Java 程序设计基础　教学大纲

Java Programming Fundamentals　Subject Syllabus

一、课程信息　Subject Information

课程编号: Subject ID	3100213001	开课学期: Semester	2
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	2	总学时/周: Total Hours/Weeks	32/4
理论学时: LECT. Hours	32	实验学时: EXP. Hours	0
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	选修 Elective	课程模式: Mode	自建 NEU
中方课程协调人: NEU Coordinator	万聪	成绩记载方式: Result Type	百分制 Marks
先修课程: Requisites	无 none		
英文参考教材: EN Textbooks	Java An introduction to problem solving and programming, Walter Savitch and Kenrick Mock		
中文参考教材: CN Textbooks	Java 程序设计与问题求解，机械工业出版社，2019		
教学资源: Resources	https://docs.oracle.com/javase/tutorial/		
课程负责人(撰写人): Subject Director	万聪	提交日期: Submitted Date	3/4/2023
任课教师(含负责人): Taught by	万聪		
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.

<table>
<tr>
<td rowspan="2">整体目标:
Overall Objective</td>
<td colspan="2">Java 语言是当前 IT 行业应用的主流语言之一，熟练掌握 Java 语言是对计算机类本科生的基本要求。本课程不仅仅要培养学生对该语言基础知识的掌握，更重要的是通过对编程语言的学习，培养学生对程序设计的兴趣，以及创造力。</td>
</tr>
<tr>
<td colspan="2">Java is one of the most popular languages in information industry. For students majoring in computer science, it is a necessary skill to program in Java language. This course is not only to train students' ability to use java language, but also to cultivate students' interest and creativity through the learning of programming language.</td>
</tr>
<tr>
<td rowspan="4">（1）专业目标:
Professional Ability</td>
<td>1-1</td>
<td>熟练掌握 Java 开发工具和常用类，能够使用开发工具编写、调试、运行程序。
Students should be able to use java programming environment to build and debug a java software.</td>
</tr>
<tr>
<td>1-2</td>
<td>熟练掌握 Java 的基本概念和语法知识，能够阅读程序并理解其中的含义。
Students should be able to know knowledge of java well, and be able to read and understand java code.</td>
</tr>
<tr>
<td>1-3</td>
<td>掌握程序设计的方法，能够使用 Java 语言编写程序来解决实际问题。
Students should be able to solve practical issues by designing and coding with java.</td>
</tr>
<tr>
<td>1-4</td>
<td>掌握面向对象的思想，能够将其应用到程序设计当中。
Students should be able to use object-oriented programming.</td>
</tr>
<tr>
<td rowspan="2">（2）德育目标:
Essential Quality</td>
<td>2-1</td>
<td>软件程序设计与开发的过程中，应当遵守工程伦理的原则。
In the process of software programming and development, the principles of engineering ethics should be observed.</td>
</tr>
<tr>
<td>2-2</td>
<td>认识到创新能力的重要性。
Students should realize the importance of innovation ability.</td>
</tr>
<tr>
<td colspan="3" align="center">课程教学目标与毕业要求的对应关系 Matrix of GA & SLOs</td>
</tr>
<tr>
<td align="center">毕业要求 GA</td>
<td align="center">指标点 GA Index</td>
<td align="center">教学目标 SLOs</td>
</tr>
<tr>
<td>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 science, engineering fundamentals and an engineering specialization to</td>
<td>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
structure, algorithms analysis and design,
computer digital system, and operating</td>
<td>1-1，1-2，1-3,1-4</td>
</tr>
</table>

the solution of complex engineering problems.	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	指标点 8-2：了解本专业相关的职业道德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；	2-1

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.	
Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.		

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

<table>
<tr><td>知识单元序号:
Knowledge Unit No.</td><td colspan="2">1</td><td>支撑教学目标:
SLOs Supported</td><td>1-1</td></tr>
<tr><td>知识单元名称
Unit Title</td><td colspan="4">绪论
Introduction</td></tr>
<tr><td rowspan="5">知识点:
Knowledge Delivery</td><td colspan="4">Java 语言的特点
Characteristics of Java language</td></tr>
<tr><td colspan="4">Java 与其他主流语言的对比，包括 C++，C#，python
Comparison between Java and other programming languages</td></tr>
<tr><td colspan="4">JDK、JRE、JVM 的概念
JDK, JRE and JVM</td></tr>
<tr><td colspan="4">建立 Java 开发环境
Establish java development environment</td></tr>
<tr><td colspan="4">编写第一个 Java 程序
Start programming</td></tr>
<tr><td rowspan="3">学习目标:
Learning Objectives</td><td colspan="2">了解:
Recognize</td><td colspan="2">Java 语言的特点
Characteristics of Java language</td></tr>
<tr><td colspan="2">理解:
Understand</td><td colspan="2">JDK、JRE、JVM 的概念
JDK, JRE and JVM
Java 与其他主流语言的对比，包括 C++，C#，python
Comparison between Java and other programming languages</td></tr>
<tr><td colspan="2">掌握:
Master</td><td colspan="2">建立 Java 开发环境
Establish java development environment
编写第一个 Java 程序
Start programming</td></tr>
<tr><td>德育目标
Moral Objectives</td><td colspan="4">2-1
2-2</td></tr>
<tr><td>重点:
Key Points</td><td colspan="4">建立 Java 开发环境
Establish java development environment
编写第一个 Java 程序</td></tr>
</table>

	Start programming
难点: Focal points	建立 Java 开发环境 Establish java development environment

知识单元序号: Knowledge Unit No.	2	支撑教学目标: SLOs Supported	1-1 1-2
知识单元名称 Unit Title	计算 Computing		
知识点: Knowledge Delivery	从控制台输入、输出 Input and output from console		
	标识符和关键字 Identifiers and keywords		
	变量 Variables		
	基本数据类型、算术运算符、精度和转换 Data type, Arithmetic Operators, Precision and conversion		
	数组、Math 对象 Array, Math object		
学习目标: Learning Objectives	了解: Recognize	标识符和关键字 Identifiers and keywords	
	理解: Understand	变量 Variables 数组、Math 对象 Array, Math object	
	掌握: Master	从控制台输入、输出 Input and output from console 基本数据类型、算术运算符、精度和转换 Data type, Arithmetic Operators, Precision and conversion	
德育目标 Moral Objectives	2-1 2-2		
重点: Key Points	变量 Variables 基本数据类型、算术运算符、精度和转换 Data type, Arithmetic Operators, Precision and conversion		
难点: Focal points	基本数据类型、算术运算符、精度和转换 Data type, Arithmetic Operators, Precision and conversion		

知识单元序号: Knowledge Unit No.	3	支撑教学目标: SLOs Supported	1-1 1-2
知识单元名称 Unit Title	控制 Control flow		

	条件分支语句、循环语句
	Conditional branch statement, loop statement
	Break 语句、continue 语句、return 语句
	Break statement, continue statement, return statement
知识点:	使用 for 语句对数组进行遍历
Knowledge Delivery	Use the for statement to traverse the array
	枚举类型和循环语句
	Enum type and
	枚举类型和 switch 语句
	Enum type and switch statement

	了解:	枚举类型和循环语句
		Enum type and
	Recognize	枚举类型和 switch 语句
		Enum type and switch statement
学习目标:	理解:	使用 for 语句对数组进行遍历
Learning Objectives	Understand	Use the for statement to traverse the array
		条件分支语句、循环语句
	掌握:	Conditional branch statement, loop statement
	Master	Break 语句、continue 语句、return 语句
		Break statement, continue statement, return statement

德育目标	2-1
Moral Objectives	2-2

	条件分支语句、循环语句
	Conditional branch statement, loop statement
重点:	Break 语句、continue 语句、return 语句
Key Points	Break statement, continue statement, return statement
	使用 for 语句对数组进行遍历
	Use the for statement to traverse the array

	条件分支语句、循环语句
难点:	Conditional branch statement, loop statement
Focal points	Break 语句、continue 语句、return 语句
	Break statement, continue statement, return statement

知识单元序号: Knowledge Unit No.	4	支撑教学目标: SLOs Supported	1-2 1-3 1-4
知识单元名称 Unit Title	类和方法 Class and method		
知识点: Knowledge Delivery	类声明、对象的声明、对象的内存模型 Class declaration, object declaration, object memory model		
	类的成员变量和局部变量、实例变量和类变量 Member variables and local variables, instance variables and class variables		
	方法的声明、构造方法、main 方法、方法重载、类方法和实例方		

		法、参数传值：基本类型和引用类型 Method declaration, Constructor, main method, method overload, class method and instance method, parameter passing
		this 关键字 keyword this
		包、import 语句、成员变量和方法的访问权限、类的访问权限、单态模式 Package, import statement, access rights of member variables and methods, access rights of class, singleton mode
学习目标: Learning Objectives	了解: Recognize	包、import 语句、成员变量和方法的访问权限、类的访问权限、单态模式 Package, import statement, access rights of member variables and methods, access rights of class, singleton mode this 关键字 keyword this
	理解: Understand	类的成员变量和局部变量、实例变量和类变量 Member variables and local variables, instance variables and class variables
	掌握: Master	方法的声明、构造方法、main 方法、方法重载、类方法和实例方法、参数传值：基本类型和引用类型 Method declaration, Constructor, main method, method overload, class method and instance method, parameter passing 类声明、对象的声明、对象的内存模型 Class declaration, object declaration, object memory model
德育目标 Moral Objectives	2-1 2-2	
重点: Key Points	方法的声明、构造方法、main 方法、方法重载、类方法和实例方法、参数传值：基本类型和引用类型 Method declaration, Constructor, main method, method overload, class method and instance method, parameter passing	
难点: Focal points	对象的内存模型 object memory model	

知识单元序号: Knowledge Unit No.	5	支撑教学目标: SLOs Supported	1-2 1-3 1-4
知识单元名称 Unit Title	继承和接口 Interfaces and Inheritance		
知识点: Knowledge Delivery	子类与父类的关系、子类的继承性、子类构建对象的过程 The relationship between subclass and superclass, the inheritance of subclass, the process of constructing object by subclass		

	成员变量的隐藏、方法的重写、super、final、上转型对象 Hiding of member variables, overriding of methods, super, final, upper transformation objects	
	抽象类和抽象方法、抽象类和多态、反射 Abstract class and abstract method, abstract class and polymorphism, reflection	
	接口的声明、接口回调、接口与多态 Interface declaration, interface callback, interface and polymorphism	
	接口与抽象类的使用场景 Application scenarios of interface and abstract class	
学习目标: Learning Objectives	了解: Recognize	接口与抽象类的使用场景 Application scenarios of interface and abstract class
	理解: Understand	接口的声明、接口回调、接口与多态 Interface declaration, interface callback, interface and polymorphism 抽象类和抽象方法、抽象类和多态、反射 Abstract class and abstract method, abstract class and polymorphism, reflection 成员变量的隐藏、方法的重写、super、final、上转型对象 Hiding of member variables, overriding of methods, super, final, upper transformation objects
	掌握: Master	子类与父类的关系、子类的继承性、子类构建对象的过程 The relationship between subclass and superclass, the inheritance of subclass, the process of constructing object by subclass
德育目标 Moral Objectives	2-1 2-2	
重点: Key Points	接口的声明、接口回调、接口与多态 Interface declaration, interface callback, interface and polymorphism 抽象类和抽象方法、抽象类和多态、反射 Abstract class and abstract method, abstract class and polymorphism, reflection 成员变量的隐藏、方法的重写、super、final、上转型对象 Hiding of member variables, overriding of methods, super, final, upper transformation objects 子类与父类的关系、子类的继承性、子类构建对象的过程 The relationship between subclass and superclass, the inheritance of subclass, the process of constructing object by subclass	
难点: Focal points	接口与多态 interface and polymorphism 抽象类和多态	

	abstract class and polymorphism		

知识单元序号: Knowledge Unit No.	6	支撑教学目标: SLOs Supported	1-2 1-3
知识单元名称 Unit Title	内部类和异常类 Inner class and Exception		

知识点: Knowledge Delivery	内部类 Inner Class		
	匿名类 Anonymous Classes		
	Exception 类、Throwable 类 Exception object, Throwable object		
	Try catch 语句 Try catch statement		
	Finally 语句 Finally statement		

学习目标: Learning Objectives	了解: Recognize	匿名类 Anonymous Classes 内部类 Inner Class
	理解: Understand	Try catch 语句 Try catch statement Finally 语句 Finally statement
	掌握: Master	Exception 类、Throwable 类 Exception object, Throwable object

德育目标 Moral Objectives	2-1 2-2
重点: Key Points	Exception 类、Throwable 类 Exception object, Throwable object Try catch 语句 Try catch statement Finally 语句 Finally statement
难点: Focal points	Exception 类、Throwable 类 Exception object, Throwable object

知识单元序号: Knowledge Unit No.	7	支撑教学目标: SLOs Supported	1-2 1-3
知识单元名称 Unit Title	高级应用 Advanced skills		

知识点: Knowledge Delivery	Swing 组件、布局管理、事件、事件监听器、窗体的设计方法 Swing components, layout, event, event listener, design method of windows	
	输入流，输出流，缓冲流，Data Streams Object Streams，文件 Input stream, output stream, buffer stream, Data Streams , Object Streams , file	
	URL，套接字，服务器，客户端 URL, socket, server, client	
	ArrayList 对象，Collection 接口，迭代器 ArrayList object, Collection interface, iterator	
	泛型，泛型在容器中的使用 Generic, the use of generics in containers	
学习目标: Learning Objectives	了解: Recognize	泛型 generic
	理解: Understand	ArrayList 对象，Collection 接口，迭代器 ArrayList object, Collection interface, iterator 泛型在容器中的使用 the use of generics in containers
	掌握: Master	Swing 组件、布局管理、事件、事件监听器 Swing components, layout, event, event listener 输入流，输出流，缓冲流，Data Streams Object Streams，文件 Input stream, output stream, buffer stream, Data Streams , Object Streams , file URL，套接字，服务器，客户端 URL, socket, server, client
德育目标 Moral Objectives	2-1 2-2	
重点: Key Points	Swing 组件、布局管理、事件、事件监听器 Swing components, layout, event, event listener 输入流，输出流，缓冲流，Data Streams Object Streams，文件 Input stream, output stream, buffer stream, Data Streams , Object Streams , file ArrayList 对象，Collection 接口，迭代器 ArrayList object, Collection interface, iterator URL，套接字，服务器，客户端 URL, socket, server, client 泛型在容器中的使用 the use of generics in containers	
难点: Focal points	URL，套接字，服务器，客户端 URL, socket, server, client	

三、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.
绪论 Introduction	2			
计算 Computing	3			
控制 Control flow	3			
类和方法 Class and method	8			
继承和接口 Interfaces and Inheritance	6			
内部类和异常类 Inner class and Exception	2			
高级应用 Advanced skills	12			
总计 Total	32			

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：问题驱动的分组学习与交流 Problem-based learning
☐	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	万聪
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，以学生平时考勤、课堂表现、课堂教师随机提问，学生平时作业完成情况综合评定，其中，学生考勤占比 80%，学生平时作业(课前预习作业、课后作业)完成情况占比 20%. The full score is 100. Students' attendance, classroom performance, random questions from teachers, and students' homework completion are comprehensively evaluated. Among them, students' attendance accounts for 80%, and students' homework (preview homework before class and homework after class) accounts for 20%.		

考核环节: Assessment Content	期末 Final	环节负责人: Director	万聪
给分形式: Result Type	百分制 Marks	课程总成绩比重(%): Percentage (%)	70
考核方式: Measures	满分 100 分，通过批阅学生大作业给出学生成绩。 The full score is 100, and students' scores are given according to the final coursework.		

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.			