**El Camino College**
**COURSE OUTLINE OF RECORD – Official**

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| **Course Acronym:** | CSCI |
| **Course Number:** | 40 |
| **Descriptive Title:** | Introduction to UNIX and LINUX Operating Systems |
| **Division:** | Mathematical Sciences |
| **Department:** | Computer Science |
| **Course Disciplines:** | Computer Science |
| **Catalog Description:** | This course covers UNIX and LINUX operating system concepts and includes basic commands, file structures, editors, file management utilities, shell programming, process control, and remote messaging, as well as network and system administration. |
| **Prerequisite:** | |
| **Co-requisite:** | |
| **Recommended Preparation:** | |
| **Enrollment Limitation:** | |
| **Hours Lecture (per week):** | 3 |
| **Hours Laboratory (per week):** | 3 |
| **Outside Study Hours:** | 6 |
| **Total Course Hours:** | 108 |
| **Course Units:** | 4 |
| **Grading Method:** | Letter Grade and Pass/No Pass |
| **Credit Status:** | Credit, degree applicable |
| **Transfer CSU:** | Yes |
| **Effective Date:** | 05/21/2007 |
| **Transfer UC:** | Yes |
| **Effective Date:** | |
| **General Education: ECC** | |
| **Term:** | |
| **Other:** | |
| **CSU GE:** | |
| **Term:** | |
| **Other:** | |
| **IGETC:** | |

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| **Term:** | |
| **Other:** | |
| **Student Learning Outcomes:** | **SLO #1 Shell Script Solutions**<br><br>Given a specification for a set of operating system tasks, students will create, edit, move, display, copy and delete files and subdirectories.<br><br>**SLO #2 Using Shell Programming**<br><br>Students use shell programming to create file processing applications and control user interaction.<br><br>**SLO #3 Input/Output of Programs and Processes**<br><br>Students create, schedule, filter, monitor, format, sort and redirect and delete input / output of programs and processes.<br><br>**SLO #4 Basic Administration Functions**<br><br>Students perform basic administration functions in system installation and maintenance, network services, user services. |
| **Course Objectives:** | 1. Demonstrate proficiency working with electronic mail and other network services.<br>2. Create, move, display, copy and delete files and subdirectories.<br>3. Use shell programming to create file processing applications and control user interaction.<br>4. Edit files with system editors.<br>5. Filter, format, sort and redirect input / output of programs.<br>6. Create, schedule, monitor and delete multiple processes.<br>7. Perform basic network functions, such as TCP/IP addressing for hosts, subnets, gateways, DHCP and DNS servers.<br>8. Perform basic system administration functions, such as operating system installation, user installation, hardware and software installation, system maintenance and system services. |
| **Major Topics:** | **I. Electronic mail and other network services (3 hours, lecture)**<br><br>    A. E-mail<br>    B. Telnet<br>    C. News groups<br>    D. FTP Server<br><br>**II. Electronic mail and other network services Lab (3 hours, lab)**<br><br>    A. E-mail<br>    B. Telnet<br>    C. News groups<br>    D. FTP server<br><br>**III. File and subdirectory manipulation commands (6 hours, lecture)**<br><br>    A. Subdirectories and file manipulation |

B. Special names and wildcards
C. Understanding permissions, including access and modifications

**IV. File and subdirectory manipulation commands Lab (6 hours, lab)**

    A. Subdirectories and file manipulation
    B. Special names and wildcards
    C. Understanding permissions, including access and modifications

**V. Shell programming (12 hours, lecture)**

    A. File processing
    B. System user interface
    C. Control Loops
    D. Decision statements
    E. Different types of shells (Bourne, Korn, C)

**VI. Shell programming Lab (12 hours, lab)**

    A. File processing
    B. System user interface
    C. Control Loops
    D. Decision statements
    E. Different types of shells (Bourne, Korn, C)

**VII. System editors (3 hours, lecture)**

    A. vi editor
    B. Emacs

**VIII. System editors Lab (3 hours, lab)**

    A. vi editor
    B. Emacs

**IX. Filtering, formatting, sorting and redirecting program input / output (3 hours, lecture)**

**X. Filtering, formatting, sorting and redirecting program input / output Lab (3 hours, lab)**

**XI. Process control (3 hours, lecture)**

**XII. Process control Lab (3 hours, lab)**

**XIII. Networking Fundamentals (12 hours, lecture)**

    A. User network interface
    B. Server-host schema
    C. Network protocols
    D. Network addressing
    E. Sub-networks

F. Unix network commands

### XIV. Networking Fundamentals Lab (12 hours. Lab)

A. User network interface
B. Server-host schema
C. Network protocols
D. Network addressing
E. Sub-networks
F. Unix network commands

### XV. System administration (12 hours, lecture)

A. Operating system installation
B. User management
C. Hardware and software management
D. System maintenance and services
E. Configuring the kernel
F. System Security

### XVI. System administration Lab (12 hours, lab)

A. Operating system installation
B. User management
C. Hardware and software management
D. System maintenance and services
E. Configuring the kernel
F. System Security

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| **Total Lecture Hours:** | 54 |
| **Total Laboratory Hours:** | 54 |
| **Total Hours:** | 108 |
| **Primary Method of Evaluation:** | 2) Problem solving demonstrations (computational or non-computational) |
| **Typical Assignment Using Primary Method of Evaluation:** | You are given a class B IP Address of 169.33.0.0 and you need to create a network with at least 20 subnets and at least 100 hosts in each subnet. Answer the following questions (answers may vary): a) What subnet mask will you choose? b) State the IP addresses to be assigned: 1) the IP address of each subnet. 2) the IP address of the first host in each subnet. 3) the IP address of the last host in each subnet. 4) the IP address of the broadcast address in each subnet. c) How many IP addresses are in an entire subnet (including the subnet address and the broadcast address)? |
| **Critical Thinking Assignment 1:** | Give a line-by-line description of each of the following shell scripts. The first line is done as an example in each case. Print telnet windows to show what happens when they are executed. The name of the script is in parens (name.sh). These scripts are in /usr/cs40sh directory. Add additional comments as requested. (echo1.sh) 1.a) echo "cat" display cat on the screen_____ echo "tails" _____ echo "hurt" _____ (echo2.sh) 1.b) echo "cat\c" display cat, cursor on same line__ echo "tails" _____ echo "hurt" |

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| | _____ Explain, in a sentence or two, why 1a differs from 1b. (echo3.sh) 1.c) echo -n "$1 _____ echo "$2" _____ Run echo3.sh with two words on the command line. Explain, in a sentence or two, how and why the -n option affected the output. |
| **Critical Thinking Assignment 2:** | Write a Shell script system called phonesys that will maintain entries in a user's phonebook. Keep track of how you designed the shell script system. What worked? What did not? What new lessons did you learn by creating phonesys? After answering these questions, write a clear and substantive paragraph describing not only how you designed your phonesys shell script system, but why you tried the things you did. |
| **Other Evaluation Methods:** | Completion, Laboratory Reports, Matching Items, Multiple Choice, Other Exams, Quizzes, True/False |
| **Instructional Methods:** | Lab, Lecture |
| **If other:** | |
| **Work Outside of Class:** | Problem solving activity, Required reading, Study |
| **If Other:** | Programming |
| **Up-To-Date Representative Textbooks:** | Richard Blum and Christine Bresnahan.  Linux Command Line and Shell Scripting Bible.  4th ed.   Wiley, 2021. |
| **Alternative Textbooks:** | |
| **Required Supplementary Readings:** | Kenneth Rosen, Douglas Host, Rachel Klee, and Richard Rosinski. UNIX, The Complete Reference, 2nd ed. McGraw-Hill, 2007.  (Discipline Standard) |
| **Other Required Materials:** | |
| **Requisite:** | |
| **Category:** | |
| **Requisite course(s): List both prerequisites and corequisites in this box.** | |
| **Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).** | |
| **Requisite Skill:** | |
| **Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable** | |
| **Requisite course:** | |
| **Requisite and Matching skill(s):Bold the requisite skill. List the corresponding** | |

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| **course objective under each skill(s).** | |
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| **Enrollment Limitations and Category:** | |
| **Enrollment Limitations Impact:** | |
| **Course Created by:** | Gregory Scott |
| **Date:** | 10/13/1997 |
| **Original Board Approval Date:** | 01/20/1998 |
| **Last Reviewed and/or Revised by:** | Edwin Ambrosio |
| **Date:** | 10/13/2020 |
| **Last Board Approval Date:** | 12/19/2022 |