FOUNDATIONAL COURSE SERIES IN PYTHON PROGRAMMING

*A three-part course series offered by
Lund University, Luleå University, Uppsala University
and Umeå University*

LUNDS UNIVERSITET

LULEÅ UNIVERSITET

UPPSALA UNIVERSITET

UMEÅ UNIVERSITET
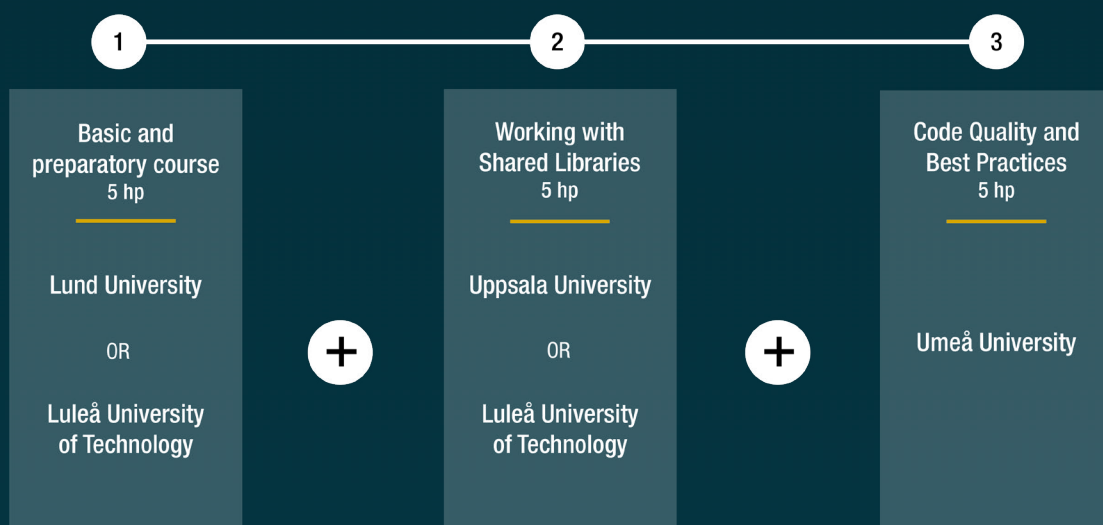
COURSE SERIES IN PYTHON PROGRAMMING

The job market today is demonstrating a consistent and increasing need in hard programming skills, particularly in languages useful in development of AI and Machine Learning interfaces.

To help meet this need, we have established a first of its kind collaboration between Lund University, Luleå Technical University, Uppsala University, and Umeå University to deliver high-quality foundational courses in Python.

This series of courses is given across these universities and entirely online to facilitate access to Python and AI expertise in Sweden, all while making the courses more accessible and location-independent for students.

In this handbook, you will find important information about each course and the series overall, including overviews of the content of each course, literature, and more.

Questions about this course series?
Contact us at python@cs.lth.se.

1

Basic and preparatory course
5 hp

Lund University

OR

Luleå University of Technology

+

2

Working with Shared Libraries
5 hp

Uppsala University

OR

Luleå University of Technology

+

3

Code Quality and Best Practices
5 hp

Umeå University

Programming in Python:
Basic and preparatory course, 5 hp

Course code: TFRE40 (Lund), D0039E (Luleå)
Antagning.se

Master the basics of the Python programming language with this foundational course. Python is quickly becoming the language of choice in modern programming, particularly for use with AI & Machine learning models. As a student in this course, you will quickly uncover why Python is a language that is both accessible to beginners and a favourite tool of experts.

By the end of this course, you should be able to understand the basics of programming and be able to write small to medium sized programs in Python. You will be well-placed to take other similar and more advanced courses, such as courses in object orientation and scientific computing.

Why choose this course?

This course aims to demystify the art of coding, making it understandable and achievable for everyone. Here is what you can expect:

- Master the basics: learn the fundamentals of imperative programming.
- Demystify coding: learning what coding is and is not, and how it differs from other structured information.
- Unlock algorithms: explore the secrets of fundamental algorithms, such as search.
- Make sense of data structures: learn to navigate arrays and matrices and understand their significance in managing and organising information.
- Learn crucial debugging skills: dive into the art of identifying and fixing codin errors, a skill every competent programmer needs.
- Gain hands-on experience: get the chance to apply what you learn in context.
- Study online: work on your own terms, totally online.

The course is composed of a seminar and lab series that runs for five weeks. This series is being repeated four times during the semester, which means that admitted students will be able to select and follow one specific series. During the series, the studies are considered 50% of full-time.

This foundational course is the first in a three-part series given in collaboration with Uppsala University and Umeå University. Students who pass this course will be eligible to continue to the next course given online by Uppsala University, titled: Programming in Python: Working with Shared Libraries, 5 hp, followed by Programming in Python: Code Quality and Best Practices, 5 hp, given online by Umeå University. All courses will be taught in English.

Please note that these courses are given in succession and will not open for late application. Therefore, if you plan on pursuing both the first and second level courses during the same academic term, we strongly recommend that you apply to both courses as part of the same application on antagning.se. You can then conditionally qualify for the second course while pursing the first course, and upon completing the first course you can be fully admitted to the second one.

Whether you're stepping into the world of programming for the first time or looking to strengthen your coding foundations, this course has been designed to empower you with these essential Python skills.

Lund and Luleå University

Examination
All assignments must have a passing grade.

Prerequisites
General entry requirements for university studies in Sweden. English 6 (LTU)

Read more aboute requirements on Antagning.se

Programming in Python:
Working with Shared Libraries, 5 hp

Course code: 5KK048 (Uppsala), D0040E (Luleå)
Antagning.se

Explore Python's Libraries and Modules. Python isn't just a language; it's an ecosystem with powerful libraries and modules that extend its capabilities beyond basic programming. In this course, you'll gain a better understanding of Python programming and more of its foundational functionality.

Why choose this course?

- Unveil Python's Potential: Delve into the core concepts of Python programming with libraries and modules, uncovering their true potential and how they elevate your coding skills.
- Harness the Python Toolbox: Master the art of utilising Python libraries for tasks ranging from tabular data manipulation to scientific computing, data visualisation, and even natural language processing (NLP).
- Real-World Applications: Bridge the gap between theory and practice by applying your knowledge to real-world examples, and discover how Python's capabilities can address a range of complex challenges.
- Master Exceptions: Learn to handle exceptions gracefully, ensuring your programs remain robust and error-resistant.
- Discover and Select Libraries: Learn to search for and choose the right libraries for specific tasks within scientific computing, data visualisation, and NLP.
- Debug with Precision: Master the art of testing and debugging programs that make use of libraries and modules, ensuring your code runs well every time.
- Resourceful Problem-Solving: Identify, evaluate, and effectively use external resources to troubleshoot challenges that may arise during your coding endeavours.
- Study online: work on your own terms, totally online.

This course is for those passionate about Python, AI and machine learning, and eager to delve deeper into the intricacies of libraries and modules.

This intermediate course is the second in a three-part series given in collaboration with Lund University/Luleå Technical University and Umeå University. Students who pass this course will be eligible to continue to the next course given online by Umeå University, titled: Programming in Python: Code Quality and Best Practices, 5 hp. All courses will be taught in English.

Uppsala and Luleå University

Examination
Performance assessment: Assignments with electronic submission.

Mandatory elements:
Assignments with electronic submission and the first lecture.

Prerequisites
The national WASP-ED Python course "Programming in Python - basic and preparatory course" At Lund University or Luleå Technical University, or equivalent.

Programming in Python:
Code Quality and Best Practices, 5 hp

Course code: 1NX002
Antagning.se

"Programming in Python: Code Quality and Best Practices," is designed to empower you with the knowledge and skills needed to write excellent code, adhere to industry best practices, and help prepare you for real-world application of your skills.

Python is well-known for its simplicity and versatility, and its applications in AI & Machine Learning make it an essential coding language for the modern programmer. In this course, you'll explore the crucial aspects of code quality, object-oriented programming (OOP), and industry-best practices.

Why choose this course?

- Master Code Quality: Understand the principles that underpin high quality code and elevate your coding standards.
- The Art of Object-Oriented Programming: Delve into object-oriented programming, a paradigm that enhances code structure and reusability.
- Learn to Test for Excellence: Dive into the world of unit testing, a vital practice to ensure your code functions as expected and remains robust.
- Get Familiar with Version Control: Grasp the intricacies of version control, a cornerstone of collaborative coding.
- Documentation Matters: Discover the importance of documenting your code comprehensively, ensuring that your creations are not only functional but also well-documented and user-friendly.
- Critical Thinking: Engage in discussions about code quality based on foundational principles and motivate the use of unit testing, version control, and documentation.

This course is the third in a three-part series given in collaboration with Lund University/ Luleå Technical University and Uppsala University.

Umeå University

Examination
Mandatory individual assignments and exercises. One of the assignments is also examined orally. The examination includes actively reviewing and discussing the work of other students via a learning platform during the course.

Prerequisites
10 hp programming in Python where a basic overview of the standard library and shared libraries in Python is included (e.g. Programming in Python: basic and preparatory course 5 hp, Lund University, and Programming in Python: Working with shared libraries 5 hp, Uppsala or Luleå Technical University).

READING LIST

Programming in Python:
Basic and preparatory course

Think Python: How to Think Like a Computer Scientist
Allen B. Downey
2nd Edition, Version 2.4.0
HTTPS://GREENTEAPRESS.COM/THINKPYTHON2/HTML/INDEX.HTML

Programming in Python:
Working with Shared Libraries

Books

- Downey, Allen B., Think Python [electronic resource]: How to Think Like a Computer Scientist, uuuu-uuuu* (Chapter 8 - page 85–95 Chapter 14 - page 165–175)

- Sweigart, Al, Automate the boring stuff with Python: practical programming for total beginners, 2nd edition, San Francisco, No Starch Press, [2019]* (Chapter 2 (pp 28–48), Chapter 3 (pp 59–63), Chapter 4(pp 88–91), Chapter 6 (pp 129–160), Chapter 9–10 (pp 201–248), Chapter 13 (pp 301–329), Chapter 14(pp 329–347), Chapter 16 (pp 371–388))

- Wes McKinney, "Python for Data Analysis, 3rd Edition", 2022* (Chapter 4, Chapter 5, Chapter 6.1–6-2, Chapters 7–9)

Web posts

- Know Your Exceptions: A Comprehensive Guide to Python Exception Handling,*
- Python documentation - The Python Standard Library,*
- Python SciPy Tutorial for Beginners,*
  (Sections: Linear algebra, integration and optimization)
- Python Seaborn Tutorial For Beginners: Start Visualizing Data,*
- Python documentation - The Python Standard Library: Built-in Types,*
- Python documentation - The Python Standard Library: Basic date and time types,*
- Python documentation - The Python Standard Library: os.path module,*
- Python documentation - The Python Standard Library: Json,*
- Input/output tutorial,*
- XML tutorial,*
- Markdown syntax,*
- NLTK,* (Intro: https://www.nltk.org/ Word embeddings: https://www.nltk.org/howto/gensim.html
  Concordance: https://www.nltk.org/howto/concordance.html Collocations: https://www.nltk.org/howto/collocations.html)
- A brief history of word embeddings,*
- Word2Vec model,*

Extended reading

- Sweigart, Al, Automate the boring stuff with Python: practical programming for total beginners, 2nd edition, San Francis co, No Starch Press, [2019] (Chapter 14 - page 165 to 175 Chapter 11 - page 249 to 267)
- Seaborn gallery,

Compulsory*
Reading-list: HTTPS://WWW.UU.SE/EN/STUDY/READING-LIST?QUERY=38980

READING LIST

Programming in Python:
Code Quality and Best Practices

Literature

Valid from: 2024 week 35
Mandatory literature
Downey Allen. Think Python. : how to think like a computer scientist
2. ed., version 2.4.0 : Needham : Green Tea Press : 2015 : PDF (xxii, 222 s.) :
Online access for UMUB
Mandatory

Additional course materials provided by the teacher will be included.

Reference literature

Sweigart Al. Beyond the basic stuff with Python : best practices for writing clean code,
San Francisco, CA : No Starch Press, Inc. : [2021] : xxv, 352 pages :
ISBN: 9781593279660
Search the University Library catalogue

The book is available for free at https://inventwithpython.com/beyond/.