

**RARITAN VALLEY COMMUNITY COLLEGE  
ACADEMIC COURSE OUTLINE**

**CISY 258 – Introduction to Network Planning, Routing and Switching**

**I. Basic Course Information**

- A. Course Number and Title: **CISY-258, *Introduction to Network Planning, Routing and Switching***
- B. New or Modified Course: **Modified**
- C. Date of Revision: Semester: **Fall** Year: **2013**
- D. Sponsoring Department: **Computer Science (CS)**
- E. Semester Credit Hours: **3**
- F. Weekly Contact Hours: 4 Lecture: **2**  
Laboratory: **2**
- G. Prerequisite: **A grade of C or better in CISY 219 – *Networking Essentials***
- H. Laboratory Fees: **Yes, at current rate**
- I. Department Chair: **Dr. Tom Edmunds;  
tedmunds@raritanval.edu**

**II. Catalog Description**

*Prerequisite: A grade of C or better in CISY 219 - Networking Essentials.* This course provides an introduction to (1) Top Down Network Design and (2) Network Routing and Switching, theory and implementation. Students learn a systematic approach to network design, implementation, testing and documentation. Students are introduced to Routing and Switching theory and learn how to configure hardware routers and switches through hands-on laboratory exercises. Offered in the Fall Semester.

**III. Statement of Course Need**

- A. Computer Networks are a common part of everyday life for business, education, and pleasure. The explosion of the Internet and growing technologies such as and wireless communications, Voice over IP, and Social Networking (Internet II applications) are causing a shortage in Network Engineers and Network Designers. This course is the third of three required courses in the Networking Curriculum and emphasizes a

systematic, top down approach to network design. At the heart of today's networks are Routers and Switches. Network Support personnel are required to have a basic knowledge of the theory of routing and switching as well as to be able to configure Routers and Switches in new and existing networks. Students gain the basic knowledge and skills needed for entry level positions in Network Support and Design.

- B. This course has a lab component. Students require access to the Cisco Academy Networking Lab where they will set up small networks and configure Cisco routers and switches
- C. Transferability of Course: This course may transfer as a Computer Science Elective or as a Free Elective

#### **IV. Place of Course in College Curriculum**

- A. Free Elective
- B. This course meets a program requirement for:
  - 1. Computer Networking, AAS
  - 2. Computer Networking & Security, Certificate – Traditional Emphasis
- C. This course serves as a CIS Elective on the Computer Science Elective List
- D. Course Transferability: a) For New Jersey Schools go to the NJ Transfer website, [www.njtransfer.org](http://www.njtransfer.org); b) for all other colleges and universities, go to their individual websites

#### **V. Outline of Course Content**

- A. First Objective: Top-Down Network Design
  - 1. Understand the four major steps in Top-Down Network Design
  - 2. Gather user requirements business goals, and set technical network goals and objectives that match requirements
  - 3. Design a logical view of the network in terms of services, applications, and network topology
  - 4. Design a physical view of the network in terms of actual network equipment required, physical location of equipment, remote access, security, and both LAN and WAN details
  - 5. Write a test plan for the network

6. Prepare a complete Network Design which incorporates the above five steps

**B. Second Objective: Network Routing and Switching**

1. Basic Routing and Switching Theory and Application
2. Networking Routing Protocols and their Configuration
3. Networking Switching Protocols and their Configuration
4. Introduction to Virtual LANs (VLANs) and their implementation on network switches
5. Trouble shooting Network Routers and Switches
6. Implementation of basic network designs for LANs and WANs

**VI. General Educational and Course Learning Outcomes**

**A. General Education Learning Outcomes**

At the conclusion of the course, students will be able to:

1. Collect and document the User (or Business) Requirements for a Network Design (GE-NJ 1)
2. Demonstrate through a written document or an oral presentation that the final network design satisfies the User (or Business) Requirements (GE-NJ 1)

**B. Course Learning Outcomes**

At the conclusion of the course, students will be able to:

1. Develop and document a Network Design using the four basic phases of the Top Down Network Design process
2. Perform basic Router and Switch configuration for simple WANs and LANs
3. Build a small WAN and LAN network, install a dynamic routing protocol on the routers and VLANs on the switches and demonstrate that inter-VLAN routing is occurring

**VII. Modes of Teaching and Learning**

- A. Traditional Lecture and Classroom Discussion
- B. Small-group work in Network Laboratory

- C. Laboratory Projects with written Reports
- D. Major Network Design Project

### **VIII. Papers, Examinations, and other Assessment Instruments**

- A. The mastery of concepts in both Network Design and Routing and Switching will be assessed through traditional examinations, including a Final Exam
- B. The ability to apply Top Down Network Design techniques will be assessed by a major Project which incorporates all phases of Network Design at a detailed level (may be a written document or oral presentation)
- C. The mastery of skills necessary to install and configure Routers and Switches will be assessed through written reports on laboratory exercises assigned during the course and functioning networks

### **IX. Grade Determinants**

- A. Weekly Homework assignments
- B. Routing and Switching Laboratory projects
- C. Major Project in Network Design (written or oral or both)
- D. Periodic examinations
- E. Final Examination
- F. Class Attendance and Participation

### **X. Textbook: Suggestions**

- A. *Top Down Network Design, Third Edition*, Oppenheimer, Priscilla, Cisco Press 2011

(Please note: The course outline is intended only as a guide to course content and resources. Do NOT purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.)

### **XI. Resources**

- A. Computer Access for research and documentation
- B. Networking equipment able to connect student machines and other PCs – isolated from the RVCC Network – requires access to the Cisco Academy Networking Lab routers and switches