课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	**课程名称 Course Title**	C/C++程序设计基础 Introduction to C/C++ Programming
2.	**授课院系 Originating Department**	系统设计与智能制造学院 School of System Design and Intelligent Manufacturing
3.	**课程编号 Course Code**	SDM252
4.	**课程学分 Credit Value**	3
5.	**课程类别 Course Type**	专业基础课 Major Foundational Courses
6.	**授课学期 Semester**	秋季 Fall
7.	**授课语言 Teaching Language**	中英双语 English & Chinese
8.	**授课教师、所属学系、联系方式（如属团队授课，请列明其他授课教师） Instructor(s), Affiliation& Contact （For team teaching, please list all instructors）**	刘涛 副教授 系统设计与智能制造学院 liut6@sustech.edu.cn LIU Tao Associate Professor School of System Design and Intelligent Manufacturing liut6@sustech.edu.cn
9.	**实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact**	无 NA
10.	**选课人数限额(可不填) Maximum Enrolment （Optional）**	

11. 授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other（Please specify）	总学时 Total
学时数 Credit Hours	32		32		64

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	无
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	SDM358 微机原理与嵌入式系统，SDM5008 高级机器人控制
14. 其它要求修读本课程的学系 Cross-listing Dept.	无

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

这是一门介绍 C/C++编程语言的入门的课程。适用于没有编程背景的学生，但有经验的学生仍能学习到 C/C++的特定结构和概念。这门课程将在过程化、通用、基于对象和面向对象编程的背景下介绍 C++的基础知识。课程将涵盖关键主题，如通用编程和标准模板库，基于对象的编程和类设计，面向对象编程和类层次结构设计，函数和类模板设计及其使用等。

This is an introductory course to the C/C++ programming language. It is intended for those with little programming background, though prior programming experience will make it easier, and those with previous experience will still learn specific constructs and concepts of C++. This course presents the basics of C/C++ in the context of procedural, generic, object-based, and object-oriented programming. The course will cover key topics such as generic programming and the Standard Template Library, object-based programming and class design, object-oriented programming and the design of class hierarchies, function and class template design and their use, etc.

16. 预达学习成果 Learning Outcomes

到本课程结束时，学生能够：

- 理解和使用 C/C++的基本编程结构
- 操作各种 C/C++数据类型，如数组、字符串和指针
- 分离和修复 C/C++程序中常见的错误
- 适当地使用内存，包括正确的分配/释放程序
- 在 C/C++中应用面向对象的方法来解决软件问题
- 使用上述技能编写小型的 C/C++程序

By the end of this course, the students should be able to:

- Understand and use the basic programming constructs of C/C++
- Manipulate various C/C++ data types, such as arrays, strings, and pointers
- Isolate and fix common errors in C/C++ programs

- Use memory appropriately, including proper allocation/deallocation procedures
- Apply object-oriented approaches to software problems in C/C++
- Write small-scale C/C++ programs using the above skills

17. 课程内容及教学日历 （如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）
Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

第 1 周，课程简介，包括发展历程，背景信息，回顾 C 语言，过渡到 C++语言。

第 2 周至第 4 周，基本 C++编程，将提供对预定义程序语言的描述，其中包括内置数据类型、预定义运算符、向量和字符串库类以及条件和循环语句。

第 5 周至第 6 周，过程化编程，将学习如何设计和使用函数，并逐步介绍 C++支持的多种函数类型，包括 inline 函数、重载函数和模板函数以及函数指针。

第 7 周至第 8 周，通用编程，将涵盖标准模板库(STL)，它是容器类的集合，例如 vector、list、set 和 map，以及在这些容器上运行的算法。

第 9 周至第 11 周，基于对象的编程，将逐步介绍 C++类工具的设计和使用，以创建针对不同应用的数据类型。

第 12 周至第 14 周，面向对象编程，将阐释如何扩展类设计以支持面向对象类层次结构中一系列的相关类。

第 15 周至第 16 周，模板编程，将实现一个类模板，能根据用户指定的值或类型自动生成一个确定函数或类。

Week 1, Course Introduction: Including the history of programming languages, background information, review of C language, and introduction of C++ language.

Weeks 2-4, Basic C++ Programming: Providing a description of the predefined language, which covers the built-in data types, the predefined operators, the vector and string library classes, and the conditional and looping statements.

Weeks 5-6, Procedural Programming: Explaining how to design and use a function and walks through the many types of functions supported in C++, including inline, overloaded, and template functions as well as pointers to functions.

Weeks 7-8, Generic Programming: Covering the Standard Template Library (STL), which is a collection of container classes, such as the vector, list, set, and map, and algorithms to operate on those containers.

Weeks 9-11, Object-Based Programming: Walking through the design and use of the C++ class facility to create data types specific to different applications.

Weeks 12-14, Objected-Oriented Programming: Explaining how to extend the class design to support families of related classes in object-oriented class hierarchies.

Weeks 15-16, Programming with Templates: Implementing a class template, which is a prescription for the automatic generation of a unique instance of a function or class based on a user-specified value or type.

18. 教材及其它参考资料 **Textbook and Supplementary Readings**

Textbook: **Essential C++**, by Stanley B. Lippman

Reference book: **C++ Primer**, Fifth Edition, by Stanley B. Lippman, Josée Lajoie, and Barbara E. Moo

课程评估 ASSESSMENT

19.

评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance				
课堂表现 Class Performance		10		
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments		15		
期中考试 Mid-Term Test				
期末考试 Final Exam		50		
期末报告 Final Presentation				
实验 Lab		25		

20. 记分方式 **GRADING SYSTEM**

✓ A. 十三级等级制 **Letter Grading**
☐ B. 二级记分制（通过/不通过） **Pass/Fail Grading**

课程审批 REVIEW AND APPROVAL

21. 本课程设置已经过以下责任人/委员会审议通过
This Course has been approved by the following person or committee of authority