



## Course syllabus

Faculty of Technology

Department of Computer Science and Media Technology

1DV534 Objektorienterad programmering med C++, 7,5 högskolepoäng

1DV534 Object Oriented Programming with C++, 7.5 credits

### **Main field of study**

Computer Science

### **Subject Group**

Informatics/Computer and Systems Sciences

### **Level of classification**

First Level

### **Progression**

G1F

### **Date of Ratification**

Approved 2018-01-08

Revised 2018-02-02 by Faculty of Technology. Objectives, Content, Type of Instruction, Examination and literature lists are revised.

The course syllabus is valid from spring semester 2018

### **Prerequisites**

Structured programming with C++ 7.5 credits (1DV433) or equivalent.

## Objectives

The aim of the course is for the student to acquire knowledge and develop basic skills in object oriented programming with the C++ programming language.

After finished course, the student shall be able to:

- account for basic concepts and principles in object oriented design and programming with regard to the C++ language. (1)
- apply object oriented programming techniques based on a given problem and a simpler own design in Unified Modeling Language (UML). (2)
- create object oriented, text based applications in C++, using a good programming methodology and with great emphasis on the program quality and ease of use in the completed program. (3)

## Content

The course consists of two modules

### ***Module 1 Theory 3.5 credits***

The theory module, which covers objectives 1-3, deals with the following elements:

- Introduction of basic concepts and principles of the object oriented programming model and object oriented design.
- Classes and objects, member variables, member functions, constructors, destructors-
- Programmatic mechanisms to support software quality and usability.
- Encapsulation, operator overloading, exception handling.
- Inheritance mechanisms in C++.
- Virtual functions and polymorphism, interface and framework.
- Generic programming and use of program libraries.
- Templates (classes and functions), STL (Standard Template Library).

### ***Module 2 Practice exercises 4 credits***

In the practical module, which covers objectives 2-3, the theoretical concepts are applied by analyzing problems, which are then designed and solved with appropriate program logic according to the object oriented principles covered in current step. This means that the student independently solves given programming problems by creating own object oriented design documents and programs in C++. To some extent, the assignments are selectable by severity, interest and ambition.

### **Type of Instruction**

The course is conducted entirely at a distance and is based on self-studies of assigned literature and web based study material. The study material deals with the theory, as well as the students are assigned practical tasks in which the knowledge is applied. For the practical applications is offered personal online tutoring. Since only web based communication is applied in this distance learning course, the student is required to have own access to computer, headset, webcam and internet connection.

The course is divided into four steps that build upon each other. Each step includes a number of practical applications, with both mandatory and optional tasks of varying severity and for different areas of interest. For approval, these should be implemented according to requirements for each assignment.

Each step 1-4 ends with a theoretical test, carried out online in a web based test tool according to instructions given on the course web. Failed step test can be reexamined at most twice, normally in connection with the next regular examination session.

### **Examination**

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).

Module Theory (3.5 credits):

Objectives 13 are examined stepwise, through tests with multiple choice questions. The tests are individual and computer based and carried out from optional location. The grades A-F are applied.

Module Practical applications (4 credits):

Objectives 23 are examined stepwise, through digital presentations of programming tasks. The grades A-F are applied.

Final grades are set only after completion of both course modules and are based on an overall assessment of respective examination results from the two modules (Theory and Practical Applications). The latter consists of programming tasks, where the solution quality is of crucial importance to the final assessment.

The grades A-F are applied for the final grade and are based on grading criteria which are published on the course website. For grade E, the approval level for respective examination module must be achieved. For higher grade than E is mainly required that the practical applications are implemented at a more advanced level, as well as comply with stated quality requirements and grading criteria for respective grade. Also the theoretical result should support the corresponding level.

Reexaminations are offered within six weeks under the regular semester periods.

### Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed at the Faculty.

### Credit Overlap

The course cannot be included in a degree along with the following course/courses of which the content fully, or partly, corresponds to the content of this course: 1DV434, 7,5 credits

### Other

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

Since only online communication is used in this distance course, is required that the student has own access to computer, headset, webcam and internet connection.

The course is communicated in English or Swedish, depending on the student's choice and prerequisites. The self-study material is available in English and Swedish on the course web site.

### Required Reading and Additional Study Material

#### **Recommended literature**

- Schildt, Herbert: C++ from the ground up, (McGrawHill/Osborne Media), latest available edition.
- Optional alternative beginner's book in C++ programming may be used after agreement with the course coordinator.
- Additional web based study material is provided on the course's website.