

ITEC350: Introduction to Computer Networking – Fall 2022

Async Online

Instructor: Dr. Hwajung Lee

Email: hlee3@radford.edu

Office Hours: TR 1-1:50PM; W 10AM-12PM (Online); T 4-5PM; and by appointment

Required Textbook:

This class has no required textbook.

Evaluation:

Activity	Percent
Midterm Exam	20%
Final Exam	20%
Quizzes & Activities	20%
Homework	5%
Cisco Networking Academy Course	
▪ Reading Assignments & Chap Exams	10%
▪ Pass Certificate Exam	25%
Total	100%

NOTE: **I will not accept late assignments.**

Honor Code:

By accepting admission to Radford University, each student makes a commitment to understand, support, and abide by the University Honor Code without compromise or exception. Violations of academic integrity will not be tolerated. This class will be conducted in strict observance of the Honor Code. Refer to your Student Handbook for details. In this class the student is expected to do all out of class assignments on their own. All violations will be reported. **All assignments are to be done independently unless I specifically say otherwise.**

Special Assistance:

Students seeking academic accommodations under the Americans with Disabilities Act must register with the Center for Accessibility Services (CAS) to determine eligibility. Students qualified for academic accommodations will receive accommodation letters and should meet with each course professor during office hours, to review and discuss accommodations. For more information, call 540-831-6350 or visit <http://www.radford.edu/content/cas/home.html>.

Topics include:

1. Introduction
 - a. Reasons for networking
 - b. Concept and rationale for network layers
 - c. Classification of networks: BAN (body area networks), PAN (personal area networks), LAN (local area networks), MAN (metropolitan area networks), WAN (wide area networks), and Internet
 - d. Network standards and standard bodies
2. Applications and Layered Architectures
 - a. Protocols, services, and layering
 - b. ISO's OSI (open systems interconnection) reference model
 - c. TCP/IP (Transmission Control Protocol/Internet Protocol) protocol stacks
 - d. DNS (Domain Name Systems)
 - e. IP addressing and subnetting
 - f. Connectionless vs. connection-oriented services
 - g. Segmentation and reassembly
 - h. Multiplexing:

- i. FDM (frequency division multiplexing)
 - ii. TDM (time division multiplexing)
 - iii. WDM (wavelength division multiplexing)
- i. Network analyzers
- 3. Digital Transmission Fundamentals
 - a. Line Coding
 - i. unipolar NRZ (non-return-to-zero)
 - ii. polar NRZ, NRZ-inverted differential encoding, bipolar encoding
 - iii. Manchester encoding, differential Manchester encoding
 - b. Error detection and correction
 - i. single parity bit
 - ii. multi-dimensional parity check
 - iii. CRC (cyclic redundancy check) polynomial codes
- 4. Peer-to-Peer Protocols and Data Link Layer
 - a. ARQ (Automatic Repeat Request) protocols and reliable data transfer
 - i. stop-and-wait ARQ
 - ii. go-back N ARQ
 - iii. selective repeat ARQ
 - iv. sliding window protocols
- 5. Medium Access Control Protocols and Local Area Networks
- 6. Packet-Switching Networks
 - a. Routing in packet-switching networks
 - i. centralized vs. distributed routing
 - ii. static vs. dynamic routing
 - iii. flat vs. hierarchical routing,
 - iv. flooding
 - b. Shortest path routings:
 - i. distance vector protocols (Bellman-Ford-Fulkerson shortest path algorithm)
 - ii. link state protocols (Dijkstra shortest path algorithm)
- 7. Communication Networks and Services
 - a. IRP (internet routing protocols)
 - i. RIP (routing information protocol)
 - ii. OSPF (open shortest path first)
 - iii. BGP (border gateway protocol)
 - b. DHCP (dynamic host configuration protocol)
 - c. NAT (network address translation)
- 8. Security Basics