PALOMAR COLLEGE
COURSE OUTLINE OF RECORD
FOR DEGREE CREDIT COURSE

(Form Version 5/95)
(Date revised: 3/11/2000)

x Transfer Course x Degree Course Applicable Course

COURSE NUMBER AND TITLE: CSIS 222 Machine Organization and Assembler Language

UNIT VALUE: 4

MINIMUM NUMBER OF SEMESTER HOURS: 80

BASIC SKILLS REQUIREMENTS: Appropriate language and computational skills

ENTRANCE REQUIREMENTS:

Prerequisite:	CSIS 220 or CSIS 235
Corequisite:	None
Recommended Preparation:	None

SCOPE OF COURSE:

An introduction to Assembler Language programming. Langauage syntax is covered, together with a study of the instruction set mnemonics, segment, index, pointer, general purpose and flag registers. A variety of memory addressing techniques will be covered, as well as stack operations, particularly thoses associated with passing parameters to subroutine calls. The course will also include I/O to screen, printer, and disk interfaces. Emphasis will be placed on interaction between the student=s code and the operating system=s supplied functions for I/O to peripheral devices. Use of editor and debugging tools will also be addressed.

SPECIFIC COURSE OBJECTIVES: The successful student will be able to:

1. Describe the organization and architecture of a computer system.
2. Apply appropriate usage of the structure and syntax of Assembler Language programming.
3. Utilize the hexadecimal, binary and octal number systems.
4. Apply binary logic operators to Assembler Language programs.
5. Utilize memory management and memory addressing methods.
6. Use the DOS and BIOS services to interface with devices such as the keyboard, disk drives, monitor and printer output.

CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:

I. Data Representation
   A. Numbering systems and bases (binary, decimal, hexadecimal).
   B. Data organization: bits, bytes, words, and double words.
   C. Logical operations (and, or, xor, not).
   D. Bitwise operations
   E. Signed numbering system (two=s complement).
   F. Packed data, shifts and rotates.

II. Boolean Algebra
   A. Truth tables and boolean expressions.
   B. Canonical forms.
   C. Simplification.
   D. Combinatorial and sequential circuits.

III. System Organization
   A. System components: CPU, Memory, I/O and the bus.
   B. System timing, memory access, wait states, and cache memory.
   C. Pipelines, superscalar operation, and stalls/hazards.

IV. Memory Organization
   A. Introduction to the 80x86 CPU.
   B. 80x86 physical memory.
   C. 80x86 segments.
   D. 80x86 adressing modes.

V. Variables and Simple Data Structures in Memory
   A. Declaring variables in an assembly language program.
   B. Byte, word, dword, and other variable sizes.
   C. Creating your own data types.
   D. Pointers.
   E. Composite data types: Arrays, structures and pointers to these.
   F. Accessing elements of arrays: row/column major ordering.
   G. Dereferencing pointers.

VI. The 80x86 Instruction set.

VII. MASM=s Directives, Pseudo Opcodes, Macros, and other Facilities.

VIII. Arithmetic and Logical Operations
- A. Converting HLL arithmetic expressions to assembly language.
- B. Logical (boolean) expressions.
- C. Multiprecision operations.
- D. Masking operations.

IX. Control Structures
- A. Simulating IF..THEN..ELSE, CASE, WHILE, REPEAT..UNTIL, LOOP.. ENDLOOP, FOR, and other control structures in assembly l anguage.
- B. Efficiency considerations.

X. Procedures and Functions
- A. Near and far procedures.
- B. Passing parameters,
- C. By value,
- D. By reference,
- E. By value/result,
- F. By result,
- G. By name, and
- H. By lazy evaluation
- I. Passing parameters in registers,
- J. In global variables,
- K. On the stack
- L. In the code stream, and
- M. In a parameter block
- N. Returning function results.
- O. Local (automatic) variables.
- P. Recursion

REQUIRED READING:

Abel, Peter. IBM Assembly Language and Programming. 4th Edition, Prentice Hall, 1998.

REQUIRED WRITING:

None. Problem solving exercises are assigned, requiring students to complete five or six computer programming labs. Each programming lab will consist of a hands-on exercise applying theory principles learned in class. Programs must be well documented (at least one written paragraph) of their overall design goals. Additionally, each subprogram must be documented (two or three sentences) as to its purpose and overall performance.

OUTSIDE ASSIGNMENTS:

Students are expected to spend a minimum of three hours per unit per week in class and on outside assignments, prorated for short term classes.

Outside assignments will include completion of lab work, assigned readings, and homework.

INSTRUCTIONAL METHODOLOGY:

Check all that apply:

_x_ lecture
___ laboratory
_x__ lecture/laboratory
___ directed study

This course may be offered as a distance education course and meets Title 5 regulations 55370, 55372, 55374, 55376 and 55378. Yes X No

If yes, check all that apply:
_x_telecourse
_x_mediated instruction
_x_computer assisted instruction

GRADING POLICY AND STANDARDS:):

Grades for courses are based upon final examinations, mid-term examinations, other tests, assignments, projects, and participation. Faculty will inform students of their grading policy at the beginning of each semester.

IS COURSE REPEATABLE FOR REASON(S) OTHER THAN DEFICIENT GRADE?

Yes___ No_x_ Number of times course may be taken for credit_0_.

If yes, identify specific provision of Division 2 section(s) **55761-55763** and **58161** which qualifies course as repeatable:

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SIGNATURES ON FILE