

Module					Comments		Projects			
Module Name	Purpose (Why this in the course?)	Outcome (What's will the student get if this is finished?)	Topics	Weeks			Title	Description	Skills Used	Module
NS Math Test - 1	The test checks if the student knows basic maths till 10th grade.	If students pass this test, they can skip the <i>Math Foundations: The Basics</i> . Otherwise, they have to compulsorily take <i>Math Foundations: The Basics</i> module.	<i>*Math Foundations: The Basics</i>	-	This test is mandatory and can be given at max twice - once before and once after <i>Math Foundations: The Basics</i> module.  Students who wish to join the sessions of <i>Math Foundations: The Basics</i> module even after passing the test are allowed.		CAPTCHA Generator	We will create a GUI-based project where randomly generated CAPTCHA is shown to the user and the text entered by the user is validated against it.	- Python	<i>* Introduction to Programming using Python</i>  <i>* Problem Solving using Python</i>
Math Foundations: The Basics	The module aims to develop logical and analytical thinking in the students, so that they could solve quantitative problems.	Students should be comfortable with numbers and develop the basic numeric aptitude.	1. Number Systems 2. Percentage, Ratio & Proportion 3. Profit & Loss 4. Simple & Compound Interest 5. Linear Equations 6. Quadratic Equations	1.5	This is a mandatory module for students who couldn't pass <i>NS Math Test - 1</i> in the first attempt.  Once the module is finished, students must pass <i>NS Math Test - 1</i> . If they are unable to do so, they can't proceed with the course.		PDF to TXT Converter	We will create a file-based project where the python script extracts the text from the PDF file and dumps it in the text file.	- Python	
NS Math Test - 2	The test checks if the student knows maths till 12th grade.	Students passing this test would be preferred for ML and DS roles over BA roles.	<i>*Math Foundations: Beyond The Basics</i>	-	This test is mandatory and can be given at max twice - once before and once after <i>Math Foundations: Beyond The Basics</i> module.  Students who wish to join the sessions of <i>Math Foundations: Beyond The Basics</i> module even after passing the test are allowed.		Movie Information Scraper	We will create a terminal based project where the script scrapes the movie data from the webpage when given the movie name.	- Python - Data Scraping	
Math Foundations: Beyond The Basics	The module aims to deliver critical math concepts required for upcoming modules of - a) Probability & Statistics b) Machine Learning c) Deep Learning d) Practical ML and DL	Students should be comfortable with the rigorous treatment of mathematics and data interpretation skills.	7. Permutation & Combination 8. Sequence & Series 9. Set Theory 10. Relations & Functions 11. Limits & Derivatives 12. Integration 13. Matrices & Determinants 14. Data Interpretation	2.5	This is an optional module but it is highly recommended for the student.		Netflix Content Analysis	We will analyse the netflix content to understand which genre is trending, what type of content has been added over the years, does the viewership increase because of the newly added content, what is the average watchtime of the customers, etc.	- Python - Data Analysis & Visualisation in Py	<i>* Data Analysis using Python</i>
Introduction to Programming using Python	The module aims to teach students Python programming language as analysts use it almost all the time while working with data. Machine Learning Engineers and Data Scientists work with advanced libraries like Tensorflow, Keras, Sklearn, etc., using Python.	Students should be well-versed with the programming concepts and the syntax of Python programming language.	1. Introduction to Python 2. Control Statements 3. Data Types 4. Dynamic Typing 5. Functions 6. Input & Output 7. Modules 8. Classes & Objects 9. Exception Handling 10. File Handling 11. Packages 12. Static & Class Methods 13. Inheritance 14. Decorators	4	At this stage, students could read python codes, understand them but may not be able to come up with their own codes to solve problems.  To facilitate that, we have <i>Problem Solving using Python</i> module.		Indian Startups & Investment Analysis	We will do detailed analysis of the Indian startups and their investments for interpreting the market trend, favorable city, type of startup, etc.	- Python - Data Analysis and Visualisation in Py	
							Sales Data Analysis	Based on the past sales data, we will make insights on the best and worst selling products. We will forecast the sales for making targets. Then we will compare the actual figures achieved with the targets.	- Data Analysis - Forecasting - Chart Visualisation	
Problem Solving using Python	The module aims to develop problem solving skills in students so that they could come up with their approach and eventually translate them into working code.	Given a problem, students should be able to come up with the approach to solve it and eventually write a code for it.	1. Working with built-in Data Structures & Algorithms 2. Working with Text 3. Working with Numbers, Dates & Timestamps 4. Working with Iterators, Generators, Files & Input-Output 5. Data Encoding & Processing	4	During this module, we will cover projects like - * CAPTCHA Generator * PDF to TXT Converter * Movie Information Scraper		Digital Marketing Data Analysis	Of all the ads running on various platforms, we will analyse data like customer retention, engagement, cost per click, conversion rate, etc. We will devise the strategy to optimise the revenue share for each platform.	- Data Analysis - Querying - Data Visualisation	<i>* Business Analytics</i>
Evaluation Test 1	The test checks if the student has learnt Python language and is able to use it properly or not.	Students passing this test are ready to move ahead in this course.	<i>*Introduction to Programming using Python</i> <i>*Problem Solving using Python</i>	-	Students who couldn't pass this test in the first attempt would be given a second chance after revision.  Students who are unable to pass the test for the second time would directly be pushed into Business Analytics module, where they would learn MS Excel and Power BI and get a job based on that.		Course Quality Check	From the data of sessions being conducted in Newton School, we will identify the top courses, top lectures and so on. We will do a quality check if batches are running successfully including sessionwise student-attendance, feedback, instructor quality, etc.	- Data Analysis - Data Preparation - Querying - Dashboarding	
Probability and Statistics	The module aims to make students familiar with the concepts of probability and statistics. Probability is a pre-requisite for understanding many Machine Learning algorithms, whereas Statistics is the soul of Data analysis and processing.	Students should be familiar with concepts of Probability and Statistics.	1. Counting Techniques 2. Basics of Probability 3. Conditional Probability & Bayes' Theorem 4. Random Variables 5. Distribution Functions 6. Correlation, Covariance & Independence 7. Descriptive Statistics 8. Population & Sampling 9. Confidence Intervals 10. Hypothesis Testing	4	-		Stock Data Analysis	From the stock market data of various companies, we will use statistical techniques to analyse & visualise the data. We will define algorithms for identifying buy and sell signals. We will check how much profitable our algorithms are on the data.	- Statistics - Chart Visualisation - Dashboarding	

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Data Analysis using Python	The module aims to teach students - how to work with data in Python. It covers end to end data analysis topics - from manipulating to visualising it.	Students should learn the python libraries necessary for data analysis like numpy and pandas, & for data visualisation like matplotlib and plotly. They should also get familiar with data analysis techniques.	1. Introduction to Jupyter Notebooks 2. Numpy 3. Pandas 4. Basics of Data Processing 5. Plotting & Visualisation using Matplotlib 6. Data Aggregation & Grouping 7. Time Series Data	4	During this module, we will cover projects like - * Netflix Content Analysis * Indian Startups & Investment Analysis		Text Extraction from Images	From the images having English text, we need to detect it and extract it.	- Computer Vision - Machine Learning	* Machine Learning * Deep Learning * Practical ML
Advanced SQL	The module aims to teach students about databases and how to use them. In all the organisations today, data is kept in databases from which BAs, DS's, etc., fetch the data to work on it.	Students should be familiar with the relational databases (tabular data), be able to write queries to get the data in right format and be able to fetch data in python scripts to work with in code using ORM.	1. Introduction to Databases 2. Entities & Relations 3. Introduction to Tables 4. SQL Query Commands 5. SQL Scripts 6. Views 7. Functions 8. Triggers 9. ORM using SQLAlchemy	4	-		Emotion Recognition from facial images	Of the facial images of the people, we will classify the expressions on the face into various categories such as anger, fear, surprise, sadness, happiness, and so on.	- Computer Vision - Machine Learning - Deep Learning	
Evaluation Test 2	The test checks if the student has understood how to fetch, edit and analyse data using Python.	Students passing this test are ready to move ahead in this course.	*Probability and Statistics *Data Analysis using Python *Advanced SQL	-	For these students, we can start placements for 'Data Analyst' roles. To crack these roles, one must know Python, SQL, Statistics and Data Analysis techniques.  Students who are unable to pass this test are anyway progressed to Business Analytics - so that they could learn data analysis without coding.		Sentiment Analysis of the text	Of the customer feedback on the e-commerce website, we will determine if the feedback is positive, negative or neutral.	- Natural Language Processing - Deep Learning	
Business Analytics	The module aims to teach students how to work with data using data analysis & visualisation softwares like Excel and PowerBI. In many organisations, data analysis and visualisation is done using these softwares and not by writing codes from scratch like in Python.	Students should be able to work with data using Excel and Power BI. They should be able to come up with the insights from the data and present them by creating visualisers or dashboards.	1. Introduction to Excel 2. Preparing Data for Analysis 3. PivotTables 4. Visualising Data using Charts 5. Forecasting 6. Introduction to PowerBI 7. Querying Data in PowerBI 8. Calculating Measures using DAX 9. Creating Reports & Visualisations 10. Dashboards	6	During this module, we will cover projects like - * Sales Data Analysis * Digital Marketing Data Analysis * Course Quality Check * Stock Data Analysis		Credit Card Fraud Prediction	From the details of credit card transactions, we will detect the fraudulent transactions by identifying anomalies.	- Exploratory Data Analysis - Machine Learning	
Evaluation Test 3	The test checks if the student has understood data analysis and visualisation using Excel and PowerBI.	Students passing this test are ready to move ahead in this course.	*Business Analytics	-	For these students, we can start placements for 'Business Analyst' & 'Business Intelligence' roles. To crack these roles, one must know SQL, Statistics, Excel and PowerBI.					
Machine Learning	The module aims to teach students the concepts of machine learning. It aims to develop the intuition in students on how data could be used to train computer and automate those tasks.	Students will learn various Machine Learning Techniques and understand the intuition behind it.	1. Introduction to ML 2. The ML flow 3. Introduction to Scikit-learn, Tensorflow & Keras 4. Linear Methods for Regression 5. Linear Methods for Classification 6. Probability Estimation & Dimensionality Reduction 7. Non-linear Methods for Regression 8. Non-linear Methods for Classification 9. Decision Trees 10. Ensemble Method	8	-					
Deep Learning	The module aims to level up the knowledge of student in the domain of Machine learning. The aim is to deliver the advanced concepts of neural networks to solve problems of data prediction and classification, when classical machine learning algorithms fail to produce promising results or are too complex.	Student will learn advanced concepts of Neural Networks.	1. History & Motivation of Deep Learning 2. The Perceptron 3. Introduction to Neural Networks 4. Gradient Descent Algorithms 5. Autoencoders 6. Convolutional Neural Networks 7. Recurrent Neural Networks 8. Encoder-Decoder Models (Basics) 9. Markov Chains (Basics) 10. Generative Adversarial Networks (Basics)	8	-					
Practical ML and DL	Of all the concepts learnt in ML and DL, this module aims to bring them into practical real-world projects which excites everyone!	Student will be able to use ML and DL techniques in real-world problems.	1. Natural Language Processing (Basics) 2. Computer Vision (Basics) 3. Time Series Forecasting (Basics)	4	During this module, we will cover projects like - * Text Extraction from Images * Emotion Recognition from facial images * Sentiment Analysis of the text * Credit Card Fraud Prediction					
Evaluation Test 4	The test checks if the student has understood the concepts of Machine Learning & Deep Learning, and is able to use them to solve problems.	Student passing this test have almost finished the course, with just one project submission to spare.	*Machine Learning *Deep Learning *Practical ML and DL	-	For these students, we can start placement for 'Machine Learning' & 'Data Scientist' roles.					

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Capstone Project	The aim of this project is to see how creative students can get once the entire course is finished. How they mix and match the concepts learnt in order to create the final capstone project	Once the student have submitted the project, they will get the certificate.	-	2	This can be student's most prominent project on the resume.					
Placement Preparation	The module's goal is to offer job-related career guidance.	The student will be ready for the company interview and feel confident about doing well.	1. Resume Prep 2. Soft-skill Improvement 3. Company-specific cracking tips & guidance	4	For students who are not getting placed, this will be additional prep and revision time for them.					
Total				56	14 months course					