



# Course program and reading list

Semester 2 Year 2024

**School:** Adelson School of Entrepreneurship B.A

## Computational Thinking and Programming in python

### Lecturer:

Dr. Revital Hollander [revital.hollander@runi.ac.il](mailto:revital.hollander@runi.ac.il)

### Tutors:

Mr. Or Tzofi [or.tzofi@post.runi.ac.il](mailto:or.tzofi@post.runi.ac.il)

### Teaching Assistant:

Dr. Revital Hollander [revital.hollander@runi.ac.il](mailto:revital.hollander@runi.ac.il)

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Course No.:	Course Type :	Weekly Hours :	Credit:
26027	Lecture	4	4

Course Requirements :	Group Code :	Language:
Final Paper	241260275	English

### Prerequisites

**Students who took one of the courses listed below will not be allowed to register to the course Computational Thinking and Programming in python (26027):**

26002 - Computational Thinking and Programming



### Course Description

Acquiring programming knowledge, which has become one of the most important skills of

the 21st century, and of great importance even for non-programmers, as a tool for orientation and communication in an entrepreneurial and business environment.

Introduction to software development and computational thinking. Designing and programming basic algorithms for solving problems. Fundamentals of programming in the Python language, a language that is widely used in industry for various applications, for machine learning, data science, and more.

The students will learn concepts and processes from the software domain that are important for understanding the software development process. Computational thinking and problem solving techniques will be learned and implemented by algorithms in Python. We will use techniques for evaluating the effectiveness of the different algorithms and compare them. We will discuss Artificial Intelligence (AI) abilities, types of problems that can be solved by AI and problems that cannot be solved by AI. We will demonstrate how programmers can use AI to work more efficiently and how AI can change software development processes.

No previous programming knowledge or experience is required.

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## Course Goals

Learn basic concepts and processes in software development, what a software development environment (IDE) is, and how a computer program works.

Acquire basic skills in computational thinking, problem definition, programming basics, planning simple algorithms for simple problems and converting them into a computer language (Python).

Understand how data is stored on a computer, how software can manage data, and how computers solve problems that are difficult for humans to calculate.

Basic terms related to AI, how AI can be used in software development, and how it can change software developers' work and abilities.

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## Grading

Class quizzes - 10%

Homework assignments - 25% (individual assignments)

Final project - 65%

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## Learning Outcomes

At the end of the course the student will be able to:

- Have a better communication in a technological environment,
  - Describe software development process.
  - Develop basic programs in the Python language.
  - Define simple problems in a formal way, build a computational solution (algorithm) and implement it as a computer language.
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## Lecturer Office Hours

Wednesdays 11:30-12:30, Adelson building fl.3 room 309.

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## Teaching Assistant

TA: Mr. Or Tzofi

[or.tzofi@post.runi.ac.il](mailto:or.tzofi@post.runi.ac.il)

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## Additional Notes

### **About the lecturer**

Dr. Revital Hollander is a musician and computer scientist. She is engaged in research, development and entrepreneurship in the field of technologies for musical creation. Revital is a graduate of the Rimon School of Music majoring in composition, and has a bachelor's and master's degree in computer science from Tel Aviv University. In the past 20 years, Revital has taught and developed innovative and multidisciplinary courses in academia in the fields of: programming, algorithms, mathematics, mobile development, agile methodologies, entrepreneurship, and music technology. Revital was the head of the specialization for music technology, and the specialization for mobile software systems and as a technology leader in the center for innovation and solving complex problems. She participated as a member of steering committees, among them at the Rimon School of Music, and at the HFMT-Hamburg University, and the Jerusalem Kamerata Orchestra. At Hi-Tech Revital, she worked as a programmer, head of the development team, and a consultant for startups. In 2015 Revital established and maintains a community activity, TMT - Tel-Aviv Music Technology, and held over 40 meetings, conferences, startup competitions in the field of music as well as international hackathons.

At RUNI, Revital teaches programming thinking, advanced programming and web applications and an entrepreneurship course for music at the Adelson School of Entrepreneurship. At the Computer Science School, Revital teaches Computer Music.

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## Reading List

### **Professional literature**

1. Hollander R., (2019), Computational Thinking and Programming in Python, a practical learning guide.
2. Think Python, Allen B. Downey, O'reilly, 2012.
3. Programming in Python 3 A Complete Introduction to the Python Language Second Edition Mark Summerfield, Addison-Wesley, 2010.
4. Introduction to Computation and Programming Using Python, [John V. Guttag](#), The MIT Press, 2nd Edition, 2013.
5. Computational Thinking: A Beginner's guide to problem solving and programming, Karl Beecher, bcs, 2017.
6. Introduction to Computation and Programming Using Python with Application to Understanding Data, Guttag John, MIT, 2016
7. <https://www.python.org>.

### **Scientific literature**

1. Jeannette M Wing, Computational thinking and thinking about computing 28 October 2008, DOI: 10.1098/rsta.2008.0118.
2. Alan Bundy, Computational Thinking is Pervasive, School of Informatics, Journal of Scientific and Practical Computing, Vol. 1, No. 2 (2007) 67–69.
3. Karen Brennan, Mitchel Resnick, New frameworks for studying and assessing the development of computational thinking, MIT Media Lab.
4. Barr, David; Harrison, John; Conery, Leslie, Computational Thinking: A Digital Age Skill for Everyone, Learning & Leading with Technology, v38 n6 p20-23 Mar-Apr 2011.