COURSE SYLLABUS

1. COURSE TITLE

C++ Programming Language

2. COURSE CODE

COMP3153

3. PRE-REQUISITE

Nil

4. CO-REQUISITE

Nil

5. NO. OF UNITS

3

6. CONTACT HOURS

42

7. OFFERING UNIT

Financial Mathematics Programme, Faculty of Science and Technology

8. SYLLABUS PREPARED & REVIEWED BY

Prepared by: Dr. Xin Feng
Reviewed by: Dr. Weifeng Su, revised by Dr. Pengfei ZHAO

9. AIMS & OBJECTIVES

This course introduces object-oriented programming concepts, principles, and techniques using the C++ programming language. Students will learn how to create C++ programmes using control statements, functions, structures, memory management, pointers, classes, inheritance, and polymorphism. Students will also learn how to use tools to edit, compile, debug, and test C++ programmes.

10. COURSE CONTENT

Introduction

A. Programming Languages
B. OO Programming languages
C. Source Code and Executable Code

II. Formatted I/O and Expressions
A. Primary Data Types and Variables
B. Formatted I/O
C. Expressions

III. Statements
A. Decision Statements
B. Looping Statements
C. Control Flow Diagram

IV. Functions
A. Declaration and Definition
B. Formal Parameters and Actual Parameters
C. Library Functions

V. Compound Data Types and Type Definition
A. Arrays
B. Structures
C. Data Type Definition
D. Enumeration

VI. Pointers and Memory Management
A. Pointer Declaration
B. Memory Allocation and Release
C. Dynamic Memory Management

VII. Strings
A. Declaration
B. String Functions

VIII. Files
A. File Stream Declaration
B. File I/O

IX. Classes
A. Main Features
B. Declaration and Definition
C. Constructors and Destructors
D. Class Instantialisation
E. Operator Overloading

X. Inheritance and Polymorphism

A. Overridding
B. Multiple Inheritance
C. Abstract Classes

XI. Exceptions and Tempaltes
A. Exceptions
B. Templates

11. COURSE INTENDED LEARNING OUTCOMES (CILOS) WITH MATCHING TO PILOS

Programme Intended Learning Outcomes (PILOs)

Programme Title: Bachelor of Science (Honours) in Financial Mathematics	
PILO	**Upon successful completion of the Programme, students should be able to:**
PILO 1	Apply the basic principles of financial mathematics to clearly explain the phenomena and problems in financial markets;
PILO 2	Interpret quantitative models for pricing derivatives, managing trading strategies and simulating market scenarios;
PILO 3	Employ theories and tools of financial mathematics for the construction of the financial product, asset pricing and risk management;
PILO 4	Use mathematical and financial software to perform computation of financial data analysis and pricing and valuation of financial instruments;
PILO 5	Conduct independent research in financial management and exploring business opportunities in financial markets;
PILO 6	Develop the capacity to work as part of a team.

CILOs-PILOs Mapping Matrix

Course Code & Title: COMP3153 C++ Programming Language		
CILO	**Upon successful completion of the course, students should be able to:**	**PILO(s) to be addressed**

Course Code & Title: COMP3153 C++ Programming Language		
CILO	**Upon successful completion of the course, students should be able to:**	**PILO(s) to be addressed**
CILO 1	Describe the basic concepts and key principles of object-oriented programming.	PILO 3, 4
CILO 2	Develop solutions to problems using the C++ language	PILO 3, 4
CILO 3	Use tools to edit, compile, debug, and test C++ programmes	PILO 3, 4
CILO 4	Work independently and also as a team	PILO 6

12. TEACHING & LEARNING ACTIVITIES (TLAS)

CILO No.	**TLAs**
CILO 1	**Lecture:** The instructor will explain the course materials in detail. **Assignments In-class exercises:** Assignments and In-class exercises are given for the students to better understand what they have learnt in lectures. **Hands-on practice:** Tutorials are arranged for the students to learn and practise programming.
CILO 2	**Lecture:** The instructor will explain the course materials in detail. **Assignments and In-class exercises:** Assignments and In-class exercises are given for the students to better understand what they have learnt in lectures. **Hands-on practice:** Tutorials are arranged for the students to learn and practise programming.
CILO 3	**Lecture:** The instructor will explain the course materials in detail. **Assignments and In-class exercises:** Assignments and In-class exercises are given for the students to better understand what they have learnt in lectures.

CILO No.	TLAs
	Hands-on practice: Tutorials are arranged for the students to learn and practise programming.
CILO 4	**Project:** A team project is arranged so that the students can learn how to work as a team to develop a larger system.

13. ASSESSMENT METHODS (AMS)

Type of Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
Assignments	20%	1-3	Assignments measure students' understanding of the basic components of C++ and abilities in finding solutions to problems, coding, and debugging.
In-class exercises	20%	1-3	In-class exercises will be given to enable students to practice for better understanding the basic components of C++ and abilities in finding solutions to problems.
Project	20%	1-4	The project assesses if the students can work as a team and use their knowledge in programming.
Final Examination	40%	1-3	The final exam checks students' understanding of the basic components of C++ and abilities in finding solutions to problems.

14. TEXTBOOKS / RECOMMENDED READINGS

TEXTBOOKS:

Nil.

RECOMMENDED READINGS:

- Bjarne Stroustrup, The C++ Programming Language, 4th Edition, Addison-Wesley Professional, 2013.
- Scott Meyers, Effective C++: 50 Specific Ways to Improve Your Programs and Designs, 3rd Edition, Addison-Wesley, 2005

- Bjarne Stroustrup, Programming: Principles and Practice Using C++, Addison Wesley, 2008
- Edsger W. Dijkstra, "Go To Statement Considered Harmful", Communications of the ACM, pp. 147-148, Vol. 11, No. 3, March 1968.
- Edsger Dijkstra, "Notes on Structured Programming", T. H. Report, 70-WSK-03, Tech. Univ. Eindhoven, 1970.
- Ole-Johan Dahl, Edsger Wybe Dijkstra and Charles Antony Richard Hoare, Structured programming, Academic Press, 1972.
- Donald Knuth, "Structured Programming with go to Statements", Computing Surveys 6 (4): 261–301, 1994.
- Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Second Edition, Prentice Hall, Inc., 1988.
- Peter van der Linden, Expert C Programming: Deep C Secrets, Prentice Hall, June 1994.
- Dennis M. Ritchie, The Development of the C Language, conference proceedings: History of Programming Languages-II ed. Thomas J. Bergin, Jr. and Richard G. Gibson, Jr. ACM Press (New York) and Addison-Wesley (Reading, Mass), 1996.

15. MEDIUM OF INSTRUCTION (MOI)

English

Revised on: <2023-06-20>