ANALYTIX LABS

POST GRADUATE DIPLOMA IN DATA SCIENCE

with AI Specialization

Industry-Relevant and Job-Oriented Courses that Get You Hired!

www.analytixlabs.co.in

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About AnalytixLabs

AnalytixLabs is a premier capability building and training solutions firm. It is led by McKinsey, IIM, ISB, and IIT alumni with deep industry experience and a flair for coaching. We endeavor in helping our students acquire and master skills in basic and advanced analytics. Our focus is to enable each student to emerge as an 'Industry-ready' professional and have a successful career through our dedicated placement support. AnalytixLabs has been featured as one of the top institutes numerous times by prestigious publications like Analytics India Magazine and Higher Education Review.

APPROACH

- Outcome-focussed pedagogy
- Practical and application based
- Real Life-like assignments and projects
- Extensive industry network for placements

CONTENT

- Industry-vetted curriculum
- Hands-on projects for every module
- Industry renowned certification
- Business case studies with real-world challenges

FACULTY

- Deep industry experience with a flair for coaching
- 50+ years of cumulative experience with prestigious firms like McKinsey, KPMG, Deloitte, and Facebook
- Strong community networks with peers

BOTTOM LINE

- Job oriented learning
- Continuous career support
- Experiential learning with high ROI

Career path in Analytics & Data Science

Data Science industry is growing by leaps and bounds. Reports show that India alone will capture 32% of the big data market and generate close to USD 20 Billion by 2026. The Covid-19 pandemic caused a seismic shift in shopping and transactions, leading to a huge spike in customer data generation. As a result, tech companies, big and small, opened up doors for skilled data scientists who can help them filter, manage, and make business decisions based on this data.

Roles within the Data Analytics Team

DATA SCIENTIST

Extracting, analyzing and modelling structured & unstructured data for intelligent solutions and decision support.

DATA ANALYST / BUSINESS ANALYST

Review data, analyze, and find meaningful insights for improve business performance.

DATA ARCHITECT / DATA ENGINEER

Design and deploy data infrastructure, and leverage it to extract & process the data for analytics and tech consumption.

AI ENGINEER

Tune and operationalize AI ML models in cloud and deploy them at enterprise scale.

BUSINESS INTELLIGENCE ANALYST

Business reporting and dashboarding for internal and external stakeholders.

TOP SKILLS

- Statistical analysis
- Data visualization
- Data wrangling
- Predictive modeling
- Data blending & manipulation
- Machine Learning
- MIS reporting analytics
- Deep learning and NLP
- Analytical thinking
- Problem-solving approach
- Communication
- Adaptability
- Business acumen
- Critical thinking
- Product understanding
- Team player

CAREER PATH OF A DATA SCIENTIST

- **Entry level: 6-9 LPA**
- **Mid-senior: 20-30 LPA**
- **Senior: 30+ LPA**

COMPANIES RECRUITING BUSINESS ANALYTICS PROFESSIONALS

- TCS
- INFOSYS
- AIRTEL
- ICICI
- HDFC
- FRACTAL ANALYTICS
- MU SIGMA
- EBAY
- AMAZON
- DELOITTE
- SNAPDEAL
- FLIPKART
- MAKEMYTRIP
- TIMES OF INDIA
- REDIFF.COM
- ABSOLUTEDATA

About The Course:

PG Diploma in Data Science with AI Specialization

This PG Diploma in Data Science program is designed for recent graduates and working professionals from across industries and covers an in-depth understanding of the most sought-after tools, techniques, frameworks, algorithms in the Data Science Industry. This program offers different learning paths by choosing specializations like Artificial Intelligence & Deep Learning.

PROGRAM OBJECTIVE

1 TERM 1

- Orientation , Industry Landscape & How to Succeed
- Building Blocks (Basic of Mathematics & Statistics, Fundamentals of Programming) - Optional
- Data Analytics & Visualization using EXCEL & POWER BI
- RDBMS - ETL - SQL for Data Science - Introduction to Cloud Computing
- Descriptive & Inferential Analytics using Python (Python for Data Science)

120 Class Hours + 30 Assessments + 350 Self Study + 18 Credits

2 TERM 2

- Business Problem Solving - Predictive Modelling Using Python
- Machine Learning using Python (Supervised & Forecasting Methods)
- Unsupervised Learning using Python & MLOps (Clustering, PCA, Recommendation systems)

100 Class Hours + 30 Assessments + 320 Self Study + 18 Credits

3 TERM 3

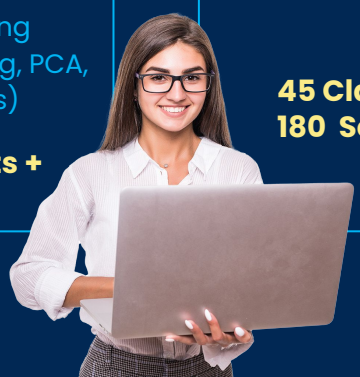
- Text Mining and Natural Language Processing using Python
- Value Proposition of Analytics in Different functions (Marketing, Risk & Operations)
- AI & Deep Learning using Python - Computer Vision, Text Mining - Elective

95 Class Hours + 30 Assessments + 325 Self Study + 18 Credits

4 TERM 4

- Industry Capstone Project work - Dissertation - Final Viva
- Problem Solving (Frameworks, approaches)
- Placement Preparation - Interview Preparation - Mock Interviews

45 Class Hours + 30 Assessments + 180 Self Study + 6 Credits



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TRAINING METHODOLOGY

INSTRUCTION

INTERACTIVE & BLENDED E-LEARNING WITH 1 YEAR ACCESS TO LMS

Blended learning model, encompassing classroom tutorials, interactive live online and e-learning sessions. All students then get access to learning management system for 12 months, keeping in mind the constant upgradation of the courses according to industry standards.

Benefits

- ➔ Classroom tutorials available at Gurgaon, Noida & Bangalore.
- ➔ Interactive online session to learn from industry experts from anywhere.
- ➔ Ease of learning with state of the art learning management portal..

REINFORCEMENT

PRACTICAL HANDS-ON LEARNING

Our training includes variety of job oriented hands-on projects with real business and data challenges. Crafted by experts to keep you ahead of the curve in industry best practices, Our case study based modules ensures that practical learning is reinforced along with the theoretical concepts.

Benefits

- ➔ Latest curriculum, meticulously designed project work
- ➔ Extensive post sessions support is provided for real-world skills,
- ➔ Cost-effective courses with high ROI, making it worth every penny you invest.

PLACEMENTS ASSISTANCE

Our Bootcamp in Data Analytics comes under the AnalytixLabs' promise of dedicated placement assistance program. We enable and focus on training our students for Resume building, Mock interviews & CV referrals. The candidate will be eligible for placement assistance after successful completion of the course & stipulated requirements.

SALARY INSIGHTS

Type of Opportunity	Salary Range (in INR)
Paid Internships	20,000–35,000
Full Time Jobs	4,00,000–24,00,000

Experience Levels	Salary Range (in INR)	% of Hike
1-3 Years	4,00,000 –12,00,000	30% -80%
3-5 Years	6,00,000–12,00,000	25% -50%
5+Years	90,0,000–24,00,000	20%-35%

Our faculty offers dedicated mentoring and support for as long as needed by our students.

Time & Investment

TRAINING DURATION:

Duration: One year

Total Credits: 60 ECTS (European Credit Transfer and Accumulation System)

Hours: 360 Contact hrs + 120 hours Assessments + 1175 Self Study hours

PROGRAM COST:

INR 2,25,000 + 18% GST

12 months EMI available at 0% interest (though education financing partners).

Scholarship available subjected to profile evaluation

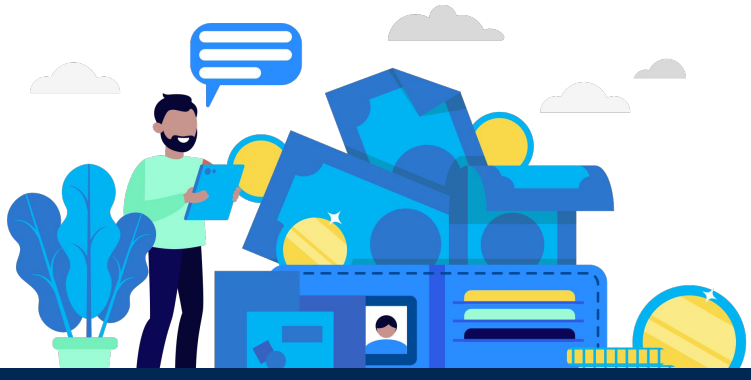
TIMING AND DURATION:

5 days a week, spread across 3 Weekdays + Weekends (Saturday & Sunday)

TRAINING MODE:

- Fully interactive Live Online Class / Classroom (Gurgaon, Bangalore and Noida) - Blended e-Learning with Live Doubt Support and practice bootcamps

In addition to the above, you will also get access to the recordings for future reference and self study.



Projects

EXPERIENTIAL LEARNING

The assignments and case studies are curated using real-life data and problems to ensure that you are equipped with the skills needed for hiring and also deal with the on-job challenges. They cover popular industries and domains to have maximum coverage based on job openings available in the industry.

KEY INDUSTRIES COVERED :

- **Retail / E-commerce**
- **Telecom**
- **Banking, Finance & Insurance**
- **Hospitality**
- **Healthcare**
- **Manufacturing**

KEY SKILLS EMPHASIZED:

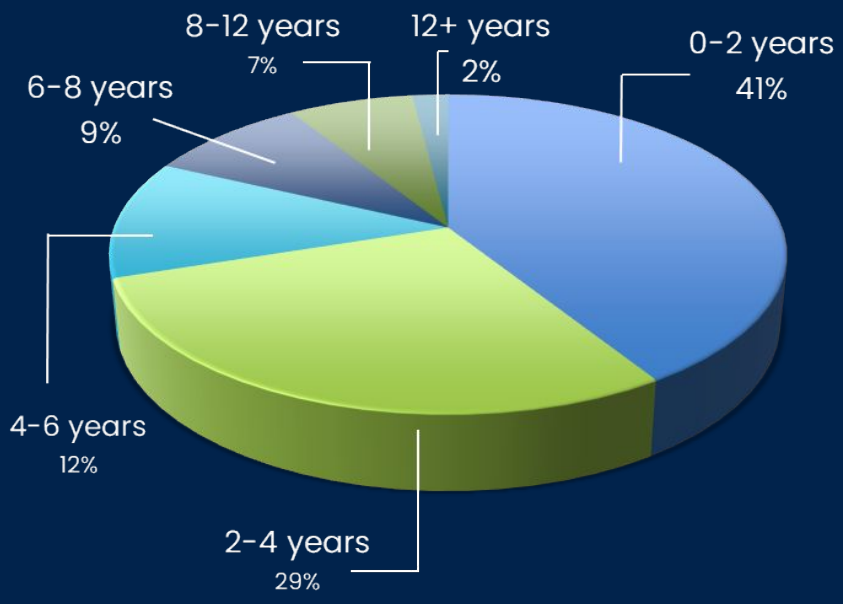
- Data Handling, Manipulation, Preparation
- Data Analytics & Visualization
- Exploratory Data Analysis (Designing KPI's)
- Descriptive Analytics
- Diagnostics Analytics
- Predictive Modeling
- Statistical Analysis
- Machine Learning (Supervised, Unsupervised)
- Text Mining & Natural Language Processing
- Model Deployment
- End to End Data Pipeline Creation
- Deep Learning (Computer Vision, DNLP)
- AI Application Development

Meet The Class

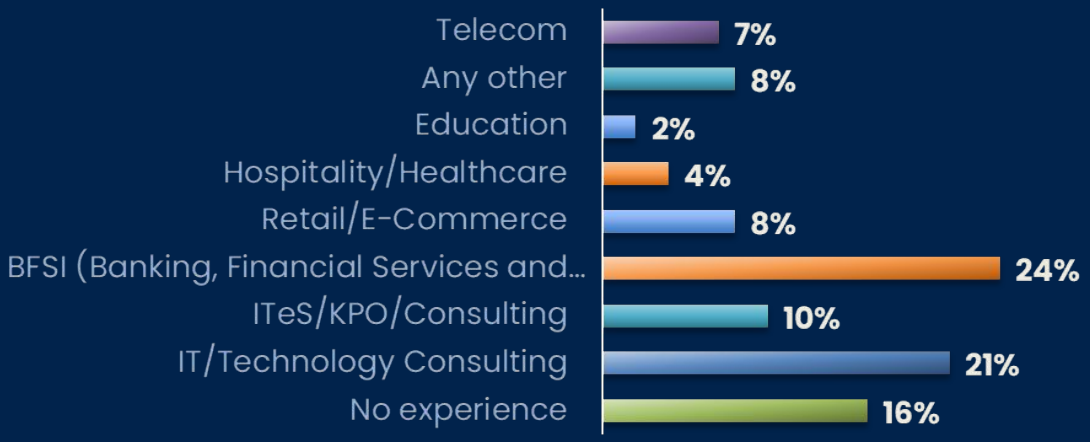
OUR STUDENTS

Work Experience

Our students comprise of beginners as well as highly experienced data science professionals looking to upskill. They are placed into different data science job roles spanning across multiple industries.



INDUSTRY



FUNCTION

What our students have to say?

Sandeep's Story of **Achieving 160% Hike and Becoming a Sr. Analyst**

Shailee Started Her Career in Data Science **after 4 Yrs of Career Break**

A **Successful Data Scientist** after **B.Com - 100% Hike!**

As a former project manager, **Akshi joined EXL as a ML professional**

Mechanical to Data Science - Shubham's striking career shift!

Ankita's Story of **Career Transition in Analytics - 42% Salary Hike!**

ANALYTIX LABS

COURSE SYLLABUS

Master the tools and acquire all the skills through a comprehensive learning model that suits your time and energy. Know everything about the course modules

1. Data Analytics & Visualization using Excel & PowerBI – (1/6)

ECTS (1 ECTS = 25 hours)	6 ECTS
Class Size	40 students
Description Of Course	This course is designed to help anyone to become a successful Data Analyst/business analyst/business intelligence analyst. This power-packed course will teach how to make insightful reports and dashboards through strong focus on case studies to ensure hands-on learning. Once armed with the much-needed skills after this advanced Excel, will also learn the powerful Data visualization tools like Tableau or Power BI to present your analysis using dynamic dashboards and stories. This program further dwells on integrating all these tools to work on various data analytics tasks like data importing, data manipulation, data analysis, and visualization. This course also emphasizes business problem solving, including identification problems, formulation of a problem, understanding of business requirements, types of requirements, frameworks & approaches to solving the problem, identifying & defining KPIs to measure performance across industries and functions, etc.
Reading List: Core And Supplementary	**Core Reading List:** Analytixlabs Reference Material (Class Notes/Codes, PPT etc…). **Supplementary reading:** "**Data Analysis Using SQL and Excel**" by Gordon S. Linoff "**Essentials of Business Analytics**" by Jeffrey D. Camm & James J. Cochran & Michael J. Fry & Jeffrey W. Ohlmann & David R. Anderson "**Communicating data with Tableau : [designing, developing, and delivering data visualizations]"** by Ben Jones "Analyzing and Visualizing Data by Using Microsoft Power BI" by Daniil Maslyuk
Topics List	**Data Analytics & Visualization using Excel** • Excel Environment • Key Terminologies • Short Cuts • Key Functionalities • Copy-paste-paste special • Formatting & conditional Formatting • Basic Excel Functions - Types of Functions • Relational operators • Data Sorting, Filtering and Data Validation • Understanding of Name Ranges • Pivot tables - Charts • Basics of charts

1. Data Analytics & Visualization using Excel & PowerBI – (2/6)

Topics List	

Data manipulation using functions

- Descriptive functions
- Logical functions: IF, and, or, not
- Date and Time functions
- Text functions
- Array functions
- Use and application of lookup functions
- Limitations of lookup functions
- Using Index, Match, Offset, reverse vlookup

Data analysis and reporting

- Data Analysis using Pivot Tables - use of row and column shelf, values and filters
- Difference between data layering and cross tabulation, summary reports, advantages and limitations
- Change aggregation types and summarization
- Creating groups and bins in pivot data
- Concept of calculated fields, usage and limitations
- Changing report layouts - Outline, compact and tabular forms
- Show and hide grand totals and subtotals
- Creating summary reports using pivot tables

Data Visualization in Excel

- Overview of chart types – column/bar charts, line/area , pie, doughnut charts, scatter plots
- How to select right chart for your data
- Creating and customizing advance charts - thermometer charts, waterfall charts, population pyramids

Overview of Dashboards

- What is dashboard & Excel dashboard
- Adding icons and images to dashboards
- Making dashboards dynamic

Create dashboards in Excel - Using Pivot controls

- Concept of pivot cache and its use in creating interactive dashboards in excel
- Pivot table design elements - concept of slicers and timelines
- Designing sample dashboard using Pivot Controls
- Design principles for including charts in dashboards - do's and dont's

Business Dashboard Creation

- Management Dashboard for Sales & Services
- Best practices - Tips and Tricks to enhance dashboard designing

1. Data Analytics & Visualization using Excel & PowerBI – (3/6)

Topics List

Introduction

- Introduction to Power BI
- Components of Power BI
- Installing Power BI Desktop (Signup for Power BI)
- Explore the Power BI Portal
- Various Options in Power BI Desktop
- Views in Power BI Desktop
- Template Apps
- Module Introduction
- Overview of Data Analysis
- Task pipeline when your working on a project

Data Preparation and Modeling

- Connect and Retrieve data from different sources (csv, excel etc.)
- Connecting to Data sources
- Query editor in Power BI
- Power Query for cleaning the data
- Power Query Functions – Text Functions, Date functions, Numeric functions
- Power Query Conditional Columns
- Clean & transform data with Query Editor
- Define data granularity
- Power Query - Combining data – Merging & Appending
- Power Query Other topics – Fill Down in Power BI, Grouping, Transpose, Unpivot, Data Types, Replace errors and values, Keep and Remove rows, Add Remove and Go To Columns
- Work with relationships and cardinality
- Types of Relationships (1:1, 1: Many, Many:1)
- Automatic Relationships update
- Cross Filter direction
- Resolve modeling challenges
- Optimizing for performance
- PBIDS Files

Data Analysis Expressions (DAX)

- Introduction to DAX
- Calculated tables, Columns & Measures
- Calculate
- Time Intelligence in DAX
- Frequently Used DAX functions in Real time (Calendar Functions, Filter Functions, Information functions, Text Functions, Logical Functions, Math functions, Parent & Child functions etc..)
- New DAX functions

1. Data Analytics & Visualization using Excel & PowerBI – (4/6)

Topics List

Reports Development (Visuals in Power BI)

- Introduction to work with Power BI visuals
- Add visualization items to reports
- Create & arrange visualizations
- Reports Development in Power BI
- Working with Different Visuals (Bar Chart, Pie Chart, Donut Chart, etc)
- Formatting Options in Reports
- Sort, copy and paste visualizations
- Use a slicer to filter visualizations
- Working with Filters (Page Level, Include/Exclude, Report Level, Cross report Filter)
- Download & use Custom Visuals from the galery (AI based Visuals, Sunburst Chart, Chord Chart, Sankey Diagram, Ribbon Chart, Goal setting Gauges, Tree maps, Box and Whisker Plot)
- Add an R or Python visual
- Work with key performance indicators
- Project to Implement the learning's

Data Driven Story Reports:

- Introduction to create a data-driven story with Power BI reports
- Design a report layout
- Add buttons, bookmarks, and selections
- Creating Interactive reports with bookmarks
- Design report navigation
- Use basic interactions
- Use advanced interactions and drill through
- Comment on reports
- Tune report performance
- Optimize reports for mobile use

Dashboards:

- Introduction to dashboards
- Configure data alerts
- Explore data by asking questions
- Add a dashboard theme
- Pin a live report page to a dashboard
- Configure a real-time dashboard
- Configure data classification
- Set mobile view

Advanced / Other Power BI Concepts

- Row level Security (Static Row Level Security, User login based row level security, Organizational level security)
- Dynamic Measures
- Dynamic Axis in Charts
- Dynamic Filters
- Power BI Template file
- Wallpapers
- Themes
- Editing the Themes
- Create Custom themes and save them

1. Data Analytics & Visualization using Excel & PowerBI – (5/6)

Topics List

Power BI Analytics:

- Explore statistical summary
- Identify outliers with Power BI visuals
- Group and bin data for analysis
- Apply clustering techniques
- Conduct time series analysis
- Use the Analyze feature
- Use advanced analytics custom visuals
- Review Quick insights
- Apply AI Insights (Enable Crotona for Power BI)

Publishing workbooks and Workspace

- Publishing the Reports & Dashboards
- Share data with Colleagues and Others
- Publish report to the web
- Manage published reports
- Share a dashboard
- Create an app workspace and add users
- Use an app workspace
- Publish an app
- Create a QR code to share a tile
- Embed a report in share point Online
- Get Power BI Desktop data with Power BI Service
- Export a report from Power BI Service to Desktop

Deployment (Power BI Service)*

- Overview of Power BI Service
- Data Gateways
- Enterprise vs Personal Gateway
- Work Spaces
- Content Packs/ Apps
- Schedule Data Refresh
- Incremental refresh of the data
- Power BI Premium
- Live Connections
- Deploy & Processing in Tabular
- SQL Server Agent
- Schedule Processing of Model
- Setting Alerts on the reports

Business problem solving

- Identification of business problem/Defining hypothesis
- Formulation of business problem
- Define & Measure KPI's/KRI's
- Story telling
- Working on various problems across industries

1. Data Analytics & Visualization using Excel & PowerBI – (6/6)

Learning Outcomes	• Learn to formulate the business problems • Understand how to deal with different sources of data, identify right information, right analysis, right visualizations for given analysis etc. • Mastering analytics tools (Excel, Power BI) to perform data analytics tasks including data importing, data understanding, data manipulation, data analysis, data visualization etc. • Learn to create dynamic/Static Dashboards • Learn to Storytelling based on the analysis & insights Etc.
Hours and Format	**Total hours = 150** Of which, synchronous contact hours = 30 Of which, exam hours = 10 Of which time spent self-directed study = 110
Mode of Assessment	**What are the general submission requirements?** 1. Weekly assessment to check conceptual understand (MCQ based) 2. Submission of assignments & case studies (Mandatory) **What is the final assessment?** Case Study Based assessment + Viva **What % of the final grade is the exam?** 60% + **Any special format for the exam? Any workplace experience?** Web proctored Test

2. RDBMS – ETL – SQL for Data Science – Introduction to Cloud Computing – (1/4)

Ects (1 Ects = 25 Hours)	6 ECTS
Class Size	40 students
Description Of Course	This course is designed to help anyone to become a successful Data Analyst/business analyst/business intelligence analyst/Data Scientist. This power-packed course will teach how to store & extracting data from RDBMS systems using SQL through a strong focus on case studies to ensure hands-on learning. As part of the course, will be focussed on multiple modules including understanding the terminologies related databases, relational databases, data modelling, designing structure of databases, relationships between database objects, data constraints, creation of databases and database objects, ETL Concepts working on various SQL commands like DDL, DML, DCL, DQL etc. Also covers how to optimize SQL queries using advanced concepts like Joins, normalization/de-normalization, indexes, window functions, views, sub queries, stored procedures, cursors, triggers, transactions etc. At the same time, we also discuss on cloud computing, different terminologies related to cloud computing, relational databases in the cloud. At the end, we will discuss how to use SQL efficiently for performing different data science tasks including Analytics file creation (Customer 360 File), data manipulation, exploratory data analysis etc.
Reading List: Core And Supplementary	**Core Reading List:** Analytixlabs Reference Material (Class Notes/Codes, PPT etc…). **Supplementary reading:** "**Data Analysis Using SQL and Excel**" by Gordon S. Linoff "SQL for Data Scientists: A Beginner's Guide for Building Datasets for Analysis" by Renee M.P Teate "SQL for Data Analysis: Advanced Techniques for Transforming Data into Insights" by Cathy Tonimura "Big-Data Analytics and Cloud Computing" by Marcello Trovati, Richard Hill, Ashiq Anjum, Shao Ying Zhu, Lu Liu

2. RDBMS – ETL – SQL for Data Science – Introduction to Cloud Computing – (2/4)

Topics list

RDBMS & Data Analytics with SQL

- Introduction to Relational Database management system. Why SQL?
- A glance at the tool and its advantages and disadvantages
- Understanding Schema, ERDs and Metadata
- Introduction to MS SQL Server
- What is SQL – A Quick Introduction
- Installing MS SQL Server for windows
- Introduction to SQL Server Management Studio
- Understanding basic database concepts
- Getting started

Data based objects creation (DDL Commands)

- Creating databases and tables. Understanding data types
- Inserting values into the table
- Altering table properties
- Introduction to Keys and constraints
- Creating, Modifying & Deleting Tables
- Create Table & Create Index statements
- Drop & Truncate statements – Uses & Differences
- DDL Statements with constraints
- Import and Export wizard to get the data in SQL server from excel files or delimited files

Data manipulation (DML Commands)

- Data Manipulation statements
- Insert, Update & Delete statements
- Select statement – Sub setting, Filters, Sorting. Removing Duplicates, grouping and aggregations etc
- Operators, predicates and built in functions(Top, distinct, Limit)
- Where, Group By, Order by & Having clauses
- SQL Functions – Number, Text, Date, etc
- SQL Keywords – Top, Distinct, Null, etc
- SQL Operators - Relational (single valued and multi valued), Logical (and, or, not), Use of wildcard operators and wildcard characters, etc

Accessing data from Multiple Tables using SELECT

- Append and Joins
- Union and Union All – Use & constraints
- Intersect and Except statements
- Table Joins - inner join, left join, right join, full join
- Cross joins/cartisian products, self joins, natural joins etc
- Inline views and sub-queries & it's types
- Optimizing your work
- Update operations with and without joins

2. RDBMS – ETL – SQL for Data Science – Introduction to Cloud Computing – (3/4)

Topics List

Advanced SQL

- Creating table copy and database copy
- Sub Queries
- Views
- Transactions
- Stored Procedures in SQL
- Crud operations using stored procedures
- Window functions in SQL
- Cursors & Triggers
- Indexes
- Normalization & De-Normalization
- If Exists
- Regular expressions
- Miscellaneous Topics: Rollup and cube

Apply learning's on Business Case study

Introduction to Cloud Computing

- What is Cloud Computing? Why it matters?
- Traditional IT Infrastructure vs. Cloud Infrastructure
- Cloud Companies (Microsoft Azure, GCP, AWS) & their Cloud Services
- Use Cases of Cloud computing
- Cloud based RDBMS Systems (Snowflake, Redshift, Azure SQL server etc.)

Introduction to ETL

- Brief on Data Warehousing
- Data warehousing life cycle
- Data Integration Concepts
- Data Profile and Data Quality Management
- Overview of ETL (Extraction, Transformation, Loading)
- ETL architecture
- Basics of Data Integration and Data cleaner tool

ETL Design considerations

- ETL – a typical architecture
- Dimensional modelling and EDW
- Different Schemas

ETL for large datasets

- Design considerations for handing huge data
- Scalability
- Using distributed computing frameworks

Working with external data

- Working with different file formats
- Working with databases
- Working with real-time data

2. RDBMS – ETL – SQL for Data Science – Introduction to Cloud Computing – (4/4)

Learning Outcomes	• Understand the concepts of ETL • Understand concepts related DBMS, RDBMS and Role of SQL • Mastering SQL tool to perform data analytics/Data Science tasks including data importing, data understanding, data manipulation, analytics file preparation, exploratory data analysis Etc. • Analyze data within a database using SQL • Working with one or multiple tables while data handling • Compare various SQL commands DDL vs DML vs DCL vs. DQL. • How to leverage Advanced SQL concepts to optimize queries • Understanding introduction to Cloud Computing Etc.
Hours and Format	**Total hours = 150** Of which, synchronous contact hours = 30 Of which, exam hours = 10 Of which time spent self-directed study = 110
Mode of Assessment	**What are the general submission requirements?** 1. Weekly assessment to check conceptual understand (MCQ based) 2. Submission of assignments & case studies (Mandatory) **What is the final assessment?** Case Study Based assessment + Viva **What % of the final grade is the exam?** 60% + **Any special format for the exam? Any workplace experience?** Web proctored Test

3. Descriptive & Inferential Analytics using Python (Python for Data Science) - (1/6)

Ects (1 Ects = 25 Hours)	6 ECTS
Class Size	40 students
Description Of Course	As part of this course, we will use python for data analytics including descriptive & inferential analytics. This course also dwell into exploratory data analysis including descriptive statistics (uni-variate (Distribution of data), bivariate analysis (relationships), basic statistical measures), inferential statistics (hypothesis testing and estimation of population etc…) In this course, we also describes on dimension reduction steps, model building & validation approaches. Python, which once was considered a general programming language, has emerged as a shining star of the Data Science world. The key driver is the flexibility it offers for an end-to-end enterprise-wide analytics implementation, including machine learning and AI. No wonder Python for data science has become the industry's preferred choice. This course is designed to help anyone to become master in data analytics tasks. This course will teach how to use python effectively for data analytics and data science tasks like data importing, data exploration, data auditing, data manipulation, data analysis, and data visualization etc. We also dwells into core python programming constructs including syntax rules, data types, operators, data structures, control flow statements, conditional statements, in-built functions, user defined functions, OOP's concepts, various features of different python packages like numpy, pandas, math, re, datetime, os, warnings, matplotlib, seaborn for various tasks.
Reading List: Core And Supplementary	**Core Reading List:** Analytixlabs Reference Material (Class Notes/Codes, PPT's etc…) **Supplementary reading:** "Complete Business Statistics" by Amir D Aezel, Jayavel Soundarapandian "Python Data Science Hand Book: Essential tools for working with data" by Vanderplas. J "Data Analysis and Visualizaiton using Python: Analyze data to create Visualizations for BI Systems" by Embarak.O "Foundations of Data Science" by John Hoperoft and Ravi Kannan

3. Descriptive & Inferential Analytics using Python (Python for Data Science)- (2/6)

Ects (1 Ects = 25 Hours)	6 ECTS
Class Size	40 students
Description Of Course	As part of this course, we will use python for data analytics including descriptive & inferential analytics. This course also dwell into exploratory data analysis including descriptive statistics (uni-variate (Distribution of data), bivariate analysis (relationships), basic statistical measures), inferential statistics (hypothesis testing and estimation of population etc…) In this course, we also describes on dimension reduction steps, model building & validation approaches. Python, which once was considered a general programming language, has emerged as a shining star of the Data Science world. The key driver is the flexibility it offers for an end-to-end enterprise-wide analytics implementation, including machine learning and AI. No wonder Python for data science has become the industry's preferred choice. This course is designed to help anyone to become master in data analytics tasks. This course will teach how to use python effectively for data analytics and data science tasks like data importing, data exploration, data auditing, data manipulation, data analysis, and data visualization etc. We also dwells into core python programming constructs including syntax rules, data types, operators, data structures, control flow statements, conditional statements, in-built functions, user defined functions, OOP's concepts, various features of different python packages like numpy, pandas, math, re, datetime, os, warnings, matplotlib, seaborn for various tasks.
Reading List: Core And Supplementary	**Core Reading List:** Analytixlabs Reference Material (Class Notes/Codes, PPT's etc…) **Supplementary reading:** "Complete Business Statistics" by Amir D Aezel, Jayavel Soundarapandian "Python Data Science Hand Book: Essential tools for working with data" by Vanderplas. J "Data Analysis and Visualizaiton using Python: Analyze data to create Visualizations for BI Systems" by Embarak.O "Foundations of Data Science" by John Hoperoft and Ravi Kannan

3. Descriptive & Inferential Analytics using Python (Python for Data Science)- (3/6)

Topics List	

Python Essentials (Core)

- Overview of Python- Starting with Python
- Why Python for data science?
  - Anaconda vs. python
- Introduction to installation of Python
- Introduction to Python IDE's(Jupyter,/Ipython)
- Concept of Packages - Important packages
  - NumPy, SciPy, scikit-learn, Pandas, Matplotlib, etc
- Installing & loading Packages & Name Spaces
- Data Types & Data objects/structures (strings, Tuples, Lists, Dictionaries)
- List and Dictionary Comprehensions
- Variable & Value Labels – Date & Time Values
- Basic Operations – Mathematical/string/date
- Control flow & conditional statements
- Debugging & Code profiling
- Python Built-in Functions (Text, numeric, date, utility functions)
- User defined functions – Lambda functions
- Concept of apply functions
- Python – Objects – OOPs concepts
- How to create & call class and modules?

Operations with NumPy (Numerical Python)

- What is NumPy?
- Overview of functions & methods in NumPy
- Data structures in NumPy
- Creating arrays and initializing
- Reading arrays from files
- Special initializing functions
- Slicing and indexing
- Reshaping arrays
- Combining arrays
- NumPy Maths

Overview of Pandas

- What is pandas, its functions & methods
- Pandas Data Structures (Series & Data Frames)
- Creating Data Structures (Data import – reading into pandas)

3. Descriptive & Inferential Analytics using Python (Python for Data Science)- (4/6)

Topics List

Cleansing Data with Python

- Understand the data
- Sub Setting / Filtering / Slicing Data
  - Using [] brackets
  - Using indexing or referring with column names/rows
  - Using functions
  - Dropping rows & columns
- Mutation of table (Adding/deleting columns)
- Binning data (Binning numerical variables in to categorical variables)
- Renaming columns or rows
- Sorting (by data/values, index)
  - By one column or multiple columns
  - Ascending or Descending
- Type conversions
- Setting index
- Handling duplicates /missing/Outliers
- Creating dummies from categorical data (using get_dummies())
- Applying functions to all the variables in a data frame (broadcasting)
- Data manipulation tools(Operators, Functions, Packages, control structures, Loops, arrays etc.)

Descriptive data Analysis using Python

- Exploratory data analysis
- Descriptive statistics, Frequency Tables and summarization
- Uni-variate Analysis (Distribution of data & Graphical Analysis)
- Bi-Variate Analysis(Cross Tabs, Distributions & Relationships, Graphical Analysis)

3. Descriptive & Inferential Analytics using Python (Python for Data Science)- (5/6)

Topics List	

Descriptive Data Analysis - Visualization with Python

- Introduction to Data Visualization
- Introduction to Matplotlib
- Basic Plotting with Matplotlib
- Line Plots
- Area Plots
- Histograms/Density plots
- Bar Charts/Stacked charts
- Pie Charts
- Box Plots
- Scatter Plots
- Panel charts/subplots
- Word Clouds
- Seaborn and Regression Plots

Inferential Analytics using Python (Statistical Methods & Hypothesis Testing)

- Introduction to Inferential Analytics
- Descriptive vs. Inferential Statistics
- What is probability distribution?
- Important distributions (discrete & continuous distributions)

- Deep dive of normal distributions and properties
- Concept of sampling & types of sampling
- Concept of standard error and central limit theorem
- Hypothesis Testing & Applications
- Various Statistical Methods - Z/t-tests (One sample, independent, paired), ANOVA, Correlation and Chi- square

3. Descriptive & Inferential Analytics using Python (Python for Data Science)- (6/6)

Learning Outcomes	• Exploring and Implementing Exploratory Data Analysis • Understanding the concepts of basic statistics including sampling, probability distributions, statistical methods, hypothesis testing etc. • Master in Python for using data analytics related tasks including data importing, data auditing, data manipulation, data analysis, data visualization • Learn to automate the repetitive tasks using python • Learn to use different existing python packages for different tasks • Understanding handling of different types of data Etc.
Hours And Format	**Total hours = 150** Of which, synchronous contact hours = 35 Of which, exam hours = 10 Of which time spent self-directed study = 105
Mode Of Assessment	**What are the general submission requirements?** 1. Weekly assessment to check conceptual understand (MCQ based) 2. Submission of assignments & case studies (Mandatory) **What is the final assessment?** Case Study Based assessment + Viva **What % of the final grade is the exam?** 60% + **Any special format for the exam? Any workplace experience?** Web proctored Test

4. Business Problem Solving – Predictive Modelling Using Python- (1/3)

Ects (1 Ects = 25 Hours)	6 ECTS
Class Size	40 students
Description Of Course	Python, which once was considered a general programming language, has emerged as a shining star of the Data Science world. The key driver is the flexibility it offers for an end-to-end enterprise-wide analytics implementation, including machine learning and AI. No wonder Python for data science has become the industry's preferred choice. This course is designed to help anyone to become master in understanding business problems solving approaches, frameworks to define the problem statements, approach to solve the problems. Also understand the concepts related predictive modelling and implementation of the different algorithms like linear regression, logistic regression using python. This course will teach how to use python effectively for data analytics and data science tasks like exploratory data analysis, predictive modelling etc. This course also emphasis on understanding the stages of end to end predictive modelling projects including pre-modelling, modelling and post modelling. In this course, we also describe on dimension reduction steps, model building & validation approaches.
Reading List: Core And Supplementary	**Core Reading List:** Analytixlabs Reference Material (Class Notes/Codes, PPT's etc…) **Supplementary reading:** "Python Data Science Hand Book: Essential tools for working with data" by Vanderplas. J "Foundations of Data Science" by John Hoperoft and Ravi Kannan
Topics List	**Introduction to Business Problem Solving** • Introduction to Business problem solving • Identification of Business problem using descriptive & diagnostic Analytics • Understanding different KPI's & KRA's • How to convert business problem into statistical problem • Types of business problems • Understand various problems across industries & Functions • Different Frameworks & Approaches while solving business problems

4. Business Problem Solving – Predictive Modelling Using Python- (2/3)

Topics List	

Introduction to Predictive Modeling

- Concept of model in analytics and how it is used?
- Common terminology used in modeling process
- Types of Business problems - Mapping of Algorithms
- Different Phases of Predictive Modeling
- Data Exploration for modeling
- Exploring the data and identifying any problems with the data (Data Audit Report)
- Identify & treat missing/Outliers in the data
- Visualize the data trends and patterns

Data Preparation

- Need of Data preparation
- Data Audit Report and Its importance
- Consolidation/Aggregation - Outlier treatment - Flat Liners - Missing values- Dummy creation - Variable Reduction using Variable Reduction Techniques

Solving Regression problem using OLS Regression

- Introduction - Applications
- Assumptions of Linear Regression
- Building Linear Regression Model
- Understanding standard metrics (Variable significance, R-square/Adjusted R-square, Global hypothesis ,etc)
- Validation of Models (Re running Vs. Scoring)
- Standard Business Outputs (Decile Analysis, Error distribution (histogram), Model equation, drivers etc.)
- Interpretation of Results - Business Validation - Implementation on new data

Solving Classification problem using Logistic Regression

- Introduction - Applications
- Linear Regression Vs. Logistic Regression Vs. Generalized Linear Models
- Building Logistic Regression Model
- Understanding standard model metrics (Concordance, Variable significance, Gini, KS, Misclassification, etc)
- Validation of Logistic Regression Models (Re running Vs. Scoring)
- Standard Business Outputs (Decile Analysis, ROC Curve,
- Probability Cut-offs, Lift charts, Model equation, Drivers, etc)
- Interpretation of Results - Business Validation - Implementation on new data

4. Business Problem Solving – Predictive Modelling Using Python- (3/3)

Learning Outcomes	• Understanding various approaches and frameworks to define business problems and solving approaches. • Understanding how to convert business problem into statistical problems • Exploring and Implementing Exploratory Data Analysis • Understanding Correlation & Regression and visualize them in Python • Learn to build end to end predictive model (with all the stages of modelling) • Understanding Supervised learning through linear & logistic regression • Understanding and implementing Regressors & Classifiers for different data sets
Hours and Format	**Total hours = 150** Of which, synchronous contact hours = 30 Of which, exam hours = 10 Of which time spent self-directed study = 110
Mode of Assessment	**What are the general submission requirements?** 1. Weekly assessment to check conceptual understand (MCQ based) 2. Submission of assignments & case studies (Mandatory) **What is the final assessment?** Case Study Based assessment + Viva **What % of the final grade is the exam?** 60% + **Any special format for the exam? Any workplace experience?** Web proctored Test

4. Machine Learning using Python (Supervised - Forecasting)- (1/3)

Ects (1 Ects = 25 Hours)	6 ECTS
Class Size	40 students
Description Of Course	Machine Learning is a key to analyse the data in businesses. Machine learning engines enable intelligent systems which help to take decisions faster. At the same time machine learning methods help unlocking the information in our DNA and make sense of the flood of information gathered from various data sources. This course provides an in-depth of understanding to the fundamental methods at the core of modern machine learning. It covers theoretical foundations as well as essential algorithms. As part of the course, covering various foundations of machine learning including bias, variance, over fitting, under fitting, hyper parameters, formulating optimization problem, loss functions, optimizers to solve optimization problems etc. Also covers in depth of understanding all the algorithms related supervised, Forecasting
Reading List: Core And Supplementary	**Core Reading List:** Analytixlabs Reference Material (Class Notes/Codes, PPT's etc...) **Supplementary reading:** "Machine Learning" by Tom M. Mitchell "Machine Learning applications using Python: Case Studies from Healthcare, Retail and Finance" by Puneet Mathur "Python Machine Learning Case Studies: Five Case Studies for the data Scientist" By Haroon.D "Python Machine Learning" by Wei-Meng Lee "Practical Time Series Forecasting with R: A Hands-On Guide" by Galit Shmueli & Kenneth C. Lichtendahl Jr
Topics List	**Introduction to Machine Learning** • Applications of Machine Learning • Overview, Traditional vs. ML • Supervised vs Unsupervised Learning vs. Reinforcement Learning • Overall process of executing the ML project • Stages of ML Project • Concept of Over fitting and Under fitting (Bias-Variance Trade off) & Performance Metrics • Concept of feature engineering • Regularization (LASSO, Elastic net and Ridge) • Types of Cross validation (Train & Test, K-Fold validation etc.) • Concept of optimization - Gradient descent algorithm • Loss/Cost & optimization functions • Tuning the parameters • Python libraries suitable for Machine Learning

4. Machine Learning using Python (Supervised - Forecasting)- (2/3)

Topics list

Supervised Learning: Regression problems

- Linear Regression
- Non-linear Regression
- K-Nearest Neighbor
- Decision Trees
- Ensemble Learning - Bagging, Random Forest, Adaboost, Gradient Boost, XGBoost, Catboost, LightGBM
- Support Vector Regressor

Supervised Learning: Classification problems

- Logistic Regression
- K-Nearest Neighbor
- Naïve Bayes Classifier
- Decision Trees
- Ensemble Learning - Bagging, Random Forest, Adaboost, Gradient Boost, XGBoost, catboost, lightGBM
- Support Vector Classifier

Artificial Neural Network

- Overview of Neural Networks
- Activation Functions, hidden layers, hidden units
- Illustrate & Training a Perceptron
- Important Parameters of Perceptron
- Understand limitations of A Single Layer Perceptron
- Illustrate Multi-Layer Perceptron
- Understand Back propagation – Using Example
- Implementation of ANN in Python- Keras

Time Series Forecasting

- What is forecasting?
- Applications of forecasting
- Time Series Components and Decomposition
- Types of Seasonality
- Important terminology: lag, lead, Stationary, stationary tests, auto correlation & white noise, ACF & PACF plots, auto regression, differencing
- Classification of Time Series Techniques (Uni-variate & Multivariate)
- Time Series Modelling & Forecasting Techniques
  - Averages (Moving average, Weighted Moving Average)
  - ETS models (Holt Winter Methods)
  - Seasonal Decomposition
  - ARIMA/ARIMAX/SARIMA/SARIMAX
  - Regression
  - Evaluation of Forecasting Models
- Evaluate risk of deploying algorithmic models
- Evaluate business performance of algorithmic models

4. Machine Learning using Python (Supervised - Forecasting)- (3/3)

Learning Outcomes	• Will be able to learn to build recommendations systems using different techniques like Market Basket Analysis and Collaborative Filtering • Will be able to work on different segmentation problems using like Heuristic & Scientific segmentation and PCA • Learn to foundations of MLOps like GIT & GITHUB, Flask, Cloud computing, JIRA etc. • Learn to Basics of MLOps, benefits and its implementation. • Understand Challenges faced by teams in the current way of handling Machine learning projects. • Understand Importance of MLOps principles in Machine learning projects. • Understand Standards and principles followed in MLOps culture. • Learn to what are continuous integration, continuous delivery and continuous training in MLOps space. • Learn to Various maturity levels associated with MLOps. • Understand MLOps tools stack and various MLOps platforms comparison. • Learn to develop a prototype, deploy, monitor and continuously improve a production-sized ML application.
Hours and Format	**Total hours = 150** Of which, synchronous contact hours = 35 Of which, exam hours = 10 Of which time spent self-directed study = 105
Mode of Assessment	**What are the general submission requirements?** 1. Weekly assessment to check conceptual understand (MCQ based) 2. Submission of assignments & case studies (Mandatory) **What is the final assessment?** Case Study Based assessment + Viva **What % of the final grade is the exam?** 60% + **Any special format for the exam? Any workplace experience?** Web proctored Test

5. Text Mining and Natural Language Processing using Python- (1/2)

ECTS (1 ECTS = 25 hours)	6 ECTS
Class size	40 students
Description of course	Machine Learning is a key to analyse the data in businesses. Machine learning engines enable intelligent systems which help to take decisions faster. At the same time machine learning methods help unlocking the information in our DNA and make sense of the flood of information gathered from various data sources. This course provides an in-depth of understanding to the fundamental methods at the core of modern machine learning. It covers theoretical foundations as well as essential algorithms. As part of the course, we learn how to deal with Text Data to solve various business problems. While we deal with Text data, we also discuss on how to extract data from data sources (websites, social media api's, flat files etc..), text pre-processing (using base python string functions, regular expressions, NLTK etc), vectorisation techniques (Count, TF-IDF, Word embedding's) to convert text into structured data to perform various analysis. Also work on various text mining tasks including text classification, text segmentation, topic mining, exploratory data analysis etc.
Reading List: core and supplementary	Core Reading List: Analytixlabs Reference Material (Class Notes/Codes, PPT's etc...) Supplementary reading: "Machine Learning" by Tom M. Mitchell "Machine Learning applications using Python: Case Studies from Healthcare, Retail and Finance" by Puneet Mathur "Python Machine Learning" by Wei-Meng Lee "Text Analytics with Python: A practical Real-World Approach to Gaining Actionable Insights from your Data" By Dipanjan Sarcar

Topics list	**Introduction to Text Mining**
	• Text Mining - characteristics, trends
	• Text Processing using Base Python & Pandas, Regular Expressions
	  • Text processing using string functions & methods
	  • Understanding regular expressions
	  • Identifying patterns in the text using regular expressions

5. Text Mining and Natural Language Processing using Python- (2/2)

Learning Outcomes	• To be able to apply machine learning algorithms to solve business problems (Un-structure (text) data) across functions and industries • Learn to Identify the objective of the analysis and define the suitable predesigned algorithms, libraries, packages, frameworks, applications to address the objective • To be able to understand the end to end steps to solve problems related text mining using NLP. • Understand of importing data from various sources, cleaning/processing text data using different python packages including NLTK, spacy, textblob, sklearn, re etc.. • To be able to apply machine learning algorithms to solve business problems on Un-structure (text) data) across functions and industries
Hours And Format	**Total hours = 150** Of which, synchronous contact hours = 35 Of which, exam hours = 10 Of which time spent self-directed study = 105
Mode Of Assessment	**What are the general submission requirements?** 1. Weekly assessment to check conceptual understand (MCQ based) 2. Submission of assignments & case studies (Mandatory) **What is the final assessment?** Case Study Based assessment + Viva **What % of the final grade is the exam?** 60% + **Any special format for the exam? Any workplace experience?** Web proctored Test

6. Value Proposition of Analytics in Different functions (Marketing, Risk & Operations) - (1/4)

Ects (1 Ects = 25 Hours)	6 ECTS
Class Size	40 students
Description Of Course	As part of this course, we will primarily focus on various business problems across functions like Marketing, Operations & Risk. As part of the course, we are covering what is marketing function and sub functions of marketing, how analytics playing role in solving various marketing business problems. We are discussing multiple types of marketing analytics like consumer marketing analytics (consumer shoppers insight, survey analytics & brand analytics), customer life time value calculation, customer analytics, analytics across stages of customer life cycle, customer satisfaction, pricing analytics (Business 2 consumers, Business 2 Business), Marketing Return On Investment (market mix modelling), various type of segmentation, prioritizing customers for marketing campaigns, Customer attrition models etc. Also, This course helps in how descriptive, diagnostic, predictive and prescriptive analytics can help organizations make sense of problems related business operations and supply chain areas. We also cover analytics in various functions like Service Operations, Manufacturing & Applications, SCM/Logistics & Applications, Quality & Applications and other functions of supply chain. This course covers the concept of Risk, types of Risk (including credit, corporate, market, operations risk), Credit Risk, data requirements, risk reporting, various types of credit risk models (like PD, LGD and EAD), approach for model building, regulatory models, portfolio risk modelling, model validation and regulatory stress testing etc. Also this course covers Banking products and Risk in Banking including credit risk & operations risk (Fraud analytics)

6. Value Proposition of Analytics in Different functions (Marketing, Risk & Operations) - (2/4)

Reading List: Core And Supplementary	**Core Reading List:** Analytixlabs Reference Material (Class Notes/Codes, PPT's etc…) **Supplementary reading:** "Marketing Analytics-Data Driven Techniques with Microsoft Excel" by Wayne L. Winston "Marketing Data Science" Thomas W. Miller "Marketing Analytics: A Practical Guide to Improving Consumer Insights Using Data Techniques" by Mike Grigsby "Marketing Analytics: Strategic Models and Metrics" by Stephan Sorger "Designing and Managing the Supply Chain concepts, Strategies and Case studies" by D. Simchi-Levi, P. Kaminsky, E. Simchi-Levi, and Ravi Shankar "Credit risk analytics" by Bart Baesens, Daniel Rosch, Harald Scheule
Topics List	**Introduction to Marketing Function** • Marketing – Analytics' Value proposition • Market Research– Branding, Product development • Customer Life cycle management (CRM, Data base marketing etc.) • MROI (Market Mix Modelling, etc) • Pricing – B2B, B2C **Market Research - Analytics** • Survey Design & Types of Survey • Consumer Insights • Brand Equity Analysis • Attitudinal/Strategic Segmentation • Customer Experience **Acquiring new customers** • Measuring and improving campaign effectiveness • Importance of test and control groups • Return on investment **Acquiring new customers** • Optimizing marketing spend • Understand Response Models **Managing existing customers** • Cross-Sell/Up-Sell Analytics • Lifetime Value Calculation • Customer segmentation(RFM, Life Stage, Cluster Analysis)

6. Value Proposition of Analytics in Different functions (Marketing, Risk & Operations) - (3/4)

Topics List	

Retention & Outflow: Keeping good customers

- Churn Modelling
- Value at Risk Modelling
- Customer lifetime value models
- Analysing survey data

MROI-Optimizing Marketing Spend

- Introduction to MROI
- Understanding Marketing and Mix
- Techniques: Market Mix Modelling

Pricing-B2B & B2C

- Value Based Pricing
- Econometric pricing
- Guideline Price Setting
- Price Elasticity/Sensitivity

An Overview of Operation

- Introduction to Operations & Analytics
- Role of Analytics in Operations
- Overview of functions in operations
- Overview Business problems related to operations & role of Analytics
- Overview of Data sources for Operations

Operations analytics: applications for different functions

Operations analytics: Service Operations & Applications

- Customer Experience
- Lean Management
- Sales Transformations
- Customer Care
- Field services

Operations analytics: Manufacturing & Applications

- Improve Operational Efficiencies
- Cost Reduction
- Logistics Analytics
- Overview of Lean & Six sigma concepts

Operations analytics: SCM/Logistics & Applications

- Network Optimization
- Inventory Optimization
- Sourcing & Supply Chain Management
- Distribution Planning: Transportation/Trans-shipment/Vehicle Routing problem
- Assignment
- Scheduling
- Sequencing

6. Value Proposition of Analytics in Different functions (Marketing, Risk & Operations) - (4/4)

Learning Outcomes	• Understand different business functions in Marketing function • Learn to understand value proposition of analytics in different topics • Explain and illustrate how different Tools and Frameworks are used in an integrated manner to solve Strategic Marketing Problems. • Understand various types of business problems related marketing analytics • Understand the use of Analytics in the applications of Business Operations, Supply Chain for Business Competitive Advantages. • Learn to understand what is Risk & Types of Risk • Understand Value proposition of Analytics to identify, Measure and Mitigate the Risk. • Understand the approach for credit risk models, credit risk score cards, model monitoring, stress testing etc.
Hours and Format	**Total hours = 150** Of which, synchronous contact hours = 30 Of which, exam hours = 10 Of which time spent self-directed study = 110
Mode of Assessment	**What are the general submission requirements?** 1. Weekly assessment to check conceptual understand (MCQ based) 2. Submission of assignments & case studies (Mandatory) **What is the final assessment?** Case Study Based assessment + Viva **What % of the final grade is the exam?** 60% + **Any special format for the exam? Any workplace experience?** Web proctored Test

7. AI & Deep Learning using Python - Computer Vision, Text Mining - (1/5)

Ects (1 Ects = 25 Hours)	6 ECTS
Class Size	20-30 students
Description Of Course	Deep Learning has seen significant advancements with companies looking to build intelligent systems using vast amounts of structure/unstructured data. Deep learning is the machine learning technique behind the most exciting capabilities in diverse areas. This course focuses on computer vision (object detection, object localization, object classification, image recognition, image segmentation etc.), Text Mining (Chabot's, natural language processing (text classification, text recommendation, text summarization, machine translation etc.)) and applications in Articial Intelligence. Recent developments in Deep learning have been nothing short of a revolution and have enabled some of the most exciting and powerful applications in the field of Artificial Intelligence. This course focus on practical & task oriented training, you'll gain hands-on, practical knowledge of how to use deep learning with cutting edge python libraries including pytorch, keras, tensorflow, opencv etc. This elective course which will help you to get a break into AI and Deep Learning domain, with one of the most sought-after skills. After successful completion of this course you will master not only the theory, but also learn how it is applied in the industry.
Reading List: Core And Supplementary	**Core Reading List:** Analytixlabs Reference Material (Class Notes/Codes, PPT's etc...) **Supplementary reading:** "Deep Learning with Python" by Francois Chollet "Deep Learning with Python: A Hands-on Introduction" by Nikhil Ketkar "Deep Learning with Applications Using Python" by Navin Kumar Manaswi "Deep Learning with Applications Using Python: Chatbots and Face, Object, and Speech Recognition with Tensorflow & Keras" by Navin Kumar Manaswi

7. AI & Deep Learning using Python - Computer Vision, Text Mining - (2/5)

Topics List

Introduction to AI & Deep Learning (AI)

- Modern era of AI
- Role of Machine learning & Deep Learning in AI
- Hardware for AI (CPU vs. GPU vs. FPGA)
- Software Frameworks for AI & Deep Learning
- Key Industry applications of AI
- What are the Limitations of Machine Learning?
- What is Deep Learning?
- Advantage of Deep Learning over Machine learning
- Reasons to go for Deep Learning
- Real-Life use cases of Deep Learning
- Overview of important python packages for Deep Learning

Introduction to Cloud Computing & Git

- Introduction to Google Colab
- What is Cloud Computing? Why it matters?
- Traditional IT Infrastructure vs. Cloud Infrastructure
- Cloud Companies (IBM, Microsoft Azure, GCP, AWS) & their Cloud Services
- Use Cases of Cloud computing
- Overview of Cloud Deployment Models
- Implementation of ML/DL model in Cloud
- Introduction to git
- Basic git commands hands on
- Recap of Machine Learning

Artificial Neural Network

- Introduction to Artificial Neural Networks
- Hidden layers, hidden units
- Illustrate & Training a Perceptron
- Limitations of A Single Layer Perceptron
- Illustrate Multi-Layer Perceptron
- Activation function, Loss Functions
- Understand Forward & Back propagation – Using Example
- Regularization – Types of Regularization
- Normalization
- Different Optimization Technique - Gradient Descent
- Vanishing Gradient
- Batch in ANN - Batch Norm

Introduction to Keras & Pytorch

- How to compose Models in Keras
- Saving and Loading a model with Keras
- Using Tensor Board with Keras
- Intuitively building networks with Keras
- How to compose Models in Pytorch
- Saving and Loading a model with Pytorch
- Intuitively building networks with Pytorch

7. AI & Deep Learning using Python – Computer Vision, Text Mining - (3/5)

Topics List

Computer Vision & Applications
- History of Computer Vision & Application
- Introduction to Convolution
- Multichannel Convolution
- Advanced Convolution Operation
- Batch Norm & GAP
- Implementation of basic network in Keras

Convolution Neural Nets - Architecture - Implementation
- Understanding CNN Architecture
- Regularization
- Dropout
- Different Image Augmentation
- Different Learning Rates
- Activation function
- Implementation

Popular ImageNet models & Transfer Learning
- Introduction to Transfer Learning
- AlexNet,
- VGGNet,
- Resnet,
- ResNext,
- Inception

Computer Vision - Object Detection – Classification – Localization – Object Segmentation
- Object Detection - Localization
- Concept of IOU
- YOLO Model Architecture & Implementation

Computer Vision – Object Segmentation
- Object segmentation & Applications
- RCNN/ Fast RCNN /Faster RCNN

Computer Vision – Face Detection & Recognition
- Face Detection
- Face Tracking
- Face Recognition

Computer Vision - GAN + Auto Encoders
- GAN
- Different GAN Network
- Auto Encoders

7. AI & Deep Learning using Python – Computer Vision, Text Mining - (4/5)

Topics List	

Sequential Data – Language Models - Text Mining

- NLP vs. NLU vs. NLG
- Vectorization using Word Embedding's
- Word2vec and Glove
- RNN/ LSTM/ Bi-LSTM/ GRU

Attention & Introduction to Popular Language Models

- Transfer Learning in Langauge Models
- ULMFiT
- Transformer
- Google's BERT
- Transformer-XL
- OpenAI's GPT-2
- ELMo

Language Models - Applications

- Machine Translation
- Text Classification
- Text Segmentation
- Sentiment Analysis

Sequential Data – Time Series - Forecasting using LSTM

Build Your Own Chatbot

- Introduction to Chatbots
- How chatbots work
- Different Types of Chatbots (FAQ, Conversational)
- Building Conversational chatbots

7. AI & Deep Learning using Python - Computer Vision, Text Mining - (5/5)

Learning Outcomes	• Understand role of Deep Learning in developing Intelligent applications and solutions • Understand the intuition behind ANN's, CNN's, RNN's, RCNN, YOLO, Self-Organizing maps, Auto encoders, BNN's, Re-enforcement learning etc. • Understand how to use various types of python packages/libraries to build deep learning models. • Apply different types of Artificial Neural Networks in practice • Learn how Deep Learning Really works in different business applications including computer vision, natural language processing, sequential data (time series data) etc. • Learn to build end to end deep learning model and deployment of model in the cloud environment • Understand the intuition behind RNN's, LSTM, Bi-LSTM, Re-enforcement learning algorithms etc. • Understand how to use various types of python packages/libraries to build deep learning models for sequential data. • Learn how Deep Learning Really works in different business applications related to natural language processing Etc.
Hours and Format	**Total hours = 150** Of which, synchronous contact hours = 35 Of which, exam hours = 10 Of which time spent self-directed study = 105
Mode of Assessment	**What are the general submission requirements?** 1. Weekly assessment to check conceptual understand (MCQ based) 2. Submission of assignments & case studies (Mandatory) **What is the final assessment?** Case Study Based assessment + Viva **What % of the final grade is the exam?** 60% + **Any special format for the exam? Any workplace experience?** Web proctored Test

8. Industry Capstone Project work - Dissertation - Final Viva (1/3)

Ects (1 Ects = 25 Hours)	6 ECTS
Class Size	40 students
Description Of Course	Industry Based Capstone Project aims to provide the trainees with an opportunity to undertake project work for 200 hours, and provide trainees with realistic project knowledge, skills and experience so as to be 'work ready'. This capstone project gives unique opportunity to demonstrate the ability to conceptualise, research, design, plan and execute a substantial capstone project This module will further equip trainees with the knowledge, abilities and skills of fundamentals of project management, stake holders management, problem solving skills and to bring together learning to that of work organisation new learning opportunities in the workplace. Trainees work with a client to execute work-based projects relevant to their specializations example like Marketing Analytics, Pricing Analytics, Digital Analytics, Risk Analytics, Operations Analytics, Recommendation systems, Computer vision, Natural Language processing projects across industries & domains. Also gives opportunity to work with a supervisor who has defined the task deliverables of the project to be undertaken.
Reading List: Core And Supplementary	**Core Reading List:** Analytixlabs Reference Material (Class Notes/Codes, PPT's etc...) Students are required to read and understand the Industry Project Guidelines **Supplementary reading:** "Beyond the Job Description: How to succeed in the Workplace" by Alva, C.N., & Marbury, C. "Human Relations: Interpersonal Job-Oriented Skills" by Du Brin, A "A Guide to the Project Management Body of Knowledge" by PMI Global Standard "Successful Project Management" by Gido, J., Clements, J., & Baker, R

8. Industry Capstone Project work - Dissertation - Final Viva (2/3)

Topics list	

Introduction to Capstone Project

- What is capstone project?
- Pre-requisites of capstone project?
- Types of capstone Projects
- Features of capstone projects?
- Which projects will be eligible for capstone projects

Analytics Project Management

- Analytics project management framework & steps involved
- Defining Business problem -> Scope the requirements -> Analytics objectives -> Data Gathering -> Data preparation -> Solution (Model) development -> validation -> Implementation (Deployment) -> Tracking & Fine-tuning
- Analytics problem solving
- Understand the data ecosystem
- Identify the right resources, tools, techniques to be used
- Finalize outcome and articulate business value
- Enhancing Analytics solution with Machine Learning
- Managing UAT's and go with Live Scenarios
- How to handle stake holders?
- Work Healthy safety and safe workplace behaviour

Dissertation & Presentations

- Overview of Dissertation
- Key sections in Dissertation
- How to structure Dissertation
- Best practices to writer Dissertation

8. Industry Capstone Project work - Dissertation - Final Viva (3/3)

Learning Outcomes	• Demonstrate industry research skills in delivering feasible work-based projects. • Work efficiently and effectively to complete project-based work integrated learning. • Adapt and apply the knowledge and skills acquired over the core units of the course • Planning and executing a capstone project. • Apply theoretical and practical skills relevant to working in the professional planning environment, including team work. • Reflect on contemporary practice and trends in a course related industry to inform your future practice. • Demonstrate the application of knowledge and skills with a high level of personal • autonomy and accountability while being part of a team-based working environment • Orally present the research background, design, implementation, results and • conclusions to an audience of peers and academic staff
Hours and Format	**Total hours = 150** Of which, synchronous contact hours = 20 Of which, exam hours = 30 Of which time spent self-directed study = 100
Mode of Assessment	**What are the general submission requirements?** Assignment 1 Group report: Project Requirements Analysis and Specification* and Individual Report Assignment 2 Group report: Project plan and preliminary design* and Individual Report Assignment 3 Group report: A report on research undertaken for project planning, and research methods to be used for the next stage of the project* and Individual Report Assignment 4 Group presentations **What is the final assessment?** Project outcome + Dissertation + Presentation + Project Viva **What % of the final grade is the exam?** 60% + **Any special format for the exam? Any workplace experience?** Dissertation + Viva

ANALYTIX LABS

GURUGRAM

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