Syllabus: Networking Course 1: The OSI Model

A. General Information

Units	1
Prerequisites	Required: none
	Helpful: A+ Certification; Microsoft Office Skills; introductory programming or multimedia courses; introductory electronics
Instructor	William B. Smith
Textbook	Required: none (online multimedia)
	Optional: Computer Networks (Andrew Tannenbaum); CCNA First-Year Companion Guide (Amato et. al); CCNA Exam: Certification Guide (Odom); Cisco Routing (Lewis)
Materials	pen, paper, journal (composition book), soft 3-ring binder
Standards	A >= 90%, B >= 80%, C >= 70%, D >= 60%
Required Class Hours	Five 41-minute days per week
Open Lab Hours with Instructor Present	2:17 PM to 3 PM schedule permitting or by appointment

B. Grading

ITEM	WEIGHT	COMMENTS
Homework	1	highly recommended
Engineering Journal	Optional	lab data and details
Online Chapter Exams	4	using school server
Skill-Based Lab	1	in conjunction with online services
Online Midterm Exam	10%	of final grade
Online Final Exam	10%	of final grade

C. Week by Week

WEEK	CHAPTER	DESCRIPTIONS
1	1	1 - Getting Started; Introduction to Computing
2	1	1 - Introduction to Computing
3	2	2 - The OSI Model
4	3	3 - Local Area Networks (LANs)
5	4	4 - Layer 1: Electronics and Signals
6	5	5 - Layer 1: Media, Connections, and Collisions
7	5,6	5 - Layer 1: Media, Connections, and Collisions
		6 - Layer 2: Concepts
8	7	7 - Layer 2: Technologies
9	7	7 - Layer 2: Technologies
10	8	8 - Design and Documentation
11	9	9 - Structured Cabling Project
12	10	10 - Layer 3: Addressing and Routing
13	10	10 - Layer 3: Addressing and Routing
14	10	10 - Layer 3: Addressing and Routing
15	11	11 - Layer 3: Routing and Protocols
16	12,13,14,15	12 - Layer 4: The Transport Layer
		13 - Layer 5: The Session Layer
		14 - Layer 6: The Presentation Layer
		15 - Layer 7: The Application Layer
17	12,13,14,15	12 - Layer 4: The Transport Layer
		13 - Layer 5: The Session Layer
		14 - Layer 6: The Presentation Layer
		15 - Layer 7: The Application Layer
18	-----	Review and Midterm

D. Benchmark Questions and Skills

WEEK	CHAPTER	BENCHMARKS
1	1	Can all students perform simple PC (hardware, software, network settings) and NIC troubleshooting?
2	1	Can all students do binary math? Can all students use the units of information and bandwidth?
3	2	Can all students name and describe the OSI layers from memory? Can all students describe the TCP/IP graph?
4	3	Can all students describe the devices required to build a LAN? Given those devices, can all students build and troubleshoot a simple LAN?
5	4	Can all students describe networking signals and what can happen to them on physical media? Can all students use a multimeter to measure resistance, voltage, and continuity?
6	5	Can all students describe the 5 basic networking media? Can all students terminate CAT 5 UTP cable according to standards?
7	5,6	Can all students, given a topology, circle all collision and broadcast domains? Can all students describe the basic elements of a frame? Can all students do hexadecimal math?
8	7	Can all students compare and contrast Token Ring, FDDI, and the Ethernet family tree?
9	7	Can all students explain the specific details of Ethernet and Layer 2 Devices? Can all students use 'Network Inspector' (or equivalent) and 'Protocol Inspector' (or equivalent) software?
10	8	Can all students create physical and logical topologies? Can all students properly locate MDFs and IDFs in an Ethernet extended star topology? Can all students plan a structured cabling installation? [Out-of-Class Structured Cabling Project]
11	9	Can all students install, terminate, test, and troubleshoot CAT 5 UTP cabling runs, from the jack to the patch panel? Have all students mastered the Fluke 620 (or equivalent) meter? [Out-of-Class Structured Cabling Project]
12	10	Can all students justify the need for and classify the various types of IP addresses?
13	10	Can all student create subnets?
14	10	Can all students do the following form of problem: "Given an IP address and the number of subnets required, find the subnetwork id numbers, the range of host numbers, the subnetwork broadcast numbers, and the subnet mask?"
15	11	Can all students, using packet diagrams and tracing header transformations, give a basic explanation of routing? Can all students flowchart basic network processes such as ARP and RARP?
16	12, 13, 14, 15	Can all students explain the similarities and differences between IP, TCP, and UDP? Can all students explain the basic processes of the session layer? Can all students describe the presentation layer functions of formatting, encryption, and compression? Can all students explain how e-mail and HTTP work?
17	12, 13, 14, 15	Can all students explain the similarities and differences between IP, TCP, and UDP? Can all students explain the basic processes of the session layer? Can all students describe the presentation layer functions of formatting, encryption, and compression? Can all students explain how e-mail and HTTP work?
18	-----	Review and Finals: Have all students mastered the concepts and skills of Chapters 1-15?

C. Week by Week

WEEK	CHAPTER	DESCRIPTIONS
19	1	1 - Review of Semester 1
20	2	2 - WANs and Routers
21	3	3 - Router Command Line Interface (CLI)
22	4	4 - Router Components
23	4	4 - Router Components
24	5	5 - Router Startup and Setup
25	6	6 - Router Configuration 1
26	6, 7	6 - Router Configuration 1; 7 - IOS Images
27	7	7 - IOS Images
28	8	8 - Router Configuration 2
29	8	8 - Router Configuration 2
30	9, 10	9 - TCP/IP; 10 - IP Addressing
31	11	11 - Routing
32	12	12 - Routing Protocols
33	12	12 - Routing Protocols
34	13	13 - Network Troubleshooting
35	13	13 - Network Troubleshooting
36	-----	Online, Oral, and Skills-Based Final Exams

D. Benchmark Questions and Skills

WEEK	CHAPTER	BENCHMARKS
19	1	Can all students describe in detail the OSI layers? Can all students differentiate between various LAN technologies, especially the varieties of Ethernet? Can all students work through a class B IP address planning example, on their own, without notes or a calculator?
20	2	Can all students give a simple description of a router (including its role as a WAN device) and a simple explanation of the process of routing? Can all students build the semester 2 topology given routers, switches, cables, hubs, and transceivers?
21	3	Can all student log into the router, enter and explain 6 different router modes, use editing features and context-sensitive help, individually and without their journal?
22	4	Can all students use the router show commands, router testing commands, and router debug commands when prompted for specific information?
23	4	Can all students, individually but using the Engineering Journal, perform lab 4.5.1?
24	5	Can all students flowchart the router boot sequence? Can all students configure a router using the setup command and dialog?
25	6	Can all students flowchart the the process for altering and saving the router configuration file? Can all students perform a CLI configuration of a router (including interfaces and routing protocols)?
26	6, 7	Can all students perform the password recovery procedure from memory? Can all students flowchart the ways a router can obtain an IOS image?
27	7	Can all students use the configuration register calculator? Can all students use the IOS commands relevant to loading and monitoring IOS images?
28	8	Can all students flowchart the complete CLI configuration of a router, including specific IOS commands? Do all students have a thorough Engineering Journal?
29	8	Can all students, individually and without notes except for an IP-labeled topology, perform a complete CLI configuration of a router (with a completely erased configuration file) in 10 minutes or less?
30	9, 10	Can all students create a variety of diagrams to explain TCP in detail? Can all students do a complete Class B IP address Planning problem? Have all students added the IOS commands from Chapters 9 and 10 to their Engineering Journal and tried those commands on a router?
31	11	Can all students pass a vocabulary and concept quiz on Chapter 11?
32	12	Can all students configure and verify static and default routes on a router?
33	12	Can all students configure and verify the dynamic routing protocols RIP and IGRP on a router?
34	13	Can all students, working in teams, build and troubleshoot the complete 5-router topology?
35	13	Have all students become proficient and efficient and building and troubleshooting the complete 5-router topology? Are all students ready to take their Online, Oral, and Skills-Based Final Exams?
36	-----	Administration of Online, Oral, and Skill-Based Exams