Vishlesan i-Hub
Indian Institute of Technology, Patna

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ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
FROM VISHLESAN i-HUB, IIT PATNA

About IIT Patna, Vishlesan i-Hub

National Innovation Hub: Vishlesan i-Hub at IIT Patna is part of a national mission, advancing AI in speech, video, and text analytics for sectors like health, education, and security.

Premier Technical Institute: IIT Patna is one of India's top engineering institutes, known for its cutting-edge research and strong academic foundation.

Strong Industry & Research Ecosystem: With active collaborations, incubators, and innovation hubs, IIT Patna bridges academia and industry to drive real-world impact.

Program Overview

The foundations in Artificial Intelligence and Machine Learning Program is designed to accommodate learners from diverse academic and professional backgrounds. Through structured coursework and hands-onprojects, students will build a solid understanding of Artificial Intelligence (AI) and Machine Learning (ML) techniques, starting from foundational mathematics and basic programming, progressing through core machine learning models, and culminating in cutting-edge AI applications. By the endof the program, participants will be able to confidently implement AI/ML solutions, interpret results,and address real-world problems across various domains.

Why Choose This Course?

- **Prestigious Certification***: Receive a Certificate of Completion with Vishlesan i-Hub, IIT Patna, significantly enhancing your profile's value.
- **Real-World Capstone Project:** Work on capstone projects designed to solve practical business challenges.
- **Expert Faculty & Industry Insights:** Learn from IIT faculty & industry experts bringing real-world insights to your learning journey.
- **Mentorship & Community Support:** Get guidance from experienced mentors and join a growing community of learners in technology.
- **For Every Learner:** Whether you're a student, working professional, or job seeker, this program makes AI–ML accessible without needing advanced English proficiency.
- **Delivery in Telugu:** Learn directly from mentors who speak your language and can simplify complex ideas with local analogies and examples.

*Certificate Eligibility: Minimum 65% overall attendance and 30% marks in cumulative evaluations score

What Will You Learn?

Begin your AI/ML journey with a beginner-friendly curriculum from i-Hub IIT Patna, taught in our language, Telugu. This course covers everything from Python basics to advanced, deep learning, and generative AI, while also learning tools like GitHub, GPT, NumPy, Pandas, and more. You also get to learn real-world skills through hands-on projects and expert-led learning.

Toolkit

python   docker   PyTorch   NumPy

pandas   GitHub   OpenAI   🤗   *& more*

Course Summary

Course Duration	Weekly Commitment	Certification
5 months	4-5 Hours	From Vishlesan i-Hub, IIT Patna

Course Syllabus

Module 1: Data & Tools Fluency

- AI vs ML vs GenAI landscape
- Git, GitHub, CLI
- VS Code, Colab, Environments and secrets
- Python fundamentals (types, flow, functions, files), Notebooks discipline
- NumPy and pandas (indexing, joins/merge, groupby, missing values)
- SQLite (SELECT, WHERE, GROUP BY, one JOIN)
- Spreadsheets (pivots, XLOOKUP), pandas ↔ SQL mental model
- Plotting and storytelling (matplotlib, plotly), EDA checklist
- APIs (requests, JSON) and basic ethics or ToS
- Ingest → clean → EDA snack app (optional Streamlit)

Module 2: Machine Learning Essentials

- ML workflow and habits: problem framing, train/validation/test split, baselines, cross validation, metric tables
- Data prep: missing values, duplicates, categorical encoding, scaling, leakage guard, simple feature engineering (dates, counts), class imbalance basics
- Regression: Linear Regression + regularization; metrics MAE/RMSE/R²; quick error analysis
- Classification: Logistic Regression; Trees & Random Forests; metrics accuracy, precision/recall, F1, ROC-AUC; threshold tuning
- Model comparison and selection based on metric and simplicity

Module 3: Generative AI and Agents

- LLM fundamentals: tokens, context windows, temperature/top-p, cost/latency basics
- Prompting patterns: role, few-shot, CoT; tiny prompt-eval set
- Agents 101 (basics): single agent, 1–2 tools, JSON schemas, retries/backoff, hard stop; mini-build (CSV Analyst or FAQ Helpdesk)
- Function/Tool calling: structured outputs (JSON/validation), idempotent tool design
- Shipping Sprint (FastAPI): wrap the agent as an API (/chat) with Pydantic schemas, env/secrets, logging + request IDs; deploy to Render or HF Spaces; run a 10-prompt live eval
- RAG 101: embeddings, chunking, retrievers, vector stores; RAG eval (answer correctness & context recall), semantic search
- Agents + RAG: reuse the Agents 101 loop with a retriever tool; same eval harness
- Orchestration (intro): LangGraph basics—nodes, transitions, retries; ship a small agent flow

Capstone Projects (Choose One)

- Time Travel to Your Past: Auto-build a lifelong searchable timeline using embeddings + vector DB with privacy-first indexing.
- Digital Twin (Your AI Clone): Train an AI to mimic your writing, decisions, and priorities with transparent logs + human-in-the-loop checks.
- Multi-Model Answerboard (AI Fiesta-style): Compare model answers side-by-side; toggle RAG; add routing + A/B prompt evals.
- SneakerFlip (Next-Week Profit Radar): Predict next-week resale prices; classify Buy/Wait/Sell with time-aware splits and profit drivers.
- CarBargain India (Fair Price + Negotiation Coach): Train a fair-price regressor; identify bargains/overpricing; auto-draft negotiation scripts.
- LiveCall Coach (Real-Time Whisper Agent): Real-time call guidance agent using consent-based listening + RAG facts + safe tool triggers.

English & Soft Skills Training

Everyday English for Self-Expression

Learn how to talk about yourself comfortably and confidently in common situations.

- **Talking About Your Present:** Learning to speak about who you are, your education/work, family, hobbies, routine and current activities in everyday situations, using the present tense

- **Talking About Past Experiences:** Forming clear sentences using the past tense to describe past education, work, choices, and general life experiences, clearly and confidently

- **Talking About Your Future:** Expressing future goals, plans, and actions in a simple and confident way with the future tense.

- **Connecting Past, Present, And Future:** Linking ideas while speaking, to connect past, present, and future naturally while maintaining flow and clarity

Building Clear and Correct Sentences

Strengthen sentence formation so your English sounds natural and complete.

- **Applying Articles & Commonly Used Prepositions:** Using articles & prepositions accurately in everyday and professional contexts.

- **Describing Skills, People, and Situations With Adjectives:** Using adjectives and descriptive phrases to explain skills, qualities, roles, and situations more clearly.

- **Forming Longer, Meaningful Sentences:** Constructing complex sentences by joining ideas, instead of speaking in short or incomplete statements.

- **Speaking with Confidence in English:** Building confidence while speaking, by managing hesitation, self-correction, and fear of grammatical mistakes.

Speaking with Impact and Awareness

Learn to organise thoughts, speak smoothly, and communicate with confidence.

- **Structured Speaking and Thinking on the Spot:** Organising thoughts using simple speaking structures to respond clearly during impromptu or unprepared situations.

- **Asking Questions Effectively:** Understanding how to form clear and appropriate questions and choose suitable question structures while speaking.

- **Reducing Fillers and MTI:** Becoming aware of methods to reduce filler words and MTI to improve clarity while speaking.

- **Body Language and Presence While Speaking:** Using posture, eye contact, tone, and awareness, to be taken seriously while speaking

Professional Communication & Soft Skills

Apply spoken English skills to professional and workplace-like situations.

- **Storytelling for Everyday and Professional Situations:** Explaining processes, experiences, and projects in a structured and engaging way.

- **Expressing Opinions and Viewpoints:** Forming opinion-based sentences using reasons, examples, and comparisons in a clear and professional manner.

- **Having Professional Conversations:** Practising polite sentence patterns and appropriate language for workplace-style conversations.

- **Core Workplace Skills:** Understanding time management, teamwork, and basic workplace behaviour.

Instructors

Aravind Samudrala
Software Engineer II, Google

Aravind is a skilled software engineer with experience in gRPC, microservices, Spring Boot, Java, full-stack development, and modern web frameworks like Redux.js. Prior to joining Google, he worked as a Software Engineer II at Blue Yonder in Hyderabad, where he focused on backend systems using Spring Boot and Java. He also held roles at BlackBuck (SDE I) with a focus on full-stack development and at NeoSOFT Technologies as a Software Engineer Intern specializing in JavaScript and blockchain technologies. Aravind's progressive career highlights his expertise in scalable backend engineering and collaborative development across different tech stacks.

Prasad Seema Kurthi
CTO, Stealth AI Startup | ex-Amex, Grab
University of Virginia

Prasad leverages deep expertise in large language models (LLMs), data science, and machine learning to drive business value through AI-powered solutions. As Co-Founder and CTO at a stealth AI startup, he leads the design and implementation of advanced AI and big data systems, with a focus on conversational AI tailored for complex user requirements. Previously, he guided ML, knowledge graph, and data engineering teams at Compass, developing robust, scalable platforms using technologies like Databricks, Spark, and vector databases. Prasad excels in machine learning observability, scalable microservices, and delivering user-centric AI innovation.

Balaji Chippada

Senior Data Scientist, Warner Bros. Discovery

Experienced Senior Data Scientist with 7 years in the IT industry, specializing in machine learning, deep learning, NLP, and generative AI. Proven track record of leading data-driven projects to achieve significant business outcomes, collaborating effectively with international teams, and deploying production-ready.

Admission Process

Clear Qualifier Test
Clear the qualifier test to be eligible for the program.

Complete Counselling
Only shortlisted candidates go through the counselling process.

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

Fees Structure

Qualifier Test Fee (Non-Refundable)	₹49	

	Option 1	Option 2
	Upfront	**EMI** (Through our NBFC partners)
Secure Seat Fee (Non-Refundable)	₹2,000	₹2,000
Programme Fee (Non-Refundable)	₹18,000	₹6,360 x 3 months
Total	₹20,000*	₹21,080*

*GST at 18% extra, as applicable