The mission of the School of Information, Technology, and Computing is to provide students with the highest quality education possible in the ever-changing high-tech arena, and to establish within them a foundation of faith from which they can lead and serve in world-changing ways.

Course Description
An introduction to operating system design and use including processes, threads, multiprogramming, resource management including scheduling and memory, and synchronization.

Goals for Student Competency
After completing this course a successful student should be able to:

- Describe the objectives and constraints of operating systems, including performance and security
- Explain rational behind design solutions to maximize objectives within constraints
- Identify and explain common policies for resources managed by an OS, including: memory, processes, threads, synchronization, devices, and files
- Write programs using advanced operating system services, such as asynchronous I/O, inter-process communication, or process synchronization primitives
- Create multi-threaded solutions which avoid deadlock and improve throughput

Format
The following topics will be presented and discussed in approximately the order listed. Relevant reading will be assigned from the book and/or online sources.

- Introduction: multiprogramming, OS overview, architectural constraints
- Devices: security, abstract resources, polling v. interrupts, overlapped I/O
- Processes: threads, state, scheduling policies
- Synchronization: shared memory, critical sections, high-level solutions, inter-process, deadlock prevention
- Memory management: address space, shared memory, virtual memory

Learning requires participation in learning activities such as reading the assigned material, attending meetings, cogitating on assignments, writing programs and discussing programs. Homework, requiring several hours outside of class each week, will regularly be reviewed in class. This means your code (possibly without identification) may be viewed by the class for discussion. Code-reviews, as a form of peer feedback, are subject to both the positive and negative aspects of peer pressure. We will apply Christian principles to insure the process is constructive and not detrimental to the author.

Prerequisites
Credit for CS220, a grade of C or higher. Proficiency with assembly language is highly recommended.

Text and Supplements
http://www.itc.acu.edu/towell/356
Course Requirements
Programming projects and other homework will require several hours outside of class each week. You are encouraged to seek help from your classmates, other classes, lab mentors, your instructor, other faculty or anyone else. The best way to receive feedback and suggestions from your instructor is to submit work, even work in progress. Printed submissions receive better feedback due to the medium available.

Written exams will be used to assess student ability. Three written exams will be scheduled during the semester; they are likely to occur during week 5, 10 and finals week. The final exam will be comprehensive.

Submissions
All email submissions must conform to the following requirements, unless specifically instructed otherwise:
• sent from your ACU email account,
• subject must begin with CS356,
• sent to dwayne.towell@acu.edu,
• graded content to be attached as a name beginning with your username (e.g., det04b_assign1.zip), and
• files contained in archive formats, such as .zip files, should be named beginning with your username.

Programs you submit may be used to study how students learn and progress in computer science classes. The goal of this work is to better understand and improve upon current computer science education and assessment practices. No personally identifying information will be used toward this end. If you have any questions, please contact Dr. John Homer (john.homer@acu.edu) or Dr. Dwayne Towell (dwayne.towell@acu.edu).

Grading
Your grade will be assigned based on the instructor’s judgment according to the following criteria:

A grade of A indicates the student’s work consistently demonstrates initiative, ingenuity, and outstanding quality. It represents a comprehensive understanding of the material and an ability to apply it in new circumstances. The student is ready to learn independently and mentor others.

A grade of B indicates the student’s work regularly demonstrates initiative, ingenuity, and follows acceptable standards. It represents a comprehensive understanding of the material and the ability to apply it. The student may be ready to learn independently but could benefit from continued mentoring.

A grade of C indicates the student’s work occasionally demonstrates initiative and regularly is acceptable. It represents an ability to apply the material in typical situations. The student has a minimally acceptable understanding of the material and could easily benefit from continued mentoring.

A grade of D indicates the student’s work is professionally unacceptable. It represents an ability to apply some of the course material. The student needs additional mentoring to reach mastery of the material.

A grade of F indicates the student’s work is unacceptable and indicates a fundamental lack of understanding of the course material. The student needs additional mentoring to reach mastery of the material.

It is your responsibility to convince the instructor of your abilities with respect to the criteria outlined above. One method for convincing the instructor of your abilities is to perform well on exams. Your minimum grade is determined by your work using the following scale:
• Final average ≥ 90% A
• Final average ≥ 80%, but < 90% B
• Final average ≥ 70%, but < 80% C
• Final average ≥ 60%, but < 70% D
• Final average < 60% F

Your final average is computed according to the following formula:
exam1×15% + exam2×15% + final×30% + projects×35% + participation/quizzes×5%

Written exam grades are determined by dividing correct points by the total points possible. Project grades are assigned based on the criteria outlined above. Project grades may be challenged within one week of receiving the assigned grade. A challenge must be in writing and will be followed by an interview with the instructor.
The other method of convincing the instructor of your abilities is to demonstrate them under informal conditions. To receive the maximum benefit for your effort, your work should be presented with appropriate reflection describing how and what you learned from the project.

**Students with Disabilities**
If you have a documented disability and wish to discuss academic accommodations, please feel free to contact your instructor or the ACU Student Disability Services Office (part of Alpha Academic Services).

**Attendance**
Attendance is expected. Research demonstrates a positive correlation between attendance and course performance. In this class, respectful participation is encouraged. If you miss class, you must take responsibility for your absence. Being responsible means you inform your instructor as soon as you know you will be absent (this almost always means before missing class). Being responsible also means you should obtain notes and information missed as the result of any absence. Students with more than 6 absences are subject to being dropped from the class.

**Missed Exams**
Exams may not be retaken. Grades for exams missed due to university excused absences or unavoidable and documentable circumstances beyond your control, such as serious illness or death in your immediate family, will be replaced by your final exam grade.

**Respect**
You are expected to respect yourself and those you meet. For example, propriety in dress is expected and required. Similarly, disable things that beep since a learning environment should be free of distractions and interruptions that prevent concentration. Even if the interruption is extremely important to you, it is not important to those around you and is a distraction. Failure to show respect may negatively impact your final grade.

**Academic Integrity**
Violations of academic integrity and other forms of cheating, as defined in the university Academic Integrity Policy, involve the intention to deceive or misrepresent. They are, therefore, a form of lying and represent actions contrary to the behavioral norms that flow from the nature of God. Alleged violations will be addressed as described in the policy. While the university enforces the policy, the most powerful motive for integrity and truthfulness comes from one’s desire to imitate God in her/his life. Every member of the faculty, staff, and student body is responsible for protecting the integrity of learning, scholarship, and research. The full policy is available for review at the campus life website (http://www.acu.edu/campusoffices/campuslife).

Students found guilty of an act of academic dishonesty in this course will be subject to the following actions. A first violation will result in: a negative score for the full value of the work submitted; no make-up or retake will be allowed; appropriate offices will be notified. A second violation will result in: an F in the course and a recommendation of immediate suspension from the university.

**Disclaimer**
The author(s) warrants, represents, and verifies that the above syllabus is true and correct to the best of the authors’ current knowledge and/or belief, based on currently known and/or publicly available facts and/or information available at the time of authorship. The author(s) reserves the right to alter, change, or otherwise modify the above syllabus in the somewhat likely event of a change of such facts and/or information, including, without limitation, the author's good faith belief that such change is warranted, advisable and/or permissible (under applicable federal, state or local laws, or any applicable administrative policy of the university, college, school or department) under the newly existing and/or prevailing circumstances and/or conditions. No free range buffalos or other animals were injured in the making of this syllabus. Made from 100% recycled bits. This legal disclaimer (hereafter referred to as the legal disclaimer) has been furnished free of charge. The author of this legal disclaimer (The Honorable DET, Jurisprudent) provides it with no written or implied guarantee. Use at your own risk. Etc., etc. and so on.
Honor Code
ACU College of Business Administration

Objective
COBA faculty, staff and students will strive to proclaim in their lives competence, character and community. In joining COBA, students, faculty, and staff covenant to abide by the following ethical principles.

Competence
To lead and serve well requires competence. And to become competent requires diligence and hard work. We owe it to all who have prepared the way and who will follow in our footsteps, to be good stewards of opportunities and resources. Thus, in all you do: set priorities, seek excellence and professionalism in your work, satisfy requirements, and take responsibility for your learning and performance. You cannot build competence if you lie, cheat, steal, or tolerate those who do.

Character
A reputation of good character is built slowly through testing, yet can be destroyed in an instant by compromise or careless work, just as it can through injustice. Guard your character; it is worth more than a grade or promotion. “A good name is more desirable than great riches; to be esteemed is better than silver or gold” (Proverbs 22:1). You cannot build character if you lie, cheat, steal, or tolerate those who do.

Community
A spirit of fellowship and mutual encouragement holds each community member accountable. Accountability leads to a healthy community through adequate preparations for the tasks at hand, respectful truthfulness in all situations, and adding value to the tasks at hand. As a community, we must hold each other accountable to the principles of competence, character, and community. You cannot build community if you lie, cheat, steal, or tolerate those who do.

We support ACU’s Academic Integrity Policy (www.acu.edu/campusoffices/studentlife/documents/Acad_Integ_Policy_Fa.pdf). This important policy offers examples of academic infractions and a process for assigning consequences and voicing appeals. Ignorance of this policy is never an excuse. Individual instructors will define course specific definitions, however, in general you should avoid:

1) Plagiarism - Copying or even paraphrasing words or ideas from another source (including current or past students) without giving adequate credit.
2) Lying - Inventing data or sources or making false attributions about the origin of material or offering a deceptive reason for an absence or delay in the completion of academic work.
3) Cheating - Facilitating or participating in any process that circumvents the intent of any exam, test, quiz, paper, or assignment.

Any dishonest act observed or reported will be investigated and if proven, be reported in administrative offices and records, and may be subject to any or all of the following outcomes based on severity:

1) A zero for the assigned work
2) A failing grade for the course
3) Dismissal from the university

Ratified by Faculty: 11/18/2004