

Dongseo University

Division of Computer Engineering

Advanced Programming

Instructor(s): LEE, Young Sil / Ph.D., Elena Tsomko

Office: #804, U-IT building

Phone: -

Email: youngsil.lee0113@gmail.com

Classroom: TBD

Class Time: TBD

Office Hours: 09-18

Course Description:

This course is an introduction to software engineering using the C++ programming language. Students will learn the fundamentals of C++. The focus is on developing high quality, working software that solves real problems.

This course is designed for students with some programming experience, but if you have none and are motivated you will do fine. This is a three-credit course and combines practice with theory.

In addition to the small programming exercises in homework assignments, this course will include extensive programming assignments in the form of team projects. The project will be more open-ended to give you a chance to express your creativity, and expose you to a more realistic programming experience.

This course is offered during the spring semester, which is a 15-week term at the U-IT building that runs from the first week of March until the end of the semester.

Course Goals & Objectives:

At the conclusion of this course, the successful (passing) students will be able to:

- Familiarize a trainee with the universal concepts of computer programming.
- Manipulate various C++ datatypes, such as arrays, string, and pointers
- Isolate and fix common errors in C++ programs
- Discuss the principles of the object-oriented model and its implementation in the C++ language.
- Demonstrate the means useful in resolving typical implementation problems with the help of standard C++ language libraries.

Course Outline:

- **Week 1 Introduction & Syllabus Overview**
 - What is C++?
 - C and C++
 - Object Oriented Programming
 - Course syllabus

- **Week 2 Types and declarations**
 - Types
 - Booleans
 - Integer Types
 - Floating-Point Types
 - Sizes
 - Void
 - Enumerations
 - Declarations
- **Week 3 Pointers, Arrays and Structures**
 - Pointers
 - Arrays
 - Pointers into Arrays
 - Constants
 - References
 - Pointers to void
 - Structures
- **Week 4 Expressions and Statements**
 - A Deck Calculator
 - Operator Summary
 - Statement Summary
 - Comments and Indentation
- **Week 5 Functions**
 - Function Declarations
 - Argument Passing
 - Value Return
 - Overloaded Function Names
 - Default Arguments
 - Pointer to Function
 - Macros
- **Week 6 Namespaces and Exceptions**
 - Namespaces
 - Exceptions
- **Week 7 Source Files and Programs**
 - Separate Compilation
 - Linkage
 - Using Header Files
 - Programs
- **Week 8 Mid-Term Exam**

- **Week 9 Classes**
 - Classes
 - Access Control
 - Constructors
 - Member functions
 - Static members
 - Destructors
 - Memory allocation
 - Member initialization
- **Week 10 Operator overloading**
 - Introduction
 - Operator Functions
 - A Complete Number Type
 - Conversion Operators
 - Friends
 - Large Objects
 - Essential Operators
 - Subscripting
 - Functions Calls
 - Dereferencing
 - Increment and Decrement
 - A String Class
- **Week 11 Derived class**
 - Introduction
 - Derived Classes
 - Abstract Classes
 - Design of Class Hierarchies
 - Class Hierarchies and Abstract Classes
- **Week 12 Team projects**
 - Presentation – project proposals
- **Week 13 Team projects**
- **Week 14 Team projects**
- **Week 15** Final presentation

Textbook(s)

- Required: Bjarne Stroustrup, “The C++ Programming Language – fourth edition,” May 2013.
- Recommended: Recent references available at JUST university library

Class Website: e-Class

Course Assignments & Grading:

- *Exams:*
 - There will be a mid-term exam, containing a set of questions, in week 8 of the lecture period (25% of final grade) and a final exam in week 15 (25% of final grade). The two exams count for 50% of the total final course grade.
- *Attendance:*
 - Attendance is mandatory (see the Course policy).
- *Assignments:*
 - All assignments must be turned in on the due date. Late assignments will not be accepted.
 - All written assignments should be typed, double-spaced, using 12-point font. No hand-written assignments will be accepted.
 - We will use e-class on occasion for posting lecture announcements.
- *Team project:*
 - All teams, you will propose and implement a program that involves using one or more publicly available libraries to accomplish some non-trivial task.
 - A written proposal must be submitted and approved by the instructors by the end of the 9th week of class.
 - The final implementation and write-up of the project is due on the last day of class.
 - The proposal and implementation should be completed as a team, but each student is expected to produce a final write-up and will be graded individually.
 - This project is intended to provide you with the opportunity to develop a level of sophistication in programming in C++. Therefore, in addition to correctness, points will be awarded for elegance, coding style, and a demonstrated understanding of the practical issues.
 - Although some competitions reward obfuscation, practical programming requires a balance of clarity and conciseness. Therefore, all code should be well-documented, with comments, and the structure of the code should be straightforward.
- *Grading Scale:*
 - 91-100% = A+
 - 81-90% = A
 - 71-80% = B+
 - 65-70% = B
 - 61-64% = C+
 - 55-60% = C
 - 50-54% = D

Grading Policies:

Your course grade will be based on the following breakdown:

Homework Assignments	30%
Attendances	10%
Midterm Exam (usually 8th week, in class)	25%
Final Exam (usually 15th week) – Team project	35%

Letter grades are subject to the instructor's evaluation of overall lecture performance, but there will not be a curve. Questions or appeals about assignment grades should be directed to the head TA, and must be made within one week of the graded assignment being returned. If you are not satisfied with the TA's resolution, you must submit a written appeal to the instructor via e-mail within two days of your discussion with the TA.

Course Policies:

- Attendance: Events such as illness, injury, or job or graduate school interviews, are expected to occasionally prevent students from attending lectures. However, students who regularly fail to attend 3 lectures will be penalized (see the Grading policy). You are responsible for all material presented while you are absent.
- Academic Misconduct Policy: