Master of Science in Applied Information and Data Science
Python for Data Scientist

Module description	
Module code	W.MSCIDS_PDS01.18
Module designation	Python for Data Scientist
Most recent change	July 2020
Module concept	Students learn the Python programming language independently with the help of a special e-learning course (intermediate user-level). Classes provide students not only with opportunities for learning independently but also for doing additional exercises as needed so that advanced learners and beginners can benefit in accordance with their level.
Module type	Required module
Form	Regular Course (weekly)
ECTS credits	6 ECTS Credits
Teaching language	German / English
Head	Erwin Mathis
Adjunct lecturers	Bruno Grossniklaus

Module positioning	
Admission requirements	None
Recommended semester	1st semester
Remarks	For this introductory module, the entry requirements for learning a programming language enable students from a range of disciplines to participate. Students should have a solid and documented background in programming and be able to apply, reflect on, and communicate their knowledge.

Module objectives	
Overall objective	Students learn additional programming languages independently. Students are able to tackle programming tasks of medium difficulty with Python and are thus prepared for the other modules of the program that involve working with Python.
Objective: **Professional skills**	Students are able to work with structured and unstructured data and can understand and solve problems relating to data science effectively on their own.
Objective: **Problem-solving and critical thinking**	Students are able to evaluate the possibilities and limitations of a programming language and can decide which technique to use to solve a specific problem.
Objective: **Method skills**	Students learn to analyze programmable tasks and to complete them with the programming language Python.
Objective: **Communication skills**	Students are able to communicate with colleagues from the field and obtain or provide the necessary support, e.g. via a suitable internet forum.
Objective: **Interpersonal skills**	Students contribute to the classes from their own experience.
Objective: **Personal skills**	Students learn to recognize and evaluate their own learning and/or timing issues.

Contents	
Topic 1: **Understanding and applying the basics of Python**	Numbers, variables The use of 'Strings' Lists in Python Casting of data types Applying controls in Python correctly: Selection: if, else Iteration: while, for The use of operators Introduction to the various Python development environments
Topic 2: **Advanced principles**	Functions Reading and writing files Examining lists, e.g. slicing Dictionaries, Tupel, Set List Comprehensions vs Lambda Object orientation with Python: Class and objects and their implementation in practice Inheritance

Topic 3: **Understanding and working with modules**	Working with modules Exception handling in Python: Clarifying the basic principles Students understand and can apply the following technical terms in the libraries environment and in their own Python programs: Iterators, generator

Teaching and learning methods

Coursework:	Hours	Hours (%)
Classroom or online	60 hrs	
Coaching		
Self-study	60 hrs	33.3%
Other	60 hrs	33.3%
Total	**180 hrs**	**100.0%**

Details on teaching and learning:

Teaching and learning: **Classroom or Online**	This preparatory module uses an adapted concept of "Flipped Classroom" in which the students receive clear instructions on which e-learning units they have to complete by themselves. During the class, selected code examples are created or reviewed. Exercises enable students to understand thoroughly the content they have learned and to identify any ambiguities they may have.
Teaching and learning: **Coaching**	None
Teaching and learning: **Self-study**	The content of the second half of the lecture deliberately prepares students for various subsequent modules in which they use Python as a programming language. Further exercises enable students to understand practical examples themselves.
Teaching and learning: **Other**	This Python module also provides in-depth references to literature and videos on selected topics.

Assessments
(Adaptions are possible at any time.)

Assessments:	Assessment 1	Assessment 2
Type of assessment	Written examination	None
Evaluation type	Grades	None
Scope	90 minutes	None
Date	In accordance with the university's instructions	None
Weighting (if two assessments)	100 %	None
Aids/materials	Four A4 pages as a summary, handwritten by the student on paper specially prepared by the lecturers.	None

Additional notes on the assessments:

Language	English (Answers in German allowed)
Certificates	None
Attendance	80%

Literature	
Script	None Various exercises
Online resources	https://www.python.org/ Python Bootcamp: https://www.udemy.com/course/the-complete-python-masterclass Python course https://www.python-course.eu/python3_course.php
Software	Jupyter Notebook, PyCharm
Other resources	Communicated during the classes.
Literature	Communicated during the classes.