ECE 587 – Hardware/Software Co-Design
Spring 2022

Instructor: Professor Jia Wang (jwang34@iit.edu)

Prerequisite:
CS 201 Introductory data structures, algorithms, and object-oriented programming.
ECE 441 Microprocessors, memories, I/O interfaces, and interrupt systems.

Though not required, you are recommended to take at least one course among ECE 429, ECE 448/528, ECE 449/590, and ECE 485/585 concurrently or before taking this course.

Class Time and Location: Mon./Wed. 1:50 PM – 3:05 PM. Lectures will be streamed first and then held in Hermann Hall 005 after 1/24.

Class Home Page: `http://www.ece.iit.edu/~jwang/ece587-2022s/`

Recommended Textbook:
"Embedded System Design: Modeling, Synthesis and Verification"
D. D. Gajski, S. Abdi, A. Gerstlauer, G. Schirner, Springer, 2009.
ISBN-13: 978-1-4419-0503-1 (eBook available from `http://library.iit.edu/`)

Course Objective: To give students a clear understanding of state-of-the-art hardware/software co-design methodology for computing systems.

Topics Covered: Hardware/software co-design of computing systems; Models of computation and functional verification; Transaction-level modeling and performance evaluation; high-level synthesis and hardware acceleration.

Grading: Homeworks: 25% / Project: 75%.
A: $\geq 90\%$ / B: $\geq 80\%$ / C: $\geq 60\%$.

Homework and Project Policy: Late homeworks and projects will not be graded. Deadlines will NOT be extended, except for extraordinary reasons. Homeworks will be graded based on general approach and completion. Discussions on homeworks/projects are encouraged, but copying will call for disciplinary action.

Lecture Schedule (tentative):

No.	Date	Topic	Chapters	HW Out	Project Due
1, 2	1/10, 1/12	Introduction	1		
3	~~1/17~~, 1/19	Models of Computation	2	HW #1	
4, 5	1/24, 1/26	State-Based Models	3.1		
6, 7	1/31, 2/2	Process-Based Models	3.1		
8, 9	2/7, 2/9	Concurrency in Practice		HW #2	
10,11	2/14, 2/16	Verification	7		
12,13	2/21, 2/23	System Modeling	3.2–3.5	HW #3	
14,15	2/28, 3/2	System Design Methodology	3.6, 4		
16,17	3/7, 3/9	Software Synthesis	5		SE Proposal
	3/14–3/19	**Spring Break**			
18,19	3/21, 3/23	Hardware Synthesis	6	HW #4	LS Progress
20,21	3/28, 3/30	CUDA and LLVM			
22,23	4/4, 4/6	Hardware Acceleration I			
24,25	4/11, 4/13	Hardware Acceleration II			
26,27	4/18, 4/20	Hardware Acceleration III			
28,29	4/25, 4/27	Hardware Acceleration IV			LS Final
	5/2–5/6	**No Final Exam**			SE Final

ADA Statement: Reasonable accommodations will be made for students with documented disabilities. In order to receive accommodations, students must obtain a letter of accommodation from the Center for Disability Resources and make an appointment to speak with me as soon as possible. The Center for Disability Resources is located in the Life Sciences Building, room 218, 312-567-5744 or `disabilities@iit.edu`.

Sexual Harassment and Discrimination Information: Illinois Tech prohibits all sexual harassment, sexual misconduct, and gender discrimination by any member of our community. This includes harassment among students, staff, or faculty. Sexual harassment of a student by a faculty member or sexual harassment of an employee by a supervisor is particularly serious. Such conduct may easily create an intimidating, hostile, or offensive environment. Illinois Tech encourages anyone experiencing sexual harassment or sexual misconduct to speak with the Office of Title IX Compliance for information on support options and the resolution process. You can report sexual harassment electronically at iit.edu/incidentreport, which may be completed anonymously. You may additionally report by contacting the Title IX Coordinator, Virginia Foster at `foster@iit.edu` or the Deputy Title IX Coordinator at `eespeland@iit.edu`. For confidential support, you may reach Illinois Tech's Confidential Advisor at (773) 907-1062. You can also contact a licensed practitioner in Illinois Tech's Student Health and Wellness Center at `student.health@iit.edu` or (312)567-7550 For a comprehensive list of resources regarding counseling services, medical assistance, legal assistance and visa and immigration services, you can visit the Office of Title IX Compliance website at `https://www.iit.edu/title-ix/resources`.

Campus Reopening: Please refer to `https://www.iit.edu/reopening` for the most recent information regarding campus reopening.

Currently, as recently announced, the university is requiring all students, faculty, and staff to receive a COVID-19 vaccination. Full details may be found in Vaccine Requirement and Reopening Policy at `https://web.iit.edu/sites/web/files/departments/general-counsel/policies/procedure_c7_COVID-19_Vaccination_Requirement_and_Reopening_Policy_Policy-C.7.pdf`

Moreover, consistent with Centers for Disease Control and Prevention and Chicago Department of Public Health recommendations, all students, faculty, staff, and campus visitors must now wear face coverings in all shared indoor settings, regardless of vaccination status.