upGrad | LIVERPOOL JOHN MOORES UNIVERSITY | iiitb

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 Generative AI as an elective in the Master of Science in Machine Learning & Artificial Intelligence.

With this key inclusion of Generative AI, learners will delve deeper into the fascinating realm of using Machine Learning & AI to build practical applications like conversational AI chat bots, image creators, and content recommenders amongst others to solve real-world challenges. So dive into this brave new world of Generative AI and Large Language Models with us, and watch yourself transform into a 10x ML/AI Engineer.

"IIIT Bangalore prides itself in constantly updating cutting-edge topics to its curriculum. Our faculty has shaped this exciting Generative AI elective along with upGrad's industry experts, ensuring both academic rigour and incorporating the latest advancements in tech."

Dr. V. Sridhar
Head-Faculty, IIITB

"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, IIIT 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.

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 Programme 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 Programme from IIITB will provide you with just the right push to accelerate your career in Machine Learning and AI!

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. With an M.Sc. from this university, you are sure to be able to access global job opportunities.

WHY UPGRAD?

50% Avg. Salary Hike

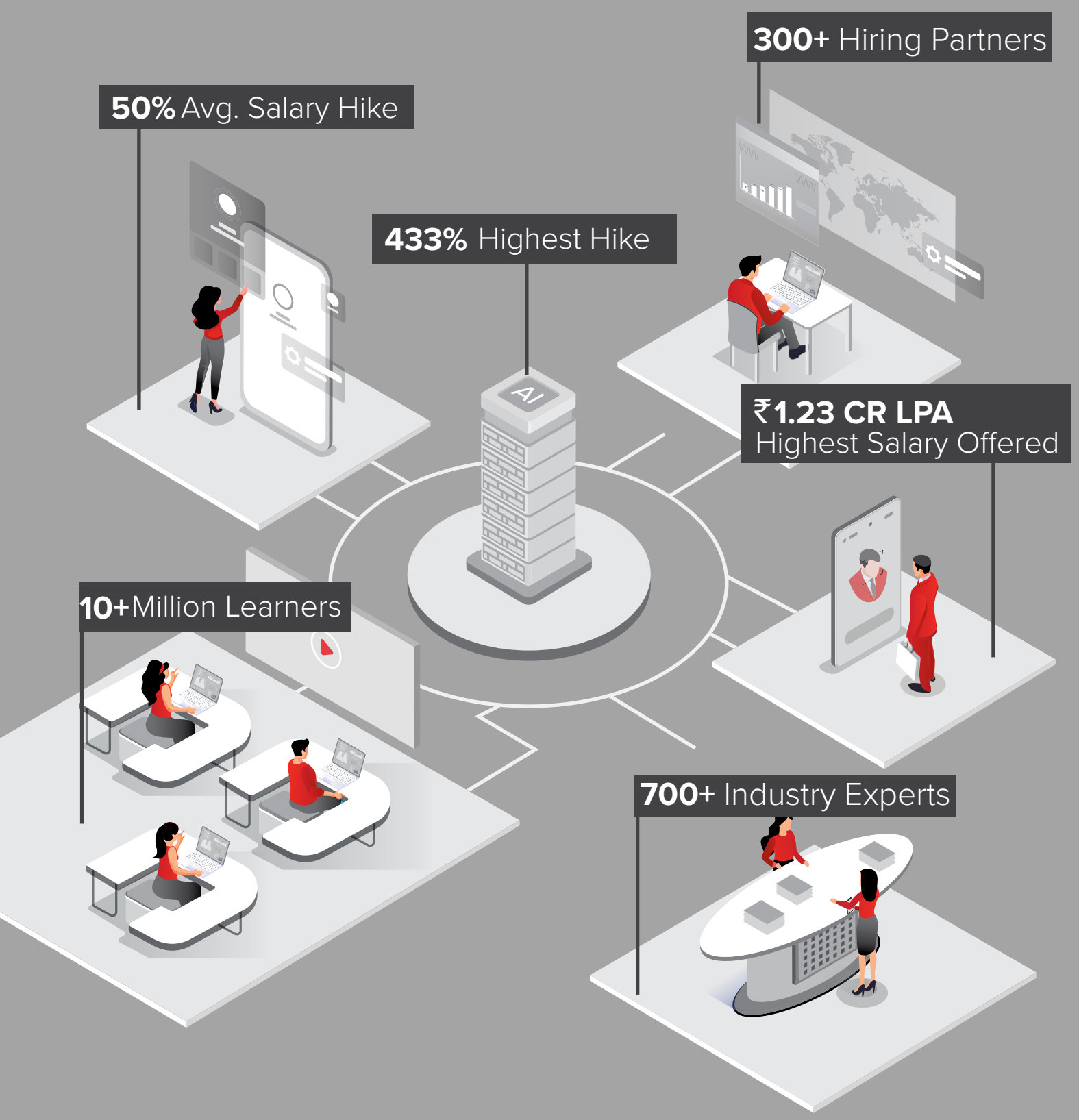
433% Highest Hike

300+ Hiring Partners

₹1.23 CR LPA
Highest Salary Offered

10+Million Learners

700+ Industry Experts



PROGRAM HIGHLIGHTS

Master's Degree + PG Programme

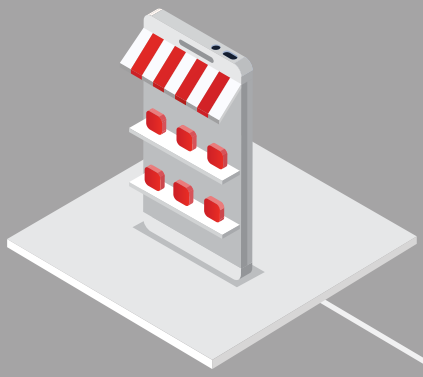
Gain an M.Sc. degree from LJMU, UK & also get an Executive PGP from IIIT Bangalore, upon successful program completion



Access to Global Job Opportunities

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 360 degree career support from access to upGrad's job opportunities portal, resume building, career mentorship from industry experts and much more.







1:1 Mentorship

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

Dual Alumni Status

Gain alumni status from LJMU, UK & IIITB 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.



S.Anand
CEO
Gramener

A Gold medallist from IIM Bangalore, an alumnus of IIT Madras and London School of Business, Anand is among the top 10 data scientists in India.



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.



Ujjyaini Mitra
Head of Analytics
ZE5

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



Chandramouleeswaran (Mouli Sankaran)
Adjunct Faculty
IIIT Bangalore

Professor Chandramouleeswaran has 33+ years of experience in networking, embedded SW, ML. He is an Adjunct faculty at IIIT Bangalore and a visiting faculty at IIIT Lucknow, handling courses on AI for IoT and Python.

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
- Offline sessions such as Basecamps & Hackathons

Mentorship

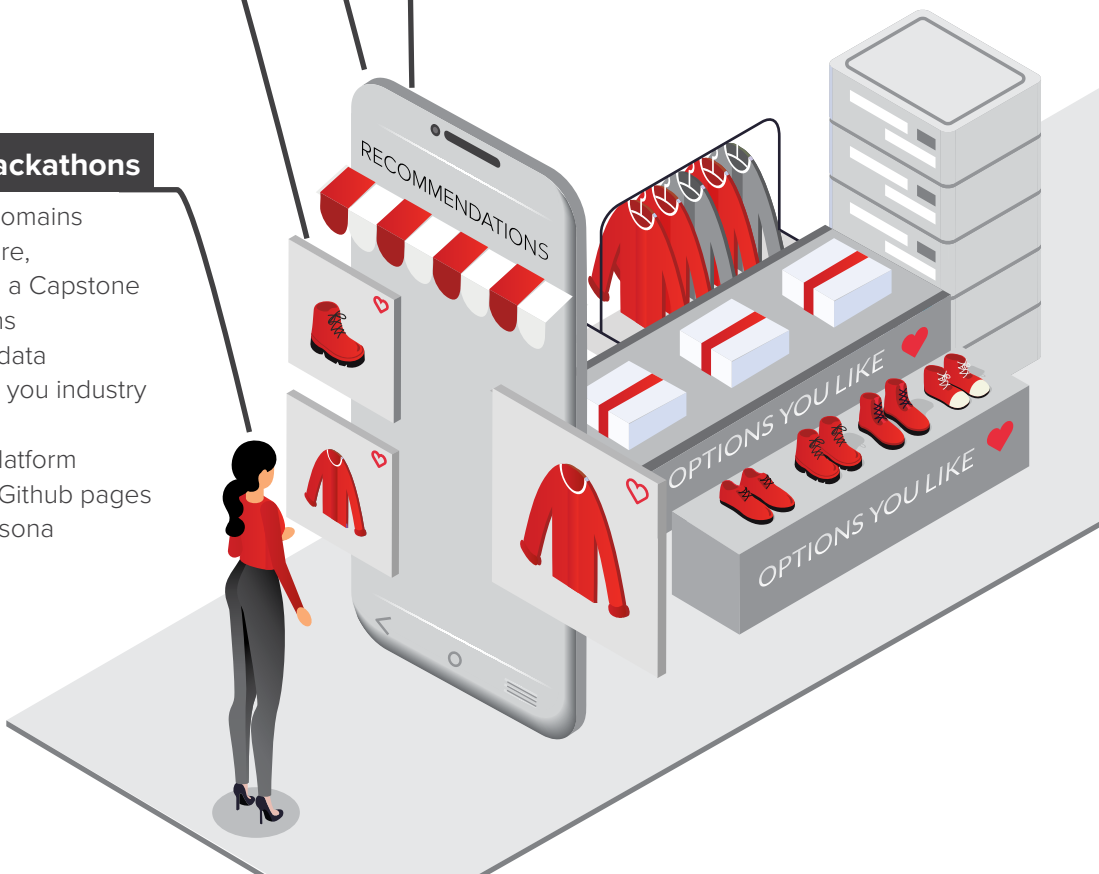
- 60+ Live interactive sessions with leading industry experts covering curriculum + advanced topics
- Weekly personalised group mentorship sessions with industry experts for pro-active mentoring

Hands-On Projects and Hackathons

- 15+ Industry projects in various domains of finance, ecommerce, healthcare, manufacturing, telecom, etc. and a Capstone project to choose from 5+ options
- BA Solutioning Masterclass, Big data Bootcamp & Hackathon to make you industry ready
- Live coding classes on Kaggle platform
- Creation of portfolio website on Github pages to boost the learners' career persona

Coaching

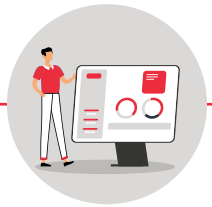
- Student Support Team & upGrad Buddy
- Weekly real-time doubt clearing sessions
- Reverse knowledge transfer sessions (FLIP classrooms) with learners assuming the role of an expert and tutoring fellow batchmates
- 100+ commonly asked interview questions added across modules
- Live Discussion forum for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



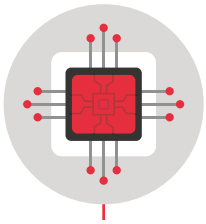
LEARNING PATH



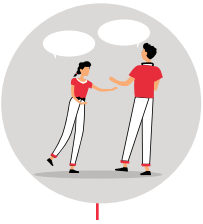
Data Science Toolkit
Preparatory Content



Statistics & Git Essentials
(5 weeks)



Machine Learning I
(7 weeks)



Natural Language Processing
(7 weeks)



Deep Learning
(8 weeks)



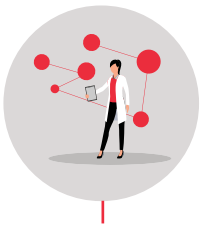
Machine Learning II
(7 weeks)



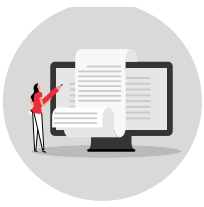
Electives (Advanced DL/ Advanced NLP/AI Leadership)
(10 weeks)



Deployment & Capstone
(4 weeks)

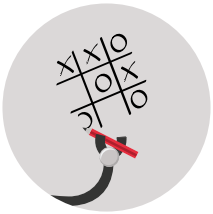


Research Methodology
(10 weeks)



Masters' Dissertation
(14 weeks)

INDUSTRY PROJECTS



Train an Agent to Play Tic Tac Toe



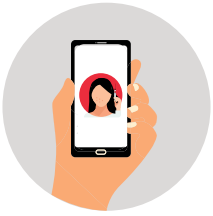
Custom Entity detection in Healthcare data



Telecom Churn Analysis



Fraud Detection



Detect Skin Cancer from Images



Gesture Recognition



Recommendation System



Maximize Cab Driver Profit Using RL



Automatic Ticket Classification



Social Media Listening



Sales Forecasting

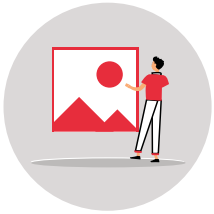
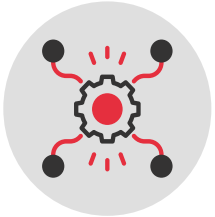


Image Captioning



Sentiment Analysis on Product Reviews



Medical Image Synthesis Using CycleGAN



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



PRE-PROGRAM PREPARATORY CONTENT (3 WEEKS)

1
INTRODUCTION TO PYTHON
Build a foundation for the most in-demand programming language of the 21st century.

2
PYTHON FOR DATA SCIENCE
Learn how to manipulate datasets in Python using Pandas, which is the most powerful library for data preparation and analysis.

3
DATA VISUALISATION IN PYTHON
Humans are visual learners and hence no task related to data is complete without visualisation. Learn to plot and interpret various graphs in Python and observe how they make data analysis and drawing insights easier.

4
DATA ANALYSIS USING SQL (OPTIONAL)
Data in companies is definitely not stored in excel sheets! Learn the fundamentals of database and extract information from RDBMS using the structured query language.

5
ADVANCED SQL AND BEST PRACTICES (OPTIONAL)
Apply advanced SQL concepts like windowing and procedures to derive insights from data and answer pertinent business questions.

6
DATA ANALYSIS IN EXCEL
Taught by one of the most renowned data scientists in the country (S.Anand, CEO, Gramener), this module takes you from a beginner level Excel user to an almost professional user.

7
ANALYTICS PROBLEM SOLVING
This module covers concepts of the CRISP-DM framework for business problem-solving.

8
MATH FOR MACHINE LEARNING
Learn the prerequisite mathematical tools and techniques for ML - Linear Algebra and Multivariable Calculus.

STATISTICS AND EXPLORATORY DATA ANALYTICS (5 WEEKS)

1
EXPLORATORY DATA ANALYSIS
Learn how to find and analyse the patterns in the data to draw actionable insights.

2
CLOUD ESSENTIALS: INTRO TO GIT & GITHUB
Learn version control, collaborating, portfolio making using git. Understand the process of creating repository. Learn the process of creating github portfolio using github pages with jekyll

*Syllabus is subject to change by the university

3 **INFERENTIAL STATISTICS**
Build a strong statistical foundation and learn how to 'infer' insights from a huge population using a small sample.

4 **HYPOTHESIS TESTING**
Understand how to formulate and validate hypothesis for a population to solve real-life business problems.

5 **LENDING CLUB CASE STUDY**
Determine which customers are at risk of default and what are their characteristics so as to avoid providing loans to similar people in the future.

MACHINE LEARNING I (7 WEEKS)

1 **LINEAR REGRESSION**
Venture into the machine learning community by learning how one variable can be predicted using several other variables through a housing dataset where you will predict the prices of houses based on various factors.

2 **LINEAR REGRESSION ASSIGNMENT**
Build a model to understand the factors car prices vary on and help a Chinese company enter the US car market.

3 **LOGISTIC REGRESSION**
Learn your first binary classification technique by determining whether customers of a telecom operator are likely to churn to help the business retain customers.

4 **NAIVE BAYES**
Understand the basic building blocks of Naive Bayes and learn how to build an SMS Spam Ham Classifier using Naive Bayes technique.

5 **MODEL SELECTION**
Learn the pros and cons of simple and complex models and the different methods for quantifying model complexity, along with regularisation and cross validation.

MACHINE LEARNING II (7 WEEKS)

1 **ADVANCED REGRESSION**
Understand generalised regression and different feature selection techniques, along with the perils of overfitting and how it can be countered using regularisation.

2 **ADVANCED REGRESSION ASSIGNMENT**
Build a model to understand the factors house prices vary on and help an American company enter the Australian housing market.

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3 **SUPPORT VECTOR MACHINE (OPTIONAL)**
Learn how to find a maximal marginal classifier using SVM, and use them to detect spam emails, recognise alphabets and more!

4 **TREE MODELS & RANDOM FORESTS**
Learn how the human decision making process can be replicated using a decision tree and other powerful ensemble algorithms.

5 **MODEL SELECTION: PRACTICAL CONSIDERATIONS**
Given a business problem, how do you choose the best algorithm? Learn a few practical tips for doing this here.

6 **BOOSTING**
Learn how weak learners can be 'boosted' with the help of each other and become strong learners using different boosting algorithms such as Adaboost, GBM, and XGBoost.

7 **UNSUPERVISED LEARNING: CLUSTERING**
Learn how to group elements into different clusters when you don't have any pre-defined labels to segregate them through K-means clustering, hierarchical clustering, and more.

8 **UNSUPERVISED LEARNING: PRINCIPAL COMPONENT ANALYSIS**
Understand important concepts related to dimensionality reduction, the basic idea and the learning algorithm of PCA, and its practical applications on supervised and unsupervised problems.

9 **TELECOM CHURN CASE STUDY**
Solve the most crucial business problem for a leading telecom operator in India and southeast Asia - predicting customer churn.

DEEP LEARNING (8 WEEKS)

1 **INTRODUCTION TO NEURAL NETWORKS**
Learn the most sophisticated and cutting-edge technique in machine learning - Artificial Neural Networks or ANNs.

2 **CONVOLUTIONAL NEURAL NETWORKS - INDUSTRY APPLICATIONS**
Learn the basics of CNN and OpenCV and apply it to Computer Vision tasks like detecting anomalies in chest X-Ray scans, vehicle detection to count and categorise them to help the government ascertain the width and strength of the road.

3 **CONVOLUTIONAL NEURAL NETWORKS - ASSIGNMENT**
Build a neural network from scratch in Tensorflow to identify the type of skin cancer from image

4 **RECURRENT NEURAL NETWORKS**
Ever wondered what goes behind machine translation, sentiment analysis, speech recognition etc. ? Learn how RNN helps in these areas having sequential data like text, speech, and videos, etc.

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5 **NEURAL NETWORKS PROJECT: GESTURE RECOGNITION**

Make a Smart TV system which can control the TV with user's hand gestures as the remote control.

NATURAL LANGUAGE PROCESSING (7 WEEKS)

1 **LEXICAL PROCESSING**

Do you get annoyed by the constant spams in yor mail box? Wouldn't it be nice if we had a program to check your spellings?
In this module learn how to build a spell checker & spam detector using techniques like phonetic hashing,bag-of-words, TF-IDF, etc.

2 **SYNTACTICAL PROCESSING**

Learn how to analyse the syntax or the grammatical structure of sentences using POS tagging and Dependency parsing.

3 **SYNTACTIC PROCESSING - ASSIGNMENT**

Use the techniques such as POS tagging and Dependency parsing to extract information from unstructured text data.

4 **SEMANTIC PROCESSING**

Learn the most interesting area in the field of NLP and understand different techniques like word-embeddings, topic modelling to build an application that extracts opinions about socially relevant issues.

5 **CASE STUDY: CLASSIFYING CUSTOMER COMPLAINT TICKETS**

In this case study you will create a solution that will help in identifying the type of complaint ticket raised by the customers of a multinational bank.

ELECTIVE 1: MLOPS (15 WEEKS)

1 **PRE-REQUISITE MODULE**

Builds upon foundational knowledge of DevOps, focusing on its application in the context of machine learning.

2 **INTRODUCTION TO MLOPS**

This module provides an overview of MLOps, focusing on the principles and practices of integrating machine learning into the software development lifecycle.

3 **DESIGNING MACHINE LEARNING SYSTEMS**

Guides students in designing ML systems from ideation to prototyping to product delivery, emphasizing robustness, reusability, reproducibility and maintainability.

4 **EXPERIMENTING WITH DATA AND MODEL USING MLFLOW**

Hands-on experience with MLflow, managing end-to-end machine learning lifecycle, including experiment tracking, model packaging, and version management.

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5 **AUTOMATING AND ORCHESTRATING PIEPELINES WITH AIRFLOW**
Students will learn how to create and schedule workflows, manage dependencies between tasks, and monitor pipeline execution using Airflow.

6 **BUILDING CONTINUOUS LEARNING INFRASTRUCTURE**
This module covers the concepts and techniques required to establish a continuous learning infrastructure for ML models. Students will learn about data drift detection, model retraining strategies, and deployment strategies for updated models.

7 **MLOPS PROJECT**
In this assignment, students will apply the concepts and tools learned throughout the curriculum to develop an end-to-end MLOps solution.

8 **ADVANCED NLP - INTRODUCTION TO ATTENTION MECHANISM**
This module focuses on building sequence to sequence models using attention mechanism to build a Neural Machine Translation(NMT) model.

9 **ADVANCED NLP - INTRODUCTION TO TRANSFORMERS**
Explores Transformers architecture in NLP, diving deeper into self-attention mechanisms, multi-head attention, and positional encoding, with a focus on fine-tuning BERT models for sentence similarity.

10 **ADVANCED CV - OBJECT DETECTION & SEMANTIC SEGMENTATION**
Covers advanced computer vision techniques, including object detection and semantic segmentation, with hands-on experience in training and evaluating models using popular algorithms and frameworks.

11 **MLOPS + DEPLOYMENT: DL (THEORY)**
Provides theoretical foundations for deploying deep learning models in MLOps pipelines, including model training with AWS SageMaker and deployment considerations such as model serving, scalability, and performance optimization.

12 **MLOPS + DEPLOYMENT: DL (CASE STUDY)**
In this case study, you will apply all your learnings from the previous module to perform an end to end deployment of a DL model using AWS Sagemaker.

ELECTIVE 2: GENERATIVE AI (15 WEEKS)

1 **ADVANCED NLP - INTRODUCTION TO ATTENTION MECHANISM**
This module focuses on building sequence to sequence models using attention mechanism to build a Neural Machine Translation(NMT) model

2 **ADVANCED NLP - INTRODUCTION TO TRANSFORMERS**
Explores Transformers architecture in NLP, diving deeper into self-attention mechanisms, multi-head attention, and positional encoding, with a focus on fine-tuning BERT models for sentence similarity.

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3 **INTRODUCTION TO GENERATIVE AI, CHATGPT & PROMPT ENGINEERING**
Introduces students to the world of generative AI and various LLMs that have revolutionised the current industry, and enables learners to dive into that revolution by learning the nitty-gritties of writing a prompt of generate a desired outputs for complex tasks.

4 **ADVANCED PROMPTING & FINE TUNING IN PYTHON**
Dive deeper into prompt engineering and learn how to structure prompts and outputs, and how you can use advanced prompting techniques such as chain-of-thought prompting, zero- and few-shot prompting, prompt injunctions, prompt pararmeter tuning. By the end of this module, learners will become proficient at defining prompts for most complex tasks.

5 **PRODUCT DEVELOPMENT & INTEGRATING SPEECH USING WHISPER API AND APPLICATION DEPLOYMENT USING FLASK**
Learn the fundamentals of product development, and deploy your own GPT-enabled web app with the use of Flask.

6 **PROMPTING ON MULTIMODAL LLMS LIKE STABLE DIFFUSION, MID JOURNEY**
Understand the fundamentals of design, photography and product development to generate images and multimodal outputs for businesses.

7 **APPLICATIONS OF LLMS IN CODE GENERATION & DATA SCIENCE**
Write prompts to generate accurate codes for various general and data tasks, perform basic data processing and modelling tasks using ChatGPT and Copilot.

8 **GENAI PROJECTS**
Apply your learnings to create various GenAI enabled applications such as Interview Gynie, PixxelCraft and ShrewdNewsAI

9 **EMBEDDING LARGE DOCUMENTS WITH LLMS**
Understand the concepts of embeddings and take the first step towards building custom LLMs that involve integrating a database with your GenAI models.

10 **STORING AND INDEXING EMBEDDINGS OF LARGE DOCUMENTS WITH VECTORSTORES LIKE PINECONE**
Embed large documents and datasets with the help of vectorstores like Pinecone to enhance ChatGPT's ability to understand context, avaoid hallucinations, and perform accurately on data-specific tasks.

11 **INTRODUCTION TO LANGCHAIN AND ITS APPLICATIONS**
With the limitaions of standalone LLMs, understand how LangChain can be used to overcome those limitations and help integrate GenAI models on specific data pools.

12 **LANGCHAIN AGENTS, TOOLS, AND VECTORSTORES FOR STORAGE AND RETRIEVAL**
Understand how the different components of LangChain such as Models, Prompts, Indexes, Chains, Memory and Agents help building a GenAI model.

13 **CONNECTING COMPONENTS USING CHAIN AND THE POWER OF TOOLS IN LANGCHAIN**
Understand how to connect components using chain, and how different inbuilt tools in Lang-Chain can be leveraged for your models.

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14 **SCALE AND DEPLOY GENERATIVE AI APPS USING AZURE OPENAI SERVICES**
Deploy your generative AI models using Azure OpenAI services and understand the considerations that go in when scaling generative AI models.

15 **FUTURE DEVELOPMENTS IN GENERATIVE AI**
Understand what the future of AI holds (mitigating risks in AI, RLHF as a product, Multimodal Learning), both from the architecture and applications perspective.

CAPSTONE (4 WEEKS)

1 **CAPSTONE**
Choose from a range of real-world industry woven projects on advanced topics like Recommendation Systems, Fraud Detection, GANs among many others.

2 **NEWS RECOMMENDER SYSTEM**
Build a model to using the concepts of natural language processing and recommender systems to recommend news stories to users on a popular news platform.

3 **CREDIT CARD FRAUD DETECTION**
To build a machine learning model capable of detecting fraudulent transactions. Here you have to predict fraudulent credit card transactions with the help of machine learning models.

4 **EYE FOR BLIND - (IMAGE CAPTIONING)**
Build a model that can help any visually impaired person in understanding image present before them. It is a deep learning model which can explain the content of an image in the form of speech.

5 **SENTIMENT ANALYSIS BASED PRODUCT RECOMMENDER SYSTEM**
Build a sentiment analysis based product recommendation system to recommend the similar products to the users. Sentiment analysis is used to fine tune the product recommendation system.

6 **SALES FORECASTING**
Predict the sales for a european pharma giant using a host of different types of variables. Apply VAR and VARMAX models to build the appropriate model

7 **STYLE TRANSFER USING GAN'S**
Build a Model for converting MRI images from one type (T1) into other (T2) and vice versa. CycleGAN model is used for producing T2 type MRI images given T1 type input MRI images.

REINFORCEMENT LEARNING (OPTIONAL)

1 **CLASSICAL REINFORCEMENT LEARNING**
Ever wondered how Alpha Go beat the best GO player or how Boston Dynamics made robots that can run. Start your journey with the classical RL algorithms like dynamic programming, Monte Carlo methods, Q Learning to train the state value and action value functions of the policy.

2 **ASSIGNMENT - CLASSICAL REINFORCEMENT LEARNING**
Train an agent that'll beat you in the game of numerical tic-tac-toe everytime you play

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3 **DEEP REINFORCEMENT LEARNING**

Want to build your own Atari Game? Learn the Q-function or policy using the various Deep Reinforcement Learning algorithms: Deep Q Learning, Policy Gradient Methods, Actor- Critic method.

4 **REINFORCEMENT LEARNING PROJECT**

Improve the recommendation of the the rides to the cab drivers by creating a RL based algorithm using vanilla Deep Q-Learning (DQN) to maximize the driver's profits and inturn help in retention of the driver on the cab aggregator service.

RESEARCH METHODOLOGY

1 **WHAT IS RESEARCH?**

Familiarise yourself with different aspects of research

- Introduction to research
- Importance of research
- Criticism in research and its importance
- Peer reviews in research and its importance

2 **TYPES OF RESEARCH**

Develop an understanding of various research designs and techniques

- Descriptive vs Analytical
- Applied vs Fundamental
- Quantitative vs Qualitative
- Bayesian vs Frequentist Approach

3 **RESEARCH PROCESS**

Learn about the different steps in the research process and how to evaluate a literature review

- Research question
- Hypothesis and aims
- Formulating a Problem
- Literature review

4 **RESEARCH PROJECT MANAGEMENT**

Learn how to plan the project timelines and arrange for data & software

- Understand the different steps involved in a project cycle
- Project Requirements on Data
- Identifying the milestones in a research project
- Learn how to track the progress using Gantt Chart

5 **REPORT WRITING AND PRESENTATION**

Master good scientific writing and proper presentation skills

- Art of writing papers
- Parts of a paper
- Tools to write papers
- Publishing papers: Journals + Seminars

6 **SCIENTIFIC ETHICS**

Develop an understanding of the ethical dimension in research

- Citation Methods and Rules
- Honor Code
- Research Claims

MASTER'S DISSERTATION

1 **SAMPLE THESIS PROJECTS**

Research, articulate & present your project.

- Monthly Checkpoints
- Submission

Examples of Project Outlines:

- Investigate the risk factors for eye disease from complex longitudinal datasets
- Investigate a diagnosis of eye diseases using imaging ophthalmic data
- Multi-task learning for drug design and discovery
- Using stacking for brain tumour discrimination
- Investigate dietary patterns and metabolite fingerprints of takeaway (fast) food consumers using PCA and Clustering methods
- Longitudinal studies to investigate the complex link between corporate environment engagement, green disclosure, business model transformation and supply chain performance
- Preventing credit card fraud through pattern recognition
- Developing a recommender system for a Media giant
- Using social media feed to place tweets regarding natural disasters on a map

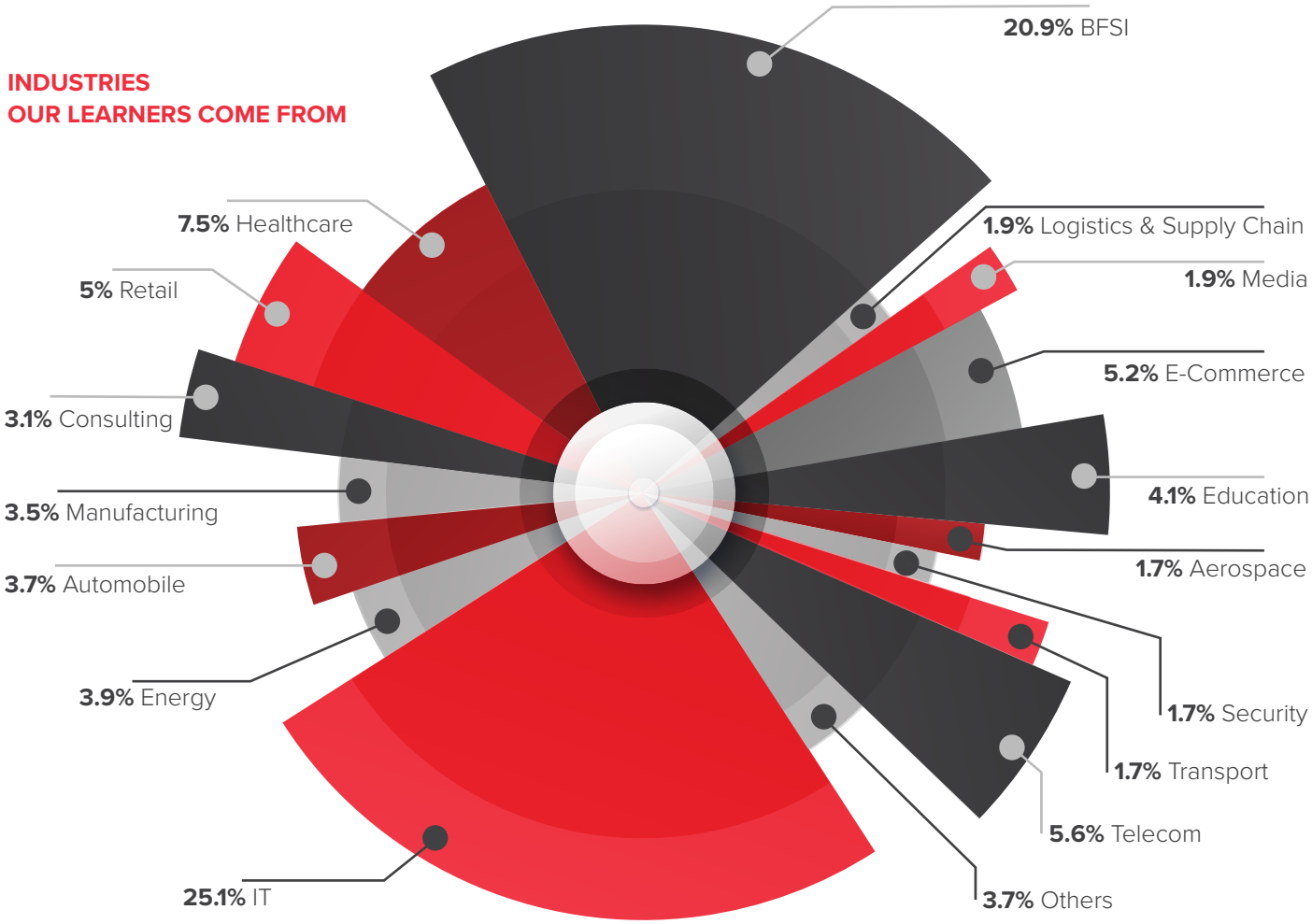


Disclaimer: Program curriculum is subject to change basis inputs from the institute and experts.
Please refer to the website for update details, or speak to our Admission Counsellors.

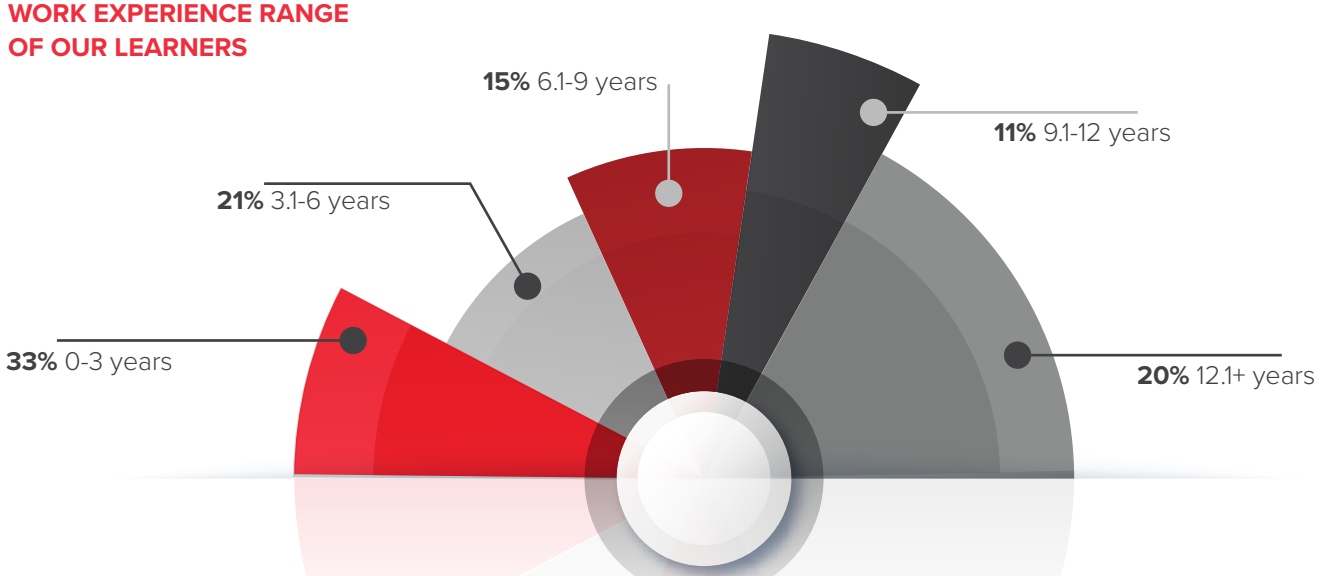
*Syllabus is subject to change by the university

MEET THE CLASS

INDUSTRIES OUR LEARNERS COME FROM



WORK EXPERIENCE RANGE OF OUR LEARNERS



CAREER SUPPORT

Jobs on Career Centre

Career Centre offering upGrad jobs across experience levels and CTC ranges.

- Easy apply feature for upGrad hiring partner vacancies.
- Create resume at profile builder and apply for various jobs with one click.

upGrad Elevate

- Recruitment Drive to connect you with the best talent admirers in the industry.
- Get access to a wide range of opportunities and find the perfect job.
- Apply your learnings to real industry problems.

Interview Preparation

Pre-recorded content on topics such as:

- Profile building, communications, etc
- Problem solving approach.
- Approaching guesstimates
- Domain specific interview question bank and much more.

Profile Builder (AI-Powered)

An easy to use Resume, LinkedIn and Cover Letter preparation tool.

- Resume Score: AI-Driven Resume Score
- Real-time recommendations to improve
- Match your resume to the JD and check fitment
- LinkedIn Profile Review
- Cover Letter creation

Just-In-Time Interview Prep (JIT)

For upcoming job interviews, JITs are conducted within 48 hours for eligible programs.

- Tailored to job role and target domain
- Real-ttime feedback and tips for improvement

High Performance Coaching

Dedicated coaches working with you to identify best suited career opportunities.

- Help you define your value proposition.
- Lay out a Career Path and help you adhere to your timelines and goals.
- Help you with interview preparations, finding jobs in the market, salary negotiations and other preparation as required.

Personalised Industry Session

90-minute sessions biweekly by leading industry experts.

- Session categories: Career, Technical and Communications
- Doubt resolution
- Develop proof of concepts and apply the oretical concepts in the real world
- Assess skill levels
- Peer Networking
- Classroom element
- Business communication sessions and much more.

Career Mentorship Sessions

Get personalised career advice through 1-1 sessions with industry experts.

- Goal setting for better employment results

Live Profile Building Workshops

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

Disclaimer: Career services are subject to change. Please refer to the website or speak to our Admission Counsellor for updated details.

OFFLINE LEARNING
& CAREER ASSISTANCE



UPGRAD ELEVATE

upGrad's Hiring Drive where you can interview with upGrad's 300+ hiring partners ensuring you get every opportunity you deserve.

HACKATHONS & JOB OPPORTUNITIES

Team up and put your learning to use with our offline Hackathons - designed to help you apply concepts and meet, network and grow! Being a top performer at Hackathons also provides the opportunity to interview at top firms.



HEAR FROM OUR LEARNERS



Angshuman Mukherjee
"For the thesis - In the initial 2 months, LJMU professors teach us about scientific research and it's methodologies, the do's and don'ts. They give a lot of stress to make sure we understand about research ethics. Post that, there is a process of submitting proposed research topics on ML and AI. These topics are evaluated and approved based on their feasibility and originality. Once the topic is finalized, for the next 4 months, we work with a research supervisor (mostly an AI researcher from reputed indian institutes) to build our thesis. At the end of the 4 months, we have to submit a thesis report and a presentation of our thesis, based on which we receive our final results."

Samarjit Adhikari
"An M.Sc. degree will not only give you an edge over other but also enables you to prepare yourself for the job market."

Pranav K
"The content is of high quality and is delivered by experienced faculty. I can say very confidently that among all the courses coming up in India, the LJMU & IIITB program at upGrad has evolved the fastest and will continue to do so."

Santosh Ambaprasad
"I have contemplated a lot and done a through look out and opted for the M.Sc. with upGrad and LJMU. The post-graduation qualification run by LJMU gives an exposure to full-fledged research. I have learning experience of both Executive PG Programme and Master's program and I personally certify that it has helped me explore further research and publication opportunities and strengthened my career graph."

PROGRAM DETAILS AND ADMISSION PROCESS

PROGRAM DURATION AND FORMAT

19 Months | Online

PROGRAM FEE

Please refer to the website for more details

ELIGIBILITY

Mention this under minimum eligibility - Bachelor's Degree with minimum 50% or equivalent passing marks, and successful completion of the Executive PG Program in Machine Learning from IIITB with a 2.4 GPA. No coding experience required.

PROGRAM START DATES

Please refer to the website for program start dates.

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 with assistance from our loan partners where required, receive immediate access to the prep content and begin your upGrad journey.

FOR FURTHER INFORMATION, CONTACT

mastersml@upgrad.com
1800 210 2020
We are available 24*7

Disclaimer: Program fee and payment options are subject to change. Please refer to the website for updated details or speak to our admission counsellor.

upGrad

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Worli, Mumbai - 400018.