DeVRY UNIVERSITY

Course Syllabus **Fall 2006**

Course Title:	Operating **Systems and Interfacing With Lab**
Course number:	CET421
Credit/Contact hour:	4-2-5
Course Dependency:	**Prerequisite:** CET375 **Required Co-requisite**: (none)
FTP Site:	`ftp://n0gsg.no-ip.org; I:\TWHEELER\` ***Note: Examples developed in class can be accessed here.***
Instructor:	Tom Wheeler twheeler@kc.devry.edu 816.941.0430 x5211
Office Hours:	**Monday 12-12:50 PM, Tuesday 10-10:50 AM, Thursday 10-10:50 AM**

Course Description

Topics in this course include process states and synchronization, multiprocessing, multiprogramming, processor scheduling, resource management strategies, static and dynamic relocation, virtual memory, logical and physical input/output (I/O), device allocation, disk scheduling and file management. In the lab the student develop software and hardware extensions and device drivers for Windows and UNIX.

Textbooks and Materials

Textbook/s Title:	Ed	Author
WIN32 SYSTEM SERVICES	3	Brain/Reeves
WINDOWS 2000 CORE TECHNOLOGIES	CURR	Tittel/Stewart

Terminal Course Objectives (TCOs):

Following are the objectives for this course. Individual faculty, based upon their experience and expertise may add to these objectives to meet local campus needs. Any such additions will be communicated to the class. While the instruction remains focused in helping students, accomplishing these objectives is a shared responsibility of students and faculty. The outcomes of this course will depend upon the motivation and capabilities of the students, sufficient time allocation for studying, and the effectiveness of that effort.

DeVry University is committed to the continual improvement of its curriculum and instruction and to meet the needs of students and employers in a rapidly changing global economy. Students, faculty, and the university must all be actively involved to accomplish these objectives, as well as the objectives of this particular course.

Every class is to some extent a unique interactive experience, which may cause some variance within the stated objectives, in either content or level. Individual faculty, based on their experience and expertise, are encouraged to add objectives, as they deem appropriate, and to communicate these directly to the class. The outcomes of the course will depend on the design of the course, the quality of instruction, and the motivation and capabilities of the students, including time available for studying and the effectiveness of the effort.

1...Given a contemporary operating system, such as Windows NT/2000 or Unix, analyze its internal structure specifying its major software components and their interrelationships.
2...Given contemporary operating systems, such as Windows NT/2000 and Unix, and a business or technical software/hardware configuration, such as an e-commerce server, compare and contrast the performance and scalability of each operating system.
3...Given the specifications for a complex hardware/software configuration, such as a data acquisition and analysis system, analyze how the features and performance of Windows NT/2000 or Unix operating systems satisfy the specification requirements.
4...Given a contemporary operating system, such as Windows NT/2000 or Unix, compare and contrast the approach used by each operating system towards information, computer and network security.
5...Given a business or technical application, such as a high-performance cluster of engineering workstations used in a design environment, that requires multiprocessing and distributed capabilities, compare and contrast the approach and performance of Windows NT/2000 vs. Unix.
6...Given an I/O hardware device, such as a hard disk, illustrate the approach used by Windows NT/2000 and Unix to provide an interface between the device and the rest of the computer and relate this interface to specific portions of the operating system kernel.
7...Given a high-performance file system, such as the NTFS (NT File System) used by Windows NT/2000 and the ext2 file system used by Unix (Linux), compare and contrast the approaches used by each operating system to implement the file system and its software interface to the operating system.
8...Given a simple hardware device, such as a serial port interface, and a hardware platform on which the device operates, select an optimal operating system in which the development of a driver for the device will be most efficient in terms of development time and cost.
9...Given a timing-critical application, such as a high rate data acquisition system, and a hardware/software system, select an optimal development environment in which the development of a driver for the device will be most efficient in terms of development time, ease of use and cost.
10...Given a simple hardware device, such as a parallel port interface, a hardware/software system and a development environment, develop a hardware driver for the device that meets specified performance criteria.
11...Given a simple hardware device, such as a serial port interface, a hardware/software system and an inefficient or flawed device driver for the device, select an appropriate environment and debug or optimize the driver.

How this Course helps in Achieving Your Program's Objectives:

The following matrix illustrates how this course supports achievement of your Program Objectives.

CET421	Assessment Outcomes																							
Lecture	*Testing* & Instrumentation					*Create/Implement Programming*				*Hardware/Software Design, Implem, & Eval*						*Writing Speaking*		*Team*		*Research Prob. Solv*		*Tech./Society Linkages*		
TCOs	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	3.5	3.6	4.1	4.2	5.1	5.2	6.1	6.2	7.1	7.2	7.3
1										X														
2	X									X										X				
3										X														
4										X														
5						X	X			X	X									X				
6						X	X			X	X													
7										X														
8						X	X	X	X	X	X	X	X							X	X			
9										X										X				
10						x	x	x	X	X										X	X			
11	X	X	X						x	X										X				

EET/CET Program Objectives and Outcomes:

(Student competencies achieved at the time of graduation)

1. Conduct experiments involving electronic systems using modern test equipment, interpret test results and use them to improve products or methodologies.
   - 1.1. Performs Needs Analysis define the problem
   - 1.2. States goals and objectives of the experiment
   - 1.3. Identifies resources to conduct experiment (parts, equipment, data sheets, etc.)
   - 1.4. Develops a procedure and collect data using modern test equipment
   - 1.5. Analyzes test results and draw conclusions.

2. Create, implement high-level and Assembly language programs in support of technical activities.
   - 2.1. Analyzes the problem logically
   - 2.2. Designs the solution
   - 2.3. Implements the solution
   - 2.4. Tests and debugs the software

3. For EET: Use the principles of science, mathematics, and engineering technology to design, implement, and evaluate hardware and software solutions to complex technical problems,
   - 3.1. Selects and defines a meaningful problem taking safety, ethical, social, economic, and technical constraints into consideration.
   - 3.2. Devises process to solve problem
   - 3.3. Applies appropriate knowledge of scientific, mathematical, and engineering design tools toward the design and analysis of problem solutions.
   - 3.4. Identifies key issues in designing and building a prototype
   - 3.5. Builds, tests and troubleshoots prototype
   - 3.6. Optimizes prototype with a commitment to quality, timeliness, and continuous improvement.

For CET: Use the principles of science, mathematics, software engineering, and engineering technology to design, implement, and evaluate software solutions to complex technical problems.
   - 3.1 Identifies a meaningful problem and defines preliminary solution specifications taking safety, ethical, social, economic, technical constraints, and user requirement into consideration
   - 3.2 Designs and implements appropriate data structures and algorithms
   - 3.3 Prepares a plan of action to implement the system
   - 3.4 Applies scientific, mathematical, software, and engineering design tools toward the design and analysis of problem solution
   - 3.5 Writes and tests readable and maintainable code
   - 3.6 Optimizes code with a commitment to quality, timeliness, and continuous improvement

4. Communicate effectively both orally and in writing.
   - 4.1 Communicates effectively in wiring
   - 4.2 Communicates effectively orally

5. Work effectively in a team environment.
   - 5.1 Exhibits good dialoguing skills
   - 5.2 As part of a small group project, when assigned roles, performs roles effectively

6. Apply applied research and problem-solving skills to support learning at DeVry as well as life-long personal and professional development.
   - 6.1 Recognizes the need to know information beyond one's own expertise and has the ability to gather and synthesize the necessary information into the solution of a problem
   - 6.2 Uses engineering problem-solving methodology in solving problems

7. Evaluate the broader effects of technology and to identify connections between technology and economics, politics, culture, ethical responsibility, social structure, the environment and other areas.
   - 7.1 Identifies linkages and causal relationships between technology and social, political, economic, cultural, and environmental conditions.
   - 7.2 Works effectively in diverse environments and adapts technical solution to solution a diverse audience
   - 7.3 Pursues technical work within guidelines for professional, ethical, and social responsibility

Class Policies and Procedures:

Attendance

Each student is required to attend every lecture and laboratory session in which he or she is enrolled. A swipe-card terminal (ATS) in each classroom is used to record attendance electronically. Students are responsible for arriving before class begins, sliding their identification card through the wall-mounted reader, and remaining for the duration of the course meeting. Students who are absent for two or more days should notify their Professor or assigned Academic Advisor in advance. Students who miss more than five (5) consecutive days of school are in violation of the DeVry attendance policy and will be dismissed. ***Unexcused absence in excess of 5 hours will result in a reduction of the final course grade by one letter***.

Homework

Homework is due at the beginning of class (xx00 UTC). ***Late homework is not accepted***. Homework carries the weight of one major exam (100 points) in the course. Failure to do homework will do severe damage to your grade. (UTC=Universal Coordinated Time, or Standard World Time.)

Homework will be kept in a 3-tab folder, with the latest assignment in front. Your name, the course number, and the instructor's name must appear in clearly-readable form on the front of the folder.

Laboratory Reports

Laboratory reports in this course are formal. See the Laboratory Schedule for details of laboratory due dates and report contents. In order to receive credit for a completed laboratory experiment, you must have a sign off on the cover page of your laboratory report. Laboratory reports are expected to be of your own original composition; see the Academic Integrity Policy of this syllabus. ***Laboratory reports are accepted up to one week late, with a 5 point deduction in score for each day late. Reports more than one week late are assigned a grade of zero***.

Make-Up Exams

No make up exams are given in CET421 for any reason.

Course Grading Standards

There are 3 major exams, an unspecified number of quizzes given at random intervals, various homework assignments, and a final examination given in the 15th week of the course. Your grade will be determined as follows:

2 Highest Major Exams ..... total 200 points
Quizzes/Homework .....Normalized to 100 points
Labs.....Normalized to 100 points
Final Exam.....150 points

550 points total for course

Note: The lowest of the three major exams is "dropped" and does not count in the final grade calculation. No makeup exams are given. All examinations will be announced at least 1 week prior to administration. All students must take the final exam. A passing grade in lecture and laboratory is necessary in order to pass the course.

A final letter grade is to be awarded to each enrolled student in accordance with the 4.00 grading system shown below:

Letter Grade	*Percent of Total Points*	*Grade Points*
A	90 - 100%	4.00
B	80 - 89%	3.00
C	70 - 79%	2.00
D	60 - 69%	1.00
F	Below 60%	0.00

Academic Integrity Policy

Ideas and learning form the core of the academic community. In all centers of education, learning is valued and honored. No learning community can thrive if its members counterfeit their achievement and seek to establish an unfair advantage over their fellow students. The academic standards at DeVry are based on a pursuit of knowledge and assume a high level of integrity in every one of its members. When this trust is violated, the academic community suffers injury and must act to ensure that its standards remain meaningful. The vehicle for this action is the Academic Integrity Policy outlined in the *Student Handbook*.

The Academic Integrity Policy is designed to foster a fair and impartial set of standards upon which academic dishonesty will be judged. All students are required to read, understand, and adhere to these standards, which define and specify the following mandatory sanctions for such dishonest acts as copying, plagiarism, lying, unauthorized collaboration, alteration of records, bribery, and misrepresentation for the purpose of enhancing one's academic standing:

- The ***first recorded offense*** will result in the student receiving zero credit for the entire paper, exam, quiz, lab, homework assignment, or other graded activity in which the incident of academic dishonesty occurred. No partial credit may be given. Where the incident involved a graded assignment normally subject to a "drop" option, the student may not exercise that option.

- The ***second recorded offense*** will result in the student receiving a failing grade for the course in which the second offense occurs. The second offense need not be in the same course, program, or term as the first offense to invoke this sanction.

- The ***third recorded offense*** will result in the student being permanently expelled from the DeVry system. Again, the third offense need not be in the same course, program, or term as either the first or second offense to invoke the sanction.

All assignments you turn in for this course (coding, homework, laboratory, or other assignments) are expected to be your own original efforts. Do not share your work with other students. If you quote from an outside source, you must properly acknowledge the source of the information using MLA or APA style. The following sites have examples of proper usage for these styles:

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http://owl.english.purdue.edu/owl/resource/557/01/
http://owl.english.purdue.edu/owl/resource/560/01/
http://www.apastyle.org
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Changes to Syllabus:

The contents of this syllabus are subject to change with appropriate notice to the students.

Tentative Course Schedule

Note: Chapters in Brain & Reeves are noted by "BR;" chapter assignments in the Tittel text are marked "ET."

Weekly Course Schedule:

Week	Topics	TCOs	Reading Assignment
1	Comparative Operating System Architectures	1,2,3,4	BR: Preface "A Tour of the Linux Filesystem, Parts I & II" Part I: http://www.linux-mag.com/2000-06/newbies_01.html Part II: http://www.linux-mag.com/2000-07/newbies_01.html
2	Win32 Components Overview	1	BR: Chapter 1 ET: Chapters 1,2
3	Files, Drives, and Directories	6,7	BR: Chapters 2,3,4 ET: Chapters 6,7
4	Registry	1,3	Library / Internet - Perform independent research on the topic. BR: Chapter 21 ET: Chapter 3
5	Exam #1		
6	Processes and Threads	5	BR: Chapter 6 ET: Chapter 4
7	Synchronization: Events	5	BR: Chapter 7 Events Example (FTP Site)
8	Synchronization: Critical Sections & Mutexes	5	BR: Chapter 7 Library / Internet Dining Philosopher's Problem Magic Array Example (FTP Site) Thread-Safe Stack Example (FTP Site)
9	Exam #2		
10	Interprocess Communications	8,10,11	BR: Chapter 2 Section 11 -- File Mapping BR: Chapter 7 Section 5 -- Overlapped I/O BR: Chapter 8 Section 3 -- Mailslots
11	Communications	4	BR: Chapter 11 -- Serial Communications BR: Chapter 8, TCP & UDP Communications
12	Win32 Services & Device Drivers (Overview)	5,9	BR: Chapter 12 ET: Chapter 5 "Beep Service" Example (FTP Site)
13	Exam #3		
14	Review	10	"Minimal Device Driver" (FTP Site)

Please note: We will use MSDN (Microsoft Developer's Network) extensively during this course. It is the definitive collection of Windows APIs, and it's freely available online at msdn.com (don't bother installing MSDN onto your computer; the live website will be much more up-to-date.)