**Course Name:** Essentials of Networking

**Course Number:** CISC143

**Semester** FALL 2017 Section: N82

**Class Sessions:** Tuesday Evenings, 6:30PM – 9:45PM

**Classroom:** Portable #4

**Instructor Name:** James Bowe

**Contact Information:** Email: [james.bowe@bucks.edu](mailto:james.bowe@bucks.edu)

# Telephone: **215-880-4532** *(mobile)*

**Office Hours:** While I do not have a permanent office on campus, I’m available via phone, text or email and with a little advance notice face-to-face meeting on Campus.

If you need to speak with me, please send a text first including your name and I will either call you back or text you with a time that I’m available to talk.

We can also meet online using Join.Me

If your question is urgent, please indicate so in your message.

**Course Materials:** Textbook: *Network+, Guide to Networks*, 7th Edition, Dean

Cengage Learning ISBN 13: 978-1-305-09094-1

**DO NOT PURCHASE THE LAB BOOK!**

Equipment: External USB 1Tb Hard Drive

(3) USB 2.0 16Gb Flash Drives

Wired Headset w/ Mike and 3.5mm plugs, and 2-to-1 Y connector would also be helpful to plug your headset into your phone.

**Technology Requirements:**

Basic computer skills and an Internet connection are required for most of the assignments in this course.

Help is available at the Technology Learning Center, if needed. Check their webpage:

<http://www.bucks.edu/old_docs/academics/tlc/TechnologyUser.pdf>

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Library computers can be used to submit work to Canvas, but not to complete the labs. To complete labs

at home, your computer must capable of running several operating systems using virtual machines - so it must be fairly new and robust.

(**Check the info here:** <http://www.virtualbox.org/wiki/End-user_documentation> )

Please contact your instructor if you are not sure about the your system.

There is generally not enough time in class to complete all of the lab work. If you do not have a computer at home, you may work at the college in **Gateway 129/128** during posted open lab hours (hours are very limited).

**Grading:**

**Quizzes**

During the semester, students will be given 12 weekly quizzes, 1 for each of the textbook chapters and lectures.

**Midterm and Final Exams**

During the semester, students will be given two major exams covering chapters in the textbook and material reviewed in class. The Final Exam will be a cumulative exam covering all semester readings, lectures and course materials.

**Labs**

Students will be expected to complete weekly lab assignments. All lab assignments are to be emailed to [james.bowe@mycompteacher.com](mailto:james.bowe@mycompteacher.com). See Lab Assignment Submissions in the documents section of the course canvas site

**Attendance**

Consistent attendance is critically important as the material in this course is cumulative in nature. Students are expected to attend class regularly and be on time. If a student is running late they should send a text message alerting the instructor (# 215.880.4532). Students with three or more unexcused absences will have their final grade reduced by 1 letter grade.

**Grade Distribution**

Quizzes 10%

Midterm & Final Exam 30%

Labs 40%

Final Project 10%

Attendance & Participation 10%

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100%

Course Description:

This lecture and laboratory course introduces the fundamental properties of data transmission and computer networks. This course is organized with the same objectives of the CompTIA Network+ Certification (Exam N10-006). Topics include: data transfer, the OSI and TCP/IP models, protocols, WAN and LAN topologies, devices and media, security and troubleshooting. This course provides basic background for other networking courses and industry certifications.

Students will be given the opportunity to gain **extensive** hands-on experience in the laboratory. Course labs will consist of everything from configuring a typical home router to network servers.to a corporate network consisting of many user workstations and servers, spanning a large geographic area. A large portion (40%) of the student final grade will be based on their lab assignments.

**This course meets the General Education requirement for Scientific Literacy.**

#####  Course Learning Goals

Students will:

1. explain the OSI (Open Standards Interface) and TCP/IP (Transmission Control Protocol/Internet Protocol) models and how they define data transmission;
2. describe and configure important network protocols and implement logical addressing schemes;
3. configure, maintain, and troubleshoot network connectivity devices and transmission media;
4. implement network architecture with basic network security, including encryption;
5. explain the scientific method of analysis and apply it in a variety of situations to solve networking problems, including data transmissions errors, hardware faults, malware, and configuration errors [Scientific Literacy]; and
6. given a scenario, plan and implement a basic SOHO (small office/home office).

#####  Planned Sequence of Topics and/or Learning Activities

**Course Outline:**

1. Standards and the OSI and TCP/IP Models
   1. OSI (Open Standards Interface) seven layer model
      1. Data encapsulation
      2. Packets and frames
   2. TCP/IP (Transmission Control Protocol/Internet Protocol) model
   3. 802.X standards and transmission methods
      1. 802.3 Ethernet
      2. 802.11 wireless
      3. 802.16 mobile
   4. Standards organizations
2. Addressing
   1. Logical vs. Physical addressing
   2. Binary and hexadecimal number systems
   3. Subnetting, supernetting, and classless inter-domain routing (CIDR)
   4. IPv4 and IPv6
   5. Dynamic Host Control Protocol (DHCP) vs. Automatic private IP addressing (APIPA)
   6. Purpose and implementation of DNS (Domain Name System)
   7. TCP and UDP (User Datagram Protocol) ports and sockets
3. Transmission and Media
   1. Media types and characteristics
      1. Copper
      2. Fiber
      3. Wireless
   2. Data transmission concepts
      1. Digital vs. analog transmission
      2. Electromagnetic light and radio waves
      3. Duplexing
      4. Attenuation, latency, and noise
   3. Structured cabling
      1. Wiring standards
      2. Backbone structures
4. Topologies
   1. Logical
   2. Physical
5. Connectivity Devices
   1. Network interface cards
   2. Repeaters/hubs
   3. Bridges/switches
   4. Routers/gateways
   5. Modems
6. WANs (Wide Area Networks) and Remote Connectivity
   1. Packet vs. circuit switching
   2. WAN transmission systems
      1. Phone lines - PSTN, ISDN, DSL
      2. Fiber optic - FTTP
      3. Frame relay, x-25
      4. ATM
      5. SONET
   3. Remote access and VPNs (virtual private networks)
7. Routing and Switching
   1. Routers and other layer-3 devices
      1. Routing tables
      2. NAT (network addressing translation)
      3. Routing protocols
      4. Filtering
   2. Switches
      1. VLAN (virtual LAN) and trunking
      2. Store-and-forward vs. cut-through switching modes
   3. Broadcast domain vs. collision domain
8. Wireless network
   1. WLAN (wireless LAN) architecture
   2. Obstacles including interference and reflection
   3. Wireless access points and encryption (WEP, WPA)
9. Virtualization
   1. Virtual network components
   2. Virtual servers
   3. Virtual desktops and thin clients
   4. Cloud computing and NaaS (Network as a Service)
10. Converged networks
    1. VoIP (voice over IP)
    2. Video-over-IP
    3. QoS (quality of service) assurance methods
11. Network Security
    1. User authentication protocols (PKI, RADIUS, TACACS+, Kerberos, CHAP, MS-CHAP, and EAP)
    2. Firewalls
    3. Protocols
    4. Wireless encryption
    5. Honeypots
    6. Common threats
       1. Social engineering
       2. Malware - viruses, worms, Trojans
       3. DoS (Denial-of-service) attacks
       4. Botnets and zombies
       5. Policies, procedures, and incident response
12. Network Design, Implementation and Maintenance
    1. Protocol analyzers and packer sniffers
    2. Fault tolerance
    3. Monitoring performance
    4. Disaster recovery
13. Network troubleshooting methodology
    1. Systematic troubleshooting process
    2. Documentation
    3. Software and hardware tools

**Academic Integrity Policy**

The expectation at Bucks County Community College is that the principles of truth and honesty will be rigorously followed in all academic endeavors. In support of this aim, Bucks County Community College requires all students to exhibit academic integrity in all their academic work.

A culture of academic integrity is built upon respect for others’ work, commitment to doing one’s own work, and intolerance for academic dishonesty in all its forms. This assumes that all work will be done by the person who purports to do the work without unauthorized aids. In addition, when making use of language and some idea not his or her own, whether quoting them directly or paraphrasing them into his or her own words, the student must attribute the source of the material in some standard form, such as naming the source in the text or offering a footnote.

Individual instructors are responsible for completing the Academic Integrity Incident Reporting Form within fourteen (14) days of the discovery of an offense. The instructor should complete the Academic Integrity Incident Reporting Form using the Maxient reporting tool, which reports the incident to the Provost. The incident will be recorded, and a notice to the student will be generated and delivered to the Dean of the department in which the charge was made, for signature and delivery to the student. The Provost will also notify the student’s Academic Dean and the Vice President, Student Affairs. Instructors should always complete the Academic Integrity Incident Reporting Form as a First Recorded Offense unless contacted by the Office of the Provost to resubmit the Incident Reporting Form as a Second Offense.

No information pertaining to the offense shall be disclosed to external entities such as colleges, employers, or agencies, except upon subpoena or by written permission of the student.

**Penalties for Violations**

First Recorded Offense

The instructor will:

Issue an automatic failing grade (F) for the work in question, e.g., quiz, essay, or examination. File the Academic Integrity Incident Reporting Form. The facilitator/impersonator, if enrolled in the course, will be subjected to the same penalty.

File the Academic Integrity Incident Reporting Form when the student is not enrolled in the course and has impersonated another student or facilitated academic dishonesty.

Second Recorded Offense

The instructor will:

Issue an automatic failing grade (F) for the course. File the Academic Integrity Incident Reporting Form. The facilitator/impersonator, if enrolled in the course, will be subjected to the same penalty.

File the Academic Integrity Incident Reporting Form when the student is not enrolled in the course and has impersonated another student or facilitated academic dishonesty.

Third Recorded Offense

Upon receipt of a third offense on the same student or facilitator/impersonator, the Office of the Provost will notify the instructor and the college will take the following action:

Issue a one-semester suspension from the college.

Appeals

Appeals to all rulings may be made in writing without fourteen (14) calendar days of the disciplinary action. Appeals pertaining to Penalties for Violations of Academic Integrity should be directed to the Dean of the department in which the course is offered. If resolution is not achieved at that level, final appeal is made to the Provost.

**Disability Accommodations**

In compliance with Bucks County Community College policy and equal access laws, support services and appropriate accommodations for qualified students with documented disabilities are available through the Accessibility Office. Students are encouraged to inquire about and register with the Accessibility Office. Information and appointments can be made via phone at (215) 968-8182 or via email at [accessibility@bucks.edu](mailto:accessibility@bucks.edu). More information can be found on the Accessibility Office website:

<http://www.bucks.edu/student/accessibility/> .

The Accessibility Office is located in the Rollins Center, Room 001. Please speak to your instructor about any requests for academic accommodations or other concerns as early in the semester as soon as possible.

**Student’s Responsibility to Retain Course Materials**

Students are always responsible for retaining copies of their own work and/or correspondence, including that posted to a web course page. Student access to a Bucks County Community College web course space is available only during the stated semester/session as indicated by the college’s

Academic calendar. All web course sites, including content, are routinely removed from the server at the conclusion of each semester/session.