NEW AGE AI ENGINEERING PROGRAM

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.

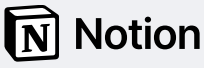
Why Choose This Course?

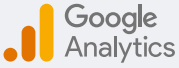
- **Certification from Vishlesan i-Hub IIT Patna:** Receive a Certificate of Completion with Vishlesan i-Hub, IIT Patna, significantly enhancing your profile's value.
- **Real-World Capstone Project:** Work on capstone projects designed to solve practical business challenges
- **Expert Faculty & Industry Insights:** Learn from IIT faculty & industry experts bringing real-world insights to your learning journey.
- **Future-Proof Career Gateway:** Launch into a high-growth, future-proof New Age AI Engineering career with in-demand skills.
- **Placement Assistance:** Get comprehensive placement support from Masai School for students with a 7 CGPA and above.
- **Case-Based Learning:** Engage in real-world, case-based sessions that connect theory with practical Software engineering challenges.

What Will You Learn?

Elevate your software engineering prowess. Learn to build intelligent applications, deploy scalable cloud solutions, and integrate Generative AI for unparalleled innovation. Drive your career forward with a robust portfolio built from hands-on labs simulating real-world AI development and cloud deployments. Secure your place as a high-impact software engineering professional, ready to lead with data-driven strategies and build intelligent digital products.

Toolkit



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Course Details

Course Duration
7 Months

Time Commitment
8-10 hours per week

Certification
From Vishlesan i-Hub IIT Patna

Course Curriculum

Module 1: Foundations of AI Programming

- Python Programming: Core Python skills, data structures, and libraries essential for AI
- Understanding LLMs: How Large Language Models work, what makes them powerful, and their limitations
- Working with OpenAI API: Making API calls, handling responses, managing costs
- Prompt Engineering: Writing effective prompts, controlling outputs with temperature and tokens, preventing prompt injections
- Different AI Models: When to use reasoning models (o1, o3) vs general models (GPT-4, Claude), introduction to multimodal AI
- Backend Engineering: Building APIs, CRUD operations, SQL databases, authentication, and security basics

Module 2: Full-Stack AI Development

- Frontend Basics: HTML/CSS/JavaScript fundamentals for AI interfaces
- Production Deployment: Docker, cloud platforms, CI/CD pipelines
- Building Complete AI Apps: Connecting frontend to AI backend, creating end-to-end applications
- RAG Fundamentals: What is Retrieval-Augmented Generation and why it matters
- Building RAG Pipelines: Document processing, chunking strategies, and retrieval techniques
- Vector Databases & Embeddings: Storing and searching through knowledge using Pinecone/Chroma/Weaviate

Module 3: RAG Systems & AI-Powered Development

- Advanced RAG with GraphRAG: Knowledge graphs and connected information retrieval
- LangChain Framework: Using chains, agents, and memory for complex AI workflows
- Evaluating RAG Systems: Measuring accuracy, relevance, and preventing hallucinations
- AI Coding Assistants: Hands-on with Cursor, Claude Code, v0.dev, Lovable, Windsurf, and Replit
- Building Your AI Dev Environment: Creating personalized AI-powered workflows
- Model Context Protocol (MCP): Connecting AI to external tools and data sources
- Accelerating Development: Using AI to write, debug, and optimize code faster
- Capstone Project 1: Scoping, implementation, testing, presentation

Module 4: AI Agents

- Introduction to AI Agents: What are agents and how they differ from simple AI calls
- Setting up Agent Workflows: Using MCP to manage and orchestrate agents
- Agent Memory & State: Making agents remember context and manage conversations
- Multi-Agent Systems with LangGraph: Building teams of agents that work together
- Production-Ready Agents: Deployment, monitoring, and human oversight
- User-Focused Design: Building agents people actually want to use

Module 5: Machine Learning & Deep Learning

- Data Handling: Collecting, cleaning, and preparing data for ML models
- Classical Machine Learning: Regression, classification, and evaluation techniques
- Tree-Based Models: Decision trees, random forests, and gradient boosting
- Unsupervised Learning: Clustering, dimensionality reduction, finding patterns in data
- Neural Networks Basics: How neural networks learn and make predictions
- Understanding Transformers: The architecture behind LLMs, attention mechanisms explained

Module 6: Open Source Models & Capstone Project

- Open Source AI Ecosystem: Using HuggingFace, Ollama, and free models
- Running Models Locally: Deploy LLMs on your own hardware
- Building with Open Source: Creating RAG systems without proprietary APIs
- How LLMs Really Work: Internal mechanics, why they hallucinate, security considerations
- Fine-tuning Models: Adapting models to your specific needs using PEFT, QLORA, LORA
- Testing & Evaluation: Benchmarking custom models and optimization strategies
- Capstone Project 2: Architecture, implementation, testing, optimization, deployment, peer review

Our Instructors

Dr. Arun Kumar Verma

Associate Professor, Department of Electrical Engineering at Indian Institute of Technology (IIT) Jammu

Dr. Verma earned his master's and Ph.D. from IIT Delhi, New Delhi, India. He was a visiting professor at Ontario Tech University, Ontario, Canada, during March–July 2024. He was a postdoctoral research fellow (PDF) at the Energy Research Institute (ERI@N), Nanyang Technological University (NTU), Singapore, from 2015–2016. Before joining NTU Singapore, he worked as a visiting graduate researcher (VGR) at the Smart Grid Energy Research Center (SMERC), University of California, Los Angeles (UCLA), California, USA, from 2014–2015. He won the prestigious BASE fellowship for advanced solar energy research in 2014. He was conferred the POSOCO Power System Research Award in 2016. He is an assistant editor of the Smart Grid journal and a member of the editorial board of the EPE Journal. He was invited by Defence University College, Ethiopia, and Metal Engineering Corporation, Ethiopia, as an instructor for the M.Tech program in Renewable Energy Engineering from 7 May 2016 to 27 May 2016. He is currently managing/completing DST research funding of ₹7 crore, including Mission Innovation (MI), SPARC, ECR, CRG, and SERB. He is also the mentor-director for a startup, Rishi Agastaya Technologies Pvt. Ltd. Dr. Verma has guided 8 Ph.D. and 16 M.Tech theses. Eight Ph.D. candidates are currently working under him. He is an associate editor for IEEE Transactions on Transportation Electrification.

Dr. Surya Prakash

Professor, Department of Computer Science & Engineering, IIT Indore

Prof. Surya Prakash is a distinguished academic with over 12 years of experience in teaching and research, dedicated to nurturing some of the brightest young minds in computer science. He has been an integral part of IIT Indore's growth and served as head of the Department of Computer Science and Engineering from 2017 to 2020, where he played a key role in shaping the department's academic and research direction.

His research expertise lies in biometrics, with a strong focus on ear biometrics, facial recognition, and biometric database indexing. He has contributed to the advancement of secure and efficient human identification systems, with a special emphasis on leveraging deep learning techniques for biometric recognition. His work bridges fundamental research and real-world applications, making an impact in areas such as security, authentication, and AI-driven recognition systems.

Prof. Prakash holds a Ph.D. from IIT Kanpur and an M.S. (Research) from IIT Madras, both in computer science, which laid the foundation for his expertise in pattern recognition and computer vision. Beyond his academic contributions, he actively mentors students, collaborates on interdisciplinary projects, and encourages innovation at the intersection of AI and biometrics.

Varun Raste

Data Scientist

A seasoned Analytics Professional with 5+ years of experience in Machine Learning, Data Science, and CPG Consulting, skilled in fraud modeling, time series forecasting, and Python automation. An active mentor and course creator on Coursera and Campus X, specializing in Python, Generative AI, and Data Science. An internationally rated chess player passionate about trekking, writing, and exploring data-driven solutions.

Admission Process

Clear Qualifier Test
You must pass the exam to confirm your seat 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	**₹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)	₹56,000	₹7,156 x 9 months
Total Program Fee	₹60,000 + GST*	₹68,404 + GST*

*GST at 18% extra, as applicable

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