

## ECET 4840– Spring Semester 2014 Advanced Telecommunications

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**Textbook:** William Stallings, *Data & Computer Communications*, Prentice-Hall, 8<sup>th</sup> ed., 2006.

**Reference(s):**

- (1) Youlu Zheng, Shakil Akhtar, *Networks for Computer Scientists and Engineers*, Oxford University Press, 2002.
- (2) Douglas E. Comer, *Computer Networks and Internets - with Internet Applications*, Prentice-Hall, third edition, 2001.

### Course Objectives:

Upon successful completion of this course, students will be able to do the following:

1. Demonstrate a fundamental understanding of data transmission principles: Time and Frequency domain concepts, Fourier signal analysis, Data rate and bandwidth relationship, Transmission impairments (delay distortion, noise), Channel capacity, Sampling and quantization.
2. Understand routing and switching theory and routing algorithms and protocols.
3. Demonstrate an understanding of queuing theory as applied to data systems.
4. Demonstrate an understanding of the principles of network analysis and be able to conduct analysis of data traffic utilizing packages such as Ethereal.
5. Demonstrate an understanding data network congestion control mechanisms.
6. Demonstrate a fundamental understanding of high speed networking technologies: DSL, Cable Modems, Fast and Gigabit Ethernet.
7. Demonstrate a fundamental understanding Network Security techniques and implementation.
8. Demonstrate an understanding of distributed Internet applications.
9. Be able to articulate emerging concepts and technologies such as IPv6, 3G and 4G networks, LTE, and MPLS.

**Grading Policy:** There will be no make up quizzes.

A $\geq$ 90, 80 $\leq$ B $<$ 90, 70 $\leq$ C $<$ 80, 60 $\leq$ D $<$ 70, F else

Final Average = .3\*L + .15\*Qx + .15\*Qy + .15\*Qz + .25\*F

A = Attendance

Qx,y,z = highest 3 out of 4 quiz grades

F = Final Exam

L = (L1+L2+...L11)/11

**Laboratory Experiments and Report Writing:**

The laboratory/project component is an essential part of Advanced Telecommunications for the TCET program. The Laboratory exercises are a combination of experiments utilizing telecommunications network equipment, network analyzers, and simulation software such as OPNET and SystemView. Each laboratory exercise requires a written report. The ability to report technical information in a clear and concise manner is one of the most important skills that a technically trained individual can develop. Students are organized into teams and are encouraged to develop their reports through team work. The students are required to follow a certain format for their reports. Adherence to the format helps to ensure that the information presented is complete and well organized. Students must pass the laboratory portion of the course to get a passing grade for the course.

**Quiz Taking Policies:**

You may use two 8.5"x11" sheets, front and back, of paper with any notes as aids for every Quiz, including the final exam. This does not mean the front half of four 8.5"x11" sheets of paper, or any derivative thereof.

You may use a calculator, pencil, pen, and eraser for any Quiz, including the final exam.

You may not use cell phones, computers, or any other electronic device for any Quiz, including the final exam.

Prior to any Quiz the instructor will verify that all computers for a given row of students are either logged out with screen turned off or shutdown. Instructor will hand out Quizzes for that row of students once all computers are in stated mode.

Online Students must have an approved proctor administer the Quiz.

**Laboratory Policies:**

You must have a passing lab grade to pass the course (Lab Grade  $\geq$  60% is passing).

Labs are to be submitted on the specified due date at the beginning of the lab period; late labs will not be accepted.

**Important Dates:** Monday, January 20<sup>th</sup> – MLK Jr. Holiday  
M-F, March 3<sup>rd</sup> -7<sup>th</sup> – Spring Break  
Monday, April 28<sup>th</sup> - LDOC

**Honor Code:** <http://www.spsu.edu/honorcode/>

**ADA/504:** Students with disabilities who believe that they may need accommodations in this class are encouraged to contact the counselor working with disabilities at (678) 915-

7226 as soon as possible to better ensure that such accommodations are implemented in a timely fashion.

Week	Topics	Lab/Quizzes
1	Introduction, Fourier Analysis	
2	Noise, Shannon's Eqn, Sampling	Lab1
3	Sampling, Quant., Routing/Switch.	<b>Q1</b> , Lab2
4	Routing Algorithms, Protocols	Lab3
5	Queuing Theory, Network Analysis	Lab4
6	Network Analysis	<b>Q2</b> , Lab5
7	Congestion	Lab6
8	IPv6, High-Speed Networking	Lab7
9	High-Speed Networking	<b>Q3</b>
10	SONET/SDH & DWDM, Mobile BB	Lab8&9
11	Mobile BB	Lab10
12	Network Security	<b>Q4</b>
13	Network Security, Emerging Techn	
14	Emerging Techn	
15	Review	
	Final Exams	<b>Final Exam</b>