Course Title	**Data Science Lab**
Course Code	**EI-334-L**
Credit Hours	1 (0,3)
Category	Domain Elective
Prerequisite	None
Co-Requisite	None
Follow-up	None
Course Introduction	This course is designed to introduce students to the rapidly growing field of data science and equip them with some of its basic principles and tools, as well as its general mindset. It covers the significance of exploratory data analysis in data science, the identification of common approaches used for feature generation as well as feature selection, and the discussion regarding ethical and privacy issues.

Course Learning Outcomes (CLOs)	At the end of the course, the students will be able to:	BT	PLO
	CLO1: Describe what Data Science is and the skill sets needed to be a data scientist.	C2 (Explain)	1, 2
	CLO2: Apply EDA and the Data Science process in a case study.	C3 (Apply)	2, 3
	CLO3: Comprehend the fundamental constructs of Python programming language.	C2 (Understand)	1, 2, 5
	CLO4: Apply basic machine learning algorithms to solve real world problems of moderate complexity.	C3 (Apply)	3, 4, 5

Syllabus	Implementation of the concepts/topics discussed in the course.
	Introduction: What is Data Science? Big Data and Data Science hype; Datafication; Current landscape of perspectives; Skill sets needed; Statistical Inference: Populations and samples, Statistical modeling, probability distributions, fitting a model; Introduction to Python; Exploratory Data Analysis and the Data Science Process; Basic Machine Learning Algorithms: Linear Regression, k-Nearest Neighbors (k-NN), k-means, Naive Bayes; Feature Generation and Feature Selection; Dimensionality Reduction: Singular Value Decomposition, Principal Component Analysis; Mining Social-Network Graphs: Social networks as graphs, Clustering of graphs, Direct discovery of communities in graphs, Partitioning of graphs, Neighbourhood properties in graphs; Data Visualization: Basic principles, ideas and tools for data visualization; Data Science and Ethical Issues: Discussions on privacy, security, ethics, Next- generation data scientists.

Suggested Instructional/ Reading Material	1. Igual, L. S. Segui. 2017. Introduction to Data Science: A Python Approach to Concepts, Techniques and Applications. 1st edition, Springer. Cham. ISBN 978-3-319-50016-4.
	2. Saltz, J.S., J. M. 2017. Stanton, An Introduction to Data Science, SAGE Publications.
	3. Subramanian, G. 2015. Python Data Science Cookbook. Packt Publishing, 1st Edition. ISBN 978-1-78439-640-4
	4. Grus, J. 2015. Data Science from Scratch, O'Relly Media, 1st Edition, 2015; ISBN 978-1-491-90142-7
	5. Zaki. M. J., W. Meira. 2014. Data Mining and Analysis: Fundamental Concepts and Algorithms. 1st edition. Cambridge University Press. ISBN 978-0-521-76633-3