

The Hebrew University of Jerusalem

Syllabus

Programming Workshop in C & C++ - 67312

Last update 20-12-2023

HU Credits: 4

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Computer Sciences

Academic year: 0

Semester: 1st Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Oded wertheimer

Coordinator Email: oded.wertheimer@mail.huji.ac.il

Coordinator Office Hours: By appointment

Teaching Staff:

Mr. Oded Wertheimer,
Ms. Yael Perez,
Mr. Avishai elmakies

Course/Module description:

The course provides a thorough introduction to the C and C++ programming language.

Course/Module aims:

Familiarity with the C programming language syntax, and better understanding of how programming language and hardware interact.
Understanding the special characteristics, benefits and faults of using C++ programming language.

Learning outcomes - On successful completion of this module, students should be able to:

Read and write programs in C/C++ language.
Use pointers safely and correctly.
Understand memory management.
Apply generic programming.

Attendance requirements(%):

0

Teaching arrangement and method of instruction: Lectures, recorded lectures, TAs, labs and programming assignments.

Course/Module Content:

C part:
The structure of a C Program
Built in data types and enumerators
Variables types (local, static, global)
Logical and arithmetic expressions
Bitwise operations
C standard library
Standard and File IO
Control-flow statements
Functions

Pointers

Static and dynamic memory understanding and management

Arrays

Structs, unions and bitfields

Strings

Error handling

The C preprocessor (macros, directives)

Program organization

Multiple files compilation and linkage (static, extern)

Make utility and building a makefile

Command-line arguments

Generic programming in C

Function pointers

Code optimization

Variadic functions

C++ part:

References

Functions overloading

Classes, fields and methods, members and static, constructors and destructors

Static and dynamic memory understanding and management

Const methods and objects

Nested classes

Namespaces

Inheritance

Virtual methods and polymorphism

Encapsulation, abstract classes and interfaces, multiple inheritance

Operators overloading

Copying and casting

Exceptions handling

Templates functions and classes

Principles of generic programming

Generic iterators

Templates specialization

Standard template library (STL)

Smart pointers

The new use of "auto" keyword

Lambda functions and Functors

Required Reading:

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Additional Reading Material:

The C Programming Language

Book by Brian Kernighan and Dennis Ritchie

The C++ Programming Language

Book by Bjarne Stroustrup

Grading Scheme:

Written / Oral / Practical Exam 64 %

*Submission assignments during the semester: Exercises / Essays / Audits / Reports
/ Forum / Simulation / others 36 %*

Additional information:

*A programming task will be administered after learning C and will constitute up to
10% mager to the final exam grade.*