<div align="center">

COMP330 - Operating Systems and Networking

Spring 2017

Syllabus

</div>

Course Description

Operating systems design and implementation. Topics include overview of components of an operating system, mutual exclusion and synchronization, implementation of processes, scheduling algorithms, memory management, and file systems. Net-centric computing, network architectures; issues associated with distributed computing. Laboratory work focuses on UNIX Operating Systems

Course Objectives:

Upon completion of this course the student should be able to:

- Explain the objectives and functions of modern operating systems.
- Describe the need for concurrency within the framework of an operating system.
- Summarize the various approaches to solving the problem of mutual exclusion in an operating system and describe reasons for using interrupts, dispatching, and context switching to support concurrency in an operating system.
- Explain conditions that lead to deadlock and discuss the types of processor scheduling such as short-term, medium-term, long-term, and I/O.
- Discuss the need for preemption and deadline scheduling.
- Explain the concept of virtual memory and how it is realized in hardware and software and summarize the principles of virtual memory as applied to caching, paging, and segmentation. .
- Analyze the various memory portioning techniques including overlays, swapping, and placement and replacement policies.
- Summarize the full range of considerations that support file systems.
- Compare and contrast different approaches to file organization, recognizing the strengths and weaknesses of each.
- Defend the need for protection and security, and the role of ethical considerations in computer use.
- Summarize the features and limitations of an operating system used to provide protection and security.
- Compare and contrast current methods for implementing security.
- Compare and contrast the security strengths and weaknesses of two or more currently popular operating systems with respect to recovery management.
- Discuss the fundamental ideas of public-key cryptography and how it works and distinguish between the use of private- and public-key algorithms.
- Describe the responsibilities of the layers of the ISO reference model.
- Describe client-server paradigm, naming and name binding, name servers, addressing and address resolution, routing and routing algorithms.

Credits : 3

Lectures and Lab: Mondays, Wednesdays, & Fridays   1.30 – 2.20 pm

Instructor : Martin Dwomoh-Tweneboah

      Office : Renshaw 209

      Office Phone : 2426   E-mail : mdwomoh@linfield.edu

      Office Hours : Daily 3:00 - 5:00PM or by appointment.

Text(Required) : **Siberschatz & Galvin**, *Operating System Concepts Essentials;* John Wiley

Text(Optional) : **Nemeth, Snyder & Hein,** Linux Administration Handbook, 2/E ; Prentice Hall

Note: The textbook serves as reference material. You should read the assigned chapters. We will not go through the text chapter by chapter as done in some disciplines. You are strongly advised to read the assigned chapter as the quizzes will be drawn from the textbook.

GRADING

Grading for this course will be based on quizzes, assignments, exams and the deliverables for a course project. Because this course is an upper-level course, the standards by which you are assessed and the grading scale used are more rigorous than those in lower division courses.

Grading is based on the following:

Assignments	30%
Quizzes.	25%
Midterm I	20%
Midterm II	25%

Grading Scale:

95 – 100	A
90 – 94	A-
85 – 89	B+
80 – 84	B
75 – 79	B-
70 – 74	C+
65 – 69	C
60 – 64	C-
50 – 59	D
Below 50	F

ASSIGNMENTS

General Information

- Several short homework assignments will be given throughout the semester.
- Homework assignments will be posted on the course website.
- Except for occasional supplementary materials, hard copies of the assignments will not be provided.
- It is your responsibility to check the course web site for any materials relating to the course and to keep track of upcoming assignments, quizzes and midterms.
- Homework is due at the beginning of class on the due date.
  - You are expected to have completed the assignment before you arrive in class.
  - You will have a 30-minute window after the class during which you may turn in your assignment with no penalty.

Assignment Management

The Bachelor of Science Computer Science major focuses on decision-making skills, oral and written communications, the values and uses of information systems, project development and completion via teams, competency in a programming language and application development, familiarity with systems analysis and design, the completion of a systems development project and the use of the computer as a tool, hence a thorough understanding of the various platforms and operating systems.

The curriculum is designed to produce graduates ready to function in the computer industry with the competencies, skills, and attitudes necessary for success in the workplace or graduate school. It forms the basis for continued career growth, life-long learning as a computer professional or a future graduate program. Among other important skills for administrators and managers are time management and resource allocation. Specifically, appropriate attention to time management and resource allocation will aid you in meeting task deadlines with available resources. These skills will be important to your success in administration or management and to your success in this degree program. This syllabus describes course assignments and defines assignment due dates. Your effective use of time management and resource allocation will be key in meeting the assignment deadlines for both individual and study group assignments. From my own experience, I offer the suggestion that your time management plan include time for yourself and your academic work.

Late Assignments

In the general case, late assignments will not be accepted for grading. ALL ASSIGNMENTS MUST BE SUBMITTED IN CLASS ON THE DUE DATE. If you know you must be absent from a class session, you should take appropriate steps to ensure that your assignments are delivered on or before the scheduled due date and time. I will not accept any excuse for late delivery. In addition to submitting a hard copy, you must keep electronic copies of all assignments in a folder in your home directory on nova.

Assignment Format
Written assignments should be submitted, typed on 8-1/2 x 11 paper, one sided only, stapled in the upper left corner, and should be done neatly so that it is: (a) easy to grade, and (b) useful as a study aid. Assignments submissions that do not meet minimal standards for acceptability in the workplace (completeness, neatness, readability, etc.) will be returned ungraded. .

QUIZZES
Some class meetings will include a short quiz. These quizzes are conducted during the class meeting and at times as take-home. Quiz questions will often be selected from or derived from the questions found at the end of the assigned chapters and readings. I will not give make-up exams and quizzes.

ATTENDANCE
Attendance is mandatory.

COURSE MATERIALS
All course materials, announcements, assignments, etc., can be found on Blackboard at http://bblearn.linfield.edu. It is your responsibility to check the web page on regular basis for course materials and due dates.

EXTRA CREDIT POLICY
There will not be any extra credit in this course. There are a lot of assessment exercises in this course for you to catch up with areas you don't perform well. Therefore, don't bank on extra credit to improve your grades.

MISSED CLASSES
It is your responsibility to make arrangements to obtain materials distributed on class days when you miss a class. This can be done through contacting a classmate who was present or by contacting me during my office hours or other times. Missed or late quizzes cannot be made up under any circumstances but with good cause and adequate notice, an early quiz may be given.

ACADEMIC HONESTY
Cheating and plagiarism will not be tolerated. Any student found to be engaging in either of these activities at any point in the course will receive a failing grade for the entire course and may be subject to further college sanctions.

CLASSROOM AND GROUP DISCUSSIONS
Study groups are highly recommended for a course of this kind. However, copying someone's work for presentation will be treated as academic dishonesty. Active involvement of each student in class discussions and exercises are essential. Class attendance and active participation are expected and required in this course. Absences or lack of participation generally reduces a learner's aggregate point score and thus may affect a learner's final grade.

We must assume that we are all persons of intelligence and good will who are here to learn from each other in a team environment. Group discussions should not be a forum to impose our ideas on others. For the academic endeavor to succeed, we must treat each other with civility, courtesy and respect. Software development involves team work and all contributions by group members should be discussed and analyzed thoroughly.

PREPARATION FOR EACH CLASS
- Read the text chapter assigned per schedule.
- Visit the companion Web site on Blackboard and review the topic objectives and other materials, complete online study guide quizzes, and review other materials.
- Make note of any questions you may have to pose during class or via e-mail.
- Browse the PowerPoint presentation for the topic.
- Take notes in class.

DIFFICULTIES
If you find you are having problems with the class – the use of the software package, case tool, attendance, keeping up with the reading, fitting into a group, please let me know. I am always available to help you, but I have to know about the problem while it's going on and before the end of the course. The last few weeks to the end of the course is not the best time to ask for help.

STUDENTS WITH DISABILITIES

Students with disabilities are protected by the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. If you are a student with a disability and feel you may require academic accommodations please contact Learning Support Services (LSS), as early as possible to request accommodation for your disability. The timeliness of your request will allow LSS to promptly arrange the details of your support. LSS is located in Melrose Hall 020 (503-883-2562).

Students with documented disabilities who may need accommodations for taking quizzes and tests, who have any emergency medical information I should know of, or who need special arrangements in the event of an evacuation, should make an appointment with me as early as possible, no later than the second week of the semester.

CELL PHONE USAGE, EMAIL AND WEB BROWSING

All cell phones should be turned off during lectures. Unless otherwise instructed, all applications, including browsers and emails must be closed during lectures.

COURSE SCHEDULE

Topics to be covered

Overview of operating systems: Role and purpose of the operating system; history of operating system development; functionality of a typical operating system

Operating system principles: Structuring methods; abstractions, processes, and resources; concepts of application program interfaces; device organization; interrupts; concepts of user/system state and protection

Introduction to concurrency: Synchronization principles; the "mutual exclusion" problem and some solutions; deadlock avoidance

Introduction to concurrency: States and state diagrams; structures; dispatching and context switching; the role of interrupts; concurrent execution; the "mutual exclusion" problem and some solutions; deadlock; models and mechanisms; producer-consumer problems and synchronization

Scheduling and dispatch: Preemptive and nonpreemptive scheduling; schedulers and policies; processes and threads; deadlines and real-time issues

Memory management: Review of physical memory and memory management hardware; overlays, swapping, and partitions; paging and segmentation; placement and replacement policies; working sets and thrashing; caching

File systems: Files: data, metadata, operations, organization, buffering, sequential, and nonsequential files. Contents and structure of directories. Partitioning, mount/unmount, virtual file systems. Naming, searching, access, backups

Security and protection Overview of system security. Policy/mechanism separation. Security methods and devices. Protection, access, and authentication . Models of protection

Networking:

- Introduction to net-centric computing: Background and history of networking and the Internet; network architectures; the range of specializations within net-centric computing
- Introduction to networking and communications: Network architectures; The ISO 7-layer reference model in general and its instantiation in TCP/IP issues associated with distributed computing; simple network protocols; APIs for network operations