课程大纲
COURSE SYLLABUS

1.	**课程代码/名称** **Course Code/Title**	SDM5004 / 产品可靠性设计与分析 SDM5004 / Product Reliability Design and Analysis
2.	**课程性质** **Compulsory/Elective**	专业选修课 Elective
3.	**课程学分/学时** **Course Credit/Hours**	3 学分 / 48 学时 3 Credit / 48 Hours
4.	**授课语言** **Teaching Language**	英文 English
5.	**授课教师** **Instructor(s)**	薛珂 / 吴景深 Ke Xue / Jingshen Wu
6.	**是否面向本科生开放** **Open to undergraduates or not**	否 No
7.	**先修要求** **Pre-requisites**	概率论与数理统计 （MA212） Probability and Statistics (MA212)
8.	**教学目标** **Course Objectives**	
	使学生了解可靠性在工程产品，部件和系统设计和制造中的重要性，了解和掌握机械和电子系统的可靠性分析以及基于可靠性的产品设计方法。 To enable students to understand the importance of reliability in the design and manufacture of engineering products, components and systems, understand and master the reliability analysis of mechanical and electronic systems and product design for reliability methods.	
9.	**教学方法** **Teaching Methods**	
	以课堂讲授为主，同时引导学生对相关文献和书籍进行自学，并将学习内容在课堂上进行分享与讨论；结合一或两个课程项目，使学生能够获得与课堂上学习主题相关的更加深入的实践经验。 Focus on lectures, assisted with self-learning of the literatures and books recommended by instructors; students should share and discuss their learning outcomes in the class. Complete one or two independent projects which can enable students to obtain in-depth knowledge related to the learning topics from the class.	
10.	**教学内容** **Course Contents** （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	可靠性工程简介 Introduction to reliability engineering
	Section 2	可靠性数学基础 Fundamentals of reliability mathematics
	Section 3	可靠性预计与建模 Reliability Prediction and Modelling

	Section 4	可靠性设计方法 Design for Reliability
	Section 5	可靠性的故障物理方法 Physic of Failure
	Section 6	机械零件与系统的可靠性 Reliability of Mechanical Components and Systems
	Section 7	电子元件与系统的可靠性 Reliability of Electronic Components and Systems
	Section 8	实验设计与方差分析 Design of Experiments and Analysis of Variance
	Section 9	可靠性试验 Reliability Testing
	Section 10	加速寿命试验技术 Highly Accelerated Life Testing
	Section 11	系统的可用性和可维护性 Availability and Maintainability
	Section 12	可靠性管理方法 Reliability Management

11. 课程考核
Course Assessment

平时作业 Homework	20%
项目报告 Project Report	20%
期中考试（开卷） Midterm Exam (Open Book)	30%
期末考试（开卷） Final Exam (Open Book)	30%

12. 教材及其它参考资料
Textbook and Supplementary Readings

References:
1. P. O'Connor and A. Kleyner, **Practical Reliability Engineering**, fifth edition, Wiley, 2012.
2. J.W. McPherson, **Reliability Physics and Engineering: Time to Failure Modeling**, 2nd Edition, Springer, 2013.