**CSCI/CMPE 4345**

**COMPUTER NETWORKS**

**Syllabus for Fall 2014**

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| Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: Description: abrahamN | **Dr. John P. Abraham, Professor**  **Current Course Schedule (Fall 2014)**  **University of Texas – Pan American**  **Fall 2014** |
| **Professor: Dr. John P. Abraham. Office: Engineering Building Room 3.276**  **Web:** [**faculty.utpa/jabraham**](http://www.faculty.utpa.edu/jabraham)  **Please check this site frequently for updates.**  **Email:** [**jabraham@utpa.edu**](mailto:jabraham@utpa.edu)**. Tele: 665-3550**   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **ALL STUDENTS: PLEASE SUBMIT ASSIGNMENTS IN A MANILA FOLDER**   |  |  |  | | --- | --- | --- | | Faculty Detail Schedule |  | 10166480 John P. Abraham Fall 2014 Aug 19, 2014 12:08 pm | | Transparent Image | | |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | [**Computer Networks - 15260 - CMPE 4345 - 01**](https://mywebsis.utpa.edu/PROD/bwckctlg.p_disp_listcrse?term_in=201510&subj_in=CMPE&crse_in=4345&schd_in=LEC) | | | | | | | | | | | | | | | | | | | | | | | | | ***Scheduled Meeting Times*** | | | | | | | | | | | | | | | | | | | | | | | | | **Type** | **Time** | | | **Days** | | | | | | **Where** | | | **Date Range** | | | | | | **Schedule Type** | | | | **Instructors** | | Class | 1:10 pm - 2:25 pm | | | TR | | | | | | Engineering Building 1.272 | | | Aug 25, 2014 - Dec 12, 2014 | | | | | | Lecture | | | | John P Abraham (P) | | [**Intr Computer&Info Tech - 17586 - CSCI 1201 - 13**](https://mywebsis.utpa.edu/PROD/bwckctlg.p_disp_listcrse?term_in=201510&subj_in=CSCI&crse_in=1201&schd_in=LEC) | | | | | | | | | | | | | | | | | | | | | | | | | ***scheduled Meeting Times*** | | | | | | | | | | | | | | | | | | | | | | | | | **Type** | **Time** | | | | | | **Days** | | | | **Where** | **Date Range** | | | | **Schedule Type** | | | | **Instructors** | | | | | Class | 11:45 am - 12:35 pm | | | | | | MW | | | | Academic Services 2.120 | Aug 25, 2014 - Dec 12, 2014 | | | | Lecture | | | | John P Abraham (P) | | | | | [**Computer Networks - 15273 - CSCI 4345 - 01**](https://mywebsis.utpa.edu/PROD/bwckctlg.p_disp_listcrse?term_in=201510&subj_in=CSCI&crse_in=4345&schd_in=LEC) | | | | | | | | | | | | | | | | | | | | | | | | | ***Scheduled Meeting Times*** | | | | | | | | | | | | | | | | | | | | | | | | | **Type** | | | **Time** | | | **Days** | | | **Where** | | | | | | **Date Range** | | **Schedule Type** | | | | **Instructors** | | | | Class | | | 1:10 pm - 2:25 pm | | | TR | | | Engineering Building 1.272 | | | | | | Aug 25, 2014 - Dec 12, 2014 | | Lecture | | | | John P Abraham (P) | | | | [**E Commerce Sys Implement - 15130 - CSCI 6314 - 01**](https://mywebsis.utpa.edu/PROD/bwckctlg.p_disp_listcrse?term_in=201510&subj_in=CSCI&crse_in=6314&schd_in=LEC) | | | | | | | | | | | | | | | | | | | | | | | | | ***Scheduled Meeting Times*** | | | | | | | | | | | | | | | | | | | | | | | | | **Type** | | **Time** | | | **Days** | | | **Where** | | | | | | **Date Range** | | | | **Schedule Type** | | | | **Instructors** | | | Class | | 5:45 pm - 8:25 pm | | | R | | | Engineering Building 1.272 | | | | | | Aug 25, 2014 - Dec 12, 2014 | | | | Lecture | | | | John P Abraham (P) | | | Office Hours: MW 10 a.m. to 11:45 Tu 11:30 to 1:00 p.m. | | | | | | | | | | | | | | | | | | | | | | | | |   **Follow me on Twitter: abrahamUTPA. You can ask me questions on Twitter.**  **TA for CMPE 4345: Mr. Rodolfo Baez** [**rbaez@broncs.utpa.edu**](mailto:rbaez@broncs.utpa.edu)  **Schedule: M** 9-10 AM T 2:30-3:30 PM W 9-10 AM TH 2:30-3:30 PM | |
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**Required Textbook**: Comer, Douglas E., Computer Networks and Internets, 5th Edition, Prentice Hall, 2009. **ISBN-0-13-606127-3 (ISBN 13: 978-0-13-606127-4)**

**Please take good notes as I cover a great deal more than in the textbook.**

**Reference:**

* Behrouz A. Forouzan, TCP/IP Protocol Suite, 4th Ed., McGraw Hill, 2010. ISBN 978-0-07-337604-2
* Tanenbaum, A. S., 2002, Computer Networks, 4th Ed., Prentice Hall, Upper Saddle River, New Jersey.
* Data and Computer Communications 7th edition, by William Stallings, Prentice Hall, 12004
* UNIX Network Programming by W. Richard Stevens, Prentice Hall, 1990

**Expected Background:**

Students are expected to be able to program in C or ++, VB or Java. Students who are not fluent in these topics should make up the deficiencies by homework and programming exercises.

**Catalog description**:

An introduction to data communication topics, including data transmission, encoding data link control, switching, network topologies, protocols, internetworking and data security. Examples of existing networks and network architectures are studied. Prerequisites: Operating systems or Computer Architecture or consent of instructor.

In addition to this, students will gain practical experience in setting up communication between computers, networking, and network management. Students will also install different peer-to-peer and client-server network software. They will also gain some experience on inter-networking.

Students are required to setup servers and conduct experiments. Students are expected to dedicate outside hours to complete lab assignments. Most lab assignments can be completed using virtual machines set up on personal computers. Advanced lab in the second floor is available if you want to make arrangements.

Grading:

Midterm and Final Exams 60%

Quizzes and Programming assignments 10%

Group Project 10%

Practical portion 20%

**Course Topics:**

Fundamentals of computer networks; theory, design, implementation and performance analysis of computer networks; network protocols; examples of computer network applications.

**COURSE OBJECTIVES**: Upon conclusion of this course a student will be able to plan and install a TCP/IP protocol stack based local area network, set up switches and routers, and write socket programs for communication.

**Learning outcomes:**

* 1. Compare and contrast the OSI and TCP/IP models.
  2. Given a network problem, create appropriate topology and draw wiring diagrams.
  3. Make cat 5 cables and connect them with switches and make crossover cables where appropriate.
  4. Configure servers, switches and routers.
  5. Create subnets and supernets.
  6. Create routing tables.
  7. Setup static IP address as well as DHCP based addresses.
  8. Setup a DNS.
  9. Setup a mail server
  10. Setup a wireless network
  11. Install appropriate network security
  12. Write socket programs in C or Java.

**Assignments:**

General instructions about programming: You may choose any of the following languages: C, C++, Java, Visual Basic. If you would like to use another language please talk with me first. I will not give you any assistance with the programming assignments. You are welcome to talk with others in the class to get general ideas and algorithms, but may not view their source codes. Assignments are due at the beginning of the class. Late penalties: 1 day=10%, 2 days=20%, 1 week=30%, 2 weeks=50%, after two weeks I do not accept assignments.

General instructions about the group project: Group assignments are given to encourage cooperation among students. Start working on the research right away. Submit a topic for approval by the 2nd week. All research should be completed by the middle of the semester. Examples of group projects done in the past will be discussed in class. General instructions about the independent project: You may do practical or theoretical research. For practical research, choose a topic that is appropriate such as Web-services, IBM websphere, Microsoft sharepoint services, wireless encryption, SSL certificates, Cyber forensics, Cyber Security, etc. and implement it and write a five to ten page paper about your implementation.

Programming assignments:

1. Write a Java program to discover the IP address of your machine.

2. Write a program to send a file across Transport Service Access Points (TSAPs) also known as TCP ports or Sockets. Your program can select any non-privileged port (that is, the port number should be greater than 1024).

**Bonus (You can apply to upgrade a grade in daily quiz, a grade in programming assignment or 5 points toward a major exam):** You have a choice for this assignment: Write a server program to make use of threads. Write appropriate client program to test it. OR Write a Java program to open a file on a remote computer and look up records.

**Drop Policy**: A student who requests a drop on or before THE OFFICIAL DAY TO DROP will receive a DR. After that DP or DF will be given based on the academic standing at the time. It is the responsibility of the student to take care of necessary paper work to receive DP, D, or W. All DP/DFs should be handled prior to the official cut off date for dropping.

**Attendance** is required. A student with three or more unexcused absences (10% of the classes) will be given a DF.

**Classroom Conduct:** All students are expected to demonstrate professional behavior and use language appropriate for the classroom learning experience. **All cell phones must be turned off during class.**  Cell phones must be entirely out of sight (inside a closed backpack or purse, for example) during exams and other in-class assignments.

**Students with Disabilities**:

If you have a verifiable disability that makes it difficult for you to complete course work as outlined in this syllabus without special accommodations under either the Americans with Disabilities Act or the Rehabilitation Act of 1973, please inform the instructor as soon as possible. The instructor will be happy to work with you and the UTPA Office of Services for Persons with Disabilities (OSPD), Emilia Schunior Ramirez Hall, Room 1.101 (956) 316-7005; V-TDD (956) 316-7092; FAX (956) 316-7034. The OSPD will process accommodation requests, assist you with verification of a disability and arrange for special services.

Tentative Schedule.

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| **WEEK** | **TOPIC** | **CHAPTERS** | Assignments due |
|  | Introduction & Overview. Network Programming | 1,3 |  |
|  | Traditional Internet Applications  Data Communication Basics | 4,5 | Project group formation  Group assignment group formation |
|  | Information Sources & signals  Transmission Media | 6,7 Lecture notes | Group Assignment discussion |
|  | Reliability and Channel Coding  Transmission Modes, Modulation | 8,9,10 | Program Ass1 |
|  | Multiplexing and Demux  Access and Interconnection | 11,12 | Group Assignment Presentations |
|  | LAN, Layer1, Layer2 | 13,14 Lecture notes | Program Ass 2  Group Assignment  Presentation Complete |
|  | Wired & Wireless Networking – Exam1 | 15 | Project proposal presentations |
|  |  |  |  |
|  | Wired and Wireless Networking | 15 & 16 |  |
|  | LAN extensions, WAN | 17,18,19 |  |
|  | Internetworking, layer3 | 20,21  Lecture notes | Project group-1 |
|  | Forwarding, Support protocols | 22,23, notes | Project group-2 |
|  | IPV 6, UDP, TCP | 24,25,26 | Project Group-3 |
|  | Routing Protocols, Performance, VOIP, Security | 27,28,29 | Project Group-4 |
|  | I will give you rest of the schedule later |  |  |