Linnæus University

Dnr: 2020/1050-3.1.2.2

Course syllabus

Faculty of Technology

Department of Computer Science and Media Technology

4DV507 Kodtransformationer och interpretation, 5 högskolepoäng
4DV507 Code transformation and interpretation, 5 credits

Main field of study
Computer Science

Subject Group
Informatics/Computer and Systems Sciences

Level of classification
Second Level

Progression
A1N

Date of Ratification
Approved 2018-10-08
Revised 2020-03-13 by Faculty of Technology. Assessment methods are revised.
The course syllabus is valid from autumn semester 2020

Prerequisites
90 credits in Computer Science (including a degree project at Bachelor level).

Objectives

After completing the course the student shall be able to:
Knowledge and understanding

- A.1 Describe the various phases in the compilation process,
- A.2 describe various parsing techniques,
- A.3 explain what happens during the semantic analysis,
- A.4 explain how type systems for common programming languages work, and
- A.5 explain how a stack machine works.

Skills and abilities

- B.1 Design a finite state machine and an LL(1) context-free grammar for simple programming languages,
- B.2 design and develop a semantic analysis,
- B.3 implement a parser using a given parser generator tool, and
- B.4 generate executable code.

Judgement and approach

- C.1 Judge the difficulty of implementing various programming language constructs, and
- C.2 select and reflect on an appropriate formal notation to describe a given formal language.

Content

The course presents techniques, theories, and tools used for constructing a compiler. The course also discusses how these ideas can be used to define, process, and interpret domain-specific languages within modeldriven software engineering. As a result, the course focuses on the compiler frontend, generation of intermediate program representations, and execution of such representations.
The following topics are covered:

- Various compilation phases
- Object-oriented compiler design
- Lexical analysis based on finite automata and regular expressions
- Context-free grammars and languages
- Various parsing techniques for context-free languages
- Type systems and type inference
- Semantic analysis
- Intermediate program representations
- Code generation
- Stack machines

Type of Instruction

The instruction consists of lectures and teacher-supervised tutoring sessions related to the practical assignments. The practical assignments are carried out in groups of two students.

Examination

The examination of the course is divided as follows:

Code	Designation	Grade	Credits
2001	Programming Assignments	AF	3,00
2002	Written exam	AF	2,00

The course is assessed with the grades A, B, C, D, E, Fx or F.

The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student’s performance is assessed as fail (i.e. received the grade F).

Assessment of student performance is made through programming assignments and a written exam. Students who do not pass the regular examination will be offered a retake examination close to the regular examination.

To pass the course, grade E or higher is required for all parts. The final grade is decided from: Programming assignments (60%) and Written exam (40%).

Repeat examination is offered in accordance with Local regulations for courses and examination at the first and second-cycle level at Linnaeus University.
If the university has decided that a student is entitled to special pedagogical support due to a disability, the examiner has the right to give a customized exam or to have the student conduct the exam in an alternative way.

Objectives achievement

The examination elements are linked to the course objectives in the following ways:

Goal	2001	2002
A.1		☑
A.2		☑
A.3		☑
A.4		☑
A.5		☑
B.1	☑	☑
B.2	☑	
B.3	☑	
B.4	☑	
C.1		☑
C.2		☑

Course Evaluation

During the implementation of the course or in close conjunction with the course, a course evaluation is to be carried out. Results and analysis of the course evaluation are to be promptly presented as feedback to the students who have completed the course. Students who participate during the next course instance receive feedback at the start of the course. The course evaluation is to be carried out anonymously.

Other

Grade criteria for the A–F scale are communicated to the student through a special document. The student is to be informed about the grade criteria for the course by the start of the course at the latest.

The course is conducted in such a way that the course participants' experiences and knowledge are made visible and developed. This means, for example, that we have an inclusive approach and strive for no one to feel excluded. This can be expressed in different ways in a course, for example by using the gender neutral example.

Required Reading and Additional Study Material

- Material from the Internet, and

- Handouts, 200 pages.