This page contains the syllabus for Problem Solving with Supercomputers for Fall 2016. "The course syllabus contains important information regarding course requirements and the grading system utilized. It is the responsibility of the students to read the syllabus and consult the instructor if they have questions." (from UNC Undergraduate and Graduate Catalogs)

CS 460/560 - Problem Solving with Supercomputers - 3 credits
Fall 2016

Class meeting time and location: Tuesdays and Thursdays, 3:30am - 4:45pm in Kepner Hall 0075
All class material is accessible through Blackboard.

Instructor: Mehrgan Mostowfi, Ph.D. (mer-gone mos-tow-fee)
Department: Accounting and CIS, Monfort College of Business
Office location: Kepner Hall 0095C
Office hours: Tuesdays and Thursdays, 1:00pm - 2:00pm and Wednesdays, 12:00pm - 3:00pm, or email to schedule an appointment.
Email: mehrgan.mostowfi@unco.edu

Prerequisites: One of the following:
- CS 101 - Intro to Computer Science with a grade of "B" or higher,
- CG 120 - Computer Programming with a grade of "B" or higher,
- Instructor's permission granted if you demonstrate knowledge of general programming concepts and a structured programming language.

Textbook: There is no required textbook for this class. The recommended textbooks for Linux administration are Linux Bible, by Christopher Negus, and Fedora 11 and Red Hat Enterprise Linux, by Christopher Negus and Eric Foster-Johnson. There will be assigned readings to complement the lectures.

Catalog course description: Basics of Linux administration and scripting in an HPC environment. Utilizing an HPC cluster to plan and carry out a significant research project.

Course objectives: As a result of successfully completing this course, students will:

1. Be able to perform basic Linux administration tasks including:
   1. Viewing the contents of a file or directory,
   2. Viewing blocks, HDD partitions, processors, etc.
   3. Converting, compressing and decompressing, copying and moving files and directories
   4. Knowing machine name, OS and kernel, and viewing the command history
   5. Changing file permissions and ownership
   6. Installing, updating and maintaining packages
   7. Changing environment variables.
2. Understand High Performance Computing concepts, principles, and techniques,
3. Understand distributed memory programming and will be able to compile and run simple MPI programs,
4. Have gained experience in practical solution development within the framework of a High Performance Computing Cluster.

Course topics: This course will cover the following topics:

- Week 1 (August 22 – August 28): Introduction - Linux and HPC Basics
- Week 2 (August 29 – September 4): Linux and HPC Basics, Accessing the HPC Cluster, Shell Architecture
- Week 3 (September 5 – September 11): Basic Linux Commands, Special Characters, More advanced Commands
- Week 4 (September 12 – September 18): Managing Running Processes, Writing Shell Scripts
- Week 5 (September 19 – September 25): Writing Shell Scripts, Exam 1
- Week 6 (September 26 – October 2): Writing Shell Scripts, Compiling and Running Programs on the Cluster
- Week 7 (October 3 – October 9): Message Passing Interface (MPI)
- Week 8 (October 10 – October 16): Message Passing Interface (MPI)
- Week 9 (October 17 – October 23): Message Passing Interface (MPI)
Week 10 (October 24 – October 30): Project Design, Exam 2
Week 11 (October 31 – November 6): Project Design and Implementation
Week 12 (November 6 – November 12): Project Implementation
Week 13 (November 13 – November 19): Project Implementation
Week 14 (November 20 – November 26): Project Implementation
Week 15 (November 27 – December 3): Project Implementation
Week 16 (December 4 – December 10): Project demo on the Final Exam time slot

Grading: Students will earn a grade based on exams and a project. The grade breakdown is:

- Exams: 40% - Two exams, held in-class. **Graduate students will be asked to solve additional exam problems beyond what is asked of undergraduates.**
- Project: 60% (See below for more details about the project)

The grading scale is "no worse than" as below:

- A = 90.00% through 100% and above
- B = 80.00% through 89.99%
- C = 70.00% through 79.99%
- D = 60.00% through 69.99%
- F = Less than 59.99%

Project:

- **Undergraduate:** You will be given a list of generic projects to choose from. All the requirements of the project you choose must be developed and presented. Your project will be graded based on the quality of the developed parts, the effort and time you put in and overall project progress, plus clarity and quality of code and other documents generated.
- **Graduate:** You need to propose a project, preferably in your field of research, by the 5th week of class. You are encouraged to work closely with a faculty advisor from your program who could guide you in the field-specific parts of the project. Your project proposal needs to be approved by me and your faculty advisor. Your final project grade will be determined jointly by both of us.

Course policies:

- I expect you to make sure your UNCO email works and check your email regularly. Email will be the main means of communication between you and me. Not having checked your email will not be accepted as an excuse for missing due dates or other important information and announcements.
- If you must submit work late you need to talk to me at least one-week before the due date in question. Otherwise, **late work cannot be accepted except in cases of verifiable emergencies.**
- Attending class is mandatory and very important. I may choose to track attendance.
- We will be observing all university policies regarding religious holidays and disabilities. Any student requesting disability accommodation for this class must inform the instructor giving appropriate notice. Students are encouraged to contact Disability Support Services (www.unco.edu/dss) at (970) 351-2289 to certify documentation of disability and to ensure appropriate accommodations are implemented in a timely manner.
- Incomplete ("I") grades will only be given in the case of severe hardship including verifiable medical emergencies or legal troubles. Simply being "overloaded" and unable to complete your work is not grounds for an "I" grade.
- Out of courtesy to other students please make sure that you turn off, or place in silent mode, your cell phone.

**Academic Integrity/Academic Dishonesty:** I expect students to be honest and not cheat on their assignments and exams. The exams must be completed without giving or accepting assistance from other students. Any source code copied from another source must be credited as such. Open source software used must maintain all headers and other information as required by the open source license used. I expect you to know the University's policies on student conduct, academic dishonesty, etc. UNC's policies and recommendations for academic misconduct will be followed. For additional information, please see the Dean of Student's website, Student Handbook link and current catalog.

*Every part of this syllabus is subject to adjustment as the semester progresses. Please contact me as soon as possible if you have particular interest in material that is relevant to the class topic but not covered in enough detail; I will be happy to accommodate reasonable requests for modifications.*

Last update on October 4, 2016