DeVRY UNIVERSITY

Course Syllabus **Spring 2005**

Course Title:	Advanced **Networking**
Course number:	EET475
Credit/Contact hour:	4-0-4
Course Dependency:	**Prerequisite:** EET465 **Required Co-requisite**: (none)
Class Schedule:	
Instructor:	Tom Wheeler E-mail: twheeler@kc.devry.edu Voice Mail: 816.941.0430 x5211
Office Hours:	TBD Other times possible by appointment

Course Description

This course examines protocols and design issues in the physical, data link, network and transport layers of local area networks (LANs) and wide area networks (WANs). Other topics include architecture and routing/congestion control algorithms of LANs. Fiber optic and wireless networks, transmission control protocol/Internet protocol (TCP/IP), Internetworking, ATM networks and network performance issues are covered.

Textbooks and Materials

Textbook/s Title:	**Ed**	**Author**
Computer Networks (Prentice-Hall)	**Current**	Tanenbaum

Terminal Course Objectives (TCOs):

Following are the objectives for this course. Individual faculty, based upon their experience and expertise may add to these objectives to meet local campus needs. Any such additions will be communicated to the class. While the instruction remains focused in helping students, accomplishing these objectives is a shared responsibility of students and faculty. The outcomes of this course will depend upon the motivation and capabilities of the students, sufficient time allocation for studying, and the effectiveness of that effort.

DeVry University is committed to the continual improvement of its curriculum and instruction and to meet the needs of students and employers in a rapidly changing global economy. Students, faculty, and the university must all be actively involved to accomplish these objectives, as well as the objectives of this particular course.

Every class is to some extent a unique interactive experience, which may cause some variance within the stated objectives, in either content or level. Individual faculty, based on their experience and expertise, are encouraged to add objectives, as they deem appropriate, and to communicate these directly to the class. The outcomes of the course will depend on the design of the course, the quality of instruction, and the motivation and capabilities of the students, including time available for studying and the effectiveness of the effort.

1...Given a list of protocols, Ethernet, Token Ring, Gigabit Ethernet, ATM, and N-ISDN; classify them by the following networking terms; broadcast, multipoint, point-to-point, LAN, WAN, connection oriented, and connectionless.
2...Given a block diagram of the reference models OSI, TCP/IP and NetWare, compare and contrast the structure and layer interfaces of the three principle reference models.
3...Given a list of the following protocols 10BASET, 10BASEF, CATV, N-ISDN, B-ISDN, ATM, 10BASE5, 10BASE2, Token Ring, Token Bus, Ethernet and Gigabit-Ethernet. Compare and contrast networks based on their physical structure, cabling or topology. At a minimum, include bus, ring, tree, twisted pair, baseband, broadband, and fiber.
4...Given an example of message flow in a network, identify the service option used by the data link protocol and compare and contrast how the message flow would change if the service option changed, explore all three service options of the data link layer.
5...Given a list of access methodologies including ALOHA, CSMA, CSMA-CD, Token Bus, and Token Ring, create a table of protocols sorted by this classification.
6...Given a list of protocols conforming to the reference models TCP/IP and OSI, classify them by one of the four types of network layer operation.
7...Given a diagram of the TCP header, analyze the function of each component to determine the similarities of the network and transport layer.
8...Given a short message to be sent over a network, develop a simple substitution or transposition code and use it to both encode and decode the message.
9...Given a specification of a simple data link protocol, such as simplex data transfer with an acknowledgment to transmit again, write a program to implement the protocol.

How this Course helps in Achieving Your Program's Objectives:

The following matrix illustrates how this course supports achievement of your Program Objectives.

EET475	Assessment Outcomes																				
Lecture	*Testing & Instrumentation*					*Create/Implement Programming*				*Hardware/Software Design, Implem, & Eval*						*Writing Speaking*		*Team*		*Research Prob. Solv*		*Tech./Society Linkages*		
TCOs	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	3.5	3.6	4.1	4.2	5.1	5.2	6.1	6.2	7.1	7.2	7.3
1	X	X	X	X	X					X	X	X	X	X	X									
2	X	X	X	X	X					X	X	X	X	X	X									
3	X	X	X	X	X					X	X	X	X	X	X									
4	X	X	X	X	X					X	X	X	X	X	X									
5	X	X	X	X	X					X	X	X	X	X	X									
6	X	X	X	X	X					X	X	X	X	X	X									
7	X	X	X	X	X					X	X	X	X	X	X									
8	X	X	X	X	X					X	X	X	X	X	X									
9						X	X	X	X															

EET/CET Program Objectives and Outcomes:

(Student competencies achieved at the time of graduation)

1. Conduct experiments involving electronic systems using modern test equipment, interpret test results and use them to improve products or methodologies.
   - 1.1. Performs Needs Analysis – define the problem
   - 1.2. States goals and objectives of the experiment
   - 1.3. Identifies resources to conduct experiment (parts, equipment, data sheets, etc.)
   - 1.4. Develops a procedure and collect data using modern test equipment
   - 1.5. Analyzes test results and draw conclusions.

2. Create, implement high-level and Assembly language programs in support of technical activities.
   - 2.1. Analyzes the problem logically
   - 2.2. Designs the solution
   - 2.3. Implements the solution
   - 2.4. Tests and debugs the software

3. For EET: Use the principles of science, mathematics, and engineering technology to design, implement, and evaluate hardware and software solutions to complex technical problems,
   - 3.1. Selects and defines a meaningful problem taking safety, ethical, social, economic, and technical constraints into consideration.
   - 3.2. Devises process to solve problem
   - 3.3. Applies appropriate knowledge of scientific, mathematical, and engineering design tools toward the design and analysis of problem solutions.
   - 3.4. Identifies key issues in designing and building a prototype
   - 3.5. Builds, tests and troubleshoots prototype
   - 3.6. Optimizes prototype with a commitment to quality, timeliness, and continuous improvement.

For CET: Use the principles of science, mathematics, software engineering, and engineering technology to design, implement, and evaluate software solutions to complex technical problems.
   - 3.1 Identifies a meaningful problem and defines preliminary solution specifications taking safety, ethical, social, economic, technical constraints, and user requirement into consideration
   - 3.2 Designs and implements appropriate data structures and algorithms
   - 3.3 Prepares a plan of action to implement the system
   - 3.4 Applies scientific, mathematical, software, and engineering design tools toward the design and analysis of problem solution
   - 3.5 Writes and tests readable and maintainable code
   - 3.6 Optimizes code with a commitment to quality, timeliness, and continuous improvement

4. Communicate effectively both orally and in writing.
   - 4.1 Communicates effectively in wiring
   - 4.2 Communicates effectively orally

5. Work effectively in a team environment.
   - 5.1 Exhibits good dialoguing skills
   - 5.2 As part of a small group project, when assigned roles, performs roles effectively

6. Apply applied research and problem-solving skills to support learning at DeVry as well as life-long personal and professional development.
   - 6.1 Recognizes the need to know information beyond one's own expertise and has the ability to gather and synthesize the necessary information into the solution of a problem
   - 6.2 Uses engineering problem-solving methodology in solving problems

7. Evaluate the broader effects of technology and to identify connections between technology and economics, politics, culture, ethical responsibility, social structure, the environment and other areas.
   - 7.1 Identifies linkages and causal relationships between technology and social, political, economic, cultural, and environmental conditions.
   - 7.2 Works effectively in diverse environments and adapts technical solution to solution a diverse audience
   - 7.3 Pursues technical work within guidelines for professional, ethical, and social responsibility

Class Policies and Procedures:

Attendance

Each student is required to attend every lecture and laboratory session in which he or she is enrolled. A swipe-card terminal (ATS) in each classroom is used to record attendance electronically. Students are responsible for arriving before class begins, sliding their identification card through the wall-mounted reader, and remaining for the duration of the course meeting. Students who are absent for two or more days should notify their Professor or assigned Academic Advisor in advance. Students who miss more than five (5) consecutive days of school are in violation of the DeVry attendance policy and will be dismissed. Unexcused absence in excess of 5 hours will result in a reduction of the final course grade by one letter.

Homework

Homework is due at the beginning of class (xx00 UTC). *Late homework is not accepted unless mitigating circumstances are present*. If this is the case, bring documentation (court papers, note on doctor's letterhead, etc.) Homework carries the weight of one major exam (100 points) in the course. Failure to do homework will do severe damage to your grade. (UTC=Universal Coordinated Time, or Standard World Time.)

Homework will be kept in a 3-tab folder, with the latest assignment in front. Your name, the course number, and the instructor's name must appear in clearly-readable form on the front of the folder.

Make-Up Exams

No make up exams are given in EET475 for any reason.

Course Grading Standards

There are 3 major exams, an unspecified number of quizzes given at random intervals, various homework assignments, and a final examination given in the 15th week of the course. Your grade will be determined as follows:

2 Highest Major Exams ..... total 200 points

Quizzes/Homework.....Normalized to 100 points

Final Exam..... 150 points

450 points total for course

Note: The lowest of the three major exams is "dropped" and does not count in the final grade calculation. No makeup exams are given. All examinations will be announced at least 1 week prior to administration. All students must take the final exam. A passing grade in lecture and laboratory is necessary in order to pass the course.

A final letter grade is to be awarded to each enrolled student in accordance with the 4.00 grading system shown below:

Letter Grade	***Percent of Total Points***	***Grade Points***
A	90 – 100%	4.00
B	80 – 89%	3.00
C	70 – 79%	2.00
D	60 – 69%	1.00
F	Below 60%	0.00

Academic Integrity Policy

Ideas and learning form the core of the academic community. In all centers of education, learning is valued and honored. No learning community can thrive if its members counterfeit their achievement and seek to establish an unfair advantage over their fellow students. The academic standards at DeVry are based on a pursuit of knowledge and assume a high level of integrity in every one of its members. When this trust is violated, the academic community suffers injury and must act to ensure that its standards remain meaningful. The vehicle for this action is the Academic Integrity Policy outlined in the *Student Handbook*.

The Academic Integrity Policy is designed to foster a fair and impartial set of standards upon which academic dishonesty will be judged. All students are required to read, understand, and adhere to these standards, which define and specify the following mandatory sanctions for such dishonest acts as copying, plagiarism, lying, unauthorized collaboration, alteration of records, bribery, and misrepresentation for the purpose of enhancing one's academic standing:

- The ***first recorded offense*** will result in the student receiving zero credit for the entire paper, exam, quiz, lab, homework assignment, or other graded activity in which the incident of academic dishonesty occurred. No partial credit may be given. Where the incident involved a graded assignment normally subject to a "drop" option, the student may not exercise that option.

- The ***second recorded offense*** will result in the student receiving a failing grade for the course in which the second offense occurs. The second offense need not be in the same course, program, or term as the first offense to invoke this sanction.

- The ***third recorded offense*** will result in the student being permanently expelled from the DeVry system. Again, the third offense need not be in the same course, program, or term as either the first or second offense to invoke the sanction.

Changes to Syllabus:

The contents of this syllabus are subject to change with appropriate notice to the students.

Weekly Course Schedule:

Week	Topics	TCO's
1	OSI model, protocol suites; key ideas & definitions; LAN, MAN, and WAN systems	1,2,3
2	Troubleshooting using the OSI model; network topologies; network planning; networking hardware	1,2,3
3	Network protocols: IPX, IP; ARP; Classful IP addressing; IP header structures and IP routed protocol operation	5,6,7
4	EXAM #1; Data link layer protocols (HDLC)	5,6
5	HDLC encapsulation; Shortest-path algorithms	4
6	IP routing algorithms; distance-vector routing, link-state routing; RIP; LSR	4,7
7	IP classless addressing, subnets, CIDR; Autonomous systems; interior and exterior routing protocols (RIP, OSPF, EIGRP, BGP, IS-IS)	4,7
8	DHCP, BOOTP, ICMP	1,4,7
9	Berkeley Sockets model; UDP, TCP, ports; EXAM #2	6,8,9
10	TCP analysis and packet tracing methods; DNS (intro)	6,7
11	DNS administration; DNS protocol suite	6
12	HTTP, FTP, IIS design and administration	6
13	FTP administration on IIS; EXAM #3	
14	Sockets programming	8,9