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	**计算机程序设计基础 A(H) Introduction to Computer Programming A (H)**
2.	授课院系 Originating Department	计算机科学与工程系 Department of Computer Science and Engineering
3.	课程编号 Course Code	CS107
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	通识必修课程 General Education (GE)Required 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）	余剑峤，助理教授，计算机科学与工程系，yujq3@sustech.edu.cn Jianqiao Yu, Assistant Professor, Department of Computer Science and Engineering, yujq3@sustech.edu.cn
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	待公布 To be announced
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	32		32		64

南方科技大学 SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

Credit Hours					

12.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	NA
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite	
14.	其它要求修读本课程的学系 Cross-listing Dept.	

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

本课程主要面向具有一定编程基础的大学本科生。本课程将介绍面向对象程序设计语言的基础知识和编程技术，并对基本数据类型和数据结构进行教授。学生将主要学习两门主流程序设计语言 Java 及 Python，学会如何使用编程语言进行程序设计，解决实际问题。

The course aims to cultivate talented students who have programming experience before their university study. In this course, we will introduce the fundamentals of object-oriented programming language and programming techniques. We will also introduce preliminary knowledge on data types and data structures. The students will be familiar with two popular programming languages, i.e., Java and Python. They will be able to construct programs for solving general problems.

16. 预达学习成果 Learning Outcomes

在课程结束时，学生应该获得以下技能：

1. 了解软件系统的基本模块，因特网和互联网的运行机制。
2. 掌握 Java 及 Python 程序设计语言的基本语法。
3. 掌握面向对象程序设计的四大特性：抽象，封装，继承，多态。
4. 熟悉集成开发环境，并能够设计程序解决实际问题。
5. 了解基础数据类型及数据结构。

On completion of this course, the students should be able to:

1. Understand the basic components in a software system and the working mechanism of the Internet and the Web.
2. Know the basic syntax of the Java programming language.
3. Understand the features of object-oriented programming: abstraction, encapsulation, inheritance, polymorphism.
4. Develop programs to solve real problems using integrated development environments.
5. Understand basic data types and data structures.

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.)

理论课教学大纲

第一讲 引言：计算机，因特网，互联网

- 计算机：硬件与软件
- 计算机组成原理
- 操作系统
- Web 2.0
- 软件技术

第二讲 Java 应用程序简介

- Java 开发环境
- Java 程序样例解析
- 基本数据类型
- 算术运算

第三讲 控制语句

- 算法与伪代码
- 控制结构
- 选择语句 if 和 if…else…
- 循环语句 while
- 循环语句 for 和 do…while
- 选择语句 switch
- break 和 continue 语句
- 逻辑运算符
- 结构化编程

第四讲 数组与方法

- 数据结构与数组
- for-each 语句
- 多维数组
- 模块化编程
- 方法声明与调用（静态方法）
- 方法调用栈
- 方法重载

第五讲 类与对象简介

- 类、对象、方法
- 类的声明及实例化
- 实例变量
- 用构造方法初始化对象

第六讲 字符串与包装类

- 字符与字符串
- String 类
- StringBuilder 类
- 基本数据类型的包装类

第七讲 类、对象及方法：深层探究 1

- 类成员的访问控制

- 默认和无参构造方法
- Set 和 Get 方法
- 类的设计：组合

第八讲 类、对象及方法：深层探究 2

- 枚举类型
- 垃圾回收和 finalize 方法
- 静态类成员：方法与域
- 方法重载简介

第九讲 面向对象程序设计：继承

- 父类与子类
- protected 类成员
- 利用继承进行软件设计与实现
- Object 类

第十讲 面向对象程序设计：多态

- 多态
- 方法重写
- 抽象类与抽象方法
- Final 类与方法

第十一讲 泛型类与方法

- 泛型方法
- 泛型类
- 通配符

第十二讲 泛型集合

- Collection 接口与 Collections 类
- 常见集合类型
- 常用集合方法

第十三讲 异常处理

- 异常及其处理机制
- 异常类层次结构
- 受检异常与未受检异常
- Stack traces 及异常链

第十四讲 Python 编程语言基础 1

- 变量
- 列表、多元组、字典
- 控制流
- 循环

第十五讲 Python 编程语言基础 2

- 列表解析式
- Python 模块与引用
- 方法与类

- 标准库

第十六讲 基本算法与数据结构

- 排序与搜索
- 堆栈与队列
- 符号表

Syllabus of Theory Couse

Chapter 1 Introduction to Computers, the Internet and the Web

- Computers: Hardware and Software
- Computer Organization
- Operating Systems
- Web 2.0
- Software Technologies

Chapter 2 Introduction to Java Applications

- Java Development Environment
- Programming Examples in Java
- Primitive Data Types
- Arithmetic Computation

Chapter 3 Control Statements

- Algorithms and Pseudo Code
- Control Structures
- Selection Statements if and if…else
- Repetition Statements while
- Repetition statements for and do…while
- Selection statement switch
- Break and continue Statements
- Logical Operators
- Structured Programming

Chapter 4 Arrays and Methods

- Data Structure and Arrays
- Enhanced for Statement
- Multidimensional Arrays
- Modular programming
- Method declaration and invocation (static methods)
- Method call stack
- Method overloading (an introduction)

Chapter 5 Introduction to Classes and Objects

- Classes, Objects, and Methods
- Declaring a Class and Instantiating an Object of a Class
- Instance Variables
- Initializing Objects with Constructors

Chapter 6 Strings and Wrapper Classes

- Fundamentals of Characters and Strings
- Class String
- Class StringBuilder

- Wrapper Classes of Primitive Types

Chapter 7 Classes, Objects and Methods: A Deeper Look 1

- Controlling Access to Members
- Default and No-Argument Constructors
- Set and Get Methods
- Composition

Chapter 8 Classes, Objects and Methods: A Deeper Look 2

- Enumerations
- Garbage Collection and Methods finalize
- Static Class Members: Methods and Fields
- Method Overloading

Chapter 9 Object-Oriented Programming: Inheritance

- Superclasses and Subclasses
- Protected Members
- Software Engineering with Inheritance
- Object Class

Chapter 10 Object-Oriented Programming: Polymorphism

- Polymorphism
- Method Overriding
- Abstract Classes and Methods
- Final Methods and Classes

Chapter 11 Generic Classes and Methods

- Generic Methods
- Generic Classes
- Wildcards

Chapter 12 Generic Collections

- Interface Collection and Class Collections
- Lists, Sets, Maps
- Collections Methods

Chapter 13 Exception Handling

- Exceptions and Their Handling
- Exception Class Hierarchy
- Checked/Unchecked Exceptions
- Stack Traces and Chained Exceptions

Chapter 14 Python Programming Fundamentals 1

- Variables
- List, tuple, dictionary
- Control flow
- Loop

Chapter 15 Python Programming Fundamentals 2

- List comprehension
- Python modules and mport
- Function and Class
- Standard library

Chapter 16 Basic Algorithm and Data Structure

- Sorting and Searching
- Stack and Queue
- Symbol table

实验课教学大纲

实验 1. 课程准备

- JDK 安装及环境变量配置
- 使用命令端编译、运行 Java 程序

实验 2. 基础练习

- IDE 的使用
- Scanner 类的使用
- 学习基本数据类型
- 学习基本运算

实验 3. 控制语句

- 选择结构：if else
- 循环结构：while
- 选择结构：swtich
- 循环结构：do while , for

实验 4. 数组

- 声明，创建，初始化
- 简单的算法练习
- 声明，创建，初始化
- 复杂算法练习
- ArrayList

实验 5. 类与对象一

- 构造方法
- Get，Set 方法

实验 6. 字符串

- String 类介绍
- String 类下的库方法
- StringBuilder 和 StringBuffer

实验 7. 类与对象二

- toString 方法

- 静态变量与方法

实验 8. 静态方法

- 定义与调用
- 方法重载

实验 9. 类与对象三

- 类的组合关系
- 枚举类

实验 10. 面向对象程序设计一

- 父类与子类
- 继承

实验 11. 面向对象程序设计二

- 多态
- 抽象类与接口

实验 12. 泛型类与方法

- 泛型类
- 泛型方法

实验 13. 综合练习一

- 项目讲解
- 项目指导

实验 14. Python 基础

- Python 环境配置
- 使用文本编辑器编写 Python 程序
- 使用 IDE 编写并运行 Python 程序

实验 15. 综合练习二

- 项目指导
- 项目展示

实验 16. 综合练习三

- 项目指导
- 项目展示

Syllabus of Lab Course

Lab 1. Programming Environment Setup

- Installing JDK and configuring environment variables
- Practice the process of compiling and running Java programs in command line.

Lab 2. Basic Exercises

- How to use IDE to write Java programs
- Practice the use of the Scanner class
- Learn basic data types
- Learn basic operations

Lab 3. Control Statements

- Selection statements including if…else
- Repetition statements including while
- Selection statements including switch
- Repetition statements including do…while and for

Lab 4. Array

- Declare, create and initialize arrays
- Simple algorithms
- Declare, create and initialize multi-dimensional arrays
- More complicated algorithms
- ArrayList

Lab 5. Classes and Objects 1

- Constructor
- Getter and Setter

Lab 6. Strings

- The String class
- Library methods in String
- The StringBuilder and StringBuffer classes

Lab 7. Classes and Objects 2

- toString method
- Static class members: methods and fields

Lab 8. Static Method

- Define and invoke static method
- Overload

Lab 9. Classes and Objects 3

- Composition
- Enumerations

Lab 10. Object-Oriented Programming 1

- Supper class and subclass
- Inheritance

Lab 11. Object-Oriented Programming 2

- Abstract class
- Interface

Lab 12. Generic Classes and Methods

- Generic class
- Generic method

Lab 13. Comprehensive exercises 1

- Course project introduction
- Guidance of the course project

Lab 14. Python Basics

- Config Python programming environment
- Code Python with text editor
- Code and run Python with IDE

Lab 15. Comprehensive exercises 2

- Guidance of the course project
- Project presentation

Lab 16. Comprehensive exercises 3

- Guidance of the course project
- Project presentation

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

Paul Deitel and Harvey Deitel, Java: How to Program (10th ed., late object version), Prentice-Hall (2014)

Robert Sedgewick and Kevin Wayne, Introduction to Programming in Java: An Interdisciplinary Approach (2nd ed.), Pearson (2017)

Robert Sedgewick, Kevin Wayne, and Robert Dondero, Introduction to Programming in Python: An Interdisciplinary Approach (1st ed.), Pearson (2015)

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		10%		
课堂表现 Class Performance				
小测验 Quiz		10%		
课程项目 Projects		20%		
平时作业 Assignments		20%		
期中考试 Mid-Term Test				
期末考试 Final Exam		40%		
期末报告 Final Presentation				

其它（可根据需要改写以上评估方式） **Others (The above may be modified as necessary)**				

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
