Department	International College of Liberal Arts		
Semester	Fall 2025	Year Offered (Odd/Even/Every Year)	Every Year
Course Number	DATA350		
Course Title	Machine Learning		
Prerequisites	DATA160 Coding Bootcamp: Python AND DATA240 Data Visualization techniques in Python AND DATA250 Mathematics for Data Science		
Course Instructor	PARIDA Abhishek	Year Available (Grade Level)	3
Subject Area	Data Science	Number of Credits	3
Class Style	Lecture	Language of instruction	English

(NOTE 1) Depending on the class size and the capacity of the facility, we may not be able to accommodate all students who wish to register for the course

Course Description	This course introduces various Machine Learning algorithms (theory) and their implementations using Sklearn in Python (practical programming). It provides essential training on data literacy (reading, handling, and explaining the data) and discusses the latest trends in utilizing Data Science and Artificial Intelligence. Each section is followed by several guided case studies analyzing real-world data sets and practice problems.
Class plan based on course evaluation from previous academic year	N/A
Course related to the instructor's practical experience (Summary of experience)	N/A
Learning Goals	A student taking this course would be considered a prospective Data Engineer who would already be familiarized with statistical notions and clearly understand the schemes needed to reach this point. This module's key takeaway is the rigorous theory sections that build the concepts and the hands-on learning that can be readily used in a Data Science professional's everyday work once mastered. Students would develop the skills needed to master mathematics for Data Science and Artificial Intelligence.

iCLA Diploma Policy	DP1／DP2

iCLA Diploma Policy

(DP1) To Value Knowledge - Having high oral and written communication skills to be able to both comprehend and transfer knowledge

(DP2) To Be Able to Adapt to a Changing World - Having critical, creative, problem-solving, intercultural skills, global and independent mindset to adopt to a changing world

(DP3) To Believe in Collaboration - Having a disposition to work effectively and inclusively in teams

(DP4) To Act from a Sense of Personal and Social Responsibility - Having good ethical and moral values to make positive impacts in the world

Active Learning Methods	Problem-Based Learning				
More details/supplemental information on Active Learning Methods	N/A				
Use of ICT	The course will take place in the Data Science Lab, which is equipped with the Anaconda distribution of Python and other relevant packages pre-installed. However, for homework assignments, students must use their own laptops and install the Anaconda distribution of Python along with the required packages.				
Contents of class preparation and review	Students are advised to take handwritten notes; this will drastically increase their ability to retain the information. Further, they are expected to practice regularly. One to two hours of study is required before the class preparation, and an equal amount of practice is needed after each lecture.	Hours expected to be spent preparing for class (hours per week)	3 hours	Hours expected to be spent on class review (hours per week)	3 hours
Feedback Methods	The best way to correspond during the course is the UNIPA system or direct emails. Please check the UNIPA account regularly for updates related to classes. To have a better grade, be regular in the study, active and attentive in the class, do a revision of classwork regularly, and participate in-class quizzes.				

Grading Criteria		
Grading Methods	Grading Weights	Grading Content
Understanding of Concepts	40%	In-class discussions, Homework Assignments, Class Quizes, Final Exam
Code Functionality	30%	Homework Assignments, Class Quizes
Timeliness	30%	Homework Assignments

Required Textbook(s)	Aurélien Géron- Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems (O'Reilly) Andreas C. Mueller, Sarah Guido- Introduction to Machine Learning with Python: A Guide for Data Scientists
Other Reading Materials/URL	N/A
Plagiarism Policy	Plagiarism is the dishonest presentation of others' work as if it were one's own. Duplicate submission is also treated as plagiarism. Depending on the nature of plagiarism, one may fail the assignment or the course. The repeated act of plagiarism will be reported to the University, which may apply additional penalties.

Other Additional Notes (Outline crucial policies and info not mentioned above)	N/A

(NOTE 2) Class schedule is subject to change

Class Schedule	
Class Number	Content
Class 1	Module 1: Machine Learning Overview and Data Pre-processing Lecture 1 - Introduction to the course - types of ML techniques; types of problems; ML project lifecycle
Class 2	Lecture 2 - Data pre-processing theory and implementation in Python (sklearn)
Class 3	Module 2: Regression models Lecture 3 - Simple Linear Regression, Multiple Linear regression, Polynomial regression
Class 4	Lecture 4 - Case Study and implementation in Python (sklearn)
Class 5	Lecture 5 - Evaluation Metrics for Regression; Assumptions for Regression
Class 6	Lecture 6 - Case Study and implementation in Python (sklearn)
Class 7	Lecture 7 - Regularization - Lasso, Ridge, Elastic
Class 8	Lecture 8 - Case Study and implementation in Python (sklearn)
Class 9	Lecture 9 - Case Study and implementation in Python (sklearn)
Class 10	Lecture 10 - Quiz 1
Class 11	Module 3: Classification models Lecture 11 - Logistic Regression

Class 12	Lecture 12 - Cost function of Logistic regression
Class 13	Lecture 13 - Softmax Regression; Handling imbalanced dataset; case study
Class 14	Lecture 14 - Evaluation Metrics for Classification
Class 15	Lecture 15 - Case Study and implementation in Python (sklearn)
Class 16	Lecture 16 - Quiz 2
Class 17	Lecture 17 - Support Vector Machine
Class 18	Lecture 18 - Case Study and implementation in Python (sklearn)
Class 19	Lecture 19 - Conditional Probability
Class 20	Lecture 20 - Naïve Bayes Classifier
Class 21	Lecture 21 - Feature Transformations
Class 22	Lecture 22 - Decision Tree
Class 23	Lecture 23 - K-Nearest Neighbours (Regression and Classification)
Class 24	Module 4: Unsupervised Learning Lecture 24 - K-Means Clustering
Class 25	Module 5: Dimensionality Reduction Techniques Lecture 25 - Principle Component Analysis

Class 26	Lecture 26 - Linear Discriminant Analysis
Class 27	Module 6: Model Selection and Boosting Lecture 27 - Cross Validation and Grid Search
Class 28	Lecture 28 - XG Boost
Class 29	Lecture 29 - Quiz 3
Class 30	Lecture 30 - Elements of Deep Learning (Introductory lecture)