PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

ADVANCED HPC INTERNETWORKING & GRID TECHNOLOGY
HPC 2020

Class Hours: 3.0  Credit Hours: 4.0
Laboratory Hours: 3.0  Revised: Fall 04

NOTE: This course is not designed for transfer credit.

Catalog Course Description:

This course is a continuation of HPC 1020 and provides instruction in the planning, installation and administration of high speed routers, switches, high performance networking, and introductory WAN security issues will be explored. Topics include Cisco router elements, network service, TCP/IP transport-layer protocols, managing configuration files, IOS software commands, protocol address resolution, router topology, IP addressing and access list operations, I/O architecture, performance modeling, high speed communication networks, grid internetworking, and security architecture.

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 1020 or consent of instructor

Textbook(s) and Other Course Materials:


I. Week/Unit/Topic Basis:

<table>
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<th>Week</th>
<th>Topic</th>
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| 1    | TCP/IP Internetworking  
Lesson 1: The Internet Infrastructure  
Lesson 2: TCP/IP Architecture |
| 2    | Lesson 3: Internet Addressing |
| 3    | Lesson 4: Network Access Layer |
| 4    | Lesson 5: Internet Layer |
| 5    | Lesson 6: Transport Layer |
| 6    | Lesson 7: Domain Name System |
| 7    | Lesson 8: Address and Parameter Allocation for TCP/IP Hosts |
| 8    | Midterm  
Course Assessment and/or quizzes from Week 1 through Week 4 |
Advanced TCP/IP Concepts and Practices
Lesson 1: Routing

10 Lesson 2: TCP/IP Troubleshooting Tools—Files, Protocols and Commands

11 Lesson 3: Troubleshooting TCP/IP Networks
Lesson 4: Network Management Fundamentals

12 Lesson 5: SNMP History, Process and Architecture
Lesson 6: The Management Information Base

13 Lesson 7: SNMP in the Enterprise
Lesson 8: IPv6—Introduction and IPv4 Comparison

14 Lesson 9: IPv6 Header and Extension Header

15 Lesson 10: IPv6 Address Architecture
Final Course Assessment and/or quizzes from Week 9 through Week 15.

II. Course Objectives*:

A. Develop a working understanding of the terminology, HPC internetworking hardware devices, current WAN internetworking technology. I, III

B. Exhibit a knowledge of WAN services implementation and configuration. I, II

C. Demonstrate use of high speed internetworking plans and protocols. I, III, V

D. Write well-documented methods of maintaining HPC networks. I, II, V

E. Use troubleshooting skills to solve high speed internetworking problems. I, IV

*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. Technological Literacy Outcome, Transitional Strategy, Active Learning Strategy

2. Examine and implement solutions to challenging internetworking. 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. Transitional Strategy, Active Learning Strategy

5. Prepare documents explaining the route for troubleshooting WAN configurations. Technological Literacy Outcome, Transitional Strategy

6. Practice elements of the work ethic such as punctuality, professionalism, dependability, cooperation, and contribution. Active Learning Strategy

*Strategies and outcomes listed after instructional processes reference TBR's goals for strengthening general education knowledge and skills, connecting course work 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:

Unit exams and security lab exercises will be averaged for the overall grade. Teamwork may increase or decrease that total by 10%

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:

- Homework practice problems and designs
- Pop-Quizzes and "Outside-Class" take-home assignments may be given.

E. Grading Scale:

- 90 - 100% A
- 80 - 89% B
- 70 - 79% C
- 61 - 70% D
- 0 - 60% F

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:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:
- Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
- In addition to other possible disciplinary sanctions that may be imposed as a result of academic misconduct, the instructor has the authority to assign either (1) an F or zero for the assignment or (2) an F for the course. (Pellissippi State Catalog).

C. Accommodations for disabilities:

If you need accommodation because of a disability, if you have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please inform the instructor immediately. Privately after class or in the instructor's office.
To request accommodations students must register with Services for Students with Disabilities: Goins 127 or 131, Phone: (865) 539-7153 or (865) 694-6751 Voice/TDD.

D. Other Policies:

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