

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	嵌入式系统与微机原理 Embedded System and Microcomputer Principle				
2.	授课院系 Originating Department	计算机科学与工程系 Department of Computer Science and Technology				
3.	课程编号 Course Code	CS301				
4.	课程学分 Credit Value	3				
5.	课程类别 Course Type	专业核心课 Major Core Courses				
6.	授课学期 Semester	秋季 Fall				
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)	史玉回, 讲席教授, 计算机科学与工程系, shiyh@sustech.edu.cn Yuhui Shi, Chair professor, Department of Computer Science and Engineering, shiyh@sustech.edu.cn				
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	胡春风, 教学实验师, 计算机科学与工程系, hucf@sustech.edu.cn Chunfeng Hu, Teaching laboratory technician, Department of Computer Science and Technology, hucf@sustech.edu.cn				
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		32		64

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	CS207 数字逻辑 Digital Logic
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	CS302 计算机操作系统 Operating Systems
14. 其它要求修读本课程的学系 Cross-listing Dept.	无。不接受跨系选课。 None. Not applicable for other departments beside CS.

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

This course will familiarize students with fundamental ARM knowledge on mnemonics, flags, data representations, subroutines, barrel shifter, interrupt, pipeline, encoding, main memory, cache memory, memory map, memory-mapped I/O, peripheral communication, ARM architecture & components, processor modes and thumb code. In addition, upon the completion of this course, the students will gain hands-on experience on ARM-based embedded system developments & debug and ARM development platform.

16. 预达学习成果 Learning Outcomes

Upon completion of this course, the students should be able to:

1. to obtain fundamental knowledge on ARM computer architecture and organization, ARM embedded system, and system-on-chip through lectures, and in-class assignments;
2. to grasp ARM embedded system development languages such as C, Assembly, as well as to be familiar with the related ARM development platform through labs and projects;
3. to grasp ARM embedded system development and debug skills through applying knowledge learnt in the course lectures into Lab projects.

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 01-02 Course Introduction and Preliminaries

[Lab01] Brief introduction of C programming and STM32, development environment (Keil uVision) Installing and configuration.

Week 02-04 Mnemonics

[Lab02] Show an integrated embedded system, Analysis system structure and how to design and program each module. Setting up a project with Keil uVision and STM32.

[Lab03] STM32 programming using library functions and registers I, basic calculations.

Week 04-05 Flags & Representations

[Lab04] STM32 programming using library functions and registers II, STM32 resources.

[Lab05] I/O operations to lighten LED on board

Week 06-06 Subroutines & Barrel Shifter

[Lab06] I/O operations to lighten LED pressing keys

Week 07-07 Interrupt

[Lab07] Communication using COM

Week 08-08 Pipeline

[Lab08] Interruptions by user operation, with keys or other instructions

Week 09-10 Encoding

[Lab09] Screen output with LCD

[Lab10] Interaction with touching screen

Week 11-11 Memory and Cache Memory

[Lab11] infrared remote controller

Week 12-12 Memory Addressing, Memory Map and Memory-mapped I/O



[Lab12] Storage with SD card
Week 13-13 Peripheral Communication
[Lab13] Basics of UCOSII
Week 14-15 Architecture & Components
[Lab14] Communications of UCOSII
[Lab15] In Application Programming
Week 16-16 Processor Modes & Thumb Code, and Review
[Lab16] System integration and final project presentation

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

ARM system-on-chip architecture, S. Furber, ISBN 0-201-67519-6
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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		30%		In-class assignments
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments				
期中考试 Mid-Term Test				
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)

	30%		Lab
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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

