

## 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 <b>Course Title</b>	数字信号处理 Digital Signal Processing				
2.	授课院系 <b>Originating Department</b>	电子与电气工程系 Department of Electrical and Electronic Engineering				
3.	课程编号 <b>Course Code</b>	EE323				
4.	课程学分 <b>Credit Value</b>	3				
5.	课程类别 <b>Course Type</b>	专业核心课 Major Core Courses 专业选修课 Major Elective Courses				
6.	授课学期 <b>Semester</b>	秋季 Fall				
7.	授课语言 <b>Teaching Language</b>	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) <b>Instructor(s), Affiliation &amp; Contact</b> (For team teaching, please list all instructors)	虞亚军, 副教授, 电子与电气工程系 Associate Professor YU Yajun, Department of Electrical & Electronic Engineering Email: <a href="mailto:yuj@sustech.edu.cn">yuj@sustech.edu.cn</a> Tel: 0755-88018557				
9.	实验员/助教、所属学系、联系方式 <b>Tutor/TA(s), Contact</b>	待公布 To be announced				
10.	选课人数限额(可不填) <b>Maximum Enrolment (Optional)</b>					
11.	授课方式 <b>Delivery Method</b>	讲授 <b>Lectures</b>	习题/辅导/讨论 <b>Tutorials</b>	实验/实习 <b>Lab/Practical</b>	其它(请具体注明) <b>Other (Please specify)</b>	总学时 <b>Total</b>
	学时数 <b>Credit Hours</b>	32		32		64

12. 先修课程、其它学习要求 <b>Pre-requisites or Other Academic Requirements</b>	EE205 信号与系统 Signals and Systems
13. 后续课程、其它学习规划 <b>Courses for which this course is a pre-requisite</b>	EE 330 DSP 系统设计与仿真, DSP Design and Simulation EE 328 语音信号处理, Speech Signal Processing
14. 其它要求修读本课程的学系 <b>Cross-listing Dept.</b>	生物医学工程系 / Department of Biomedical Engineering

### 教学大纲及教学日历 SYLLABUS

#### 15. 教学目标 Course Objectives

<p>本课程介绍数字信号处理的基本理论和知识, 重点介绍</p> <ol style="list-style-type: none"> <li>1、离散时间信号和系统在时域和变换域中表示方法。变换域主要包括离散时间傅立叶变换, 离散傅立叶变换以及 z 变换。</li> <li>2、线性时不变系统</li> <li>3、有限脉冲响应滤波器 (FIR filters) 和无限脉冲响应滤波器 (IIR filters) 结构及其设计。</li> <li>4、快速傅立叶变换及其实现。</li> </ol> <p>This course introduces fundamental principles and concepts in the area of digital signal processing, including:</p> <ol style="list-style-type: none"> <li>1. the representation of discrete time signal and system in the time domain and transformed domain. The transformed domains mainly include discrete-time Fourier transform, discrete Fourier transform, and z-transform.</li> <li>2. Linear and time-invariant (LTI) System</li> <li>3. Digital filters (FIR filters and IIR filters) structures and their designs,</li> <li>4. Fast Fourier transform and its implementation.</li> </ol>
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#### 16. 预达学习成果 Learning Outcomes

<p>完成本课程学习后, 学生可以</p> <ol style="list-style-type: none"> <li>1. 掌握数字信号处理领域的基本数学原理、主要问题、常用设计思路和解决方法,</li> <li>2. 解决常见数字信号处理问题;</li> <li>3. 掌握基本的分析和设计数字信号处理系统的能力, 熟练运用 matlab 编程工具, 以及</li> <li>4. 运用本课程的知识解决数字信号处理相关的科研项目中的问题。。</li> </ol> <p>After completing this course, the students should be able to</p> <ol style="list-style-type: none"> <li>1. Understand the basic principles and design approaches of digital signal processing;</li> <li>2. Solve typical digital signal processing problems;</li> <li>3. Master skills to conduct basic analysis and design of discrete-time signal processing systems, using computer languages, such as MATLAB programming; and</li> <li>4. Conduct further research in the area of digital signal processing.</li> </ol>
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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.)**

Week 1 Introduction of Discrete-time Signals and Systems.  
 Week 2 Time domain representation of discrete-time signal  
 Week 3 & 4 Time domain representation of discrete-time system.  
 Week 5 & 6 Frequency domain representation of discrete-time signal  
 Week 7 Frequency domain representation of discrete-time system  
 Week 8, 9 & 10 Discrete Fourier Transform, Fast Fourier Transform and its implementation  
 Week 11 z-transform  
 Week 12 LTI Discrete time system in transformed domain  
 Week 13 Digital filter structures  
 Week 14, 15 and 16 Digital filter (IIR filter and FIR filter) design

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

**Textbook:**  
 Sanjit K. Mitra, Digital Signal Processing: A Computer-Based Approach, 4th edition McGraw Hill

**Supplementary Readings**  
 Alan V. Oppenheim and Ronald W. Schaffer, **Discrete-time Signal Processing**, Pearson  
 Lawrence R. Rabiner and Bernard Gold, **Theory and Application of Digital Signal Processing**, Prince Hall

19. 课程评估 ASSESSMENT

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		15%		
平时作业 Assignments		5%		
期中考试 Mid-Term Test				
期末考试 Final Exam		60%		
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)

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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

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