Syllabus – EGR 226 – Operating Systems and Networking

Purpose of the Course:

The Operating System manages the computer hardware. It schedules programs and executes processes, allocates available resources to processes, and tries to protect processes from unwanted access. In this course, we will look at the major pieces of an OS: what they do and how they do it. We will program some key pieces of an OS, look at the design decisions of common operating systems in use, and examine in detail two important attributes: networking and security.

Course Meeting Times and Location:

Lecture: 226A: T/R 12:15-1:45pm, 226B: T/R 2:00-3:30pm

Instructor:

Professor Benjamin Sanders, MS.

Office Hours: TEGR 335, TEGR 335, M,W: 7:30am – 9:30am. T,R: 6:45am – 8:45am.

Pre/co –requisites:

EGR 222

Required Materials:

Textbook: Operating System Concepts, Silberschatz, Galvin and Gagne.

Slides - http://codex.cs.yale.edu/avi/os-book/OS9/slide-dir/

Bibliography (for additional reading and reference; these are <u>not</u> required):

Kevin Fall, *TCP/IP Illustrated, Volume 1: The Protocols,* Addison-Wesley Professional, 2011. ISBN-13: 9780321336316.

CBU's College of Engineering Mission Statement:

"Preparing engineering students of competence and character, with a Christian worldview who are called to serve, equipped to lead and sent to engage the world with their lives and the appropriate use of technology."

General Course Objectives

Students who successfully complete EGR226 will be able to:

- ✓ describe the overall structure and function of a modern operating system (1);
- ✓ understand and use processes and threads (11);
- ✓ describe concurrency and synchronization issues in an OS (5);
- ✓ describe the management of memory, files and I/O (1);
- ✓ understand computer and OS security, including current threats (6);
- ✓ list the levels of the TCP/IP protocol stack and give examples at each level (8);
- ✓ perform basic network programming (5); and
- ✓ understand basic network hardware devices and their function (11).

As part of the Software Engineering and Computer Science majors, this course addresses the following CBU College of Engineering overall Student Learning Objectives:

1. An ability to apply knowledge of mathematics, science, and engineering.
5. An ability to identify, formulate and solve engineering problems.
6. An understanding of professional and ethical responsibility.
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Class preparation

It is the general policy that the student will contribute a minimum of two hours of preparation time for each one hour of class time.

CSDS Rules of conduct:

As college students and soon-to-be professionals, your conduct around your peers and your professor are expected to be polite, respectful and non-distracting. In particular, this means the following:

- No use of cell phones in class (for calls, texting, browsing, gaming, playing music or any other function)
- No use of any computer for a non-class related purpose (taking notes is OK, working on homework, gaming or browsing is not)
- Earphones are not allowed during any class sessions.
- Do not record the lecture without permission.
- No talking or other behavior that might distract another student
- No treating another class member or the instructor with disrespect
- No submitting late work via email (or any other method) pleading for consideration

For each violation of any of the above guidelines, five points will be deducted from your overall grade for the course

Late assignments

- Late assignments **WILL NOT BE ACCEPTED**.
- Assignments are submitted via Blackboard through any terminal that is connected to the Internet.
- Students are encouraged to submit assignments early; do not wait until the last possible moment to submit assignments.
- There are no acceptable excuses for the assignments being late.

Attendance

- Students are required to attend all class sessions.
- If a student decides to drop the course, it is their responsibility to do so by submitting a Drop Form to the registrar's office.

- The instructor cannot drop a student from a class.
- If the course is not properly dropped, the student will receive an "F" as the final grade.

Points will be allocated for class participation for each class meeting.

- A student cannot participate in any class discussion if they are not present;
  - therefore, zero participation points are issued for the session(s) missed.
- Participation is not limited to classroom discussions, but includes inquires about assignments, techniques, best practices deploying solutions, and participation with respect to **in-class and external-class assignments submitted**.

Class Preparation

- Students are expected to prepare for each assignment prior to the class which presents the topic.
- There will be in class discussions and demonstrations.
  - Demonstrations are not the sole responsibility of the instructor, but from time to time individuals and teams will be required to demonstrate a technique.
- Plan to spend approximately six hours each week working on reading, reviewing, homework, and laboratory assignments to obtain a grade of "C" in this course.

Exams

The midterm and final exams will be cumulative. At the professor's discretion, students may be exempt from the final exam.

If a student has an excused absence for a test, they will need to arrange an alternative date to take the exam with the instructor.

Academic Dishonesty

- Academic dishonesty, as explained in the student handbook HONOR CODE policy, **WILL NOT BE TOLERATED**.
- Each student should become familiar with those offenses identified in the student handbook.
- A failing grade in the course will result from offenses identified as "cheating," especially the misrepresentation of assignments.
- ***All course work is the sole responsibility of the student***. Work performed by a student other than the name appearing on the assignment turned in, will be considered misrepresentation for **both** students for the assignment. At a minimum, a failing grade for the assignment and potentially the course will result from any incident of academic dishonesty.

- Students are expected to uphold the school's standard of conduct relating to academic honesty.
- Students assume full responsibility for the content and integrity of the academic work they submit. The guiding principle of academic integrity shall be that a student's submitted work, examinations, reports, and projects must be that of the student's own work.
- Students shall be guilty of violating the honor code if they:
  1. Represent the work of others as their own.
  2. Use or obtain unauthorized assistance in any academic work.
  3. Give unauthorized assistance to other students.
  4. Modify, without instructor approval, an examination, paper, record, or report for the purpose of obtaining additional credit.
  5. Misrepresent the content of submitted work.

- The penalty for violating the honor code is severe. Any student violating the honor code is subject to receive a failing grade for the course and will be reported to the Office of Student Affairs and Provost. If a student is unclear about whether a particular situation may constitute an honor code violation, the student should meet with the instructor to discuss the situation.

It is permissible to assist classmates in general discussions of computing techniques. General advice and interaction is encouraged. Each person, however, must develop his or her own solutions to the assigned projects, assignments, and tasks. In other words, students may not "share solutions" on graded assignments. Such collaboration constitutes cheating. A student may not use or copy (by any means) another's work (or portions of it) and represent it as his / her own. If help on an assignment is needed, contact the instructor; do not seek solutions from other classmates.

Classroom Behavior

Disruptions

Any acts of classroom disruption, that go beyond the normal rights of students to:

- question and discuss the instructor's educational process or outside relative subject content,
- ingress and egress the classroom on time, or
- conduct normal communication

will not be tolerated. (see Student Life Policy described in the Student Handbook).

Children in class

The University does not provide childcare for the dependents of students, faculty, or staff. Students are not permitted to be accompanied by children / dependents during class sessions. (NOTE THE CHILDCARE (BABY-SITTING) POLICY IN YOUR STUDENT HANDBOOK.)

APPEALS POLICY

To appeal a grade, send e-mail to your instructor's e-mail address within two weeks of the grade having been received. Overdue appeals will not be considered. For final course grade the use the normal CBU appeals process.

INCOMPLETE POLICY

Students will not be given an incomplete grade in the course without sound reason and documented evidence as described in the Student Handbook. In any case, for a student to receive an incomplete, he or she must be passing and must have completed a significant portion of the course.

DISABILITIES POLICY

In compliance with the Americans with Disabilities Act (ADA), all qualified students enrolled in this course are entitled to "reasonable accommodations." Please notify the instructor during the first week of class of any accommodations needed for the course.

TUTOR ASSISTANCE

Tutors are available in the Academics Resource Center.

SEXUAL HARASSMENT & TITLE IX POLICY

Review the Sex Discrimination, Sexual Violence & Sexual Harassment section of the Student Handbook. All offences will be reported.

Student Handbook: http://www.calbaptist.edu/explore-cbu/offices/office-registrar/academic-catalogs/undergraduate/
Academic Catalog: http://www.calbaptist.edu/explore-cbu/offices/office-registrar/academic-catalogs/undergraduate/
Calendar: https://insidecbu.calbaptist.edu/ICS/Academics/Academic_Calendars.jnz

Evaluation

Homework assignments and projects
Students are allowed to have group discussions on requirements and algorithms of the problems in your assignments. You are also allowed to use sample code in the textbook or code given by the instructor as templates. **However, copying your classmate's (or anyone else's) code will be considered as academic dishonesty and a violation of the University's Honor Code.** Homework assignments will be submitted via Blackboard. Specific requirements for each assignment will be stated at that time.

Graded Item	Percentage
HW and ICA's	40%
Midterm	30%
Final	30%
	100%

Grades will be assigned on the following basis:
A 93-100% A- 90-92% B+ 87-89% B 83-86% B- 80-82%
C+ 77-79% C 73-76% C- 70-72% D+ 67-69% D 63-66% D- 60-62% F below 60%

Some Key Points to Remember:

- On homework assignments and projects, you must submit your own program! To do otherwise is an Honor Code violation! Be very careful when sharing ideas; do not use anyone else's source code!
- When communicating with me by email, you must put "**EGR 226**" in the subject line.
- To keep up with the material, read the relevant section of the textbook before each lecture.

Date	Lecture	Reading	Topic	Due
26-Jan	1	OS/Ch 1	Computer Systems Overview	
28-Jan	2		Hard-Disk Check Out and Configuration	
2-Feb	3	OS/Ch 2	Operating Systems Overview	
4-Feb	4	OS/Ch 3	Processes and Process States - Process Control	HW1
9-Feb	5		OS Execution and Security	
11-Feb	6	OS/Ch 4	Threads; Multithreading	HW2
16-Feb	7		Threading in Windows, Linux and Mac OS	
18-Feb	8		Concurrency and Mutual Exclusion; Message Passing	HW3
23-Feb	9	OS/Ch 7	Deadlock; Concurrency in UNIX, Linux and Windows	
25-Feb	10		Memory Management, Partitioning and Paging	HW4
2-Mar	11	OS/Ch 9	Virtual Memory	
4-Mar	12		Virtual Memory in Unix, Linux and Windows	HW5
9-Mar	13	OS/Ch 6	Scheduling - Uniprocessor	
11-Mar	14		Multiprocessor Scheduling; Scheduling in Modern OS	
16-Mar	15		Midterm	
18-Mar	16	OS/Ch 13	I/O Management; I/O Devices	
23-Mar	17	OS/Ch 11&12	File Management and Organization	
25-Mar	18	OS/Ch 14	File System Security; Files in Modern OS	HW6
30-Mar	19	OS/Ch 15	Security Threats; Malware, Viruses and Rootkits	
1-Apr	20	NW/Ch 1	Introduction to Network Protocols; the TCP/IP Stack	HW7
6-Apr	21		Application Layer	
8-Apr	22		Transport Layer	HW8
13-Apr	23		Sockets; Networking in Linux	
15-Apr	24		Network Layer	HW9
20-Apr	25		Network Architecture (LAN and WAN)	
22-Apr	26	NW/Ch 3	Link/Physical Layer	HW10
			Final TBD	

Search me, O God, and know my heart; Try me, and know my anxieties; And see if there is any wicked way in me, And lead me in the way everlasting.

Psalm 139:23-24

1.	11.	21.	31. .....
2.	12.	22.	32. .....
3.	13.	23.	33. .....
4.	14.	24.	34. .....
5.	15.	25.	35. .....
6.	16.	26.	36. .....
7.	17.	27.	37. .....
8.	18.	28.	38. .....
9.	19.	29.	39. .....
10.	20.	30.	40. .....