# 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.

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| 1. | **课程名称 Course Title** | 传热学 Heat Transfer |
| 2. | **授课院系 Originating Department** | 力学与航空航天工程系 Department of Mechanics and Aerospace Engineering |
| 3. | **课程编号 Course Code** | MAE308 |
| 4. | **课程学分 Credit Value** | 3 |
| 5. | **课程类别 Course Type** | 专业核心课 Major Core Course<br>专业选修课 Major Elective Course |
| 6. | **授课学期 Semester** | 春季 Spring |
| 7. | **授课语言 Teaching Language** | 中英双语 Chinese-English Bilingual |
| 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）** | 唐欣 副教授<br>力学与航空航天工程系<br>tangx@sustech.edu.cn<br><br>Xin TANG, Associate Professor<br>Department of Mechanics and Aerospace Engineering<br>tangx@sustech.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）** | |

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| 11. | 授课方式<br>Delivery Method | 讲授<br>Lectures | 习题/辅导/讨论<br>Tutorials | 实验/实习<br>Lab/Practical | 其它(请具体注明)<br>Other（Please specify） | 总学时<br>Total |
| | 学时数<br>Credit Hours | 48 | | 0 | | 48 |
| 12. | 先修课程、其它学习要求<br>Pre-requisites or Other Academic Requirements | 高等数学（下）(MA127)）或 MA102a 数学分析 II<br>Calculus II (MA127) / MA102a Mathematical Analysis II | | | | |
| 13. | 后续课程、其它学习规划<br>Courses for which this course is a pre-requisite | | | | | |
| 14. | 其它要求修读本课程的学系<br>Cross-listing Dept. | | | | | |

## 教学大纲及教学日历 SYLLABUS

### 15. 教学目标 Course Objectives

The first objective of this course is to provide students with basic principles of heat transfer. A second objective is for students to develop creative thinking skills by solving heat transfer problems in engineering, using analytical methods.

通过本课程教学，让学生理解传热学基本原理，并培养学生的创新思维能力，利用学到的分析方法来解决工程中遇到的传热学问题。

### 16. 预达学习成果 Learning Outcomes

1. Students can understand the basic concepts on heat transfer.
2. Students can identify the mechanism of a heat transfer phenomenon in engineering practice and construct the proper model for it.
3. Students can apply the knowledge from pre-requisites as a tool to solve the constructed model.

1. 学生能够理解传热学的基本概念。
2. 学生能够正确辨别出工程中遇到的传热现象的机理，并为它构建出正确的数学模型。
3. 学生能够利用已学过的数学知识求解出上述数学模型。

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### 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.)**

1. Introduction to heat transfer (2 credit hours)
2. Introduction to heat conduction (2 credit hours)
3. One-dimensional steady heat conduction with/without heat source (4 credit hours)
4. One-dimensional steady heat conduction: special case (3 credit hours)
5. Two-dimensional steady heat conduction (2 credit hours)
6. Unsteady heat conduction (4 credit hours)
7. Introduction to convection (2 credit hours)

8. Midterm exam (2 credit hours)
9. Conservation law (2 credit hours)
10. Internal Forced Convection (3 credit hours)
11. External forced convection (4 credit hours)
12. Natural convection (3 credit hours)
13. Convection with phase change (3 credit hours)
14. Radiation (4 credit hours)
15. Heat exchange (2 credit hours)
16. Final review and project presentation (3 credit hours)

1. 传热学基本介绍 (2 学时)
2. 热传导基础 (2 学时)
3. 带和不带热源的一维稳态热传导问题 (4 学时)
4. 一维稳态热传导的特殊问题 (3 学时)
5. 二维稳态热传导 (2 学时)
6. 非稳态热传导 (4 学时)
7. 对流换热概论 (2 学时)
8. 期中考试 (2 学时)
9. 守恒定律 (2 学时)
10. 内部自然对流 (3 学时)
11. 外掠自然对流 (4 学时)
12. 自然对流 (3 学时)
13. 相变对流换热 (3 学时)
14. 热辐射 (4 学时)
15. 换热器 (2 学时)
16. 课程总结及学生项目汇报 (3 学时)

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

教材 Textbook：
Yunus Cengel, Afshin Ghajar, Heat and Mass Transfer: Fundamentals and Applications, McGraw-Hill Education.

参考书 Supplementary Readings：
1. J. P. Holman, 传热学 HEAT TRANSFER 英文版原书第 10 版，机械工业出版社;
2. 杨世铭，陶文铨，传热学，高等教育出版社;
3. Adrian Bejan, Heat Transfer, Wiley, 1993;
4. Hans Dieter Baehr, Karl Stephan, Heat and Mass Transfer, Springer 2006.

## 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 | | 5 | | |
| 课堂表现 Class Performance | | | | |
| 小测验 Quiz | | | | |
| 课程项目 Projects | | 30 | 抄袭记 0 分 Cheating:0 | |
| 平时作业 Assignments | | 5 | 抄袭记 0 分 Cheating:0 | |
| 期中考试 Mid-Term Test | 2 hours | 20 | 作弊记 0 分 Cheating:0 | |
| 期末考试 Final Exam | 2 hours | 40 | 作弊记 0 分 Cheating:0 | |
| 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

力学与航空航天工程系教学指导委员会
The Committee for Teaching Affairs in Department of Mechanics and Aerospace Engineering