课程大纲
COURSE SYLLABUS

1.	**课程代码/名称** **Course Code/Title**	材料与化工实验安全实践 Laboratory Safety and Practice of Materials and Chemical Engineering
2.	**课程性质** **Compulsory/Elective**	专业核心课 Major Core Course
3.	**开课单位** **Offering Dept.**	材料科学与工程系 Department of Materials Science and Engineering
4.	**课程学分/学时** **Course Credit/Hours**	1/（12 学时理论课+8 学时实践课）
5.	**授课语言** **Teaching Language**	中文 Mandarin
6.	**授课教师** **Instructor(s)**	卢周广，王海鸥，李艳艳，廖成竹，章剑波，李慧丽 Zhouguang Lu, Haiou Wang, Yanyan Li, Chengzhu Liao, Jianbo Zhang, Huili Li
7.	**开课学期** **Semester**	秋季 Fall
8.	**是否面向本科生开放** **Open to undergraduates or not**	否 No
9.	**先修要求** **Pre-requisites**	（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.） 无 None

10. 教学目标
Course Objectives

（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.）

材料与化工实验安全实践是面向材料与化工专业研究生开设的一门专业核心课，以提高学生对安全问题的认识与理解，提升学生安全意识及实操技能为教学目标；采取理论与实践教学相结合的方式，由校内教师与安全领域企业专家协作完成课程教学。理论部分主要介绍实验室安全的重要性、实验室安全教育的必要性、实验室安全相关法律、法规、消防安全、用电安全、危险化学品、病原微生物实验室生物安全等内容。在理论教学过程中，紧密穿插与课程相对应的实践内容，包括消防安全教育、危险化学品分类、实验室常用仪器的安全操作、实验室事故的应急处理方法等。课程包含 8 学时实践课，内容包括：应急和急救、安全应急演习与考核，通过实操与考核强化学生对安全操作及应急处理技能的掌握，培养动手解决实际问题的能力。

Laboratory Safety and Practice of Materials and Chemical Engineering is a core course designed for graduate students in Materials and Chemical Engineering to cultivate their awareness and understanding of safety issues, and to improve their safety consciousness and practical skills. The course combines theoretical teaching with practical teaching, and is jointly completed by university teachers and industry experts in the field of safety. The theoretical part mainly introduces the importance of laboratory safety, the necessity of laboratory safety education, relevant laws, regulations on laboratory safety, fire safety, electrical safety, hazardous chemicals, and biosafety in pathogen laboratories. During the theoretical teaching, practical content closely related to the course is interspersed, including fire safety education, classification of hazardous chemicals, safe operation of common laboratory instruments, and emergency handling methods for laboratory accidents. The course includes 8 hours of practical classes, covering emergency and first aid, safety emergency drills and tests, to strengthen students' mastery of safe operation and emergency handling skills through hands-on practice and tests, and cultivate the ability to solve practical problems through hands-on experience.

11. 教学方法 Teaching Methods

（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.）

课程采取理论讲授、安全事故实例分析、实操培训、应急演练与考核相结合的方式开展课程教学。

（1） 理论讲授：介绍实验室安全的重要性、实验室安全教育的必要性、实验室安全相关法律、法规、标准和指南，介绍实验室常见危险源及防护方式、实验室安全守则、实验室安全应急预案等；

（2） 安全事故示例分析：通过实验室安全事故视频、相关新闻，与学生一起分析事故原因，提出改进建议，加强学生安全知识与技能运用能力，提升学生安全意识；

（3） 实操培训：通过常见实验室危险源排查与处理，提高学生对安全问题的认识与理解，包括：化学品危险等级识别及泄漏处理、常用气体的使用及泄漏处理、洗眼器使用等，强化学生对安全知识与技能的掌握；

（4） 实践课：应急和急救、安全应急演习与考核邀请企业专家讲解消防安全、急救等方面实验室安全实例，指导常见实验室安全问题的应急处理等，提升学生发现并处理常见实验室安全问题的能力，包括：化学品泄漏与应急处理、电气安全、急救、灭火器及消防栓的使用等。

（5） 考核方式为考查，包括安全知识测评、安全技能实操测试，各占50%，突出实验室安全理论知识与实操技能并重的特点，考核结果同时作为材料系实验室准入条件。通过实操演练和测评，验证相关知识与技能掌握及灵活运用情况，同时提升学生解决实际问题的能力。安全技能实操培训与测试需要借助气瓶、灭火器、消防栓等器具，在开阔场地集中进行。

The course is carried out by combining lectures, safety videos watching, practical operation training, emergency drill and assessment.

（1） Lectures: introduces the importance of laboratory safety, the necessity of laboratory safety education, relevant laws, regulations, standards, guidelines for laboratory safety, common sources of danger in laboratories and their protective measures, laboratory safety rules, and emergency plans for laboratory safety;

（2） Analysis of safety accidents: using laboratory safety accident videos and related news to analyze the causes of accidents with students, propose suggestions for improvement, strengthen students' ability to apply safety knowledge and skills, and enhance their safety awareness;

(3) Practical training: through investigation and handling of common laboratory hazards to improve students' understanding and recognition of safety issues, including: identification and treatment of chemical hazard levels and leakage, use and leakage treatment of common gases, and the use of eye wash, to reinforce students' grasp of safety knowledge and skills;

(4) Practical classes: include emergency and first aid, safety emergency drills and assessments. Inviting industry experts to explain examples of laboratory safety in fire safety and first aid, guiding the emergency handling of common laboratory safety issues, to enhance students' ability to identify and handle common laboratory safety problems, including: chemical leakage and emergency treatment, electrical safety, first aid, and the use of fire extinguishers and fire hydrants.

(5) Assessment: the evaluation is based on a 50% safety knowledge assessment and a 50% practical safety skills test, emphasizing the importance of both theoretical knowledge and practical skills in laboratory safety. The outcomes of these assessments also serve as the prerequisites for access to the laboratories of Department of Materials Science and Engineering. Through practical drills and tests, the course aims to verify students' mastery and flexible application of relevant knowledge and skills, while also enhancing their ability to solve real-world problems. Safety skills practical training and tests require the use of equipment such as gas cylinders, fire extinguishers, and fire hydrants, and should be carried out in an open area.

12. 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（2hours）	材料与化工实验室安全概述（理论课） Overview of laboratory safety for materials and chemical engineering (Lecture)
Section 2（2hours）	化学品安全（理论课） Chemical safety (Lecture)
Section 3（2hours）	气体安全（理论课） Gas safety (Lecture)
Section 4（2hours）	消防安全（理论课） Fire safety (Lecture)
Section 5（2hours）	生物和辐射安全（理论课） Biological and radiation safety (Lecture)
Section 6（2hours）	电气安全（理论课） Electric safety (Lecture)
Section 7（4hours）	应急和急救演练（实践课） Emergency response and first aid (Practice)
Section 8（4hours）	安全应急演习与实操考核（实践课） Emergency drills and examination (Practice)

13. 课程考核
Course Assessment

（考核形式 Form of examination；.分数构成 grading policy；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.）

考核形式为考查，包括：安全知识测评、安全技能实操测试;

分数构成：安全知识测评 50%，安全技能实操测试 50%。

Form of examination：safety examination, safety skills practical tests;
Grading policy: safety examination 50%, safety skills practical tests 50%.

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

（1） 朱莉娜等. 高校实验室安全基础. 天津大学出版社，2014 年;

（2） 黄凯等. 大学实验室安全基础. 北京大学出版社，2012 年;

（3） 黄开胜. 清华大学实验室安全手册. 清华大学出版社，2019 年;

（4） 刘景良等. 安全管理. 化学工业出版社，2010 年;

（5） A.库尔曼. 安全科学导论. 中国地质大学出版社，1991 年;

（6） 陈宝智. 安全原理. 冶金工业出版社，1995 年;

（7） 王凯全等. 危险化学品安全评价方法（危险化学品安全培训丛书——6）. 中国石化出版社, 2005 年;

（8） 王新颖等. 危险化学品设备安全（危险化学品安全培训丛书——2）. 中国石化出版社,2005 年;

（9） 周忠元等. 化工安全技术.化学工业出版社,1993;

（10） 莫瑞·加瑟. 计算机安全的技术与方法.电子工业出版社,1992.