



## DEPARTMENT OF SCIENCE

### COURSE OUTLINE – Fall 2019

#### CS2290 – COMPUTER ORGANIZATION AND ARCHITECTURE I - 3 (3-0-3) 90 HOURS

**INSTRUCTOR:** Libero Ficocelli

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**OFFICE HOURS:** TBA

**DELIVERY MODE(S):** In class lecture

**PREREQUISITE(S)/COREQUISITE:** CS1150

#### **REQUIRED TEXT/RESOURCE MATERIALS:**

Assembly Language for x86 Processors, 7th Edition (6<sup>th</sup> Edition is acceptable)

By Kip R. Irvine, Pearson Publishing,

ISBN 0-13-376940-2

#### **CALENDAR DESCRIPTION:**

General introduction to number representation, architecture and organization concepts of von Neumann machines, assemble level programming, exception handling, peripheral programming, floating point computations and memory management.

#### **LEARNING OUTCOMES:**

- Understand computer data representation
- Know basic processor architecture and memory management
- Be able to write, assemble, and debug Intel Assembler code

- Be able to perform conditional processing and Integer arithmetic, use code libraries, code procedures and advanced procedures and use string manipulation routines
- List the basic components of a modern CPU

### **COURSE OBJECTIVES:**

- Learn the fundamentals behind program execution
- Understand how a modern CPU works
- Learn how machine code is generated by a compiler
- Understand the interface between software and hardware

### **COURSE SCHEDULE/TENTATIVE TIMELINE:**

#### **Introduction to Computer Architecture:**

- Microprocessor and computer architecture
- Operations and operands of computer hardware
- Representing instructions

#### **Number systems and Arithmetic**

- Signed and Unsigned Numbers
- Addition and Subtraction
- Logical Operations
- Constructing an Arithmetic Logic Unit
- Multiplication and Division
- Floating Point numbers

#### **80x86 Assembly**

- Overview of 80x86 assembler (segments, registers and organization)
- Program structure
- I/O operations
- Data movement instructions
- Conditionals and Branching instructions
- Arrays
- Macros and Procedures
- Interrupts
- String processing

- Video operations (text and graphics)
- Parameter passing and stack operations

### EVALUATIONS:

Lab/Homework

Assignments 30%

Class Quizzes 10%

Midterm 25%

Final Exam 35%

### GRADING CRITERIA:

Alpha Grade	4-point Equivalent	Percentage Guidelines	Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	90-100	C+	2.3	67-69
A	4.0	85-89	C	2.0	63-66
A-	3.7	80-84	C-	1.7	60-62
B+	3.3	77-79	D+	1.3	55-59
B	3.0	73-76	D	1.0	50-54
B-	2.7	70-72	F	0.0	00-49

### STUDENT RESPONSIBILITIES:

- The Student must pass the theory/concepts portion of the course in order to qualify for a passing grade for the term. In other words, a student must obtain 35 out of a possible 70 points (from exams/quizzes) before adding the lab assignment marks to compute the final grade. If you cannot achieve the required 50% (on exams) then regardless of your lab assignment grades, you cannot pass the course.
- No late project assignments will be accepted. The student is responsible for adhering to all requirements as specified for each project assignment.
- When necessary, lab time may be utilized for lecturing on specific Assembly language features.

The remainder of the lab time will generally be used as "hands-on" programming time.

## **STATEMENT ON PLAGIARISM AND CHEATING:**

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the College Calendar at <http://www.gprc.ab.ca/programs/calendar/> or the College Policy on Student Misconduct: Plagiarism and Cheating at <https://www.gprc.ab.ca/about/administration/policies>

\*\*Note: all Academic and Administrative policies are available on the same page.

## **TRANSFERABILITY:**

**A list of institutions to which this course transfers:** University of Alberta , University of Calgary\*, University of Lethbridge , Athabasca University , Augustana Faculty University of Alberta , King's University College, Grant MacEwan University

\* An asterisk (\*) beside any transfer institution indicates important transfer information. Consult the Alberta Transfer Guide.

**Warning:** Although we strive to make the transferability information in this document up-to-date and accurate, **the student has the final responsibility for ensuring the transferability of this course to Alberta Colleges and Universities.** Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at Alberta Transfer Guide main page <http://www.transferalberta.ca> or, if you do not want to navigate through few links, at <http://alis.alberta.ca/ps/tsp/ta/tbi/onlineSearch.html?SearchMode=S&step=2>

Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. **Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability.**