ICE3028:
Embedded Systems Design

Jinkyu Jeong (jinkyu@skku.edu)
Computer Systems Laboratory
Sungkyunkwan University
http://csl.skku.edu
Introduction

• Schedule
  – 13:30 – 14:45 (Tuesday), 12:00 – 13:15 (Thursday)
  – Lecture room #400126, Semiconductor Bldg.
  – PC room #400202, Semiconductor Bldg.

• Course homepage
  – http://csl.skku.edu/ICE3028F18/Overview
  – Lecture slides, announcements, exam scores, projects, …
  – Don’t waste your time in i-Campus
About me

• Jinkyu Jeong (정진규)
  – Assistant professor @ SSE & SW Dept.
  – Computer Systems Laboratory
  – Operating systems, storage systems, embedded systems, distributed systems, …
  
  – Email: jinkyu@skku.edu
  – URL: http://csl.skku.edu/People/Jinkyu
  – Tel: 031-290-7692
  – Office: Semiconductor Bldg., #400510 (5th floor)
  – Office hours: 15:00~16:00 (Tue)
    13:30~15:00 (Thu)
  – Email contact is preferred
TAs

• We have two awesome Tas
  – Minwoo Ahn (안민우)
    • minwoo.ahn@csl.skku.edu
  – Donghyun Kim (김동현)
    • donghyun.kim@csl.skku.edu
  – Office: #400509, Semiconductor bldg.

• They will lead your lab sessions and assist your projects
Textbook

- Computers as Components
  - Marilyn Wolf
  - Fourth Edition
  - Morgan Kaufmann Publishers
  - 2016

- [http://marilynwolf.us/CaC4e](http://marilynwolf.us/CaC4e)
References (1)

• Modern Embedded Computing: Designing Connected, Pervasive, Media-Rich Systems
  – Peter Barry and Patrick Crowley
  – Morgan Kaufmann Publishers
  – 2012
References (2)

• Embedded System Design: A Unified Hardware/Software Introduction
  – Frank Vahid and Tony Givargis
  – John Wiley & Sons
  – 2002
References (3)

• Introduction to Embedded Systems: A Cyber-Physical Systems Approach
  – Edward A. Lee and Sanjit A. Seshia
  – Second Edition
  – Lulu.com
  – 2015
  – PDF version available at http://LeeSeshia.org
Solid State Drive (SSD)
SSD Internals

[Diagram showing SSD Internals with components such as SRAM, ROM, ARM7TDMI-S, Clock Generator, UART, GPIO, Timer, WDC, PMU, ICU, JTAG, NAND Controller, Buffer Manager, SATA Device, DRAM Controller, Memory Utility, NAND Flash, SATA Host Interface, DRAM, JTAG debug port, and System Bus connections.]
The OpenSSD Project

- [http://www.openssd-project.org](http://www.openssd-project.org)
Course Plan

• Lectures

• Projects

• Exam
Lectures

• Embedded Systems
  – Processors and memory, compilers,
  – Program design and analysis, OS, …

• Issues surrounding SSDs
  – NAND flash memory, SSDs, FTLs

• Lab sessions
  – Jasmine OpenSSD platform
Projects

• There will be two or more projects using the Jasmine/Cosmos OpenSSD platform
• These are team projects
• You’ll need a Linux-based PC for projects
• Most of Thursday classes will be devoted to Lab sessions led by the TA
Exam

• No midterm exam

• We will have only the final exam at the end of this semester.
Prerequisites

• **ICE3003: Computer Architecture (Must!)**
• **SSE2030: Introduction to Computer Systems**
• **SSE3044: Operating Systems**

• You should be fluent in C programming!
Grading Policy

• Class attendance + Lab: 20%
• Projects: 60%
• Final exam: 20%
• Grading policy is subject to change.

• If you miss the final exam, you will fail this course.
Attendance Policy

• Do not be late! You should be present when I take class attendance.

• You can miss the class up to “four” times without any penalty.
  – Applies to excused absences as well.