Spring 2024 - CS350 Intro Computer Systems - Syllabus

- **Class Web page**: http://web.njit.edu/~sohna/cs350
- Homework submission page: http://canvas.njit.edu
- **Instructor**
  - Andrew Sohn, GITC 4209, (973)596-2315, email: sohna -at- njit -dot- edu
    Office hours: Tue 10:30-11:30 am, Thur 2:30-3:30 pm, and by appointment
  - You can visit any time during the office hours. No need to tell me you are coming.
  - Please, DO NOT use your cell phone in my office.
- **TAs and office hours**
  - Namitha Yalla, ny6 -at- njit -dot- edu; office hours GITC 4325 Wednesdays 4:30 - 6:30 PM
  - Jason Lew, jl247 -at- njit -dot- edu; office hours GITC 4324 Fridays 2:00 - 4:00 PM
  - TBA
- **Class time and location**: See the registrar's page https://uisnetpr01.njit.edu/courseschedule
- **Textbooks - required. Get a hardcopy. You will find it useful in your computing career**:
  - Computer Systems: A Programmer's Perspective, 3/E (CS:APP3e), Randal E. Bryant and David R. O'Hallaron, Pearson (July 6, 2015), ISBN-13: 978-0134123837, ISBN-10: 0134123832.
    See http://csapp.cs.cmu.edu/3e/home.html for lecture notes.
  - The C Programming Language, Kernighan and Ritchie, Prentice Hall, 2nd ed., ISBN: 978-0131103627, and a Bash book of your choice.
- **Platform**: Linux and C. You need access to a Linux box for this course. Use the school's Linux boxes if you don't have access to a Linux box. It's best if you get your machine multibooted along with your native OS such as windows or mac. For Linux installation-related issues, check the Web or ask the TAs when announced. Those who are not proficient in using Linux/Unix will be at a serious disadvantage, to say the least.
- **Grading**:
  - Attendance (4%) - I am required to verify your presence for financial aid.
  - Weekly homework and programming assignments (10%) - submit on Canvas
  - Test 1 (25%), Tues, 2/13/2024, for an hour and 15 mins. You will receive a message an hour or two before the exam on seating assignment.
  - Test 2 (25%), Tues, 3/26/2024, for an hour and 15 mins. You will receive a message an hour or two before the exam on seating assignment.
  - Final exam (36%) - See the registrar's page for date, time and location. You will receive a message an hour or two before the exam on seating assignment. Final exam is cummulative and comprehensive. Failure on the final will result in an automatic F in the course.
  - Grades are determined based on a combination of both absolute and relative (curve) performance of class comapred against many years in the past. In general average performance will likely get you a C unless the average is very high or low, in which case the grading will be adjusted according to the aberation. Those who get 20 to 25 points above the course average with a high final score will likely earn an A. Those who get 10 to 15 points above the course average with a good final score will possibly earn a B. Those who get 10 to 15 points below the course average will likely earn a D, if ever given, or an F. Those who get 20 points below the course average will definitely fail the course. Again, this short guideline is for your reference only so don't rely soley on this metric. Every semester performance is different and so are the scores. For your information, the typical average course score is around 50 over the years, which consists of *high homework* scores and *low exam* scores. It is commonly known for this course that those who *do all homework from scratch and on their own and solve all the sample midterms and finals posted on Canvas* tend to get B or higher. You will hear this mantra many times throughout the semester.
- **Homework**:
  - Homework is posted on http://web.njit.edu/~sohna/cs350

- See Canvas for HW due dates and submission.
- Homework is due at 11:59 pm of the posted due date.
- Homework will not be accepted after the due date. Submit on time. Do not ask for exceptions. If you ask for an exception, I will apply that to everyone in class.
- Do your homework from scratch and on your own. Be prepared to spend an hour or two a day on homework. You'll be glad you did, not just for the course but rather more importantly for your computing career. You'll realize that in the next 10 years.
- Homework must be your own work. Do not show your code and/or copy other's code.
- Copying homework will be referred to the University for disciplinary actions.

- **Attendance:** I am required to verify your presence. Make sure to put your name on the sign-up sheet circulated during each lecture. No sign-up no-show.
- **NJIT policy on recording class materials**: You may not record anything in class in any form with any device. You may not put any video/audio recorded class materials on the Web/Internet. You are breaking the policy. Please, honor the policy.
- **Exam related. Read carefully:**
  - **Procedure for exams**: An hour or two before the exam, you will receive an email regarding seating assignment based on NJIT ID number. Make sure to take a seat according to the seating assignment. *Numbered exams will be distributed to the matching seats.* Make sure your numbered exam paper matches your seat assignment. Leave your NJIT ID card on the table. IDs will be checked during the exam. Do not take someone else's exam paper. You both are taking someone else's exam.
  - **Disagreement with exam marking/scores**: If you disagree with your exam scores/marks, you may dispute within a week of receiving/seeing the graded exam paper. After a week, no exams will be contested.
  - **Grading dispute**: If you disagree with your grade, you may contest after the first day but within a week of the following semester. After a week of the first day of the following semester, no grading dispute will be considered.
  - **NJIT policy on missed exams**: There will be no make-up exam(s). You must plan your semester accordingly, especially if you work. Should you miss the exam(s) due to emergency, (a) go to/contact the Dean of students, (b) explain your situation as to why you had to miss, and (c) ask to issue a memo to me. If and when I receive a memo from the Dean verifying that your absence was for a good reason, I will copy your next exam score to the missing one. Those who miss the final exam will fail in the course unless you demonstrate a true emergency again through the office of the Dean of students. No other policy will be applied. No exceptions will be made.
- **Email Policy: I read email and respond between 9 am to 5 pm, Monday through Friday.**
  - I read email and respond between 9 am to 6 pm, Monday through Friday. I do not read emails on weekends and holidays. Do not expect to receive my response on weekends and holidays.
  - Do not expect to receive my immediate email response.
  - Do not make important decisions based on the assumption that you would get my immediate response.
  - I will try to respond within 24 hours. In most cases, I respond sooner than 24 hours. However, often times there are situations where I am simply unable to respond to your email within 24 hours for various reasons, including school committees, health, inclement weather, traveling, etc, in which case your patience is appreciated.
  - Keep your email succinct, short, to the point. You don't need to write profuse pleasantries, thanking in anticipation of my replies for finding your programming bugs, etc.
  - Emails of half to a page containing programming questions, in particular assembly code, will take hours to even days for me to respond as I have to read carefully and actually execute to make sure you get useful comments from me.

- You'll get no response if you ask questions that are answered in the syllabus, on the course web page, or on Canvas, such as office hours, locations, TA/Grader names, their hours, exam dates and locations, the URL of lecture notes, etc.

- **Academic Integrity:** I am required to post this on the course syllabus.
  "Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf. Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu"

Lecture schedule - Topics may change according to class pace
See http://csapp.cs.cmu.edu/3e/home.html for lecture notes.

Week	Chapter	Lecture	Date	Section	Homework
1	Ch.1 A Tour of Computer Systems	1	Tu, 1/16	About the course	
		2	Th,1/18	Intro to computers	
2	Ch.2 Representing and Manipulating Information	3	Tu,1/23	Binary, octal, decimal, hexa numbers, integer representation	HW1 on reality
		4	Th,1/25	Binary to integer to unsigned and back	
3		5	Tu,1/30	Integer addition, integer multiplication	HW 2 on ints
		6	Th,2/1	Floating point representation and operationsn	
4	Ch.3 Machine-Level Representation of Programs - Linux assembly and machine languages	7	Tu,2/6	Floating point continues. Data types, registers,	HW 3 on floats
		8	Th, 2/8	C to assembly to machine code, Data movement instructions	
5		**9**	**Tu,2/13**	**Test 1, for an hour and 15 mins**	
		10	Th,2/15	Data movement instructions, address computation	
6		11	Tu,2/20	Control: jump instructions, conditional branches	HW 4 on basic assembly
		12	Th,2/22	Loops and switch statements, push, pop	
7		13	Tu,2/27	Procedures and recursions	HW 5 on control
		14	Th,2/29	Array allocation and access, pointers	
8		15	Tu,3/5	Multi-dimension arrays, matrix, structs,	HW 6 on procs, recurs
		16	Th,3/7	Stack overflow detection and prevention, varible stack	
9		17	Tu,3/19	Floating point instructions using mmx...zmm registers, avx,sse	HW 7 on stack overflow
9	Ch.4 Processor Architecture	18	Th,3/21	Sequential computers - instruction set, add, mov	
10		**19**	**Tu,3/26**	**Test 2, for an hour and 15 mins**	
		20	Th,3/28	Sequential computers - add, mov, load, store	
11		21	Tu,4/2	Sequential computers - load, store, push, pop, call, ret	HW 8 on instr exec
		22	Th,4/4	Pipelined computers - data and branch hazards	
12		23	Tu,4/9	Pipelined computers - solutions to the hazards	
12	Ch.6 Memory Hierarchy	24	Th,4/11	Main memory, cache memory, locality of reference	HW 9 on issues
13		25	Tu,4/16	Cache memory - mapping, placement	
		26	Th,4/18	Cache memory - placement, replacement, memory mountain, matrix multiplcation	HW 10 on cache
14	Ch.9 Virtual Memory	27	Tu,4/23	Paging, page tables, address translation, example 1	
		28	Th,4/25	Address translation example 2, dynamic memory allocation	HW 11 on virtual mem
15	---	Final	See the registrar's page for the time and location		