Data Communications and Networking

Course Description
Areas studied include principles of computer-based communication systems, analysis and design of computer networks and distributed data processing.

Learning Objectives
This course is intended to provide students with broad understanding of advanced concepts in networking technologies, protocols, and applications. Upon completion of the course, a student will have:

1. In-depth understanding of packet transmission mechanisms and their performances
2. Knowledge about advanced packet routing and datagram forwarding mechanisms.
3. Knowledge how all internetworking protocols work together to support an internet and corresponding network services
4. Understanding in advanced internetworking techniques and protocols
5. Understanding of advanced application layer protocols
6. Knowledge regarding various overlay networks

Major Course Requirements

Regular completion of all reading, homework, and other outside assignments, are absolutely essential for success in this course. We will follow the text generally, but non-text material may also be included in the lectures. Except the final exam, all the assignments and the exams will be given during the class hours. You are responsible for all material presented or handed out during a class period.

Your course grade will be decided on your performance in the homework assignments, two mid-term exams, one project, and a final exam. The distribution of points is as follows:
1. Assignments: 25%
2. Paper: 15%
3. Three exams: 60% (exam 1: 20%, exam 2: 20%, and exam 3: 20%)

Assignments: Approximately five-six assignments will be given. Partial credit will be given for incomplete assignments. Assignments will significantly build on the material from the lectures. They will be posted on the course web page or hard copies will be handed out in the class.

Paper: The paper can be a survey paper or a research paper. An in-class presentation is also required for the paper. All papers must be approved by the instructor. Additional details on
the paper will be available later. The final research paper or survey paper will be due on May 7, 2013.

**Exams:** The first exam will be given on February 27, 2013, the second exam will be given on April 8, 2013, and the third exam will be given on the last day of the class during the scheduled class time.

**Required or Recommended Readings**


*Website:* will be announced in the class.

**List of Supplies:** None

**Course Policies**

**Attendance/Tardiness**

You must attend all classes. You are responsible for any materials covered or handed out or announcements made for the tests, quizzes, and homework assignments in your absence. Records of your attendance will be maintained and reported to the university. Students found missing classes without the instructor's permission will be automatically withdrawn from the course. Students are responsible for all materials covered in class and assigned. Should a student be absent from class, it is his/her responsibility to get the notes, etc. for that missed class. More important, should there be assignments, it is the student’s responsibility to obtain such assignments. No excuse will be accepted for assignments not turned in because the student was absent when it was due.

**Late Work and Make-up Exams**

All the assignments are due at the beginning of the class on the due date. If the student is absent on the assignment due date, it is the student's responsibility to make sure that the assignment is submitted on the designated date. An assignment that is turned in after the class on the due date is considered one day late. There is a penalty for late submissions. Late assignments will be counted 20% off for each day after the due time. No credit will be given if an assignment is submitted after 5 days. If you have not completed your assignment by the due date, you should submit the work you have done for partial credit. No work will be accepted once the graded work has been returned or the solution has been disclosed to the class, except for unusual circumstances.

Exams must be taken on the hour they are scheduled. In the event, if you cannot attend the class to take the exam due to some emergency or some unavoidable situation (such as serious illness, death in the family, participation in university
sports, religious observations, and so on) you must notify me as soon as possible before the exam and also you must validate your absence by providing me a document (e.g., with a letter from your doctor).

**Extra Credit**

None

**Cell Phone/Electronic Device Usage**

Set your cell phone/electronic device in silent mode when you are in class.

**Academic Integrity/Plagiarism**

University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a score of 0 (zero) for the work or dismissal from the course and the Dean of Students office will be notified. No copying from another student's work, of any class, is allowed. It is the student's duty to allow no one to copy his or her work. Anyone found cheating in the exams will receive an automatic F for the course.

**Dropping a Class**

I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. April 12, 2013 is the last day to drop a class with an automatic grade of “W” this term.

**Preferred methods of scholarly citations**

All referenced material used in a paper or project report must be properly acknowledged and cited. Use APA style for all scholarly citations.

**Grade Appeals**

As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as
outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at http://www.tamu.cc.edu/provost/university_rules/index.html. For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

Disabilities Accommodations

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Driftwood 101.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.
| Week 1 | Introduction and Overview, Chapter 1: Foundation  
Network architecture, Internet Architecture, Performance |
|--------|--------------------------------------------------|
| Week 2 | Chapter 2: Getting Started  
Error detection, Internet checksum algorithm, cyclic redundancy code,  
reliable transmission, stop-and wait, sliding window, frame order and flow control |
| Week 3 | Chapter 2: Getting Started (cont’d)  
Ethernet, Wireless, physical properties, collision avoidance, distribution  
system frame format, Bluetooth, Cellular phone technologies |
| Week 4 | Chapter 3: Internetworking  
Topics: Switching and bridging, datagrams, virtual circuit switching, source routing;  
Exam 1 |
| Week 5 | Chapter 3: Internetworking (cont’d)  
IP, subnetting, datagram forwarding, ARP, DHCP, ICMP, virtual networks |
| Week 6 | Chapter 3: Internetworking (cont’d)  
Routing, distance vector, RIP, Link state routing protocol, OSPF, performance |
| Week 7 | Chapter 4: Advanced Internetworking  
Global Internet, Interdomain routing, IPv6, multicast, MPLS, VPNs, routing among mobile devices |
| Week 8 | Chapter 5: End to end protocols  
UDP, TCP  
Exam 2 |
| Week 9 | Chapter 5: End to end protocols (cont’d)  
TCP (cont’d), RTP, RPC |
| Week 10 | Chapter 5: Congestion Control  
TCP congestion control  
Congestion avoidance mechanisms |
| Week 11 | Chapter 9: Applications  
HTTP, SMTP, Web services, multimedia applications |
| Week 12 | Chapter 9: Applications (cont’d)  
Common services, DNS, SNMP, overlay networks, |
| Week 13 | Exam 3; Presentations |