

OHLONE COLLEGE
Ohlone Community College District
OFFICIAL COURSE OUTLINE

I. Description of Course:

1. **Department/Course:** CS - 119
2. **Title:** Computer Architecture
3. **Cross Reference:**
4. **Units:** 4
Lec Hrs: 3
Lab Hrs: 3
Tot Hrs: 108.00
5. **Repeatability:** No
6. **Grade Options:** Grade Only (GR)

7. **Degree/Applicability:**
Credit, Degree Applicable, Transferable
- CSU (T)

8. **General Education:**

9. **Field Trips:** Not Required

10. **Requisites:**
Advisory
CS 102 Introduction to Computer Programming Using C++
CS 113 Discrete Mathematics for Computers
CS 118 Introduction to Assembly Language Programming

12. **Catalog Description:**

This course will present the logical design of digital computers. The following topics will be covered: Boolean algebra, combinational and sequential circuits, computer arithmetic, memories, integrated circuits, control processors, input/output. No electronic experience is needed.

13. **Class Schedule Description:**

introduction of computer organization and logical design.

14. **Counselor Information:**

This course is intended for computer science transfer students and vocational students preparing for a computer-related career. Most universities require CS 118 (Assembly Language) together with this course.

II. Student Learning Outcomes

The student will:

1. Demonstrate the application of discrete mathematics, number theory, Boolean algebra, and simple digital design to the field of computers and computer architecture.
2. Provide a comparative overview of multiple computer processors, peripheral devices, instruction set architectures, and operating systems to identify key functional and performance aspects.
3. Analyze processor, microcontroller, and computer structures, interpret the various aspects as required for a specific system using computers or applications, and determine the appropriate class of hardware, firmware, and software that can meet desired needs.
4. Apply a structured approach to the study, analyze, and assessment of novel and next generation computers, processors, and microcontrollers as they are introduced in the future.

III. **Course Outline:**

- A. Historical perspective of computer architectures and their evolution into current families of computers.
- B. Computer system components and organization: processors, primary memory, secondary memory, and input/output ports and devices.
- C. Digital logic elements in computer design: numerical representations, basic circuits, memory, CPU and busses, input and outputs
- D. Microarchitecture level structures and design for implementations of data paths, definable operations and instructions, and various performance options and improvements.
- E. Instruction set architecture for programming: ISA overview, data types, formats, addressing, instruction types, and flow control
- F. Operating system machine functions and instructions used to support applications programming: virtual memory, virtual I/O, and process management.
- G. Assembly language constructs, translation into machine language and support for software module linking and loading.
- H. An overview of parallel computer architectures and design issues.

IV. **Course Assignments:**

A. Reading Assignments

- 1. Students will be assigned readings for each topic listed in the content area.

B. Projects, Activities, and other Assignments

- 1. Activities will include labs designed to clarify the topics.
- 2. This is especially needed for digital logic design of circuits.
- 3. Project to design a limited architecture using constraints in size of memory, instruction set, I/O ports, etc.

C. Writing Assignments

- 1. Writing assignments will include comparative studies of existing architectures, analysis of proposed future architectures, and descriptions of the components needed for a complete system.

V. **Methods of Evaluation/Assessment:**

- A. Midterm/Final Exam
- B. Quizzes on reading topics
- C. Lab Activities/Project
- D. Graded written homework

VI. **Methods of Instruction:**

- A. Lecture
- B. Laboratory
- C. Discussion
- D. Demonstration
- E. Independent Study

VII. **Textbooks:**

Recommended

1. Andrew S. Tanenbaum *Structured Computer Organization* 5th Edition, Prentice Hall, 2005 ISBN: 0131485210

Supplemental

VIII. Supplies:

- A. Use of personal computer

CID 3087