

Dr. Won-Jae Yi

ECE 242

Digital Computers and Computing

Syllabus

Spring 2021

Won-Jae Yi

Syllabus

Instructor	Dr. Won-Jae Yi (wyi3@iit.edu) Office Hours: Tuesdays 11:15AM – 1:15PM, or by appointment in advance Office Location: Meet online (Zoom link on Blackboard)
Teaching Assistant	Mr. Xin Zhang (xzhang78@hawk.iit.edu) Office Hours: Fridays 1-3PM, or by appointment in advance Office Location: Meet online (Zoom link on Blackboard)
Class Time	Tuesdays & Thursdays 9:40 AM – 10:55 AM No class: Tuesday, February 9th & Thursday, April 8th (COVID Study Days)
Class Location	Zoom (link available under “Zoom Class Meeting” on Blackboard) McCormick Tribune Campus Center (MTCC) 723 – Auditorium
Prerequisites	ECE 218 and CS 116; Boolean algebra, combinational logic design, basic software programming
Course Description	Basic concepts in computer architecture, organization, and programming, including: integer and floating point number representations, memory organization, computer processor operation (the fetch/execute cycle), and computer instruction sets. Programming in machine language and assembly language with an emphasis on practical problems. Brief survey of different computer architectures. Motorola 68000 (CISC) microprocessor and MIPS (RISC) processor instruction set and programming models.

Syllabus

✓ PDF

Class Website	Illinois Tech Blackboard (Lecture slides will be uploaded using a <u>password protection</u>)
Textbooks	<ul style="list-style-type: none">• "The Motorola MC68000 Microprocessor Family", T. Harman and D. Hein, Prentice Hall, 2nd Edition, 1996 (Available at Illinois Tech Bookstore online)• "MIPS Assembly Language Programming", Robert Britton, Prentice Hall, 2004 (PDF available online)
Additional Materials	<ul style="list-style-type: none">• "See MIPS Run", Dominic Sweetman, Morgan Kaufmann, 2nd Edition, 2006 (optional)• MC68000 Assembler & Simulator (https://tinyurl.com/ece242easy68k)• MIPS Tutorial (http://ellard.org/dan/www/Courses/cs50-asim.pdf)• MIPS Assembler & Simulator (http://courses.missouristate.edu/kenvollmar/mars/)
Course Objective	<ul style="list-style-type: none">• Learn essential parts of a typical digital computer processor unit• Learn the format of a typical digital computer instruction (machine code)• Understand the process of instruction execution• Able to write programs in assembly languages• Able to use subroutines for repetitive tasks• Utilize indirect addressing in various program applications (pointers, etc.)• Understand the importance of an operating system• Able to write programs to convert numbers between bases to prepare for input and output• Able to use input and output functions of a computer operating system

for learning

Windows

Syllabus

Topics Covered	<ul style="list-style-type: none">• Introduction, Number Systems, Basic Computer Organization, MC68000 Microprocessor• MC68000 Registers, Memory, Instructions, Machine Code, Addressing Modes• MC68000 Simulator, Machine-code Program, Source-code Program Assembler, Program Counter, Assembly-language Program, Assembler Directives, .LIS and .H68 Files• Arithmetic and Logic Operations, Jump and Branch Instructions, Conditional Branch Instructions• Status Register, Compare and Test Instructions, Indirect Addressing, Move and Add Variations• Stack Pointer, Subroutines, Operating System and its Subroutines• Shift and Rotate Instructions, Conversions between Number Bases• Vector Table, Traps, Interrupts• Intro to RISC and MIPS Architectures, RISC and CISC comparison• RISC Architecture (Registers, Integer multiply unit and Registers)• Programming Model (Addressing Modes, Data types in Memory and Registers)• MIPS Instruction Set Overview• MIPS Assembler and Simulator Usage (Segment and Linker Directives, Data Directives, syscalls)• MIPS Instruction Set (Load, Store, and Data Movement, Arithmetic Instructions, Comparison Instructions, Branch and Jump Instructions)• Exception Handling & Interrupts• Address Space (Kernel vs. User Privilege Level)
-----------------------	---

Syllabus

Grading		1 per week.	
Exercises	10%	10%	10%
Programming Assignments	10%	20%	20%
Midterm Exam I	25%	00%	
Midterm Exam II	25%	00%	
Final Exam	30%	00%	
Homework Policy		<p>All submissions must be uploaded to the Blackboard. Late homework will not be accepted nor graded.</p> <p>Working together on homework is encouraged, but copying assignments will call for disciplinary action.</p>	
Exam Policy		<p>All exams will be done remotely using Respondus Lockdown Browser.</p> <p>Specific directions will be given before the exam dates including trial exams.</p> <p>Makeup exams will not be given except for extraordinary reasons and advance approvals.</p>	

Syllabus

Academic Honesty	<p>It is your responsibility to be familiar with Illinois Tech Code of Academic Honesty: https://web.iit.edu/student-affairs/handbook/fine-print/code-academic-honesty</p> <p>Working together on the homework assignments are encouraged but copying assignments will call for disciplinary action. All submissions including exercises, programming assignments and exam papers must be your own.</p> <p>If the above policy and/or any part of the Illinois Tech Code of Academic Honesty is violated in any similarity within the exercise answers, programming assignment codes, comments, customized program behavior, any writings and/or figures are found, both the helper (original source of work submission) and the requestor (duplicated/modified work submission) will be called for academic disciplinary action including zero score of the submission/exam AND degrading course letter grade by one.</p> <p>If the above policy and/or any part of the Illinois Tech Code of Academic Honesty is violated in any similarity within the exam paper submissions, both the helper (original source of work submission) and the requestor (duplicated/modified work submission) will receive a failing grade E for this course, and will be notified to the student's advisor, department and the university.</p>
-------------------------	---

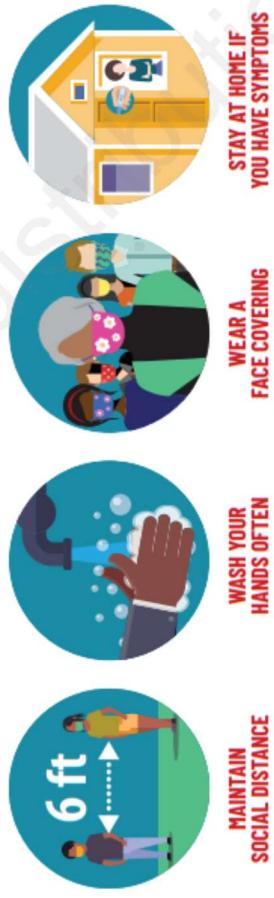
Syllabus

COVID-19 Precautions and Face Coverings in Class	<p>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. If you start to feel ill after leaving your home, you should immediately return there.</p> <p>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. 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.</p> <p>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.</p> <p>Visit iit.edu/COVID-19 for details on Illinois Tech's response to coronavirus (COVID-19). Students are also welcome to call 312.567.5810 between 8:30 a.m.-5 p.m. CST for university-related information regarding COVID-19.</p> <p>For information from government authorities, please visit chicago.gov/2019-nCoV or cdc.gov/coronavirus, email coronavirus@chicago.gov, or call 312.746.4835.</p>
---	---

Syllabus

ADA Statement	Reasonable accommodations according to American Disability Act (ADA) 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 appoint to speak with as soon as possible. The Center for Disability Resources (CDR) is located in 3424 S. State St. Suite 1C3-2, (312) 567-5744 or disabilities@iit.edu
----------------------	---

STAY SAFE



Course Logistics

- All lectures will be recorded, and available to everyone.
 - No attendance will be taken during this semester.
 - You can either join online or in-person for ECE 242.
- Rule of thumb for students taking course asynchronously
 - It's your responsibility to follow the lecture, submit your work on time as others, take the exam at the same time as others, ...