

Data Networks and Security - INFSYS 3842
Management of Data Networks and Security - INFSYS 6836
(Combined Section) Spring-2017
Thursdays 6:55pm to 9:35pm – Express Scripts Hall (ESH) 103

Instructor: *Dr. Shaji Khan* (Ph.D. Business Administration, M.S. Computer. Science, B.A., B.Com)

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(Email is the best way to get in touch with me. Please mention course and section number in your correspondence. My cell phone is also listed above. Please leave a message if call goes to voicemail.)

Note: If anyone has a health condition or disability which may require my attention, please contact me and the **Disability Access Services Office at 144 Millennium Student Center (ph: 314-516-6554)**

Course Materials

There is no required text book for this course. Online reading material, videos, and PowerPoint slides etc. will be provided via Canvas.

Optional Networking Certifications Books:

- For those interested in getting Network+ Certification, I recommend: CompTIA Network+ All-In-One Exam Guide: Exam N10-005 (ISBN-13: 978-0071789226) or the latest version.
- If interested in pursuing Cisco Certified Network Associate (CCNA) Routing and Switching, you could try the combined CCNA exam and this book: “*CCNA Routing and Switching 200-120 Official Cert Guide Library 1st Edition*” by Odom Wendell (2013) ISBN-13: 978-1587143878 or the latest version

Optional Text-books:

- “*Business Data Networks & Security, 10th Edition*” by Panko, R.R. and Panko, J.L. (2015) ISBN-13: 9780133544015 (older, 9th Edition should also work)
- “*Computer Networking: A Top-Down Approach (6th Edition)*” by Kurose, J. and Ross, K. (2012) ISBN-13: 978-0132856201

Course Description

Motivation: We are in the age of “apps”, “cloud”, “big data” analytics, “internet of things” etc. These ideas are interrelated in one sense or another. More importantly, all of them rely heavily on computer networks. Without the advances in networking throughout the past few decades, the so called “IT revolution” may have never begun. Business users rely on networks when working with their “networked/distributed” software applications, for storing data, and for carrying out distributed processing of large amounts of data. However, most users don’t concern themselves with just how the network infrastructure makes this possible. They expect everything to simply be there! It is the job of networking professionals to provide a seamless, “always there”, and secure computing environment. It is not a trivial task. Further, security remains a major challenge as vulnerabilities in networks could provide the “entry points” for malicious actors. With the rapid proliferation of numerous types of devices connected to the networks the field of networking has never been more important, challenging, and exciting!

Course objectives: The purpose of this course is to provide an introductory overview of key data networking concepts. The course will place a strong emphasis on fundamentals of networking and incorporate hands-on

exercises to reinforce learning. It will also provide the fundamentals of network security by incorporating material/discussion/labs on security as and when we discuss networking topics. That is, security will be blended in when learning about networking. Finally, this course will focus on the “big-picture” implications and challenges of networking within contemporary corporate IT environments.

Learning Outcomes: Upon completion of the course, students will have an understanding of at least the following. With a bit more out-of-the-classroom effort and reading students should be able to attempt basic networking certifications such as CompTIA’s Network+. This course is a good start toward CISCO’s CCNA Certification as well.

- a. A solid grounding in networking terminology
- b. An overview of “how we got here” in terms of networking
- c. A thorough understanding of important network standards
- d. Fundamentals of network security
- e. Use of network protocol analyzers such as Wireshark™
- f. Virtualization and Networking in virtual environments
- g. Basic Linux skills as pertaining to networking
- h. Overview of network design and management
- i. Wired Local Area Networks (LANs)
- j. Wireless LANs (WLAN)
- k. Internetworking (TCP/IP) - IPv4, IPv6, TCP, UDP, Routing/Forwarding, Subnetting.
- l. Supporting and supervisory protocols such as DNS, DHCP, ICMP, ARP
- m. An understanding of how some common networked applications operate by utilizing the networking infrastructure. That is, the bottom-line of having networks!

Expectations of performance

I expect all students to prepare for, **attend**, and contribute to, the classes on a regular basis. Another forum for you to demonstrate your learning is through assignments/quizzes/lab assignments, which together account for 40% of the course grade. This course will have two exams, each worth 25% of your course grade. Thus, your grade will be calculated as follows:

Course Component	Weight
Assignments/Quizzes/Lab Assignments	40%
Exam 1 (mid-semester)	25%
Exam 2 (end-of-semester)	25%
Attendance	10%
Maximum Possible Final Score:	100%

Grading Policy:

Letter grades will not be assigned to individual components of the course. Only points (numeric scores) will be assigned. These scores will be combined into a Final Score (a Weighted Total) out of 100, rounded to one decimal place. Depending on this final score, your overall letter grade for this course will be determined as follows: *see next page.*

Final score ranges and corresponding letter grades				
>=94	A		70-73.9	C
90-93.9	A-		66-69.9	C-
86-89.9	B+		62-65.9	D+
82-85.9	B		58-61.9	D
78-81.9	B-		54-57.9	D-
74-77.9	C+		<54	F (fail)

Attendance (10% of overall score (and hence grade))

It is extremely important you attend all class periods. This material becomes unwieldy when a student has missed a class or two. I will allow excused absences only for extenuating circumstances (illness, family emergency, etc.)

Assignments /Quizzes/Lab Assignments (40% of your overall grade)

During this semester, I will assign no fewer than five (5) and no more than ten (10) assignments/quizzes/lab assignments combined. These will be assigned when I feel the need that you may benefit from practicing the material covered. I will upload detailed documents to Canvas and make relevant announcements.

- 1) Some assignments may carry more weight toward your final grade than others. If so, I will note this detail clearly in the assignment document.
- 2) Quizzes could be in-class or take home. In-class quizzes will typically **not be announced** in advance.
- 3) All assignments/quizzes will be turned in through Canvas. Submission deadlines will be listed on each assignment. Late submissions will receive deductions of 10% for each 24 hour period after the due date until no points remain.

TENTATIVE: Depending on availability of resources, we may have team based lab assignments as part of the overall 40% dedicated to assignments/quizzes and lab assignments mentioned above.

Team-Based Lab Assignments

It is imperative that we get as much “hands-on” exposure to networking fundamentals as possible.

- 1) Students will work in (self-selected) groups of four for the lab assignments component of this course. One group may have five students.
- 2) Each team will be required to demonstrate a “working setup” based on the lab requirements. I will schedule team demonstrations spread evenly throughout the semester. These demonstrations will be outside the regular class hours.
- 3) I will provide detailed descriptions of the lab tasks on Canvas and make relevant announcements. In some instances, I will also provide demonstrations. However, the goal is to let students “get their hands dirty” and “figure things out”!

Exams (50% of your overall grade)

There will be TWO exams and each will be worth 25% of your overall grade. Exams will contain objective type questions such as Multiple Choice, “True or False”, “Fill in the blanks” etc. Both exams may include short answer questions and/or quantitative problems. Exam dates are listed on the schedule page below.

Note:

1. The exams are “closed everything.” I trust you to strictly adhere to this requirement.
2. Due to the nature of this field of study, the exams are comprehensive. However, material covered after Mid-term will be more important for the Final exam.
3. Exam material includes, readings/exercises, class discussions/lectures/PowerPoint slides/videos, assignments/quizzes, cases, and any supplemental material assigned.
4. You will have only one attempt at each exam. I will provide a make-up exam only under extenuating circumstances.
5. I will provide more details on Canvas as we move closer to the first exam.

Academic Honesty Guidelines: (from Academic Affairs website, Updated April, 27 2010)

Students at the University of Missouri-St. Louis are expected to exhibit the highest standards of academic integrity. An act of academic dishonesty is an offense against the university. For that reason, university rules prescribe disciplinary consequences for academic dishonesty administered by the Office of Academic Affairs, as well as academic consequences assessed by the faculty member. For a description of what constitutes “Academic Dishonesty” and for procedures followed by the University and by faculty members, please refer to: <http://www.umsl.edu/services/academic/policy/academic-dishonesty.html>

Classroom Conduct: I expect students to be attentive in class and positively contribute to class discussions. Please refrain from using computers/mobile devices for anything other than classwork and avoid all other distractions.

Remember, paying attention is the first step toward learning. In general, “multitasking” while learning is probably not going to work. (https://www.google.com/?gws_rd=ssl#q=multitasking+while+learning). Further, without actual learning taking place it will be very difficult for you to “connect the dots” (i.e. connecting different things you learn to create even better/bigger picture understanding of phenomena).

Overall, for your own sake, please pay attention to classwork. You will learn better!

Other notes:

1. I will make announcements on Canvas. I strongly encourage you to visit this course under Canvas regularly for important updates and documents.
2. Please check your UMSL email account regularly for information/updates regarding this course.

TENTATIVE COURSE SCHEDULE

Please refer to Canvas for updated weekly topics, assigned readings, and assignments due dates.

Wk.	Date	Topic	Assigned Readings / Tasks/Assignments
1	19-Jan	Course introduction, syllabus, course basics	<i>(read syllabus)</i>
2	26-Jan	Introduction to Data Networks, Basic Networking Concepts <i>(introducing Wireshark and other ways to capture network traffic)</i>	See Canvas Week 1 and Week 2
3	2-Feb	Network Standards (Common networking models, the role of standards in everything related to networking)	See Canvas
4	9-Feb	Network Standards (contd.) Overview of Network Security <i>(and security concepts integrated with rest of the topics below)</i>	See Canvas <i>(be ready with basic skills in virtualization - Assignment 1 and beyond)</i>
5	16-Feb	Network and Security Management Introduction to LANs and Switching	See Canvas
6	23-Feb	Ethernet (802.3) Switched LANs	See Canvas
7	2-Mar	Ethernet (802.3) Switched LANs (contd.)	See Canvas
8	9-Mar	Introduction to TCP/IP Internetworking	See Canvas
9	16-Mar	Mid-Term Exam (Exam 1), regular class time and location	All material covered thus far
10	23-Mar	TCP/IP Internetworking (contd.)- Routing/Forwarding, ARP	See Canvas <i>(in class lab exercises - bring personal laptop)</i>
11	30-Mar	No Class – Semester Break	
12	6-Apr	TCP/IP Internetworking II (contd.) – Routing (continued), NAT, TCP, DHCP	See Canvas <i>(in class lab exercises - bring personal laptop)</i>
13	13-Apr		
14	20-Apr	DNS – Introduction to IPv6	See Canvas
15	27-Apr	IPv6 Continued (NDP, SLAAC) and Introduction to “Subnetting”	See Canvas
16	4-May	Networked Applications	See Canvas
17	11-May	Final Exam (Exam 2), regular class location Time: 07:45pm – 09:45pm	Comprehensive Exam (Most emphasis on material after exam 1)

---End Syllabus---