

CSCCE 312



COMPUTER SCIENCE & ENGINEERING
TEXAS A&M UNIVERSITY



FALL 2018

Sections 504-505

Computer Organization



ZACH 310
TR 3:55 PM - 5:10 PM



ZACH 261
504 - MW 11:30 AM - 12:20 PM
505 - MW 12:40 PM - 1:30 PM



Jyotikrishna Dass
Graduate Assistant Lecturer

SYLLABUS

Howdy !!

There are only **10** types of people in this world
Those who understand **BINARY**
and those who don't

Prerequisites ?

Self-contained course with all the knowledge provided in the course lectures, lab projects and textbook. Some projects will require basic skills in C++/ JAVA/ Python etc. Basic background in CSCCE 221 will be helpful.



Curiosity



Enthusiasm

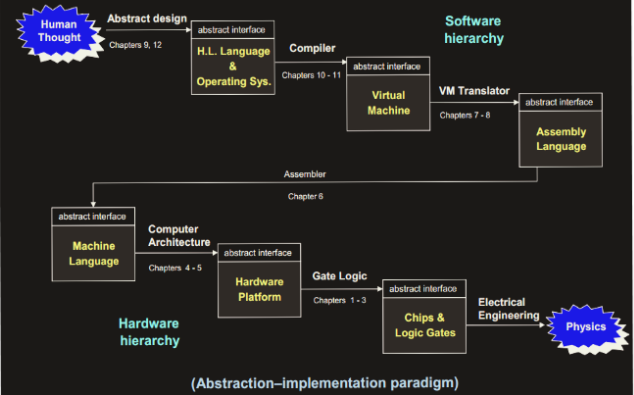
Table of Contents

Course Description	1
Learning Outcomes	2
Grading Policies	2
Resource Materials	3
Make-up & Late Work	4
Course Schedule	5
Important Dates	5
Teaching Staff	6
Aggie Honor Code	6
ADA Policy Statement	6
Acknowledgements	6

Course Description

Introduction to computer systems from programmer's perspective: simple logic design, data representation and processor architecture, programming of processors, memory, control flow, input/output, and performance measurements; hands-on lab assignments.

Course theme and structure



Elements of Computing Systems, Nisan & Schocken, MIT Press. www.nand2tetris.org, Introduction

slide 5



IT'S IN THE SYLLABUS

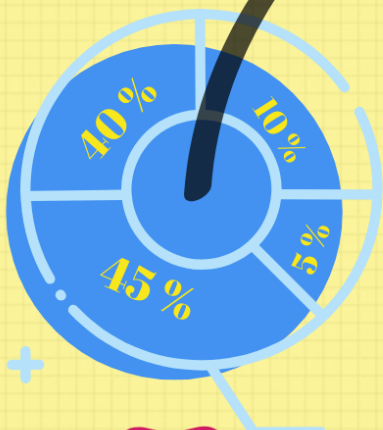


**SUCCESS
THROUGH
TEAMWORK**

Learn1ng Outcomes

- 1) To **integrate** key notions from Algorithms + Computer Architecture + OS + Compilers + Software Engineering
- 2) To **explore** various ideas and techniques to answer how computer works, and how are they designed
- 3) To actively **apply** new concepts as we learn, via fascinating hands-on lab projects
- 4) To constructively **build** a modern virtual general-purpose computer system from the ground up that you will be proud to use and share
- 5) To **gain** many cross-section views of the computing field, from the bare-bone details of switching circuits to the high level abstraction of object-based software design.
- 6) To **simulate** digital logic circuits using a simple Verilog-like hardware description language
- 7) To **design** a cool gaming application using an easy-to-learn JAVA-like language running on the computer we built
- 8) To **work** as a part of team in equal contribution, maintain professional conduct in an inclusive environment, and manage time efficiently while developing key critical-thinking, communication, and decision-making skills

"...if I had to average all of your understanding, progress, success, and performance into a single alphanumeric character, it'd be this, but really this is over-simplifying things because learning is messy and understanding is highly dynamic"



40%	Lab Projects
8 lab projects aligned with lecture, Done individually unless specified, Demo + Lab Quiz/Code Review	P1-P7: 30% Game: 10%

10%	Participation
Group activities, Class and Piazza discussions, Scribe Team, Lecture attendance	Scribe 5% Other 5%

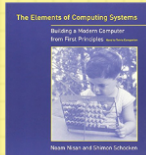
45%	Exams
Closed book, and notes, Not Comprehensive, Done individually, Held in class lecture	Midterm 20% Final 25%

5%	Take-home Quizzes
Problem solving, Done individually, May discuss approaches/consult books, No solution sharing	5 to 6 Quizzes

Grading



% Total	>= 90	80-89	70-79	60-69	< 60
Letter Grade	A	B	C	D	F



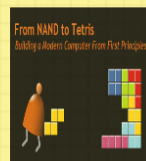
TEXTBOOK

The Elements of Computing Systems: Building a Modern Computer from First Principles
Noam Nisan, Shimon Schocken
MIT Press, 2005
Recommend buying for pure joy, 1st half free online



REFERENCE

Digital Design, 2nd Ed
Frank Vahid
Wiley Publication, 2010
Referenced in a limited capacity, selected topics



SOFTWARE

From Nand to Tetris, <https://www.nand2tetris.org/>
Noam Nisan, Shimon Schocken
Official website to accompany the textbook, Comprises of book chapters from Ch1-6, Download and install software suite to access all simulators on Windows, Unix, MacOS



COURSE CONTENTS

CSCE 312, piazza.com/tamu/fall2018/csce312504505/home
All course lecture notes, project handouts, announcements, student queries, exam and quiz solutions, staff contact will be posted here, good student discussions and responses will be endorsed and tracked, direct your subject queries to entire class and teaching staff for quicker response (DO NOT share your code or solutions in public posts), post private piazza messages to any/all the teaching staff for personal matters/grading queries, option to be anonymous, Avoid direct email to teaching staff unless required



SUBMISSION

CSCE 312,
Submission channels with due date and time will be created, Upload and submit your lab projects, and scanned copy of take-home quizzes, Grades and feedback will be published here, Recommend using Firefox/Chrome as browser



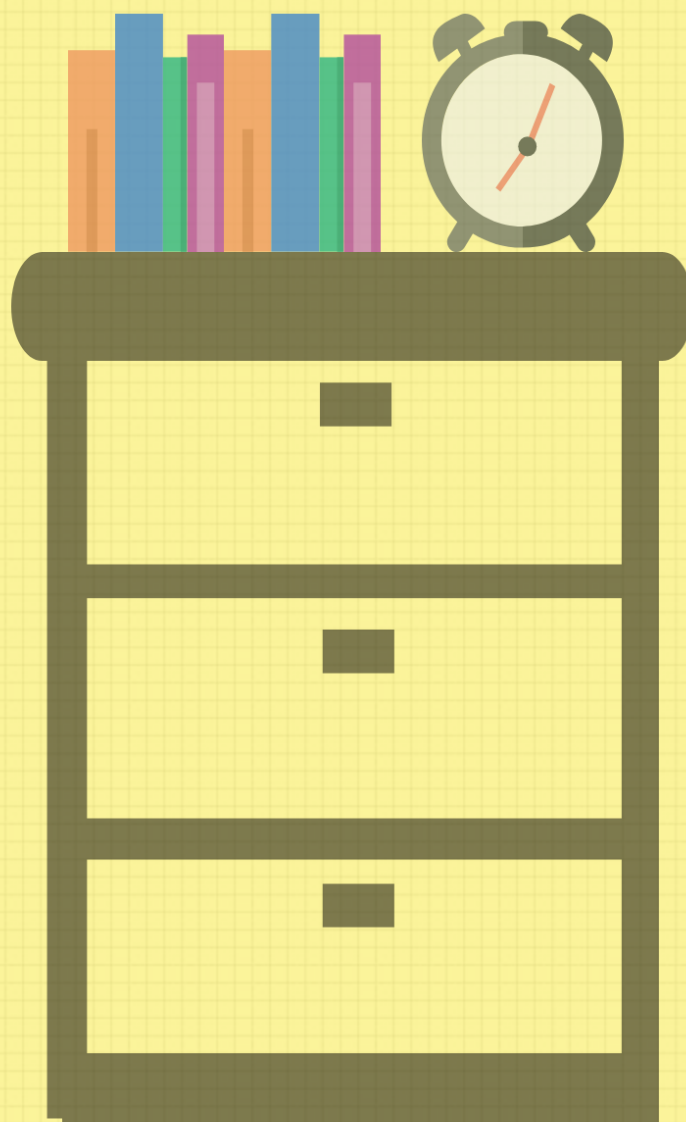
SCRIBING

CSCE 312,
Every scribe team will be assigned a lecture chapter for collaboration on creating concise study notes, and guides, presenting information creatively with figures/infographics and, surveying interesting facts or current articles, extended concepts etc., to be meant for publishing & sharing with the entire class for peer review and improvement, helpful for exam and quiz review



COMPUTER

Personal Laptop
BYOD to every class and lab, Check system requirements for compatibility to run nand2tetris softwares/ simulators for doing Lab projects, to demonstrate lab projects, to code in HDL, JAVA / C++/ Python etc, and JACK for the game



Make-up, Late Work & Attendance



Exam Make-up

Missed exams will be eligible for make-up only for university excused absences

Valid documentation must be submitted by the student as per Student Rules below and must be acknowledged by the instructor prior to making up a missed exam

If advanced notice is not feasible (e.g. accident, or emergency) the student has 2 business days after the excused absence to provide notification, failing which it will be categorised as an unexcused absence

In event of an unexcused absence, a zero will be assigned for the missed exam

Make-up for missed exam, if approved by the instructor, needs to be completed no later than 30 calendar days from the last day of initial excused absence

For more details on university excused absences and procedure, refer to Student Rules in <https://student-rules.tamu.edu/rule07/>



Late Submission

Applies to assigned Lab projects, and Take-home quizzes with announced due date and time

Submission time is the timestamp recorded while uploading the above assigned work on eCampus

Late work is defined when the submission time exceeds the due date and time, resulting in a grading penalty described here

In event of missing the due date and time resulting from university excused absence, a rescheduled due date and time with no grading penalty, must be requested by the student and approved by the instructor, provided a valid documentation or notification, wherever applicable, is provided within 2 business days after the absence

Late work can not be accepted once solutions are shared or discussed in class, or lab



Attendance

Course is structured with class group activities and lab quizzes that will regularly track student's attendance

Class group activities are meant to support lecture content, to drive class discussions and to promote a cooperative learning atmosphere

There will be no make-up for unexcused absence, but extra-credit assignment can be provided towards participation grades in the event of university excused absence, as per Student Rules.

A student can boost one's participation grades by active involvement and substantial contribution in facilitating Piazza discussions/queries, and creating high quality notes in terms of both content and presentation for the scribing tasks.



Grading Penalty

$$G = G \times (0.9999)^m$$

G = Grade achieved for the assigned work

m = minutes late in submission

Minutes Late	Max Grade
5	99.9%
60	98.8%
1440 (1 day)	75%
2880 (2 days)	56.2%
4320 (3 days)	42.1%

Course Schedule

Weekly Agenda

subject to change

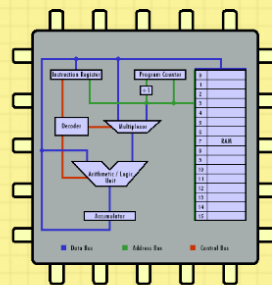
#1	Boolean Logic	#9	CPU Architecture, Virtual Machines
#2	Boolean Arithmetic	#10	Virtual Machines, Compilers
#3	Sequential Logic Design	#11	Compilers
#4	Sequential Logic Design	#12	CPU Pipelining, Q-Drop
#5	Machine Language	#13	Memory Hierarchy, Thanksgiving
#6	Machine Language	#14	Virtual Memory, Cache Memory
#7	Midterm Review, MIDTERM EXAM	#15	Game Project Demo, Reading Day
#8	Assembler	#16	FINAL EXAM

Lab Projects

Week 1	Setup, HDL
Week 2	P1, P1
Week 3	P1, P2
Week 4	P2, P2
Week 5	P3, P3
Week 6	P3, P4
Week 7	P4, -
Week 8	P4, JACK
Week 9	P6, P6
Week 10	P6, P5
Week 11	P5, P7
Week 12	P7, P7
Week 13	Game, na
Week 14	Game, Game
Week 15	na, -

P: Project
- buffer day
na: reading/redefined day

subject to change



Important Dates

Midterm Exam	:	Oct 11
Q-Drop	:	Nov 16
Reading Day	:	Nov 21
Thanksgiving Break	:	Nov 22-23
Redefined Days	:	Dec 3-4
Reading Day	:	Dec 6
Final Exam	:	1-3pm Dec 11



Don't let this be you...

Plan ahead!

KEEP CALM AND STUDY FOR EXAMS

C = A + B;

C

C++

JAVA

High Level Language

ADD A, B

Assembly Language

100100111

Machine Language



Hardware

MEET THE STAFF



GAL

Jyotikrishna "JD" Dass

PhD student, Dept. of CSE

- HRBB 514B, W: 3-5 PM
- Use Piazza private post
- W <http://people.tamu.edu/~jyoti1991/>



PT

Zachary Steer

Bachelors student, Dept. of CSE

- HRBB 129, M: 9-10 AM, T: 9-9:30 AM, W: 5:30-6:30 PM, R: 9-9:30 AM
- Use Piazza private post



TA

Kavaya Sree BVS

MS student, Dept. of CSE

- HRBB 501C, T+R: 2-3 PM
- Use Piazza private post



PT

Feras Khemakhem

Bachelors student, Dept. of CSE

- HRBB 129, W: 5:30-7 PM, F: 9-10 AM
- Use Piazza private post



AGGIE HONOR CODE

An Aggie does not lie, cheat, or steal, or tolerate those who do

For additional information please visit <http://aggiehonor.tamu.edu>

Americans with Disabilities Act Policy Statement

ADA

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information visit <http://disability.tamu.edu/>

ACKNOWLEDGEMENT

The course owes its existence to the Nand2Tetris organizers, Prof. Nisan and Prof. Schocken (<http://www.nand2tetris.org>). The material has been adopted and enhanced by Dr. Aakash Tyagi for CSCI 312 at Texas A&M University, College Station. The lecturer expresses his deepest gratitude to Dr. Tyagi for inculcating curiosity in learning, and passion for teaching, which has led the instructor from his previous TA role(s) to being offered the current GAL position for Fall 2018. The lecturer has profoundly grown under Dr. Tyagi's mentorship, friendship, and encouragement, and continues to strive towards success in graduate studies and future endeavors



Sneak Peek into New Zachry:
<https://www.facebook.com/dass.jyotik/posts/10216022383653579>