Texas A&M–Texarkana

CS 420 – Computer Networks

Course Syllabus

Course Description:

This course provides students with a comprehensive introduction to computer networking concepts, focusing on the OSI and TCP/IP reference models for networking protocols. Topics include network architectures, communication protocols, physical media, error control, data link control, and medium access control. Students will also explore Local Area Networks (LANs), the network layer, congestion control, and an introduction to virtual circuit and datagram networks.

Additionally, the course covers essential networking topics such as IP addressing, routing algorithms, subnetting, and the TCP/UDP protocols. Students will study network design principles, examine network security fundamentals, and explore the impact of emerging technologies on modern networks, such as wireless networks and software-defined networking (SDN).

The course incorporates case studies and hands-on lab assignments that allow students to work with real-world networks, analyzing network configurations, performance, and troubleshooting. Students will gain practical experience in configuring network devices and implementing solutions for common networking challenges.
Prerequisite: CS 332

Instructor:

Dr. Sukrutha Vangipuram, Ph.D., lvangipuram@tamut.edu

Office Room: SCIT 311K
Office Phone: (903) 334-6744

Office Hours: Tue & Thur 11:00 am -1:00 pm,
Office Hours: Tue & Thur 2.15 pm -3.15 pm

Zoom ID: https://tamut.zoom.us/j/6717518168, Passcode: bY8E=#+A

Textbook Required:

Computer Networks, Tanenbaum, Feamster, Wetherall, 6th Edition, Pearson Education Limited.
ISBN 10: 1-292-39406-3
ISBN 13: 978-1-292-37406-2

Lab- Computer Networks with C :

1. Prior knowledge of C required for Lab

Student Learner Objectives

Course Objectives:

- To provide students with a comprehensive understanding of the fundamental concepts of computer networks.
- To introduce students to the layered communication models (OSI and TCP/IP) and familiarize them with the protocols associated with each layer.
- To enable students to grasp the critical functions and responsibilities of each layer within the OSI and TCP/IP reference models.
- To teach students the principles of subnetting and routing mechanisms essential for designing and managing efficient networks.
- To familiarize students with key protocols in computer networks and demonstrate how these protocols are applied in the design, configuration, and implementation of modern network infrastructures.

Course Outcomes:

- Acquire a solid understanding of the foundational technologies and principles of computer networking.
- Gain in-depth knowledge of the OSI and TCP/IP models, including the roles and functions of each layer.
- Develop practical skills in subnetting and routing to optimize network design and management.
- Gain familiarity with essential networking protocols such as IP, TCP, UDP, HTTP, DNS, and others, and understand their application in real-world networking scenarios

Tentative Course Schedule

Week	Chapters	Topics Covered
Week 1 Week 2 Week 3	Chapter 1, 2 & 3	Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet. Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission. Data link layer: Design issues, framing, Error detection and correction.

Week 4 Week 5 Week 5 (1st Day)	Chapter 3	Elementary data link protocols Sliding Window Protocols
Week 5(2ndDay) Week 6 Week 7 Week 8 Week 9	Test I Chapter 4, 5	Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching. Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Ignternetworking, The Network layer in the internet.
Week 10 Week 11 Week 12 Week 13 Week 14	Test II Chapter 6,7 Chapter 8	Transport Layer : Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols. Application Layer: –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video. Network Security
Week 15	Review Left out Syllabus completion and Labs	Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance
Week 16	Test III	END

Assignments and Details

The overall class schedule, assignments, assignment descriptions, due dates, etc. are all found within the Canvas. The entire course is based off the textbook provided where there are 6 parts, and each of the chapters in your book are aligned to these parts.

The book is nearly 1,000 pages. While we will 'cover' all chapters, there is absolutely no expectation that you "read every word" of the book. Guidance will be provided on what sections of the chapters you will be responsible for. Treat it more like a reference guide.

Assignments:

Grades will be based on the timely completion of the homework assignments, attendance and quizzes and exams. The semester grade will be based on the following:

Attendance	5%
Quizzes	15%
HomeWorks	15%
Lab Assignments	15%
Test 1-Mid Term	25%
Test 2-Final	25%
Total	100%

Class Policies:

- **Late work will be accepted with a 25% penalty and should be submitted within 24 hours after the given deadline.**
- All written assignments should contain the student's name, class title, and the title of the assignment on each document submitted.
- Any "extra credit" assignments will be identified and due prior to December.
- Students must be present to receive credit

Course Etiquette:

Email will be the best way to reach me. You can expect a reply from me one weekday. Generally, I reply in less than 24 hours. You are welcome to visit me during my office hours anytime during the semester.

Summary of Assignments

Surprise Quizzes:

Throughout the course, there will be surprise quizzes designed to reinforce key concepts from the textbook. These quizzes will consist of multiple-choice, True/False, matching, and sequence-type questions, and will be based entirely on the course material covered in the textbook. Quizzes will be administered at the beginning of class, typically lasting 10 to 15 minutes, and their timing will be random to encourage consistent preparation.

To ensure that all students have the opportunity to succeed, the final quiz grade will be based on the average score across all quizzes, allowing students to maximize their potential grades.

Homework:

There are 8 homework assignments for every part completion that have various elements to them, some are working out programs based on the chapter, and some are essay questions. These are not scored equally; they are all worth a different number of points and constitute a different percentage of the overall homework grade.

Labs:

Labs are a crucial component of a Computer Networks course, as they provide students with hands-on experience to better understand and apply networking concepts. While lectures introduce theoretical aspects such as network protocols, error control, and network architectures, lab sessions allow students to implement these concepts by writing programs and configuring network devices. Through tasks like implementing TCP/IP protocols, subnetting, and routing, students develop problem-solving skills, gain familiarity with essential network tools, and understand the practical challenges of network design and management. Additionally, labs offer students the opportunity to analyze network performance, troubleshoot issues, and explore the real-world implications of different network protocols. Writing network applications further develops their technical skills, including socket programming and message formatting, essential for creating efficient and reliable networked systems. Overall, labs provide an invaluable opportunity to bridge theory with real-world application, equipping students with the skills necessary for a career in network administration and development.

Application Project Presentations:

As part of this course, you are required to develop an application project that utilizes the concepts and techniques covered in both the lectures and labs. The project should demonstrate your understanding of the topics discussed throughout the semester.

At the end of the semester, prior to Test 3, you will present a demo of your project in class. Your presentation should include a minimum of 10 slides and be designed to last 8 to 9 minutes. This presentation will give you the opportunity to showcase your work and highlight the key features and functionality of your application.

Be sure to prepare thoroughly, focusing on clarity and conciseness, and ensure that you explain how your project aligns with the course content.

Means of Evaluation:

Grades will be based on the timely completion of the following tasks:

- 25% - Test1
- 25% - Test2
- 15% - Quizzes
- 15% - HomeWorks
- 15% - Lab Assignments
- 5% - Attendance

A&M-Texarkana Email Address:

Upon application to Texas A&M University-Texarkana an individual will be assigned an A&M-Texarkana email account. This email account will be used to deliver official university correspondence. Each individual is responsible for information sent and received via the university email account and is expected to check the official A&M-Texarkana email account on a frequent and consistent basis. Faculty and students are required to utilize the university email account when communicating about coursework.

Class Participation:

Students are responsible for beginning their participation on the FIRST CLASS DAY by logging on and completing assignments according to the COURSE CALENDAR. Failure to submit assignments between the first day of classes and the University census date (according to the University schedule) will result in an ADMINISTRATIVE DROP from the course.

Students with federal loans and/or grants:

Students who have federal loans and grants must be aware that participation is monitored in online courses. In the event a student withdraws from a course the student will be required to refund all federal funds prorated from the last date of participation. A student's last access to Canvas would not suffice as participation. The required weekly activity could include a comment to a blog, a discussion board posting, a journal entry, a quiz or exam, a submitted assignment, or other activities.

Academic Integrity:

Academic honesty is expected of students enrolled in this course. Unauthorized collaboration, falsification of research data, plagiarism, and copying or undocumented use of materials from any source, constitute academic dishonesty, and may be grounds for a grade of "F" in the course and/or disciplinary action. The student is responsible for reading and understanding the University Policy on Academic Integrity.

Disability Accommodations:

Students with disabilities may request reasonable accommodations through the A&M-Texarkana Disability Services Office by calling 903-223-3062.

Grading Scale:

A => 90
B => 80
C => 70
D=>60
F <60

Student Technical Assistance:

- Solutions to common problems and FAQ's for your web-enhanced and online courses are found on the Online Student Training page on our website.
- If you cannot find your resolution there, you can submit a support request by contacting the IT HelpDesk:
  - Email: isite@tamut.edu
  - Phone: 903-334-6603
  - Submit a Support Request Ticket
- Additional student help for Blackboard can be found here:
  - Blackboard Help for Students

    Julia Allen (main contact) 903-223-3154 julia.allen@tamut.edu Frank Miller (alternate) 903-223-3156 frank.miller@tamut.edu Nikki Thomson (alternate) 903-223-3083 nikki.thomson@tamut.edu

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Plagiarism (Used with permission from Turnitin.com)

Many people think of plagiarism as copying another's work or borrowing someone else's original ideas. But terms like "copying" and "borrowing" can disguise the seriousness of the offense:

According to the Merriam-Webster Online Dictionary, to "plagiarize" means

- to steal and pass off (the ideas or words of another) as one's own
- to use (another's production) without crediting the source
- to commit literary theft
- to present as new and original an idea or product derived from an existing source.

In other words, plagiarism is an act of fraud. It involves both stealing someone else's work and lying about it afterward.

But can words and ideas really be *stolen*?

According to U.S. law, the answer is yes. The expression of original ideas is considered intellectual property, and is protected by copyright laws, just like original inventions. Almost all forms of expression fall under copyright protection as long as they are recorded in some way (such as a book or a computer file).

All of the following are considered plagiarism:

- turning in someone else's work as your own
- copying words or ideas from someone else without giving credit
- failing to put a quotation in quotation marks
- giving incorrect information about the source of a quotation
- changing words but copying the sentence structure of a source without giving credit
- copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not.

Most cases of plagiarism can be avoided, however, by citing sources. Simply acknowledging that certain material has been borrowed, and providing your audience with the information necessary to find that source, is usually enough to prevent plagiarism. You can find more information about plagiarism from http://www.turnitin.com/research_site/e_what_is_plagiarism.html

During this course, student papers may be submitted to turnitin.com for evaluation. Turnitin.com is a tool that the University may use to determine

whether or not any paper contains words or ideas from previously published materials. In the event that plagiarism is detected, a grade of zero will be given for the assignment.

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Drop Policy

To drop this course after the census date (see semester calendar), a student must complete the Drop/Withdrawal Request Form, located on the University website http://tamut.edu/Registrar/droppingwithdrawing-from-classes.html) or obtained in the Registrar's Office. The student must submit the signed and completed form to the instructor of each course indicated on the form to be dropped for his/her signature. The signature is not an "approval" to drop, but rather confirmation that the student has discussed the drop/withdrawal with the faculty member. The form must be submitted to the Registrar's office for processing in person, email Registrar@tamut.edu, mail (7101 University Ave., Texarkana, TX 75503) or fax (903-223-3140). Drop/withdraw forms missing any of the required information will not be accepted by the Registrar's Office for processing. It is the student's responsibility to ensure that the form is completed properly before submission. If a student stops participating in class (attending and submitting assignments) but does not complete and submit the drop/withdrawal form, a final grade based on work completed as outlined in the syllabus will be assigned.

Class Participation

Students are responsible for beginning their participation on the FIRST CLASS DAY by logging on and completing assignments according to the COURSE CALENDAR. Failure to submit online assignments between the first day of classes and the "university census date" (according to the university schedule) will result in an ADMINISTRATIVE DROP from the course.

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