



Hunan University

CS 21: Intermediate Programming

Professor: To be announced
Total contact hours: 54 hours
Credit: 4

Course Description

C++ is a large, complex language, and learning it is never entirely easy. But some concepts and techniques must be thoroughly mastered if students are ever to do professional-quality work. This course aims at cutting through the technical details to reveal what is commonly understood to be absolutely essential. It includes the most critical knowledge required for successful C++ programming. During your learning, you will find that this course covers essential but commonly misunderstood topics in C++ programming and design while filtering out needless complexity in the discussion of each topic. All of it remains is a clear distillation of the essential required for production C++ programming, presented in the author's trademark incisive, engaging style.

Required Material

Textbook: *C++ Common Knowledge: Essential Intermediate Programming*

Author: Stephen C. Dewhurst

Publisher: Addison-Wesley Professional; 1(March 10, 2005)

Grading

- Quizzes 20%
- Reports 20%
- Midterm Exam 20%
- Final Exam 40%

A+ 96-100	A 90-95	A- 85-89
B+ 82-84	B 78-81	B- 75-77
C+ 71-74	C 66-70	C- 62-65
D 60-61	F < 60	



Course Schedule

The course has 24 class sessions in total. All sessions are 2 hours and 15 minutes in length.
Note: the course outline and required readings are subject to change.

Class 1:

Introduction to the course and the textbook

Class 2:

Item 1: Data Abstraction

Item 2: Polymorphism

Item 3: Design Patterns

Class 3:

Item 4: The Standard Template Library

Item 5: References Are Aliases, Not Pointers

Item 6: Array Formal Arguments

Class 4:

Item 7: Const Pointers and Pointers to Const

Item 8: Pointers to Pointers

Item 9: New Cast Operators

Report 1

Class 5:

Item 10: Meaning of a Const Member Function

Item 11: The Compiler Puts Stuff in Classes

Item 12: Assignment and Initialization Are Different

Class 6:

Item 13: Copy Operations

Item 14: Function Pointers

Item 15: Pointers to Class Members Are Not Pointers

Class 7:

Item 16: Pointers to Member Functions Are Not Pointers

Item 17: Dealing with Function and Array Declarators

Item 18: Function Objects

Class 8:

Item 19: Commands and Hollywood

Item 20: STL Function Objects

Item 21: Overloading and Overriding Are Different



Quiz 1

Class 9:

Item 22: Template Method

Item 23: Namespaces

Item 24: Member Function Lookup

Class 10:

Item 25: Argument Dependent Lookup

Item 26: Operator Function Lookup

Item 27: Capability Queries

Class 11:

Item 28: Meaning of Pointer Comparison

Item 29: Virtual Constructors and Prototype

Item 30: Factory Method

Class 12:

Midterm Exam

Class 13:

Item 31: Covariant Return Types

Item 32: Preventing Copying

Item 33: Manufacturing Abstract Bases

Class 14:

Item 34: Restricting Heap Allocation

Item 35: Placement New

Item 36: Class-Specific Memory Management

Class 15:

Item 37: Array Allocation

Item 38: Exception Safety Axioms

Item 39: Exception Safe Functions

Class 16:

Item 40: RAI

Item 41: New, Constructors, and Exception

Item 42: Smart Pointers

Report 2

Class 17:

Item 43: auto_ptr Is Unusual

Item 44: Pointer Arithmetic



Item 45: Template Partial Specialization

Class 18:

Item 46: Class Template Explicit Specialization

Item 47: Template Partial Specialization

Item 48: Class Template Member Specialization

Class 19:

Item 49: Disambiguating with Typename

Item 50: Member Template

Item 51: Disambiguating with Template

Class 20:

Item 52: Specialization for Type Information

Item 53: Embedded Type Information

Item 54: Traits

Quiz 2

Class 21:

Item 55: Template Template Parameters

Item 56: Policies

Item 57: Template Argument Deduction

Class 22:

Item 58: Overloading Function Templates

Item 59: SFINAE

Item 60: Generic Algorithms

Class 23:

Item 61: You Instantiate What You Use

Item 62: Include Guards

Item 63: Optional Keywords

Class 24:

Final Exam

Attending Policy

Regular and prompt attendance is required. Under ordinary circumstances, you may miss two times without penalty. Each absence over this number will lower your course grade by a third of a letter and missing more than five classes may lead to a failing grade in the course. Arriving late and/or leaving before the end of the class period are equivalent to absences.



Policy on “Late Withdrawals”

In accordance with university policy, appeals for late withdrawal will be approved ONLY in case of medical emergency and similar crises.

Academic Honesty

Hunan University expects all students to do their own work. Instructors will fail assignments that show evidence of plagiarism or other forms of cheating, and will also report the student's name to the University administration. A student reported to the University for cheating is placed on disciplinary probation; a student reported twice is suspended or expelled.

General Expectations:

Students are expected to:

- Attend all classes and be responsible for all materials covered in class and otherwise assigned;
- Complete the day's required reading and assignments before class;
- Review the previous day's notes before class and make notes about questions you have about the previous class or the day's reading;
- Participate in class discussions and complete required written work on time;
- Refrain from texting, phoning or engaging in computer activities unrelated to class during the class period;
- While class participation is welcome, even required, you are expected to refrain from private conversations during the class period.

Special Needs or Assistance

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.