TRINITY EDUCATION ALLIANCE COUNCIL

ADVANCED LEARNING & RESEARCH

CONTENTS

The idea behind this education alliance is to bring together a network of professional individuals & firms to utilize their domain expertise and experiences in creating a holistic guidance mechanism for learners.

MULTIPLE BUSINESS FIRMS ACROSS THE GLOBE COME TOGETHER TO CREATE EVERY SINGLE PROGRAM.

AN ALLIANCE LIKE NO OTHER.

CREATED FOR THE INDUSTRY BY THE INDUSTRY

Take your place in the fast-paced industry with Trinity's transformational executive certifications.

Through our unique global input methodology, the Trinity experience provides learners with the best-in-class and real-world experiential learning to prepare them for the ever-changing industry environment.
Every certification is designed to make learners ready for the industry.

1. THE TRINITY EAC CONCEPT

WHY ARE BUSINESSES ALL OVER THE WORLD SPENDING CAPITAL ON TRAINING ?

Formal education fails to encompass the real-world domain specific training, creating the need for specialized true industry training. This has given rise to a host of professional certifications.

Professionals who usually contribute to the domain currently, are the best people to learn from. However, such people cannot be tapped easily for training due to their professional commitments.

Professional level training programs have become all together a different industry in themselves, which keep learners disconnected from the dynamic requirements of real-world businesses. This means that industry does not get professionals as per their expected standards.

Such experts, if hired, need to be paid higher in order to honor their time utilization appropriately, resulting in a higher program fee. This ultimately burdens the learners with a high cost of quality education.

SIMPLICITY IN UNIQUENESS

TRINITY EAC COUNTERS THE PROBLEM USING A SIMPLE CONCEPT:

Instead of a few being burdened, everyone in the industry can contribute little time and effort to design and execute a world-class training. Such a training will result in professionals that match the industry expectations, as their training comes right from the industry. This mode of operating exponentially enhances the career prospects of learners.

Trinity Education Alliance Council creates domain specific networks, the aim of which is to design and execute real-world quality training programs which produces high-octane professionals with the desired attitude and skills. Such an alliance is unmatched in the industry.

> “When the industry comes together for training, learners get a sense of belonging to their future potential employers/partners.”

Kumod Shirkande

- Founder: TRINITY EAC, AI Sciences INC. and Slikun Technologies
- NASA Citizen Scientist

THE TRINITY EAC ADVANTAGE WITH CUTTING-EDGE TECHNOLOGY

01

Learn what's right, what's 'IN' right now. Learn from and learn with professionals who are currently making their valued contributions to the domain. Learn without taking any break from your profession.

02

Be a part of the education alliance. Join a community of a huge number of professionals and businesses. Receive not just updated information about the field but also create/grow your own professional network.

03

Explore the endless possibilities in job prospects, freelancing work and business alliances. Once a part of the Trinity alliance, the whole community can work to get you better opportunities.

04

Challenge yourself with life-size projects after a rigorous coursework. Ensure your knowledge absorption with unlimited projects to practice under the trainer's guidance, upto 1 year after program completes.

05

Your project performance opens the doors to your hiring as a freelancer by Trinity EAC alliance companies. Get paid for showcasing your superior knowledge and implementation skills.

EVERY TRAINING DESIGNED AT TRINITY EAC PROMISES THAT:

- Learners shall be trained with an updated curriculum, most recent case studies and transparent industry insights.
- Learners develop the right professional attitude towards professional career, their domain and the industry at large.
- Learners develop expertise in practically applying concepts learnt, by working on life-size projects.

> "We are committed to honest training…
> Nothing more nothing less !!!"

Dr. Vishal Ghag

- Program Director, Management - TEAC
- Managing Director - Pratibhashala Foundation
- Director - SLIKUN Institute of Management & Technology, Mumbai &
- Director - Slikun School OF Business, London

2. THE TRINITY EAC ADVANTAGE

PROGRAMS OFFERED

Trinity EAC's program designers understand the importance of time. For this reason, all programs are conducted part-time, while you manage your full-time education or job. Additionally, all programs come with an extension period to take care of any uncertainties.

Data Science & AI

- Certified Professional in Data Science and AI (CP-DSAI) — (3 months)
- Executive Post-Graduate in Data Science and AI (EPGP - DSAI) — (8 months)
- Masters Program in Data Science, AI and Quantum Computing (M - DSAIQ) — (12 months)
- Corporate & Group Training Programs — (Customized)

Investment Banking

- Professional Certification in Certified Investment Banking Operations Analyst — (6 months)
- Masters Program in Investment Banking — (12 months)
- Corporate & Group Training Programs — (Customized)

Business Management

- Certified Sales Management Associate — (6 months)
- Certified Business Development Professional — (6 months)
- Masters Program in Business Administration — (15 months)
- Corporate & Group Training Programs — (Customized)

More to launch soon...

MEET THE FOUNDING PARTNERS

AI SCIENCES INC

Technical Training Partner

A company formed with a vision and dedicated to taking the field of data sciences on the next level in Indian IT industry using its unique competencies.
AI Sciences Inc. has designed the Trinity EAC training programs using its expertise to include the most relevant concepts to train learners and fulfill the expectations of their future employers in the domain.

PRATIBHASHALA FOUNDATION

Industry Training Partner

A non-profit organization aimed at providing the best real-world education to learners at lesser than affordable cost, (if not free) thus making higher education viable for all. Pratibhashala Foundation takes care of entire student profile building and management, facilitating industry training, helping them with interview and network building skills to complete 360° development.

SLIKUN TECH LABS

Project Training Partner

A young brand run by veteran IT tech experts works to provide the industry-best technology solutions to its clients. Slikun Tech Labs provides Trinity EAC learners its own projects (live/recent) to make them understand the real-world scenarios and scale of projects in the field of analytics and BI and giving them the confidence to perform in their future jobs.

Become a part of the exponentially developing data industry.

HERE IS WHY...

The field of Data Science is gaining an exponential importance, thereby creating a high demand for data scientists and analysts.

Data Science has already become one of the top 3 careers all over the world and is bound to be the largest in-demand field within the next decade.

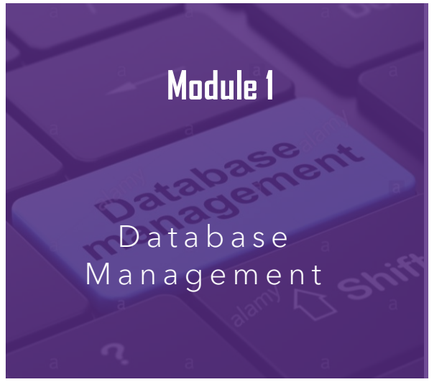
With TEAC's data science programs, develop the critical skill of creating advanced techniques for harnessing the power of data.

Top 3 reasons for learning Data Science

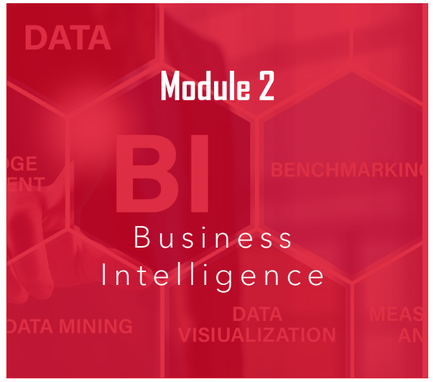
- It is amongst the largest job producing industries in the world. Exponentially increases your career prospects.
- It is beneficial for those who aim to advance their careers as well as those who wish to restart on a new career path.
- Data Analysts can take up a job, work as freelancers or consultants, or set up their own ventures to create a better professional path for themselves.

* The syllabus of all the programs are the same. Focus changes according to the candidate and type of training.

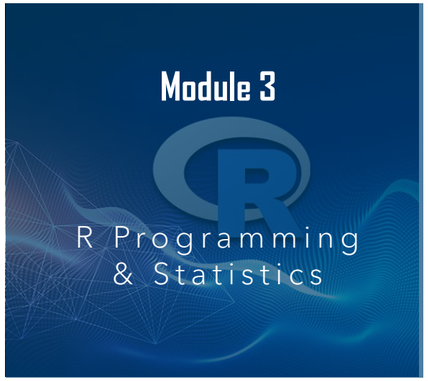
GET TRAINED ON A METICULOUSLY DESIGNED SYLLABUS



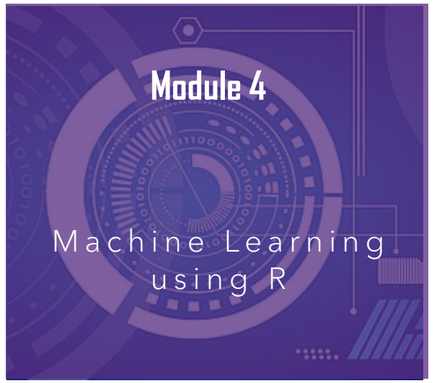
- Database Management Systems
- SQL development
- Data Warehousing
- Data Mining



- Importance of BI
- 3 top different tools in BI
- Industry & Job Market of BI
- Advanced Excel
- Use of excel for descriptive analytics

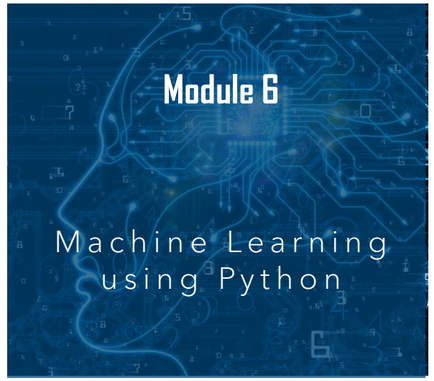


- R Programming & Statistics:
- R Programming Basics
- Statistical Concepts for Machine Learning (Basics of ML)

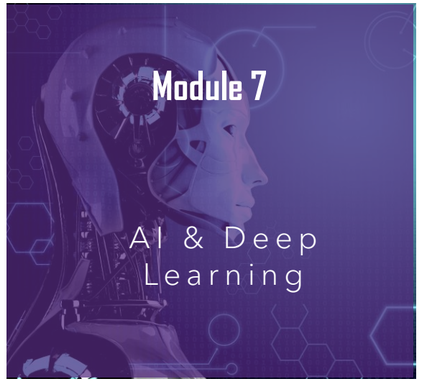


- Predictive Modeling (ML) with R:
- Regression Techniques
- Classification Techniques

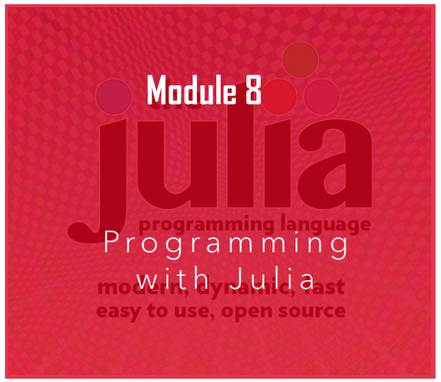
- Python Programming:
- Basics of python programming
- Python Libraries (for Data Science & ML)



- Regression Techniques
- Classification Techniques
- Supervised & Unsupervised Techniques
- Neural Network, Text Mining & Ensemble Methods



- AI, DL & NLP:
- Introduction to AI & Deep Learning
- Deep Learning Algorithms
- Application of AI (Computer Vision, NLP, AV Data)



- Scientific Programming with Julia:
- Basics of Programming in Julia
- Structuring Data and Functions in Julia
- Descriptive and Inferential Statistics

PROFESSIONAL CERTIFICATION PROGRAM

About The Program

This learning path is ideally designed for learners:

- Who are new in the field and are unsure whether data science is the ideal field for them.
- Who have some industry experience but wish to make a career switch.
- Those who can afford to or wish to spend less money until they are sure about the field.
- Who wish to make quickly join the industry and then develop their own knowledge bank.

The entire certification journey is split into 3 levels, classified based on concept complexity and job opportunities. Individuals can start off with CDSA and start their professional journey in the domain. Once they start developing a real-world understanding of analytics and data management, they can gradually move on to higher certifications.

Certified Professional in Data Science and AI (CP-DSAI)

Program Duration:
3 months

Modules: 1 & 2

- DBMS & SQL
- Data Warehousing
- Data Mining
- Business Intelligence
- Advanced Excel, Tableau
- Introduction to R and ML with R
- 3 Capstone Projects

Exam Details:

Exam Type:
- ✓ MCQs: 25 marks
- ✓ Descriptive: 75 marks
- ✓ Project: 100 marks

Minimum Passing Percentage: 80%

Executive PG in Data Science and AI (EPGP - DSAI)

Program Duration:
6-8 months

Modules: 1 to 6

- CP-DSAI plus
- R Programming & Statistics
- Predictive Modeling (ML) with R
- Python Programming
- Predictive Modeling (ML) with Python
- 5 Capstone Projects

Exam Details:

Exam Type:
- ✓ MCQs: 25 marks
- ✓ Descriptive: 75 marks
- ✓ Project: 100 marks

Minimum Passing Percentage: 75%

Masters in Data Science, AI & Quantum Computing (M - DSAIQ)

Program Duration:
12 months

Modules: 1 to 8

- PGP-EX plus
- Artificial Intelligence (AI)
- Deep Learning (DL)
- Natural Language Processing (NLP)
- Scientific Programming with Julia
- Introduction to Quantum Computing
- 9 Capstone Projects

Exam Details:

Exam Type:
- ✓ MCQs: 25 marks
- ✓ Descriptive: 75 marks
- ✓ Project: 100 marks

Minimum Passing Percentage: 70%

EXECUTIVE POST-GRADUATE PROGRAM IN DATA SCIENCE & AI(EPGP-DSAI)

The PGP learning path is ideally designed for those:

- Industry professionals with more than 2 years of experience
- Fresh Graduates with a background of IT/Comps or programming.
- Working Professionals who do not have the time to go for a Masters degree
- Professionals who wish to acquire both knowledge and PG certification in data science

A FAST PACED CASE-STUDY BASED PROGRAM DESIGNED FOR EXPERIENCED LEARNERS

PROGRAM FEES

For Indian Students

INR 90, 000/-

For International Students

$ 1200.00

POST-GRADUATE PROGRAM
PGP-EX
IN DATA SCIENCE

PROGRAM DURATION:
6-8 Months

The PGP-EX is an 8-month practical learning intensive program with a focused case-study based training, specifically targeted towards experienced candidates. The program comes with an inherent 4-month long extension period to ensure that working professionals can honor their professional commitments as well.

This PG equivalent certification program is designed to help experienced professionals to understand the concepts in data science and learn to apply the same to their businesses, thus mastering the skills in applied analytics.

Semester 1 — Modules: 1 & 2

(1.5 months)

- DBMS & SQL
- Data Warehousing
- Data Mining
- Business Intelligence
- Advanced Excel, Tableau
- Introduction to R and ML with R
- 3 Capstone Projects

Exam Details:

Exam Type:

- ✓ MCQs: 25 marks
- ✓ Descriptive: 75 marks
- ✓ Project: 100 marks

Minimum Passing Percentage: 80%

Semester 2 — Modules: 1 to 6

(2 months)

- CP-DSAI plus
- R Programming & Statistics
- Predictive Modeling (ML) with R
- Python Programming
- Predictive Modeling (ML) with Python
- 5 Capstone Projects

Exam Details:

Exam Type:

- ✓ MCQs: 25 marks
- ✓ Descriptive: 75 marks
- ✓ Project: 100 marks

Minimum Passing Percentage: 75%

Semester 3 — Modules: 1 to 8

(2.5 months)

- PGP-EX plus
- Artificial Intelligence (AI)
- Deep Learning (DL)
- Natural Language Processing (NLP)
- Scientific Programming with Julia
- Introduction to Quantum Computing
- 9 Capstone Projects

Exam Details:

Exam Type:

- ✓ MCQs: 25 marks
- ✓ Descriptive: 75 marks
- ✓ Project: 100 marks

Minimum Passing Percentage: 70%

MASTERS PROGRAM IN DATA SCIENCE, AI AND QUANTUM COMPUTING(M-DSAIQ)

ELIGIBILITY:
- Graduate in any discipline or final year of graduation
- Less than 2 years of total experience in any industry

A UNIQUE PROGRAM WITH A YET UNMATCHED OFFERING SPECIALLY DESIGNED FOR FRESH GRADUATES

The Masters program is a very specifically designed course for fresh graduates, who haven't yet been exposed completely to the industry. Freshers need a lot of guidance at the start of their careers in order to ascertain the do's and don'ts of the industry. A lack of orientation poses a big hindrance to their professional journey and must be carefully handled.

The program designers at Trinity EAC understand the problems faces by businesses with inexperienced candidates and a major amount of capital being spent on their orientation & training. To resolve this, the Masters program involves industry training as an intricately woven part of the curriculum. Exposing the learners to the industry beforehand is the only solution.

Blending technical knowhow with industry-oriented skill building, the resulting amalgamation ensures that individuals transform themselves into utter professionals with the right attitude and aptitude. Such individuals can guarantee a better throughput since their thinking is aligned with the company beforehand. This training is unmatched in the industry.

The industry orientation training takes learners on a journey through the real-industry through live interactions, latest technology workshops, interview preparations, on-the-job skills, business understanding, virtual industry visits, internships and a lot more. A holistic professional development the prima facie outcome of the training.

PROGRAM DURATION:
12 + 3 Months

PROGRAM FEES

For Indian Students
INR 1, 10, 000/-

For International Students
$ 1500.00

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6
• Orientation – Introduction to the industry and Data science • DBMS & SQL • Data Warehousing • Data Mining • Business Intelligence • Advanced Excel, Tableau • Exam – Sem 1 • (Viva, MCQs, Descriptive)	• Industry training • Internship Project 1 • Exam – Sem 2 • (Project Report, Viva)	• R Programming & Statistics • Predictive Modeling (ML) with R • Python Programming • Predictive Modeling (ML) with Python • Exam – Sem 3 • (Viva, MCQs, Descriptive)	• Industry training • Internship Project 2 • Exam – Sem 4 • (Project Report, Viva)	• Artificial Intelligence (AI) • Deep Learning (DL) • Natural Language Processing (NLP) • Scientific Programming with Julia • Exam – Sem 5 • (Viva, MCQs, Descriptive)	• Placement training • Problem solving case study • Program designing Case Study • Internship Project 3 • Exam – Sem 6 • (Project Report, Viva)

8. MASTERS PROGRAM DETAILS

CORPORATE & INSTITUTIONAL TRAININGS

Stay Ahead To Stay Alive...

The world is becoming increasingly more data-centric and many organizations are working towards harnessing the power of data. Because corporates have a huge pressure of constantly upgrading the knowledge bank of their employees and management, Trinity EAC also executes its Data Science trainings for all corporate groups. The training modules as well as certifications can be customized according to the unique requirement of the group. TEAC team also guides the groups on real-life projects that they may be undertaking in the company. Programs can be sponsored or self-funded or semi-funded as per mutual agreement between TEAC and the sponsor company.

Data Is The Next Gen Oil...

With the requirement for data science professionals increasing day by day, education institutions are trying harder to inculcate Data Science trainings are collegiate level. To aid their efforts, TEAC offers customized training solutions to universities and colleges. The structure, time period, certification and program fees can all be tailored as per the needs of the institutions.

TEAC offers institutions the flexibility to incorporate external training within their regular curriculum thereby making learning more holistic and career-oriented for students, something which is quite lacking in the context of formal education in developing countries.

A completely customizable training solution offered by TEAC to organizations and educational institutions, aimed at empowering them with the right tools to upgrade their own businesses as well as outperform the competitors.

Partner up with Trinity EAC for projects and training and open up a multitude of opportunities for raising your brand equity in the market.

A DUAL PARTNERSHIP OFFERING

Owing to the huge network of Data Science Professionals and firms operating together with us, TEAC offers a unique offering; to be a partner in training as well as project execution. Both corporate firms as well as education institutions can now partner with TEAC and take up projects from clients in the field of DBMS, BI, Data Analytics and more. Our team can either train you or execute the project on your behalf. TEAC's expertise and experience can prove monumental in up-scaling your brand value in the market.

9. CORPORATE / GROUP TRAININGS

Kumod Shirkande

Founder's Profile

Data, AI & QC Scientist

+91 99307 22498

Kumod.s@gmail.com

Kalyan, Thane, MH

PROFESSIONAL FIGURES

Students Trained in Analytics:

1000+

Projects Delivered in Analytics:

25+

Total Client Count:

45+

KEY HIGHLIGHTS

- Founder - AI Sciences INC,, Trinity Education Alliance Council and SLIKUN Technologies
- Technical Head & HOD (Analytics) - Slikun Institute of Management and Technology, Mumbai.
- Quantum Computing Researcher at IBM Qiskit
- Member - International Astronomical Search Collaboration (IASC)
- Researcher - NASA's Earth and Space Science Project – Sci Starter

PROFESSIONAL ACHIEVEMENTS

- Analysis of Banking & Finance Applications for – ICICI, HDFC, Yes Bank, SBI, Centrum Wealth and EPS
- Core team member of Digital Server Capacity Planning for SONY DADC in Austria and Germany
- IT Operations & Technology Lead for SONY MUSIC's Australia, Europe and India Projects
- Core Team Member of Database Architect & Designing Team of Reserve Bank of India

EDUCATION DETAILS

- Currently, M. Tech. in Quantum Computing – IIT Madras
- Masters in Information Management from K. J. Somaiya Institute of Management Studies & Research, Mumbai.
- Bachelor of Engineering in Computer Science from Shivajirao S. Jondhale CoE, University of Mumbai

Module 1: Database

Introduction to Database Management System
> Database-System Applications
> Purpose of Database Systems
> View of Data
> Database Languages
> Relational Databases
> Database Design
> Data Storage and Querying
> Transaction Management
> Database Architecture
> Data Mining and Information Retrieval

Introduction to Relational Model
> Structure of Relational Databases
> Database Schema
> Keys
> Schema Diagrams
> Relational Query Languages
> Relational Operations

Introduction To SQL
> What is SQL?
> Why SQL?
> What are relational databases?
> SQL command group
> MS SQL Server installation
> Exercises

SQL Data Types & Operators
> SQL Data Types
> Filtering Data
> Arithmetic Operators
> Comparison operators
> Logical Operators
> Exercises

Useful Operations in SQL
> Distinct Operation
> Top N Operation
> Sorting results
> Combine results using Union
> Null comparison
> Alias
> Exercises

Aggregating Data in SQL
> Aggregate functions
> Group By clause
> Having clause
> Over clause

Writing Sub-Queries in SQL
> What are sub-queries?
> Sub-query rules
> Writing sub-queries
> Exercises

Common function in SQL
> Ranking functions
> Date & time functions
> Logical functions
> String functions
> Conversion functions
> Mathematical functions
> Exercises

Analytic Functions in SQL
> What are analytic functions?
> Various analytic functions
> SQL syntax for analytic functions
> Exercises

Writing DML Statements
> What are DML Statements?
> Insert statement
> Update statement
> Delete statement
> Exercises

Writing DDL Statements
> What are DDL Statements?
> Create statement
> Alter statement
> Drop statement
> Exercises

Using Constraints in SQL
> What are constraints?
> Not Null Constraint
> Unique constraint
> Primary key constraint
> Foreign key constraint
> Check constraint
> Default Constraint
> Exercises

SQL Joins
> What are joins?
> Cartesian Join
> Inner Join
> Left & Right Join
> Full Join
> Self Join

Views in SQL
> What are views?
> Create View
> Drop view
> Update view

Introduction to Data Warehouse
> Decision-Support Systems
> Data Warehousing
> Components of a Data Warehouse
> Data Warehouse Schemas

Introduction to Data Mining
> Classification
> Decision-Tree Classifiers
> Support Vector Machines
> Regression
> Association Rules
> Other Types of Associations
> Clustering
> Other Forms of Data Mining
> Data Visualization

Exercises
Case Studies
Problem Solving

Module 2: Business Intelligence

Introduction to Business Intelligence & Visualization
> What is Business Intelligence?
> What is data visualization?
> Need for Visualization
> Uses of visualization

Introduction to Tableau
> What is Tableau
> Tableau vs. Excel
> Installing Tableau Desktop
> Overview of Tableau Desktop
> Various Applications of Tableau
> Components of Tableau Desktop
> Benefits of Tableau and Opportunities
> Tableau Products & Certifications
> Tableau Architecture
> Saving and publishing your work in Tableau

Dive into Tableau
> Explore Tableau Interface
> Understand various Tableau terminologies
> Create Different Views to Analyze Data

Connecting Data Sources
> Connection Options
> Data Types
> Data Roles
> Joins & Over Joins
> Unions
> Custom SQL Query
> Data Blending
> Editing Connections
> Case Studies

Tableau Generated Fields
> Use of Measure Names and Measure Values
> Compare Multiple Measures
> Fetch Number of Records In Database
> Latitude & Longitude Fields
> Case Study

Data Manipulation in Tableau
> Creating Groups
> Creating Combined Fields
> Sorting
> Filtering Data
> Sets
> Binning Data
> Hierarchies

Working with Dates in Tableau
> Changing Date Levels
> Different Date Parts
> Custom Dates
> Create Fiscal Dates

Data Customization with Calculations
> Calculated Fields
> Arithmetic Calculations
> Date Calculation
> String Calculation
> Logical Calculation
> Type Conversion Calculation
> Table Calculation
> Level of Detail Calculations
> String Calculation

Adding Dynamism to a View with Parameters
> Introduction to Parameters
> Create a Parameter
> Explore Parameters
> Use Parameters in Calculations
> Parameters in Reference Lines
> Parameters in Filters
> Make Estimates using Parameters

Geographical Analysis & Maps
> Uses of Geographical or Map View
> Creating a Map view
> Custom Geocoding
> WMS Maps
> Modify Locations

Creating Visualizations
> Bar in Bar Chart
> Scatter Plots
> Histogram
> Heat Maps
> Highlighting in Tables
> Motion Charts
> Pie Chart
> Bullet Chart
> Box & Whisker Plot
> KPI Chart
> Market Basket Analysis Chart
> Pareto Chart
> Waterfall Chart
> Best Practice for Selecting Chart Type

Formatting & Annotation
> Add Titles, Captions & Annotations
> Formatting Options
> Formatting Axes, Mark Labels and Legends

Adding Statistics to Data
> Reference Lines
> Reference Bands
> Distribution Bands
> Trend Lines
> Forecasting
> Clustering
> Summary Card

Dashboards & Stories
> What are Dashboards?
> Why and How are Dashboards Useful?
> Creating an Interactive Dashboard
> Adding Actions to a Dashboard
> Best Practices for Dashboard Design
> What is a Story?
> Creating a Story
> Adding a Background Image to a Story
> Case Studies

Exercises
Case Studies
Problem Solving

Module 3: R Programming & Statistics

Fundamentals of R
> Installation of R & R Studio
> Getting started with R
> Basic & advanced data types in R
> Variable operators in R
> Working with R data frames
> Reading and writing data files to R
> R functions and loops
> Special utility functions
> Merging and sorting data
> Case study on data management using R
> Important R Packages to learn
> Practice assignment

Data visualization in R
> Need for data visualization
> Components of data visualization
> Utility and limitations
> Introduction to grammar of graphics
> Using the ggplot2 package in R to create visualizations

Understanding the data using univariate statistics in R
> Summarizing data, measures of central tendency
> Measures of variability, distributions
> Using R to summarize data
> Case study on Univariate statistics using R

Data preparation and cleaning using R
> Needs & methods of data preparation
> Handling missing values
> Outlier treatment
> Transforming variables
> Derived variables
> Binning data
> Modifying data with Base R
> Data processing with dplyr package
> Using SQL in R

Hypothesis testing and ANOVA in R to guide decision making
> Introducing statistical inference
> Estimators and confidence intervals
> Central Limit theorem
> Parametric and non-parametric statistical tests
> Analysis of variance (ANOVA)
> Conducting statistical tests

Exercises
Case Studies
Problem Solving

Module 4: Machine Learning using R

Correlation and Linear regression
> Correlation
> Simple linear regression
> Multiple linear regression
> Model diagnostics and validation
> Case study

2. Logistic regression
> Moving from linear to logistic
> Model assumptions and Odds ratio
> Model assessment and gains table
> ROC curve and KS statistic
> Case Study

3. Techniques of customer segmentation
> Need for segmentation
> Criterion of segmentation
> Types of distances
> Hierarchical clustering
> K-means clustering
> Deciding number of clusters
> Case study

4. Time series forecasting techniques
> Need for forecasting
> What are time series?
> Smoothing techniques
> Time series models
> ARIMA

5. Decision trees & Random Forests
> What are decision trees
> Entropy and Gini impurity index
> Decision tree algorithms
> CART
> Random Forest
> Case Study

6. Boosting Machines
> Concept of weak learners
> Introduction to boosting algorithms
> Gradient Boosting Machines
> Extreme Gradient Boosting (XGBoost)
> Case study

7. Cross Validation & Parameter Tuning
> Model performance measure with cross validation
> Parameter tuning with grid & randomized grid search

Exercises
Case Studies
Problem Solving

Module 5: Python Programming

Introduction to Machine Learning in Python
> What is machine learning & why is it so important?
> Applications of machine learning across industries
> Machine Learning methodology
> Machine Learning Toolbox
> Tool of choice- Python: what & why?

Introduction to Python
> Installation of Python framework and packages: Anaconda and pip
> Writing/Running python programs using Spyder, Command Prompt
> Working with Jupyter Notebooks> Creating Python variables: Numeric, string and logical operations
> Basic Data containers: Lists, Dictionaries, Tuples & sets

Iterative Operations & Functions in Python
> Writing for loops in Python
> List & Dictionary Comprehension
> While loops and conditional blocks
> List/Dictionary comprehensions with loops
> Writing your own functions in Python
> Writing your own classes and functions as class objects
> PEP 8 guidelines and best practices in python
> Try Except in Python

Data Summary; Numerical and Visual in Python
> Need for data summary
> Summarising numeric data in pandas
> Summarising categorical data
> Group wise summary of mixed data
> Need for visual summary
> Introduction to ggplot & Seaborn
> Visual summary of different data combinations

Data Handling in Python using NumPy & Pandas
> Introduction to NumPy arrays, functions &properties
> Introduction to pandas
> Dataframe functions and properties
> Reading and writing external data
> Manipulating Data Columns

Exercises
Case Studies
Problem Solving

Module 6: Machine Learning using Python

Basics of Machine Learning
> Business Problems to Data Problems
> Broad Categories of Business Problems
> Supervised and Unsupervised Machine Learning Algorithm
> Drivers of ML algorithms
> Cost Functions
> Brief introduction to Gradient Descent
> Importance of Model Validation
> Methods of Model Validation
> Introduction to Cross Validation and Average Error

Generalized Linear Models in Python
> Linear Regression
> Limitation of simple linear models and need of regularization
> Ridge and Lasso Regression (L1 & L2 Penalties)
> Introduction to Classification with Logistic Regression
> Methods of threshold determination and performance measures for classification score models

Tree Models using Python
> Introduction to decision trees
> Tuning tree size with cross validation
> Introduction to bagging algorithm
> Random Forests
> Grid search and randomized grid search
> ExtraTrees (Extremely Randomised Trees)
> Partial Dependence Plots

Boosting Algorithms using Python
> Concept of weak learners
> Introduction to boosting algorithms
> Adaptive Boosting
> Extreme Gradient Boosting (XGBoost)
> Case study
> Home exercise

Support Vector Machines (SVM) and KNN in Python
> Introduction to idea of observation based learning
> Distances and Similarities
> K Nearest Neighbors (KNN) for classification
> Introduction to SVM for classification
> Regression with KNN and SVM
> Case study
> Home exercises

Unsupervised learning in Python
> Need for dimensionality reduction
> Introduction to Principal Component Analysis (PCA)
> Difference between PCAs and Latent Factors
> Introduction to Factor Analysis
> Patterns in the data in absence of a target

> Segmentation with Hierarchical Clustering and K-means
> Measure of goodness of clusters
> Limitations of K-means
> Introduction to density based clustering (DBSCAN)

Neural Networks
> Introduction to Neural Networks
> Single layer neural network
> Multiple layer Neural network
> Back propagation Algorithm
> Moment up and decaying learning rate in context of gradient descent
> Neural Networks implementation in Python

Text Mining in Python
> Quick Recap of string data functions
> Gathering text data using web scraping with url-lib
> Processing raw web data with Beautiful Soup
> Interacting with Google search using url-lib with custom user agent
> Collecting twitter data with Twitter API
> Introduction to Naive Bayes
> Feature Engineering for text Data
> Feature creation with TFIDF for text data

Ensemble Methods in Machine Learning
> Making use of multiple ML models taken together
> Simple Majority vote and weighted majority vote
> Blending
> Stacking

Bokeh
> Introduction to Bokeh charts and plotting

Version Control using Git and Interactive Data Products
> Need and Importance of Version Control
> Setting up git and github accounts on local machine
> Creating and uploading GitHub Repos
> Push and pull requests with GitHub App
> Merging and forking projects
> Examples of static and interactive data products

Exercises
Case Studies
Problem Solving

Module 7: Artificial Intelligence & Deep Learning

Introduction to AI and Deep Learning
> What is AI?
> How will AI change the world?
> What is Deep Learning?
> Uses of Deep Learning?
> Examples of Deep Learning & AI

Introduction to parameter optimisation
> Neural Network representation
> Gradient descent with backpropagation for a generic feedforward network
> Optimisers in deep learning [SGD, SGD with momentum, RMSProp, Adam]
> Understanding difference in optimisers with implementation in python from scratch

Getting Started with Tensorflow
> What is a tensor?
> Setting up Tensorflow and the GPU instance
> Understanding computation graph and basics of Tensorflow
> Implementing simple perceptron in Tensorflow
> Simple linear Regression with Gradient Tape
> Working with Google Collab
> Visualising training with tensor board
> Classification with a deep feedforward network using base Tensorflow and Gradient tape

Unsupervised Deep Learning
> Autoencoders
> Embeddings
> Autoencoders and embeddings implementation
> Generative Adversarial Networks
> GAN Implementation

Deep Feed Forward & Convolutional Neural Networks
> Limitations of simple feed forward networks
> How vision works for humans
> Understanding convolutions, strides, padding, filters.
> Convolutions for extracting features from images
> How receptive fields change in sequence of convolution networks
> Pooling for parameter reductions [max , average , sum]
> Implementing CNN with Tensorflow
> Regularizing with dropout
> Learning rate decay and its effects
> Batch normalisation and its effects

Introduction to Keras
> Basics of Keras
> Getting started with model building in keras
> Sequential and Functional API
> Regularisation with dropout and batch-normalisation
> L1 and L2 penalties on weights
> Weight initialisation [e.g. xavier]
> Model saving and loading
> Data generators and data loaders in keras
> Transfer learning in keras
> Early stopping
> Model checkpoint
> Custom call backs

Sequence to Sequence models with Recurrent Neural Networks, Long-Short Term Memory (LSTM) and Gated Recurrent Unit (GRU)
> Introduction to seq2seq problems
> Intro to RNN architecture
> Backpropagation through time and vanishing gradient
> Modelling sequences
> Limitations of RNNs and data reshaping for RNNs
> Introduction to LSTM
> Univariate times series with LSTM
> Multidimensional time series with LSTM
> Action sequences with LSTM
> Introduction to GRU and implementation on text classification

Deep Learning for Natural Language Processing
> Word embeddings
> How to train and use word2vec
> Fasttext
> Glove
> Bi-Directional RNNs
> Encoder Decoder Architecture
> Attention models
> Transformers
> Context Aware word embeddings with BERT
> GPT-2
> QA models with memory network
> Transformer model on SQUAD
> Custom data QnA with cdqa
> Sentence embeddings
> Text Summarisation

Chatbots with Rasa
> Intention and entities
> Rasa installation and project setup
> NLU data
> Model pipelines
> Dialogue management
> Dialogue Policies

AI Applications: Computer Vision
> Object Detection and Localisation
> Object detection and localisation as combination of classification and regression problem
> RCNN, fastRCNN and Faster RCNN
> Semantic Segmentation, Mask R-CNN
> YOLO, SSD
> Object detection with pre trained models
> Annotating custom data with vott
> Training YOLOv3 for custom data
> Using trained YOLOv3 with a camera
> Face Detection and Recognition
> Face detection with MTCNN
> Face Extraction
> Face embeddings with VGGFace
> Face Recognition

AI Applications: Working with Audio Data
> Audio data processing in python
> Using spectrogram as features for audio data
> Using CNN for audio data
> using 1D CNNs with raw audio data

Image Captioning And Style Transfer
> Image encoding
> Word embeddings
> Hybrid model
> Mapping output to caption
> Revisiting receptive fields
> Using different layers to learn style
> Understanding loss function for style transfer
> Implementation

Exercises
Case Studies
Problem Solving

Module 8: Scientific Programming with Julia

Introduction to Julia Scientific Programming

> Julia version 1.0
> Programming languages and why Julia is special
> Getting Ready: Julia programming environments
> The Julia REPL - Read, Evaluate and Print Loop
> Arithmetical expressions
> Logical expressions
> Julia's Type System
> Variables in Julia
> Functions in Julia
> User-defined functions
> User-defined functions
> Installing Juno using Julia
> Installing Julia Pro
> Practice exercises
> Julia REPL and the notebook
> Arithmetical and logical expressions in Julia
> Types and Arrays in Julia
> Julia functions
> Graded Quiz
> What makes Julia special?

A context for exploring Julia: Working with data

> The Ebola Epidemic of 2014
> Loading data using Julia
> Creating .csv from data tables
> For Loops and Date-Time Formats
> Simple plots with the Plots package
> Multiple curves in a single diagram
> How to do a Peer Graded Assignment
> Data and Loops in Julia
> Plots in Julia

Notebooks as Julia Programs

> Linear Regression Modle in Julia
> Limitation of simple linear models and need of regularisation
> Plotting Data and an Approximately Fitted Line Simultaneously
> Using the Data - fitting the model parameters
> Practicing fitting a circle to data
> 2 practice exercises
> Making simple models
> Models
> Introduction to Classification with Logistic Regression
> Case Studies

Structuring data and functions in Julia

> Using Julia for descriptive statistics
> Installing packages for this lesson
> Creating simulated data
> Descriptive statistics
> Creating a dataframe
> Descriptive statistics
> Visualizing data
> Inferential statistics
> Exporting data as a csv file
> Package installation and troubleshooting in Julia
> Collections
> Functions

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Thank You