RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

CISY 256 - Computer Architecture & Assembly Language

I.   Basic Course Information

A. Course Number and Title: **CISY 256 - Computer Architecture & Assembly Language**

B. New or Modified Course: Modified

C. Date of Proposal or Revision: Semester: **Spring**   Year: **2008**

D. Sponsoring Department: **Computer Science (CS)**

E. Semester Credit Hours: **4**

F. Weekly Contact Hours: **5**   Lecture: **3**
                                               Lab: **2**

G. Prerequisite/Corequisite: **CISY 254 - Data Structures & MATH 151 - Calculus I or equivalent.**

H. Laboratory Fees: **Yes, at current rate**

I. Department Chair: **jsullival@raritanval.edu**

II.   Catalog Description

Prerequisite: CISY 254 - Data Structures & MATH 151 - Calculus I or equivalent.
This course is the third in the sequence for students in Computer Science planning to transfer to a four-year college. It may also be taken as a free elective by interested students with sufficient background. This course focuses on the components of a computer that describe its architecture: storage, the central processing unit, the instruction set and addressing modes. The course also examines the way these components are interconnected and the nature of the information flow between them. Students will use Assembly language to reinforce these concepts.

III.   Statement of Course Need

A Computer Scientist needs to understand the underlying architecture of the processor and the components of the computer that the processor interacts with to write programs effectively even with a high level language.

The Association for Computing Machinery (ACM) requires this course for all Computer Science Graduates. It meets the transfer requirement to four year colleges and universities.

IV. Place of Course in College Curriculum

A. Free Elective
B. This course meets a program requirement for the Computer Science A.S. degree
C. CIS Elective
D. Transferability: This course transfers to most four year schools in NJ in Computer Science

V. Outline of Course Content

Computer Architecture:
- Overview of Computer Architecture
- Binary Numbers
- Digital Logic
- Interconnections (System Bus, Expansion Bus)
- Cache Memory
- Internal Memory
- External Memory
- Input/Output
- Instruction Set
- Reduced Instruction Set (RISC)
- Parallel Architectures
- Intel IA-64 Architecture

Assembly Language:
- Assembly Language Concepts
- Intel IA-32 Architecture
- Binary Numbers and Big vs. Little Endian Numbers
- Assembly Fundamentals
- Using the Assembler
- Data Transfer
- Memory Addressing on IA-32
- Integer Arithmetic
- Procedures
- Conditional Processing
- Strings and Arrays
- Interrupts
- Structures/Macros
- Disk Storage and File Processing

VI.   Educational Goals and Learning Outcomes

    A. Education Goals

At the conclusion of the course, students will be able to:
1. Apply creative and critical thought in designing computing solutions that demonstrate knowledge of the computer architecture (G.E. 1)
2. Apply quantitative reasoning to interpret data used in solving problems (G.E. 7)

    B. Learning Outcomes

At the conclusion of the course, students will be able to:
1. Describe the main components of computer systems that define its architecture (CPU, storage, memory, instruction sets, and addressing modes)
2. Discuss the way the main components of computers are interconnected
3. Recognize assembly language syntax while reading and analyzing assembly language programs
4. Design, develop and test programs using MS Assembly Language commands while featuring various basic Assembly Language operations (data/program transfer, arithmetic instructions, indirect memory, addressing, procedures and stack operations)
5. Design, develop and test programs in the MS Assembly Language that include strings, arrays, macros, and conditional processing (Boolean instructions, loops)

VII.   Modes of Teaching and Learning

    A. Lecture – Lecture on Computer Architecture
    B. Lecture/Discussion – Lecture on Assembly Language with demonstration of programming in assembly.
    C. Laboratory – Lab time to analyze, design, and write Assembly Programs.

VIII. Papers, Examinations, and other Assessment Instruments

    A. Labs – In-Class assignments
    B. Projects – In-class and out of class projects
    C. Exam - Exams on Computer Architecture
    D. Exam – Exams on Assembly Language (paper-based and hands on)
    E. Other – Homework on Architecture and Assembly

IX.   Grade Determinants

    A. Labs
    B. Projects
    C. Exams
    D. Homework

X.   Texts and Materials

Suggested Textbooks:

A. Stallings, William. *Computer Organization and Architecture: Designing for Performance, Seventh Edition.* Prentice Hall, 2006

B. Irvine, Kip R. *Assembly Language for Intel-Based Computers, Fifth Edition.* Prentice Hall, 2007

(Note: The course outline is intended only as a guide to course content and resources. Do **NOT** purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.)

XI.   Resources

- Microsoft Windows
- TextPad or other comparable language editor
- Microsoft Assembler