

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	信号与线性系统分析 Signals and Linear System Analysis
2.	授课院系 Originating Department	系统设计及智能制造学院 School of System Design and Intelligent Manufacturing (SDIM)
3.	课程编号 Course Code	SDM246
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	专业基础课 Major Foundational Courses
6.	授课学期 Semester	秋季 Fall
7.	授课语言 Teaching Language	中英双语 English & Chinese
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)	刘德荣 系统设计及智能制造学院 liudr@sustech.edu.cn LIU Derong School of System Design and Intelligent Manufacturing (SDIM) liudr@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)	

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	48		0		48
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	MA127 高等数学(下) Calculus II, EE104 电路基础 Fundamentals of Electric Circuits				
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	SDM263 自动控制理论 Feedback Control Theory				
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

本课程涵盖信号与系统的基本知识，介绍以下8大方面的内容，要求学生理解连续信号傅立叶变换、拉普拉斯变换、离散信号的傅立叶变换、Z变换：

1. 信号与系统的基本知识，包括单位冲击信号和单位阶跃信号，系统的特征；
2. 线性时不变系统的特征和描述方法，包括单位冲击响应，卷积；
3. 周期信号的傅里叶级数；
4. 连续时间信号的傅里叶变换；
5. 采样和采样原理；
6. 离散时间信号的傅里叶变换；
7. 拉普拉斯变换和Z变换；
8. 信号与系统相关的Matlab程序设计。

This course covers the fundamental knowledge of signals and systems and introduces the following 8 aspects:

1. Basic concepts of signals and systems, including unit impulse signal and unit step signal, system characteristics;
2. Characteristics and description of linear time-invariant systems, including unit impulse response, convolution;
3. Fourier series of periodic signals;
4. Fourier transform of continuous-time signals;
5. Sampling and sampling principles;
6. Fourier transform of discrete-time signals;
7. Laplace transform and Z transform;
8. Matlab program design related to signals and systems.

16. 预达学习成果 Learning Outcomes

通过这门课程的学习，学生能够：

1. 理解LTI系统及其单位冲击响应和频率响应等概念；
2. 描述并计算离散时间信号与连续时间信号的卷积；
3. 描述并计算离散时间周期信号与连续时间周期信号的傅里叶级数；
4. 描述并计算离散时间信号与连续时间信号的傅里叶变换；
5. 掌握并应用采样定理；
6. 掌握拉普拉斯变换的Z变换的基本内容；

7. 利用Matlab等软件工具实现傅里叶级数和傅里叶变换，从而对信号和系统进行分析；能够在信号处理中运用滤波、采样和调制等方法。

Through this course, students will be able to:

1. Understand concepts such as LTI systems, unit impulse response, and frequency response.
2. Describe and calculate the convolution of discrete-time and continuous-time signals.
3. Describe and calculate the Fourier series of discrete-time periodic signals and continuous-time periodic signals.
4. Describe and calculate the Fourier transform of discrete-time and continuous-time signals.
5. Master and apply the sampling theorem.
6. Understand and apply Laplace transform and Z-transform.
7. Use software tools such as Matlab to implement Fourier series and Fourier transform, and analyze signals and systems.

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.)

理论课

第1周：信号与系统I

第2周：信号与系统II

第3周：线性时不变系统I

第4周：线性时不变系统II

第5周：周期信号的傅里叶级数I

第6周：周期信号的傅里叶级数II

第7周：连续时间信号的傅里叶变换I

第8周：连续时间信号的傅里叶变换II

第9周：离散时间信号的傅里叶变换I

第10周：离散时间信号的傅里叶变换II

第11周：信号与系统的时间和频率描述

第12周：拉普拉斯变换I

第13周：拉普拉斯变换II

第14周：采样

第15周：Z变换

第16周：信号与系统的时间和频率分析

Theory Course

Week 1: Signals and Systems I

Week 2: Signals and Systems II

Week 3: Linear Time-Invariant Systems I

Week 4: Linear Time-Invariant Systems II

Week 5: Fourier Series of Periodic Signals I

Week 6: Fourier Series of Periodic Signals II

Week 7: Fourier Transform of Continuous-Time Signals I

Week 8: Fourier Transform of Continuous-Time Signals II

Week 9: Fourier Transform of Discrete-Time Signals I

Week 10: Fourier Transform of Discrete-Time Signals II

Week 11: Time and Frequency Description of Signals and Systems

Week 12: Laplace Transform I
 Week 13: Laplace Transform II
 Week 14: Sampling
 Week 15: Z Transform
 Week 16: Time and Frequency Analysis of Signals and Systems

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

Alan V. Oppenheim and A. S. Willsky. Signals and Systems. Prentice Hall, 1982. ISBN: 9780138097318.

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		20		
课程项目 Projects				
平时作业 Assignments		20		
期中考试 Mid-Term Test		20		
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

