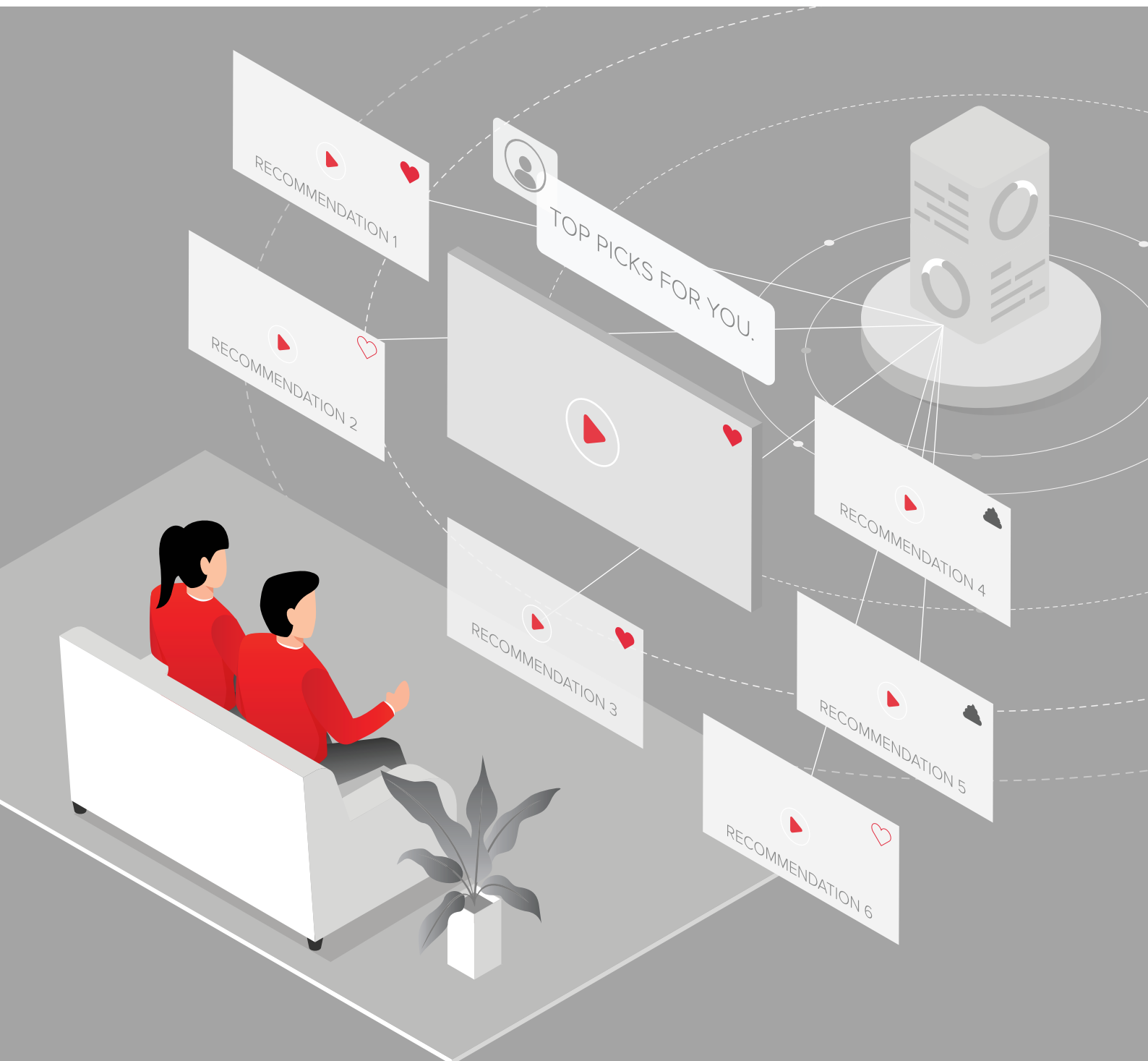




Master of Science in

# MACHINE LEARNING & ARTIFICIAL INTELLIGENCE

 Now integrated with **Generative AI**





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# The Era Of Generative AI



The world is at the cusp of Generative AI rapidly changing the world as we know it. At upGrad, we've always believed in imparting learners the skills necessary to thrive in the fast-evolving world of technology. We are hence quite thrilled to pioneer a structured way of learning to build Generative AI enabled applications - and with 100% real-world project-based curriculum.

Learners will delve into the fascinating realm of using Artificial Intelligence to build practical applications like conversational AI chat bots, image creators, content recommenders, and sales assistants, amongst others, to solve real-world

challenges. Dive into this brave new world of Generative AI and Large Language Models with us, and watch yourself transform into a 10x tech professional.

“As an organisation that asks professionals to stay updated with the latest skills, we had to be one of the first to teach Generative AI. With this move, we are excited to witness the impact that Generative AI will have on the future, as well as the value our learners will bring to the field with this essential skill.”

**Mayank Kumar, Co-founder & MD,  
upGrad**



# About upGrad, IIITB, and LJMU, UK

*upGrad has delivered over 20 million hours of learning, delivering programs by collaborating with universities across the world including Duke CE, IIT Madras, LJMU, IIT Bangalore and Deakin Business School, among others*

Online education is a fundamental disruption that will have a far-reaching impact. **upGrad** was founded taking this into consideration. upGrad is an online education platform to help individuals develop their professional potential in the most engaging learning environment. Since inception, upGrad is focussed on helping working professionals in their bid to learn, grow and move up in their career through a wide-range of programs designed to improve their expertise.

With a heritage that stretches back to 1823, **Liverpool John Moores University**, UK is now one of the largest and well-established universities in the UK. It has been ranked in the Top 100 World Young Universities & Top 50 in the UK by Student Satisfaction. There are 5 Faculties within the university which are: Business & Law, Arts, Professional & Social Studies, Health, Science, Engineering & Technology. The university is well regarded for its esteemed faculty & teaching as well as research & also for student satisfaction.

An M.Sc from LJMU will help you access global job opportunities.

**IIITB** is a renowned university offering programs specialising in data science, machine learning and artificial intelligence. IIITB's faculty bring with them an average of 15 years of experience. The faculty covers the conceptual depths of topics such as Data Science, Machine Learning and AI, and Big Data Analytics. These will be complemented by industry relevant case studies from major industry verticals by industry leaders with 8+ yrs of experience from upGrad's industry network. The Executive PG Program in ML & AI has been developed with the experienced faculty of IIITB in collaboration with Industry experts & upGrad to bring you cutting edge-curriculum with industry relevance. The strong placement network, industry mentorship and the credibility of this Executive PG Program from IIITB will provide you with just the right push to accelerate your career in Machine Learning and AI!





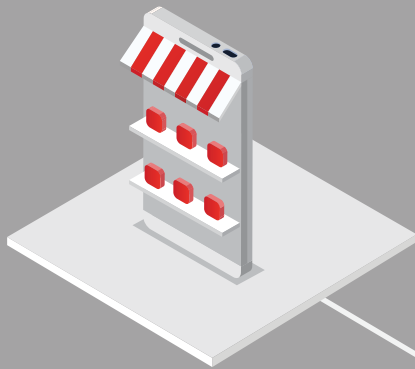
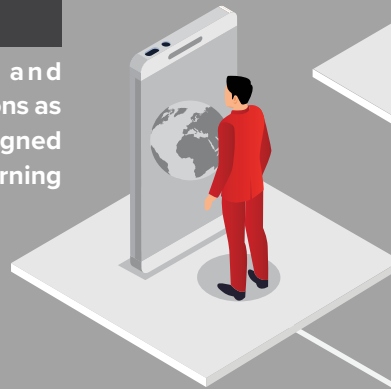
# Program Highlights

## Master's Degree + Executive PG Program

Gain an M.Sc. degree from LJMU, UK & also get a Executive PG Program from IITB on successful completion of the program.

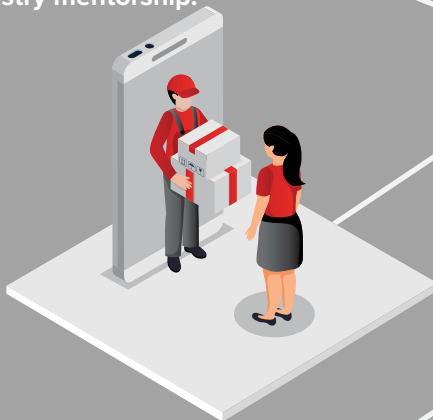
### Enhanced Learning Experience

Learn with the ease and flexibility of recorded sessions as well as live sessions - designed to ensure a wholesome learning experience.



### For the Industry, by the Industry

Learn and apply concepts on industry projects and work on a Capstone project along with personalised industry mentorship.



### Dedicated Career Assistance

Receive career services in the form of career coaching, resume building, career mentorship from Global Industry Experts and much more.



### 4 Months Masters Thesis

Get mentored by a thesis supervisor for your Masters Thesis & gain complete command on the subject.



### Dual Alumni Status

Gain alumni status from LJMU, UK & IITB when you complete the program.



# Faculty and Industry Experts



**Dr. Gabriela Czanner**

Faculty - Engineering and Technology  
Liverpool John Moores University

A Senior Lecturer in Statistics and Data Science at Department of Applied Mathematics at LJMU. Her research focus is advanced statistics for decision support.



**Dr. Atif Waraich**

Faculty - Computer Science  
Liverpool John Moores University

A Senior faculty of Engineering and Technology at LJMU who has multiple publications in the healthcare domain.



**Prof. Dhiya Al-Jumeily**

Professor - Artificial Intelligence  
Liverpool John Moores University

A Senior Member of the IEEE and a Chartered IT Professional. He is a fellow of the UK Higher Education Academy.



**Prof. Paulo Lisboa**

Head of Dept - Applied Mathematics  
Liverpool John Moores University

Studied mathematical physics at LU and was the chairman of Industrial Mathematics at LJMU in 1996 and Head of Graduate School in 2002.



**Chandrashekar Ramanathan**

Dean | Academics  
International Institute of Information  
Technology Bangalore

Prof. Chandrashekar has a PhD. from Mississippi State University and over 10 years of experience in several multinational organisations.



**Tricha Anjali**

Ex- Associate Dean  
International Institute of Information  
Technology Bangalore

Prof. Anjali has a PhD. from Georgia Tech as well as an integrated M.Tech. (EE) from IIT Bombay. She is currently the dean of IIITB.



**Prof. Debabrata Das**

Director  
International Institute of Information  
Technology Bangalore

Dr. Debabrata Das is serving as Director of IIIT Bangalore (IIITB). He has completed his Ph.D. degree from the Indian Institute of Technology Kharagpur. His main areas of research interest are IoT and Wireless Access Network's MAC, QoS, Power saving.



**Prof. G. Srinivasaraghavan**

Professor  
International Institute of Information  
Technology Bangalore

Prof. Srinivasaraghavan has a PhD. in Computer Science from IIT Kanpur and 18 years of experience with Infosys Technologies and several other well-known organisations.



**Anshuman Gupta**

Director | Data Science  
Pitney Bowes

He has a PhD. (Dual) from Penn State University as well as a B.Tech. Degree from IIT Bombay.



**Ankit Jain**

Sr. Research Scientist  
Uber AI Labs

An alumnus of IIT Bombay, UCB, and Harvard Business School with over 9 years of experience.



**Ujjyaini Mitra**

Head of Analytics  
ZE5

An alumnus of Mckinsey and Co., Flipkart, and Bharti Airtel with over 11 years of experience.



**Mirza Rahim Baig**

Lead | Business Analytics  
Flipkart

Advanced analytics professional with 8+ years of experience as a consultant in the e-commerce and healthcare domains.



**Prof. V. Sridhar**

Faculty In Charge, CPE, IIITB

Dr. Sridhar has a Ph.D. from the University of Iowa, U.S.A. He has been a member of Government of India committees on Telecom and IT and has published many peer reviewed articles in telecom and information systems journals.







# upGrad Learning Experience

## Format

- Online format with live sessions weekly from industry experts & faculty to help with topic walk-throughs, doubt resolution & personalised project feedback.

## Mentorship

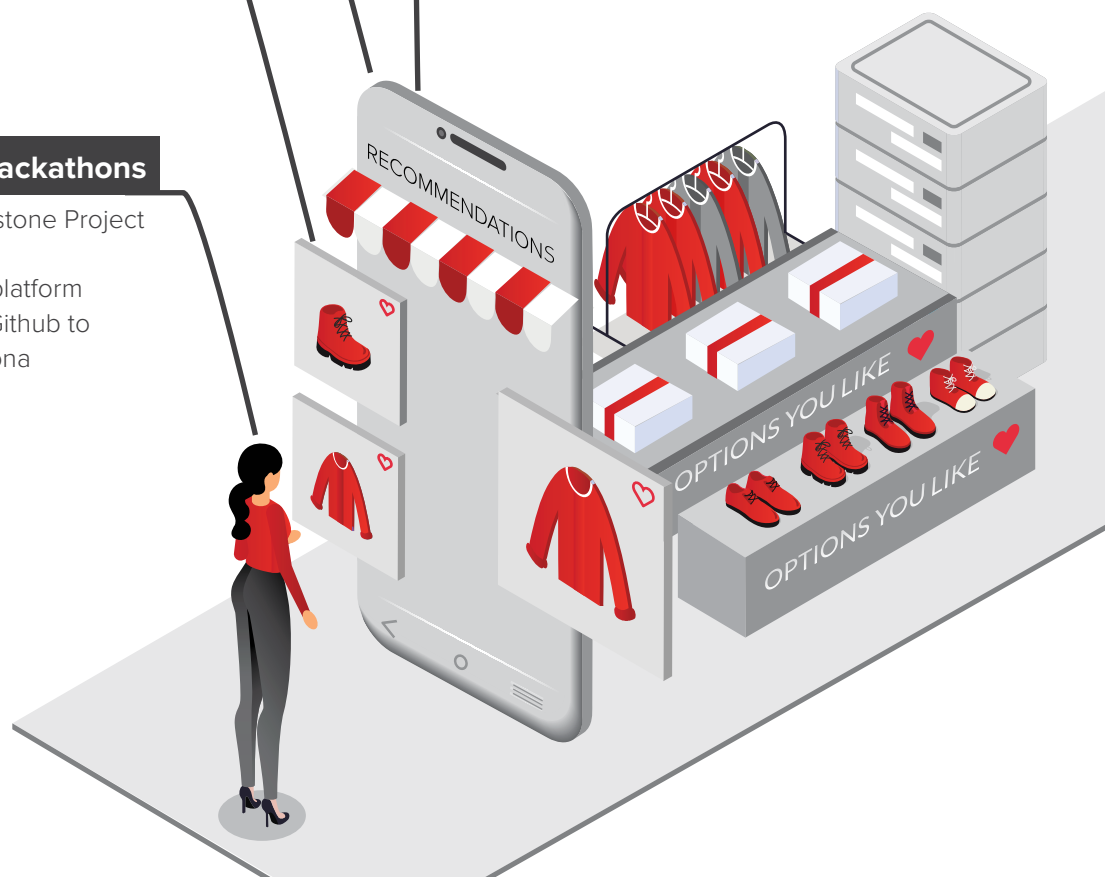
- 60+ Live interactive sessions with leading industry experts covering curriculum + advanced topics.
- Fortnightly personalised group (1:8) mentorship sessions with Global Industry Experts for pro-active mentoring.

## Hands-On Projects and Hackathons

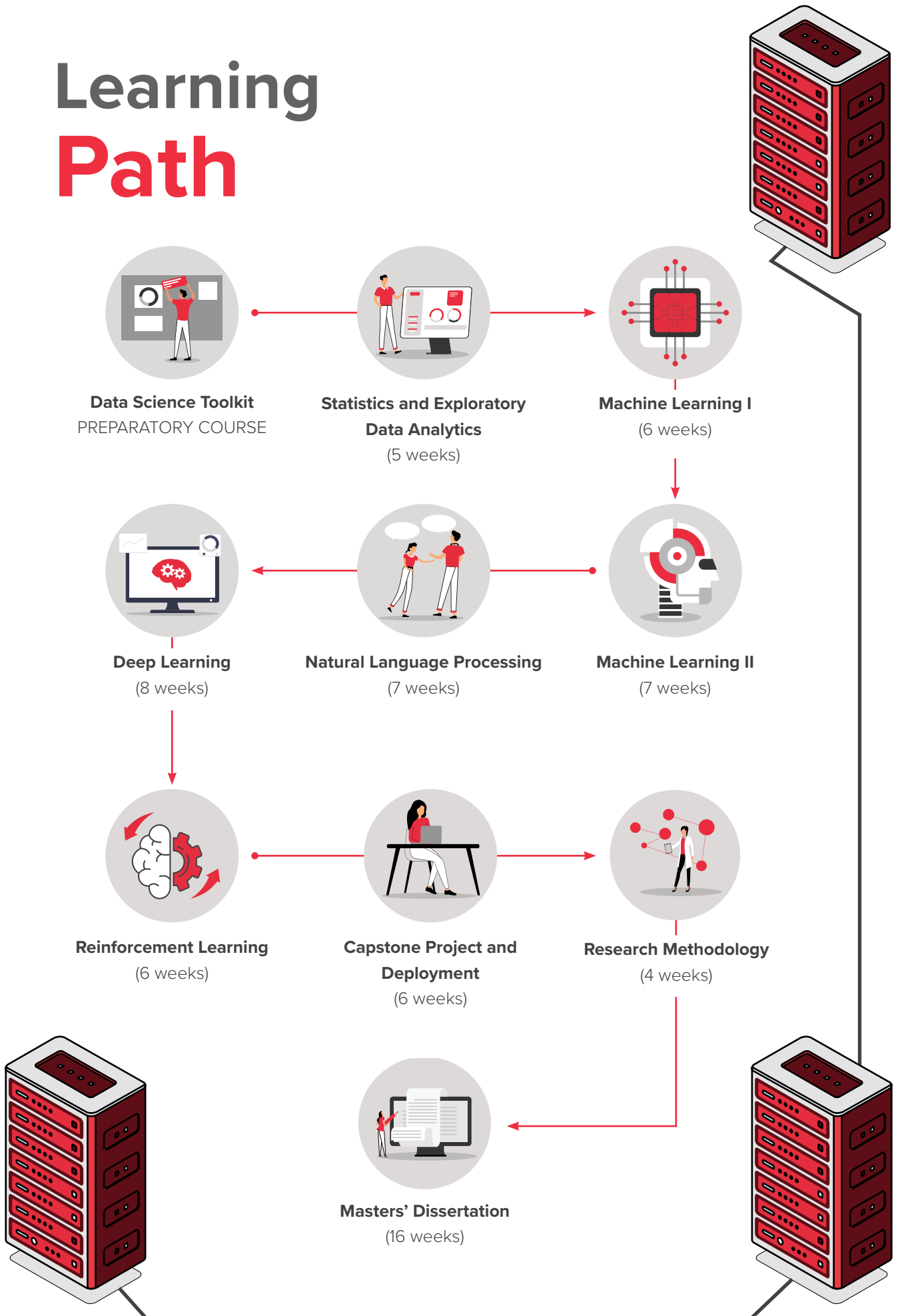
- 12+ Industry projects and a Capstone Project to choose from 10 options.
- Live coding classes on Kaggle platform
- Hands-on sessions on Git and Github to boost the learners' career persona
- Live coding session on openCV

## Coaching

- 24x7 Dedicated Student Success Team
- Weekly real-time doubt clearing sessions
- Reverse knowledge transfer sessions (FLIP classrooms) with learners assuming the role of an expert and tutoring fellow batchmates
- 100+ commonly asked interview questions added across modules
- Live Discussion forum for peer to peer doubt resolution monitored by technical experts
- Peer to peer International Networking opportunities with an alumni pool of 10,000+
- Lab walk-throughs of 15+ industry-driven assignments/case studies/projects
- 6 Employability Tests for industry readiness
- Access to the program for upto 3 years

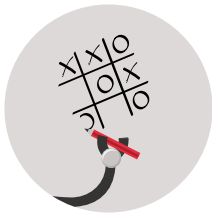


# Learning Path





# Industry Projects



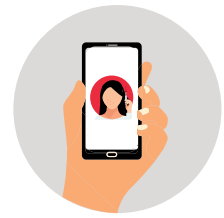
Train an Agent to Play Tic Tac Toe



Telecom Churn Analysis



Fraud Detection



Detect Skin Cancer from Images



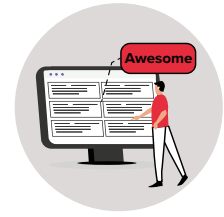
Gesture Recognition



Recommendation System



Maximize Cab Driver Profit Using RL



Topic Modelling With Amazon Reviews



Social Media Listening



Speech Recognition



Image Captioning



Sentiment Analysis on Twitter



And many more!

## Programming **Tools, Languages & Libraries**

Pandas, Matplotlib, Numpy, Seaborn, Scikit-learn, Statsmodels, Kubernetes, Rest API, Docker, Flask, AWS, Heroku, Keras, Tensorflow, MySQL, Excel, NLTK, OpenCV, Rasa, Python



# Program Curriculum



## Course 1

5 Week

- EDA + Welcome
- Intro to Git & Github
- Lending club case study
- Inferential Stats
- Hypothesis Testing

## Course 2

7 Week

- Linear Regression Module
- Linear Regression Module
- Linear Regression Assignment: Bike sharing company (demand regression)
- Logistic Regression
- Naive Bayes
- Model Selection
- Revision week - Skill test

## Course 3

9 Week

- Advanced Regression
- Advance regression assignment + SVM (Optional)
- Tree Models
- Random Forests + Practical Considerations
- Boosting - 1
- Unsupervised Clustering
- PCA
- Telecom Churn Case Study
- Buffer - Skill test



## Course 4

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9 Week

- Introduction to Neural Networks - Part1
- Introduction to Neural Networks - Part2
- Convolutional Neural Networks
- Assignment: Convolutional Neural Networks
- CNN : Practical Considerations
- Recurrent Neural Networks
- Gesture Recognition - Project
- Exam on Sunday End of the week
- Revision week - Skill test (DL)

## Course 5

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7 Week

- NLP - Lexical Processing
- NLP - Syntactic Processing
- NLP Assignment - Syntactic Processing
- NLP - Semantic Processing
- NLP - Semantic Processing
- Ticket classification Project
- Buffer - Skill test(NLP)



# Elective course

## MLOps Elective

17 Week

- Pre-Requisite Module
- Introduction to MLOps
- Designing Machine Learning Systems
- Experimenting with Data and Model using MLflow
- Automating and Orchestrating pipelines with Airflow
- Building continuous learning infrastructure
- MLOps Project
- Advanced NLP - Introduction to Attention Mechanism
- Advanced NLP - Introduction to Transformers
- Advanced CV - Object Detection & Semantic Segmentation
- MLOps + Deployment: DL (Theory)
- MLOps + Deployment: DL (Case Study)
- Exam on Sunday End of the week
- Revision week - Skill test()

## Generative AI Elective

15 Week

- Advanced NLP - Introduction to Attention Mechanism
- Advanced NLP - Introduction to Transformers
- Fundamentals of Generative AI, ChatGPT & Prompt Engineering using Non Reasoning, Chain of Thought & Advanced Techniques
- Product Development using OpenAI APIs, Fine Tuning using STaR technique in Python
- Integrating speech using Whisper API and application deployment using Flask
- Fundamentals of Multimodal LLMS like Stable Diffusion, Mid Journey
- Fundamentals of Design, Photography & Product Development using Stable Diffusion in Python & Applications of LLMs for Data Science problems like clustering, classification"

### GenAI Project

- Applications of LLMs to create Embeddings for Large Documents
- Applications of Vectorstores like Pinecone to store and index embeddings of large documents
- Understand the importance of LangChain and it's applications
- Initialise the agents, tools and vectorstore for storage and retrieval
- Connect the components using Chain and explore the power of tools in LangChain
- Scale and Deploy Generative AI Apps using Azure OpenAI services
- Future Developments in Generative AI

## Capstone



# Masters Phase

## Research Methodologies

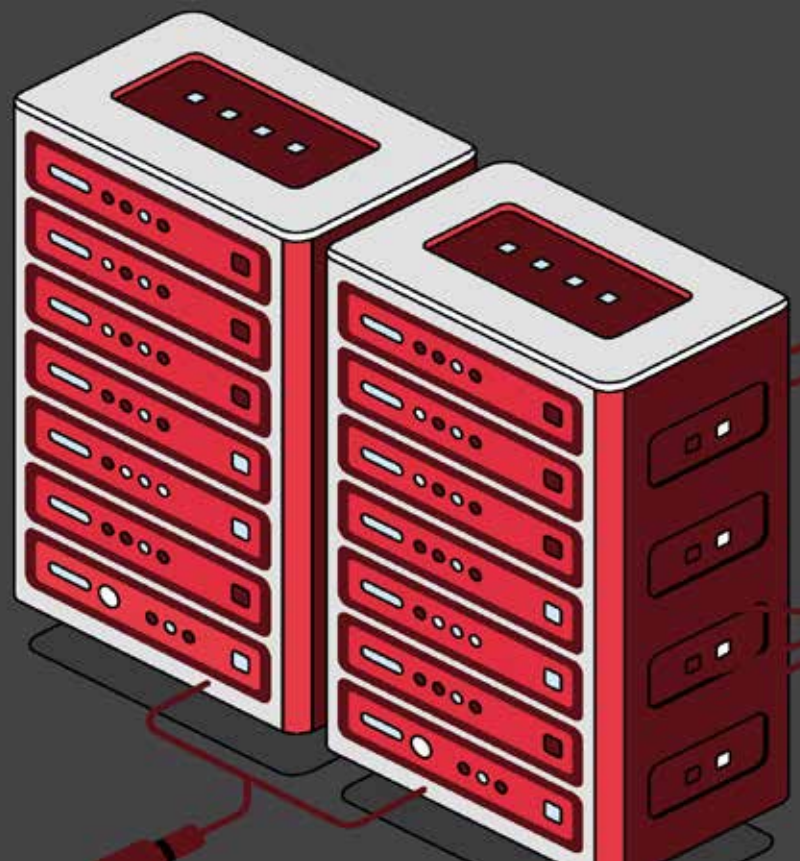
8 Week

- Introduction to Research and Research Process
- Research Design
- Literature Reviewing
- Research Project Management
- Report Writing and Presentation Skills
- Scientific Ethics

## Master's Dissertation

16 Week

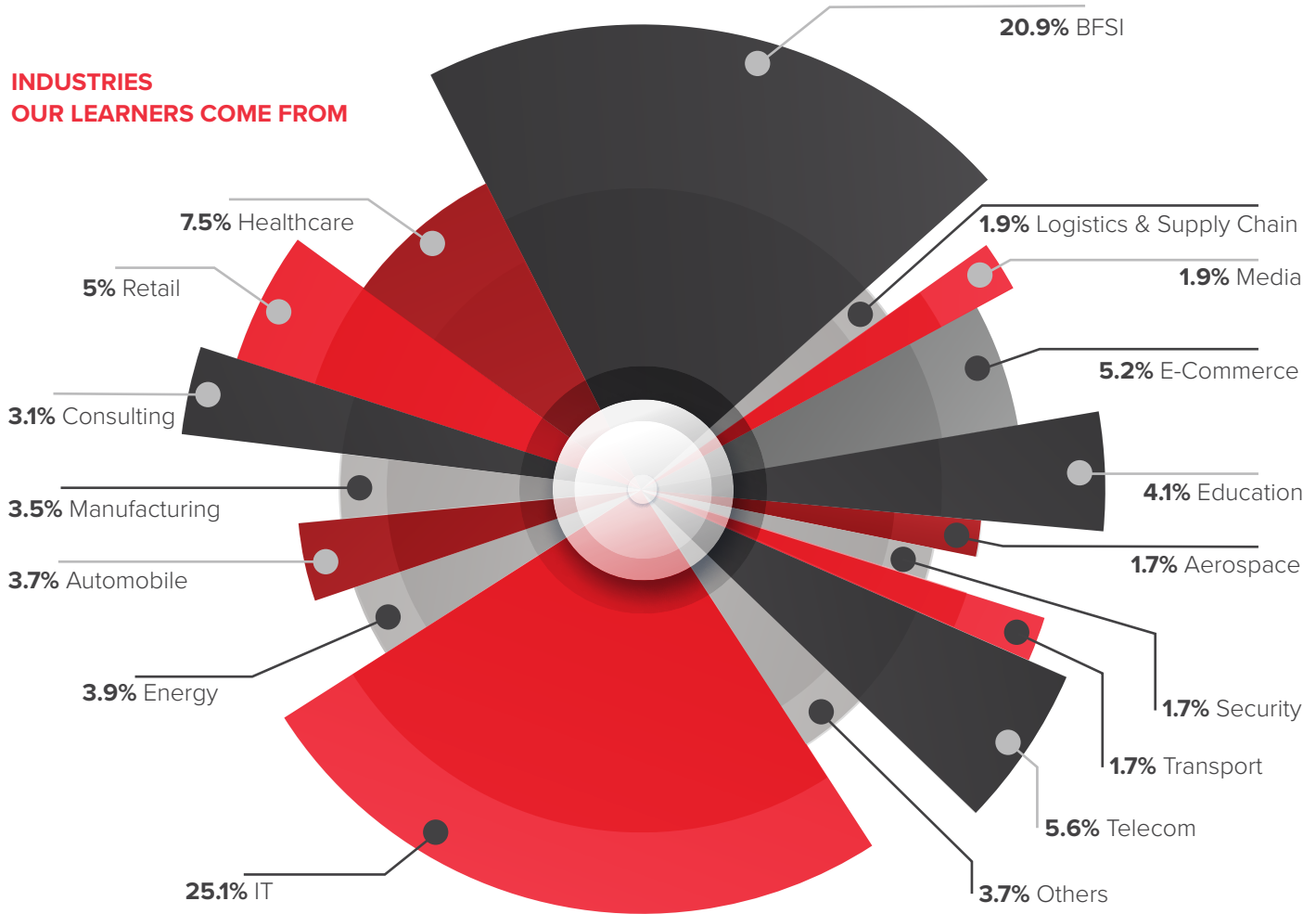
- Investigate dietary patterns and metabolite fingerprints of takeaway (fast) food consumers using PCA and clustering methods
- Investigate a diagnosis of eye diseases using imaging ophthalmic data
- Structure medical images with information geometry
- Using Social media feed to place tweets regarding natural disasters on a map
- Preventing credit card fraud through pattern recognition
- Developing a recommender system for a Media giant
- Risk modelling for Financial activities and Investment Banking



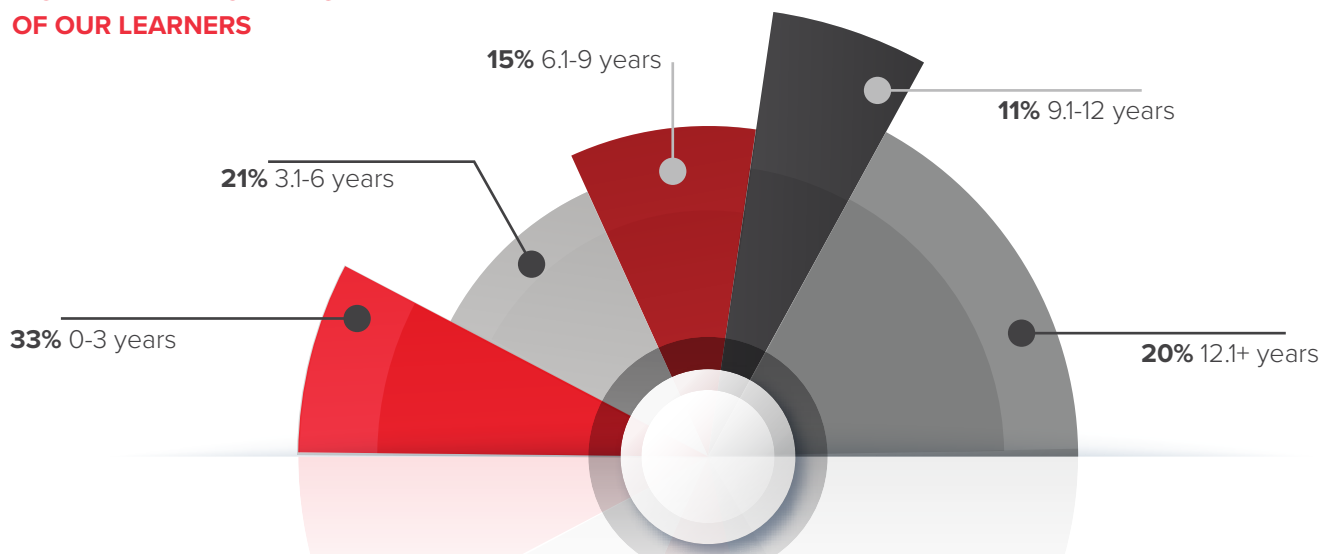


# Meet the Class

## INDUSTRIES OUR LEARNERS COME FROM



## WORK EXPERIENCE RANGE OF OUR LEARNERS







# Career Support

## Mock Interviews

Get company and role-specific preparation with our mock interview sessions.

## Resume Review

Obtain specific, personalised inputs on your resume structure and content.

## Personalised Mentorship

Get mentored by an internationally experienced data science industry expert and receive personalised feedback with 4 one-to-one calls.

## Career Mentor

Get a dedicated career mentor to help track your weekly company application targets, coach you on your profile, and support you during your career transition journey.

## Post Graduation Career Support

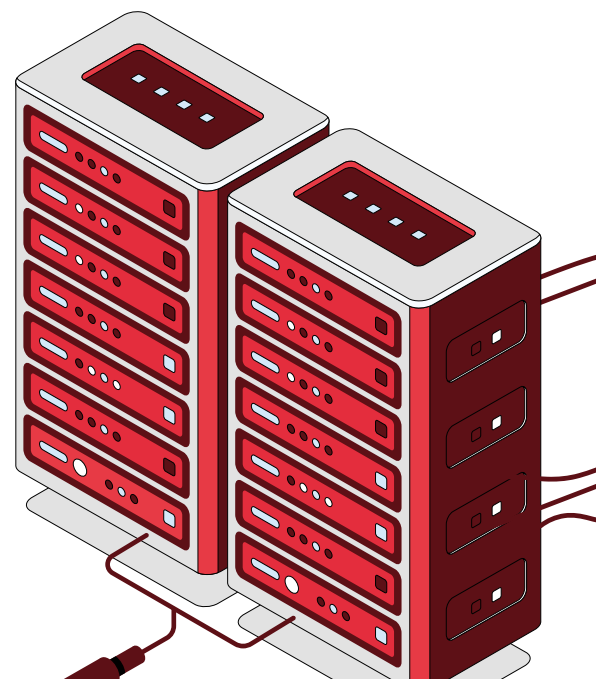
Career sessions are continued post graduation because we want you to have all the help you need. These include: live sessions with industry mentors to guide you, dedicated mentorship, and access to upGrad's career assistance resources.

## Company-Specific Preparation

Get company-specific guidance with access to a carefully curated pool of interview resources per company to ensure you are interview-ready for the company of your choice.

## Live Profile Building Workshops

Have live sessions of how to build your profile - be it your resume or GitHub - with hands-on sessions on Git and Github you can boost your profile. And also include your work from Kaggle & OpenCV.





# Hear from Our Learners



**Sondre Rennan Nettet**  
CEO at Sensor Innovation AS,  
Norway

The highlights of my course so far are the depth of knowledge it has given me about AI/ML, the assignments which have taught me more about the field as well as the affordability of the course.



**Budhaditya Goswami**  
Target oriented Biostatistician  
(ML-AI), Germany

Topics are designed keeping practical application at the forefront which means that learners practice on actual problems in real industries. The content, the reputation of the provider and course fees being within my budget are why I chose upGrad.



**Emmanuel Idehen**  
Full Stack Developer, FedEx  
Services, Memphis

Very happy that I joined the program for upskilling in ML & AI & upGrad gave me the right opportunity.



# Program Details and Admission Process

## PROGRAM DURATION AND FORMAT

20 Months | Online

## PROGRAM FEE

Please refer to the website for the program fee.

## PROGRAM START DATES

Please refer to the website for program start dates.

## ELIGIBILITY

50% (or equivalent) Bachelor's Degree preferably in a Mathematical/ Statistical background.

Recommended 1 year of work experience in programming/ analytics.

## WEEKLY COMMITMENT (15 hours/week)



### 7-8 HOURS

Asynchronous learning time.



### 7-8 HOURS

Assignments and projects.



### LIVE SESSIONS

Every Weekend.

## SELECTION CRITERIA



### STEP 1: Online Eligibility Test

Fill out an application and take a quick 40 mins online test of 18 questions to assess your aptitude.



### STEP 2: Review and Shortlisting of Suitable Candidates

Our faculty will review all applications - considering the educational and professional background of an applicant and review the test scores where applicable. Following this, offer letters will be rolled out so you're assured a great peer group to learn and network with.



### STEP 3: Enrollment for Access to Prep Content

Make a quick block payment and receive immediate access to the prep content and begin your upGrad journey.

For any queries, reach us on the following numbers:

**+44 2086 381187, [info.emea@upgrad.com](mailto:info.emea@upgrad.com) - Europe, Middle East and Africa**

**+1 (240) 719-6120, [globaladmissions@upgrad.com](mailto:globaladmissions@upgrad.com) - North and South America**

**+65 6232 6730, [query@upgrad.com](mailto:query@upgrad.com) - Asia Pacific except India**

**+84-28-7300-8884, [connect@upgrad.com](mailto:connect@upgrad.com) - Vietnam**