**Instructor:** Md Tariqul Islam

**Office:** In person (323C Hinds Hall) or zoom by request

**Office Hours:** MW 2:00 to 3:00 PM

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**Course Description**

Overview of technology, standards, implementation, and management of digital computer networks. Wired and wireless local and wide area networks, Internet protocols, telecommunications, and network security. Includes weekly labs.

**Additional Course Description**

IST 233 provides a technical and managerial overview of digital computer networks, the foundation for all modern enterprise information systems and Internet cloud services, also the primary conduit for a wide range of security threats. In this course, you will learn about the network software and hardware technologies used on home, service provider and enterprise computer networks, as well as the basic design and operation of such networks. Students will learn how content/information is encoded into digital packets and reliably transported across internal networks like SU’s as well as global networks like the Internet. Special attention will be focused on the increasing frequency and scope of network security threats, including technologies and strategies designed to protect digital assets from attack, as well as the increasing centrality and unique threats associated with mobile networks, Wi-Fi and 4G/5G. This course will emphasize the critical importance of open network standards and protocols, which allow products from a variety of vendors to interoperate while also stimulating market competition and driving down prices for network products and services.

IST 233 employs a blended teaching strategy with weekly learning modules designed to allow students from diverse technical backgrounds to progress in their understanding of computer networking. You will be expected to learn core concepts through guided reading assignments, which include a weekly online assessment. Key textbook concepts and instructor insights will be addressed in two weekly one-hour full-class sessions. You will complete weekly lab assignments, including pre-lab modules and quizzes completed on your own computer prior to attending your assigned weekly lab session in the ITELL network lab. After completing this course, you should be able to intelligently interact with information professionals about computer networking and perform basic network troubleshooting. If you choose to pursue further study in computer systems, networking, or security, a strong performance in this course will provide you with a solid foundation on which you can develop more advanced technical skills.

**Prerequisite(s)**There are no formal prerequisites for this course. Most students will have completed IST 195, which provides a broad overview of information technology.

**Credits**

This is a 3-credit course.

**Learning Objectives**

After the successful completion of this course, students will be able to

* explain the ***basic design and operation of the Internet and the Cloud***, including the key ***design principles*** of ***interoperability, scalability, and high-availability*** and the software and hardware components used to provide **Internet access** and **Cloud services**.
* explore the major ***security vulnerabilities*** associated with **computer networks and Cloud** and the policies, protection strategies and tools that can be used to avoid or mitigate these threats.
* explain key management issues related to **networks, cloud, systems, and security**, and describe the five dimensions of the FCAPS network management model.
* explain and demonstrate how content/information is ***encoded*** and transmitted as a sequence of network ***packets*** transported across ***physical network media***, including copper cables, fiber-optics, and radio channels.
* describe and configure software and hardware required to support and troubleshoot network services using ***Ethernet and Wi-Fi*** local area network technologies.
* explain how the telephone system has been transformed from landline phones using simple voice analog signaling to mobile systems using digital signaling to support multimedia.
* describe the role Internet Service Providers (ISP’s) and telecommunication carriers play in delivering wide area network services to homes and enterprises.
* explain the fundamental characteristics of ***packet-switched data networks*** and the key ***Internet protocols*** that make up the ***TCP/IP communications suite***.
* describe the relationship between the Internet infrastructure and key ***networked application architectures.***
* learn the fundamental ideas behind ***Cloud Computing***, the evolution of the paradigm, its applicability, benefits, as well as current and future challenges.
* apply fundamental concepts in ***Cloud infrastructures*** to understand the tradeoffs in power, efficiency, and cost, and then study how to leverage and manage single and multiple datacenters to build and deploy ***Cloud applications*** that are resilient, elastic, and cost-efficient.
* discuss ***system, network and storage virtualization*** and outline their role in enabling the ***Cloud computing system model***.
* Illustrate the fundamental concepts of ***Cloud storage*** and demonstrate their use in storage systems such as Amazon S3.

**Required Textbook**

Panko, Raymond R. and Julia L. Panko, **Business Data Networks and Security**, Tenth Edition, Pearson Education, 2015. ISBN-13: 978-0133544015. The textbook was designed primarily for Business students studying information systems, not as technical as a Computer Science Intro Networking book, but it is likely to challenge many of you. It is available for purchase in the SU Bookstore and through online sources, including Amazon and eBay. Book rental and paperback global editions are also available. **I strongly recommend acquiring the 10th edition of this textbook.**

**Course Requirements and Expectations**

This course contains ten learning modules that map to chapters in the textbook. Each week, you will complete various tasks related to that week’s module. Exams will be administered at the end of the 4th, 7th and 10th learning modules. To handle the relatively high workload of this class, students are encouraged to develop a structured weekly work schedule. **S*uccessful students should expect to commit between 7 and 8 hours per week to this course***.

**Readings:** Reading is an essential element of this course; it will require some discipline and focus. You will be expected to read a textbook chapter for each learning module and complete an online reading assessment before any material is covered in class. These lectures will include study questions that will serve as the basis for all examination questions.

**Lecture:** Class presentations will emphasize key points from the book while also including additional information and insights your professor has acquired through professional experience. I will do my best to apply this material to real-world scenarios, including home networks, enterprise networks, and service provider networks. I hope you will consider asking questions, even fact-checking my presentations, and bringing issues to my attention. We will also do some live polling during class to give you some familiarity with the types of questions you are likely to encounter on exams. **Successful students ask questions.**

**Weekly Hands-On Labs**: When it comes to technology, hands-on “experiential learning” is essential. Each week, we will introduce a lab topic online and structure a pre-lab learning exercise that you will complete before you do the lab session. You will be guided through a lab exercise by graduate lab instructors. The labs will also be available online for those that need to distance themselves.

# Grading:

***Online Reading Assessments/Quizzes (100 points)****:*

-Ten 10-point assessments on Blackboard.

-Open Book

-Multiple Choice and T/F

-10 Points Each

-3 Tries, highest score recorded.

-Deadline **(see calendar below)**

-No Makeups

**Labs:**

**Prelabs** available at **noon** **Wednesday** on Blackboard in Learning Module for week (see calendar)

-Multiple Choice/ True-False

-10 points

-Two tries highest score recorded.

-Prelabs Due Friday at 9am ET (see calendar)

-No Makeups

**Labs** available at **noon Thursday** in Blackboard (Look in Learning Module for week)

-5 points quiz via Blackboard.

-One try

-Lab Due Friday at 2pm ET

-No Makeups

***Exams (300 total points)****:* There will be 3 exams in this course; Exams will consist entirely of multiple-choice and T/F questions developed by your instructor. ***Make-up exams will be offered only in extraordinary circumstances, and at the total discretion of the instructor.***

***Attendance and Participation:*** An indication of commitment and time management. **Graded**. Will be taken on irregular basis. You must email the instructor if you are to miss a class.

***Blackboard*:** We will make extensive use of SU’s Blackboard Learning Management System in this class. If you have questions regarding technical aspects of Blackboard, please submit a help ticket to the iSchool dashboard at My.iSchool Dashboard at <https://my.ischool.syr>.

***Use of Personal Computers for lab work:*** Students are required to use their own computers to complete some pre-lab assignments. If you do not wish to install software on your computer, you can use the iSchool Remote Lab service. While we always try to choose software that runs on both Windows and Mac OS-X, in some cases, software only runs on Windows.

***E-Mail***: **Students are expected to review and respond to e-mail on their SU account on a daily basis**. Course announcements will be posted on Blackboard and forwarded to each student’s @syr.edu email account.

***Make-Ups:*** None

***Extra-Credit:*** None.

**Grading Matrix**

|  |  |
| --- | --- |
| **Assessment Criterion** | **Total Points** |
| Online reading assessments/quizzes | 100 |
| Exam 1 | 100 |
| Exam 2 | 100 |
| Exam 3 | 100 |
| Prelabs and Labs | 170 |
| Attendance and Participation | 50 |
| **Total** | **620** |

# Grading Tables

| Grades | Grade points /credit | Percentage Range |
| --- | --- | --- |
| A | **4.000** | 100 - 94 |
| A- | **3.667** | 93 - 90 |
| B+ | **3.333** | 89 – 87 |
| B | **3.000** | 86 - 84 |
| B- | **2.667** | 83 - 80 |
| C+ | **2.333** | 79 - 77 |
| C | **2.000** | 76 - 74 |
| C- | **1.667** | 73 - 70 |
| D | **1.000** | 69 - 60 |
| F | **0** | 59 - 0 |

Course Schedule: Week/ lecture, topic for the week/lecture, and required readings are in the columns below.

* Labor Day (no residential classes, University offices closed): Monday, September 4
* Fall Break, excluding LAW (no residential classes): Monday, October 9 – Tuesday, October 10
* Thanksgiving Break (no residential classes, University offices open Monday through Wednesday)

Sunday, November 19 – Sunday, November 26 (Mon-20th, Wed-22nd)

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Topic** | **Readings** | **Tasks/Events** |
| Jan 17 (W) | Course Overview |  | Chapter 1 PDF on Blackboard. |
| Jan 19 (F) | **No Lab** | | |
| Jan 22 (M) | Basic Networking and Introduction to the Cloud | Panko Chapter 1 |  |
| Jan 24 (W) | Basic Networking and Introduction to the Cloud | Panko Chapter 1 | **Reading Quiz #1 – DUE: 12 pm ET** |
| Jan 26 (F) | #1 Basic Network Diagnostic Tools and Packet Analysis | | Prelab Due: 9am ET- Lab Due: 2pm ET |
| Jan 29 (M) | Network Standards & Protocols | Panko Chapter 2 |  |
| Jan 31 (W) | Network Standards & Protocols | Panko Chapter 2 |  |
| Feb 2 (F) | #2 Network Security | | Prelab Due: 9am ET- Lab Due: 5pm ET |
| Feb 5 (M) | Review – How is it going so far | Panko Chapter 1 & 2 |  |
| Feb 7 (W) | Network Security | Panko Chapter 3 | **Reading Quiz #2 – DUE: 12 pm ET** |
| Feb 9 (F) | #3 Network Topology – Visio and Packet Tracer Network Simulation | | Prelab Due: 9am ET- Lab Due: 2pm ET |
| Feb 12 (M) | Network Security | Panko Chapter 3 | **Reading Quiz #3 – DUE: 12 pm ET** |
| Feb 14 (W) | Network Management | Panko Chapter 4 |  |
| Feb 16 (F) | #4 Ethernet – MAC, ARP, VLAN, RSPT | | Prelab Due: 9am ET- Lab Due: 2pm ET |
| Feb 19 (M) | Network Management | Panko Chapter 4 | **Reading Quiz #4 – DUE: 12 pm ET** |
| Feb 21 (W) | **Exam 1 Review** | | |
| Feb 23 (F) | #5 Speed Test – Wired & Wireless | | Prelab Due: 9am ET- Lab Due: 2pm ET |
| Feb 26 (M) | **Exam 1 Chapter 1 - 4** | | All Day ET– 2 hours – Open Book |
| Feb 28 (W) | Ethernet | Panko Chapter 5 |  |
| Mar 1 (F) | #6 WIFI Validation | | Prelab Due: 9am ET- Lab Due: 2pm ET |
| Mar 4 (M) | Wireless Networks I | Panko Chapter 6 | **Reading Quiz #5– DUE: 12 pm ET** |
| Mar 6 (W) | Wireless Networks I | Panko Chapter 6 |  |
| Mar 8 (F) | #7 Servers & Services | | Prelab Due: 9am ET- Lab Due: 2pm ET |
| **SPRING BREAK** (**No Residential Classes): Sunday, March 10 – Sunday, March 17** | | | |
| Mar 18 (M) | Wireless Networks II | Panko Chapter 7 |  |
| Mar 20 (W) | Wireless Networks II | Panko Chapter 7 | **Reading Quiz #6– DUE: 12 pm ET** |
| Mar 22 (F) | #8 TCP/IP & Routing | | Prelab Due: 9am ET- Lab Due: 2pm ET |
| Mar 25 (M) | **Exam 2 Review** | | |
| Mar 27 (W) | **Exam 2: Chapter 5 – 7** | | All Day ET – 2 hours – Open Book |
| Mar 29 (F) | #9 TCP/IP Services | | Prelab Due: 9am ET- Lab Due: 2pm ET |
| Apr 1 (M) | TCP/IP Internetworking I | Panko Chapter 8 | **Reading Quiz #7 – DUE: 12 pm ET** |
| Apr 3 (W) | TCP/IP Internetworking I | Panko Chapter 8 |  |
| Apr 5 (F) | #10 Cloud Computing Lab #1 | | Prelab Due: 9am ET- Lab Due: 2pm ET |
| Apr 8 (M) | TCP/IP Internetworking II | Panko Chapter 9 |  |
| Apr 10 (W) | TCP/IP Internetworking II | Panko Chapter 9 | **Reading Quiz #8– DUE: 12 pm ET** |
| Apr 12 (F) | #11 Cloud Computing Lab #2 | | Prelab Due: 9am ET- Lab Due: 2pm ET |
| Apr 15 (M) | Cloud Computing: Introduction | Instructor Notes |  |
| Apr 17 (W) | Cloud Concepts and Technologies | Instructor Notes | **Reading Quiz #9– DUE: 12 pm ET** |
| Apr 19 (F) | **RESERVE LAB DAY** | | |
| Apr 22 (M) | Cloud Platforms and Services, Cloud Security | Instructor Notes |  |
| Apr 24 (W) | Cloud Platforms and Services, Cloud Security | Instructor Notes | **Reading Quiz #10– DUE: 12 pm ET** |
| Apr 29 (M) | **Exam 3 Review** | | |
| **May 1** (W) | **Exam 3: Chapter 8 – 10 and Cloud Concepts** | | |

## **University Attendance Policy**

Attendance in classes is expected in all courses at Syracuse University. Students are expected to arrive on campus in time to attend the first meeting of all classes for which they are registered. Students who do not attend classes starting with the first scheduled meeting may be academically withdrawn as not making progress toward degree by failure to attend. Instructors set course-specific policies for absences from scheduled class meetings in their syllabi.

It is a federal requirement that students who do not attend or cease to attend a class to be reported at the time of determination by the faculty. Faculty should use “ESPR” and “MSPR” in Orange Success to alert the Office of the Registrar and the Office of Financial Aid.

Students should also review the University’s religious observance policy and make the required arrangements at the beginning of each semester.

**Syracuse University Policies**Students should review the University’s policies regarding: Diversity and Disability <https://www.syracuse.edu/life/accessibility-diversity/>; the Religious Observances Notification and Policy <http://supolicies.syr.edu/studs/religious_observance.htm> ; and Orange SUccess - <http://orangesuccess.syr.edu/getting-started-2/>.

## **Disability-Related Accommodations**

If you believe that you need academic adjustments (accommodations) for a disability, please contact the Office of Disability Services (ODS), visit the ODS website– http://disabilityservices.syr.edu, located in Room 309 of 804 University Avenue, or call (315) 443-4498 or TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting academic adjustments. ODS is responsible for coordinating disability-related academic adjustments and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since academic adjustments may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

## **Academic Integrity Policy**

Syracuse University’s Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the University’s academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice.