**UNIX Operating System**

**CS 3240 Fall 2023**

Department of Computer and Mathematical Sciences

New Mexico Highlands University

**Course Instructor**

Patrik Boloz, M.S.

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**Time and Location**

Lecture: Wednesday and Friday: 2:00 PM – 3:15 PM in HSCI 282, Ivan Hilton Science Building, Las Vegas, NM

Lab: Asynchronous through Brightspace

Office Hours: Monday, Tuesday, and Thursday 03:00 PM – 05:00 PM + by appointment in HSCI 293

**About This Course**

Introduction to the UNIX operating system and its interfaces including the file system, shell, editors, pipes, and filters, input/output system, shell programming, program development, and document preparation. Prerequisites: Any programming language or permission of instructor.

**Major Topics**

* History and Standards of Linux
* Fundamental Concepts
* System Programming Concepts
* File I/O
* Processes
* Memory Allocation
* Users and Groups
* Process Credentials
* System Limits and Options
* File I/O Buffering, Systems, and Attributes
* Access Control Lists
* Monitoring File Events
* Signals (Fundamental Concepts, Signal Handlers, Advanced Features)
* Time, Timers, and Sleeping
* Threads (Introduction, Synchronization, Safety and Per-Thread Storage, Cancellation)
* Daemons
* Writing Secure Privileged Programs
* Fundamentals and Advanced Features of Shared Libraries
* Pipes and FIFOs
* Sockets (UNIX Domain, TCP/IP Networks, Internet Domains, Server Design)
* Terminals and Pseudoterminals

**Attendance**

Class attendance and active participation are essential if a student wishes to receive maximum benefit from this class. Material discussed during class and lab times provides the foundation for assignments and evaluations. Not all material discussed during class is necessarily available electronically. If a student is absent, they should obtain any notes from a fellow student present during that time. Any additional course policies (not covered in this syllabus) will be discussed during class/lab time and it is the student’s responsibility to abide by these policies to achieve full credit for coursework completed. Although attendance does help one’s final grade, perfect attendance alone does not guarantee a passing grade.

**Email**

Every attempt will be made to answer e-mail on a 24-hour to 48-hour turnaround basis (during the Monday through Friday week; weekend messages will be responded to during the next scheduled office hour). When sending an e-mail please indicate your name, in which course you are currently enrolled, the problem you are having, and how best to contact you with a resolution.

**Textbooks and other Class Materials**

Required book to read: The Linux Programming Interface: A Linux and UNIX System Programming Handbook / Michael Kerrisk (2010)

Optional book to read: How Linux Works: What Every Superuser Should Know, 2nd Edition / Brian Ward (2015)

The required book will be mandatory to read, and the recommended method is by purchasing a physical copy either through Amazon or the book publishers’ official website. Other materials will be published on Brightspace on the certain classes page. This website can be accessed on this link: <https://nmhu.desire2learn.com/d2l/home>

**Course Requirements**

1. **Regular (daily/weekly) access to NMHU (New Mexico Highlands University) Desire2Learn/Brightspace for this course is expected**
2. **Attendance/Participation is expected.** Each student must attend the class, but in case of emergencies, family problems, athletic events and related travel/activities, and other sudden events, these must be reported to me. In this case, that absence will not count toward the total number of absences through the semester. For grading, the attendance grade is calculated by 100% – total absences\*5. (ex. 100% – 5 absences \* 5 = 75% Attendance Grade)
3. **Homework/Lab Assignments.**
4. **Midterm Exam with a Midterm Assignment**
5. **Final Exam with a Final Assignment** (comprehensive)
6. **Quizzes.** Several quizzes will be scheduled during the semester and will always be announced one class before the Quiz date. Therefore, any absences to be made on the Quiz date must be reported before the start of the class because these Quizzes will NOT be able to be made up on a later date.
7. **Extra Credit Opportunities**. During the semester, there might be extra credit opportunities on quizzes or homework assignments. These extra credits will be able to be applied to reduce the number of absences, get a better grade on a certain quiz, etc.

**Grading**

* **10% Attendance**
* **20% Labs/Homework Assignments**
* **20% Quizzes**
* **20% Midterm Exam and Assignment**
* **30% Final Exam and Assignment**

**Grading Scale**

|  |  |
| --- | --- |
| Grade | Percentage |
| A - Excellent | 100% - 90% |
| B – Above Average | 89.9% - 80% |
| C – Average | 79.9% - 70% |
| D – Below Average | 69.9% - 60% |
| F – Failure, NOT Passing | 59.9% - 0% |

**Homework/Lab Policy**

It is expected that deadlines for programming assignments will be honored. Late assignments will be accepted and assessed. However, point deduction for late assignments will be calculated as follows:

* Less than two days late è 10% reduction in assessed score (potential 100% on the assignment = overall score of 90% for that assignment)
* Less than seven days late è 30% reduction in assessed score (potential 100% on the assignment = overall score of 70% for that assignment)
* More than seven days late è assignment will be assessed but no credit will be given (potential 100% on the assignment = overall score of 0% for that assignment)

All homework assignments will be submitted to Brightspace. If Brightspace is unavailable, the assignment can be mailed to my email address.

No assignments will be accepted without the proper format, listed in the section Homework/Lab Format Policy

**Policy on Collaborations**

Assigned homework/programming assignments are strictly the work of each student. Student collaboration is highly encouraged, especially during Labs, but literal COPYING from another student and/or from the internet means immediate 0% on that assignment. If a paper is submitted as a part of an assignment, an exam, or a quiz, it will be checked for any plagiarism and will NOT be tolerated.

If you and other students work together on an assignment, follow these steps:

1. All parties must indicate in comments (at the top of submitted file) the nature of the collaboration, who was involved, and what was gained by the collaboration.
2. Your assignment cannot be a copy of your collaborator’s work. Copy and paste techniques are a part of Computer Science but not while learning the basics. I will be looking for any signs of serious copying from other students.
3. If student A credits another student B and copies student B’s code without student B’s knowledge, this will be seen as plagiarism and will be punished by the terms and regulations to their highest extent from the Academic Affairs Department at NMHU.

To collaborate without issues, learn from each other by discussing ideas, designs, and solutions. The implementation of the assignment should be your own work!

**AI Chatbot Policy**

With the rise of AI chatbots like OpenAI, Azure AI, ChatGPT, and others, the amount of submitted assignments utilizing these chatbots rose as well. Intellectual honesty is vital to an academic community and for my fair evaluation of your work. All work submitted in this course must be your own, completed in accordance with NMHU’s academic regulations. You may not engage in unauthorized collaboration or make use of ChatGPT or other AI composition software. Students must obtain permission from me before using AI composition software (like ChatGPT) for any assignments in this course. Using these tools without my permission puts your academic integrity at risk.

**Homework/Lab Format Policy**

All programming or other assignment submission should include the following on the first lines of your assignment file as comments. Example python source file:

# CS 3240 – UNIX Operating System

# Boloz, Patrik

# Lab 1/Homework 1

Your submitted assignment files should be named to include your last name, first initial followed by homework/lab assignment number as demonstrated below. DO NOT USE SPACES IN FILE NAMES!

Example file name: bolozp-hw1.py / bolozp-hw1.pdf / bolozp-hw1.zip

bolozp-lab1.py / bolozp-lab1.pdf / bolozp-lab1.zip

**Policy and Rules for Computer Lab Use**

Computer lab use policy consists of the following rules and policies listed below. Any person found violating computer lab rules or policies may lose their lab privileges.

* NO food or drink at computer workstations
* NO disruptive behavior
* NO moving the lab equipment and/or cables
* NO illegal copying of ANY materials
* NO installation of any personal software or any other software not approved by the instructors
* NO use of the workstations for any other purpose than educational (gaming, watching movies, etc.)
* NO sharing of the passwords to anyone outside of the Computer Science Department
* Keep sound levels to a minimum
* The labs are for NMHU Computer Science students, staff, and faculty ONLY. We reserve the right to refuse access to anyone outside of the department
* Students using the workstations during classes have priority to use the lab. Students conducting undergraduate/graduate research have second priority.
* By using the workstation, you are responsible for the equipment so handle with care! If there are any software/hardware issues with the workstations, report the issue to the first available Lab Assistant, Teaching Assistant, or Faculty.

The password to access the workstations and the lab itself will always be provided by a faculty member during the first weeks of the semester or whenever the password gets updated. This policy can be updated throughout the semester and will always be visible on the door of the lab or on any other visible space. If you require an additional copy of the policy, please contact any faculty member of the Computer Science Department.

**Disabilities Accommodations (ADA Policy)**

In accordance with federal law, it is university policy to comply with the Americans with Disabilities Act (ADA). If you believe that you have a physical, learning, or psychological disability that requires an academic accommodation, contact the Coordinator of Disability Services by phone at **(505) 454-3250**, via e-mail at [**camille@nmhu.edu**](mailto:camille@nmhu.edu), schedule a Zoom appointment, or visit Room 250 of the Lora Shields building on the Las Vegas campus. If you need the document upon which this notice appears in an alternative format, you may also contact the Coordinator of Disability Service.

**HU-CARES Information**

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you are encouraged to contact the Center for Advocacy, Resources, Education, & Support (HU-CARES) located in the Student Union Building at 800 National Ave in Suite 328.  If you have questions or need to speak to someone regarding a concern, please call HU-CARES at **505-454-3445** or email [**leonbustos@nmhu.edu**](mailto:leonbustos@nmhu.edu). HU-CARES can support you in various ways, regardless if you want to report to police or not. **All services are confidential, student-centered, and free for all NMHU students, including center campuses**.

Additional resources available to you include:

* Student Health Center Main Campus-(Counseling) 505-454-3218
* HU-CARES After-Hours Crisis Line 505-795-3665 (Available 24/7)
* Campus Police 505-454-3278
* NMHU Dean of Students 505-454-3020
* Director of Compliance and Title IX Coordinator 505-454-3363; 505-429-6888; [TIX@nmhu.edu](mailto:TIX@nmhu.edu)
* NM Crisis & Access Line (Professional Counselors available 24/7) 1-855-662-7474

*Center students are encouraged to contact HU-CARES for resources near the center campuses.*