C++程序设计基础 教学大纲

Fundamentals of C++ Programming Subject Syllabus

一、课程信息 Subject Information

课程编号: Subject ID	3100212001	开课学期: Semester	1
课程分类: Category	专业教育 PA	所属课群: Section	专业基础 MF
课程学分: Credit Points	4.5	总学时/周: Total Hours/Weeks	72
理论学时: LECT. Hours	56	实验学时: EXP. Hours	16
PBL 学时: PBL Hours	0	实践学时/周: PRAC. Hours/Weeks	0
开课学院: College	东北大学 悉尼智能科技学院	适用专业: Stream	计算机科学与技术 CST
课程属性: Pattern	必修 Compulsory	课程模式: Mode	自建 NEU
中方课程协调人: NEU Coordinator	李国瑞 Guorui Li	成绩记载方式: Result Type	百分制 Marks
先修课程: Requisites	无		
英文参考教材: EN Textbooks	Paul Deitel, C++ How to Program, Pearson.5th Edition.		
中文参考教材: CN Textbooks	谭浩强，《C++程序设计》，清华大学出版社，2015 年，第三版		
教学资源: Resources	张冰，《面向对象程序设计 C++语言编程》，机械工业出版社，2008 年，第一版； 钱能，《C++程序设计教程》，清华大学出版社，2005 年，第二版。		
课程负责人(撰写人): Subject Director	李国瑞 Guorui Li	提交日期: Submitted Date	单击或点击此处输入日期。
任课教师(含负责人): Taught by	李国瑞 Guorui Li		
审核人: Checked by	韩鹏	批准人: Approved by	史闻博
		批准日期: Approved Date	单击或点击此处输入日期。

二、教学目标 Subject Learning Objectives (SLOs)

注：毕业要求及指标点可参照悉尼学院本科生培养方案，可根据实际情况增减行数

Note: GA and index can be referred from undergraduate program in SSTC website. Please add/reduce lines based on subject.

整体目标: Overall Objective	本课程为计算机科学与技术专业本科生的主干专业课，从程序数据类型和表达式、基于过程的程序设计、基于对象的程序设计、面向对象的程序设计四个方面，系统阐述了程序设计的基本过程和主要知识点。 《C++程序设计》是计算机科学与技术专业本科生的一门基础课程，它是为学生掌握当前最基本的面向对象程序设计方法而设置的。通过本课程的学习，使学生比较熟练地掌握 C++语言的语法规则、基本概念和简单算法，掌握基本的程序设计过程和技巧；具备初步的高级语言程序设计能力和编程经验，能够熟练应用集成环境进行 C++语言的编写、编译与调试，在此基础上增加面向对象的基本知识，掌握 C++输入输出流操作，以及类的基本定义和使用。 该课程培养学生应用问题分析、程序设计和编码、程序调试能力，使学生掌握必要的算法设计技能，初步掌握软件开发的思路和方法，掌握软件工程技术规范，为后继课程的学习、为各类专业应用打下坚实的基础，达到使用 C++语言工具解决应用问题的水平。 This course is the main professional course for undergraduates majoring in computer science. It systematically expounds the basic process and main knowledge points of program design from four aspects: program data type and expression, process based program design, object-based program design and object-oriented program design. C + + programming is a basic course for undergraduates majoring in computer science. It is designed for students to master the most basic object-oriented programming method. Through the study of this course, students can master the grammar rules, basic concepts and simple algorithms of C + + language, and master the basic programming process and skills; Have the preliminary high-level language programming ability and programming experience, can skillfully use the integrated environment for C + + language writing, compiling and debugging, on this basis, increase the basic knowledge of object-oriented, master the C + + input and output stream operation, as well as the basic definition and use of class. This course cultivates students' abilities of application problem analysis, program design and coding, and program debugging. It enables students to master the necessary algorithm design skills, preliminarily master the ideas and methods of software development, and master the technical specifications of software engineering, so as to lay a solid foundation for the study of subsequent courses and various professional applications, and reach the level of using C + + language tools to solve application problems.

（1）专业目标: Professional Ability	1-1	掌握 C++程序设计的初步知识，了解程序发展史和软件工程的基本概念。 Master the preliminary knowledge of C + + programming, understand the history of program development and the basic concepts of software engineering.
	1-2	掌握程序设计中三种设计结构、函数、数组、指针和用户自定义类型的使用，建立起基于过程的程序设计思想，为后续课程打下基础。 Master the use of three kinds of design structure, function, array, pointer and user-defined type in the program design, establish the process based program design idea, and lay the foundation for the follow-up courses.
	1-3	在基于过程设计基础上，进一步掌握基于对象的程序设计思想，建立类和对象的基本概念，逐步培养学生面向对象程序设计的思路。 On the basis of process based design, we should further master the idea of object-based programming, establish the basic concepts of class and object, and gradually cultivate students' thinking of object-oriented programming.
	1-4	掌握继承和多态，了解继承在软件开发中的重要意义，使得学生具有面向对象程序设计的能力。 Master inheritance and polymorphism, understand the importance of inheritance in software development, so that students have the ability of object-oriented programming.
	1-5	能够在软件设计的团队中承担个体、团队成员以及负责人的角色。 Be able to take on the role of individual, team member and leader in the software design team.
（2）德育目标: Essential Quality	2-1	理解计算机编程对于国家信息化发展重要意义。 Understanding computer programming is of great significance to the development of national informatization.
	2-2	认知当前全球编程领域发展前沿及相关中国企业的核心竞争力。 Recognize the current development frontier of global programming and the core competitiveness of relevant Chinese enterprises.

课程教学目标与毕业要求的对应关系 Matrix of GA & SLOs

毕业要求 GA	指标点 GA Index	教学目标 SLOs
1、工程知识：能够将数学、自然科学、工程基础和专业知识用于解决复杂工程问题。 GA1. Engineering Knowledge: Apply knowledge of mathematics, natural	指标点 1-2：掌握程序设计、数据结构、算法分析与设计、计算机数字系统、操作系统等专业知识，具备计算机程序设计开发能力和计算机与信息系统设计开发与维护能力。 1-2: Mastery of programming, data	1-1，1-2，1-3,1-4

science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.	structure, algorithms analysis and design, computer digital system, and operating system, etc., and capable of computer programming and design, design and maintenance of computer and information systems;	
3、设计/开发解决方案：能够设计针对复杂工程问题的解决方案，设计满足特定需求的系统、单元或流程，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。 Design/Development of Solutions: Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health, and safety, cultural, societal and environmental considerations.	指标点 3-1：能够设计针对本专业相关复杂工程问题的解决方案，能够设计和开发实现特定功能、满足特定需求的计算机、软件或网络系统。 3-1: Capable of designing solutions to complex engineering problems related to the major, and capable of designing and developing computers, software or network systems that can function specifically and meet specific requirements.	1-3
	指标点 3-3：能够在设计和开发的各个环节中综合考虑社会、健康、安全、法律、文化以及环境等因素。 3-3: Capable of taking social, health, safety, legal, cultural and environmental factors in consideration during all aspects of design and development.	1-3，2-1
4、研究：能够基于科学原理并采用科学方法对复杂工程问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。 Investigation: Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.	指标点 4-1：能够基于科学原理并采用科学方法，在本专业相关理论指导下对复杂工程问题设计实验进行研究。 Capable of designing experiments and doing research on complex engineering problems based on scientific principles and scientific methods, under the guidance of related theories of the major.	1-3，2-2
8、职业规范：具有人文社会	指标点 8-2：了解本专业相关的职业道德	2-1

科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德和规范，履行责任。 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.	与规范并认识其重要性，具备良好的职业道德和社会责任感，能够对工程实践活动的社会道德进行判断和评鉴，并履行相应的责任； 8-2：Understanding of the professional ethics and norms related to the major and recognize its importance, good professional ethics and social responsibility, capable of judging and evaluating the social ethics of engineering practice activities and fulfill corresponding responsibilities.	

三、教学内容 Content (Topics)

注：以中英文填写，各部分内容的表格可根据实际知识单元数量进行复制、扩展或缩减

Note: Filled in both CN and EN, extend or reduce based on the actual numbers of knowledge unit

(1) 理论教学 Lecture

知识单元序号: Knowledge Unit No.	1		支撑教学目标: SLOs Supported	1-1，2-1，2-2
知识单元名称 Unit Title	C++初步知识 Preliminary knowledge of C + +			
知识点: Knowledge Delivery	从 C 到 C＋＋；最简单的 C＋＋程序； From C to C +; The simplest c + + program			
	C＋＋程序的构成和书写形式； C + + program composition and writing form;			
	C＋＋程序的编写和实现；关于 C＋＋上机实践 C + + programming and implementation; Practice of C + +			
学习目标: Learning Objectives	了解: Recognize	C++程序设计的基本内容 The basic content of c++ programming		
	理解: Understand			
	掌握: Master			
德育目标 Moral Objectives	了解计算机编程对于社会经济发展的重要意义 Understanding the significance of computer programming for social and economic development			
重点: Key Points	C++程序的构成和书写形式；理解程序的开发过程。 C + + program composition and writing form; Understand the process of program development.			
难点: Focal points	C++程序的构成和书写形式。 C + + program composition and writing form.			

知识单元序号: Knowledge Unit No.	2	支撑教学目标: SLOs Supported	1-2，1-4
知识单元名称 Unit Title	数据类型与表达式 Data types and expressions		
知识点: Knowledge Delivery	C＋＋的数据类型、常量、变量； Data type, constant and variable of C + +;		
	C++的运算符：算术运算符、算术表达式、赋值运算符与赋值表达式；逗号运算符与逗号表达式。 C++operators: arithmetic operators, arithmetic expressions, assignment operators and assignment expressions; Comma operator and comma expression.		
学习目标: Learning Objectives	了解: Recognize	数据类型的概念及其分类； The concept and classification of data type;	
	理解: Understand	常量的概念及其表现形式：数值常量、字符常量、符号常量；变量的概念及其表现形式； The concept of constant and its manifestation: numerical constant, character constant and symbol constant; The concept of variable and its manifestation;	
	掌握: Master	算术运算符、算术表达式、赋值运算符和逗号运算符的使用。 The use of arithmetic operators, arithmetic expressions, assignment operators, and comma operators.	
德育目标 Moral Objectives	培养严谨的工程师精神 Cultivate rigorous engineer spirit		
重点: Key Points	变量和常量定义；表达式；运算符的结合性和优先级 Variable and constant definition; expression; Associativity and priority of operators		
难点: Focal points	++；--运算符的前缀和后缀 ++；-- Prefixes and suffixes of operators		

知识单元序号: Knowledge Unit No.	3	支撑教学目标: SLOs Supported	1-1，1-2，1-4，2-1
知识单元名称 Unit Title	程序设计初步 Preliminary programming		
知识点: Knowledge Delivery	面向过程的程序设计和算法； Process oriented programming and algorithm;		
	C＋＋程序设计语句和赋值语句； C + + programming statements and assignment statements;		
	C＋＋的输入与输出； Input and output of C + +;		
	顺序结构程序的编写基本思路； The basic idea of writing sequence structure program;		
	关系运算和逻辑运算； Relation operation and logic operation;		
	选择结构和 if 语句；		

	Select structure and if statement;	
	循环结构和循环语句。 Loop structure and loop statement.	
学习目标: Learning Objectives	了解: Recognize	算法的概念和算法的应用背景 The concept of algorithm and its application background
	理解: Understand	简单 I/O 流控制语句，理解关系运算符（<、<=、>、>=、==、！=）、逻辑运算符（||、&&、!） Simple I / O flow control statements, understand the relational operators (<, < =, >, > =, = =,! =) Logical operators (|, &,!)
	掌握: Master	选择结构（包括 if 语句的使用、if 语句的嵌套、条件表达式、switch 语句）；循环结构（包括 while 语句、do－while 语句、for 语句）的程序设计方法。 Select structure (including the use of if statement, nesting of if statement, conditional expression and switch statement); The program design method of loop structure (including while statement, do while statement and for statement).
德育目标 Moral Objectives	培养规范化习惯 Develop standardized habits	
重点: Key Points	C++程序和语句；数据的输入与输出（包括 getchar 函数、putchar 函数、scanf 函数、printf 函数）；程序流程的控制结构。 C + + programs and statements; Data input and output (including getchar function, putchar function, scanf function and printf function); Control structure of program flow.	
难点: Focal points	程序流程的控制结构（break 语句和 continue 语句） Control structure of program flow (break statement and continue statement)	

知识单元序号: Knowledge Unit No.	4	支撑教学目标: SLOs Supported	1-2，1-4
知识单元名称 Unit Title	利用函数实现指定的功能 Using function to realize the specified function		
知识点: Knowledge Delivery	函数的概念；The concept of function;		
	定义函数的一般形式；Define the general form of function;		
	函数参数和函数的值；Function parameters and function values;		
	函数的调用、嵌套调用、递归调用；Function call, nested call, recursive call;		
	内置函数；Built in functions;		
	局部变量和全局变量；Local variables and global variables;		
	变量的存储类别和变量属性小结；The storage category and attribute summary of variable;		
	关于变量的声明和定义；The declaration and definition of variables;		
	内部函数、外部函数和头文件。Internal functions, external functions,		

	and header files.	
学习目标: Learning Objectives	了解: Recognize	函数的概念和形式（包括无参函数、有参函数、函数定义的一般形式）；函数调用的机制；变量的存储类别和变量属性； The concept and form of function (including nonparametric function, parametric function and general form of function definition); Function call mechanism; The storage category and attribute of variable;
	理解: Understand	函数参数和函数的值、内部函数、外部函数和头文件； Function parameters and function values, internal functions, external functions and header files;
	掌握: Master	函数的调用、嵌套调用、递归调用；内置函数；局部变量和全局变量。 Function call, nested call, recursive call; Built in functions; Local variables and global variables.
德育目标 Moral Objectives	培养模块化思维能力 Training modular thinking ability	
重点: Key Points	函数的定义及调用；变量的作用域。 Function definition and call; The scope of the variable.	
难点: Focal points	静态局部变量在程序中的使用方法；递归函数和重载函数等特殊函数用法 How to use static local variables in program; Special functions such as recursive function and overloaded function	

知识单元序号: Knowledge Unit No.	5	支撑教学目标: SLOs Supported	1-2，1-4
知识单元名称 Unit Title	数组 Array		
知识点: Knowledge Delivery	数组的概念；The concept of array;		
	定义和引用一维数组；One dimensional array is defined and referenced;		
	定义和引用二维数组；Define and reference two-dimensional array;		
	用数组作函数参数；Using array as function parameter;		
	字符数组；Character array;		
	C++处理字符串的方法--字符串类与字符串变量。The method of dealing with string in C + + -- string class and string variable.		
学习目标: Learning Objectives	了解: Recognize	数组的概念 The concept of array	
	理解: Understand	定义和引用一维数组，定义和引用二维数组 Define and reference one-dimensional array, define and reference two-dimensional array	
	掌握: Master	用数组作函数参数（包括用数组元素作函数实参、用数组名作函数参数）；字符数组（包括字符数组的定义和初始化、字符数组的赋值与引用、字符串和字符串结束标志）；字符串类与字符串变量。	

		Using arrays as function parameters (including array elements as function parameters and array names as function parameters); Character array (including definition and initialization of character array, assignment and reference of character array, string and string end flag); String classes and string variables.
德育目标 Moral Objectives	培养归类思考问题的能力 Develop the ability to think in categories	
重点: Key Points	一维和二维数组的操作及应用；字符串的处理（包括 strcat 函数、strcpy 函数、strcmp 函数和 strlen 函数再程序中的使用方法） The operation and application of one-dimensional and two-dimensional array; String processing (including strcat function, strcpy function, StrCmp function and strlen function)	
难点: Focal points	字符数组；字符串类与字符串变量 Character array; String class and string variable	

知识单元序号: Knowledge Unit No.	6	支撑教学目标: SLOs Supported	1-2，1-4，2-2
知识单元名称 Unit Title	指针与引用 Pointers and references		
知识点: Knowledge Delivery	指针的概念；The concept of pointer;		
	变量与指针；Variables and pointers		
	数组与指针；Array and pointer		
	字符串与指针；String and pointer;		
	函数与指针；Function and pointer;		
	返回指针值的函数；Functions that return pointer values;		
	指针数组和指向指针的指针；Pointer array and pointer to pointer;		
	const 指针和 void 指针类型；Const pointer and void pointer types;		
	指针的数据类型和指针运算；Pointer data type and pointer operation;		
	引用。references		
学习目标: Learning Objectives	了解: Recognize	指针数组和指向指针的指针 Pointer array and pointer to pointer	
	理解: Understand	返回指针值的函数；const 指针；void 指针类型；数据类型和指针运算 Functions that return pointer values; Const pointer; Void pointer type; Data types and pointer operations	
	掌握: Master	指针的概念；变量与指针（包括取地址运算符、 指针运算符）；数组与指针（包括指向数组元素的指针和用指针变量作函数参数接收数组地址）；字符串与指针（包括：用字符数组存放一个字符串、用字符串变量存放字符串、用字符指针指向一个字符串）；函数与指针（包括用函数指针变量调用函数、用指向函数的指针作函数参数）；引用。 The concept of pointer; Variable and pointer (including address operator and pointer operator); Array and	

		pointer (including pointer to array element and receiving array address with pointer variable as function parameter); String and pointer (including: using character array to store a string, using string variable to store a string, and using character pointer to point to a string); Function and pointer (including calling function with function pointer variable and using pointer to function as function parameter); references.
德育目标 Moral Objectives	培养严谨的工程师精神 Cultivate rigorous engineer spirit	
重点: Key Points	指针的概念；各类指针的基本应：变量指针；数组指针；字符串指针；函数指针、const 指针、void 指针 The concept of pointer; The basic functions of all kinds of pointers are: variable pointer; Array pointer; String pointer; Function pointer, const pointer, void pointer	
难点: Focal points	数组与指针；函数与指针和指针数组 Array and pointer; Functions and pointers and pointer arrays	

知识单元序号: Knowledge Unit No.	7		支撑教学目标: SLOs Supported	1-2，1-4，2-1
知识单元名称 Unit Title	用户自定义数据类型 User defined data type			
知识点: Knowledge Delivery	结构体类型；Structure type;			
	共用体类型；Type of Commons;			
	枚举类型；Enumeration type;			
	用 typedef 声明新的类型名；Declare a new type name with typedef			
学习目标: Learning Objectives	了解: Recognize	用 typedef 声明新的类型名 Declare a new type name with typedef		
	理解: Understand	共用体类型；枚举类型 Type of Commons; Enumeration type		
	掌握: Master	结构体类型：结构体定义方法、结构体初始化和引用结构体变量 Body type: method of structural definition, initialization of structure, and reference of structural body variable		
德育目标 Moral Objectives	培养综合解决问题的能力 Cultivate the ability of comprehensive problem solving			
重点: Key Points	结构体及应用：结构体数组、指向结构体变量的指针、结构体类型数据作为函数参数 Structure and application: structure array, pointer to structure variable, structure type data as function parameters			
难点: Focal points	结构的指针用法 Pointer usage of structure			

知识单元序号: Knowledge Unit No.	8	支撑教学目标: SLOs Supported	1-2，1-4

知识单元名称 Unit Title	类和对象的特性 Properties of classes and objects	
知识点: Knowledge Delivery	面向对象程序设计方法概念；The concept of object-oriented programming method;	
	类的声明和对象的定义；Class declaration and object definition;	
	类的成员函数；Class member function;	
	对象成员的引用；Object member reference;	
	类的封装性和信息隐蔽；Class encapsulation and information hiding;	
	类和对象的应用 Application of class and object	
学习目标: Learning Objectives	了解: Recognize	面向对象程序设计方法概念； The concept of object-oriented programming method;
	理解: Understand	对象成员的引用（包括通过对象名和成员运算符访问对象中的成员、通过指向对象的指针访问对象中的成员、通过对象的引用变量来访问对象中的成员）；类和对象的应用； The reference of object members (including accessing the members in the object through the object name and member operator, accessing the members in the object through the pointer to the object, accessing the members in the object through the reference variable of the object); The application of class and object;
	掌握: Master	类的声明和对象的定义；类的成员函数（包括成员函数的性质、在类外定义成员函数、inline 成员函数、成员函数的存储方式）；类的封装性和信息隐蔽。 Class declaration and object definition; Class member functions (including the properties of member functions, defining member functions outside the class, inline member functions, and storage methods of member functions); Class encapsulation and information hiding.
德育目标 Moral Objectives	培养综合解决问题的能力 Cultivate the ability of comprehensive problem solving	
重点: Key Points	类的声明和对象的定义；类的成员函数；类的封装性和信息隐蔽指针的概念 Class declaration and object definition; Class member function; Encapsulation of class and concept of information hiding pointer	
难点: Focal points	类的封装性和信息隐蔽 Class encapsulation and information hiding	

知识单元序号: Knowledge Unit No.	9	支撑教学目标: SLOs Supported	1-2，1-4
知识单元名称 Unit Title	使用类和对象 Use classes and objects		
知识点: Knowledge Delivery	利用构造函数对类对象进行初始化；Class objects are initialized by using constructor;		
	析构函数；Destructor;		

	调用构造函数和析构函数的顺序；The order in which constructors and destructors are called;	
	对象数组；Object array	
	对象指针；Object pointer;	
	共用数据的保护；Protection of shared data;	
	对象的动态建立和释放；The dynamic establishment and release of objects;	
	对象的赋值和复制；Assignment and copy of objects;	
	静态成员；Static members;	
	友元；Friend	
	类模板指针的概念；The concept of class template pointer;	
学习目标: Learning Objectives	了解: Recognize	析构函数；共用数据的保护；类模板指针的概念 Destructor; Protection of shared data; The concept of class template pointer
	理解: Understand	调用构造函数和析构函数的顺序；友元； The order of calling constructors and destructors; Friends;
	掌握: Master	构造函数（包括使用默认参数的构造函数、构造函数的重载），对象数组，对象指针（包括指向对象的指针、指向对象成员的指针、this 指针），对象的动态建立和释放，对象的赋值和复制，静态成员（包括静态数据成员、静态成员函数）、类模板。 Constructors (including constructors with default parameters and overloads of constructors), object arrays, object pointers (including pointers to objects, pointers to object members and this pointers), dynamic creation and release of objects, assignment and replication of objects, static members (including static data members and static member functions) and class templates.
德育目标 Moral Objectives	培养解决实际问题的能力 Develop the ability to solve practical problems	
重点: Key Points	构造函数；对象数组；对象指针；对象的动态建立和释放；对象的赋值和复制；静态成员；类模板。 Constructor; Object array; Object pointer; Dynamic creation and release of objects; Object assignment and copy; Static members; Class template.	
难点: Focal points	对象数组；对象指针；对象的动态建立和释放；类模板。 Object array; Object pointer; Dynamic creation and release of objects; Class template.	

知识单元序号: Knowledge Unit No.	10	支撑教学目标: SLOs Supported	1-2，1-4
知识单元名称 Unit Title	运算符重载 Operator overloading		

知识点: Knowledge Delivery	运算符重载的概念和方法；The concept and method of operator overloading;	
	重载运算符的规则；Rules for overloading operators;	
	运算符重载函数作为类成员函数和友元函数；Operator overloaded functions are used as class member functions and friend functions;	
	重载双目运算符；Overloading binocular operators;	
	重载单目运算符；Overload the unary operator;	
	重载流插入运算符和流提取运算符； Overload the stream insertion operator and stream extraction operator;	
	不同类型数据间的转换。Conversion between different types of data.	
学习目标: Learning Objectives	了解: Recognize	运算符重载函数作为类成员函数和友元函数； Operator overloaded functions are used as class member functions and friend functions;
	理解: Understand	重载运算符的规则；重载单目运算符；不同类型数据间的转换（包括标准类型数据间的转换、转换构造函数和类型转换函数） Rules for overloading operators; Overload the unary operator; Conversion between different types of data (including conversion between standard type data, conversion constructor and type conversion function)
	掌握: Master	运算符重载的概念和方法；重载双目运算符；重载流插入运算符和流提取运算符。 The concept and method of operator overloading; Overloading binocular operators; Overloads the stream insertion operator and the stream extraction operator.
德育目标 Moral Objectives	培养多角度思考问题的能力 Develop the ability to think from multiple perspectives	
重点: Key Points	运算符重载的概念和方法 Concept and method of operator overloading	
难点: Focal points	运算符重载的概念和方法 Concept and method of operator overloading	

知识单元序号: Knowledge Unit No.	11	支撑教学目标: SLOs Supported	1-2，1-4
知识单元名称 Unit Title	继承与派生 Inheritance and Derive		
知识点: Knowledge Delivery	继承与派生的概念；The concept of inheritance and derivation;		
	派生类的声明方式；Declaration method of derived class;		
	派生类的构成；The composition of derived classes;		
	派生类成员的访问属性；Access properties of derived class members;		
	派生类的构造函数和析构函数；Constructor and destructor of derived class;		
	多重继承；Multiple inheritance;		
	基类与派生类的转换；Conversion between base class and derived class;		

	继承与组合。Inheritance and combination.	
学习目标: Learning Objectives	了解: Recognize	派生类的构成；基类与派生类的转换；继承与组合 The composition of derived classes; Conversion between base class and derived class; Inheritance and combination
	理解: Understand	派生类的构造函数和析构函数；多重继承； Constructor and destructor of derived class; Multiple inheritance;
	掌握: Master	继承与派生的概念；派生类的声明方式；派生类成员的访问属性（包括公用继承、私有继承、保护继承） The concept of inheritance and derivation; Declaration method of derived class; Access properties of derived class members (including public inheritance, private inheritance and protected inheritance)
德育目标 Moral Objectives	培养尊敬长辈的良好品德 Cultivate good moral character of respecting elders	
重点: Key Points	继承与派生的概念和方法 Concepts and methods of inheritance and derivation	
难点: Focal points	多重继承：多重继承过程中每个成员的访问属性变化 Multiple inheritance: the access properties of each member change during multiple inheritance	

知识单元序号: Knowledge Unit No.	12	支撑教学目标: SLOs Supported	1-2，1-4
知识单元名称 Unit Title	多态性与虚函数 Polymorphism and virtual function		
知识点: Knowledge Delivery	多态性的概念；The concept of polymorphism;		
	虚函数；Virtual function;		
	纯虚函数与抽象类；Pure virtual function and abstract class;		
学习目标: Learning Objectives	了解: Recognize	纯虚函数与抽象类 Pure virtual function and abstract class	
	理解: Understand	虚函数 virtual function	
	掌握: Master	多态性的概念 The concept of polymorphism	
德育目标 Moral Objectives	培养多角度考虑问题的能力 Develop the ability to think from multiple perspectives		
重点: Key Points	多态性的概念 The concept of polymorphism		
难点: Focal points	虚函数 virtual function		

知识单元序号: Knowledge Unit No.	13	支撑教学目标: SLOs Supported	1-2，1-4

知识单元名称 Unit Title	输入输出流 Input output stream	
知识点: Knowledge Delivery	C++的输入和输出；Input and output of C + +;	
	标准输出流；Standard output stream;	
	标准输入流；Standard input stream;	
	文件操作与文件流；File operation and file flow;	
	字符串流。Character stream.	
学习目标: Learning Objectives	了解: Recognize	字符串流 string streams
	理解: Understand	标准输出流（包括 cout，cerr 和 clog 流）；标准输入流； Standard output stream (including cout, cerr and clog stream); Standard input stream;
	掌握: Master	C++的输入和输出；文件操作与文件流（包括文件的打开与关闭、ASCII 文件的操作、文件操作与文件流、字符串流）。 Input and output of C + +; File operation and file stream (including file opening and closing, ASCII file operation, file operation and file stream, character stream).
德育目标 Moral Objectives	培养规范化品格 Cultivate standardized character	
重点: Key Points	C++的输入和输出 Input and output of C + +	
难点: Focal points	文件操作与文件流 File operation and file flow	

(2) 实验教学 Experiments

注：可根据实际情况增减行数。实验类型可分为验证性、设计性、综合性，实验性质可分为选做、必做。

Note: Please add/reduce lines based on subject. The Type contains Verify, Design, and Comprehensive, while the Pattern contains Required and Elective

序号 No.	实验项目名称 Experiment Topic	学时 Hours	每组人数 MPG*	实验类型 Type	实验性质 Pattern
1	C++的初步知识 Preliminary knowledge of C + +	2	1	设计性 Design	必做 Elec
2	函数 Function	2	1	设计性 Design	必做 Elec
3	数组 Array	2	1	设计性 Design	必做 Elec
4	指针 Pointer	2	1	设计性 Design	必做 Elec
5	自定义数据类型	2	1	设计性	必做

	Custom data type			Design	Elec
6	类和对象 Classes and objects	2	1	设计性 Design	必做 Elec
7	继承与派生 Inheritance and Derive	2	1	设计性 Design	必做 Elec
8	输入输出流 Input output stream	2	1	设计性 Design	必做 Elec
	总计 Total	16			

*MPG: Members per group

实验项目序号: Experiment No.	1	支撑教学目标: SLOs Supported	1-1,1-2
每组成员: Members per Group	1	指导教师: Tutor	吕艳霞
实验名称: Experiment Title	C++的初步知识 Preliminary knowledge of C + +		
实验内容: Content	C++程序设计初步 Preliminary study on C + + Programming		
学习目标: Learning Objectives	掌握三种基本结构的使用方法 Master the usage of three basic structures		
教学要求: Requirements	C++程序设计初步、输入/输出、三种基本结构的应用实践 The application of C + + program design, input / output and three basic structures		
实验场地: Location	C++实验室 C + + Lab		
实验软硬件设备: Software/Hardware	PC 机 PC		

实验项目序号: Experiment No.	2	支撑教学目标: SLOs Supported	1-2,1-3
每组成员: Members per Group	1	指导教师: Tutor	吕艳霞
实验名称: Experiment Title	利用函数实现指定的功能 Using function to realize the specified function		
实验内容: Content	函数 Function		

学习目标: Learning Objectives	掌握函数的使用方法 Master the usage of function
教学要求: Requirements	编程实现函数定义与调用 Programming function definition and call
实验场地: Location	C++实验室 C + + Lab
实验软硬件设备: Software/Hardware	PC 机 PC

实验项目序号: Experiment No.	3	支撑教学目标: SLOs Supported	1-1,1-4
每组成员: Members per Group	1	指导教师: Tutor	吕艳霞
实验名称: Experiment Title	利用数组处理批量数据 Using array to deal with batch data		
实验内容: Content	数组 Array		
学习目标: Learning Objectives	掌握数组的使用方法 Master the use of array		
教学要求: Requirements	掌握数组的使用，数组与函数调用关系 Master the use of array and the relationship between array and function call		
实验场地: Location	C++实验室 C + + Lab		
实验软硬件设备: Software/Hardware	PC 机 PC		

实验项目序号: Experiment No.	4	支撑教学目标: SLOs Supported	1-2,1-3
每组成员: Members per Group	1	指导教师: Tutor	吕艳霞
实验名称: Experiment Title	善于使用指针与引用 Using pointer and reference		
实验内容: Content	指针 Pointer		

学习目标: Learning Objectives	掌握指针的使用方法 Master the usage of pointer
教学要求: Requirements	掌握指针的使用，指针与函数、数组的关系 Master the use of pointer, the relationship between pointer and function, array
实验场地: Location	C++实验室 C + + Lab
实验软硬件设备: Software/Hardware	PC 机 PC

实验项目序号: Experiment No.	5	支撑教学目标: SLOs Supported	1-2,1-3
每组成员: Members per Group	1	指导教师: Tutor	吕艳霞
实验名称: Experiment Title	用户自定义数据类型 User defined data type		
实验内容: Content	自定义数据类型 Custom data type		
学习目标: Learning Objectives	掌握结构体的使用方法 Master the usage of structure		
教学要求: Requirements	掌握结构体定义方法与应用 Master the definition method and application of structure		
实验场地: Location	C++实验室 C + + Lab		
实验软硬件设备: Software/Hardware	PC 机 PC		

实验项目序号: Experiment No.	6	支撑教学目标: SLOs Supported	1-2,1-3
每组成员: Members per Group	1	指导教师: Tutor	吕艳霞
实验名称: Experiment Title	怎样使用类和对象 How to use classes and objects		
实验内容: Content	类和对象 Classes and objects		

学习目标: Learning Objectives	掌握类和对象的使用方法 Master the usage of class and object
教学要求: Requirements	掌握类的定义方法、对象的使用 Master the definition method of class and the use of object
实验场地: Location	C++实验室 C + + Lab
实验软硬件设备: Software/Hardware	PC 机 PC

实验项目序号: Experiment No.	7	支撑教学目标: SLOs Supported	1-2,1-4
每组成员: Members per Group	1	指导教师: Tutor	吕艳霞
实验名称: Experiment Title	继承与派生 Inheritance and Derive		
实验内容: Content	继承与派生 Inheritance and Derive		
学习目标: Learning Objectives	掌握类的继承、派生的使用方法 Master the use of class inheritance and derivation		
教学要求: Requirements	掌握继承与派生的方法 Master the methods of inheritance and derivation		
实验场地: Location	C++实验室 C + + Lab		
实验软硬件设备: Software/Hardware	PC 机 PC		

实验项目序号: Experiment No.	8	支撑教学目标: SLOs Supported	1-2,1-5
每组成员: Members per Group	1	指导教师: Tutor	吕艳霞
实验名称: Experiment Title	输入输出流 Input output stream		
实验内容: Content	输入输出流 Input output stream		

学习目标: Learning Objectives	掌握各种输入输出的方法 Master various input and output methods
教学要求: Requirements	掌握文件的操作方法 Master the operation method of documents
实验场地: Location	C++实验室 C + + Lab
实验软硬件设备: Software/Hardware	PC 机 PC

(3) 课外实践教学 PBL

PBL 项目序号: PBL No.	1	支撑教学目标: SLOs Supported	
项目名称: PBL Title			
每组成员: Members per Group		指导教师: Tutor	
学时 Hours		成果物 Achievements	
项目内容: Content			
学习目标: Learning Objectives			
教学要求: Requirements			
实践场地: Location			
实践软硬件设备: Software/Hardware			

四、教学安排 Teaching Schedule

注：可根据实际情况增减行数

Note: Please add/reduce lines based on subject.

教学内容 Teaching Content	学时(周) Hour(Week)

	理论 LECT.	实验 EXP.	课外实践 PBL	集中实践 PRAC.
C++的初步知识 Preliminary knowledge of C + +	2	2		
数据类型与表达式 Data types and expressions	4			
程序设计初步 Preliminary programming	6			
利用函数实现指定的功能 Using function to realize the specified function	4	2		
数组 Array	4	2		
指针与引用 Pointers and references	6	2		
用户自定义数据类型 User defined data type	4	2		
类和对象的特性 Properties of classes and objects	2			
使用类和对象 Using classes and objects	8	2		
运算符重载 Operator overloading	4			
继承与派生 Inheritance and Derive	6	2		
多态性与虚函数 Polymorphism and virtual function	2			
输入输出流 Input output stream	4	2		
总计 Total	56	16		

五、教学方法 Teaching Methodology

注：可根据实际情况增减行数或修改内容

Note: Please add/reduce lines or revise content based on subject.

勾选 Check	教学方法与特色 Teaching Methodology & Characters
☑	多媒体教学：基于信息化设备的课堂教学 Multi-media-based lecturing
☑	实践能力传授：理论与行业、实际案例相结合 Combining theory with industrial practical problems
☑	课程思政建设：知识讲授与德育相结合 Knowledge delivery with ethic education
□	PBL 教学：

□	其他:单击或点击此处输入文字。 Other:单击或点击此处输入文字。

六、成绩评定 Assessment

注：可根据实际情况增减行数或修改内容

Note: Please add/reduce lines or revise content based on subject.

考核环节: Assessment Content	平时 Behavior	环节负责人: Director	李国瑞
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	30
考核方式: Measures	满分 100 分，使用学习通记录学生平时的课堂表现，每次考勤计 10 分，缺勤不得分，缺勤五次及以上取消考试资格。每次作业计 10 分，抄袭、给他人抄袭或未交作业不得分。每次课堂正确回答问题计 5 分，每次课堂注意力不集中、影响课堂纪律等情况扣 5 分。最后总分不超过 100 分，不低于 0 分。		

考核环节: Assessment Content	实验 Experiment	环节负责人: Director	吕艳霞
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	10
考核方式: Measures	满分 100 分，实验成绩不及格（低于 60 分）不得参加期末考试。通过课堂表现及实验报告记录学生成绩，每次考勤计 10 分，缺勤不得分。前五次实验每次计 10 分，最后一次实验计 20 分。抄袭、给他人抄袭或未交实验报告不得分。最后总分不超过 100 分，不低于 0 分。		

考核环节: Assessment Content	期末 Final	环节负责人: Director	李国瑞
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	60
考核方式: Measures	满分 100 分，通过批阅期末考试试卷给出学生成绩。		

七、改进机制 Improvement Mechanism

注：未尽事宜以教学团队以及学院教学指导委员会商定为准。

Note: Matters not covered in this file shall be determined by TAB of SSTC, NEU.

教学大纲改进机制 Subject Syllabus Improvement Mechanism			
考核周期(年): Check Period (YR)	4	修订周期(年): Revise Period (YR)	4
改进措施: Measures	课程负责人根据课程教学内容与人才培养目标组织课程团队讨论并修改教学大纲，报分管教学工作副院长审核后由执行院长批准。 The subject coordinator shall be responsible for the syllabus discussion and improvement, and the revised version shall be submitted to deputy dean (teaching affairs) for reviewing then to executive dean for approvement.		
成绩评定改进机制 Assessment Improvement Mechanism			
考核周期(年): Check Period (YR)	1	修订周期(年): Revise Period (YR)	1
改进措施: Measures	课程负责人根据课程教学内容、课堂教学效果以及成绩分布，对课程教学方法和成绩评定环节进行改进，并同步优化评定办法。 The subject coordinator shall revise the syllabus based on the teaching content, effect and result distribution while optimize the assessment measures.		