课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	**课程名称 Course Title**	材料力学 Mechanics of Materials
2.	**授课院系 Originating Department**	材料科学与工程 Department of Materials Science and Engineering
3.	**课程编号 Course Code**	MSE305
4.	**课程学分 Credit Value**	2
5.	**课程类别 Course Type**	专业基础课 Major Foundational Courses
6.	**授课学期 Semester**	春季 Spring
7.	**授课语言 Teaching Language**	英文 English
8.	**授课教师、所属学系、联系方式（如属团队授课，请列明其他授课教师） Instructor(s), Affiliation& Contact （For team teaching, please list all instructors）**	唐斌，副教授，材料科学与工程系第一科研楼 425 tang.b@sustc.edu.cn 0755-8801-8998 Tang B, Ph.D Associate Professor, Department of Materials Science and Engineering tang.b@sustc.edu.cn 0755-8801-8998 宋金华，研究教授，材料科学与工程系与创新创业学院双聘教授 songjh@sustc.edu.cn
9.	**实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact**	待公布 To be announced
10.	**选课人数限额(可不填) Maximum Enrolment**	

（Optional）					
11. 授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other（Please specify）	总学时 Total
学时数 Credit Hours	32	0	0	0	32

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	MSE001 材料科学与工程基础 Fundamentals of Materials Science and Engineering MSE002 材料科学与工程基础实验 Experiments for Fundamentals of Materials Science and Engineering
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	
14. 其它要求修读本课程的学系 Cross-listing Dept.	

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

This course will introduce the basic concepts of mechanics in materials science and engineering’s applications, including strain, stress, tensile, bending, torsion, shear, etc. The objectives of this course is to provide a complete framework of mechanics in materials science applications as well as the mechanical behavior of materials.

16. 预达学习成果 Learning Outcomes

(1).Clearly understand follow concepts: strain, stress, tensile, bending, torsion, shear, and know how to do the analysis on the mechanical behavior listed.

(2).Understand the mechanical behavior of materials, including elastic deformation, plastic deformation, viscoelastic deformation.

(3).Well understand the working principle of following techniques: tensile test, torsion test, indentation test, bending test

17. 课程内容及教学日历 （如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）
Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

第一讲、绪论（2 学时） Introduction (2 Credit Hours)

1. 材料力学的历史 Development of mechanics of materials

2. 材料力学在社会发展中的重要性 Importance of mechanics of materials in social development

3. 本课程的性质和要求 Nature and requirements of this course

第二讲、应力（2 学时） Stress (2 Credit Hours)

1. 力稳态 Stress equilibrium

2. 应力分类及基本定义 Classification and basic definition of stress

第三讲、应变（2 学时） Strain (2 Credit Hours)

1. 应变的分类及基本定义 Classification and basic definition of Strain

2. 结构杆件中应变的计算方法 Calculation method of strain in structural members

第四讲、轴向拉伸（2 学时） Axial load (2 Credit Hours)

1. 轴向拉伸相关的力学概念及受力分析 Mechanical concept and force analysis related to axial load

2. 具体工程问题中拉伸应力及应变的力学分析及计算 Mechanical Analysis and Calculation of Tensile Stress and Strain in Engineering Problems

3. 拉伸过程中的应力集中 Stress concentrations in axial load

第五讲、扭转变形（2 学时） Torsion (2 Credit Hours)

1. 扭转相关的力学概念及受力分析 Mechanical concept and force analysis of torsion

2. 具体工程问题中扭转应力及应变的力学分析及计算 Mechanical analysis and calculation of torsional stress and strain in engineering problems

第六讲、弯曲（2 学时） Bending (2 Credit Hours)

1. 弯曲相关的力学概念及受力分析 Mechanics concepts and force analysis related to bending

2. 具体工程问题中弯曲相关应力及应变的力学分析及计算 Mechanical analysis and calculation of bending-related stress and strain in engineering problems

3. 弯曲过程中的应力集中 Stress concentrations in bending

第七讲、横向剪切（2 学时） Transverse shear (2 Credit Hours)

1. 材料的横向剪切应力，应变的基础知识 Basis for transverse shear stress and strain

2. 相应应力应变的具体分析方法 Analysis method of corresponding stress and strain

第八讲、复合加载（2 学时） Combined loadings (2 Credit Hours)

1. 薄壁压力囊的力学分析 Mechanical analysis of thin-walled pressure vessels

2. 复合应力的具体分析方法 Specific analysis method of combined stress

第九讲、应力转换（4 学时） Stress transformation

1. 应力转换的原理及公式 Principle and formula of stress transformation

2. 主应力及最大应力的定义及具体应用 Definition and application of principal stress and maximum stress

第十讲、应变转换（4 学时） Strain transformation (4 Credit Hours)

1. 应变转换的原理及公式 Principle and formula of strain transformation

2. 主应变及最大应变的定义及具体应用 Definition and application of principal strain and maximum strain

第十一讲、杆和梁的设计（4 学时）Design of beams and shafts (4 Credit Hours)

1. 杆和梁设计的基本原理 Basis for beam design

2. 安全系数的定义 Definition of safety factor

第十二讲、杆的位移分析（2 学时）Deflection of beams and shafts (4 Credit Hours)

1. 杆受力位移的基本概念 Basis for the force displacement of shafts

2. 相关力学分析方法 Related mechanical analysis method for shaft displacement

第十三讲、屈曲及力学分析（2 学时） Buckling and mechanics analysis (4 Credit Hours)

1. 屈曲的基本概念及其在工程应用中的影响 Basis for buckling and its influence in engineering applications

2. 屈曲相关的力学分析方法及公式 Mechanical analysis and formulas related to buckling

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

Text Book: Mechanics of Materials, 5th Edition, R.C. Hibbeler

Reference Book: Mechanical Behavior of Materials- Engineering Methods for Deformation, Fracture and Fatigue, 4th, Norman E. Dowling

课程评估 ASSESSMENT

19.

评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance				
课堂表现 Class Performance				
小测验 Quiz		30		
课程项目 Projects				
平时作业 Assignments				
期中考试 Mid-Term Test		30		
期末考试 Final Exam		40		
期末报告 Final Presentation				
其它（可根据需要改写以上评估方式） Others (The above may be modified as necessary)				

20. 记分方式 **GRADING SYSTEM**

☑A. 十三级等级制 **Letter Grading**
☐ B. 二级记分制（通过/不通过） **Pass/Fail Grading**

课程审批 REVIEW AND APPROVAL

21. 本课程设置已经过以下责任人/委员会审议通过
This Course has been approved by the following person or committee of authority