CS A242: COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE

Item	Value
Curriculum Committee Approval Date	10/21/2015
Top Code	070600 - Computer Science (Transfer)
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

Introduction to the organization and behavior of real computer systems at the assembly-language level. Topics include studying the mapping of statements and constructs in a high-level language onto sequences of machine instructions, as well as the internal representation of simple data types and structures, and examining numerical computation to note various data representation errors and potential procedural errors. ADVISORY: CS A100, CS A122, CS A131, CS A150, or CS A170. Transfer Credit: CSU, UC. C-ID COMP 142.

Course Level Student Learning Outcome(s)

1. Write short assembly language segments demonstrating calculation along with data storage and the implementation of selection and iteration.
2. Demonstrate an understanding of the different ways that data is stored in a computer, including integer and floating-point representations.

Course Objectives

- 1. Write simple assembly language program segments.
- 2. Demonstrate how fundamental high-level programming constructs are implemented at the machine-language level.

Lecture Content

Bits, bytes, and words Numeric data representation and number bases Fixed- and floating-point systems Signed and twos-complement representations Representation of nonnumeric data (character codes, graphical data) Representation of records and arrays Basic organization of the von Neumann machine Control unit; instruction fetch, decode, and execution Instruction sets and types (data manipulation, control, I/O) Assembly/machine language programming Instruction formats Addressing modes Subroutine call and return mechanisms I/O and interrupts

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)

Instructional Techniques

Lecture, demonstration, and programming exercises.

Reading Assignments

Students will spend a minimum of 3 hours per week reading the textbook and/or other reading material assigned. Students will be expected to follow along with the exercises in the reading material.

Writing Assignments

Students will spend a minimum of 6 hours per week writing code.

Out-of-class Assignments

Students will spend a minimum of 6 hours weekly completing exercises and/or programming assignments.

Demonstration of Critical Thinking

Student will demonstrate the ability to explain different data representations for integer and floating point types.

Required Writing, Problem Solving, Skills Demonstration

Students will write assembly language programs making use of data storage, selection and iteration

Eligible Disciplines

Computer science: Masters degree in computer science or computer engineering OR bachelors degree in either of the above AND masters degree in mathematics, cybernetics, business administration, accounting or engineering OR bachelors degree in engineering AND masters degree in cybernetics, engineering mathematics, or business administration OR bachelors degree in mathematics AND masters degree in cybernetics, engineering mathematics, or business administration OR bachelors degree in any of the above AND a masters degree in information science, computer information systems, or information systems OR the equivalent. Note: Courses in the use of computer programs for application to a particular discipline may be classified, for the minimum qualification purposes, under the discipline of the application. Masters degree required.

Textbooks Resources

1. Required Planz, R.G.. Introduction to Computer Organization with x86-64 Assembly Language GNU/Linux, 1st ed. Raleigh, N.C: Lulu.com, 2012 2. Required Irvine, K.. Assembly Language for x86 Processors, 6th ed. Upper Saddle River, NJ: Prentice-Hall (Pearson), 2010