

Government of Pakistan

**National Vocational and Technical Training Commission**

**Prime Minister's Hunarmand Pakistan Program**

"Skills for All"



**Course Contents / Lesson Plan**

**Course Title:** Data Science and Analytics (Business Intelligence)

Tags: Mining, AI, BigData, Intelligence

**Duration:** 6 Months

**Revised Edition**

<b>Course Title</b>	<b>Data Science and Analytics (Business Intelligence)</b>
<b>Objective of Course</b>	<p>We are living in the age of data science, and it comes as no surprise that Data Scientist is the number one job on Glassdoor. The abundance of data collected since the beginning of data digitization has provided us with unique opportunities like never before. Designed by industry leaders and top academics, this course on Data Science is for beginners and experts alike. Dive in for a hands-on experience that will familiarize you with the data engineering and mining pipelines.</p> <p>By the end of this course, the trainees should gain the following competencies:</p> <ul style="list-style-type: none"> <li>• Data science toolkit</li> <li>• Data understanding</li> <li>• Exploratory data analysis</li> <li>• Data wrangling and preprocessing</li> <li>• Data modeling</li> <li>• Model deployments</li> <li>• Understanding of theoretical concepts with practical implementations</li> </ul>
<b>Entry-level of trainees</b>	Intermediate
<b>Learning Outcomes of the course</b>	<p>By the end of this course, the trainees should gain the following competencies:</p> <ul style="list-style-type: none"> <li>• Data science toolkit</li> <li>• Data understanding</li> <li>• Exploratory data analysis</li> <li>• Data wrangling and preprocessing</li> <li>• Data modeling</li> <li>• Model deployments</li> </ul> <p>Understanding of theoretical concepts with practical implementations</p>
<b>Course Execution Plan</b>	<p>The total duration of the course: <b>6 months (26 Weeks)</b>  Class hours: <b>4 hours per day</b>  Theory: <b>20%</b>  Practical: <b>80%</b>  Weekly hours: <b>20 hours per week (5 days a week)</b>  Total contact hours: <b>520hours</b></p>
<b>Companies offering jobs in the respective trade</b>	<ol style="list-style-type: none"> <li>1. Software Houses</li> <li>2. Government Institutes</li> <li>3. Upwork</li> <li>4. Freelancing</li> <li>5. Fiverr</li> <li>6. Crossover</li> <li>7. All Private Institutes who are managing software</li> </ol>

<b>Job Opportunities</b>	<p>The role of data scientist is now a buzzworthy career. Sources say by 2024, a shortage of 250,000 data scientists is predicted in the United States alone. The buzz around Machine Learning has spawned a lot of online courses which serves as a good stepping stone for beginners, but the learning curve is steep. The demand for skilled Data Scientists and Machine Learning engineers is not going to decrease. Majority of the learners just scratch the surface of Data Science. Once they get introduced to the highly conceptual Math that is involved in Deep Learning, they give up and leave. The competition is only among a few people who gets their hands dirty and drill deeper into the hard math that enables Machine Learning. The industry roles for data science experts include</p> <ul style="list-style-type: none"> <li>• Machine learning Engineer</li> <li>• Business Analyst</li> <li>• Data Engineer</li> <li>• Big data analyst</li> <li>• Business Analyst</li> <li>• Freelancer (Upwork, Fiverr)</li> </ul>
<b>No of Students</b>	25
<b>Learning Place</b>	Classroom / Lab
<b>Instructional Resources</b>	<p><b>Development Platform:</b></p> <ul style="list-style-type: none"> <li>• <a href="https://github.com/">https://github.com/</a></li> <li>• <a href="https://www.anaconda.com/distribution/">https://www.anaconda.com/distribution/</a></li> <li>• <a href="https://www.jetbrains.com/pycharm/">https://www.jetbrains.com/pycharm/</a></li> <li>• <a href="https://jupyter.org/">https://jupyter.org/</a></li> </ul> <p><b>Learning Material:</b></p> <ul style="list-style-type: none"> <li>• <a href="https://www.udemy.com/topic/data-science">https://www.udemy.com/topic/data-science</a></li> <li>• <a href="https://www.datacamp.com/">https://www.datacamp.com/</a></li> <li>• <a href="https://www.coursera.org/browse/data-science">https://www.coursera.org/browse/data-science</a></li> <li>• <a href="https://www.edx.org/course/subject/data-science">https://www.edx.org/course/subject/data-science</a></li> </ul> <p><a href="https://online-learning.harvard.edu/subject/data-science">https://online-learning.harvard.edu/subject/data-science</a></p>

## MODULES

Scheduled Week	Module Title	Learning Units	Remarks
Week 1	Introduction	<ul style="list-style-type: none"> <li>● <b>Motivational Lecture</b> (For further detail please see Annexure: II)</li> <li>● Introduction to data science</li> <li>● Course applications and use cases</li> <li>● Motivational lecture</li> </ul>	<b>TASK1</b>  <u>Details may be seen at Annexure-I</u>
Week2	Business intelligence	<ul style="list-style-type: none"> <li>● <b>Success stories</b> ( For further detail please see Annexure: III)</li> <li>● Intro to Business intelligence</li> <li>● Business reporting</li> <li>● Using BIRT for BI</li> <li>● PIVOT Tables and charts</li> <li>● Data Visualization                             <ul style="list-style-type: none"> <li>○ Histograms</li> <li>○ Bar charts</li> <li>○ Pie charts</li> <li>○ Box plots</li> <li>○ Density plots etc.</li> </ul> </li> </ul>	<b>TASK2</b>  <u>Details may be seen at Annexure-I</u>
Week3	Data mining with Weka	<ul style="list-style-type: none"> <li>● <b>Motivational Lecture</b> (For further detail please see Annexure: II)</li> <li>● Introduction to Weka</li> <li>● Data Loading in Weka</li> <li>● Data Preprocessing</li> <li>● Pattern finding and analytics</li> </ul>	<b>TASK3</b>  <u>Details may be seen at Annexure-I</u>

<b>Week4</b>	<b>Setting up programming environment</b>	<ul style="list-style-type: none"> <li>● <b>Success stories</b> ( For further detail please see Annexure: III)</li> <li>● Programming introduction</li> <li>● Jupyter notebook</li> <li>● Virtual Environments setup (Anaconda)</li> <li>● Pycharm installation and tutorial (IDE)</li> <li>● Learn to install packages and libraries</li> </ul>	<b>TASK4</b>  <u>Details may be seen at Annexure-I</u>  <b>1<sup>st</sup> Monthly Test at end of month (Week-4)</b>
<b>Week 5</b>	<b>Start to program with python</b>	<ul style="list-style-type: none"> <li>● <b>Motivational Lecture</b> (For further detail please see Annexure: II)</li> <li>● Syntax and semantics</li> <li>● Working with Variables</li> <li>● User input and print statements</li> <li>● String operations</li> <li>● Working with Lists and Arrays</li> <li>● Logical operators</li> <li>● Conditioning statements</li> </ul>	<b>TASK 5</b> <b>TASK 5A</b>  <u>Details may be seen at Annexure-I</u>
<b>Week6</b>	<b>Basic level Programming in python</b>	<ul style="list-style-type: none"> <li>● <b>Success stories</b></li> <li>● ( For further detail please see Annexure: III)</li> <li>● Loops</li> <li>● Functions and parameters</li> <li>● Dictionary</li> <li>● Tuples</li> <li>● Type Casting</li> </ul>	<b>TASK 6</b> <b>TASK 6A</b>  <u>Details may be seen at Annexure-I</u>

		<ul style="list-style-type: none"> <li>• Lambda function</li> <li>• Recursion</li> </ul>	
<b>Week7</b>	<b>Intermediate level Programming in python</b>	<ul style="list-style-type: none"> <li>• <b>Motivational Lecture</b> (For further detail please see Annexure: II)</li> <li>• Object oriented programming</li> <li>• Objects and Classes</li> <li>• Files handling</li> </ul>	<b>Task7</b> <b>Task 7A</b>  <u>Details may be seen at Annexure-I</u>
<b>Week 8</b>	<b>Database</b>	<ul style="list-style-type: none"> <li>• <b>Success stories</b> (For further detail please see Annexure: III)</li> <li>• Intro to Databases</li> <li>• Different types of DBs</li> <li>• DB Normalization</li> <li>• Metadata</li> <li>• Database Lineage and Structure</li> </ul>	<b>TASK8</b>  <u>Details may be seen at Annexure-I</u>  <b>2<sup>nd</sup> Monthly Test at end of month (Week-8)</b>
<b>Week 9</b>	<b>MySql</b>	<ul style="list-style-type: none"> <li>• <b>Motivational Lecture</b> (For further detail please see Annexure: II)</li> <li>• MySql intro</li> <li>• Create, Alter and Drop</li> <li>• Insert, Update, Delete and Truncate</li> <li>• Select, Distinct</li> <li>• where (row filtering)</li> <li>• Case Statements</li> <li>• group by, having</li> </ul>	<b>TASK9</b>  <u>Details may be seen at Annexure-I</u>

		<ul style="list-style-type: none"> <li>• Aggregations</li> </ul>	
<b>Week10</b>	<b>MySql</b>	<ul style="list-style-type: none"> <li>• <b>Success stories</b> ( For further detail please see Annexure: III)</li> <li>• Joins</li> <li>• String Operations and Wild Cards</li> <li>• Null Functions</li> <li>• Union</li> <li>• Stored Procedure</li> <li>• Practice Exercises and Quiz</li> </ul>	<b>TASK10</b>  <u>Details may be seen at Annexure-I</u>
<b>Week11</b>	<b>Statistics</b>	<ul style="list-style-type: none"> <li>• <b>Motivational Lecture</b> ( For further detail please see Annexure: II)</li> <li>• Mean, Median and Mode</li> <li>• Data skewness</li> <li>• Gaussian / normal distributions</li> <li>• Correlation</li> <li>• Standard Deviation and Variance</li> <li>• Outliers and Quartiles</li> </ul>	<b>TASK11</b>  <b>TASK11A</b>  <u>Details may be seen at Annexure-I</u>
<b>Week12</b>	<b>Data preprocessing</b>	<ul style="list-style-type: none"> <li>• <b>Success stories</b> ( For further detail please see Annexure: III)</li> <li>• Missing value analysis</li> <li>• Outliers &amp; anomalies</li> <li>• One hot encoding</li> <li>• Feature engineering</li> <li>• Feature selection</li> <li>• Feature creation</li> <li>• Data standardization</li> <li>• Z score normalization</li> </ul>	<b>TASK12</b>  <u>Details may be seen at Annexure-I</u>  <b>3<sup>rd</sup> Monthly Test at end of month</b>

		<ul style="list-style-type: none"> <li>• Range normalization etc.</li> <li>• Dimensionality reduction</li> <li>• Principle component analysis</li> <li>• Singular value decomposition</li> </ul>	<b>(Week-12)</b>
<b>Week12</b>	<b>Build your CV</b>	<p>Download professional CV template from any good site (<a href="https://www.coolfreecv.com">https://www.coolfreecv.com</a> or relevant)</p> <ul style="list-style-type: none"> <li>• Add Personal Information</li> <li>• Add Educational details</li> <li>• Add Experience/Portfolio</li> <li>• Add contact details/profile links</li> <li>•</li> </ul>	
<b>Week13</b>	<b>Exploratory Data Analysis (EDA)</b>	<ul style="list-style-type: none"> <li>• <b>Motivational Lecture</b> (For further detail please see Annexure: II) <ul style="list-style-type: none"> <li>○ Feature Types</li> <li>○ Visualizing Features</li> <li>○ Handling Missing Values</li> <li>○ Probabilities and odds</li> <li>○ Outlier Detection on Pandas</li> <li>○ Handling Categories</li> <li>○ Visualizing Data using Matplotlib</li> </ul> </li> </ul>	<b>TASK13</b>  <u>Details may be seen at Annexure-I</u>
	<b>Mid-Term Assignment/Exam</b>		
<b>Week14</b>	<b>Web Scraping</b>	<ul style="list-style-type: none"> <li>• <b>Success stories</b> ( For further detail please see Annexure: III)</li> <li>• Data scraping intro</li> <li>• Data scraping tools and techniques</li> <li>• Data scraping practice</li> <li>• Extract, Transform and Load</li> </ul>	<b>TASK14</b>  <u>Details may be seen at Annexure-I</u>



Week15	Working on different data file formats and types	<ul style="list-style-type: none"> <li>● <b>Motivational Lecture</b> (For further detail please see Annexure: II)</li> <li>● Working with Pandas <ul style="list-style-type: none"> <li>○ Querying a DataFrame</li> <li>○ Indexing Dataframes</li> <li>○ Merging DataFrames</li> </ul> </li> <li>● CSV</li> <li>● JSON</li> <li>● XML</li> </ul>	<b>TASK15</b>  <u>Details may be seen at Annexure-I</u>
Week15	Create an account profile on Fiverr (at least two gigs) and Upwork	Create an account by following these steps: Step 1: Personal Info Step 2: Professional Info Step 3: Linked Accounts <ul style="list-style-type: none"> <li>● Step 4: Account Security</li> </ul>	
Week 16	Machine learning	<ul style="list-style-type: none"> <li>● <b>Success stories</b> ( For further detail please see Annexure: III)</li> <li>● Introduction to machine learning</li> <li>● Use cases and applications</li> <li>● Motivation</li> <li>● Classical machine learning</li> <li>● Supervised machine learning <ul style="list-style-type: none"> <li>○ Classification intro</li> <li>○ Regression intro</li> </ul> </li> <li>● Unsupervised machine learning <ul style="list-style-type: none"> <li>○ Clustering intro</li> </ul> </li> </ul>	<b>TASK16</b>  <u>Details may be seen at Annexure-I</u>  <b>4th Monthly Test at end of month (Week-16)</b>

Week 17	Supervised machine learning / Regression	<ul style="list-style-type: none"> <li>● <b>Motivational Lecture</b> (For further detail please see Annexure: II)</li> <li>● Regression <ul style="list-style-type: none"> <li>○ Linear regression</li> <li>○ Polynomial regression</li> <li>○ Multiple regression</li> </ul> </li> </ul>	<b>TASK17</b>  <u>Details may be seen at Annexure-I</u>
Week18		<ul style="list-style-type: none"> <li>● <b>Success stories</b> ( For further detail please see Annexure: III)</li> <li>● Classification <ul style="list-style-type: none"> <li>○ Logistic regression</li> <li>○ Support vector machines</li> <li>○ Naïve Bayes</li> <li>○ K-Nearest neighbor</li> <li>○ Decision Trees</li> </ul> </li> <li>● ML model saving and loading</li> </ul>	<b>TASK18</b>  <u>Details may be seen at Annexure-I</u>
Week 19	Supervised machine learning / Classification	<ul style="list-style-type: none"> <li>● <b>Motivational Lecture</b> (For further detail please see Annexure: II)</li> <li>● Bias vs variance</li> <li>● Train, test split</li> <li>● Train, test, validation split</li> <li>● K-fold cross validation</li> <li>● Hyperparameter tuning</li> </ul>	<b>TASK19</b>  <u>Details may be seen at Annexure-I</u>
Week 20	Supervised machine learning / Classification	<ul style="list-style-type: none"> <li>● <b>Success stories</b> ( For further detail please see Annexure: III)</li> <li>● Model evaluation</li> <li>● Confusion matrix</li> </ul>	<b>TASK20</b>  <u>Details may be seen at Annexure-</u>

		<ul style="list-style-type: none"> <li>• Accuracy, Precision, Recall</li> <li>• F-1 Score</li> <li>• Specificity &amp; Sensitivity</li> <li>• ROC &amp; AUROC</li> <li>• Macro vs Micro averages</li> </ul>	<p>/</p> <p><b>5<sup>th</sup> Monthly Test at end of month (Week-20)</b></p>
<b>Week 21</b>	<b>Employable Project/Assignment (6 weeks i.e 21-26) in addition of regular classes.</b>	<ul style="list-style-type: none"> <li>• <b>Motivational Lecture</b> (For further detail please see Annexure: II)</li> <li>• Guidelines to the Trainees for selection of students employable project like final year project (FYP)</li> <li>• Assign Independent project to each Trainee</li> <li>• A project based on trainee's aptitude and acquired skills.</li> <li>• Designed by keeping in view the emerging trends in the local market as well as across the globe.</li> <li>• The project idea may be based on Entrepreneur.</li> <li>• Leading to the successful employment.</li> <li>• The duration of the project will be 6 weeks</li> <li>• Ideas may be generated via different sites such as:</li> <li>• <a href="https://1000projects.org/">https://1000projects.org/</a></li> <li>• <a href="https://nevonprojects.com/">https://nevonprojects.com/</a></li> <li>• <a href="https://www.freestudentprojects.com/">https://www.freestudentprojects.com/</a></li> <li>• <a href="https://technofizi.net/best-computer-science-and-engineering-cse-project-">https://technofizi.net/best-computer-science-and-engineering-cse-project-</a></li> </ul>	<p><b>TASK21</b></p> <p><u>Details may be seen at Annexure-I</u></p>

		<p>topics-ideas-for-students/</p> <ul style="list-style-type: none"> <li>•</li> <li>• Final viva/assessment will be conducted on project assignments.</li> <li>• At the end of session the project will be presented in skills competition</li> <li>• The skill competition will be conducted on zonal, regional and National level.</li> <li>• The project will be presented in front of Industrialists for commercialization</li> </ul>	
<b>Week22</b>	<b>Supervised machine learning / Deep learning</b>	<ul style="list-style-type: none"> <li>• <b>Success stories</b></li> </ul> <p>( For further detail please see Annexure: III)</p> <ul style="list-style-type: none"> <li>• Neurons</li> <li>• Multi-layer perceptron</li> <li>• Neural networks</li> <li>• Feed forward model</li> </ul>	<b>TASK22</b>  <i><u>Details may be seen at Annexure-I</u></i>
<b>Week22</b>	<b>How to search and apply for jobs in at least two labor marketplace countries (KSA, UAE, etc.)</b>	<ul style="list-style-type: none"> <li>• Browse the following website and create an account on each website <ul style="list-style-type: none"> <li>▪ Bayt.com – The Middle East Leading Job Site</li> <li>▪ Monster Gulf – The International Job Portal</li> <li>▪ Gulf Talent – Jobs in Dubai and the Middle East</li> </ul> </li> <li>• Find the handy ‘search’ option at the top of your homepage to search for the jobs that best suit your skills.</li> <li>• Select the job type from the first ‘Job Type’ drop-down menu, next, select the location from the second drop-down menu.</li> <li>• Enter any keywords you want to use to find suitable job vacancies.</li> <li>• On the results page you can search for part-time jobs only, full-time jobs only, employers only, or agencies only. Tick the boxes as appropriate to your search.</li> <li>• Search for jobs by: <ul style="list-style-type: none"> <li>▪ Company</li> <li>▪ Category</li> </ul> </li> </ul>	

		<ul style="list-style-type: none"> <li>▪ Location</li> <li>▪ All jobs</li> <li>▪ Agency</li> </ul> <ul style="list-style-type: none"> <li>● Industry</li> </ul>	
<b>Week23</b>	<b>Supervised machine learning / Deep learning</b>	<ul style="list-style-type: none"> <li>● <b>Motivational Lecture</b> (For further detail please see Annexure: II)</li> <li>● Backpropagation</li> <li>● Activation functions</li> <li>● Regularizers</li> <li>● Optimizers</li> <li>● Multiclass classification</li> </ul>	<b>TASK23</b>  <i>Details may be seen at Annexure-I</i>
<b>Week24</b>	<b>Supervised machine learning / Classification</b>	<ul style="list-style-type: none"> <li>● <b>Success stories</b> ( For further detail please see Annexure: III)</li> <li>● Ensembles</li> <li>● Bagging</li> <li>● Boosting</li> <li>● Random forest</li> </ul>	<b>TASK24</b>  <i>Details may be seen at Annexure-I</i>
<b>Week25</b>	<b>Unsupervised machine learning / Classification</b>	<ul style="list-style-type: none"> <li>● <b>Motivational Lecture</b> (For further detail please see Annexure: II)</li> <li>● Clustering <ul style="list-style-type: none"> <li>○ K means</li> <li>○ K medoids</li> </ul> </li> </ul>	<b>TASK25</b>  <i>Details may be seen at Annexure-I</i>
<b>Week 26</b>	<b>Entrepreneurship and Final Assessment in project</b>	<ul style="list-style-type: none"> <li>● <b>Success stories</b> ( For further detail please see Annexure: III)</li> <li>● Job Market Searching</li> <li>● Self-employment</li> <li>● Freelancing sites</li> <li>● Final Assessment</li> </ul>	<b>TASK26</b>  <i>Details may be seen at Annexure-I</i>  <b>Final</b>

			<b>Exams</b>
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### Tasks For Certificate in Big Data Analytics

Task No.	Task	Description	Week
<b>Big Data Analytics Techniques</b>			
1	<b>Explore Data science</b>	Make presentation on applications of data science in different fields.	1
2	<b>Data exploration</b>	Apply data visualization. <ul style="list-style-type: none"> <li>• Histogram</li> <li>• Bar charts</li> <li>• Pie charts</li> <li>• Box plot</li> </ul>	2
3	<b>Analytics</b>	Perform data loading, preprocessing and analytics in Weka.	3
4	<b>Setting up envs</b>	Setup IDEs and environments on your own machines.	4
5	<b>Basic Python Program for Array</b>	Write a Python program to create an array of 5 integers and display the array items. Access individual element through indexes	5
5A	<b>Prime no finding Program</b>	write a program in Python to <b>check whether the input number is prime or not</b>	
6	<b>Python Program for Loop and function etc</b>	Write a Python program to find those numbers which are divisible by 7 and multiple of 5, between 1500 and 2700 (both included).	6
6A	<b>Program for sum of numbers</b>	Write a Python function to sum all the numbers in a list. <i>Sample List : (8, 2, 3, 0, 7)</i> <i>Expected Output : 20</i>	
7	<b>Programming for objects etc.</b>	Write a Python program to create an Enum object and display a member name and value. Sample data : Afghanistan = 93	7

Task No.	Task	Description	Week
		Albania = 355 Algeria = 213 Andorra = 376 Angola = 244 Antarctica = 672 Expected Output : Member name: Albania Member value: 355 Write a Python program to get all values from an enum class. Expected output: [93, 355, 213, 376, 244, 672] Project :Hangman Project in Python	
8	<b>Create DB and make ERD</b>	Create a database in excel or mysql and then create ERD.	8
9	<b>Exercise for mysql operation</b>	On MySQL perform the following operations. Create,alter,drop,insert etc	9
10	<b>Perform multiple operations on mysql</b>	Perform multiple operations on <ul style="list-style-type: none"> <li>• Joins</li> <li>• String Operations and Wild Cards</li> <li>• Null Functions</li> <li>• Union</li> <li>• Stored Procedure</li> </ul>	10
11	<b>Exercise and examples</b>	<ul style="list-style-type: none"> <li>• Find the variance and standard deviation of the following scores on an exam: 92, 95, 85, 80, 75, 50</li> <li>• Find the standard deviation of the average temperatures recorded over a five-day period last winter: 18, 22, 19, 25, 12</li> </ul>	11
11A	<b>Exercise and examples</b>	Write a Program to implement correlation in python Numpy implements a <code>corrcoef()</code> function that returns a	



Task No.	Task	Description	Week
		matrix of correlations of x with x, x with y, y with x and y with y. We're interested in the values of correlation of x with y (so position (1, 0) or (0, 1)).	
12.	<b>Exercise and examples</b>	<p>Provided is the data set, perform the following operations</p> <ul style="list-style-type: none"> <li>Analyze dataset</li> <li>Find and remove outliers and anomalies</li> <li>Perform data standardization if needed</li> </ul>	12
13	<b>Exercise and examples</b>	<p>Install the software and Using open source Talend studio ,Perform Extract, Transform and Load</p> <p>Perform following operations on dataset</p> <ul style="list-style-type: none"> <li>Feature type conversion</li> <li>Categorize features</li> </ul>	13
14	<b>Exercise and examples</b>	A website link will be provided to scrap required data from it.	14
15	<b>JASON File and XMLs</b>	<ul style="list-style-type: none"> <li>In Python Parse a JSON File</li> <li>Convert XML to csv</li> </ul>	15
16	<b>Presentation on ML</b>	Make and deliver presentation about ML	16
17.	<b>Linear Regression (Python Implementation)</b>	find a linear function that predicts the response value(y) as accurately as possible as a function of the feature or independent variable(x)	17

<b>Task No.</b>	<b>Task</b>	<b>Description</b>	<b>Week</b>
18	<b>Classification task</b>	Perform different classification algorithms on dataset and find suitable algorithm with top results.	18
19	<b>Exercise</b>	<ul style="list-style-type: none"> <li>• Test and try different kind of splitting on data and find optimal splitting value.</li> <li>• Justify the effect of hyper parameter tuning on train and test accuracy.</li> </ul>	19
20	<b>Exercise</b>	<ul style="list-style-type: none"> <li>• Do training of different algorithms on a dataset and perform different evaluation matrices.</li> </ul>	20
21	<b>Project Selection</b>	Select the project in data science and analytics.	21
22	<b>Multilayer perceptron</b>	Make a feed forward multilayer perceptron in python.	22
23	<b>Performance enhancement and optimization</b>	Explore different kind of activation functions and apply regularization on the network to observe the effects. Apply diff optimization algorithms.	23
24	<b>Exercise</b>	Apply ensembles on at least three machine learning classification algorithm.	24
25	<b>Exercise</b>	Apply k-mean and k-medoid clustering to dataset with unknown labels. And after training perform evaluation.	25
26	<b>Final project</b>	Final project Assessment	26

**He became top rated freelancer in first 4 months on upwork | data analyst freelancer**

Qasim Bhatti started freelancing on upwork in August, 2020 and within 4 months he reached to a level where he earns close to 2 lakh pak rupees a month from upwork (close to 1300\$). In this conversation he will share his story on how he got so much success in a very short time period. He will also give tips on how to become successful data analyst freelancer on upwork.

<https://www.youtube.com/watch?v=sQnG6XiFfLE>

**What is freelancing and how you can make money online - BBCURDU**

<https://www.youtube.com/watch?v=9jCJN3Ff0kA>

**What Is the Role of Good Manners in the Workplace? By Qasim Ali Shah | In Urdu**

<https://www.youtube.com/watch?v=Qi6Xn7yKIIQ>

**Hisham Sarwar Motivational Story | Pakistani Freelancer**

[https://www.youtube.com/watch?v=CHm\\_BH7xAXk](https://www.youtube.com/watch?v=CHm_BH7xAXk)

**21 Yr Old Pakistani Fiverr Millionaire | 25-35 Lakhs a Month Income | Interview**

<https://www.youtube.com/watch?v=9WrmYYhr7S0>

**Success Story of a 23 Year - Old SEO Expert | How This Business Works | Urdu Hindi Punjabi**

<https://www.youtube.com/watch?v=tlQ0CWgszI0>

**Failure to Millionaire - How to Make Money Online | Fiverr Superhero Aaliyaan Success Story**

<https://www.youtube.com/watch?v=d1hocXWSpus>

## Annexure-II

### SUGGESTIVE FORMAT AND SEQUENCE ORDER OF MOTIVATIONAL LECTURE.

#### Mentor

Mentors are provided an observation checklist form to evaluate and share their observational feedback on how students within each team engage and collaborate in a learning environment. The checklist is provided at two different points: Once towards the end of the course. The checklists are an opportunity for mentors to share their unique perspective on group dynamics based on various team activities, gameplay sessions, pitch preparation, and other sessions, giving insights on the nature of communication and teamwork taking place and how both learning outcomes and the student experience can be improved in the future.

#### Session- 1 (Communication):

Please find below an overview of the activities taking place Session plan that will support your delivery and an overview of this session's activity.

Session- 1 OVERVIEW
Aims and Objectives:
<ul style="list-style-type: none"> <li>To introduce the communication skills and how it will work</li> <li>Get to know mentor and team - build rapport and develop a strong sense of a team</li> <li>Provide an introduction to communication skills</li> <li>Team to collaborate on an activity sheet developing their communication, teamwork, and problem-solving</li> <li>Gain an understanding of participants' own communication skills rating at the start of the program</li> </ul>

Activity:	Participant Time	Teacher Time	Mentor Time
Intro Attend and contribute to the scheduled.			
Understand good communication skills and how it works.			
Understand what good communication skills mean			
Understand what skills are important for good communication skills			
Key learning outcomes:	Resources:		Enterprise skills developed:
<ul style="list-style-type: none"> <li>Understand the communication skills and how it works.</li> <li>Understand what communication skills</li> </ul>	<ul style="list-style-type: none"> <li>Podium</li> <li>Projector</li> <li>Computer</li> <li>Flip Chart</li> <li>Marker</li> </ul>		<ul style="list-style-type: none"> <li>Communication</li> <li>Self Confidence</li> <li>Teamwork</li> </ul>

<p>mean</p> <ul style="list-style-type: none"> <li>• Understand what skills are important for communication skills</li> </ul>		
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Schedule	Mentor Should do
<p><b>Welcome:</b> 5 min</p>	<p>Short welcome and ask the <b>Mentor</b> to introduce him/herself. Provide a brief welcome to the qualification for the class. Note for Instructor: Throughout this session, please monitor the session to ensure nothing inappropriate is being happened.</p>
<p><b>Icebreaker:</b> 10 min</p>	<p>Start your session by delivering an icebreaker, this will enable you and your team to start to build rapport and create a team presentation for the tasks ahead. The icebreaker below should work well at introductions and encouraging communication, but feel free to use others if you think they are more appropriate. It is important to encourage young people to get to know each other and build strong team links during the first hour; this will help to increase their motivation and communication throughout the sessions.</p>
<p><b>Introduction &amp; Onboarding:</b> 20mins</p>	<p>Provide a brief introduction of the qualification to the class and play the “Onboarding Video or Presentation”. In your introduction cover the following:</p> <ol style="list-style-type: none"> <li>1. Explanation of the program and structure. (Kamyab jawan Program)</li> <li>2. How you will use your communication skills in your professional life.</li> <li>3. Key contacts and key information – e.g. role of teacher, mentor, and SEED. Policies and procedures (user agreements and “contact us” section). Everyone to go to the Group Rules tab at the top of their screen, read out the rules, and ask everyone to verbally agree. Ensure that the consequences are clear for using the platform outside of hours. (9am-8pm)</li> <li>4. What is up next for the next 2 weeks ahead so young people know what to expect (see pages 5-7 for an overview of the challenge). Allow young people to ask any questions about the session topic.</li> </ol>
<p><b>Team Activity Planning:</b> 30 minutes</p>	<p>MENTOR: Explain to the whole team that you will now be planning how to collaborate for the first and second collaborative Team Activities that will take place outside of the session. There will not be another session until the next session so this step is required because communicating and making decisions outside of a session requires a different strategy that must be agreed upon so that everyone knows what they are doing for this activity and how.</p> <ul style="list-style-type: none"> <li>• “IDENTIFY ENTREPRENEURS” TEAM ACTIVITY</li> <li>• “BRAINSTORMING SOCIAL PROBLEMS” TEAM ACTIVITY”</li> </ul> <p><i>As a team, collaborate on a creative brainstorm on social</i></p>

	<p><i>problems in your community. Vote on the areas you feel most passionate about as a team, then write down what change you would like to see happen.</i></p> <p>Make sure the teams have the opportunity to talk about how they want to work as a team through the activities e.g. when they want to complete the activities, how to communicate, the role of the project manager, etc. Make sure you allocate each young person a specific week that they are the project manager for the weekly activities and make a note of this.</p> <p>Type up notes for their strategy if this is helpful - it can be included underneath the Team Contract.</p>
<p><b>Session Close:</b> <b>5 minutes</b></p>	<p><b>MENTOR:</b> Close the session with the opportunity for anyone to ask any remaining questions.</p> <p><b>Instructor:</b> Facilitate the wrap-up of the session. A quick reminder of what is coming up next and when the next session will be.</p>

## MOTIVATIONAL LECTURES LINKS.

<b>TOPIC</b>	<b>SPEAKER</b>	<b>LINK</b>
<b>Informatica CEO: The Business Of Big Data</b>	CEO	<a href="https://www.youtube.com/watch?v=CONitz2n68w">https://www.youtube.com/watch?v=CONitz2n68w</a>
<b>Taking On Big Data</b>	<b>Talend CEO</b>	<a href="https://www.youtube.com/watch?v=8jB_1-P7qV4">https://www.youtube.com/watch?v=8jB_1-P7qV4</a>
<b>How to Face Problems In Life</b>	Qasim Ali Shah	<a href="https://www.youtube.com/watch?v=OrQte08MI90">https://www.youtube.com/watch?v=OrQte08MI90</a>
<b>How To Prepare For Applying Freelancing Jobs For Data Science</b>	Krish Naik	<a href="https://www.youtube.com/watch?v=EXbMZGjswjI">https://www.youtube.com/watch?v=EXbMZGjswjI</a>
<b>Big Data and AI in Small Business</b>	Bernard Marr	<a href="https://www.youtube.com/watch?v=hYoRMqkN_TI">https://www.youtube.com/watch?v=hYoRMqkN_TI</a>
<b>Just Control Your Emotions</b>	Qasim Ali Shah	<a href="https://www.youtube.com/watch?v=JzFs_yJt-w">https://www.youtube.com/watch?v=JzFs_yJt-w</a>
<b>How to Communicate Effectively</b>	Qasim Ali Shah	<a href="https://www.youtube.com/watch?v=PhHAQEGehKc">https://www.youtube.com/watch?v=PhHAQEGehKc</a>
<b>Your ATTITUDE is Everything</b>	Tony Robbins Les Brown David Goggins Jocko Willink Wayne Dyer Eckart Tolle	<a href="https://www.youtube.com/watch?v=5fS3rj6eIFg">https://www.youtube.com/watch?v=5fS3rj6eIFg</a>
<b>Control Your EMOTIONS</b>	Jim Rohn Les Brown TD Jakes Tony Robbins	<a href="https://www.youtube.com/watch?v=chn86sH0O5U">https://www.youtube.com/watch?v=chn86sH0O5U</a>
<b>Defeat Fear, Build Confidence</b>	Shaykh Atif Ahmed	<a href="https://www.youtube.com/watch?v=s10dzfbozd4">https://www.youtube.com/watch?v=s10dzfbozd4</a>
<b>Wisdom of the Eagle</b>	Learn Kurooji	<a href="https://www.youtube.com/watch?v=bEU7V5rJTtw">https://www.youtube.com/watch?v=bEU7V5rJTtw</a>
<b>The Power of ATTITUDE</b>	Titan Man	<a href="https://www.youtube.com/watch?v=r8LJ5X2ejqU">https://www.youtube.com/watch?v=r8LJ5X2ejqU</a>
<b>STOP WASTING TIME</b>	Arnold Schwarzenegger	<a href="https://www.youtube.com/watch?v=kzSBrJmXqdg">https://www.youtube.com/watch?v=kzSBrJmXqdg</a>
<b>Risk of Success</b>	Denzel Washington	<a href="https://www.youtube.com/watch?v=tbnzAVRZ9Xc">https://www.youtube.com/watch?v=tbnzAVRZ9Xc</a>

**SUCCESS STORY\***

S. No	Key Information	Detail/Description
1.	<b>Self &amp; Family background</b>	<p>Mr Usman is a computer Engineering graduate from UET with distinction and also a founder of DsPortal (A Data Science Growth Platform). He has 5+ years of experience in providing IT training and has been attached to key institutes since then. He holds a master in data science and has 3 international publications in Machine Learning/Data Science</p> <p><b>If at first, you don't succeed, try try again</b></p>
2.	<b>How he came on board NAVTTC Training/ or got trained through any other source</b>	Form UET(NAVTTC partner institute)
3.	<b>Post-training activities</b>	<p>Usman area of expertise is in <b>Big Data</b>. In his first month using Fiverr, he pitched mostly for projects centered around logo designing. But it wasn't so simple. In the first few weeks, he didn't hear back from even a single client, despite pitching for dozens of projects.</p> <p>"I needed to understand what worked, so I read blogs, participated in forums, and analyzed profiles of successful freelancers. It was an uphill struggle, but I didn't want to give up," he explains.</p> <p>Usman says he understands why clients would be apprehensive giving projects to untested freelancers. They have hundreds of options to choose from, he explains, and to give a project to someone with no experience requires a strong leap of faith.</p> <p>A slow stream of projects started to come Usman way. Within a few months, he was landing an average of a hundred projects every month, with a large number of repeat clients. He also expanded the range of his professional services, Mirpur, threatened to derail his freelancing career. "Sometimes I haven't had connectivity for two days straight," he explains. "That's unthinkable for someone who makes his livelihood on the internet."</p>



4.	<b>Message to others (under training)</b>	Take the training opportunity seriously Impose self-discipline and ensure regularity Make Hard work pays in the end so be always ready for the same.
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*\*Example pattern*

**Note:** Success story is a source of motivation for the trainees and can be presented in several ways/forms in a NAVTTC skill development course as under: -

1. To call a passed out successful trainee of the institute. He will narrate his success story to the trainees in his own words and meet trainees as well.
2. To see and listen to a recorded video/clip (5 to 7 minutes) showing a successful trainee Audio-video recording that has to cover the above-mentioned points.\*
3. The teacher displays the picture of a successful trainee (name, trade, institute, organization, job, earning, etc) and narrates his/her story in the teacher's own motivational words.

*\* The online success stories of renowned professional can also be obtained from **Annex-II***

## Workplace/Institute Ethics Guide

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Work ethic is a standard of conduct and values for job performance. The modern definition of what constitutes good work ethics often varies. Different businesses have different expectations. Work ethic is a belief that hard work and diligence have a moral benefit and an inherent ability, virtue, or value to strengthen character and individual abilities. It is a set of values-centered on the importance of work and manifested by determination or desire to work hard.

The following ten work ethics are defined as essential for student success:

**1. Attendance:**

Be at work every day possible, plan your absences don't abuse leave time. Be punctual every day.

**2. Character:**

Honesty is the single most important factor having a direct bearing on the final success of an individual, corporation, or product. Complete assigned tasks correctly and promptly. Look to improve your skills.

**3. Team Work:**

The ability to get along with others including those you don't necessarily like. The ability to carry your weight and help others who are struggling. Recognize when to speak up with an idea and when to compromise by blend ideas together.

**4. Appearance:**

Dress for success set your best foot forward, personal hygiene, good manner, remember that the first impression of who you are can last a lifetime

**5. Attitude:**

Listen to suggestions and be positive, accept responsibility. If you make a mistake, admit it. Values workplace safety rules and precautions for personal and co-worker safety. Avoids unnecessary risks. Willing to learn new processes, systems, and procedures in light of changing responsibilities.

**6. Productivity:**

Do the work correctly, quality and timelines are prized. Get along with fellows, cooperation is the key to productivity. Help out whenever asked, do extra without being asked. Take pride in your work, do things the best you know-how. Eagerly focuses energy on accomplishing tasks, also referred to as demonstrating ownership. Takes pride in work.

**7. Organizational Skills:**

Make an effort to improve, learn ways to better yourself. Time management; utilize time and resources to get the most out of both. Take an appropriate approach to social interactions at work. Maintains focus on work responsibilities.

**8. Communication:**

Written communication, being able to correctly write reports and memos.  
Verbal communications, being able to communicate one on one or to a group.

**9. Cooperation:**

Follow institute rules and regulations, learn and follow expectations. Get along with fellows, cooperation is the key to productivity. Able to welcome and adapt to changing work situations and the application of new or different skills.

**10. Respect:**

Work hard, work to the best of your ability. Carry out orders, do what's asked the first time. Show respect, accept, and acknowledge an individual's talents and knowledge. Respects diversity in the workplace, including showing due respect for different perspectives, opinions, and suggestions.