# 概率论与随机变量 教学大纲

# Probability and Random Variables Subject Syllabus

## 一、课程信息 Subject Information

| | | | |
|---|---|---|---|
| 课程编号:<br>Subject ID | 310031200 | 开课学期:<br>Semester | 3 |
| 课程分类:<br>Category | | 所属课群:<br>Section | 专业方向类 |
| 课程学分:<br>Credit Points | 3.5 | 总学时/周:<br>Total Hours/Weeks | 56 |
| 理论学时:<br>LECT. Hours | 56 | 实验学时:<br>EXP. Hours | 0 |
| PBL 学时:<br>PBL Hours | 0 | 实践学时/周:<br>PRAC. Hours/Weeks | 0 |
| 开课学院:<br>College | 东北大学秦皇岛分校<br>悉尼智能科技学院 | 适用专业:<br>Stream | 应用统计学 AS |
| 课程属性:<br>Pattern | 必修 Compulsory | 课程模式:<br>Mode | 引进 UTS |
| 中方课程协调人:<br>NEU Coordinator | Gui-Lai Zhang<br>张贵来 | 成绩记载方式:<br>Result Type | 百分制 Marks |
| 先修课程:<br>Requisites | 数学分析与建模、线性代数<br>Mathematical Analysis and Modeling、Linear Algebra | | |
| 英文参考教材:<br>EN Textbooks | Probability An Introduction，Geffrey Grimmett, Dominic Welsh, Oxford, 2014 | | |
| 中文参考教材:<br>CN Textbooks | 概率论与数理统计.（第 4 版） 邓集贤等，高等教育出版社，2009（上下两册） | | |
| 教学资源:<br>Resources | 概率论基础.（第 2 版） 李贤平，高等教育出版社，2010<br>Probability and Statistics for Engineering and the Sciences. (Ninth Edition) Jay L. Devore, 2014 | | |
| 课程负责人(撰写人):<br>Subject Director | 张贵来<br>Gui-Lai Zhang | 提交日期:<br>Submitted Date | 单击或点击此处输入日期。 |
| 任课教师(含负责人):<br>Taught by | Stephen Woodcock, Gui-Lai Zhang | | |
| 审核人:<br>Checked by | 韩鹏 | 批准人:<br>Approved by | 史闻博 |
| | | 批准日期:<br>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>整体目标:<br>Overall Objective</td><td colspan="2">在对现实世界的问题建模时，我们需要处理不确定性，而概率提供了一种量化和建模不确定性的有效方法。本课程介绍了概率的概念，如依赖事件和独立事件以及条件概率。介绍了随机事件的分布建模思想，包括概率计算、期望、方差、生成函数和独立事件的顺序统计。最后讨论了离散马尔可夫链。<br>When modelling real-world problems we need to deal with uncertainty, and probability provides an effective way to quantify and model uncertainty. This subject introduces concepts in probability such as dependent and independent events as well as conditional probability. The idea of modelling random events with distributions is introduced, including probability calculation, expectation, variance, generating functions, and order statistics for independent events. The subject concludes by considering discrete Markov chains.</td></tr>
<tr><td rowspan="8">（1）专业目标:<br>Professional Ability</td><td>1-1</td><td>了解确定性与随机系统、隐藏状态模型、信号解释<br>Recognize deterministic versus stochastic system,<br>理解随机实验、概率的解释、韦恩图<br>Understand random experiments, interpretations of probability and Venn diagrams<br>掌握条件概率、互斥、简单集理论和德摩根定律、贝叶斯定理<br>Master conditional probability, mutual exclusivity, simple set theory and de Morgam’s laws, Bayes Theorem.</td></tr>
<tr><td>1-2</td><td>了解累积概率函数<br>Recognize cumulative probability functions<br>理解离散随机变量<br>Understand discrete random variables<br>掌握概率质量函数、期望和方差<br>Master probability mass functions, expectation and variance</td></tr>
<tr><td>1-3</td><td>掌握金融期权的公平定价和基本博弈论<br>Master fair pricing of financial options and elementary game theory</td></tr>
<tr><td>1-4</td><td>掌握伯努利分布和二项式分布、卷积<br>Master Bernoulli and Binomial distributions, convolutions</td></tr>
<tr><td>1-5</td><td>了解指数分布及其与泊松分布的关系<br>Recognize exponential distribution and its relation to Poisson distribution<br>掌握条件分布和条件期望，随机变量的函数<br>Master conditional distributions and conditional expectation, functions of random variables</td></tr>
<tr><td>1-6</td><td>掌握生成函数、随机变量的和<br>Master generating functions and sums of random variables</td></tr>
<tr><td>1-7</td><td>了解马尔科夫链分类<br>Recognize classification of Markov Chains</td></tr>
</table>

| | | |
|---|---|---|
| | | 掌握离散马尔科夫链、可约性, 周期性、瞬态和吸收状态<br>Master discrete Markov Chains , Reducibility, periodicity, recurrent/transient/absorbing states |
| （2）德育目标:<br>Essential Quality | 2-1 | 培养具有不畏困难、不惧失败、锲而不舍、敢于尝试、迎难而上的精神,并在学习过程中培养自己的细心和耐心的勇气和精神<br>Cultivate the spirit of not fearing difficulties or failure, perseverance, daring to try, and cultivate their own careful and patient courage and spirit in the process of learning |
| | 2-2 | 培养遵守法律、懂规则、守规则的新时代公民<br>Cultivate citizens of the new era who abide by the law, understand and obey the rules |
| | 2-3 | 了解主要矛盾和次要矛盾,在面对复杂问题的时候要实事求是、抓住主要矛盾<br>Understand the main contradiction and secondary contradiction, seek truth from facts and grasp the main contradiction in the face of complex problems |
| | 2-4 | 引导同学们加强团队精神的学习,真正体会到团队力量的强大。使学生意识到：个人的力量是有限的，只有个人投入到集体团队中，通过高效沟通、良好协作，才能激发出无限力量，实现自身价值。<br>Guide the students to strengthen the study of team spirit, and truly experience the strong team strength.Make students realize that the strength of individuals is limited, only individuals into the collective team, through efficient communication, good cooperation, can stimulate infinite power, to realize their own value. |
| | 2-5 | 勉励同学们养成良好的行为习惯,无论学习还是做事都要有毅力有恒心，培养坚持不懈的优秀品质。<br>Encourage students to develop good behavior habits, no matter study or work to have perseverance and perseverance, cultivate unremitting excellent quality. |
| | 2-6 | 联系时政，增强学生勇于探索的创新精神、善于解决实际问题的能力。<br>Contact current politics, enhance students' innovative spirit to explore, good at the ability of solving practical problems. |
| | 2-7 | 明确事物的普遍联系性和事物是不断变化发展的唯物主义观点，提高学生正确认识问题、分析问题解决问题的能力。<br>Clarify the general connection of things and things is the changing materialist view, and improve students' ability to correctly understand, analyze and solve problems. |

**课程教学目标与毕业要求的对应关系 Matrix of GA & SLOs**

| 毕业要求 GA | 指标点 GA Index | 教学目标 SLOs |
|---|---|---|

| | | |
|---|---|---|
| **1**、理学知识：具有扎实的数学基础，能够将数学、自然科学和专业知识用于解决复杂实际问题。<br><br>**1. Science Knowledge:** Apply knowledge of mathematics, natural science, fundamentals and an engineering specialization to the solution of complex engineering problems. | 1-1：具有较强的演绎推理能力、准确计算能力、分析归纳能力、抽象思维能力，掌握数学、自然科学和相关专业知识，并使用其建立正确的数学、物理学等模型以解释复杂实际问题；<br>1-1: Capable of deductive reasoning, accurate calculation, analysis and induction and abstract thinking. Establishing correct mathematical and physical models with the professional knowledge of mathematics, natural science, etc. to solve complex practical problems; | |
| | 1-2：掌握统计调查、统计数据处理、统计分析、计算机与统计软件使用等应用统计学的基本理论、知识与方法，具备采集、处理、分析数据的能力，熟悉预研报告、可行性分析报告、研究方案等文档的撰写规范;<br>1-2: Mastery the basic theories, knowledge and methods of applied statistics, such as statistical investigation, statistical data processing, statistical analysis, and the use of computers and statistical software; capable of data collecting, processing, and analyzing; familiar with the writing norms of pre-research reports, feasibility analysis reports, and research plans; | 1-1 到 1-7<br>2-1、2-7 |
| | 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方案设计、技术创新的能力。<br>1-3: Understanding the development and operations of related industries in this major; capable of conducting program design and technological innovation in related fields of this major. | |
| **2**、问题分析：能够借助应用统计学的基本原理、方法和手段，识别、表达、并通过文献研究分析复杂实际问题，以获得有效结论。<br>**2. Problem Analysis**: Identify, formulate, research | 2-1：能够借助应用统计学的基本原理、方法和手段，分析、识别、表达本专业相关的复杂实际问题；<br>2-1: Capable of analyzing, identifying and elaborating complex practical problems related to this major with the applying of the basic principles of Applied Statistics; | 1-1 到 1-7<br>2-1 到 2-7 |

| | | |
|---|---|---|
| literature and analyze complex practical problems reaching substantiated conclusions using first principles of mathematics and sciences. | 2-2：能够借助应用统计学的基本原理、方法和手段，针对复杂实际问题设计针对性的方案，并综合运用文献、科学理论和技术手段予以解决。<br>2-2: Capable of drawing on the basic principles of applied statistics to design targeted schemes for complex practical problems, and using literature, scientific theories and technical means to solve them. | |

## 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

| | | | |
|---|---|---|---|
| 知识单元序号:<br>Knowledge Unit No. | 1 | 支撑教学目标:<br>SLOs Supported | 1-1、2-1 到 2-5 |
| 知识单元名称<br>Unit Title | 随机事件与概率<br>Random events and probability | | |
| 知识点:<br>Knowledge Delivery | 随机实验<br>Random experiments | | |
| | 确定性与随机系统<br>Deterministic versus stochastic systems | | |
| | 概率的解释<br>Interpretations of probability | | |
| | 条件概率<br>Conditional probability | | |
| | 互斥<br>Mutual exclusivity | | |
| | 维恩图<br>Venn diagrams | | |
| | 简单集理论和德摩根定律<br>Simple set theory and de Morgan’s laws | | |
| | 贝叶斯定理<br>Bayes Theorem | | |
| | 隐藏状态模型<br>Hidden state models | | |
| | 信号的解释<br>Interpretation of signals | | |
| 学习目标:<br>Learning Objectives | 了解:<br>Recognize | 确定性与随机系统<br>Deterministic versus stochastic systems | |
| | | 隐藏状态模型<br>Hidden state models | |

| | | |
|---|---|---|
| | | 信号的解释<br>Interpretation of signals |
| | 理解:<br>Understand | 随机实验<br>Random experiments |
| | | 概率的解释<br>Interpretations of probability |
| | | 维恩图<br>Venn diagrams |
| | 掌握:<br>Master | 条件概率<br>Conditional probability |
| | | 互斥<br>Mutual exclusivity |
| | | 简单集理论和德摩根定律<br>Simple set theory and de Morgan's laws |
| | | 贝叶斯定理<br>Bayes Theorem |
| 德育目标<br>Moral Objectives | 培养具有不畏困难、不惧失败、锲而不舍、敢于尝试、迎难而上的精神，并在学习过程中培养自己的细心和耐心的勇气和精神<br>Cultivate the spirit of not fearing difficulties or failure, perseverance, daring to try, and cultivate their own careful and patient courage and spirit in the process of learning | |
| | 了解主要矛盾和次要矛盾，在面对复杂问题的时候要实事求是、抓住主要矛盾<br>Understand the main contradiction and secondary contradiction, seek truth from facts and grasp the main contradiction in the face of complex problems | |
| | 培养遵守法律、懂规则、守规则的新时代公民<br>Cultivate citizens of the new era who abide by the law, understand and obey the rules | |
| | 引导同学们加强团队精神的学习，真正体会到团队力量的强大。使学生意识到：个人的力量是有限的，只有个人投入到集体团队中，通过高效沟通、良好协作，才能激发出无限力量，实现自身价值。<br>Guide the students to strengthen the study of team spirit, and truly experience the strong team strength.Make students realize that the strength of individuals is limited, only individuals into the collective team, through efficient communication, good cooperation, can stimulate infinite power, to realize their own value. | |
| | 勉励同学们养成良好的行为习惯，无论学习还是做事都要有毅力有恒心，培养坚持不懈的优秀品质。<br>Encourage students to develop good behavior habits, no matter study or work to have perseverance and perseverance, cultivate unremitting excellent quality. | |
| 重点:<br>Key Points | 随机实验；概率的解释；条件概率；互斥；维恩图；简单集理论和德摩根定律；贝叶斯定理<br>Random experiments; Interpretations of probability; Conditional | |

| | |
|---|---|
| | probability; Mutual exclusivity; Venn diagrams; Simple set theory and de Morgan's laws; Bayes Theorem |
| 难点:<br>Focal Points | 条件概率；互斥；贝叶斯定理<br>Conditional probability; Mutual exclusivity; Bayes Theorem |

| | | | |
|---|---|---|---|
| 知识单元序号:<br>Knowledge Unit No. | 2 | 支撑教学目标:<br>SLOs Supported | 1-2、2-5 |
| 知识单元名称<br>Unit Title | 离散随机变量；概率质量函数；累积概率函数；期望和方差<br>Discrete random variables; Probability mass functions; Cumulative probability functions; Expectation and variance | | |
| 知识点:<br>Knowledge Delivery | 离散随机变量<br>Discrete random variables | | |
| | 概率质量函数<br>Probability mass functions | | |
| | 累积概率函数<br>Cumulative probability functions | | |
| | 期望和方差<br>Expectation and variance | | |
| 学习目标:<br>Learning Objectives | 了解:<br>Recognize | 累积概率函数<br>Cumulative probability functions | |
| | 理解:<br>Understand | 离散随机变量<br>Discrete random variables | |
| | 掌握:<br>Master | 概率质量函数；期望和方差<br>Probability mass functions; Expectation and variance | |
| 德育目标<br>Moral Objectives | 勉励同学们养成良好的行为习惯，无论学习还是做事都要有毅力有恒心，培养坚持不懈的优秀品质。<br>Encourage students to develop good behavior habits, no matter study or work to have perseverance and perseverance, cultivate unremitting excellent quality. | | |
| 重点:<br>Key Points | 概率质量函数；期望和方差<br>Probability mass functions; Expectation and variance | | |
| 难点:<br>Focal Points | 概率质量函数；累积概率函数；期望和方差<br>Probability mass functions; Cumulative probability functions; Expectation and variance | | |

| | | | |
|---|---|---|---|
| 知识单元序号:<br>Knowledge Unit No. | 3 | 支撑教学目标:<br>SLOs Supported | 1-5、2-3、2-6 |
| 知识单元名称<br>Unit Title | 应用包括金融期权的公平定价和基本博弈论<br>Applications including fair pricing of financial options and elementary game theory | | |
| 知识点:<br>Knowledge Delivery | 金融期权的公平定价<br>Fair pricing of financial options | | |
| | 基本博弈论<br>Elementary game theory | | |
| 学习目标: | 掌握: | 金融期权的公平定价 | |

| | | |
|---|---|---|
| Learning Objectives | Master | Fair pricing of financial options |
| | | 基本博弈论<br>Elementary game theory |
| 德育目标<br>Moral Objectives | 培养遵守法律、懂规则、守规则的新时代公民<br>Cultivate citizens of the new era who abide by the law, understand and obey the rules | |
| | 联系时政，增强学生勇于探索的创新精神、善于解决实际问题的能力。<br>Contact current politics, enhance students' innovative spirit to explore, good at the ability of solving practical problems. | |
| 重点:<br>Key Points | 金融期权的公平定价<br>Fair pricing of financial options | |
| | 基本博弈论<br>Elementary game theory | |
| 难点:<br>Focal Points | 金融期权的公平定价和基本博弈论<br>Fair pricing of financial options and elementary game theory | |

| | | | |
|---|---|---|---|
| 知识单元序号:<br>Knowledge Unit No. | 4 | 支撑教学目标:<br>SLOs Supported | 1-6，2-6 |
| 知识单元名称<br>Unit Title | 伯努利分布和二项式分布；卷积<br>Bernoulli and Binomial distributions; convolutions | | |
| 知识点:<br>Knowledge Delivery | 伯努利分布<br>Bernoulli distributions | | |
| | 二项式分布<br>Binomial distributions | | |
| | 卷积<br>convolutions | | |
| 学习目标:<br>Learning Objectives | 掌握:<br>Master | 伯努利分布和二项式分布；卷积<br>Bernoulli and Binomial distributions; convolutions | |
| 德育目标<br>Moral Objectives | 联系时政，增强学生勇于探索的创新精神、善于解决实际问题的能力。<br>Contact current politics, enhance students' innovative spirit to explore, good at the ability of solving practical problems. | | |
| 重点:<br>Key Points | 类的定义与对象的创建<br>Definitions of class and creations of objects | | |
| | 成员函数的调用<br>Member functions and theirs calling | | |
| 难点:<br>Focal Points | 类的一些高级应用方法<br>Advanced methods about class | | |

| | | | |
|---|---|---|---|
| 知识单元序号:<br>Knowledge Unit No. | 5 | 支撑教学目标:<br>SLOs Supported | 1-5、2-4 |
| 知识单元名称<br>Unit Title | 指数分布及其与泊松分布的关系；条件分布和条件期望；随机变量的函数<br>Exponential distribution and its relation to Poisson distribution; Conditional | | |

| | | |
|---|---|---|
| | distributions and conditional expectation; Functions of random variables | |
| 知识点:<br>Knowledge Delivery | 指数分布及其与泊松分布的关系<br>Exponential distribution and its relation to Poisson distribution | |
| | 条件分布和条件期望<br>Conditional distributions and conditional expectation | |
| | 随机变量的函数<br>Functions of random variables | |
| 学习目标:<br>Learning Objectives | 了解:<br>Recognize | 指数分布及其与泊松分布的关系<br>Common operations about directories and files |
| | 掌握:<br>Master | 条件分布和条件期望<br>Conditional distributions and conditional expectation |
| | | 随机变量的函数<br>Functions of random variables |
| 德育目标<br>Moral Objectives | 引导同学们加强团队精神的学习，真正体会到团队力量的强大。使学生意识到：个人的力量是有限的，只有个人投入到集体团队中，通过高效沟通、良好协作，才能激发出无限力量，实现自身价值。<br>Guide the students to strengthen the study of team spirit, and truly experience the strong team strength.Make students realize that the strength of individuals is limited, only individuals into the collective team, through efficient communication, good cooperation, can stimulate infinite power, to realize their own value. | |
| 重点:<br>Key Points | 条件分布和条件期望<br>Conditional distributions and conditional expectation | |
| | 随机变量的函数<br>Functions of random variables | |
| 难点:<br>Focal Points | 指数分布及其与泊松分布的关系；条件分布和条件期望<br>Exponential distribution and its relation to Poisson distribution; Conditional distributions and conditional expectation | |

| | | | |
|---|---|---|---|
| 知识单元序号:<br>Knowledge Unit No. | 6 | 支撑教学目标:<br>SLOs Supported | 1-6 |
| 知识单元名称<br>Unit Title | 生成函数，随机变量的和<br>Generating functions, Sums of random variables | | |
| 知识点:<br>Knowledge Delivery | 生成函数<br>Generating functions | | |
| | 随机变量的和<br>Sums of random variables | | |
| 学习目标:<br>Learning Objectives | 掌握:<br>Master | 生成函数<br>Generating functions | |
| | | 随机变量的和<br>Sums of random variables | |
| 德育目标<br>Moral Objectives | 无<br>None | | |
| 重点: | 生成函数 | | |

| | |
|---|---|
| Key Points | Generating functions |
| | 随机变量的和<br>Sums of random variables |
| 难点:<br>Focal Points | 随机变量的和<br>Sums of random variables |

| | | | |
|---|---|---|---|
| 知识单元序号:<br>Knowledge Unit No. | 7 | 支撑教学目标:<br>SLOs Supported | 1-7，2-7 |
| 知识单元名称<br>Unit Title | 马尔可夫链<br>Markov Chains | | |
| 知识点:<br>Knowledge Delivery | 离散马尔可夫链<br>Discrete Markov Chains | | |
| | 马尔可夫链分类<br>Classification of Markov Chains | | |
| | 可约性, 周期性、瞬态、吸收状态<br>Reducibility, periodicity, recurrent/transient/absorbing states | | |
| 学习目标:<br>Learning Objectives | 了解:<br>Recognize | 马尔可夫链分类<br>Classification of Markov Chains | |
| | 掌握:<br>Master | 离散马尔可夫链<br>Discrete Markov Chains | |
| | | 可约性, 周期性、瞬态和吸收状态<br>Reducibility, periodicity, recurrent/transient/absorbing states | |
| 德育目标<br>Moral Objectives | 明确事物的普遍联系性和事物是不断变化发展的唯物主义观点，提高学生正确认识问题、分析问题解决问题的能力。<br>Clarify the general connection of things and things is the changing materialist view, and improve students' ability to correctly understand, analyze and solve problems. | | |
| 重点:<br>Key Points | 条件分布和条件期望<br>Conditional distributions and conditional expectation | | |
| | 随机变量的函数<br>Functions of random variables | | |
| 难点:<br>Focal Points | 指数分布及其与泊松分布的关系；条件分布和条件期望<br>Exponential distribution and its relation to Poisson distribution; Conditional distributions and conditional expectation | | |

## 四、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<br>LECT. | 实验<br>EXP. | 课外实践<br>PBL | 集中实践<br>PRAC. |

| | | | | |
|---|---|---|---|---|
| 随机事件与概率<br>Random events and probability | 6 | | 8 | |
| 离散随机变量；概率质量函数；累积概率函数；期望和方差<br>Discrete random variables; Probability mass functions; Cumulative probability functions; Expectation and variance | 5 | | 5 | |
| 应用包括金融期权的公平定价和基本博弈论<br>Applications including fair pricing of financial options and elementary game theory | 2 | | 2 | |
| 伯努利分布和二项式分布；卷积<br>Bernoulli and Binomial distributions; convolutions | 2 | | 2 | |
| 指数分布及其与泊松分布的关系；条件分布和条件期望；随机变量的函数<br>Exponential distribution and its relation to Poisson distribution; Conditional distributions and conditional expectation; Functions of random variables | 4 | | 6 | |
| 生成函数，随机变量的和<br>Generating functions, Sums of random variables | 2 | | 2 | |
| 马尔可夫链<br>Markov Chains | 4 | | 6 | |
| 总计 Total | 25 | | 31 | |

## 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<br>Multi-media-based lecturing |
| ☑ | 实践能力传授：理论与行业、实际案例相结合<br>Combining theory with industrial practical problems |
| ☑ | 课程思政建设：知识讲授与德育相结合<br>Knowledge delivery with ethic education |
| ☑ | PBL 教学：问题驱动的分组学习与交流<br>Problem-based learning |
| ☐ | 其他:单击或点击此处输入文字。<br>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:<br>Assessment Content | 平时 Behavior | 环节负责人:<br>Director | 张贵来<br>Gui-Lai Zhang |
| 给分形式:<br>Result Type | 百分制 Marks | 课程总成绩比重(%):<br>Percentage (%) | 50 |
| 考核方式:<br>Measures | 课堂作业和课后作业 30%<br>Classroom and homework 30%<br>出勤 20%<br>Attendance 20% | | |

| | | | |
|---|---|---|---|
| 考核环节:<br>Assessment Content | 期末 Final | 环节负责人:<br>Director | 张贵来<br>Gui-Lai Zhang |
| 给分形式:<br>Result Type | 百分制 Marks | 课程总成绩比重(%):<br>Percentage (%) | 50 |
| 考核方式:<br>Measures | Test paper score 50%<br>试卷成绩 50% | | |

## 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):<br>Check Period (YR) | 4 | 修订周期(年):<br>Revise Period (YR) | 4 |
| 改进措施:<br>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。<br>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 | | |
| **成绩评定改进机制 Assessment Improvement Mechanism** | | | |
| 考核周期(年):<br>Check Period (YR) | 1 | 修订周期(年):<br>Revise Period (YR) | 1 |
| 改进措施:<br>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。<br>The subject coordinator shall revise the syllabus based on the teaching content, effect and result distribution while optimize the assessment measures. | | |