NATIONAL UNIVERSITY
of Computer & Emerging Sciences, Lahore

Department of Data Science

Data Analysis and Visualization

FALL 2024

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Course Information

Program: BSDS **Credit Hours:** 3 **Type:** Core
Pre-requisites (if any): Programming competence,

Course Website (if any) : Google Classroom
Class Meeting Time: Mon & Tue (2:30pm to 4pm) Room: 208

Course Outline

	Topics	**Material**
Week 1	Introduction to Data Analysis and Visualization, Introduction to Data Scrapping	
Week 2	Data Scrapping tools and techniques with demo lecture using selenium	
Week 3	Data Wrangling Methods (Missing Value, Outlier Detection, Normalization)	**Chapter** 3, Data Mining by Micheline Kambers
Week 4	Feature Extraction using deep learning methods (Correlations, Convolutions) w.r.t to Images and Signals	Chapter 5, Digital Image Processing by Gonzalez
Week 5	Embeddings (Bag of Words, TFIDF) w.r.t textual dataset.	
Week 6	Sessional 1	
Week 7	N-Grams	
Week 8	Logistic Regression and Regularization, linear and non-linear lasso regression	
Week 9	R Language	
Week 10	Demo and Examples on Neural Network, Forward Pass in Convolutional Neural Networks (CNN)	Deep Learning by Ian Goodfellow
Week 11	Applications of CNN and RNN, Inference Mechanism of CNN and RNN	Deep Learning by Ian Goodfellow
Week 12	Sessional 2	

Week 13	Support Vector Machine (SVM), Overview, a bit of mathematics about SVM and its applications.	Machine Learning in Action by Peter Harrington
Week 14	Professional tools and techniques for data visualization (Dash Plotly)	Interactive Dashborads and Data Apps with Plotly and Dash by Elias Dabbas
Week 15	Interactive Demo Session using plotly.	-do-
Week 16	Presentations	
Week 17-19	Final Term Exam	

Assessments	**Weightage**
Quizzes	10 %
Project	10 %
Assignments	10%
Sessional 1 & 2	30 %
Final Term	40 %
Total	100 %