operating Departments

Faculty Members



100+

ABOUT PW MEDHARTHI

PW Medharthi is dedicated to transforming the education landscape in India. Founded on the belief that quality affordable learning should be accessible to all, we leverage innovative technology and engaging content to create enriching educational experiences.

We at PW Medharthi understand the diverse needs of learners across the country.

Our comprehensive platform offers tailored solutions, from interactive courses to skill-building resources, designed to empower students, educators, and institutions alike. Focusing on academic excellence and personal growth, we collaborate with IITs & IIMs, as well as other premium institutes, to bridge the gap between traditional learning methods and the demands of a rapidly evolving digital world.

Join us on our mission to bridge the gap between theoretical knowledge and real-world application, inspire curiosity, foster creativity, and cultivate lifelong learners, as we reshape the future of education in India and beyond. Together, let's unlock the potential of every learner!



Enrolling in the Professional Certificate Programme In Artificial Intelligence & Machine Learning (AI & ML) by the Indian Institute of Technology Patna, in partnership with Physics Wallah, offers an exceptional opportunity to delve into the cutting-edge world of AI and ML. Participants will gain a solid foundation in key concepts, algorithms, and tools, equipping them with the skills needed to excel in this rapidly evolving field.

Join us to unlock your potential and shape the future with AI & ML!

PROGRAMME & ACADEMIC QUERIES

INDIAN INSTITUTE OF TECHNOLOGY PATNA



cep_off@iitp.ac.in

ADMISSIONS & ENROLLMENT SUPPORT

MRUDUL RAJ

DIRECTOR-PW MEDHARTHI



[+91-80738 40603](tel:+91-8073840603)



mrudul.raj@pw.live

Get Placement Ready, With PW!

- Interview Preparation
- Resume Building
- Career Guidance



Enrol Now