

CPS 221 - SOFTWARE SYSTEMS

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Office: KOSC 242 x4377
Hours: MWF 9-10 am; Tu 1:30-4:30 pm
and by appointment

Fall Semester, 2014
MWF 3:20-4:20 pm
Lab: Tu. 9:45-12:45 pm
(beginning 9/2)

Course Site: Blackboard site + <http://www.cs.gordon.edu/courses/cps221>

PREREQUISITE: CPS122 or familiarity with Java

CATALOG DESCRIPTION:

Introduces fundamental software systems: operating systems, computer networks, database management systems. Common concerns such as concurrency and security. Continued development of design and programming skills using Java through weekly laboratories. Prerequisite: CPS122 or familiarity with Java.

COURSE OBJECTIVES:

TEXT: Custom ebook. Purchase at <http://create.mcgraw-hill.com/shop/>. Under “Looking for new materials?”, choose ISBN in the drop down and then search for 9781308257495. After double-checking that you have found the current version (last updated in 2014) of the text, you can purchase a copy for download onto your computer.

Hailperin, Max. *Operating Systems and Middleware*. (Free pdf - see Blackboard site)

Casad, Joe. *Teach Yourself TCP/IP*. (5th ed) (Indianapolis: Sams, 2012)

ON BLACKBOARD: link to *JDBC API Tutorial and Reference*

“Reflections on Trusting Trust” *Communications of the ACM* 27.8 (August, 1984) pp. 761-763

COURSE TECHNIQUES AND PROCEDURES

Readings in the text or supplementary material are assigned for every class, which you are expected to read before class. Class sessions will include a discussion and amplification of the material in the text and the presentation of further examples and supplementary material. You should not expect to grasp everything presented in the text when you first read it; however, you should note areas that are unclear to you and be prepared to raise questions about them in class. You will further develop your understanding of the material by doing homework problems and through weekly laboratories.

COURSE REQUIREMENTS AND EVALUATION:

1. You will be expected to do textbook/reserve material reading as assigned in the schedule below. (Reading assignments should be completed BEFORE the class hour in which the topic is discussed, as specified in the schedule below.) However, our classroom discussion will not rigidly follow the order of material in the text, nor will it be confined to material covered there.
2. Eleven homework sets will be distributed during the semester, and will be due as shown in the course schedule. Solutions to each set will be discussed in class on the due date and/or posted outside the professor's office door or on Blackboard after the set is turned in. Credit for homework sets will be awarded on the basis of the completeness and correctness of your solutions, with significant credit given for a reasonably complete attempt at solving each problem, even if the final answer is not correct. Homework will account for 30% of the final course grade. The tentative emphases of the various homework sets are as follows (*subject to change.*)

<u>Set</u>	<u>Emphases</u>
1	Operating System Functions and History
2	Threads and Scheduling
3	Critical Sections
4	Deadlock
5	Processes and Protection; Operating System Structure; Virtual Machines
6	Network Architecture
7	The Physical and Data Link and Network Layers
8	The Transport, and Application Layers; The Client-Server Model; Cloud Computing
9	Introduction to Database Management Systems; The Relational Data Model
10	Relational Database Design and Creation; ACID Transactions
11	Security; Encryption; Secure Programming

The following guidelines should be observed when doing these homework sets

- Homework sets will be due at the start of class on the date indicated. Late homework sets will **NOT** be accepted.
 - Homework sets must be done on one side only of 8-1/2 x 11 paper, and pages must be stapled in problem-number order. Problems must be numbered, and final answers (where appropriate) should be highlighted. (Homework sets not conforming to these standards will be returned ungraded.)
 - You may work together with another student on homework, provided each of you works on each problem.
3. Weekly laboratories will focus on gaining practical experience with the material covered in the book and/or in lecture. Lab assignments will be posted on Blackboard ahead of time, and **must** be read over carefully **before** coming to lab. In some cases, you will be explicitly directed to study certain material in preparation for the lab. For most laboratories, there will be a writeup to turn in. There may also be a quiz given at the start of the lab hour (based on your reading of the lab assignment and any assigned pre-lab preparation) and/or a quiz based on the work done in lab given at the start of class on the due date. Labs will account for 30% of the final course grade).

The following are the tentative emphases for the lab sessions (*subject to change*):

<u>Lab</u>	<u>Emphasis</u>
1	The Unix Command Line
2	Unix Shell Scripting
3	Threads in Java
4	Semaphores and Message Passing
5	Synchronization and Deadlock
6	Operating System Installation
7	Network Configuration
8	Packet sniffing
9	Sockets
10	Remote Method Invocation
11	A Database-Driven Web Site
12	SQL Use
13	JDBC
14	Encryption

- 4.. There will be two hour exams given as shown in the course schedule, plus a final exam. The first hour exam be worth 13% of the final course grade, the second will be worth 9%, and the final exam will be worth 18%. Each exam will assume familiarity with material in the text, covered in lecture, and/or used in homework problems or labs. Exams will be open book (course text only), open notes.
5. Your final grade will be computed on the basis of a weighted sum of the items listed above.

Summary:	Homework Sets	30%
	Labs	30%
	Exams	<u>40%</u>
		100%

The following are minimum guaranteed grades for the percentages indicated:

	93% - 100%: A	90% - 92.9%: A-
87% - 89.9%: B+	83% - 86.9%: B	80% - 82.9%: B-
77% - 79.9%: C+	73% - 76.9%: C	70% - 72.9%: C-
67% - 69.9%: D+	63% - 66.9%: D	

POLICY STATEMENT ON EXTENSIONS AND INCOMPLETES:

1. Extensions of the due dates for homework or projects will be given in the event of extenuating circumstances (such as illness, personal emergency) **IF** you submit a brief written request to the professor as soon as possible after the circumstances arise. This request will be initialed (if approved) and will be returned to you. You must attach it to the piece of work for which the extension was granted.
2. A grade of Incomplete will be given without penalty **IF** you are unable to complete the course work by the last day of the term due to major illness or other similar emergency. Again, a written request should be submitted. Such a request will only be granted if you are substantially up-to-date with your course work and were making good progress in the course up to the time that the difficulty arose. Of course, you must complete all work for the course by the midpoint of the next semester in accordance with College policy.

3. A grade of Incomplete with a penalty of one letter grade to be applied in the final grade computation MAY be given if you are unable to complete all the course work for reasons other than those noted above. You must make a written request, and your progress in the course, class attendance etc. will be taken into consideration in determining whether to grant it. Again, you must complete all work for the course by the midpoint of the next semester.

ATTENDANCE POLICY:

Regular class attendance is expected of all students, and class attendance will be recorded. Absences from class will be classified as “documented” or “undocumented”. A documented absence is one where written documentation is submitted supporting an absence from class due to circumstances beyond the student’s control. An undocumented absence is any other absence, including one which could qualify as documented if proper documentation were submitted.

Students who have more than three absences (of any kind) during the semester should expect to see their final grade reduced by 1% for the lesser of the number of undocumented absences and the total number of absences over 3, and students who have more than 12 undocumented absences will fail the course automatically. Note that it is not necessary to document absences unless there are more than three total absences; for most students, this will avoid the need to submit documentation. A student who anticipates the need to miss more than three classes due to athletic competitions or other student activities should review the college’s attendance policy on page 36 of the catalog, and should then discuss alternatives to class attendance with the professor at the start of the semester.

A student who is habitually late will have late arrival for class counted as a half absence for that class, and a student who sleeps through most or all of a given class session will be counted as absent for that class.

You may ask the professor to waive this policy for you if you earned an A in the prerequisite course, or if you have an A average in this course as of the mid-term exam. If you wish to take advantage of this exemption, you must so inform the professor. However, the attendance policy will be reimposed if your subsequent work deteriorates.

STUDENTS WITH DISABILITIES:

Gordon College is committed to assisting students with documented disabilities (see Academic Catalog Appendix C, for documentation guidelines). A student with a disability who may need academic accommodations should follow this procedure:

1. Meet with a staff person from the Academic Support Center (Jenks 412 X4746) to:
 - a. make sure documentation of your disability is on file in the ASC,
 - b. discuss the accommodations for which you are eligible,
 - c. discuss the procedures for obtaining the accommodations, and
 - d. obtain a **Faculty Notification Form**.
2. Deliver a Faculty Notification Form to each course professor *within the first full week of the semester*; at that time make an appointment to discuss your needs with each professor.

Failure to register in time with your professor and the ASC may compromise our ability to provide the accommodations. Questions or disputes about accommodations should be immediately referred to the Academic Support Center. (See also Grievance Procedures in Student Handbook).

TENTATIVE COURSE SCHEDULE

<u>Date</u>	<u>Topic(s)</u>	<u>Reading</u>	<u>Written Work Due</u>
UNIT I: OPERATING SYSTEMS			
W 8/27	Course Introduction; OS Functions and History		Start HW 1
F 8/29	Operating System History (ctd)	Hailperin ch. 1	
M 9/1	<i>(Labor Day - no class)</i>		
W 9/3	Threads	Hailperin ch. 2	LAB 1 DUE
F 9/5	(continued)		HW 1 DUE
M 9/8	Scheduling	Hailperin ch. 3	
W 9/10	(continued)		LAB 2 DUE
F 9/12	The Critical Section Problem	Hailperin §4.1-4.3	
M 9/15	(continued)	Hailperin §4.4-4.6	HW 2 DUE
W 9/17	(continued)	Hailperin §4.8-4.10	LAB 3 DUE
F 9/19	Deadlock	Hailperin §4.7	
M 9/22	(continued)		HW 3 DUE
W 9/24	Processes; Virtual Memory	Hailperin §6.1-6.2; 7.1-7.2	LAB 4 DUE
F 9/26	Protection	Hailperin §7.3-7.6	
M 9/29	Operating System Structure; Virtual Machines	Custom Book ch. 1	HW 4 DUE
UNIT II: NETWORKS			
W 10/1	Introduction to Net-Centric Computing	Casad ch. 1; ch. 17	LAB 5 DUE
F 10/3	Layered Network Architecture	Casad ch. 2	HW 5 DUE
M 10/6	Review and Catch up		
W 10/8	HOURLY EXAM I - UNIT I		LAB 6 DUE
F 10/10	The Physical and Data Link (Network Access) Layers	Casad ch. 3, ch. 9	
M 10/13	The Network Layer	Casad ch. 4; ch. 5; ch. 8 just pp. 127-141	HW 6 DUE
W 10/15	(continued)	Casad ch. 10 just pp. 177-192; skim ch. 12-13	LAB 7 DUE
F 10/17	<i>(Quad Break - no class)</i>		
M 10/20	The Transport Layer	Casad ch. 6	
W 10/22	The Application Layer; The Client-Server Model; Web 2.0; Web Services	Casad ch. 7; skim chapters 18-22; Hailperin § 10.1,10.3,10.4	LAB 8 DUE
F 10/24	(continued)		HW 7 DUE
M 10/27	Cloud Computing	Casad ch. 23	

UNIT III: DATABASE MANAGEMENT SYSTEMS

W 10/29	Introduction to Database Management Systems	Custom Book ch. 2	LAB 9 DUE
F 10/31	(continued)		HW 8 DUE
M 11/3	Review and Catch Up		
W 11/5	HOOR EXAM 2 - UNIT II		LAB 10 DUE
F 11/7	The Relational Data Model	Custom Book ch. 3	
M 11/10	(continued)		
W 11/12	Relational Database Querying and Updating	Custom Book ch. 4	LAB 11 DUE
F 11/14	(continued); JDBC	JDBC ebook linked from Blackboard - ch 2 through §2.8	HW 9 DUE
M 11/17	Relational Database Design and Creation		
W 11/19	(continued); ACID Transactions	Hailperin §5.1-5.2.1	LAB 12 DUE
	UNIT IV: SECURITY		
F 11/21	Encryption	Custom Book ch. 6	
M 11/24	(continued)		HW 10 DUE
W 11/26;	<i>Thanksgiving Break (no class)</i>		
F 11/28			
M 12/1	Introduction to Security	Custom Book ch. 5; Hailperin ch. 11	LAB 13 DUE
W 12/3	(continued)	"Reflections on Trusting Trust" (on Blackboard)	LAB 14 DUE
F 12/5	Secure Programming	Custom Book ch. 7	
M 12/8	(continued)		
Tu 12/9	<i>In the rest of the world, today is a Tuesday - but - by administrative decree, at Gordon, today is a Thursday, so no lab</i>		
W 12/10	Review and Catch up		HW 11 DUE

Wed., Dec. 17 - 2:30-4:30 pm - Final Exam (Comprehensive, with focus on Units III-IV)