# ECE 527: System-On-Chip Design
# **Fall 2023**

**Website:** https://courses.grainger.illinois.edu/ece527/fa2023/

**Lecture:** 2013 ECEB
Time: Tuesday/Thursday 11:00 - 12:20 PM Central Time

**Labs:** 4022 ECE Building

- Lab details will be introduced in Lecture 3.
- The TAs will hold Lab Sessions the week a lab is released. Lab sessions will be run during TA office hours, introduce core lab concepts, and have time for Q&A. More info will be posted to the Campuswire as needed.

Pick up your lab kits at 3-5 PM Friday (8/25) in CSL 403. Each 2-person team checks out one lab kit.

**Instructor:** Deming Chen (dchen@illinois.edu)
Office hours: Tuesday 4:00 - 5:00 PM Central Time, CSL 250 and on Zoom for online students.
Zoom link:
https://illinois.zoom.us/j/83070928177?pwd=a2laQXVaZ3V5ZFNsejlNT1NzYlpxdz09
Meeting ID: 830 7092 8177. Password: 674838.

**TAs:**

- Scott Smith (scottcs2@illinois.edu)
  Office hours: 6-8 PM Mondays, Central Time, ECEB 4022 and online. Same Zoom link as above for online students.

- Hanchen Ye (hanchen8@illinois.edu)
  Office hours: 9-11 AM Thursdays, Central Time, ECEB 4022 and online. Same Zoom link as above for online students.

**Credits:**
Four hours.

**Text:**
Class notes.

**Supplementary materials:**
Related Research Papers.

**Prerequisites:**
ECE 425 (or equivalent), ECE 391 (or equivalent)

| Dates | Topics | Release/due date |
|---|---|---|
| 8/22 | Introduction and overview | |
| 8/24 | SOC design methodology | MP 1 release on 8/24, due 9/3 |
| 8/29 | Lab review | |
| 8/31 | Hardware design | |
| 9/5 | Embedded processor & software | MP 2 release on 9/4, due 9/17 |
| 9/7 | Reconfigurable computing | |
| 9/12 | MoC & System Modeling | HW 1 release on 9/11, due 9/25 |
| 9/14 | High-level synthesis (HLS) | |
| 9/19 | HLS coding style | MP 3 release on 9/18, due 9/27 |
| 9/21 | HLS techniques | |
| 9/26 | Scheduling & Binding | |
| 9/28 | HW-SW co-design (1) | MP 4 release on 9/28, due 10/8 |
| 10/3 | HW-SW co-design (2) | |
| 10/5 | FCUDA | HW 2 release on 10/4, due 10/18 |
| 10/10 | ScaleHLS/ScaleFlow | MP 5 release on 10/9, due 10/29 |
| 10/12 | **Introduction - Research project starts** | |
| 10/17 | Machine learning and DNN (1) | |
| 10/19 | Machine learning and DNN (2) | |
| 10/24 | DNN Acceleration (1) | |
| 10/26 | DNN Acceleration (2) | |
| 10/31 | **In-class Midterm exam** | |
| 11/2 | GPU | |
| 11/7 | Hybrid cloud | |
| 11/9 | System security | |
| 11/14 | Research case studies (1) | |
| 11/16 | Research case studies (2) | **Initial research project report due** |
| 11/21 | **Thanksgiving break** | |
| 11/23 | **Thanksgiving break** | |
| 11/28 | Research projects updates from students (1) | |
| 11/30 | Research projects updates from students (2) | |
| 12/5 | Additional Q&A session for research projects | |
| 12/12 | **1:30-4:30 (Final research project presentation)** | |
| 12/15 | **Final research project report due** | |

**Grading policy:**
Machine problems total (30%)

- Machine problem 1: 5% (70% actual work + 30% report)
- Machine problem 2: 5% (70% actual work + 30% report)
- Machine problem 3: 5% (70% actual work + 30% report)
- Machine problem 4: 5% (70% actual work + 30% report)
- Machine problem 5: 10% (70% actual work + 30% report)

Class participation: 5%
Homework: 10%
Midterm: 20%
Research Project 35%: (70% actual work + 20% report + 10% presentation)

**Class discussion**
We encourage you to post your questions on Campuswire so everyone can participate in class-related discussions and benefit from them. Please do not include answers or code solutions in public posts and discussions.

Link: https://campuswire.com/p/G893E6B86
Join Code: 9179

**Lateness Policy**
15% off/day, cannot be more than 3 days late.