

Course Number, Course Title and Semester Hours

CSC 342 Computer Systems 4sh

Course Coordinator

Joel Hollingsworth

Current Catalog Description

This course involves the study of the basic building blocks of modern computer systems. Topics include digital logic, machine-level representation of data, assembly-level organization, operating systems primitives and concurrency. Pre-requisite: CSC 230. Co-requisite: MTH 206. Offered Fall.

Textbook

Computer Systems: A Programmer's Perspective
Bryant and O'Hallaron
Prentice Hall, 2003, ISBN 0-13-034074-X

References

The C Programming Language (2nd Edition - ANSI C)
Kernighan and Ritchie
Prentice Hall, 1988, ISBN 0-13-110362-8

Operating System Concepts (8th Edition)
Silberschatz, Galvin and Gagne
John Wiley and Sons, 2009, ISBN 978-0-470-12872-5

Computer Networking: A Top-Down Approach Featuring the Internet (3rd Edition)
Kurose and Ross
Addison-Wesley, 2005, ISBN 0-321-22735-2

Course Outcomes (Relationship between Course Outcomes and Program Outcomes)

The student will be able to:

1. Manipulate data using bit-level operations. (PO 1)
2. Convert data between binary, decimal and hexadecimal formats. (PO 1)
3. Define the following numbering systems: unsigned integer, one's complement, two's complement and IEEE floating point. (PO 1)
4. Implement simple systems using digital logic. (PO 1)
5. Discuss modern processor architectures. (PO 1)
6. Read and understand x86-style assembly language. (PO 1)
7. Define and discuss the implications of stack discipline. (PO 1)
8. Discuss the technological and ethical concerns of buffer overflow. (PO 6)
9. Implement assembly-level performance enhancements. (PO 1,3,10)
10. Write C language programs using system-level functions. (PO 1,3,11)
11. Discuss operating systems at the organizational level. (PO 1)
12. Adequately work at a Linux command line for both the development of

programs and the manipulation of files. (PO 1,9)
13. Work in teams effectively. (PO 4)

Pre-requisites/Co-requisites by Topic

DS/BasicLogic
PF/FundamentalConstructs
PF/DataStructures
PF/Recursion
AL/BasicAnalysis

Major Topics Covered in the Course

AR/DigitalLogicandDataRepresentation [core - 4 hours]
AR/ComputerArchitectureandOrganization [core - 9 hours]
AR/InterfacingandI/OStrategies [core - 3 hours]
AR/MemoryArchitecture [core - 5 hours]
AR/FunctionalOrganization [core - 5 hours]
AR/Multiprocessing [core - 3 hours]
AR/PerformanceEnhancements [elective - 2 hours]
AR/DistributedArchitectures [elective - 1 hour]
OS/OverviewOfOperatingSystems [core - 1 hour]
OS/Operating System Principles [core - 1 hour]
OS/Concurrency [core - 1 hour]
OS/SchedulingAndDisptach [core - 1 hour]
OS/MemoryManagement [core - 2 hours]
PL/FunctionalProgramming [elective - 2 hours]

Estimate Curriculum Category Content in Semester Hours

| <i>Category</i> | <i>Core</i> | <i>Advanced</i> |
|-----------------------|-------------|-----------------|
| Data Structures | | |
| Algorithms | | |
| Software Design | | |
| Computer Architecture | 3.5 | |
| Programming Languages | .5 | |

Course Assessment

Proposed Changes from Fall 2008

The proposed changes are to complete the integration of operating system material into this course.

Planned Assessment

Two course learning outcomes will be assessed. The two are:

1. Manipulate data using bit-level operations. (PO 1)
6. Read and understand x86-style assembly language. (PO 1)

These two learning outcomes are related to CSC Program Outcome 1.

The week-long Data Lab assignment requires students to implement simple logical and arithmetic functions using bit-level operations. The results from this lab will be used to evaluate course learning outcome 1. Since this lab allows for multiple attempts for each required function, it is expected that most students (working in teams) will correctly complete 90% of the assignment.

The week-long Binary-Bomb Lab assignment requires students to read and understand x86-style assembly language and respond with correct input to the given program. It is expected that most students (working in teams) will correctly complete 85% of the assignment.

Assessment Data

Proposed Changes for Next Offering