

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	DSP 系统设计与仿真 DSP System Design and Simulation
2.	授课院系 Originating Department	电子与电气工程系 Department of Electrical and Electronic Engineering
3.	课程编号 Course Code	EE330
4.	课程学分 Credit Value	1.5
5.	课程类别 Course Type	专业核心课 Major Core Courses
6.	授课学期 Semester	春季 Spring
7.	授课语言 Teaching Language	中文 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)	庞利会 电子与电气工程系 panglh@sustc.edu.cn  Lihui Pang Department of Electrical and Electronic Engineering panglh@sustc.edu.cn
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	无 NA
10.	选课人数限额(可不填) Maximum Enrolment (Optional)	

11. 授课方式 Delivery Method	讲授	习题/辅导/讨论	实验/实习	其它(请具体注明)	总学时
	Lectures	Tutorials	Lab/Practical	Other (Please specify)	Total
学时数 Credit Hours			48		48

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	EE323 数字信号处理 EE323 Digital Signal Processing
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

通过本课程的学习，使学生了解 DSP 的基本结构和工作原理，重点掌握 TMS320F28335 和 TMS320C5402 的硬件结构、各片内外设的工作原理与应用方法。掌握 DSP 软件 CCS 开发过程、DSP 的 C 语言编程和数字信号处理算法设计实现方法。在上述基础上，学生应能设计基本的 TMS320F28x 硬件系统，使用 C 语言编写 TMS320F28x 应用软件和数字信号处理算法，为设计基于 DSP 的智能测控仪器或者系统奠定基础。

Through the study of this course, students can understand the basic structure and working principle of DSP, especially, master the hardware structure, internal module and peripheral device working principle of TMS320F28335 and TMS320C5402, and an ability to apply the technique. Skilled use the CCS software to develop DSP program, and be able to use C language programming and the digital signal processing algorithm realization on DSP chips. On the basis of the above, students should be able to design the hardware system based on TMS320F28x chips, use C language to program on TMS320F28X chips, and the digital signal processing algorithm realization on DSP chips, which will lay the foundation for the design of intelligent measurement and control instruments or systems based on DSP.

16. 预达学习成果 Learning Outcomes

通过这门课程的学习，学生能够

1. 掌握 DSP 芯片基本结构，并可以根据应用需求选择合适 DSP 芯片；
2. 掌握 DSP 硬件开发软件 CCS 的使用，初步建立利用 DSP 芯片进行数字信号处理的编程、汇编、连接、仿真运行的基本思路；
3. 熟悉 TMS320F28335 芯片的特性和资源；
4. 掌握 DSP 芯片的 ALU 和 MAC 的工作原理；
5. 掌握定点、浮点运算的 DSP 实现；
6. 掌握 DSP 芯片的内部存储器空间的分配及指令寻址方式，并会用 CCS 软件修改、填充 DSP 内存单元；
7. 掌握 SRAM 存储空间分配以及 SRAM 的读写及数据的检查方法；
8. 掌握定时器的处理的工作原理；
9. 掌握片上 AD 采样工作原理；
10. 完成简单算法的 DSP 实现。

After completing this course, the students will be able to

1. Grasp the basic structure of the DSP chip, and can choose the appropriate DSP chip according to the application requirements;
2. Can well use the DSP development software CCS, and be establish the basic idea of programming, assembly, connection and simulation of digital signal processing based on DSP chips;
3. Familiar with the characteristics and resources of TMS320F28335 chip;
4. Grasp the working principle of ALU and MAC of DSP chip;
5. Master the DSP implementation of fixed-point and floating-point operations;
6. Master the internal memory space allocation and instruction addressing mode of the DSP chip, and be able to use CCS software to modify and fill the memory unit of DSP;
7. Master the allocation of SRAM storage space and the methods of reading, writing and data checking of SRAM.
8. Master the working principle of timer;
9. Grasp the working principle of AD sampling on chip;
10. Be able to complete the DSP implementation of simple algorithm.

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.)

本课程的主要内容有：

1. DSP 系统的特点、DSP 系统的设计思路、DSP 芯片技术的发展、DSP 芯片的选择；
2. DSP 芯片的硬件结构和基本特点,DSP 芯片的 CPU 结构、总线结构、存储器分配、在片外围电路、串行口、外部总线和中断等；
3. DSP 集成开发环境 CCS 及其使用；
4. TMS320F28335 和 TMS320C5402 芯片的特性和资源；
5. DSP 芯片的内部存储器空间的分配及指令寻址方式，以及 CCS 软件修改、填充 DSP 内存单元的方法；
6. DSP 的定点运算、浮点运算；
7. DSP 定时器的工作原理与应用；
8. AD 采样的工作原理与应用；
9. 基于 DSP 完成简单数字信号处理算法的实现。

The main contents of this course are as follows:

1. DSP system characteristics, DSP system design idea, DSP chip developing technology and DSP chip choice ;
2. The hardware structure and basic characteristics of the DSP chip, including the CPU structure, bus structure, memory allocation, on-chip peripheral circuit, serial port, external bus and interrupt.
3. Integrated development environment CCS of DSP and its application;
4. The characteristics and resources of TMS320F28335 and TMS320C5402 chips;
5. Distribution of internal memory space and instruction addressing mode of DSP chip, and the method of modifying and filling the memory unit of the DSP by CCS software;
6. Fixed-point operation and floating-point operation of DSP;
7. The working principle and application of DSP timer;
8. Principle and application of AD sampling;

9. Implementation of simple digital signal processing algorithm based on DSP.

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

主要参考资料 References

1. 《手把手教你学 DSP-基于 TMS320F28335》，张卿杰等，北京航空航天大学出版社，2015
2. 《DSP 技术实践教程》，姚晓通等，清华大学出版社，2014
3. 《DSP 原理与应用教程》，杨家强，清华大学出版社，2014
4. 《DSP 技术实践教程》，邹彦等，电子工业出版社，2012
5. 《SEED-DTK2335 用户指南》
6. TMS320F28335、TMS320C5402 等芯片的芯片手册

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		15		
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments		40		
期中考试 Mid-Term Test				
期末考试 Final Exam				
期末报告 Final Presentation		40		
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

