

# Computer System Design (Advanced Digital Systems Design) 4190.309 2008 Fall Semester

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Seoul National University

# Course Introduction

- Undergraduate course that covers advanced digital systems design
- Schedule
  - Monday and Wednesday, 2:30 PM to 3:45 PM
- Instructor
  - Prof. Naehyuck Chang
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  - Office: 301-506
- TA
  - Sangyoung Park (박상용), Jaeam Seo (서재암)
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  - Phone: SNU-1836
  - Office: 301-551



# Course Introduction

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- Homepage
  - <http://etl.snu.ac.kr> Computer System Design (BBS)
- Language
  - Korean + English (dependent on situation)
- Evaluation
  - Attendance (5%)
  - Midterm project (30%)
  - Final exam and project (50%)
  - Assignment (15%)



# Course Introduction

- Digital logic design
  - Theory
    - Axioms and theorems of Boolean algebra
    - Combinational logic design and optimization
    - Sequential logic elements: FF and latch
    - Sequential logic design and optimization
  - Practice
    - Principle of operation of digital logic elements
    - Unit delay model, rise time, falling time, and propagation delay
    - Random logic, regular logic, and simple programmable devices
  - Lab
    - Prototyping techniques



# Course Introduction

- Advanced digital system design
  - Specially tailored digital “system” design for real practices
    - System architects
  - More about practice
    - Inside the digital logic gates
      - Circuit theory
      - Diode and transistors
      - Modern logic gates
      - Interface between digital logic gates and non-digital logic devices
    - Fanout, driving capability, impedance, power consumption and signal integrity
    - Power supply for digital logic gates
    - Logic synthesis
      - Verilog



# Course Introduction

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- Advanced digital system design
  - More about practice (contd)
    - Advanced tools
    - Data translation
    - Bigger design projects
    - Advanced instruments: digital storage oscilloscope
  - Review of finite state machines
  - Concept of digital “systems”
    - Beyond “logic” and toward “systems”
  - Bridge to microprocessor-based systems
    - This course covers only hardwired logic
    - Concept of microprocessor-based systems will be introduced



# Course Introduction

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- Advanced digital system design
  - Intensive lab courses
    - Additional three-credit lab course
    - Designed to combine electric/electronics lab courses



# Course Introduction

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- Textbook
  - There is no single textbook for this course
- References
  - Manuals
  - TA will post some documents
- Course materials
  - PDF format slides will be uploaded soon





# What to cover

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- Basic prototyping knowledge and technology
  - Design
  - Verification
  - Implementation
    - Layout
    - Wiring
    - Soldering
    - FPGA targeting
- Understanding real-world digital systems design
  - Beyond the math theory
  - Optimal design



# Comments: toward your career goal

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- What do you want to be in the future?
  - 5 years later
  - 10 years later
  - 15 years later
  - 20 years later
  - 30 years later
  - 40 years later
- System architect and top engineering
  - What will be the job of that position?



# Who can or cannot attend this course

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- What do you want to maximize?
  - Yield
  - What is your performance metric?
    - Grade/man hour?
    - Knowledge/man hour?

