Introduction to Telecommunications
Fall 2003

Course Number: CSCE 5613 Section 1, Safari 04837
              ELEG 5613 Section 1, Safari 05057

Time and Place: TR, 11:00 AM - 12:20 PM, ENGR 307

Catalog Description: Overview of public and private telecommunication systems, traffic
engineering, communications systems basics, information
technology, electromagnetics, data transmission.

Textbook: Digital Telephony (Third edition) by Bellamy, John Wiley & Sons
          handouts

Programming: Many of the traffic engineering problems require programming to
             solve. If not specified, you may use any language.

Coordinator: Dale R. Thompson, Assistant Professor of Computer Science and
              Computer Engineering

Goals: The main topics include traffic engineering, communication system
       basics, information technology, and data transmission. The
       objectives of the course are to provide the students a basic
       understanding of the following concepts of public and private
       telecommunications systems:

       a) History of analog and digital bandwidth in telecommunications
       b) Voice digitization
       c) Multiplexing, Switching, Transmission, Signaling, and Routing
       d) Traffic Engineering
       e) Integrated Services Digital Network (ISDN)
       f) Frame Relay and Asynchronous Transfer Mode (ATM)
       g) Digital Subscriber Loop
       h) Internet (leased lines, frame relay)
       i) Synchronous optical network (SONET), wavelength division
          multiplexing (WDM)

Prerequisites by topic:
1. Graduate standing
Instructor: Dale R. Thompson
Office: ENGR 331
Office Hours: See [http://csce.uark.edu/~drt/schedule/schedule.html](http://csce.uark.edu/~drt/schedule/schedule.html)
Telephone: 575-5090
Email: drt@uark.edu
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**Grading Policy:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Midterm</td>
<td>25%</td>
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<tr>
<td>Homework</td>
<td>25%</td>
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<tr>
<td>Project</td>
<td>25%</td>
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<tr>
<td>Final Exam</td>
<td>25% (Wednesday, Dec. 17, 10:00 a.m. to 12:00 noon)</td>
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*Note that the Final Exam is scheduled according to University calendar. Mark your calendars now because this is when I will give the Final Exam.*

**Attendance:** I will take attendance. I use attendance as a deciding factor when your average is between grades. For example, if you have an average of 89.4 and you have attended a high percentage of the classes it will probably be rounded up to an “A”. If you have an average of 89.4 and have attended a smaller percentage of the classes it will probably still be a “B”.

**Deadline Policy:** All assignments will be given with a strict deadline, and students are required to submit their assignments on or before the deadline. Homework will be collected at the start of the class on the due date, and late submissions will not be accepted. In case of extenuating circumstances, students are advised to contact the professor as soon as practical. You are encouraged to discuss the course and the assignments with each other; however, your exams and homework should be your own work.

**Academic Dishonesty:** Students who violate University standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the University. Since dishonesty in any form harms the individual, other students and the University, policies concerning academic dishonesty will be strictly enforced. I expect you will familiarize yourself with the University's Academic Dishonesty Policy which may be found in your undergraduate catalog.
Students who graduate from the Computer Engineering program at the University of Arkansas shall possess:

I. Program Outcomes specified by Accreditation Board for Engineering and Technology (ABET) General Criteria

   a. an ability to apply knowledge of mathematics, science, and engineering
   b. an ability to design and conduct experiments, as well as to analyze and interpret data
   c. an ability to design a system, component, or process to meet desired needs
   d. an ability to function on multi-disciplinary teams
   e. an ability to identify, formulate, and solve engineering problems
   f. an understanding of professional and ethical responsibility
   g. an ability to communicate effectively
   h. the broad education necessary to understand the impact of engineering solutions in a global and social context
   i. a recognition of the need for, and an ability to engage in life-long learning
   j. a knowledge of contemporary issues
   k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

II. Program outcomes specified by ABET program criteria for Electrical, Computer, and Similarly Name Engineering Programs

   l. a knowledge of mathematics through differential and integral equations, discrete mathematics, and probability and statistics
   m. a knowledge of basic sciences
   n. a knowledge of engineering sciences
   o. a knowledge of computer science

III. Program outcomes specified by the University of Arkansas Computer Engineering Program (Approved October 2, 2001)

   p. a knowledge of computer organization and architecture
   q. a knowledge of system software principles, particularly of modern operating systems
r. a knowledge of the fundamental relationships between hardware and software components and the ability to exploit these relationships to design effective solutions to computer engineering problems
s. an understanding both of hardware and software techniques sufficient to design, build, and test complex digital systems

Students who graduate from the **Computer Science** program at the University of Arkansas shall possess (*Approved October 2, 2001*):

t. a knowledge of computer organization
u. the knowledge and skills required to design, develop and produce high quality computer software
v. the knowledge and ability to abstract general principles such as capturing recurring patterns from concrete examples or data to apply inductive reasoning in formulating solutions of computational problems
w. the knowledge of programming language design and implementation issues and key paradigms of modern programming languages
x. a knowledge of system software principles, particularly of modern operating systems

**Relationship of Introduction to Telecommunications to program outcomes:**

(a)(c)(l)(r)(s) Students are required to apply probability and statistics to determine the probability that the number of circuits in a trunk group will be exceeded. Students are required to determine the probability that a call is blocked given alternate routes.
(b)(g) Students are required to do a project or a literature review on a topic and turn in a written report.
(c)(e) Students are required to calculate the required number of bits to support a specified signal-to-quantization noise ratio.
(i) The need to stay current is reinforced through class discussions on current and future developments.
(j) Current issues in telecommunications are used as examples such as wavelength division multiplexing.

Prepared by: ________________________________ Date: ______________