**Department of Information Sciences and Technology College of Engineering & Computing**

**George Mason University**

Fall 2021

**IT 341 Data Communications and Networking Principles**

**Syllabus** (Revised 8/15/2021)

# Section 001/002:

Instructor: *Saeed Agbariah, PhD*

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# Prerequisite:

IT 101 and IT212 or IT 105, IT 106 or IT 109 or IT 196 or CS 112, MATH 108 or MATH 113

# Lecture Textbooks:

* Introduction to Networks v6 Companion Guide
* Routing and Switching Essentials v6 Companion Guide

# Lab Textbooks:

* Introduction to Networks v6 Labs & Study Guide
* Routing and Switching Essentials v6 Labs & Study Guide
* Lecture Textbooks are necessary for this course, whereas Lab Textbooks are optional.

# Slides:

Class lectures

# Course Materials at:

https://mymasonportal.gmu.edu

# Description:

This course focuses on the primary aspects of data communications networking, including a study of the Open Systems Interconnection (OSI) and Internet models. Students will start at Layer 1 with the study of various Layer 1 interface and cabling configurations. They will construct and test various cables with connectors. Moving up the OSI layers, students will focus on IP network addressing, network design, and enhanced hands-on router and port configurations. Switch configuration like creation and management of VLANs are covered. They will also learn security protocols and do static routing, RIPv2, and OSPF configurations. Concentration on layers 4 through 7 include studying TCP, UDP, data reliability, and error correction methods, on the ladder to the FTP, HTTP, SMTP, DNS, and TFTP protocols of Layer 7. Half of this course entails lab work where students design networks, configure routers and switches, engages in implementation and testing of networking devices.

# Course Learning Outcomes:

## You will learn the following after successful completion of this course-

* Understand the OSI Model
* Describe LAN and WAN designs
* Configure static and dynamic routes
* Design basic routing architecture
* Configure router from scratch by applying IOS CLI commands
* Configure IP addresses
* Configure port security
* Understand Ethernet principles
* Understand IP principles
* Understand TCP principles
* Understand TCP/IP Internet Model
* Understand IP addressing and sub-netting
* Describe all types of WAN technologies
* Describe all types of transmission physical media
* Be able to build IP addressing configuration using CIDR and VLSM
* Be able to troubleshoot all network common problems

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| **Grading**:  Homework and Lab Work- | 15% |
| Quizzes - | 10% |
| Skills Exam 1 - | 10% |
| Skills Exam 2 - | 10% |
| Discussion Forums - | 5% |
| Midterm Exam - | 20% |
| Final Exam - | 20% |

Grades will be awarded in accordance with the GMU Grading System for undergraduate students. For details, refer to: <http://catalog.gmu.edu/policies/academic/grading/#text>

GMU does not dictate a grading scale: https://registrar.gmu.edu/topics/grading-scale/

This course uses the grading scale below but the scale may vary at instructor’s discretion.

# Grading Scale:

97 – 100% A+

93 – 96%  A

90 – 92%  A-

87 – 89%  B+

83 – 86%  B

80 – 82%  B-

76 – 79%  C+

70 – 75%  C

60 – 69%  D

0 – 59%  F

Raw scores may be adjusted by the Instructor to calculate final grades.

# Homework Assignments, Lab Sessions

Homework assignments and lab sessions are available in Blackboard. In each lab session, you practice the lecture materials in Cisco innovative network simulation program, Packet Tracer. Acceptance of late homework assignment and lab session, will be at the sole discretion of the Instructor. Each homework assignment and lab session will be released for viewing 7 days prior to the due date. Late homework assignment and lab session, will not be accepted – if accepted, a penalty will be applied.

# Weekly Quizzes:

The quizzes will cover materials discussed during last lectures and will be conducted at the end of lab sessions on Blackboard. These quizzes will be “closed book”– no reference materials will be permitted**.**

# Skills Exams:

Skills exams are conducted in class (one for each module) using Cisco Packet Tracer. These exams are mostly concerned with router/switch configurations which you will learn through your lab assignments. All necessary commands will be given to you during the exams.

# Discussion Forum:

There will be 2 discussion forums. Each is worth 2.5% of your grade. The forum will be released on Sunday and you will need to submit your initial post no later than Saturday 11:59pm EST of the following week. You will then need to read your classmates’ posts and reply to one of them by 11:59pm EST Saturday of next week. Please see the schedule below for discussion forum release and due dates

# Midterm Exam:

The midterm exam will cover materials discussed up to Session 6. The midterm exam will be “closed book”– no reference materials will be permitted.

# Final Exam:

The final exam will cover materials discussed primarily during Sessions 8 thru 15. The final exam will be “closed book”– no reference materials will be permitted. Final exams are retained by the IST Department and are not returned to students.

# Schedule (Subject to Change):

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| **Session** | **Content** | **Reading, Assignments & Labs** |
| **1**  Week of Aug 22 | Ch 1 - Exploring the Network (Introduction to Networks Companion Guide)  Ch 2 - Configuring a Network Operating System (Introduction to Networks Companion Guide) | ***Released on: Aug 25***   * Lab Session 1 Released |
| **2**  Week of Aug 29 | Ch 7 – IP Addressing Part I (IPv4) (Introduction to Networks Companion Guide)  Ch 7 – IP Addressing Part II (IPv6) (Introduction to Networks Companion Guide) | ***Due: Sept 1***   * Lab Session 1   ***Released on: Sept 1***   * Home Assignment 1   ***Sept 1:***   * ***Quiz 1 Released*** |
| **3**  Week of Sept 5 | Ch 8– Subnetting IP Networks (Introduction to Networks Companion Guide)  Ch 3 - Network Protocols and Communications (Introduction to Networks Companion Guide) | ***Due: Sept 8***   * Home Assignment 1   ***Released on: Sept 8***   * Home Assignment 2 * Discussion Forum 1 Released   ***Sept 8*:**   * + Quiz 1 due |

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| **4**  Week of Sept 12 | Ch 4 - Network Access (Introduction to Networks Companion Guide)  Ch 5 – Ethernet (Introduction to Networks Companion Guide) | **Due**: ***Sept 15***   * Home Assignment 2 * Discussion Forum 1 Initial Post Due   **Released on**: ***Sept 15***   * Lab Session 2   ***Sept 15:***   * ***Quiz 2 released*** |
| **5**  Week of Sept 19 | Ch 6 - Network Layer (Introduction to Networks Companion Guide)  Ch 9 – Transport Layer (Introduction to Networks Companion Guide) | ***Due: Sept 22***   * Lab Session 2 * Discussion Forum 1 Second Post Due   ***Sept 22* :**   * Quiz 2 due |
| **6**  Week of  Sept 26 | **Sept 26(Sunday)**  **Take home**  **Skills Exam 1**  **from**  **5-10pm** |  |
| **6**  Week of Sept 26 | Ch 10 – Application Layer (Introduction to Networks Companion Guide)  Ch 11 – Build a Small Network (Introduction to Networks Companion Guide) | ***Sept 29***   * **M**idterm Exam Review |
| **7**  Week of Oct 3 | **Take-home Midterm Exam Oct 6th from**  **4:30 PM – 10:00 PM**  **(on Blackboard using Respondus LockDown Browser/Monitor)** |  |
| **8**  Week of Oct 10 | Ch 4 – Introduction to Switched Networks (Routing and Switching Essentials Companion Guide)  Ch 5 – Basic Switching Concepts and Configuration (Routing and Switching Essentials Companion Guide) | ***Oct 13:***  ***Quiz 3 released*** |
| **8**  Week of Oct 17 | Ch 6 – VLANs (Routing and Switching Essentials Companion Guide)  Ch 6 – Inter-VLAN Routing (Routing and Switching Essentials Companion Guide) | ***Released on: Oct 20***   * Lab Session 3   ***Oct 20 between 5pm -11pm*:**   * + Quiz 3 due   ***Released on: Oct 17***   * Discussion Forum 2 Released |

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| **9**  Week of Oct 24 | Ch 1 – Routing Concepts (Routing and Switching Essentials Companion Guide) | ***Due: Oct 27***   * Lab Session 3   ***Released on: Oct 27***   * Lab Session 4   ***Oct 27:***  ***Quiz 4 released*** |
| **10**  Week of Oct 31 | Ch 2 – Static Routing (Routing and Switching Essentials Companion Guide) | ***Nov 3*:**   * Quiz 4 due |
| **11**  Week of Nov 7 | Ch 3 – Routing Dynamically (Routing and Switching Essentials Companion Guide)  Ch 3 – Single-Area OSPF (Routing and Switching Essentials Companion Guide) | ***Due: Nov 10***   * Lab Session 4 * Discussion Forum 2 Initial Post Due   ***Released on: Nov10***   * Lab Session 5 * Quiz 5 |
| **12**  Week of Nov 14 | Ch 7 – Access Control Lists (Routing and Switching Essentials Companion Guide)  Ch 8 – DHCP (Routing and Switching Essentials Companion Guide) | ***Due: Nov 17***   * Lab Session 5 * Discussion Forum 2 Second Post Due   ***Released on: Nov 17***   * Lab Session 6   ***Nov 17* :**   * + Quiz 5 due |
| **13**  **Week of**  **Nov 21** | **Thanksgiving Recess: No Classes (University Closed Nov. 24-28)** |  |
| **Week of**  **Nov 28** | **Take Home Skills Exam**  **Nov28(Sunday)-Nov29**  **Nov28 5pm to Nov29 10pm** |  |
| **14**  Week of Nov 28 | Ch 9 – Network Address Translation to IPv4 (Routing and Switching Essentials Companion Guide) | ***Due on: Dec 1***   * Lab Session 6   ***Dec 1***  Final exam review |
| 15 | **Dec 8**  **from 4:30 PM – 10:00 PM** |  |
| Week of | **(on Blackboard using** |
| Dec 5 | **Respondus LockDown** |
|  | **Browser/Monitor)** |
|  | **Browser/Monitor)** |

The reading assignment(s) shown for each lecture is/are to be completed **prior to** that lecture.

## This schedule is subject to revision before and throughout the course.

***Registered students should see the Blackboard Learning System for the latest class schedule.***

Important Dates

**Last day to add classes:** Refer to the link below **Final drop deadline with 67% tuition penalty:** Refer to the link below **Last day of classes:** Refer to the link below

**https://registrar.gmu.edu/calendars/fall\_2021/**

# Religious Holidays

A list of religious holidays is available on the University Life Calendar page. Any student whose religious observance conflicts with a scheduled course activity must contact the Instructor **at least 1-week**

**in advance** of the conflict date in order to make alternative arrangements.

# Attendance Policy

Departmental policy requires students to take exams at the scheduled time and place, unless there are truly compelling circumstances supported by appropriate documentation. Except in such circumstances, failure to attend a scheduled exam will result in a score of zero (0) for that exam, in accordance with Mason policy on final exams. Students should not make travel plans or other discretionary arrangements that conflict with scheduled classes and/or exams. If the University is closed due to weather or other unforeseen conditions, final exams may be rescheduled – students are strongly advised not to make plans that would prevent them from attending exams that may be rescheduled during the entire exam period.

# Communications

Registered students will be given access to a section of the Blackboard Learning System for this course. Blackboard will be used as the primary mechanism to disseminate course information, including announcements, lecture slides, homework and other assignments, and scores for homework and exams.

Communication with the Instructor on issues relating to the individual student should be conducted using GMU email, via telephone, or in person - **not** in the public forums on Blackboard. GMU email is the preferred method – for urgent messages, you should also attempt to contact the Instructor via telephone. Federal privacy law and GMU policy require that any communication with a student related in any way to a student's status be conducted using secure GMU systems – if you use email to communicate with the Instructor you **MUST** send messages from your GMU email account.

# Lecture slides are complements to the lecture process, not substitutes for it - access to lecture slides will be provided in Blackboard.

All course materials (lecture slides, assignment specifications, *etc.*) are published on Blackboard. This allows users of most computing platforms to view and print these files. Microsoft® Word (or a compatible word processing application) is required for preparing assignments – it is available on computers in the Mason open labs.

# Privacy

Instructors respect and protect the privacy of information related to individual students. Issues relating to an individual student will be discussed via email, telephone or in person. Instructors will not discuss issues relating to an individual student with other students (or anyone without a need to know) without prior permission of the student.

Assessable work other than final exams will be returned to individual students directly by the Instructor (or by a faculty or staff member or a Teaching Assistant designated by the Instructor or via another secure method). Under no circumstances will a student's graded work be returned to another student.

Faculty and staff will take care to protect the privacy of each student's scores and grades.

# Disability Accommodations

The Office of Disability Services (ODS) works with disabled students to arrange for appropriate accommodations to ensure equal access to university services. Any student with a disability of any kind is strongly encouraged to register with ODS as soon as possible and take advantage of the services offered.

Accommodations for disabled students **must** be made in advance – ODS cannot assist students retroactively, and at least one week's notice is required for special accommodations related to exams. Any student who needs accommodation should contact the Instructor during the first week of the semester so the sufficient time is allowed to make arrangements.

# Honor Code

All members of the Mason community are expected to uphold the principles of scholarly ethics. Similarly, graduating students are bound by the ethical requirements of the professional communities they join. The ethics requirements for some of the communities relevant to IT graduates are available via the following links:

ACM Code of Ethics and Professional Conduct

IEEE Code of Ethics

On admission to Mason, students agree to comply with the requirements of the GMU Honor System and code.. The Honor Code will be strictly enforced in this course. Honor Code cases are heard by a panel consisting of students – students who meet the requirements are encouraged to nominate themselves to serve on the Honor Committee.

Any use of the words or ideas of another person(s), without explicit attribution that clearly identifies the material used and its source in an appropriate manner, is **plagiarism** and will not be tolerated. The Instructor reserves the right to use manual and/or automated means (including such services as Turnitin.com) to detect plagiarism in any work submitted by students for this course, and to direct Teaching Assistants and/or other faculty and/or staff members to do likewise in support of this course.

For this course, the following requirements are specified:

All assessable work is to be prepared by the individual student, unless the Instructor explicitly directs otherwise.

All work must be newly created by the individual student for this course for this semester.

Any usage of work developed for another course, or for this course in a prior semester, is strictly prohibited without prior approval from the instructor.

Students may seek assistance with assigned work (and are encouraged to do so if they feel the need),

# provided:

* + The directions for the assigned work do not prohibit such assistance.
  + Such assistance is acknowledged in the submitted work, clearly identifying the person(s) giving assistance and the nature of the assistance given.
  + Any work to be submitted is prepared entirely and exclusively by the student submitting it. Students are expressly prohibited from sharing any assessable work for this course in any manner with other students (except students assigned as Teaching Assistants to this course and the student's section), unless all students involved have had their work graded and returned by the Instructor, or the Instructor has explicitly approved such sharing.