iiit-b International Institute of Information Technology Bangalore | Clarkson | upGrad

MS IN

APPLIED DATA SCIENCE

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ABOUT UPGRAD

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 its inception, upGrad has delivered over 20 million hours of learning, delivering programs by collaborating with universities across the world including LJMU, IIIT Bangalore and Deakin Business School among others. And it doesn't end there.

upGrad, in collaboration with IIIT Bangalore, a renowned university and Clarkson University, US is excited to offer a one-of-its-kind, academically rigorous and industrially relevant MS in Applied Data Science.

The faculty includes 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+ years of experience from upGrad's industry network.

Ronnie Screwvala
Co-founder & Executive Chairman

"Our aim is simple: We strive to create high-impact, on-campus hands-on experiences that prepare students for meaningful and productive careers."

ABOUT
CLARKSON UNIVERSITY, U.S.

Clarkson University is a private, national research institution founded in 1896. With its main campus in Potsdam, NY, the university is a front-runner in technology education. The university's prime focus is on solution-oriented thinking utilizing innovation, research, scholarship, and teaching to create real impact, relevant innovations and enduring value in the world.

The university is renowned for offering unparalleled learning experiences with over 90 rigorous undergraduate, graduate, Ph.D., and certificate programs. With powerful intentions, the university ignites connections across academic disciplines and industries to promote an entrepreneurial mindset and intellectual curiosity to create leaders of tomorrow.

At Clarkson University, students are supervised by faculty members with a pool of experience. Each program at Clarkson University is coherently designed to offer a cutting-edge curriculum and industry-oriented pedagogy in a supportive environment. The external network of the university engages 380+ active partners in the industry, chamber of commerce, and research organizations. A degree from Clarkson University will equip students in every domain to achieve their professional aspirations, from enhancing knowledge to acquiring new competencies.

Rankings and Accreditations

- The U.S. News & World Report, 2022 has ranked Clarkson University 127th in National Universities.
- According to QS World University Rankings, 2022, Clarkson University’s ranking ranges between 751-800.
- The university is ranked 49th in Best Value Schools, 179 in Top Performers on Social Mobility, and 114 in Best Undergraduate Engineering Programs by The U.S. News & World Report, 2022.
- The university's undergraduate mechanical, aeronautical, computer, electrical, chemical, civil, environmental, and software engineering programs and undergraduate engineering and management programs are accredited by the Engineering Accreditation Commission of ABET.
- The Commission on the Accreditation of Healthcare Management Education (CAHME) accredits the Healthcare Management MBA offered by the university.
- College Factual, a higher education data and analytics company has ranked the university in the top 10% of schools in the nation in their 2022 Best Schools Ranking.
- The university is accredited by the Middle States Commission on Higher Education (MSCHE).
- The AACSB accredits the management programs offered by the university.

- According to the 2021 National University Rankings in Washington Monthly Magazine, Clarkson University ranks 79.
- The university is ranked in the Top 10 Best Master's Degrees in New York, University HQ.
- The university is one of only 150 Institutions Included in the New College Guide, Colleges Worth Your Money.

Reason for Choosing Clarkson University

- Clarkson University provides ample opportunities for the growth of students, with exposure to sports, arts & culture, and creational activities.
- The student-faculty ratio at Clarkson University is 13:1.
- According to Forbes, the university is one of America's Top Research Universities.
- The university's average freshman retention rate, an indicator of student satisfaction, is 89%.
- The university would offer merit-based scholarships to qualified students.
- With more than 250 clubs at the university, students get a chance to comprehensive learning.
- Unparalleled learning experience under the guidance of industry experts and 380+ active partners in the industry.
- According to U.S. News & World Report, the university's admissions are more selective, with an acceptance rate of 78%.
- The university is among the top 10 four-year colleges in the nation, enhancing the value to student earnings potential, according to value-added college rankings, Brookings Institution. The report says that students getting a degree from Clarkson University can boost their earnings by 42 percent.
- According to PayScale College Salary Report, 2022, Clarkson University is ranked 39 for a bachelor's degree.

PLEASE REFER TO THE WEBSITE FOR TRANSFER ELIGIBILITY CRITERIA

ABOUT
POTSDAM, NEW YORK

Potsdam is a small town in northern New York. It offers many recreational and cultural-enriching experiences for the students, such as fishing, hiking, and canoeing. The campus location is just an hour away from the Adirondack Mountains, and Lake Ontario and Lake Champlain are also close by. Moreover, the Raquette River is right down the street from campus and is an excellent stress-buster for students and the perfect option for canoeing/kayaking.

LIFE AT POTSDAM – THE MELTING POT OF ART, CULTURE, AND HISTORY

- **The Cheel Campus Center**: It is a 3,000-seat multi-purpose arena in Potsdam, New York. It is one of the go-to places for students to have coffee and relax.

- **Potsdam Public Museum**: The students would get a chance to look at the city's history. The museum encapsulates the history of the village of Postdam since the eighteenth century. More over, they can scour the archives available, which encompass records of many of the businesses in the area since 1800.

- **Potsdam Summer Festival**: International students can get a cultural glimpse of the city during the festival. Downtown is closed off; all the stores have sidewalks, food, and sales. Moreover, students can enjoy concerts held at night.

ABOUT U.S.

The United States of America witnessed an influx of more than 211,930 Indian students in 2021 as per the Free Press Journal. From world-class universities, top-notch student facilities to a flourishing job market, the United States of America has millions of options for international students.

Studying in the U.S. will provide you with a globally recognized degree and the opportunity to find high-paying jobs around the globe. The industry-oriented curriculum, amalgamation of practical and theory, a wide variety of cultures, and opportunity to interact with pioneers from different fields of study makes the U.S. the best choice to study abroad.

WHY CHOOSE US AS YOUR STUDY ABROAD DESTINATION?

- Universities offer academic flexibility to students to explore different academic disciplines
- A perfect mix of theoretical and practical knowledge for industry exposure
- Part-time work opportunities along with studies
- The U.S. is home to top-ranking universities with high academic standards
- Excellent support systems for international students
- A melting pot of different cultures and ethnicities and races
- More than 200 research universities engaged in world-class research
- Multiple career and internship opportunities upon completion of degree
- More than 2 million courses are offered in the U.S.
- Multiple scholarships and grants available for international students
- OPT of up to 36 Months

ABOUT MS IN APPLIED DATA SCIENCE

The MS in Applied Data Science degree prepares students to be competent professionals in identifying, acquiring, managing, presenting, analyzing and interpreting massive amounts of data in several professional fields and industries, and organizational environments. Moreover, students can complete the program at the Potsdam campus.

Students will gain a shared set of critical abilities in data management, decision analysis, statistics, data mining, and knowledge discovery through close faculty-student interaction in core courses. Additionally, the program offers elective courses in many fields of data science and analytics from which students can gain additional skills and knowledge.

WHY STUDY MS IN APPLIED DATA SCIENCE

- It will allow students to learn how to draw informed decisions and conclusions with data while being attuned to ethical considerations of data use.
- In the digital world, students get a chance to build a solid foundation to work in a gamut of industries.
- Students will get global exposure while pursuing MS in Applied Science from the U.S.
- According to PayScale, the average base salary for MS in Applied Data Science graduates is $100,000 per annum.

PROGRAM HIGHLIGHTS

Dual Accreditation and Alumni Status
Get certified by IIITB and Clarkson University, U.S.

High Employment Potential
Starting salaries of Data Scientists in US is $100,000 per annum as per indeed.com

Optional Practical Training (OPT)
STEM programs leading up to 3 years of OPT (post-study work visa)

FACULTY AND INDUSTRY EXPERTS

Hindol Basu

CEO
Actify Data Labs

An alumnus of IIT and IIM with over 13 years of experience in Analytics with industry leaders such as the CitiGroup, Tata Industries etc.

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

Tricha Anjali

Ex- Associate Dean, IIITB

Prof. Anjali has a PhD from Georgia Tech as well as an integrated M.Tech. (EE) from IIT Bombay. Her research interests are computers and wireless technology.

Dr. Debabrata Das

Director, IIITB

Dr. Debabrata Das is currently Director of IIITB. He has received his PhD degree from IIT-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 as well as several other companies.

Ankit Jain

Sr. Research Scientist
Uber Ai Labs

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

Dinesh Babu Jayagopi

Assistant Professor
International Institute of Information Technology Bangalore

Prof. Dinesh has a PhD from Ecole Polytechnic Federate Switzerland, M.Sc. from IISc Bangalore in System Science and Signal Processing, and B.Tech.

Kalpana Subbaramappa

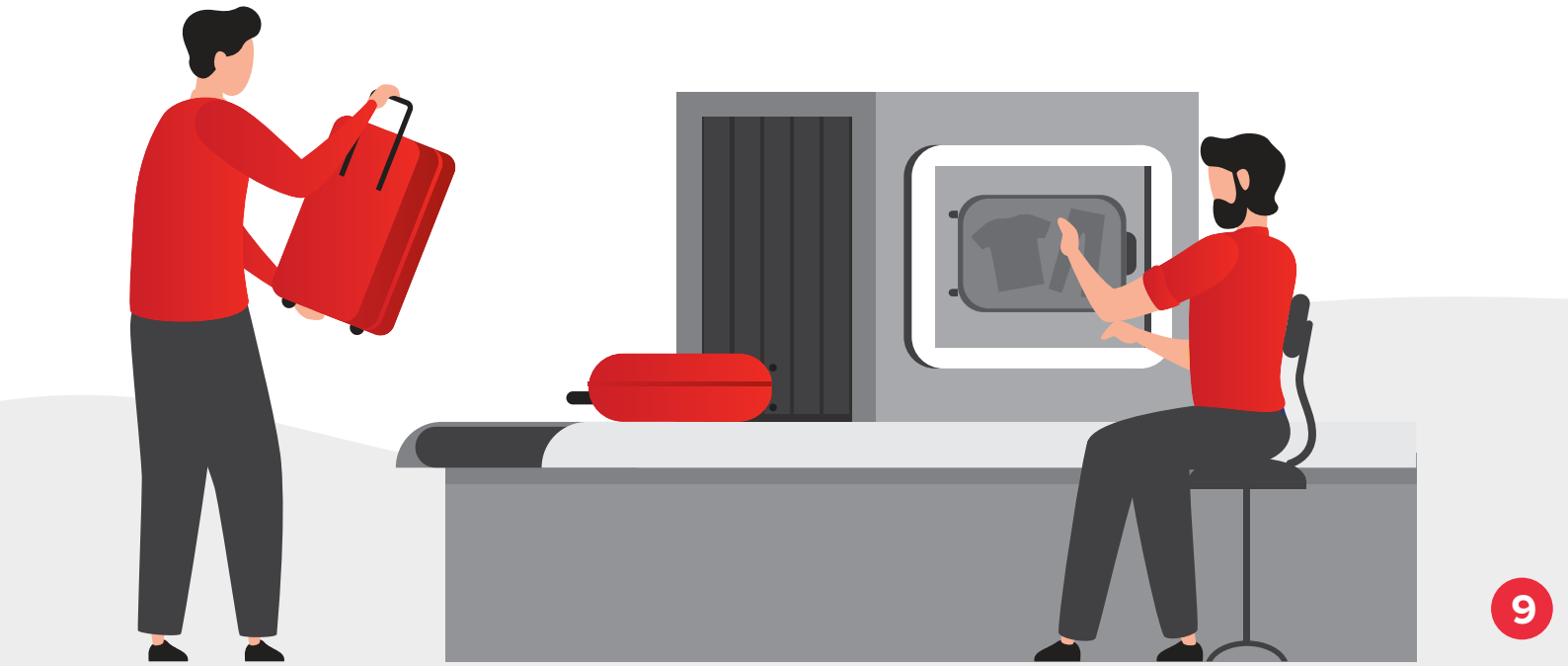
ex-AVP | Decision Science
Genpact

Kalpana is the ex-AVP of Decision Sciences at Genpact with over 20 years of experience.

Mirza Rahim Baig

Lead Analyst
Zalando

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



UPGRAD
LEARNING EXPERIENCE

EXPERT FEEDBACK AND LEARNING

- TA sessions
- Regular live sessions by experts to clarify concept related doubt
- Receive unparalleled guidance from industry mentors, teaching assistants and graders

Q/A FORUM

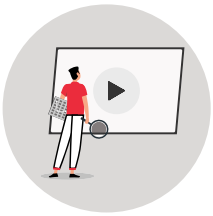
Peer-to-peer discussion forum where you can post your queries and your peers/faculty/teaching assistants answer your queries within a day. Regular Q&A sessions with faculty to get clarification on conceptual doubts.

NEW ADDITIONS

Career Essential Soft-skills Program

- Excel in your personal & professional life with upGrad's Soft Skills Program.
- Study Three fundamental Skills - Interview & Job Search, Corporate & Business Communication and Problem Solving.
- Get access to 40+ learner hours of soft skills content delivered by the best faculty & Industry experts

INDUSTRY PROJECTS



IMDb Movie Analysis

Uber Supply-Demand Gap

Lead Scoring

Fraud Detection

Creditworthiness of Customers

Speech Recognition

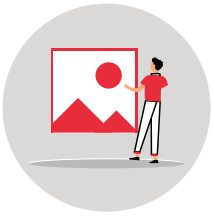
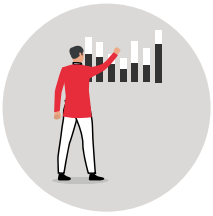


Image Captioning

Gesture Recognition

Social Media Listening

Telecom Churn



Interactive Market Campaign Analysis

Retail Giant Sales Forecasting

And many more!

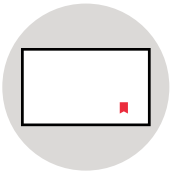
LEARNING PATH

Preparatory Course
2 weeks
Tools: Python, Excel

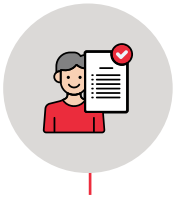
Data Toolkit
12 weeks
Tools: Python, Excel, mySQL

Machine Learning
9 weeks
Tools: Python, Excel

Course 3
11 weeks
Tools: Python, Excel



Advanced Certification in Data Science



IELTS Preparation & Exam

Journey in Clarkson.

Main Courses, Elective, Capstone

MS in Applied Data Science at Clarkson University

MS IN APPLIED DATA SCIENCE

1. Advanced Certificate in Data Science from IIIT, Bangalore (8 months)

PROGRAM CURRICULUM

Pre-program Preparatory Content

Data Analysis in Excel

1. Introduction to Excel
2. Data Analysis in Excel - I: Functions, Formulae, and Charts
3. Data Analysis in Excel - II: Pivots and Lookups

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.

Analytics Problem Solving

1. The CRISP-DM Framework - Business and Data Understanding
2. CRISP-DM Framework - Data Preparation, Modelling, Evaluation and Deployment

This module covers concepts of the CRISP-DM framework for business problem-solving.

Course 1: Data Toolkit

Introduction to Python

2 WEEKS

1. Understanding the upGrad Coding Console
2. Basics of Python
3. Data Structures in Python
4. Control Structure and Functions in Python
5. OOP in Python

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

**The Curriculum is subject to change as per the inputs from university or industry experts*

Programming in Python **2 WEEKS**

1. Logic and Syntax Building
2. Data Structures: Lists, Strings, Dictionaries, and Stacks
3. Time Complexity
4. Searching and Sorting
5. Two Pointers
6. Recursion

Learn how to approach and solve logical problems using programming.

Python for Data Science **1 WEEK**

1. Introduction to NumPy
2. Introduction to Matplotlib
3. Introduction to Pandas
4. Getting and Cleaning Data

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.

Data Visualization in Python **1 WEEK**

1. Introduction to Data Visualization
2. Data Visualisation using Seaborn

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.

Exploratory Data Analysis **1 WEEK**

1. Data Sourcing
2. Data Cleaning
3. Univariate Analysis
4. Bivariate Analysis and Multivariate Analysis

Learn how to find and analyse the patterns in the data to draw actionable insights.

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Credit Eda Case Study

1 WEEK

1. Problem Statement
2. Evaluation Rubric
3. Final Submission
4. Solution

Solve a real industry problem through the concepts learnt in exploratory data analysis.

Inferential Statistics

1 WEEK

1. Basics of Probability
2. Discrete Probability Distributions
3. Continuous Probability Distributions
4. Central Limit Theorem

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

Hypothesis Testing

1 WEEK

1. Concepts of Hypothesis Testing - I: Null and Alternate Hypothesis, Making a Decision, and Critical Value Method
2. Concepts of Hypothesis Testing - II: p-Value Method and Types of Errors
3. Industry Demonstration of Hypothesis Testing: Two-Sample Mean and Proprotion Test, A/B Testing

Understand how to formulate and validate hypotheses for a population to solve real-life business problems.

Data Analysis Using Sql

1 WEEK

1. Database Design
2. Database Creation in MySQL Workbench
3. Querying in MySQL
4. Joins and Set Operations

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.

**The Curriculum is subject to change as per the inputs from university or industry experts*

Advaced Sql & Best Practices **1 WEEK**

1. Window Functions
2. Case Statements, Stored Routines and Cursors
3. Query Optimisation And Best Practices
4. Problem-Solving Using

Apply advanced SQL concepts like window-ing and procedures to derive insights from data and answer perti-nent business ques-tions.

Sql Assignment: Rsvp Movies **1 WEEK**

1. Problem Statement
2. Evaluation Rubric
3. Final Submission
4. Solution

In this assignment, you will work on a movies dataset using SQL to extract exciting insights.

Course 2 - Machine Learning I

Linear Regression **2 WEEKS**

1. Simple Linear Regression
2. Simple Linear Regression in Python
3. Multiple Linear Regression
4. Mutliple Linear Regression in Python
5. Industry Relevance of Linear Regression

Venture into the machine learning community by learning how one vari-able can be predict-ed using several other variables through a housing dataset where you will predict the prices of houses based on various factors.

Linear Regression Assignment **1 WEEK**

1. Problem Statement
2. Evaluation Rubric
3. Final Submission
4. Solution

Build a model to understand the factors on which the demand for bike sharing systems vary on and help a company optimise its revenue.

**The Curriculum is subject to change as per the inputs from university or industry experts*

Logistic Regression **2 WEEKS**

1. Univariate Logistic Regression
2. Multivariate Logistic Regression: Model Building and Evaluation
3. Logistic Regression: Industry Applications

Learn your first binary classification tech-nique by determining which customers of a telecom operator are likely to churn versus who are not to help the business retain cus-tomers.

Classification Using Decision Trees **1 WEEK**

1. Introduction to Decision Trees
2. Algorithms for Decision Trees Construction
3. Hyperparameter Tuning in Decision Trees

Learn how the human decision making process can be replicated using a decision treeand tune it to suit your needs.

Unsupervised Learning: Clustering **1 WEEK**

1. Introduction to Clustering
2. K-Means Clustering
3. Hierarchical Clustering
4. Other Forms of Clustering: K-Mode, K-Prototype, DB Scan

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.

Basics Of NLP and Text Mining **1 WEEK**

1. Regex and Introduction to NLP
2. Basic Lexical Processing
3. Advanced Lexical Processing

Do you get annoyed by the constant spams in your mailbox? 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 pho-net-ic hashing, bag-of-words, TF-IDF, etc.

**The Curriculum is subject to change as per the inputs from university or industry experts*

Business Problem Solving **1 WEEK**

1. Introduction to Business Problem Solving
2. Business Problem Solving: Case Study Demonstrations

Learn how to approach open ended real world problems using data as a lever to draw actionable insights.

Case Study: Lead Scoring **1 WEEK**

1. Problem Statement
2. Evaluation Rubric
3. Final Submission
4. Solution

Help the Sales team of your company iden-tify which leads are worth pursu-ing through this classification case study.

Specialisation - Deep Learning

Course 3 - Machine Learning II

Bagging & Random Forest **1 WEEK**

1. Popular Ensembles
2. Introduction to Random Forests
3. Feature Importance in Random Forests
4. Random Forests in Python

Learn how powerful ensemble algo-rithms can improve your classification models by building random forests from decision trees.

Boosting **1 WEEK**

1. Introduction to Boosting and Adaboost
2. Gradient Boosting

Learn about ensemble modelling through bagging and boosting and understand how weak algorithms can be transformed into stronger ones.

Model Selection & General ML Techniques **1 WEEK**

1. Principles of Model Selection
2. Model Evaluation
3. Model Selection: Best Practices

Learn the pros and cons of simple and complex models and the different methods for quantifying model com-plexity, alongwith general machine learning techniques like feature engi-neering, model evaluation, and many more.

**The Curriculum is subject to change as per the inputs from university or industry experts*

Principal Component Analysis **1 WEEK**

1. Prinicipal Component Analysis and Singular Value Decomposition
2. Principal Component Analysis in Python

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.

Advanced Regression **1 WEEK**

1. Generalized Linear Regression
2. Regularized Regression

In this module, take a more advanced look at regression models and learn the concepts related to regularization.

Advanced ML Case Study **1 WEEK**

1. Problem Statement
2. Evaluation Rubric
3. Final Submission
4. Solution

Build a regularized regression model to understand the most important variables to predict the house prices in Australia.

Specialisation - Natural Language Processing

Course 3 - Machine Learning II

Bagging & Random Forest **1 WEEK**

1. Popular Ensembles
2. Introduction to Random Forests
3. Feature Importance in Random Forests
4. Random Forests in Python

Learn how powerful ensemble algorithms can improve your classification models by building random forests from decision trees.

Boosting **1 WEEK**

1. Introduction to Boosting and Adaboost
2. Gradient Boosting

Learn about ensemble modelling through bagging and boosting and understand how weak algorithms can be transformed into stronger ones.

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Model Selection & General ML Techniques

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Principal Component Analysis

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1. Prinicipal Component Analysis and Singular Value Decomposition
2. Principal Component Analysis in Python

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.

Advanced Regression

1 WEEK

1. Generalized Linear Regression
2. Regularized Regression

In this module, take a more advanced look at regression models and learn the concepts related to regularization.

Advanced ML Case Study

1 WEEK

1. Problem Statement
2. Evaluation Rubric
3. Final Submission
4. Solution

Build a regularized regression model to understand the most important variables to predict the house prices in Australia.

**The Curriculum is subject to change as per the inputs from university or industry experts*

Specialisation - Business Analytics

Course 3 - Advanced Machine Learning

Bagging & Random Forest — 1 WEEK

1. Popular Ensembles
2. Introduction to Random Forests
3. Feature Importance in Random Forests
4. Random Forests in Python

Learn how powerful ensemble algorithms can improve your classification models by building random forests from decision trees.

Model Selection & General ML Techniques — 2 WEEKS

1. Principles of Model Selection
2. Model Building and Evaluation
3. Feature Engineering
4. Class Imbalance

Learn the pros and cons of simple and complex models and the different methods for quantifying model complexity, alongwith general machine learning techniques like feature engineering, model evaluation, and many more.

Time Series Forecasting — 2 WEEKS

1. Introduction to Time Series and its Components
2. Smoothing Techniques
3. Introduction to AR Models
4. Building AR Models

In this module, you will learn how to analyse and forecast a series that varies with time.

Model Selction Case Study — 1 WEEK

1. Problem Statement
2. Evaluation Rubric
3. Final Submission
4. Solution

Apply your business acumen to the newly learnt machine learning techniques, and select the right model most appropriate for a provided business scenario.

**The Curriculum is subject to change as per the inputs from university or industry experts*

Specialisation - Business Intelligence/Data Analytics

Course 3 - Advanced DBS and Big Data Analytics

Data Modelling — 1 WEEK

1. Database Design Recap
2. Building Blocks of Data Modelling
3. Problem Solving using Data Modelling
4. Data Modelling: Optional Assignment

In this module, you will learn and use data modelling on a dataset to solve a business problem.

Advanced SQL and Best Practices — 1 WEEK

1. Window Functions
2. Case Statements, Stored Routines, and Cursors
3. Query Optimisation and Best Practices
4. Problem Solving using SQL

Apply advanced SQL concepts like windowing and procedures to derive insights from data and answer pertinent business questions

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Introduction to Big Data and Cloud — 1 WEEK

1. Big Data and Cloud Computing
2. Amazon Web Services
3. Big Data Storage and Processing - Hadoop
4. EMR Cluster in AWS

Understand the basics of big data and cloud and learn to work with an EMR cluster on a cloud-based service.

Analytics using Spark — 2 WEEKS

1. Exploratory Data Analysis with PySpark
2. Predictive Analysis with Spark MLLIB

Use PySpark to do EDA and Predictive Analysis using Spark's ML library.

Big Data Case Study — 1 WEEK

1. Problem Statement
2. Evaluation Rubric
3. Final Submission
4. Solution

Use your analytics skills to work on a large dataset in cloud to solve an industry problem.

**The Curriculum is subject to change as per the inputs from university or industry experts*

Specialisation - Data Engineering

Course 3 - Data Engineering - I

Data Management and Relational Database Modelling — 1 WEEK

1. Enterprise Data Management
2. Relational Database Modelling
3. Normal Forms and ER Diagrams

Understand the concepts of Data Management and learn to model data from a Relational Database.

Introduction to Big Data(Optional) — 0 WEEK

1. 4Vs of Big Data
2. Big Data: Industry Case Studies

This module you will learn what big data is, its various characteristics, and its determining factors. You will also get an idea of the various sources of big data and the wide range of big data applications in different industries such as retail, healthcare, and finance.

Introduction to Cloud and AWS Setup — 1 WEEK

1. Introduction to Cloud
2. AWS Setup

Understand what is cloud and setup your AWS account which will be required duing the program.

Introduction to Hadoop and MapReduce Programming — 1 WEEK

1. Concepts Retailed to Distributed Computing
2. Hadoop Distributed File System
3. MapReduce Programming in Python

Understand the world of distributed data processing and storage with Hadoop. Learn to write MapReduce jobs in Python.

**The Curriculum is subject to change as per the inputs from university or industry experts*

Assignment (Optional) **0 WEEK**

1. Introduction, Problem Statement and Grading Rubrics

Solve an assignment to brush up the skills learnt so far.

NoSQL Databases and Apache HBase
NoSQL Databases and MongoDB (Optional) **1 WEEK**

1. Concepts of NoSQL Databases
2. Introduction to Apache HBase
3. HBase Python API
4. Comparision of NoSQL Databases

Learn the concepts of NoSQL databases. Understand the working of Apache HBase.

Data Warehousing (Optional) **0 WEEK**

1. Introduction to Data Warehouse and Data Lakes
2. Designing Data Warehousing for an ETL Data Pipeline
3. Designing Data Lake for an ETL Data Pipeline

Understand the intricacies behind designing a data warehouse and a data lake for use case/s.

Data Ingestion with Apache Sqoop and Apache Flume **1 WEEK**

1. Introduction to Data Ingestion
2. Structured Data Ingestion with Sqoop
3. Unstructured Data Ingestion with Flume

Get familiar with the challenges involed in data ingestion. Use Sqoop and Flume to ingest structured and unstructured data into Hadoop.

Map reduce Programming Assignment **1 WEEK**

1. Problem Statement and Sample Dataset
2. Solution

Practise MapReduce Programming on a Big Dataset.

**The Curriculum is subject to change as per the inputs from university or industry experts*

STUDY ABROAD CURRICULUM

IELTS PREPARATION

- Preparation of IELTS Exam

ACADEMIC ENGLISH

- Language Development
- Academic Writing Skills
- Spoken Academic Communication
- Reading and Listening in Academic Context

RESEARCH METHODOLOGY

- Introduction to Research
- Research Sampling

ACADEMIC INTEGRITY & RESEARCH

- Introduction to Academic Integrity
- Introduction to Plagiarism
- Plagiarism : Advanced Understanding
- Ethical Considerations

ACADEMIC REFERENCING

- Academic Referencing
- Referencing Style Guides

FORMS OF ACADEMIC WRITING

- Different forms of Long Format Writing
- Dissertation or Thesis Writing
- Writing SOPs

CRITICAL THINKING

- Being a Critical Thinker
- Reasoning Skills
- Persuasion
- Critical Thinking as a Life Skill

NETWORKING AND PROFILE BUILDING IN FOREIGN DESTINATION

- Networking
- Profile Building

FINDING JOBS AND INTERNSHIPS

- How to Find Jobs And Internships in Foreign Destinations

IMMIGRATION AND VISA RULES

FINANCING EDUCATION

2. MS IN APPLIED DATA SCIENCE FROM CLARKSON UNIVERSITY, U.S. (YEAR 2)

CORE COURSES

• Database Modeling, Design and Implementation*	3 Credits
• Probability and Statistics for Analytics*	3 Credits
• Data Warehousing	3 Credits
• Information Visualization	3 Credits
• Data Mining	3 Credits
• Machine Learning	3 Credits

**Courses waived on the basis of IIITB course*

ELECTIVE COURSES (CHOOSE ANY THREE)

• Modeling for Insight	3 Credits
• Big Data Processing and Cloud Services	3 Credits
• Introduction to Big Data Architecture and Applications*	3 Credits
• Strategic Project Management	3 Credits
• Marketing Research Methods	3 Credits
• Econometrics	3 Credits
• Design of Experiments	3 Credits
• Pattern Recognition	3 Credits
• Stochastic Processes for Engineers	3 Credits
• Artificial Intelligence	3 Credits
• Human Computer Interaction	3 Credits
• Digital Signal Processing	3 Credits
• Computational/Machine Learning	3 Credits

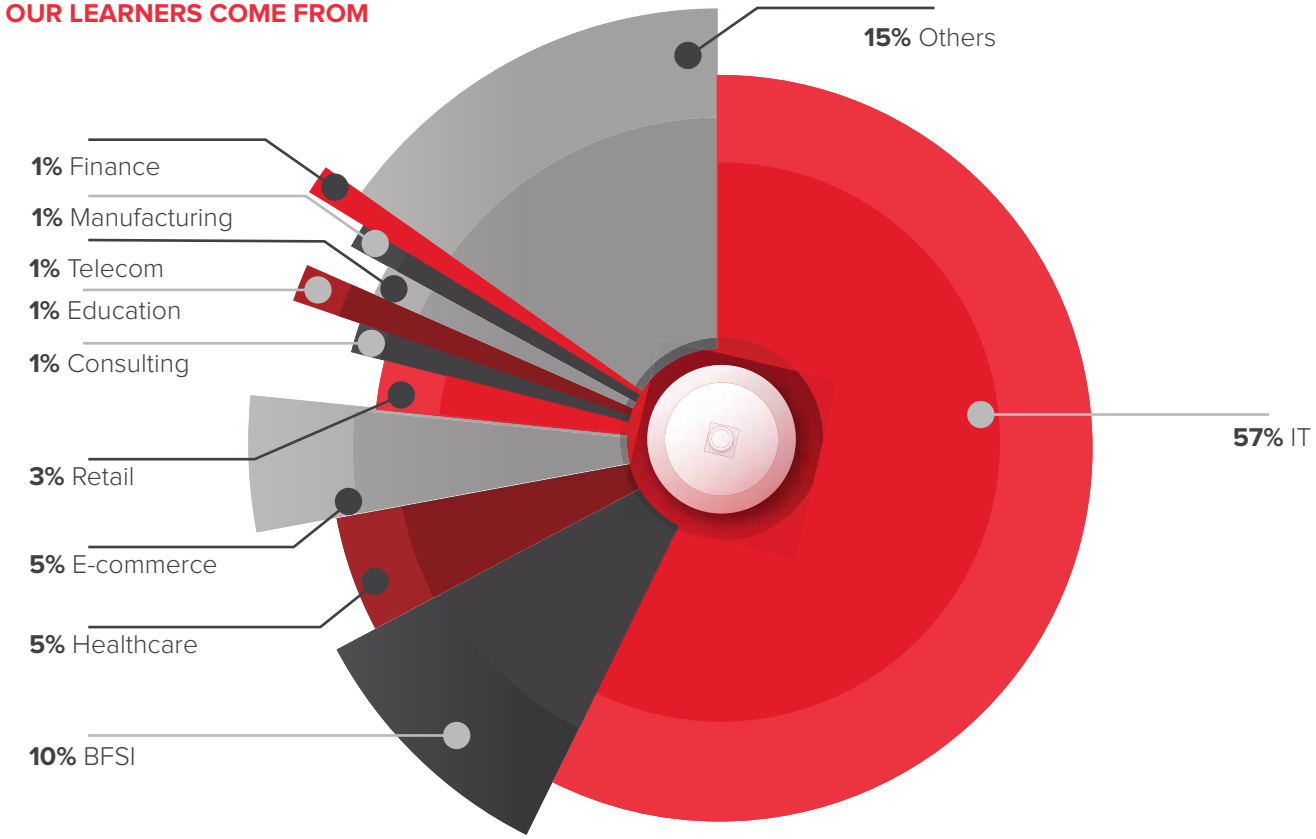
**Courses waived on the basis of IIITB course*

CAPSTONE — 6 CREDIT

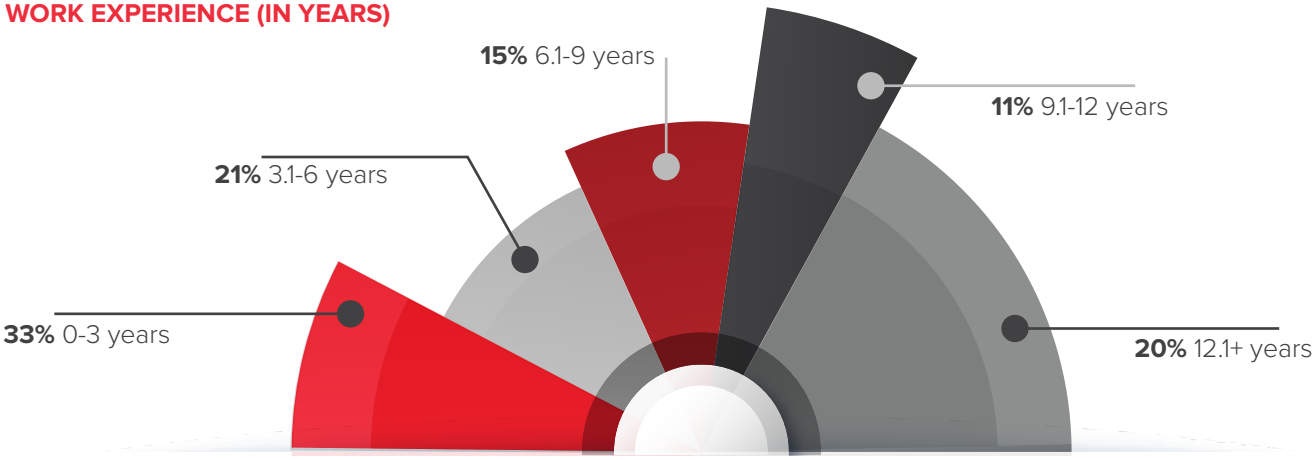
The Capstone Project is a course centered on sponsored data science projects with interdisciplinary teams. Capstone projects, depending on project parameters could consist of a **2-unit seminar with a 4-unit project** and/or be a mentored **capstone of 6 total units**. Depending on the nature of the capstone and its sponsorship, projects could be on-site fieldwork intensive.

MEET
THE CLASS

INDUSTRIES OUR LEARNERS COME FROM



WORK EXPERIENCE (IN YEARS)



A few of the companies our students are from: Accenture, Amazon, Cognizant, Deloitte, Infosys, Microsoft, Wipro, EY, CitiBank, Cisco, Thomson Reuters

Hear from our Learners upGrad Accel Programs

Bharat Rajvanshi 5+ Years of Entrepreneurial Experience

MS Project Management, Clark University

"I decided to trust upGrad with my application to the university. I had the advantage of ***not having to prepare for GRE/GMAT. I also got a scholarship through upGrad***. So during this entire process, everything was taken care of by upGrad. It laid a strong foundation for me. Having more rigorous knowledge through ***upGrad's online model helped me excel in the university*** as well. It also ***helped a lot in getting a part time job (Teaching Assistant)*** on-campus. upGrad has indeed become my lifelong learning partner now."

16+ Years of Work Experience in Data Science & AIML *Lakshmikar Reddy*

MS Artificial Intelligence, Yeshiva University

"I came here after finishing my ***Data Science online modules from upGrad***. The professors help us gain in-depth knowledge. ***They helped us start our research projects in the field of AI. I have done a project on autonomous driving and deep learning techniques*** and an independent study with Prof. Youshan Zhang from the AI department. With his guidance, we shaped the research and got extraordinary results. We received an invitation to ***present our research*** at the Future Technologist Conference in San Francisco. "

Jhanvi Shah 4+ Years of Experience in Finance & Fixed Income Brokerage

MBA Finance, Golden Gate University

"Back in India, I worked for 4 years in the financial market. The ***reason that I opted for upGrad's MBA program through GGU is the course curriculum***. The assignments are so practical. I have matched the course curriculum with multiple universities back home as well. Also, the ***GGU community is so enriching***. The people there are super helpful—the faculty, the people who are working there, and the students. They make you feel at home as soon as you are here! After my graduation, I'm looking for a client-facing advisory role that is going to be based on financial products."

Mohd Umar 4+ Years of Work Experience in Fashion Design

MBA, IU Germany

"I completed my ***first semester online through upGrad without disturbing my work*** and the ***course is really flexible*** and is really a ***good option if you are a working professional***. upGrad has supported me in each and every step, especially my counselor who explained the ***importance of the course and specialization***. Kudos to the upGrad team for working so hard towards making my dream of studying abroad come to reality. I could not have imagined it any other way for this amazing experience. ***Thank you so much upGrad***."

Fresh Graduate ***Rahil***

MS Artificial Intelligence, Yeshiva University

"I applied to ***Yeshiva University through upGrad*** and got accepted. This is my first semester, and I ***got really good grades*** as well. As soon as my first semester got over, I got an opportunity to work under Prof. Youshan Zhang, one of the best professors in Deep Learning at Yeshiva. ***I also got a Research Assistantship part-time job***. Now I'm hoping I'll get some good results, and I'll be able to publish that work and get featured in some of the good research publications as well."

Varshitha M 2+ Years of Experience as a Software Engineer

MS Data Analytics, Clark University

"This was my dream & through upGrad I was able to fulfill it. I chose this program because ***I got 2 courses waived off, a 30% scholarship & 3 years of OPT & Clark has a good ranking***. Through upGrad it was easier for me & they supported me in each and every step, from resume writing until my visa. ***With the strong foundation from upGrad, I also secured TA (Teaching Assistantship) for 2 classes at SPS***. So my entire day goes with my own courses and TAing, my job. I also work on my personal projects because with upGrad's program I learnt that having a very strong base through projects is very important."

UPGRAD ABROAD
ONSHORE ALUMNI BENEFITS

Our support does not end up once you board a flight to your study destination but also continues in the University you join. Once you reach the University, you will be provided following additional support by upGrad Abroad:

- **upGrad Abroad Onshore Buddy**

  Entering a foreign land can be a blissful experience when one knows that someone is always there to assist in attuning to the culture and other important aspects related to the country. With upGrad Abroad courses, the students will be entitled to one such service which is onshore upGrad Abroad buddy.

  As the name suggests, the onshore upGrad Abroad buddy will extend the support in many ways like helping them with the orientation session, arranging the city tours, guiding you with the local visa process, finding the accommodations, city registration, opening a bank account, and other mandatory services.

  Not only this, the onshore buddy will organize insightful sessions on destination country cultures so that the students can easily get along with the local students at the university. The onshore buddy will extend his support in finding part-time work at the university or outside University (if allowed) and providing guidance on how to apply for a post-study work visa / OPT (optional practical training).

- **Extended upGrad Career Services**

  There are also extended career services offered by upGrad Abroad and that include building a strong resume, organizing mock interviews, and providing guidance on the best practices to find onshore jobs.

- **Alumni Portal**

  As an upGrad Abroad student, the students are entitled to access the Alumni portal where they can build a professional network with other upGrad Abroad Alumni for assimilating information related to finding jobs or social integration.

ADMISSION PROCESS

PROGRAM DURATION AND FORMAT

8 months Online | 12 months On-Campus in United States

Program Fee

Please refer to the website for program fee

Eligibility Criteria

Please refer to the website for eligibility criteria

Program Start Dates

Please refer to the website for program start dates

Selection Process

Step 1: Complete Application Form
Fill out an application form Online

Step 2: Get Shortlisted & Received your offer Letter
Our admissions committee will review your profile. Upon qualifying, an offer letter will be sent to you.

Step 3: Block your Seat & Begin the Prep Course
Block your seat with a payment of INR 25,000 to enroll on the programme. Begin with your Prep course and start your Data Analytics journey!

For further details, contact:

admissions@upgrad.com