

ECE 587 – Hardware/Software Co-Design Spring 2021

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 Home Page: <http://www.ece.iit.edu/~jwang/ece587-2021s/>

Lectures will be streamed Mon./Wed. 5:10 PM – 6:25 PM or pre-recorded.

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	1/13 , 1/20	Introduction			
2, 3	1/25, 1/27	Models of Computation	1, 2	HW #1	
4, 5	2/1, 2/3	State-Based Models	3.1		
6, 7	2/8, 2/10	Process-Based Models	3.1		
8, 9	2/15, 2/17	Concurrency in Practice		HW #2	
10,11	2/22, 2/24	Verification	7		
12,13	3/1, 3/3	Software Processor Modeling	3.3, 3.4		
14	3/8, 3/10	Communication Modeling	3.5	HW #3	
15,16	3/15, 3/17	System Design Methodology	3.2, 3.6, 4		SE Proposal
17,18	3/22, 3/24	Software Synthesis	5		LS Progress
19,20	3/29, 3/31	Hardware Synthesis	6	HW #4	
21,22	4/5, 4/7	CUDA and LLVM			
23,24	4/12, 4/14	Hardware Acceleration I			
25,26	4/19, 4/21	Hardware Acceleration II			
27,28	4/26, 4/28	Hardware Acceleration III			
29,30	5/3, 5/5	Hardware Acceleration IV			LS Final
	5/10–5/14	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>.

COVID-19 Precautions and Face Coverings in Class: Illinois Tech students are required to wear face masks at all times and maintain social distancing (6 feet between individuals) in traditional classrooms, instructional laboratories, and similar settings. In general, individuals should spend as little time as practicable in closer proximity when doing so is necessary to achieve learning objectives. Students who are feeling ill or experiencing symptoms such as sneezing, coughing, or a higher than normal temperature will be excused from class and are expected to stay at home. Instructors have the right to ask those who are not complying with these requirements to leave class in the interest of everyone's health and safety. In the event that a student refuses to comply with instructor directions regarding face masks and/or social distancing, the instructor has the right to ask the student to leave, and/or cancel class. A student who refuses to comply with these requirements will be referred to the Office of the Dean of Students for possible disciplinary action under the Student Code of Conduct. Additionally, as a reminder, following other simple practices such as frequent and thorough hand washing, wiping down desks and seats with disinfectant wipes when possible, not sharing personal items such as pens and cell phones, and avoiding crowded hallways and other enclosed spaces will promote good health in and out of the classroom. Visit iit.edu/COVID-19 for details on Illinois Tech's response to coronavirus (COVID-19). For information from government authorities, please see the Centers for Disease Control and Prevention website at cdc.gov.