

**University of Detroit Mercy  
College of Engineering and Science  
Department of Mathematics and Computer Science**

**CSC-417 UNIX Systems Programming  
Winter Term II 2001-2002**

**Instructor:** Dr. Kevin Daimi

**Times:** 6:35 – 9:05 P.M., R, B 246

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**Office Hours:** Tuesday 1:00 – 2:00 P.M.,  
Thursday 4:00 – 5:00 P.M.,  
& by Appointment

**Description of Course:**

This course is an in-depth look at the workings of the UNIX System shells, both as a command interpreter and a programming language. It teaches the writing, debugging, and linking of shell programs, and provides students with an understanding of various UNIX shells as programming languages. These shell programs will be applied to UNIX Networking and UNIX System Administration. The course's main emphasis will be on Unix Systems Programming with C++. Students will use their C++ skills to implement various UNIX functions and utilities.

**Course Prerequisite:**

Students should have already taken either CSC 172 Introduction to Computer Science II or CSC 441 Object-Oriented Programming, and CSC 449 Operating Systems.

**Required Text:**

Graham Glass, and King Ables: UNIX for Programmers and Users, Prentice Hall, 1999.

Richard Peterson, Red Hat Linux: The Complete Reference, Osborne, 2000.

There will also be supplementary lecture notes and handouts.

**Optional Text:**

1. Terrence Chan, UNIX System Programming using C++, Prentice Hall, 1997.
2. Keith Haviland, Dina Gray, and Ben Salama, UNIX System Programming, Addison-Wesley, 1999.
3. Harley Hahn, Student Guide to UNIX, McGraw Hill, 1996.
4. Daniel Gilly, UNIX in a Nutshell, O'Reilly & Associates, 1996.

**General Objectives:**

1. To introduce the UNIX Systems Fundamentals.
2. To introduce various Shell Command Language Programming including the Bourne, Korn and C shells.
3. To introduce the techniques and tools for UNIX Systems Administration.
4. To introduce the UNIX Networking.
5. To introduce UNIX Systems Programming in C++.

**Specific Objectives:**

Upon completion of the course, students will

1. Understand the organization, concepts, tools, and commands of UNIX.
2. Be able to write scripts for various software requirements and administrative tasks using Bourne, Korn, and C shell script languages.
3. Be able to program UNIX Systems in C++.

**Instruction Methods and Techniques:**

1. There will be lectures of 150 minutes once a week.
2. UNIX scripts will be demonstrated in class using overhead projector. Handouts will be provided.
3. Students will have 4 individual lab assignments to be done outside class.
4. Students will be asked to submit a 3-page extra-credit report on various UNIX issues including UNIX Development Environment, UNIX Networking, UNIX Administration, and UNIX Productivity Tools.
5. Students will be involved in the classroom by questioning to stimulate thought, interest and reinforce previous points.
6. Whenever possible students will discuss each other's assignments and suggest ways for improving these programs.

### Assignments for the Course:

Assignment	Topic Covered	Assign Date	Collect Date
Project 1	Bourne Shell Programming	2/14/2002	2/28/2002
Project 2	Korn Shell Programming	2/28/2002	3/21/2002
Project 3	C Shell Programming	3/21/2002	4/4/2002
Group Project	UNIX System Programming with C++	4/4/2002	4/18/2002

Programs will be graded for scope, correctness, style, documentation, and timeliness. A program that “works” will not receive full credit unless it is well written, properly documented, and efficient in terms of memory space used and execution speed.

Late projects will not receive full credit. Unless otherwise specified, projects turned in late may lose as much as 20% and projects may not be accepted at all after that week.

### Attendance/Participation:

Students are expected to attend class on a regular basis and participate in the discussions. They are responsible for all the material presented therein. Formal attendance records will not be maintained; however, attendance is highly correlated with performance on the projects and the exams.

The instructor will attempt to make reasonable accommodations for students who miss a class due to illness, death in the family, or other legitimate reasons. However, students who are forced to miss several classes will have difficulty completing the course in a satisfactory manner.

### Academic Integrity:

Students are expected to conform to a high standard of honesty and integrity in this course. Copying the work of someone else and other forms of cheating are strictly prohibited. Permitting or tolerating such behavior is also prohibited. The minimum penalty for any offense is a 0 on that assignment. The culprits may be subject to additional sanctions, up to and including expulsion from school for serious offenses, as prescribed by the University Catalog and the Engineering and Science Student Handbook.

### Make Up Policy:

Make Up exams will only be given to students who miss an exam for legitimate reason (as defined above under “Attendance”) and who notify the instructor in advance.

**Important Course Dates:**

Exam	Date	Time	Chapters
Exam I	2/21/2002	8:15-9:05 p.m.	1-4
Exam II	4/4/2002	8:15-9:05 p.m.	5-8
Final exam	4/25/2002	7:30-9:20 p.m.	2-8, 10, 13-14, UNIX Systems Programming with C++

**Other Important Dates:**

1/15/2002	Last Day for 100% Refund
1/15/2002	Last Day to Add a Class
1/16-22/2002	75% Refund Period
1/18/2002	Last day to Declare Audit
1/23-29/2002	50% Refund Period
1/30-2/5/2002	25% Refund Period
2/1/2002	Last Day to Drop a Course Without a "W"
3/11/2002	Advising for Fall 2002-2003 Begins
3/18/2002	Registration for Fall 2002-2003 Begins

**Grading:**

Project/Exam	Percentage
Project 1	7.5%
Project 2	7.5%
Project 3	7.5%
Project 4	7.5%
Exam I	15%
Exam II	15%
Final Exam	40%

**Grading Scale:**

Grade	Quality Point
A	4.0
A-	3.7
B+	3.3
B	3.0
B-	2.7
C+	2.3
C	2.0
C-	1.7
D+	1.3
D	1.0
D-	0.7
F	0.0

## Course Outline

- UNIX Systems Fundamentals: UNIX File System, File and Directory Manipulation, UNIX Tools, UNIX Mail.
- Editors: vi and Emacs.
- UNIX Shells: Bourne Shell, Korn Shell, C Shell, Restricted Shells.
- Shell Programming: Introduction to Shell Programming, Shell Variables, Shell Metacharacters, Programming Commands, Debugging Scripts, Advanced Shell Programming.
- UNIX Utilities: Filtering Files, Sorting Files, Finding Files, Text Processing, Transforming Files, Mounting File Systems.
- UNIX Development Environments: X Windows, UNIX User Interface.
- UNIX Networking: Network File System, Distributed Processing, and Internetworking.
- UNIX Internals: The Kernel, Process Management, Input/Output, Interprocess Communications.
- System Administration: Starting and Stopping UNIX, Accounting, File System, Installing Software, Devices, Network Interface.
- UNIX Systems Programming with C++.