东北大学秦皇岛分校本科课程教学大纲

一、课程基本信息

<table>
<tr><td>开课单位</td><td colspan="3">悉尼智能科技学院</td><td>课程代码</td><td colspan="5">3100213005</td></tr>
<tr><td>中文名称</td><td colspan="8">智能信息系统开发</td></tr>
<tr><td>英文名称</td><td colspan="8">Information System Development Methodologies</td></tr>
<tr><td>总学时</td><td>56</td><td rowspan="2">理论学时</td><td rowspan="2">56</td><td rowspan="2">实验学时</td><td rowspan="2">0</td><td rowspan="2">上机学时</td><td rowspan="2">0</td><td rowspan="2">设计学时</td><td rowspan="2">0</td><td rowspan="2">课外学时</td><td rowspan="2">0</td></tr>
<tr><td>学　分</td><td>3.5</td></tr>
<tr><td>课程类型</td><td colspan="11">☑理论课程　☐ 理论（含实验）课程　☐实践类课程</td></tr>
<tr><td>课程类别</td><td colspan="11">☐通识类 ☐学科基础类 ☑专业方向类 ☐实践类</td></tr>
<tr><td>适用专业</td><td colspan="11">计算机科学与技术</td></tr>
<tr><td>先修课程</td><td colspan="11">业务需求建模</td></tr>
<tr><td>建议开课学期</td><td colspan="11">☐1-1 ☐1-2 ☐2-1 ☑2-2 ☐3-1 ☐3-2
☐4-1 ☐4-2 ☐5-1 ☐5-2 ☐*（代表每学期都开设）</td></tr>
<tr><td>考核方式</td><td colspan="4">☑考试☐考查</td><td>成绩分制</td><td colspan="6">☑百分制 ☐五级制
☐二级制</td></tr>
<tr><td>使用教材</td><td colspan="11">无</td></tr>
<tr><td>参考书及教学资源</td><td colspan="11">1，斯科特.蒂利，哈里.罗森布拉特. 系统分析与设计（第11版）. 中国人民大学出版社.2020年.</td></tr>
<tr><td>其他说明</td><td colspan="11">无</td></tr>
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二、课程简介

中文描述

智能信息系统作为连接物理世界与数字世界的桥梁，正以前所未有的速度改变着我们的生活、工作乃至整个社会的运行方式。本课程旨在通过系统学习智能信息系统的基本原理、设计方法、关键技术及开发流程，培养学生的团队协作能力、创新思维、技术实践能力及项目管理能力，使其能够胜任智能信息系统设计、开发、维护与管理等相关工作，为未来的职业发展奠定坚实基础。

本课程是一门集计算机科学、人工智能、大数据分析、云计算及物联网等技术于一体的综合性课程，包含信息系统设计思维、功能性需求分析、面向对象分析、系统总体设计、系统详细设计、敏捷开发、信息系统伦理及发展等内容。课程深入剖析了智能信息系统的基本原理、架构设计与关键技术，还注重实践应用，通过一系列精心设计的项目案例，让学生亲手设计并规划智能信息系统，体验从理论到实践的跨越。

本课程由中澳双方教师合作全英授课，外方教师来自悉尼科技大学。课程采用悉尼科技大学授课模式，课堂分为理论授课与小组讨论，课程由中外双方教师共同参与，注重中外教育资源融合与学术互补，重视学生组织、表达等综合能力提升与增强国际视野及跨文化交流能力。

此外，课程内容按照“价值塑造、能力培养、知识传授”三位一体育人理念开展，在专业课程中注重融入价值观教育，注重培养学生的家国情怀和四个自信。通过学习智能信息系统开发相关知识，学生不仅能够获得实用的技能，还能够在学习过程中增强对中国特色社会主义文化自信及工匠精神的认同，树立起正确的世界观、人生观和价值观，从而更好地服务于国家发展和民族复兴。

English Description

The rapid evolution of Smart Information Systems (SIS), bridging the physical and digital realms, is transforming our lives, work, and societal operations. This comprehensive course integrates computer science, AI, big data analytics, cloud computing, and IoT to impart fundamental principles, design methodologies, key technologies, and development processes of SIS.

Aimed at fostering teamwork, innovative thinking, technical proficiency, and project management skills, students will be equipped to excel in designing, developing, maintaining, and managing SIS, laying a solid foundation for future careers. The curriculum delves into system architecture, functional requirement analysis, object-oriented modeling, overall & detailed system design, agile development, and ethical considerations of SIS.

With a blend of theory and practice, students engage in hands-on projects, bridging the gap between academics and real-world applications. Co-taught in English by Chinese and Australian professors from the University of Technology Sydney (UTS), the course adopts UTS's pedagogy, blending lectures with group discussions. This collaboration enhances international exposure, fosters cross-cultural communication, and bolsters students' organizational and presentation skills.

Embracing the holistic approach of "values shaping, competence building, and knowledge imparting," the course integrates values education, nurturing students' patriotism and the "Four Self-Confidences." By mastering SIS development, students not only acquire practical skills but also deepen their appreciation for Chinese socialist cultural confidence and craftsmanship, fostering a positive worldview, outlook on life, and values to contribute to national development and rejuvenation.

三、课程目标

1、知识目标：

1-1：掌握常见信息系统开发方法及流程；

1-2：掌握信息系统设计思维，理解创意与创新的重要性；

1-3：掌握以用户和中心的需求分析方法；

1-4：掌握敏捷开发基本原则与设计方法；

1-5：掌握面向对象系统分析与设计；

1-6：掌握信息系统硬件架构、软件架构设计；

1-7：掌握用户需求规格说明书撰写方法。

2、能力目标：

2-1：掌握不同信息系统开发方法关键技术，以设计和开发业务系统；

2-2：掌握不同信息系统的开发方法，如需求分析、项目管理或跨组织开发；

2-3：掌握不同信息系统开发方法评估方法；

2-4：针对特定应用场景及需求，提供不同信息系统解决方案。

3、德育/素养目标：

3-1：展示本专业在新时代中国特色社会主义建设中的成就和当前要解决的重大课题；

3-2：具有良好的团队协作意识和能力、较强的表达能力和人际交往能力；

3-3：认知提升工程科技人才创新创业能力、责任意识对提高中国在全球发展核心竞争力的作用；

3-4：认知大国工匠精神的内涵及时代意义，增强专业认同感、民族责任感；

3-5：具备良好的职业道德和社会责任感，遵纪守法。

表 1 课程目标与毕业要求的对应关系

毕业要求	指标点	课程目标	关联性（H/M/L）
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。	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；	1-1、1-2、1-3、1-4、1-5、1-6、1-7	H
2、问题分析：能够应用数学、自然科学和工程科学的基本原理、方法和手段，识别、表达、并通过文献研究分析复杂工程问题，以获得有效结论。	指标点 2-1：专业知识掌握扎实，了解中国和世界经济领域及其研究的最新动态和发展趋势；能够应用数学、自然科学和工程科学的基本原理、方法和手段，分析、识别、表达本专业相关的复杂工程问题；	2-1、2-2、2-3、2-4、3-1	M
5、使用现代工具：能够针对复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对复杂工程问题的预测与模拟，并能够理解其局限性。	指标点 5-3：能够针对本专业相关复杂工程问题，选择与使用恰当的技术、资源、现代工程工具和信息技术工具。	2-1、2-2、2-3、2-4、3-1、3-2	L

6、工程与社会：能够基于本专业相关背景知识和相关法规标准进行合理分析，评价本专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。	指标点 6-1：能够基于本专业相关背景知识进行合理分析，评价计算机相关工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响	2-1、2-2、2-3、2-4、3-1、3-2、3-3、3-4	M

四、主要教学内容

（一）理论教学

第一章：Introduction（支撑课程目标 1-1、2-1、2-2、2-3、2-4、3-1、3-2、3-3、3-4、3-5）

【1】知识点：

(1) Information Systems.
(2) System Development.
(3) Methodology for System Development.
(4) Successful project development.
(5) Traditional Methodologies.
(6) Waterfall approach.

【2】学习目标：

了解：Information Systems. Methodology for System Development.
理解：Traditional methodologies.
掌握：Waterfall approach.

【3】重点内容：

Traditional methodologies for Information system development, Waterfall approach.

【4】难点内容：

Waterfall approach.

【5】思政案例：

The lifecycle of information system development includes multiple stages such as analysis, design, development, testing, and maintenance. Each stage requires team members to cooperate with each other and have a high sense of responsibility and mission. In the analysis phase, facing a large and complex task, the team needs to conduct in-depth requirement analysis and planning. Experts and technical personnel from different backgrounds work together to discuss from multiple dimensions such as user experience, technical implementation, and cost control. During the process, members need to maintain an open and inclusive attitude, and through effective communication and negotiation, ultimately form a unified project vision and detailed implementation plan; In the design phase, the team is divided into multiple groups responsible for key aspects such as system architecture, interface design, and database planning. Faced with challenges, each group works closely together through a collaborative mechanism, utilizing the professional strengths of each member in the team to jointly find solutions. In summary, at every stage of information system development, team members must uphold the spirit of unity and collaboration, with clear division of labor and mutual support.

第二章：Design Thinking（支撑课程目标 1-2、1-3、2-1、2-2、2-3、2-4、3-1、3-2、3-3、3-4、3-5）

【1】知识点：

(1) Introduction to Design Thinking.

(2) Underlying Philosophy & Key Principles.
(3) Stakeholders & Complex Environments.
(4) Problem Context.
(5) Tools for Design Thinking.
(6) Stakeholder Analysis.
(7) Empathy mapping.
(8) Value Creation.
(9) Osterwalder business model.
(10) Value Proposition.

【2】学习目标：

了解：Introduction to Design Thinking, Osterwalder business model.

理解：Philosophy & Key Principles of design thinking. Value Creation. Value Proposition.

掌握：Methods for Stakeholders & Complex Environments analysis. Problem Context analysis. Stakeholders, Complex environments. Empathy mapping.

【3】重点内容：

Methods for Stakeholders & Complex Environments analysis. Problem Context analysis. Empathy mapping.

【4】难点内容：

Stakeholder analysis. Empathy mapping.

【5】思政案例：

Taking the construction of our school's smart campus as an example: (1) Introduce the user centered design concept: Introduce the key focus of different information system designs in the initial stage, guide students to conduct in-depth research on the actual needs of teachers and students for campus information systems, and emphasize the "user centered" design concept. Through discussions, interviews, and other means, students are able to deeply understand the real needs of the service recipients, cultivating their empathy and sense of social responsibility. (2) Cultivate students' innovative and critical thinking: During the ideation and prototyping stages, encourage students to break out of traditional thinking frameworks and propose novel and practical solutions. At the same time, guide students to think critically about design solutions, continuously iterate and optimize them, cultivate students' innovative thinking, and enable them to understand how to make rational analysis in complex and changing environments. (3) Strengthening students' patriotism in practice: In the process of system development, guide students to pay attention to the latest developments and technological trends in smart campus construction at home and abroad. Through comparative analysis, let students realize the advantages and disadvantages of China's smart campus construction. At the same time, encourage students to apply their learned knowledge to practical projects, contribute their own strength to improving the level of educational informatization in China, and strive for the realization of the Chinese Dream of great rejuvenation of the Chinese nation.

第三章：Agile（支撑课程目标 1-4、1-5、1-6、2-1、2-2、2-3、2-4、3-1、3-2、3-3、3-4、3-5）

【1】知识点：

(1) Why Agile?
(2) Underlying Philosophy & Key Principles.
(3) Agile in practice.
(4) Requirement Engineering.
(5) User Stories & Epics.

(6) Functional/non-functional requirements.

(7) Agile project management: Scrum.

【2】学习目标：

了解： The cause of agile development concept; Underlying philosophy and key principles of agile development.

理解： Requirement Engineering. User Stories & Epics.

掌握： Functional & non-functional requirements. Scrum。

【3】重点内容：

Underlying Philosophy & Key Principles. Stakeholder and complex environment.

【4】难点内容：

Differences between Agile and other development approach. Functional & non-functional requirements. Scrum.

【5】思政案例：

Faced with sudden public health emergencies, community epidemic prevention work is facing enormous challenges. The college responded quickly and organized an agile development team composed of teachers and students to use their learned skills to develop an epidemic prevention information management system for the local community. The system aims to improve the efficiency of epidemic prevention work, accurately track personnel flow, timely release epidemic prevention information, ensure residents' health and safety, and protect residents' personal privacy information. Agile development emphasizes "continuous improvement" and "encouraging innovation". In the process of system development, students are encouraged not only to master the technical details of Agile development, but also to cultivate the habit of continuous learning, pay attention to industry trends and technological frontiers. At the same time, students are encouraged to challenge traditional thinking, bravely propose new solutions, and motivate them to continuously pursue excellence in their future careers, contributing more wisdom and strength to society.

第四章：Other Methodologies（支撑课程目标 1-7、2-1、2-2、2-3、2-4、3-1、3-2、3-3、3-4、3-5）

【1】知识点：

(1) V-Model.

(2) Feature-Driven Development (FDD).

(3) Prototype & Rapid Application Development (RAD).

(4) Kanban.

(5) DevOps.

(6) Extreme Programming (XP).

(7) Spiral Model.

(8) Joint Application Development Methodology (JAD).

(9) Lean Development Methodology.

【2】学习目标：

了解： Feature-Driven Development (FDD). Extreme Programming (XP).

理解： Kanban. DevOps. Lean Development Methodology。

掌握： V-Model. Spiral Model. Joint Application Development Methodology (JAD).

【3】重点内容：

V-Model. Spiral Model. Joint Application Development Methodology (JAD).

【4】难点内容：

Spiral Model

【5】思政案例：

Introduce the development and growth of lean development methods in the software field in China. By introducing the significant success and remarkable performance of domestic enterprises (China Merchants Bank, Huawei) that have adopted lean software development methods, students can understand the principles, methods, and implementation steps of lean product development in the field of information system development in China, and further extend lean production, lean thinking, lean values, lean software development, and lean product development. In addition, introduce microservice architecture, service grid architecture, serverless architecture, distributed multi run architecture, virtualization technology, container technology, container orchestration and other technologies and their applications in lean development, so that students can understand the software and hardware design principles of lean software development.

（二）实验教学

None.

五、教学安排与学时分配

表 2 学时分配表

讲　　课　　内容		学时				
		讲课	实验	上机	设计	课外
第一章	Introduction	4	0	0	0	0
第二章	Design Thinking	18	0	0	0	0
第三章	Agile	26	0	0	0	0
第四章	Other Methodologies	8	0	0	0	0
小计		56	0	0	0	0
总计	56					

六、教学方法

1、Multi-media-based lecturing.
2、Combining theory with industrial practical problems.
3、Knowledge delivery with ethic education.
4、Problem-based learning.

七、成绩评定

1、Class Behavior：100 marks in all, according to class attendance and presentation. This item accounts for 30%.

2、Quizzes & Reports：Contains 4 individual quizzes and 2 group project tasks. Each quiz accounts for 5%, each project accounts for 40%. This item accounts for 70%.

八、评价及持续改进

1、教学大纲 Subject Syllabus Improvement Mechanism
考核周期：4 年，修订周期：4 年。
Check Period (YR)：4.　Revise Period (YR)：4

Measures：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 approval.

2、成绩评定考核 Assessment Improvement Mechanism

考核周期：1 学年，评价依据：学生最终成绩综合分析。

Check Period (YR)：1. Evaluation basis: comprehensive analysis of students' final scores.

改进措施：根据学生最终成绩的分布，进行相应的内容调整和优化，并改进教学方法。

Measures：The subject coordinator shall revise the syllabus based on the teaching content, effect and result distribution while optimize the assessment measures.

撰写： 于七龙，傅昌锃

审核： 韩鹏

批准： 史闻博

日期： 2024.07.05