

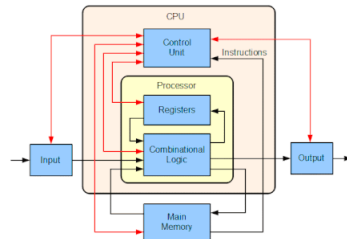


COM 410.1 – Computer Architecture & Organization Spring Semester, 2020

Professor: Michael Brady
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COURSE OVERVIEW

The course introduces students to the topic of computer architecture and organization. Focus is on the structure and design of modern central processing units. During lab sessions, students will learn the basics of the x86 instruction set and machine code, the corresponding assembly language, and the mapping of high-level language structures to the low-level processing. The goal is to appreciate how computation and memory management is actually implemented in a computer. The design of and development for other types of processors and memory handling is then considered.



COURSE MATERIALS

e-course.uaca.kg

TIME AND PLACE

Rm 410, Mon Lecture 14:10- 15:25
Wednesdays (3 Labs)

PREREQUISITES

COM-119, Object Oriented Prog.
COM-223, Algorithms&Structures

GRADING

20% - Lab Midterm
20% - Lab Final
15% - Lecture Midterm
15% - Lecture Final
30% - Course Projects
+5% - Participation/Attendance

AIMS AND OUTCOMES

By the end of this course, students will:

- appreciate modern computer architectures and organization
- be able to use the x86 and x86-64 assembly languages
- have an increased understanding about how computer code is compiled into instructions to be run on a CPU, multiple CPUs, and other types of processors. From this the software engineer will know how to optimize fast and efficient code

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A-	90-92.99
B+	87-89.99
B	83-86.99
B-	80-82.99
C+	77-79.99
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C-	70-72.99
D+	67-69.99
D	60-66.99

Planned Schedule:

WEEK	DATE	TOPIC
1	Jan 13	Introductions, course overview, review of syllabus & schedule, course materials
	Jan 15	Unix environment
2	Jan 20	Tour of computer systems, C language (Bryant & O'Hallaron 1.1 – 1.10)
	Jan 22	Unix environment, C programs
3	Jan 27	X86-64 architecture -- Y86 as subset (Bryant & O'Hallaron 4.1 – 4.3)
	Jan 29	Intro to assembly x86-64
4	Feb 3	Y86-64 architecture continued (Bryant & O'Hallaron 4.4 – 4.6)
	Feb 5	Intro to assembly x86-64 continued
5	Feb 10	Representing and manipulating information (Bryant & O'Hallaron 2.1 – 2.5)
	Feb 12	Arguments and parameters
6	Feb 17	Machine level representation of programs (Bryant & O'Hallaron 3.1 – 3.6)
	Feb 19	Arguments and parameters continued, stack
7	Feb 24	Machine level representation continued (Bryant & O'Hallaron 3.7 – 3.11)
	Feb 26	Conditionals, loops
8	March 2	Review for mid-term written exam
	March 4	Review for mid-term programming exam
9	March 9	Mid-term written exam
	March 11	Mid-term programming exam
10	March 16	Spring Break – no class
	March 18	Spring Break – no class
11	March 23	Optimizing program performance (Bryant & O'Hallaron 5.1 – 5.9)
	March 25	Arrays
12	March 30	Optimizing program performance continued (Bryant & O'Hallaron 5.10 – 5.15)
	April 1	FPU (floating point unit)
13	April 6	Memory Hierarchy (Bryant & O'Hallaron 6.1 – 6.7)
	April 8	Project setup
14	April 13	RISC and CISC instruction sets (MIPS, ARM and x86-64)
	April 15	Project
15	April 20	Overview of parallel programming, Flynn's taxonomy
	April 22	Project
16	April 27	GPUs, TPUs, FPGAs, microcontrollers, other processors & systems
	April 29	Project
17	May 4	Review for written final exam
	May 6	Review for programming final exam
18	May 13	Final written exam
	May 15	Final programming exam