

IIT Kharagpur – Virginia Tech Joint Certificate Programme in Business Analytics and Artificial Intelligence

Syllabus:

Module	Topics
Introduction to Business Analytics and Artificial Intelligence	
Prerequisite - Software	Python Anaconda R-Studio MySQL-Along with data dump for Assignment 1 Mongodb-Along with data dump for Assignment 2
Prerequisite - Python	Data types If else Loop Lists Tuples Sets Dictionary Functions Numpy Matplotlib Pandas Scikit-Learn
Structured and Unstructured Databases	Fundamentals of Data Intensive Systems Models for Structured and Unstructured Data Storage and Retrieval of Structured Data Storing and Querying Data using MySQL
Database Projects Due	
Statistics for Business Analytics	Descriptive Statistics Distributions Continuous - Distributions Theory of Probability – Bayes Theorem

	<p>Inference Generation Hypothesis – Testing Linear Regression Multiple Regression Logistic Regression Data Preparation</p>
Exam 1- Statistics	
Business Statistics Project Due	
Classification and Clustering Methods	<p>Types of Learning (Supervised, Unsupervised, RL), the PAC Learning Clustering Feature/Model Selection Clustering Methods k-means Clustering, Hierarchical Clustering Bayes classifier KNN Decision Tree Support Vector Machines (SVM) Ensemble Learning, Bagging and Boosting, Random Forest, SGBost Feature Selection, PCA</p>
Neural Networks, Deep Learning, and Decision Trees	<p>Artificial Neural Networks and Deep Neural Networks: Perception, MLP, CNN, RNN, LSTM Hands-on Pytorch, TensorFlow (Colab/AWS/Azure)</p>
Test 2 – Machine Learning	
Visualization and Storytelling with Data	<p>Data Visualization Storytelling in Data Sciences and AI</p>
Machine Learning Project Due	
Big Data	<p>Big Data and Distributed Databases Storage and Retrieval of Unstructured Data The HDFS File System Review of Hadoop family of technologies Hadoop Technologies in Depth</p>

	Apache Spark Yarn, etc.
Big Data Project Due	
Application Domains and Case Studies	Computer Vision (Fashion Analytics, Autonomous Vehicles) NLP and Sentiment Mining (Customer Reviews and Chatbots, Financial Report Analysis) Time Series modelling (Financial Analytics) Integration with other Technologies (Block Chain) Industry Talk Series
Capstone Project Presentation	