Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
IT 513	Python Programming	1	4	0	0	3	8

Prerequisites	
Admission Requirements	

Language of Instruction	English
Course Type	Elective
Course Level	Masters Degree
Objective	In this course, students are introduced to the fundamentals of algorithmic thinking and the core concepts of programming through hands-on applications using the Python programming language. Building on these foundations, the course aims to equip students with the knowledge and experience to define data-driven problems, develop and propose solution strategies, implement these solutions in Python, and evaluate them based on various performance criteria.
Content	This course aims to equip students with general programming skills and algorithmic thinking through the fundamental concepts of the Python programming language. In this context, the course begins with basic data structures and control flow in Python and covers topics such as the numpy and pandas libraries commonly used in data analysis, the matplotlib and seaborn libraries for data visualization, statistical data analysis and data preprocessing, and some examples from machine learning methods. Through hands-on applications carried out as part of the course, students gain experience in analyzing and processing real-world data they encounter for the first time, as well as in building models to extract meaningful insights from data. In addition, they develop the ability to write modular Python code.
References	Learning Python, 6th Edition by Mark Lutz, February 2025, O'Reilly Media, Inc. ISBN: 9781098171308 Python Data Science Handbook, 2nd Edition by Jake VanderPlas, December 2022, O'Reilly Media, Inc. ISBN: 9781098121228

Theory Topics

Week	Weekly Contents
1	Introduction to Algorithms and Programming Languages
2	Introduction to Python Programming
3	Python Libraries I: Numpy & Pandas
4	Descriptive Statistics and Preprocessing with Pandas
5	Python Libraries II: Matplotlib & Seaborn
6	Data Visualization
7	Python Libraries III: Sklearn
8	Machine Learning Algorithms
9	Practice Session I: Problem Definition, Data Preprocessing
10	Practice Session II: Modeling and Performance Evaluation
11	Student Presentations