Artificial Intelligence & Machine Learning

	MON	TUE	WED	THU	FRI	ENVIRONMENT
Week 1 **Python**	• Installing Anaconda, Python • Python Spyder IDE • Python basics • Python data structures • Numpy arrays • Indexing • File input/output	• Data frame manipulation • Descriptive statistics • Combining and merging data frames • Removing duplicates • Discretizing and binning • String manipulation • Selection and filtering • Natural language processing basics with Python • NLTK, textblob, Tokenizers • TF-IDF, edit distance • Text preprocessing - stopwords, latent semantic analysis and indexing • Named entity recognizer, Part of speech tagging • ngrams clustering • Word association analysis • Text clustering and categorization, sentiment analysis	• Visualization - plots, charts (line, bar, pie, histograms, scatterplot, parallel coordinates) • Predictive modelling tools & analytics with Python • Case study - kth nearest neighbor algorithm for classification • Lazy learning notation • Computation of distance matrix • The Optimum K value • Data transformations as a preprocessing phase • Model building on training data set • Model validation on testing data set • Evaluation of model • Advantages / disadvantages of KNN models	• Naive Bayes algorithm • Bayesian Theorem • Probabilities - Prior/Posterior • Conditional and Joint Probabilities Notion • Traditional approach - extract important features • Naive approach - independence of features assumption • Data processing - discretization of features • Model building, testing, validation • Advantages/disadvantages of Naive Bayes model	• Case study - Support Vector Machines • Understanding SVMs • Concepts of linearly separable vs non-separable data • Build, train the model • Testing and validation • Tuning the model • Application - credit risk analytics using SVM in Python	

	MON	TUE	WED	THU	FRI	ENVIRONMENT
Week 2 **Linux**	Written evaluation Trainer 1-1 interview • Intro to networking Quality Audit • OSI Model • Transmission basics and networking media • TCP/IP Protocols • Topologies and Ethernet standards • Network hardware • Wireless networking • Network Operating Systems • VoIP • Network security & management	• Enterprise architecture • Business architecture • Data architecture • Application component • Master data management • Clustered or load-balanced environments • Intro to Architecture-driven modernization • Transaction processing architecture • Service Oriented Architecture • Data quality and MDM	• Intro to Linux & OS Installation • Linux boot process • File system hierarchy • Linux distros • Basic linux commands - cd, pwd, touch, cp, grep, find, df, du	• Intro to the cloud • Intro to GCP • VMs in GCP • Storage in the cloud • Apps in the cloud • Developing, deploying, monitoring in the cloud • Big data & ML in the cloud	• Bash scripting & CLI tools • Intro to distributed architecture	
Week 3 **DevOps**	Written evaluation Trainer 1-1 interview Quality Audit • Intro to Docker • Containerization fundamentals • Creating images • Working with volumes • Docker networking basics • Docker swarm • Intro to Kubernetes	• Intro to DevOps • SDLC models • DevOps + Agile • DevOps tools - building a pipeline • Configuration management • CI/CD	• Intro to git and version control • Creating repos, cloning, check-in, committing • Fetch, pull, and remote • Branching	• Spinnaker • Application management and deployment • Pipeline architecture • Deploying Spinnaker using Helm • Configure Spinnaker • Deploy Spinnaker chart	Project 1 • Creating containerized apps with Docker • Intro to Jenkins • Jenkins architecture • Installing, configuring Jenkins • Creating DevOps pipeline with Jenkins	

	MON	TUE	WED	THU	FRI	ENVIRONMENT
Week 4 **AI / ML**	Project 1 Written evaluation Trainer 1-1 interview Quality Audit • Intro to AI - techniques, methods, frameworks, use cases • Intro to Machine Learning - algorithms and use cases	Project 1 • Python libraries - pandas, numpy, matplotlib, scikit-learn • ML algorithms - Regression, classification, clustering, association • Creating a model • Training and test data	Project 1 • Supervised/unsupervised learning • Applications of regression • Types of regression, fitting the line • Applications of classification • Unsupervised learning - clustering • Distance between clusters • k-means algorithm	Project 1 • Intro to Deep Learning • Neural networks - types • Biological vs artificial neuron • Artificial neural network, layers • Reinforcement learning - principles, elements • RL Agent Taxonomy • Hidden Markov Models • Finding hidden states - Viterbi algorithm • Learning and the Baum-Welch algorithm	Project 1 • Natural Language Processing - techniques, components, applications • Tensorflow w/ Keras • Deployment of machine learning models • Saving the model - serialization/deserialization • Creating an API using Flask	
Week 5 **Tensorflow**	Project 1 Written evaluation Quality audit Trainer 1-1 interview • History of tensorflow • Implementing basic graphs • Reducing tensors of arbitrary shape • Graphs, sessions, TensorBoard	Project 1 • Activation functions • Perceptrons - illustration, training, parameters • Tensorflow basics • Graph visualization • Constants, placeholders, variables • Creating a model	Project 1 • Limitations of single perceptrons • Multi-layer perceptrons • Backpropagation algorithm • Understand backprop - neural network • MLP digit classifier using tensorflow • TensorBoard	Project 1 • Restricted Boltzmann machine • Collaborative filtering with RBM • Autoencoders	Project 2 • TFlearn API • Composing models in TFlearn • Sequential composition • Functional composition • Predefined neural network layers • Batch normalization • Saving and loading a model with TFlearn • Customizing the traning process • TensorBoard with TFlearn	

	MON	TUE	WED	THU	FRI	ENVIRONMENT
Week 6 **ML DevOps**	Project 2 • Intro to Kubeflow on Google Kubernetes Engine • Setting up GCP and SDK • Setup environment, download project files, deploy kubeflow	Project 2 • Training workflow • Deployment workflow and strategies • Batch, streaming, and realtime predictions • Ad-hoc predictions via SQL • Airflow scheduler • Docker containers • Amazon SageMaker • MLFlow	Project 2 • Airflow • DAG • Airflow scheduler • DagRun	Project 2 • SeldonCore workflow • Installing SeldonCore • Wrap your model • Define runtime service graph • Deploy and serve predictions • Prepacked model servers	Project 2 • ML Ops Pipeline with Google Cloud Composer • Cloud Composer • Creating Cloud Composer Environment • Create an ML Model • Creating a DAG	
Week 7 **Distributed Tensorflow**	Project 2 Written evaluation Trainer 1-1 interview Quality Audit • Types of parallelism in distributed deep learning • Model and data parallelism • Distributed tensorflow with tf.distribute.Strategy • Supported types of distribution strategies • MirroredStrategy • MultiWorkerMirroredStrategy • ParameterServerStrategy	Project 2 • Working with tensorflow and GPUs • Multiple GPUs and one CPU • Multiple servers	Project 2 • Introduction to distributed deep learning • Parallel computer platforms • Performance metrics • Concurrency in data parallelism training • Synchronous vs asynchronous distributed training • Parameter distribution and communication in synchronous training • Horovod - overview, running distributed Tensorflow • Usage in Estimators	Project 2 • The Yarn workflow • CLI commands • Migrating from npm client • Creating a package • Dependencies & Versions • Configuration • Workspaces • Plug'n'play • Yarn Organization	Project 2 • TensorFlowOnYarn (TonY) • tf-yarn APIs • run_on_yarn • standalone_client_mode • Error reporting • Port reservation race condition • Accessing HDFS in Tensorflow • Mixed CPU/GPU training	
Week 8 **Project 3**	Project 3	Project 3	Project 3	Project 3	Project 3	
Week 9 **Panels / Project 3**	Project 3	Project 3	Project 3	Project 3	Project 3	
Week 10 **Project Showcase**	Project 3	Project 3	Project 3	Project 3		

SIX PHRASE myslate

PROJECT	TECHNOLOGIES
Project 1	Python, DevOps, ML
Project 2	Python, Tensorflow, ML, DevOps, GCP, Docker, Kubernetes
Project 3	Python, TonY, ML, DevOps

SIX PHRASE myslate