PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

HPC INTERNETWORKING & GRID TECHNOLOGY
HPC 1020

Class Hours: 3.0 Credit Hours: 4.0
Laboratory Hours: 3.0 Revised: Spring 03

NOTE: This course is not designed for transfer credit.

Catalog Course Description:

This course provides instruction in the planning of high speed networks using Cisco routers and switches along with emphasis on the dynamics of communications related to remotely accessing massively parallel computers (HPC). Topics include internetworking functions of the OSI model; data encapsulation conversion; IP addressing and subnetting; TCP/IP network layer protocols, single and multistage interconnection networks, grid internetworking, optimization techniques, load balancing, bandwidths, and data communications.

Entry Level Standards:

College level reading and math skills; keyboarding skills of at least 20 wpm; familiarity with the architecture and operation of standard PCs.

Prerequisites:

HPC 1010 (NETW 2530) or consent of instructor

Textbook(s) and Other Reference Materials Basic to the Course:


I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Networking and the OSI Reference Model</td>
</tr>
<tr>
<td>2</td>
<td>The Physical and Data Link Layers</td>
</tr>
<tr>
<td>3</td>
<td>Networking Devices - LANs and WANs</td>
</tr>
<tr>
<td>4</td>
<td>IP Addressing - ARP and RARP</td>
</tr>
<tr>
<td>5</td>
<td>Topologies - Structured Cabling and Electricity</td>
</tr>
<tr>
<td>6</td>
<td>The Application, Presentation, Session, and Transport Layers</td>
</tr>
</tbody>
</table>
II. Course Objectives*:

A. Develop a working understanding of the terminology, hardware devices, system software, and a proficiency in current WAN internetworking. I, II, IV

B. Exhibit a knowledge of router implementation and configuration. II, III

C. Demonstrate use of logical addressing schemas and WAN protocols. I, II, III


E. Use troubleshooting skills to solve complex internetworking problems. I, II, IV, V

*Roman numerals after course objectives reference goals of the HPC program.

III. Instructional Processes*:

Students will:

1. Design a complex networking plan which incorporates advanced routing techniques. Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Transitional Strategy, Active Learning Strategy

2. Examine and implement solutions to challenging internetworking. Problem Solving and Decision Making Outcome, Technological Literacy Outcome

3. Use professional diagnostic tools to produce successfully implemented wide area networking products. Technological Literacy Outcome, Transitional Strategy

4. Participate in team projects involving installation, configuration, and upgrading of WAN software and hardware. Problem Solving and Decision Making Outcome, Transitional Strategy, Active Learning Strategy

5. Prepare documents explaining the route for troubleshooting WAN configurations. Communication Outcome, Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Transitional Strategy
6. Practice elements of the work ethic such as punctuality, professionalism, dependability, cooperation, and contribution. *Personal Development Outcome*

*Strategies and outcomes listed after instructional processes reference Pellissippi State’s goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.*

**IV. Expectations for Student Performance***:

Upon successful completion of this course, the student should be able to:

1. Master basic content: OSI model, internetworking devices, IP addressing, LAN media and topologies, structured cabling, electronics. A, B
2. Master lab skills: PC hardware & software, patch cables, installation of structured cabling; use of test equipment. E
3. Master documentation skills: maintaining engineering journal; cable management techniques. E
4. Master people skills: working in engineering teams, self and project management, oral exams, presentations. E
5. Master basic content: review of 1st semester concepts; routing theory; router components; router setup and startup; router configuration; IOS; TCP/IP; IP addressing; routing protocols. A, B, C
6. Master lab skills: router configuration; associated hardware and software tools and techniques. D, E
7. Master documentation skills: maintaining engineering journal; cable management techniques. E
8. Master people skills: working in engineering teams, self and project management, oral exams, presentations. E
9. Achieve awareness and access: basic technological literacy; awareness of IT careers; preparation for 2 and 4 yr. EE, CS, and IT programs; access to well-paying, learning-oriented jobs; ability to design, install, and maintain Internetworks. B, C
10. Understand networking router theory and implementation. C
11. Utilize advanced networking router configuration in the enterprise. A
12. Understand associated hardware, software tools, and networking techniques. C
13. Understand implementation of networking media management techniques. C
14. Understand project management coordination. B
15. Utilize working in networking team skills. B, E
16. Understand basic technology literacy. E
17. Demonstrate an awareness of IT careers. A

*Letters after performance expectations reference the course objectives listed above.

V. Evaluation:

A. Testing Procedures: 70% of grade

Skill Exams pass/fail
Mastery of Skills: PC hardware & software; making of cables; structured wiring installations; building and troubleshooting simple LANS. Individual router configuration; configuring networks of routers; building and troubleshooting simple LANS.
Two concept-based exams
Exams 40% On-Line Exams
Final Exam 30% Comprehensive Written, Oral, and Lab Practical Exams
There will be no make-up tests unless prior arrangements are made with the instructor.

B. Laboratory Expectations:

Lab attendance is required. Assignments must be completed and submitted by the assigned deadline. This is a coordinated laboratory class, and assignments must be completed as scheduled.

C. Field Work:

N/A

D. Other Evaluation Methods: 30% of grade

Homework 10% practice problems and designs
Journal 10% document all laboratory and project work completely
Portfolio 10% Semester Online Portfolio; posting physical and logical topologies
Pop-Quizzes and "Outside-Class" take-home assignments may be given.

E. Grading Scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90 - 100%</td>
</tr>
<tr>
<td>B</td>
<td>80 - 89%</td>
</tr>
<tr>
<td>C</td>
<td>70 - 79%</td>
</tr>
<tr>
<td>D</td>
<td>61 - 70%</td>
</tr>
<tr>
<td>F</td>
<td>0 - 60%</td>
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VI. Policies:

A. Attendance Policy:

Students are expected to promptly attend all lecture and lab classes as assigned. Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. (Pellissippi State Catalog)

B. Academic Dishonesty:

Plagiarism, cheating, software piracy, non-educational use of computer systems and other
forms of academic dishonesty are strictly prohibited. A student guilty of academic misconduct, either directly or indirectly through participation or assistance, is immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions that may be imposed through the regular Pellissippi State procedures as a result of academic misconduct, the instructor has the authority to assign an F or a zero for the exercise or examination or to assign an F in the course.

C. Other Policies:

Behavior is expected to conform to Pellissippi State Catalog and to the normal classroom behavioral standards.