ISM UNIVERSITY OF MANAGEMENT AND ECONOMICS

APPROVED BY
THE STUDY COMMISSION
Minutes No. 02-12-2025-13
as of 26th August 2025

FUNDAMENTALS OF COMPUTER PROGRAMMING

Course code	*IT111*
Compulsory in the programmes	*Economics and Data Analytics*
Level of studies	*Undergraduate*
Number of credits	*6 ECTS (42 in-class hours + 6 hours of examination, 114 individual work hours)*
Course coordinator (title and name)	*Kristina Aldošina*
Prerequisites	-
Language of instruction	*English*

THE AIM OF THE COURSE

The aim of this course is to provide students with a solid foundation in Python programming, equipping them with the essential concepts, skills, and confidence to write clear, functional, and well-structured code. Through a hands-on, step-by-step approach, learners will be introduced to fundamental programming constructs such as variables, data types, collections, conditional statements, and loops, progressing gradually toward more advanced topics including functions, error handling, and object-oriented programming with classes.

By the end of the course, students will not only be capable of solving basic to intermediate-level programming problems but will also be fully prepared to continue their learning journey into specialized areas such as data analysis and visualization. This course serves as a crucial stepping stone for further studies and applications in Python-driven data science.

MAPPING OF COURSE LEVEL LEARNING OUTCOMES (OBJECTIVES) WITH DEGREE LEVEL LEARNING OBJECTIVES (See Annex I), ASSESSMENT AND TEACHING METHODS

Course level learning outcomes (objectives)	Learning objectives for the Bachelor of Social Science	Assessment methods	Teaching methods
CLO1. To be able to process information and operate at multiple levels of abstraction.	ELO4.1. Students will be able to communicate reasonably in different settings according to target audience tasks and situations	Tests, midterm exams, final exam	Lectures, seminars, individual work
CLO2. To be able to decompose IT problems into parts and solve them efficiently.	ELO1.2. Students will be able to identify underlying assumptions and logical consistency of causal statements	Midterm exams, final exam	Lectures, seminars, individual work
CLO3. To be able to demonstrate proficiency in a software development environment.	ELO3.2. Students will be able to make decisions using appropriate IT tools	Tests, midterm exams, final exam	Seminars, individual work
CLO4. To be able to assess the correctness, design, and style of code.	ELO3.2. Students will be able to make decisions using appropriate IT tools	Midterm exams, final exam	Seminars, individual work

ACADEMIC HONESTY AND INTEGRITY

The ISM University of Management and Economics Code of Ethics, including cheating and plagiarism are fully applicable and will be strictly enforced in the course. Academic dishonesty, and cheating can and will lead to a report to the ISM Committee of Ethics. With regard to remote learning, ISM remind students that they are expected to adhere and maintain the same academic honesty and integrity that they would in a classroom setting.

COURSE OUTLINE

Topic	In-class hours	Readings
Introduction. Computer science, binary numbers, programming languages, Python, PEP8 standard, code editors.	2	Lecture notes. https://www.w3schools.com/python/default.asp (intro, get started, syntax, comments, variables, data types, numbers, casting, strings, booleans, operators, lists, tuples, sets, dictionaries, input, string formatting, Python reference)
1. Variables, integers, floats, booleans. *Test 1.*	4	
2. Strings, input, formatted strings. *Test 2.*	4	
3. Lists, tuples. *Test 3.*	4	
4. Dictionaries, sets. *Test 4.*	4	
MIDTERM EXAM 1	**2**	
5. Conditional statements, "while" loop. *Test 5.*	4	Lecture notes. https://www.w3schools.com/python/default.asp (if...else, while loops, for loops, functions, lambda, modules, dates, math, try...except, polymorphism, iterators, scope, Python reference, module reference)
6. "for" loop, comprehensions. *Test 6.*	4	
7. Built-in and user-defined functions. *Test 7.*	4	
8. Lambda functions, error handling. *Test 8.*	4	
9. Modules, import. *Test 9.*	4	
MIDTERM EXAM 2	**4**	
10. Introduction to object-oriented programming, classes. *Test 10.*	4	Lecture notes. https://www.w3schools.com/python/default.asp (classes/objects, inheritance)
Total:	**48**	
FINAL EXAM	**4**	

FINAL GRADE COMPOSITION

Type of assignment	%
Individual Components 100%	
Tests 1 – 10	20 (10*2%)
Midterm exam 1 (topics 1 – 4)	20
Midterm exam 2 (topics 5 – 9)	30
Final exam (topics 1 – 10)	30
Total:	**100**

DESCRIPTION AND GRADING CRITERIA OF EACH ASSIGNMENT

The overall assessment of the course (total maximum of 100% is possible) will be composed from evaluations of multiple tasks which are described as follows:

1. **Tests** are 10-minute long in-class written (on paper) closed-book individual assignments taken at the end of the lecture or beginning of the following seminar. Students will have to answer several multiple-choice and/or open questions. The number of questions and the proportion of different type questions may vary.
2. **Midterm exam 1** is 90 minutes long in-class open-book individual examination. Students will have to solve one complex coding task. Detailed rules (how to complete, how to ensure academic honesty, where to upload, evaluation criteria, etc.) will be announced on e-learning.
3. **Midterm exam 2** is 180 minutes long in-class open-book individual examination. Students will have to solve one complex coding task. Detailed rules (how to complete, how to ensure academic honesty, where to upload, evaluation criteria, etc.) will be announced on e-learning.
4. **Final exam** is 180 minutes long in-class open-book individual examination. Students will have to solve one complex coding task. Detailed rules (how to complete, how to ensure academic honesty, where to upload, evaluation criteria, etc.) will be announced on e-learning.

RETAKE POLICY

In case of a negative final evaluation, retake is possible. It will cover material of the whole course and will comprise **100%** of the final grade. Marks earned for tests, midterm exams, and final exam will be annulled. Retake is 180 minutes long in-class open-book individual examination. Students will have to answer 20 test-like questions, and to solve one complex coding task. Detailed rules (how to complete, how to ensure academic honesty, where to upload, evaluation criteria, etc.) will be announced on e-learning.

ADDITIONAL REMARKS

Precision of composite evaluations is left intact (up to 2 decimal places) until the end of semester and only the final evaluation will be subject to rounding.

REQUIRED READINGS

1. Lecture notes.
2. https://www.w3schools.com

ADDITIONAL READINGS

1. Effective Python: 59 specific ways to write better Python, Brett Slatkin, 2015, ISBN 978-0-13-403428-7
2. Learning Python, Fifth edition, Mark Lutz, 2013, ISBN: 978-1-449-35573-9
3. Python Cookbook, Third Edition, David Beazley and Brian K. Jones, 2013, ISBN: 978-1-449-34037-7
4. Python Crash Course, Eric Matthes, 2016, ISBN-10: 1-59327-603-6

MORE EXERCISES

1. https://www.hackerrank.com/domains/python
2. https://edabit.com/challenges
3. https://holypython.com/beginner-python-exercises/
4. https://www.hackerrank.com/domains/python
5. https://codesignal.com/
6. https://pythontutor.com/index.html

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ANNEX I

DEGREE LEVEL LEARNING OBJECTIVES

Learning objectives for the Bachelor of Social Science
Programmes:
Economics and Data Analytics,
Economics and Politics

Learning Goals	Learning Objectives
Students will be critical thinkers	ELO1.1. Students will be able to understand core concepts and methods in the key economics disciplines
	ELO1.2. Students will be able to identify underlying assumptions and logical consistency of causal statements
Students will have skills to employ economic thought for the common good	ELO2.1.Students will have a keen sense of ethical criteria for practical problem-solving
Students will be technology agile	ELO3.1. Students will demonstrate proficiency in common business software packages
	ELO3.2. Students will be able to make decisions using appropriate IT tools
Students will be effective communicators	ELO4.1.Students will be able to communicate reasonably in different settings according to target audience tasks and situations
	ELO4.2.Students will be able to convey their ideas effectively through an oral presentation
	ELO4.3. Students will be able to convey their ideas effectively in a written paper