

# 课程大纲

## COURSE SYLLABUS

1.	<b>课程代码/名称</b> <b>Course Code/Title</b>	工程结构可靠性和风险量化 <b>Engineering Structure Reliability and Risk Quantification</b>
2.	<b>课程性质</b> <b>Compulsory/Elective</b>	专业选修课
3.	<b>课程学分/学时</b> <b>Course Credit/Hours</b>	3 /48
4.	<b>授课语言</b> <b>Teaching Language</b>	中文
5.	<b>授课教师</b> <b>Instructor(s)</b>	邹广
6.	<b>是否面向本科生开放</b> <b>Open to undergraduates or not</b>	是
7.	<b>先修要求</b> <b>Pre-requisites</b>	<p>(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)</p> <p>研究生无先修要求 本科生需已修《材料力学》(MAE202 或 MAE202-16 或 MSE213 或 MSE305) 或《结构力学》(OCE322 或 OCE405)</p>
8.	<b>教学目标</b> <b>Course Objectives</b>	<p>(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)</p> <p>1) 理解结构可靠性分析在工程中的重要意义; 2) 掌握对载荷和结构承载能力的数理统计方法; 3) 掌握可靠性计算的常用方法; 4) 掌握基于可靠性的结构规范校准的一般方法 5) 了解时变可靠性和系统可靠性的分析方法 6) 了解可靠性分析在海洋工程中的应用及可靠性前沿研究。</p> <p>对研究生, 要求理解可靠性计算常用方法之间的区别和联系; 对本科生, 无此要求。</p> <p>1) understand the importance of reliability analysis in engineering 2) acquire the skill to develop statistical models for loads and structural capacity 3) acquire the skill to compute structural reliability 4) acquire the skill to calibrate structural design codes based on reliability 5) understand time-variant or system reliability problems 6) understand applications of reliability analysis in ocean engineering and frontiers of reliability analysis</p> <p>understand the distinctions and connections among reliability computation methods (for graduates)</p>
9.	<b>教学方法</b> <b>Teaching Methods</b>	<p>(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)</p> <p>讲授、习题和讨论相结合 (习题和讨论针对本科生和研究生分别设计)</p> <p>Combination of lectures, exercises and discussions (the exercises and discussions for undergraduates and graduates are different)</p>

10.	<b>教学内容</b> <b>Course Contents</b> (如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)
Section 1	绪论 (2 学时) Introduction
Section 2	概率论和统计基础知识 (4 学时) Fundamentals of Probability and Statistics
Section 3	可靠性理论和经典算法 (6 学时) 对研究生, 要求理解可靠性计算常用方法之间的区别和联系; 对本科生, 无此要求。 Reliability Theory and Classic Computational Methods Understand the distinctions and connections among reliability computation methods (for graduates)
Section 4	可靠性数值计算方法 (4 学时) Simulation Methods
Section 5	时变可靠性 (3 学时) Time-Variant Reliability
Section 6	系统可靠性 (4 学时) System Reliability
Section 7	基于可靠性的结构设计规范校准 (6 学时) Reliability-based Structural Code Calibration
Section 8	工程风险量化 (3 学时) Engineering Risk Quantification
Section 9	贝叶斯工程决策分析 (3 学时) Bayesian Engineering Decision Analysis
Section 10	海洋工程可靠性 (5 学时) Applications of Reliability Analysis in Ocean Engineering
Section 11	可靠性研究前沿 (5 学时) 对研究生, 要求多参与讨论, 发表见解; 对本科生, 无此要求。 Frontiers of Reliability Analysis Engage in more discussions and express opinions (for graduates)
Section 12	辅导和讨论 (3 学时) Tutorials and Discussions
11.	<b>课程考核</b> <b>Course Assessment</b>
(① 考核形式 Form of examination; ②. 分数构成 grading policy; ③ 如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)  出勤 Attendance 15% 课堂表现 Class Performance 15% 平时作业 Assignments 20% 期末考核 Final Assessment 50%  研究生的考核内容将比本科生的多一道题目	

**12. 教材及其它参考资料**

**Textbook and Supplementary Readings**

参考资料:

1. 赵国藩. 工程结构可靠性理论与应用[M]
2. 余建星. 工程结构可靠性原理及其优化设计[M]
3. O. Ditlevsen and H. O. Madsen. Structural reliability methods.