



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DIT515 Advanced programming in Python, 7.5 credits

Fortsättningskurs i programmering i Python, 7,5 högskolepoäng

First Cycle

Confirmation

This course syllabus was confirmed by Department of Computer Science and Engineering on 2022-11-17 to be valid from 2023-08-28, autumn semester of 2023.

Field of education: Science 100%

Department: Department of Computer Science and Engineering

Position in the educational system

The course is given as an single subject course at the University of Gothenburg.

The course can be part of the following programme: 1) Computer Science, Bachelor's Programme (NICOS)

Main field of studies

Computer Science

Specialization

G2F, First cycle, has at least 60 credits in first-cycle course/s as entry requirements

Entry requirements

To be eligible for the course, students must have an Introductory course in programming, in e.g. Python, Java or Haskell. Examples of such courses are DIT441, DIT013, FYD095 och MVG301.

Applicants must prove knowledge of English: English 6/English B or the equivalent level of an internationally recognized test, for example TOEFL, IELTS.

Learning outcomes

On successful completion of the course the student will be able to:

Knowledge and understanding

- recognize all constructs of Python and the design choices behind them
- explain the design alternatives in modular and scalable programming

Competence and skills

- create well-organized software projects for complex tasks
- read and analyse code written by others
- contribute to collaborative projects
- use standard libraries for advanced tasks
- apply testing methods to guarantee the quality of code
- write code documentation on different levels of detail

Judgement and approach

- reason about software design choices
- assess the complexity of programming tasks

Course content

The course starts with a quick introduction to the elements of Python, which serves as repetition for students who already know Python but also enables students with other backgrounds to get started with Python.

After the introduction, the course proceeds to more advanced features of Python programming:

- object-oriented design
- functional programming techniques
- advanced Python-specific techniques
- the use of standard libraries
- testing methodologies
- creation of larger programming projects

The goal is to give a thorough understanding of Python so that the participants can read and write state of the art code and reason about design choices.

The theoretical material is presented in relation to a project, which is divided into individual components (labs), and which results in a comprehensive software system implementing techniques such as scientific computing, data analysis, visualization, and machine learning. No knowledge of these techniques is presupposed but will be a part of the teaching; the focus here is not on the theory but on enabling the students to use relevant software libraries in adequate ways.

Sub-courses

1. Written hall examination (*Skriftlig salstentamen*), 3 credits

Grading scale: Pass with distinction (5), Pass with credit (4), Pass (3) and Fail (U)

2. Laboratory work (*Laboration*), 4.5 credits

Grading scale: Pass with distinction (5), Pass with credit (4), Pass (3) and Fail (U)

Form of teaching

Lectures, exercises, assignments, individual supervision.

Language of instruction: English

Assessment

The course project is organized into three levels, corresponding to grades 3,4, and 5. Thus a higher grade can be obtained by doing more work in the project. A project of level 4 must also satisfy the requirements of level 3, and level 5 must satisfy level 4. After completed projects, an exam must be passed. The purpose of the exam is to control that the students have made their projects independently and understood what they are doing.

If a student who has twice received a failing grade for the same examination component wishes to change examiner ahead of the next examination session, such a request should be made to the department in writing and should be approved by the department unless there are special reasons to the contrary (Chapter 6 Section 22 of the Higher Education Ordinance).

If a student has received a recommendation from the University of Gothenburg for study support for students with disabilities, the examiner may, where it is compatible with the learning outcomes of the course and provided that no unreasonable resources are required, decide to allow the student to sit an adjusted exam or alternative form of assessment.

In the event that a course has ceased or undergone major changes, students are to be guaranteed at least three examination sessions (including the ordinary examination session) over a period of at least one year, but no more than two years after the course has ceased/been changed. The same applies to internships and professional placements (VFU), although this is restricted to just one additional examination session.

Grades

The grading scale comprises: Pass with distinction (5), Pass with credit (4), Pass (3) and Fail (U).

The final grade is determined by the lowest of the exam grade and the course project.

Course evaluation

The course is evaluated through meetings both during and after the course between teachers and student representatives. Further, an anonymous questionnaire is used to ensure written information. The outcome of the evaluations serves to improve the course by indication which parts could be added, improved, changed or removed.

Additional information

The course is a joint course together with Chalmers (DAT515).

Course literature to be announced the latest 8 weeks prior to the start of the course.