Rowan College at Burlington County

Course Syllabus

Division of Science and Mathematics			
Department	Computer Information Systems		
Faculty Member	Jonathan David		
Course Title	Networking Fundamentals		
Course Number	CIS 150-500	**Credits**	4
Prerequisites	CIS 101 or EET 101 or CIS 138 or permission		
Co-requisite	CIS 138		
# of Lecture Hours		**# of Lab Hours**	2
Semester	Fall 2023	**Location**	online
Course Start Date	09/1/2023	**Course End Date**	12/20/2023
Meeting Information	Meeting room is in TEC317 Mondays and Wednesdays Start Time: 5:00 PM End Time: 7:20 PM		
Coordinator:	Aloysius Nagbe		
Coordinator Email	jdavid@rcbc.edu	Phone	856-222-9311 ext.2026

Faculty Contact Information	
Email: Jdavid@rcbc.edu Phone:856-222-9311 Web Site: Office: online Goggle meet	**OFFICE HOURS:** **Monday: Available by appointment** **Tuesday: Available by appointment** **Wednesday: Available by appointment** **Thursday : Available by appointment** **Friday: Available by appointment**
Alternate Contact: Associate Dean: Dr Elizabeth Price	Email: eprice@rcbc.edu

Campus Resources	
Transfer Center	Evans Hall, Room 172 Monday - Friday: 8:30 am - 5 pm transfer@rcbc.edu (856) 222-9311, ext. 2737
Career Services Center	Student Success Center Monday - Friday: 9 am - 5 pm (856) 222-9311, ext. 2056 CareerServices@rcbc.edu

Tutoring Center	Student Success Center, Room 209 (856) 222-9311, ext. 2096 Monday: 9:30 am - 4 pm Tuesday: 9:30 am - 4 pm Wednesday: 9:30 am - 4 pm Thursday: 9:30 am - 4 pm
	Friday: Closed Saturday: 9:30 am - 1:30 pm Sunday: Closed

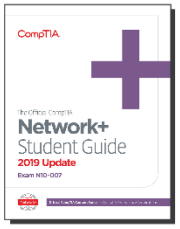
Section 2

Course Description

This course emphasizes the knowledge and application of basic concepts of networking technology. It presents the OSI model, industry standards, network topologies, IP addressing, subnet masking, networking components, and basic network design. Students will gain hands-on experience in basic network infrastructure design, troubleshooting, testing. It will provide students the necessary skills to pass the COMPTIA Network + Certification exam

Required Text and Other Materials

The Official CompTIA Network+ Student Guide (Exam N10-007) 2019 update Print (includes eBook code)



ISBN: NET-007-SPBK-20-C

CompTIA Labs for Network+ (N10-007) 2019 Update - Student License

ISBN: NET-007-CLBS-20-C

Flash Drive: External Hard disk required for assignments and exercise

Remote Access: Computer with Internet access, Speaker and a Microphone

Course Learning Outcomes

- Demonstrate knowledge of topologies, protocols, terminology and architectures associated with both LAN and WAN, including Wireless Network
- Install, configure and troubleshoot, routers, firewalls, wireless devices, switches and cabling.
- Configure, analyze and design TLP/IP based network, including DST model, TCP/IP protocol suite and network traffic
- Install, configure, and implement concepts and tools such as cloud computing, DNS, DHCP, FTP, SMTP, wireless tools, network analyzer and security concepts.
- Install and configure Windows and Linux based operating systems in a virtual and simulated production environment, individually and as a team.

Course Objectives	
• Explain OSI Model Layers • Explain properties of network traffic • Install and configure switched networks • Configure IP Networks • Install and Configure routed networks • Configure and monitor ports and protocols • Explain network application and storage issues • Monitor and troubleshoot networks	• Explain network attacks and mitigations • Install and configure security devices • Explain authentication and access controls • Install and configure security devices • Explain authentication and access controls • Deploy and troubleshoot wireless technologies • Compare and contrast WAN technologies • Use remote access methods • Identify site policies and best practices
General Learning Outcomes	
· Written and Oral Communication: Communication	
○ Students will logically and persuasively support their points of view or findings. · Technological Competency or Information Literacy: Technology ○ Students will demonstrate competency in office productivity tools appropriate to continuing their education. ○ Students will use critical thinking skills for computer-based access, analysis, and presentation of information. ○ Students will exhibit competency in library online database tools appropriate to accessing information in reference publications, periodicals and bibliographies. ○ Students will demonstrate the skills required to find, evaluate, and apply information to solve a problem.	
Course Content	

• Explain OSI Model Layers • Explain the TCP/IP Suite • Deploy Ethernet Standards • Configure and Monitor Network Interfaces • Install and Configure Hubs and Bridges • Install and Configure Switches • Compare and Contrast Network Topologies • Compare and Contract Network Types • Configure IPv4 Addressing Components • Test IP Interfaces with Command Line Tools • Configure IPv4 Subnets • Configure Private and Public IPv4 Addressing Schemes • Configure IPv6 Addressing Components • Explain Characteristics of Routing • Install and Configure Routers • Explain the Uses of Ports and Protocols • Use Port Scanners and Protocols Analyzers • Explain the Uses of Network Application Services • Explain the Uses of Name Resolution Services • Configure DNS and IPAM Services • Explain the Uses of Network Application Services • Explain the Uses of Voices Services and Advanced Networking Devices	• Explain the Uses of Virtualization and Network Storage Services • Summarize the Concept of Cloud Services • Monitor Network Interfaces and Logs • Explain Network Troubleshooting Methodology • Troubleshoot Common Network Services Issues • Summarize Common Networking Attacks • Characteristics of VLANs, NAT and Port Forwarding • Install and Configure Firewalls and Proxies • Explain the Uses of IDS/IPS and UTM • Authentication Controls and Attacks and Directory Services • Uses of Port Security and NAC • Implement Network Device Hardening • Explain Patch Management and Vulnerability Scanning Processes • Deploy Structured Cabling Systems, Twisted-pair Cabling solutions, Wireless Technologies. • Troubleshoot Wireless Performance Issues • Secure and Troubleshoot Wireless Connectivity • Compare and Contrast WAN Core Service Types, WAM Subscriber Service Types, WAM Framing Service Types and Wireless and IOT WAN Technologies • Manage a Network with Documentation and Diagrams • Purposes of Physical Security Devices • Compare and Contrast Business Continuity and Disaster Recovery Concepts • Identify Policies and Best Practices

SECTION 2:

Course and Classroom Policies:

Expectations: Students are expected to attend class, be prepared having read the text chapter beforehand, complete assignments, and to participate in discussions. Students are expected to complete and submit assignments on or before the due date. Students are expected to conduct themselves in a professional manner in classes and labs.

Required email: Students are assigned an email account by the college

(*firstname_lastname@mymail.rcbc.edu*). Students are expected to use this account to correspond with the instructor and to include CIS ###(### represent the course number) in the subject line.

Attendance:

- Students are expected to attend all classes.
- Coming to class late and/or leaving class early without prior permission from the instructor will be counted as an absence.
- All materials will be collaborated as in class exercises and discussions. Attending all classes is the key to success in this class, since all projects/exams will be based on those materials that are covered in the class. Computer Usages
- Students are not allowed to use computers for any other purposes except for lecture notes during lectures and for practical.
- Student will be asked to leave the room if he or she persists to use a computer.
- Printing is not permitted during lectures.

Late Work Policy

- All course work must be completed by the deadline, if it is not submitted by the deadline the following will occur:
    - A total of 10 points will be deducted for each week until the 5th week after the 5th week a student will receive a grade of 0.
    - All late work must be submitted via Blackboard no work should be e-mailed to the instructor.

Requesting Work

- If a student has prior engagements, that student can request to have work completed and submitted so the work can be submitted on time

<u>Criteria for Grade Determination:</u>

15 Week Assessments:

- There are two exams a Midterm and a Final ○ There will be 13 Quizzes, one per week ○ There will be a 13 Discussion Boards one per week
- Most projects will be started in class through in-class exercises. Submitting assignments after the due date will result in loss of grade points.
- No quiz or discussion board will be given on the week of the Midterm and Finals

Tests/Exam

"Makeup" tests/exams and assignments will be accepted at the instructor's discretion and can result in loss of grade points. Make up tests will be allowed only in extraordinary situations. I have a problem with my car is not an acceptable excuse.

Project

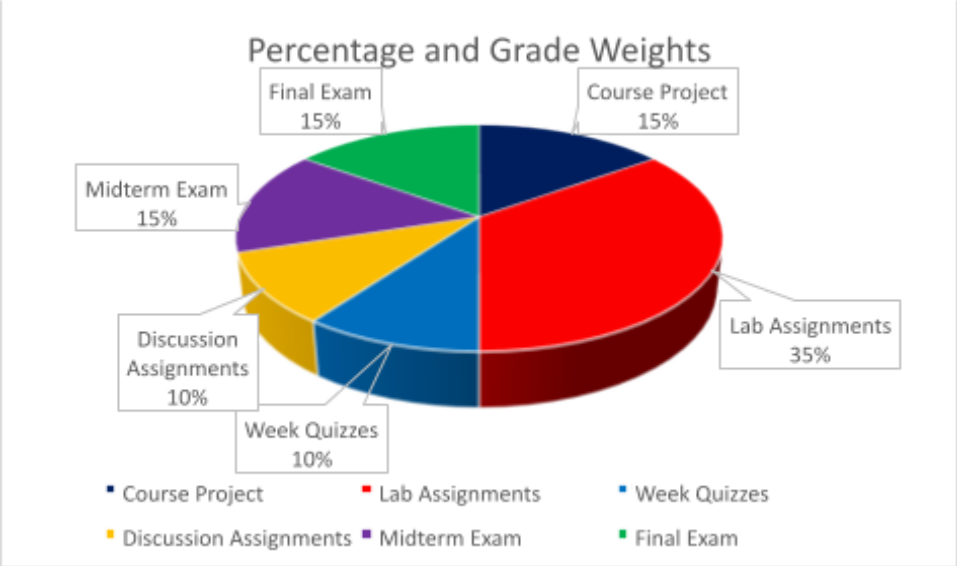
The course project will demonstrate the student's ability to configure, troubleshoot, design and test a computer network. It will also demonstrate the written, documentation and research skills. Overall the course project will show relevance to real world scenarios and also prepare them for specific IT entry level jobs. There will be a rubric used for grading purposes.

Class Participation

Class participation can be a combination of attendance, seeking help from the instructor or tutor, and classroom activities.

Weighting of Assessments: A student's final grade in the course will be determined using the following percentage:

Activity	Percentage Grade Weights
Course Project	**15%**
Lab Assignments	**35%**
Weekly Quizzes	**10%**
Discussion Assignments	**10%**
Midterm Exam	**15%**
Final Exam	**15%**
Total	**100%**



Grade Determination:

Letter Grade	Percentage Grade Range
A	**90-100%**
B+	**85-89.99%**
B	**80-84.99%**
C+	**75-79.99%**
C	**70-74.99%**
D	**60-69.99%**
F	**< 60%**

Tentative Schedule

15-Week Course Outline

Week	Sessions	Topics	Chapter Readings	Assignments/Labs/Projects Lab Activities (VM-based or workbench-based	Assessments
1	1&2	Welcome and Course Introduction Homework – Read ahead Lessons 1 & 2 Homework- Labs Lesson 1: Explaining the OSI and TCP/IP Models 01A: Explain OSI Model Layers 01B Explain the TCP/IP Suite 02A: Explain Media Types and Access Methods Lesson 2: Explaining Properties of Network Traffic 02B: Deploy Ethernet Standards 02 C: Configure and Monitor Network Interfaces Review Lessons 1 and 2	Lessons 1 &2	1. **Discussion Assignment** 2. **Lab Research IT and Networking Job Opportunities** 3. **2c: Exploring the Lab Environment**	**Quiz 1**

2	3&4	Homework- Read ahead Lesson 2 and 3 Homework – labs Lesson 3 Installing and Configuring Switched Networks 03A: Install and Configure Hubs and Bridges 03B: Install and Configure Switches 03C: Compare and Contrast Network Topologies 03D: Compare and Contrast Network Types	Lesson 3	1. Discussion Assignment 2. Week 2 Labs: 02C: Configuring Ethernet Networking – Parts 1 and 2 03D: Designing a Switch Topology	**Quiz 2**
3	5&6	Lesson 4 Configuring IP Network Homework - read ahead Lesson 4 Homework - labs 04A: Configure IPv4 Addressing Components 04B: Test IP Interfaces with Command Line Tools *Break* 04C: Configure IPv4 Subnets Review Lesson 4	Lesson 4	1. Discussion Assignment 2. **Week 3 Labs:** 4B: Configuring IPv4 Networking 4C: Designing an IP Subnet	**Quiz 3**
4	7&8	Homework - read ahead *Lesson 4: Configuring Network IP* Homework - labs 04D: Configure Private and Public IPv4 Addressing Schemes *Break* 04E: Configure IPv6 Addressing Components	Lessons 4	1.Discussion Assignment 2.Week 4 Labs 04C: Configuring IPv4 Subnet 04D: Designing VLSM Subnet 04E: Configuring IPv6 Networking	**Quiz 4**
5	9&10	Homework - read ahead Lessons 4 and 5 Homework - labs Lesson 04F: Configure DHCP Services Lesson 05: Installing and Configurin Routed Networks 05A: Explain Characteristics of Routing 05B: Install and Configure Routers	.essons 5	1. Discussion Assignment 2. Week 5 Labs 04F: Configuring Address Assignments 05A: Designing a Branch Office Internetwork	**Quiz 5**

		Review Lessons 4 and 5			
6	11&12	Homework - read ahead Lessons and 6 Homework - labs Lesson 6: Configuring and Monitoring Ports and Protocols 06A: Explain the Uses of Ports and Protocols 06D: Use Port Scanners and Protocol Analyzers Review Lessons 5 and 6 Review for the Midterm Exam	Lessons 6	1. Discussion Assignment 2. Week 6 Labs 05B: Configuring Routing 06A: Using Port Scanning Tools 3. Group Project member selection.	**Quiz 6**
7	13 &14	Review Homework - read ahead Lessons and 7 Homework - labs Lesson 6: 06c: Explain the Use of Name Resolution Services 06D: Configure DNS and IPAM Services Break 07A: Explain the Uses of Network Application Services Review Lessons 6 and 7	Lessons 7	1. Week 7 Labs 06D: Configuring DNS Servers	**Midterm Exam**
8	15 & 16	Homework - read ahead Lesson 7 and 8 Homework - labs 7B: Explain the Uses of Voice Services and Advanced Networking Devices 7C: Explain the Uses of Virtualization and Network Storage Services Break 07D: Summarize the Concepts of Cloud Services	Lessons 8	1. Discussion Assignment 2. Week 8 Labs Configuring Application Protocols (CompTIA Lab) 08A: Using Event Management and Performance Monitors	**Quiz 7**

		Review Lesson 7 and 8			
9	17 & 18	Homework - read ahead Lessons 8 and 9 Homework - labs 08A: Monitor Network Interfaces and Logs Break 08B: Explain Network Troubleshooting Methodology 08C: Troubleshoot Common Network Services Issues 09A: Summarize Common Networking Attacks Review Lessons 8 and 9	Lessons 9	1. Discussion Assignment 2. Week 9 Labs 08C: Troubleshooting Network Issues	**Quiz 8**
10	19 & 20	Homework - read ahead Lessons 9 and 10 Homework - labs 09B: Explain the Characteristics of VLANs 09C: Explain the Characteristics of NAT and Port Forwarding 10A: Install and Configure Firewalls and Proxies Break 10B: Explain the Uses of IDS/IPS and UTM Review Lessons 9 and 10	Lessons 11	1. Discussion Assignment 2. Week 10 Labs 10A: Configuring a NAT Firewall	**Quiz 9**
11	21&22	Homework - read ahead Lesson 11 Homework - labs 11A: Explain Authentication Controls and Attacks 11B: Explain the Uses of Authentication Protocols and Directory Services Break 11C: Explain the Uses of Port Security and NAC 11D: Implement Network Device Hardening	Lessons 12	1. Discussion Assignment 2. Week 11 Labs 11B: Securing Appliance Administration with RADIS Authentication	**Quiz 10**

		11E: Explain Patch Management and Vulnerability Scanning Processes Review Lesson 11			
12	23 & 24	Homework - read ahead Lesson 12 and 13	Lessons 13	1. Discussion Assignment 2. Week 12 Labs 13C: Configuring Wireless Router	**Quiz 11**
		Homework - labs 12A: Deploy Structured Cabling Systems 12B: Deploy Twisted-pair Cabling Solutions 12C: Test and Troubleshoot Twisted-pair Cabling Solutions 12D: Deploy Fiber Optic Cabling Solutions *Break* 13A: Install and Configure Wireless Technologies 13B: Troubleshoot Wireless Performance Issues 13C: Secure and Troubleshoot Wireless Connectivity Review Lesson 12 and 13		3. Capstone Project Part 1: Written Report	
13	25 & 26	Homework - read ahead Lessons 14 and 15 Homework - labs 14A: Compare and Contrast WAN Core Service Types 14B: Compare and Contrast WAN Subscriber Service Types 14C: Compare and Contrast WAN Framing Service Types 14D: Compare and Contrast Wireless and IoT WAN Technologies *Break* 15A: Use Remote Access VPNs 15B: Use Remote Access Management Methods	Lessons 14	Labs: 15B: Configuring Secure Access Channels	**Quiz 12**

		Review Lessons 14 and 15			
14	27 &28	Homework - read ahead Lesson 16 Homework - labs 16A: Manage a Network with Documentation and Diagrams 16B: Summarize the Purposes of Physical Security Devices 16C: Compare and Contrast Business Continuity and Disaster Recovery Concepts Break 16D: Identify Policies and Best Practices Review Lesson 16	Review for the Final Exam	Final Course Project Part 2: Capstone Project Presentation	**Final Exam Review**
15	**29 & 30**	Course Review / Q & A *Break* Practice Exam **Final Exam Review**			**Final Exam**

Capstone Final Course Project Requirements:

1. Drawings showing a map of cable runs and placement of wiring rooms for networking devices FOR EACH FLOOR made in MS Visio or another graphic drawing program.
2. Excel spreadsheet listing supplies and equipment with prices.
3. Excel spreadsheet listing installation labor costs, as well as any other labor costs you feel are appropriate to the bid.
4. Documentation in Word or Excel showing your proposed subnetting scheme.
5. Presentation using PowerPoint or other presentation software to be given to the customer.
6. Written report to be given to the customer that details your bid plan (this includes a copy of your presentation slides and a compilation of deliverables 1-4 neatly bound in a binder/report folder).

(Online) 10-Week Course Outline- Summer Schedule

10 Week Assessments:

- There are two exams a Midterm and a Final ○ There will be 13 Quizzes, one per week
- There will be 13 Discussion assignments, one per week
- Most projects will be started in class through in-class exercises. Submitting assignments after the due date will result in loss of grade points.

- No quiz or discussion board will be given on the week of the Midterm and Finals

****** Subject to change without notice.**

SECTION 3:

College Policies:

In order for students to know their rights and responsibilities, all students are expected to review and adhere to all regulations and policies as listed in the College Catalog and Handbook. The current college catalog and student handbook are important documents for understanding your rights and responsibilities as a student in the BCC classroom. Please read your catalog and handbook as they supplement this syllabus, and can be accessed at rcbc.edu/publications . Important policies and regulations include, but are not limited, to the following:

- College Attendance Policy
- Grading Standards ○ Withdraw (W) and Incomplete Grades (I & X) ○ Withdrawal date for this semester – Academic Calendar
- Student Code of Conduct ○ Academic Dishonesty/Plagiarism and Civility
- Use of Communication and Information Technology

Academic Integrity Code

- *Plagiarism* – Plagiarism includes copying or paraphrasing another's words, ideas, or facts without crediting the source; submitting a paper written by someone else, either in whole or in part, as one's own work; or submitting work previously submitted for another course or instructor. Plagiarism on any assignment will result in failure for that assignment and may result in further disciplinary action, including but not limited to failure for the course. Please refer to the Student Handbook for additional information regarding plagiarism and College regulations.

- *Texting, Cell phones, and Laptops* – should be turned off in class or the ringer must be turned to silent. No texting is allowed in class during instruction time.

- *Internet and Other Computer Use* – all students are required to abide by established RCBC computer and Internet use procedures and regulations. Willful damage to or misuse of RCBC computers and/or software will be considered a violation of the RCBC Student Code of Conduct. Criminal prosecution may also result. This applies to IPODS, games or electronics of any kind, instant messenger, and social media.

Student Conduct Code - We shall abide by the expectations outlined in the Student Handbook (page 106-112). RCBC students are accountable according to the standards established in this policy. http://www.rcbc.edu/PDFFiles/publications/1314Handbook.pdf

Tutoring - RCBC offers free tutoring for all currently enrolled students. For more information regarding the Tutoring Center, please call extension 1495 at (609) 894-9311 or visit the Tutoring Center website at: http://www.rcbc.edu/pages/218.asp

Academic Advisement – RCBC provides Academic advising and free referral services to all students through the office of Academic Advising. For more information, visit the drop in centers at the Lewis Parker Center (Pemberton Campus) or Laurel Hall (Mt. Laurel Campus). Call extension 7337 at (609) 894-9311 or (856) 2229311 or visit the website at: *http://www.rcbc.edu/pages/206.asp*

Library Resources – The RCBC Library provides access to the information resources you need to succeed in your studies, including books, journals and databases. Library Information Specialists provide support in finding and utilizing these resources. Library services are available at the Pemberton and Mount Laurel campuses and online. In Pemberton you can visit the Library located in the William K. McDaniel Integrated Learning Resource Center (ILRC), in Mt. Laurel at the Technology and Engineering Center (TEC) and online at http://staff.rcbc.edu/library. Online services include IM Chat, text, and phone support during regular hours and access to a wide variety of journals and databases 24/7/365 from both on and off campus. Library hours are posted in the libraries and on the library website.

Office of Student Support and Disability Services: RCBC welcomes students with disabilities into the college's educational programs. Access to accommodations and support services for students with learning and other disabilities is facilitated by staff in the Office of Student Support (OSS). To receive accommodations, a student must contact the OSS, self-identify as having a disability, provide appropriate documentation, and participate in an intake appointment. If the documentation supports the request for reasonable accommodations, the OSS will provide the student with an Accommodation Plan to give to instructors. For additional information, please contact the Office of Student Support at 609-894-9311, ext. 1208, disabilityservices@rcbc.edu, or rcbc.edu/studentsupport.

Educational Technology Statement: Rowan College at Burlington County (RCBC) advocates the use of technology to enhance instruction. Students should assume that classroom and online technology will be used throughout their coursework at RCBC, as it will most certainly be used in their future education and careers. The College provides oncampus facilities for the convenience of the RCBC community. Various college departments, including the Office of Information Technology and the Office of Distance Education, provide technology training and assistance to faculty and students.

Student Success Services: RCBC offers a variety of free services for its students including those listed below. Descriptions of these services, as well as many others, can be found in the College Catalog and Handbook and on the RCBC website at rcbc.edu/publications.

- Academic Advisement (rcbc.edu/advising)
- Career Services (rcbc.edu/careers)
- Educational Opportunity Fund (EOF) (rcbc.edu/eof)
- Financial Aid (rcbc.edu/financialaid)
- International Students Office (rcbc.edu/international)
- Library/Integrated Learning Resource Center (ILRC) (rcbc.edu/library)
- Office of Veteran Services (rcbc.edu/vets)
- Student Support Counseling (rcbc.edu/cpit)
- Tutoring Center (rcbc.edu/tutoring)
- Test Center (rcbc.edu/testcenter)
- Transfer Services (rcbc.edu/transfer)