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">3100213002</td></tr>
<tr><td>中文名称</td><td colspan="8">系统测试与质量管理</td></tr>
<tr><td>英文名称</td><td colspan="8">Systems Testing and Quality Management</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">工程领导力</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="5">☑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">Graham, D., Veenendaal, E. V., Evans, I., & Black, R. (2008). Foundations of software testing: ISTQB certification. Intl Thomson Business Pr.</td></tr>
<tr><td>其他说明</td><td colspan="11">无</td></tr>
</table>

二、课程简介

中文描述

系统测试与质量管理课程 是一门专为计算机科学与技术专业学生量身定制的课程，它不仅深入探讨了软件产品质量的测量与控制，而且融合了当前最前沿的技术，包括计算机科学、数据分析、软件工程等。这门课程的目的是培养学生在软件工程领域的专业技能，以及在全球化背景下进行有效沟通和协作的能力。

本课程从软件质量保证的基本原则出发，涵盖了管理策略和系统及软件测试的实践技能。课程内容全面覆盖了软件开发生命周期的各个阶段，包括需求分析、系统设计和软件测试等内容。学生将学习如何识别用户需求，如何设计满足这些需求的软件系统，以及如何通过测试确保软件的质量和性能。

课程由中澳双方教师共同授课。这种模式结合了理论讲授、案例分析、小组讨论和项目实践，旨在通过多样化的教学手段，提高学生的参与度和学习效果。通过小组讨论，学生能够锻炼团队合作能力，通过项目实践，学生能够将理论知识应用于解决实际问题。

本课程遵循“价值塑造、能力培养、知识传授”的教育理念。在专业课程中融入价值观教育，强调中国特色社会主义文化自信及工匠精神，培养学生的家国情怀和四个自信。这不仅有助于学生形成正确的世界观、人生观和价值观，而且能够激发学生的创新精神和社会责任感。

在课程中，学生将学习信息系统设计思维、面向对象分析与设计、敏捷开发方法以及信息系统伦理与发展。这些内容不仅涵盖了软件工程的技术层面，还包括了伦理、法律和社会影响等非技术层面。学生将掌握如何设计测试用例、执行测试计划、分析测试结果，并理解敏捷开发的核心原则。

English Description

The "System Testing and Quality Management" course is meticulously designed for students majoring in Computer Science and Technology. It delves deeply into the measurement and control of software product quality and integrates cutting-edge technologies such as computer science, data analysis, and software engineering. The purpose of this course is to cultivate students' professional skills in the field of software engineering and their ability to communicate and collaborate effectively in a global context.

Starting from the fundamental principles of software quality assurance, the course covers management strategies and practical skills in system and software testing. The curriculum comprehensively spans all stages of the software development lifecycle, including requirement analysis, system design, and software testing. Students will learn to identify user needs, design software systems that meet these needs, and ensure the quality and performance of the software through testing.

The course is co-taught by Chinese and Australian faculty. This mode combines theoretical lectures, case studies, group discussions, and practical projects, aiming to enhance students' engagement and learning outcomes through diverse teaching methods. Through group discussions, students can exercise their teamwork skills, and through practical projects, they can apply theoretical knowledge to solve real-world problems.

In the course, students will learn about information system design thinking, object-oriented analysis and design, agile development methods, and the ethics and development of information systems. These topics cover not only the technical aspects of software engineering but also non-technical aspects such as ethics, law, and social impact.

三、课程目标

1、知识目标：

1-1：掌握常见系统测试方法及流程；

1-2：掌握探索性测试并评估系统操作和功能；

1-3：掌握敏捷测试和瀑布式测试过程；

1-4：掌握敏捷开发基本原则与设计方法。

2、能力目标：

2-1：掌握不同测试方法关键技术，完善软件质量保证及管理；

2-2：掌握在测试的各个方面以专业的方式沟通方式；

2-3：掌握质量管理的原则和主要方法，包括测试过程支持开发人员、项目和业务成果的方式。

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）
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；	1-1、1-2、1-3、1-4、2-1、2-2、2-3	H
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。	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；	2-1、2-2、2-3、3-1、3-2、3-3、3-4、3-5	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 5-1：能够对本专业相关复杂工程问题进行建模与分析，理解获取相关信息参数的必要性与基本方法，并理解其局限性；	2-1、2-2、2-3、3-1、3-2、3-3、3-4、3-5	M
	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。		H

四、主要教学内容

（一）理论教学

第 1 章：Introduction to STQM（支撑课程目标 1-1、2-1、2-2、2-3、3-1、3-2、3-3、3-4、3-5）

【1】知识点：

(1) Subject Overview.

(2) Introduction to Quality and Testing.

(3) Basic testing concepts and principles

【2】学习目标：

了解：Subject Overview

理解：Quality and Testing

掌握：Basic testing concepts and principles

【3】重点内容：

Quality and Testing, Basic testing concepts and principles

【4】难点内容：

Basic testing concepts and principles

【5】思政案例：

The development lifecycle of a software application encompasses stages such as analysis, design, development, testing, and maintenance, each requiring team members to exhibit a high sense of responsibility and mission. For example, during the analysis phase, the team confronts a substantial and complex task, necessitating in-depth requirement analysis and planning. Here, experts and technical staff from various fields collaborate, considering aspects like user experience, technical feasibility, and cost control. Team members must maintain an open and inclusive attitude, communicate effectively, and negotiate to establish a unified project vision and detailed implementation plan. This process exemplifies the importance of collaboration and communication, which is integral to the course's focus on teamwork and ethical responsibility. In the design phase, teams are organized into groups, each tasked with key elements such as system architecture, interface design, and database planning. When faced with challenges, groups must work closely through a collaborative mechanism, utilizing the professional strengths of each member to find collective solutions. This highlights the importance of division of labor and mutual support, a core principle in software testing and quality management. Furthermore, the testing phase is where the principles of quality and testing are directly applied. Teams must ensure that the software application meets the defined quality standards through rigorous testing methodologies. This phase underscores the importance of meticulous attention to detail and adherence to testing principles, central to the course content.

第二章：Quality and Testing（支撑课程目标 1-2、1-3、2-1、2-2、2-3、3-1、3-2、3-3、3-4、3-5）

【1】知识点：

(1) The relationship between quality and testing.

(2) Impacts of poor quality and introduction to quality management

(3) Static testing

(4) Failure Modes & Effects Analysis (FMEA)

【2】学习目标：

了解：The relationship between quality and testing; Impacts of poor quality and introduction to quality management; Traditional test processes; Test cases and test scenarios.

理解：Differences between Static Analysis & FMEA; Differentiates between different test levels; Defect management

掌握：Test types including black and white box testing, performance, security and other test domains; Flow of test design; Agile testing processes.

【3】重点内容：

The relationship between quality and testing; Differences between Static Analysis & FMEA; Test planning; Flow of test design; Defect management.

【4】难点内容：

Static testing; Key sections in test plan building; Flow of test design; Agile testing processes.

【5】思政案例：

High-speed rail is an essential component of China's modern transportation system, and the quality of its control system software is directly related to the safety of passengers' lives and the image of the nation. Through a rigorous quality management system and a scientific testing process, the development of China's high-speed rail control system software not only ensures high reliability but also showcases China's outstanding achievements in the field of software engineering. From static testing code reviews to FMEA failure mode analysis, and then to the rapid response of agile testing, every step reflects Chinese engineers' relentless pursuit of software quality and meticulous attention to testing details. This case not only helps us understand the key role of software testing in ensuring system safety but also makes us realize the great responsibility that software testers bear. Through this case, we not only learn professional knowledge of software testing but also deeply feel how, as young people of the new era, we should combine personal development with national needs and contribute to the advancement of scientific progress and social development.

第三章：Flow of System Testing（支撑课程目标 1-2、1-3、2-1、2-2、2-3、3-1、3-2、3-3、3-4、3-5）

【1】知识点：

(1) Traditional test processes
(2) Test level
(3) Agile testing
(4) Defect management

【2】学习目标：

了解：Traditional test processes; Test cases and test scenarios.

理解：Differentiates between different test levels; Defect management

掌握：Flow of test design; Agile testing processes.

【3】重点内容：

Test planning; Flow of test design; Defect management.

【4】难点内容：

Flow of test design; Agile testing processes.

【5】思政案例：

In the tide of digital education, many online course education platform software teams are facing the challenges of stability and reliability brought about by a surge in user volume. To improve software quality, the team introduced the concept of Total Quality Management (TQM), using static testing and Failure Modes and Effects Analysis (FMEA) to predict and prevent potential defects in the early stages of development. They formulated a detailed testing plan, adopted agile testing processes to achieve rapid feedback and continuous integration, and established a strict defect management process to ensure that each issue is resolved in a timely manner. In this process, team members demonstrated a high sense of responsibility and mission, overcoming numerous difficulties through effective communication and collaboration, reflecting a spirit of continuous learning and innovation. They adhered to professional

ethics, honestly reported issues, managed defects transparently, and won the trust of users. This case not only demonstrates the intrinsic connection between software quality and testing but also emphasizes the importance of teamwork, professional ethics, and the spirit of innovation in the practice of software engineering.

第四章：Testing tools（支撑课程目标 2-1、2-2、2-3、3-1、3-2、3-3、3-4、3-5）

【1】知识点：

(1) Test Driven Development (TDD) and Behaviour Driven Development (BDD)
(2) Automation tools
(3) Cucumber- a BDD Test tool
(4) Crowd testing
(5) Ways to deal with difficult situations

【2】学习目标：

了解：Automation tools; Test infrastructure.

理解：Test Driven Development (TDD) ; Behaviour Driven Development (BDD); Automated testing; Crowd testing

掌握：Steps of automated testing.

【3】重点内容：

Automated testing. Test Driven Development (TDD) ; Behaviour Driven Development (BDD)

【4】难点内容：

Automated testing. Test Driven Development (TDD) ; Behaviour Driven Development (BDD)

【5】思政案例：

Taking the automated testing of Chinese space software as an example, we can see that these advanced testing tools and methods play a crucial role in ensuring the quality and reliability of space software. Through TDD and BDD, development teams can identify issues early on, optimize software design, while the use of automated testing tools greatly increases the efficiency and coverage of testing. Moreover, the introduction of crowd testing allows a broad range of users to participate in the testing process, helping to uncover more potential issues and enhance the user experience of the software. In this process, the Chinese space software team has demonstrated exceptional problem-solving capabilities in the face of difficulties, which not only reflects China's technological strength in the field of software testing but also highlights the country's emphasis on technological innovation and support. Through this case, we not only learn about the professional knowledge of testing tools but also deeply appreciate the core position of independent innovation in national development. As young people of the new era, we should understand how to integrate personal development with national needs and contribute to the advancement of science and technology and social progress.

（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 to STQM	4	0	0	0	0
第二章	Quality and Testing	8	0	0	0	0
第三章	Flow of System Testing	24	0	0	0	0
第四章	Testing tools	20	0	0	0	0
小计		56	0	0	0	0
总计	56					

六、教学方法

1. Multimedia Teaching: Classroom instruction based on information technology devices.
2. Practical Skills Instruction: Combining theory with industry and real-case scenarios.
3. Curriculum Ideological and Political Construction: Integrating knowledge teaching with moral education.
4. PBL (Problem-Based Learning) Teaching: Group learning and communication driven by problems.

七、成绩评定

1. Classroom Performance: Out of a maximum of 100 points, the score is based on attendance and active participation in class discussions, accounting for 30% of the total grade.
2. Assignments: This includes four assignments, with weights 20%, 25%, 35%, 20%, respectively.

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： 袁晓铭

批准： 史闻博

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