ITMO 340 SYLLABUS

ITMO 340 Introduction to Data Networking and the Internet

Hours: 3 credit hours / 45 contact hours

Instructor: Louis F. McHugh IV

Textbook, title, author, and year: *The Official CompTIA Network+ Student Guide* James Pengelly, 2019

Specific course information

a. Catalog description: This course covers current and evolving data network technologies, protocols, network components, and the networks that use them, focusing on the Internet and related LANs. The state of worldwide networking and its evolution will be discussed. This course covers the Internet architecture, organization, and protocols including Ethernet, 802.11, routing, the TCP/UDP/IP suite, DNS, SNMP, DHCP, and more. Students will be presented with Internet-specific networking tools for searching, testing, debugging, and configuring networks and network-connected host computers. There will be opportunities for network configuration and hands-on use of tools.
b. Prerequisites: None.
c. Required

Specific goals for the course

a. Program Educational Objective
2. Perform requirements analysis, design and administration of computer and network-based systems conforming to policy and best practices, and monitor and support continuing development of relevant policy and best practices as appropriate.
3. Apply current technical and mathematical concepts and practices in the core information technologies and recognize the need to engage in continuing professional development.

b. Course Outcomes:
The course is a foundation course in the basics of Data Communications and Computer Networks. It is intent is to serve as a basis for practical studies in field of Computer Networking and Network Administration. Upon completion, a student should be able to understand how a Computer Network works from both a practical and theoretical perspective. They should understand OSI & TCP/IP Models, Various Networking Protocols, Data Circuits, Switches, and Routers. They will also have an understanding of troubleshooting and management of networks by usage of various tools.

c. Course Student Outcomes:
Each successful student will demonstrate foundation knowledge and application of the following skills:

- Outline the basics components of a computer network using both the TCP/IP protocol suite and the OSI model.
- Identify the various types of network systems, including local area networks, metropolitan area networks, wide area networks, and voice/data delivery networks.
- Enumerate the various transmission media commonly used in carrier systems, i.e. twisted pair, coaxial cable, fiber optic cable, terrestrial microwave, satellite, as well as other wireless technologies.
- Recognize the basics of data communications, including data, signals, conversions between data and signals, encoding techniques, multiplexing, and modulation.
- Identify the various types of error detection and error corrections schemes.
- Identify the basics of T-carrier systems, frame relay, asynchronous transfer mode, DSL, and cable modems, and be able to compare and contrast their characteristics.
- Describe the basic operating procedures of the Internet and how it relates to data and voice communications.
- Enumerate the differences between the wireless telephone systems D-AMPS, TDMA, CDMA, GSM, and others.
- Document the characteristics of local area networks, including hub and switch technologies.
- Complete a case study in which, given a minimum set of requirements, you will recommend wide area network solutions.
- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions **(ABET Computing Criterion 3.1)**
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline **(ABET Computing Criterion 3.2)**
- Identify and analyze user needs and take them into account in the selection, creation, evaluation, and administration of computer-based systems **(ABET IT Criterion 3.6)**

ITMO 340 Topics to be covered

- **a.** Explaining the OSI and TCP/IP Models 1
- **b.** Explaining Properties of Network Traffic
- **c.** Installing and Configuring Switched Networks
- **d.** Configuring IP Networks
- **e.** Installing and Configuring Routed Networks
- **f.** Configuring and Monitoring Ports and Protocols
- **g.** Explaining Network Applications and Storage Services
- **h.** Monitoring and Troubleshooting Networks
- **i.** Explaining Networking Attacks and Mitigations
- **j.** Installing and Configuring Security Devices
- **k.** Explaining Authentication and Access Control
- **l.** Deploying and Troubleshooting Cabling Solutions
- **m.** Implementing and Troubleshooting Wireless Technology
- **n.** Comparing and Contrasting WAN Technologies
- **o.** Using Remote Access Methods
- **p.** Identifying Site Policies and Best Practices