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">Sydney Smart Technology College, Northeastern University</td><td>课程代码</td><td colspan="5">3100013007</td></tr>
<tr><td>中文名称</td><td colspan="8">可持续工程项目设计</td></tr>
<tr><td>英文名称</td><td colspan="8">Designing Sustainable Engineering Projects</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">CST/CE</td></tr>
<tr><td>先修课程</td><td colspan="11"></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">Park, CS (2016) Contemporary Engineering Economics, Pearson</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

本课程旨在使学生学习并理解工程项目实施过程中涉及到的公司财务和经济学理论。课程将增强学生使用经济和财务技术，来降低项目成本和更好管理工程项目的能力；将讲授例如现金流量分析、价格评估和成本分析等方法；将通过分析财务报告和评估工程项目对企业财务业绩的影响，培养学生在工程领域内进行财务经济决策的能力。

English Description

In this subject, students understand finance and economics as they apply to engineering projects. Students increase their ability to accurately cost and manage engineering projects by applying economic and financial techniques, such as cash flow, valuation and costing. Students also develop competence in the financial language in the engineering domain by analyzing financial reports and assessing the impacts of engineering projects on the financial performance of a business.

三、课程目标

1、知识目标：

1-1：掌握在专业工程环境中运用工程经济学的基本原理、理论和实践；分析、理解和构建影响工程项目经济环境的各个指标。

1-2：掌握工程项目相关的会计和财务基础、资金管理、现金流分析、财务评价、等知识；系统掌握财务分析方法和技术，例如工程项目的现金流量分析技术；通过衡量评价财务和经济信息的影响，来评价项目可行性。

1-3：掌握对工程项目进行风险评估、敏感性分析等的方法和知识；了解工程经济学报告书写的技巧。

2、能力目标：

2-1：具有卓越的工程经济技术素养；具备突出的财务分析技术与工程实践技能，具备在工程项目及其相关领域通过财务理论和经济方法创造性的解决工程项目问题；通过工程项目评价学习过程培养工程经济素养。

2-2：可以分析、理解和构建影响工程项目经济环境的各个指标；能够胜任分析工程项目不同财务报告的要求。

2-3：具有搜集项目需求、可行性相关内容的信息搜集和利用能力

3、德育/素养目标：

3-1：理解工程经济教育对提高自主创新能力，建设创新型国家的重要意义。

3-2：认知提升工程科技人才的创新创业能力、构建产学合作的教育网络提高中国在全球发展核心竞争力。

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 1-3：了解本专业涉及相关行业的发展趋势以及相关产业的运营模式，具备在本专业相关领域进行工程设计、技术创新的能力。	1-1、1-2	H
2、问题分析：能够应用数学、自然科学与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；	1-3、3-2	M
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	M
	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。		H

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。	指标点 4-3：能够追踪国际前沿技术动态，掌握本专业涉及的重要技术指标以及达到指标所需的技术途径。	1-3、2-1	L
11、项目管理与财务：理解并掌握工程管理原理与经济决策方法，并能在多学科环境中应用。	指标点 11-1：掌握基本的工程管理原理和经济决策方法，能对通信相关领域的新技术、新应用进行财务与经济技术分析和比较；	2-1、2-2	H

四、主要教学内容

（一）理论教学

第 1 章：Introduction to Engineering Economics（支撑课程目标 1-1、1-2、2-1、2-2、3-1、3-2）

【1】知识点：

Overview of Engineering Economics.

【2】学习目标：

了解：Structure and meaning of course content design.

理解：Curriculum Framework for Engineering Economics.

掌握：basic concepts related to engineering economics.

【3】重点内容：

Clear understanding of the role of financial and economic theory in uncertain decision-making and effective change in the business ecology.

【4】难点内容：

Marginal impact of utility or cost of engineering economic projects.

【5】思政案例：

Understand the importance of engineering economics for socio-economic development and regional security, and the latest development of engineering economics in China.

第 2 章：Fundamentals of accounting and finance（支撑课程目标 1-1、1-2、2-1、2-2）

【1】知识点：

(1) Three major financial statements.

(2) Cash flow and profitability analysis.

【2】学习目标：

了解：Basic accounting and finance terminology; importance of resource evaluation.

理解：Must-have financial statement analysis techniques for investors and managers.

掌握：Basic finance and accounting processes.

【3】重点内容：

Three statements.

【4】难点内容：

Strategies and approaches to finance and accounting.

第 3 章：Funds management（支撑课程目标 1-1、1-2、2-1、2-2）

【1】知识点：

Interest, rates, simple and compound interest.

【2】学习目标：

Understanding and knowledge of: the time value of money; the present and future value of money; and the concept of the annual interest rate.

【3】重点内容：

Impact of inflation, risk factors, potential investment returns and loan interest on business decisions.

【4】难点内容：

Nominal and real interest rates.

第 4 章：Cash flow analysis（支撑课程目标 1-1、1-2、2-1、2-2）

【1】知识点：

(1) Cash flows and bank balances.

(2) Theory of depreciation.

【2】学习目标：

了解：The concept of project cash flow.

理解：Cash inflows and outflows.

掌握：Cost-benefit analysis of cash flows.

【3】重点内容：

Cash flow analysis.

【4】难点内容：

Depreciation and cash flow statement.

第 5 章：Financial evaluation（支撑课程目标 1-1、1-2、2-1、2-2）

【1】知识点：

(1) Payback period, net present value and rate of return on cost.

(2) Life-cycle cost, average cost for the year, and internal rate of return.

【2】学习目标：

了解：Financial evaluation of investment objectives.

理解：Key points and entry points for financial evaluation..

掌握：Calculation of financial indicators.

【3】重点内容：

Net present value (NPV).

【4】难点内容：

Internal rate of return.

第 6 章：Project risk assessment（支撑课程目标 1-1、1-2、2-1、2-2）

【1】知识点：

(1) Inflation and its impact on project cash flows.

(2) Uncertainty and risk.

【2】学习目标：

了解：Inflation concepts, Monte Carlo simulations.

理解：Inflation and cash flow.

掌握：Cash equivalents under inflation; sensitivity analysis.

【3】重点内容：

Real value ("constant dollar" value) calculation.

【4】难点内容：

CPI-based inflation calculation.

第 7 章：Evaluation of public projects（支撑课程目标 1-1、1-2、2-1、2-2）

【1】知识点：

Methodology for financial and economic evaluation of public projects.

【2】学习目标：

了解：Definition of public projects.

理解：The essential difference between public and private projects.

掌握：key steps in financial and economic evaluation.

【3】重点内容：

Analytical framework for public project evaluation.

【4】难点内容：

Cost-benefit analysis of public projects.

第 8 章：Analysis and improvement suggestions for engineering project reports（支撑课程目标 1-1、1-2、2-1、2-2）

【1】知识点：

Specific applications of the engineering project methodology.

【2】学习目标：

了解：Project Identification.

理解：Indicators and Models for Engineering Economics.

掌握：Accurate calculation and correct application.

【3】重点内容：

Engineering economics project analysis framework.

【4】难点内容：

Project Logic.

五、教学安排与学时分配

This course is based on classroom instruction. Classroom teaching centers around the basic concepts, basic theories, and basic principles of the course. The course focuses on the fundamental task of establishing moral education, and takes cultivating socialist builders and successors with the overall goal of developing moral, intellectual, physical, aesthetic, and labor as the general objective of financial accounting and economic effect of engineering projects as the main line; introduces the accounting and financial basis, financial evaluation, risk assessment, sensitivity analysis and other contents related to engineering projects; plays the role of teaching theoretical knowledge and value leading, thickly plants the national sentiment and strong national concept, solid basic knowledge, improves the professional skills and innovative spirit, establishes correct life, world and values. It will also strengthen the basic knowledge, improve the professional skills and innovation spirit, and establish a correct outlook on life, worldview and values. The allocation of hours in the classroom is shown in Table 3.

表 3 学时分配表

讲　　课　　内　　容		学时				
		讲课	实验	上机	设计	课外
第 1 章	Introduction to Engineering Economics	4	0	0	0	0
第 2 章	Fundamentals of accounting and finance	8	0	0	0	0
第 3 章	Funds management	8	0	0	0	0
第 4 章	Cash flow analysis	8	0	0	0	0
第 5 章	Financial evaluation	8	0	0	0	0
第 6 章	Project risk assessment	8	0	0	0	0
第 7 章	Evaluation of public projects	8	0	0	0	0

第 8 章	Analysis and improvement suggestions for engineering project reports the analysis of engineering project reports	4	0	0	0	0
小计		56	0	0	0	0
总计	56					

六、教学方法

1、In the learning process, we should pay attention to the combination of in-class and out-of-class learning, mastering the basic theoretical knowledge of engineering economics;

2、PBL teaching: problem-driven group learning and communication;

3、The use of multimedia courseware, case study teaching combined teaching, give vitality to the classroom;

4、The combination of theoretical teaching, discussion and case study forms mobilizes students' enthusiasm for learning and develops their ability to analyze and solve practical problems.

七、成绩评定

The course assessment consists of three parts, namely, the usual grade, the mid-term grade and the final grade, of which the usual grade mainly consists of the classroom performance and the pre-course measurement grade, which accounts for 15% of the total grade in percent; of which the grade consists of the student's work, which accounts for 35% of the total grade in percent; and the final grade consists of the final report and the project reflection report grade, which accounts for 50% of the total grade in percent. Students are required to participate and sign in for all sessions of this course and may not be absent. Unexcused absences of more than 1/3 of the hours of this course will disqualify students from taking the exam in this course.

八、评价及持续改进

1. Syllabus

Assessment cycle: 4 years, revision cycle: 4 years.

Improvement Measures: The course director organizes all the faculty members of the course team to discuss and propose improvement measures, which are approved by the Dean of Teaching and Learning after review by the Director of the Faculty.

2. Performance assessment and evaluation

Assessment cycle: 1 academic year, evaluation based on: comprehensive analysis of students' final grades.

Improvement measures: According to the distribution of students' final grades, adjust and optimize the content accordingly, and improve the teaching methods.

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