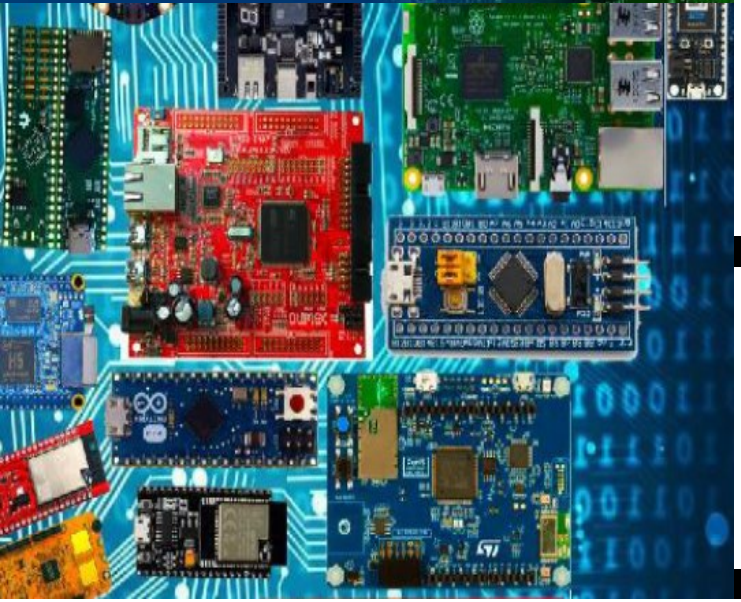


VLSI
&
Embedded System

INTRODUCTION

Dennis A. N. Gookyi

CONTENTS

- Course Organization and Syllabus

INSTRUCTOR

- Instructor
  - Name: Dennis Agyemanh Nana Gookyi
  - Email: dennisgookyi@gmail.com
  - Phone: 0203493435
  - Research Portals:
    - https://www.researchgate.net/profile/Dennis-Gookyi
    - https://sites.google.com/view/eisedlab

INSTRUCTOR

- Instructor

Education

- Ph.D. in Information and Communication Engineering, Hanbat National University, South Korea, 2021.
- M.Eng. in Information and Communication Engineering, Hanbat National University, South Korea, 2017.
- B.Sc. in Computer Engineering, Kwame Nkrumah University of Science and Technology, Ghana, 2009.

Employment

- Research Scientist, CSIR-INSTI, Ghana, 2022 – Present.
- Researcher, Korea Electronics Technology Institute (KETI), South Korea, 2021 – 2022.
- Research and Teaching Assistant, SoC Design Lab, Hanbat National University, South Korea, 2014 – 2021.
- RTL Design Engineer, Future Systems, South Korea, 2015 – 2016.
- Teaching Assistant, Computer Engineering Department, Kwame Nkrumah University of Science and Technology, Ghana, 2013 – 2014.

LEARNING OUTCOMES

- Expected Learning Outcomes
  - Learn how to select development boards and toolchains for application prototyping
  - Program MCU and SoC to read sensor data and control actuators
  - Analyze sensor data and interface peripherals to microprocessors
  - Identify components of a microprocessor
  - Understand the building blocks of an Integrated Circuit (IC)

PREREQUISITES AND GRADING

- Prerequisite
  - Inclination toward computer programming
  - Inclination towards Digital Systems Design
  - Engineering mindset
  - Inquisitive about the physical world
- Grading scheme: Homework (10%), Participation (5%), Attendance (15%) Project (10%), Exam (60%)
  - Homework: hybrid grading show your work in class
  - Participation: attendance, ask questions, answer questions, be active
  - Project: non-trivial implementation of something useful by applying knowledge including and beyond what's learned in class

LEARNING APPROACH

- Learning approach:
  - Type up your own code, and make it work on your device
  - Learn from sample code, assimilate then modify, integrate, or extend
  - Be ready to show your work
  - Read manuals and product specification documents

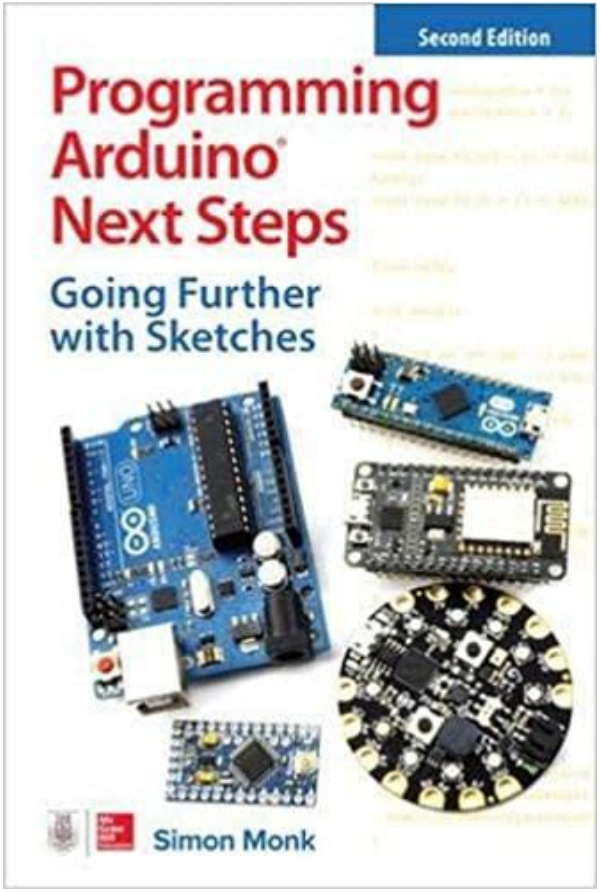
COURSE OUTLINE

- Schedule

Lecture	Topic	
01	Course Overview	
02	Course Hardware and Software Toolchain Setup	
03	Building Blocks of an Embedded System	
04	Developmental Boards Overview	PART 1
05	Programming Arduino and Nano 33 BLE	
06	Nano 33 BLE Peripherals Interfacing	
07	Nano 33 BLE Sensors Interfacing	
08	Building Blocks of an Integrated Circuit	
09	Transistors to Logic Gates	
10	Combinational Logic Design	PART 2
11	Memory Elements	
12	Sequential Logic Design	

TEXTBOOKS AND LINKS

- PART 1 Textbook and Links
  - https://www.adafruit.com/
  - https://www.arduino.cc/
  - https://www.st.com/en/microcontrollers microprocessors/stm32 32 bit
  - Arm-cortex-mcus.html
  - https://www.espressif.com/en/products/socs/esp32
  - https://www.nordicsemi.com/
  - https://www.sparkfun.com/



TEXTBOOKS AND LINKS

- PART 2 Textbook and Links
  - https://riscv.org
  - https://en.wikichip.org/wiki/WikiChip
  - https://riscv.org/wp-content/uploads/2017/05/riscv-spec-v2.2.pdf
  - https://www.elsevier.com/__data/assets/pdf_file/0011/297533/RISC-V-Reference-Data.pdf#RISC-V%20Reference%20Data
  - https://github.com/dennisgookyi/comp_arch_list/tree/master/books