Department of Information Sciences and Technology

Volgenau School of Engineering

IT 366 Network Security I
Fall 2017

Common Syllabus

revised 8/10/2017

This syllabus contains information common to all sections of IT 366 for the Fall 2017 semester. Information specific to each section will be made available to registered students via the Blackboard course management system.

University Policies

The University Catalog is the central resource for university policies affecting student, faculty, and staff conduct in university affairs. Unless explicitly noted, any conflict between the policies in the University Catalog and the content of this document is unintentional. Please notify the author to resolve any such conflicts.

Please note that the Academic Year runs from the Fall semester of one calendar year through the Spring and Summer semesters of the following calendar year. Please be sure to select the correct archived Catalog if appropriate.

Scheduled Sections

Section	Instructor	Campus	Day	Time
001	Prof. Varghese	Science and Technology	Tuesdays	7:20–10:00 p.m.
DL1	Prof. Lyons	Online		

Course Description

From the University Catalog:

> **IT 366:** *Network Security I.* 3 credits.
>
> Examines information security services and mechanisms in network context. Topics include symmetric and asymmetric cryptography; message authentication codes, hash functions and digital signatures; digital certificates and public key infrastructure; access control including hardware and biometrics; intrusion detection; and securing network-enabled applications including e-mail and web browsing. Offered by Info Sciences & Technology. Limited to two attempts.

Registration Restrictions:

Required Prerequisites: (IT 206[C] or CS 211[C]) and (IT 223[B]).
[C] Requires minimum grade of C.
[B] Requires minimum grade of B.

Enrollment is limited to students with a major, minor, or concentration in Applied Information Technology, Applied Science, Individualized Study, Information Technology or Infmtn Tchngy Entrepreneurship.

Students with the terminated from VSE major attribute may **not** enroll.

Schedule Type: Lecture

Prerequisites

The required grades must be achieved in each prerequisite course **before** a student is qualified to take this course. The prerequisite courses must be completed prior to, not concurrently with, this course.

This requirement will be **strictly enforced**. Any student enrolled in the course who has not meet the prerequisite requirements (or received a waiver) by the start of the semester will be dropped from the course and the student will be responsible for any consequences of being dropped.

Rationale

Information security is a critical aspect of information technology – unless users can be confident that information is complete, consistent and accurate, it is worthless. A majority of information used today is transmitted over electronic networks, which adds additional security concerns when those networks are not under the direct control of the user (as is typically the case, especially when the Internet is part of the end-to-end network between the user and the information source or destination).

This is the first course of three (with IT 466 Network Security II and IT 467 Network Defense) that focus on securing information in a network context. This course emphasizes the fundamental tools and techniques used to provide information security services in that context, using current examples of technologies and their applications.

Course Applicability

IT 36 is an option in the Information Security (INFS) and Network and Telecommunications (NTEL) concentrations of the Bachelor of Science in Information Technology,
and a Technical Focus Course in the Information Technology Minor
and the Information Technology Undergraduate Certificate.

Objectives

On successful completion of this course, students will:

– Describe the information network context, including common approaches to networking.

– Describe the risks involved in transmitting information over networks and give examples of threats to and attacks against network security.

– Describe the security services needed for information networks.

– Describe the operation and give examples of modern network security mechanisms.

– Give examples of current applications of network security technologies.

Faculty and Staff

Course Coordinator:
Michael X. Lyons

Instructors:
See **Scheduled Sections** above

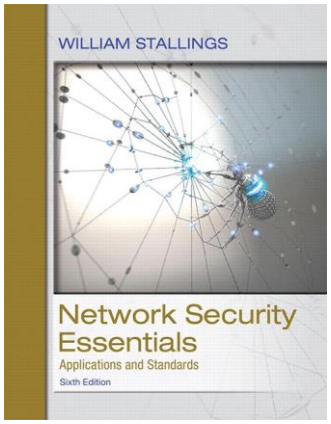
Teaching Assistants:
To be assigned – see Blackboard

Administrative support:
Department of Information Sciences and Technology
Fairfax campus
5400 Nguyen Engineering Building
Email: bsit@gmu.edu
Phone: 703-993-3565

References

Textbooks

There is one required textbook for this course:



Network Security Essentials: Applications and Standards
6th edition
William Stallings
© 2017; Pearson

See the publisher's Web page for rental and purchase options.

The paperback edition is available at a significant discount through the author's Web page.

Grading

Grades will be awarded in accordance with the Mason Grading System for undergraduate students. See AP.3.1 Undergraduate Grading for more information.

The grading scale for this course is:

97 – 100%	A+	Passing
93 – 96%	A	Passing
90 – 92%	A-	Passing
87 – 89%	B+	Passing
83 – 86%	B	Passing
80 – 82%	B-	Passing
77 – 79%	C+	Passing
73 – 76%	C	Passing
70 – 72%	C-	*Passing**
60 – 69%	D	*Passing**
0 – 59%	F	**Failing**

* Grades of "C-" and "D" are considered passing grades for undergraduate courses. However:

- As of Catalog Year 2014-15 a minimum grade of "C" is required in all Concentration courses in the IT major. See the University Catalog for minimum grade requirements for other programs.

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

Final grades will be determined based on the following components:

In-class exercises	15%
Homework	25%
Mid-term exam	30%
Final exam	30%

These components are outlined in the following sections.

In-class exercises

For classroom sections: Quizzes and other exercises will be assigned in selected class sessions throughout the semester, and will **not** be announced in advance.

For online sections: Discussion board postings and other activities will be assigned online. All such activities will be completed individually by each student, and are typically due within one week.

Homework

Homework will be assigned several times during the semester. Each assignment will count towards the final grade - there are no "optional" assignments. Each homework assignment is to be prepared and submitted by the individual student as specified by the Instructor.

Mid-term exam

For classroom sections: The mid-term exam will be conducted during the 6th scheduled class session.

For online sections: Students are required to attend an exam session (to be scheduled) in person, or to arrange for a proctored exam.

The mid-term exam will be based on topics addressed in Lectures 1-4, and will be "closed book" - no reference materials other than those provided with the exam paper will be permitted. Mid-term exams will be returned to students.

Final exam

For classroom sections: The final exam will be held during the scheduled final exam session (see Fall 2017 Final Exams).

For online sections: Students are required to attend an exam session (to be scheduled) in person, or to arrange for a proctored exam.

Please note that exams may be re-scheduled to compensate for disruptions in the semester schedule and ***students are required to be available throughout the exam period including the scheduled Make-up Day***.

The final exam will be based on topics addressed throughout the entire course and will be "closed book" - no reference materials other than those provided with the exam paper will be permitted. Final exams will be retained by the Department of Information Sciences and Technology and will not be returned to students.

Students are expected to submit work as scheduled by the Instructor. Any assignment submitted after the due date-time but within 24 hours of it will be graded with a penalty of 25% of the available credit. Any assignment submitted more than 24 hours late will not be graded. Exceptions to the submission time requirement may be made at the sole discretion of the Instructor.

Any student with an unexcused absence (including absence from part of a classroom session due to late arrival or early departure) will receive no credit for any assessment activity missed during that absence. A student arriving after an assessment activity has begun will not receive additional time to complete the activity.

A student with an exam conflict (or other circumstance that would justify rescheduling an exam under Mason policy), must notify the Instructor **no later than 2 weeks prior to the scheduled exam**. A student in an online section who wishes to take a proctored exam at another location must notify the Instructor **no later than 3 weeks prior to the scheduled exam** and the student will be responsible for making appropriate arrangements in accordance with Mason Policy 3004.

Any student arriving more than 15 minutes late for an exam may be prohibited from taking the exam at the sole discretion of the Instructor.

Each student is required to present a current Mason ID in order to take an exam or other in-person assessment. No other form of identification is accepted. See the Mason ID Web page website for information on obtaining a card. Students in online sections should also see this Web page.

Mid-term and final grades will be posted to PatriotWeb, which is the only mechanism for students to obtain those grades. A student with a "hold" on his/her PatriotWeb account will be unable to access grades until the hold has been removed by the Registrar.

Schedule

Lecture	Content	Reading*
1	Introductions; Logistics; Course overview Networking and security fundamentals Legal and ethical issues	Preface, §§1.0-1.5, Appendix D (optional) ,Chapter 14 (optional)
2	Security policy; Security services Security architecture Number theory for cryptography	Chapter 1, §2.3, Appendix A, Appendix E (optional)
3	Symmetric cryptography (including DES, AES, modes of operation)	Chapter 2, §4.1
4	Public key cryptography (including Diffie Hellman, RSA, certificates, PKI)	§§3.4-3.7, 4.3-4.7
5	Message authentication (including MACs, digital signatures) Review for mid-term exam	§§3.1-3.3, 3.6
6	**Mid-term exam** Guest lecture	
7	User authentication; Access control Identity management; Kerberos	Chapter 4 Appendix F (optional)
8	Web security; SSL and TLS	Chapter 6, Appendix G (optional)
9	Network layer security IPsec and IPv6	§5.1, Chapter 9
10	Email security; PGP, S/MIME, DKIM	Chapter 8, Appendices H, K (optional)
11	Wireless security	Chapter 7
12	Intruders; Intrusion detection	Chapter 11
13	Firewalls; Honeypots	Chapter 12
14	Network management security; SNMP Review for final exam	Chapter 13 (optional)
–	**Final exam**	

* From the textbook

The reading assignment shown for each lecture is to be completed ***prior to*** that lecture.

This schedule is subject to revision before and throughout the course.
Registered students should see Blackboard for the latest class schedule.

If a class is cancelled due to closure of a University campus or similar circumstance:

- The Provost may schedule a Make-Up Day, in which case the cancelled class will be held on that day, at the usual class time and in the usual classroom unless otherwise advised. Please note that the Make-Up Day may be on a different day of the week from the usual class day.
- If the Provost does not schedule a Make-Up Day the Instructor will schedule an *ad hoc* make-up session. The make-up session may be online – students will need Internet access and a compatible browser in order to participate in real time, but the session will be recorded for later viewing.

Important Dates

Please see the Fall 2017 Calendar for important dates, including the last days to add and drop courses.

Religious Holidays

A list of religious holidays is published by University Life. Any student whose religious observance conflicts with a scheduled course activity must contact the Instructor ***at least 2 weeks in advance*** of the conflict date in order to make alternative arrangements.

Attendance Policy

Students are expected to attend every class, to complete any required preparatory work (including assigned reading – see **Schedule** above) and to participate actively in lectures, discussions and exercises. As members of the academic community, all students are expected to contribute regardless of their proficiency with the subject matter.

Students are expected to make prior arrangements with Instructor if they know in advance that they will miss any class and to consult with the Instructor as soon as possible if they miss any class without prior notice. Any student who expects to miss more than one class session is **strongly advised** to drop the course and take it in a later semester when he/she can attend every class.

Mason policy AP.3.10 requires students to take exams at the scheduled time and place, unless prior approval is granted by the student's academic dean or director. An unexcused absence from an exam will result in a score of zero (0) for that exam. Please note that exams may be re-scheduled by the Registrar to compensate for disruptions in the semester schedule and ***students are required to be available throughout the exam period including the scheduled Make-up Day***.

Classroom conduct

Students are expected to conduct themselves in a manner that is conducive to learning, as directed by the Instructor. Any student who negatively impacts the opportunity for other students to learn may be asked to leave the classroom.

Electronic devices are potential distractions in the classroom environment. All electronic devices must be turned off or set to "silent" mode at all times unless the Instructors directs otherwise. In order to maximize student engagement the Instructor may prohibit use of such devices.

Communications

Registered students will be given access to a Blackboard section for this course. Blackboard will used as the primary mechanism (outside of lectures) to disseminate course information, including announcements, lecture slides, homework and other assignments, and scores for homework and exams. Some announcements may be sent via Blackboard to students' Mason email accounts.

Communication with the Instructor on issues relating to the individual student only should be conducted using Mason email, via telephone, or in person - ***not*** in the public "Discussions" forums on Blackboard. To protect student privacy any communication related in any way to a student's status must be conducted using secure Mason systems – if you use email to communicate with the Instructor you ***MUST*** send messages from your Mason email account. Students must activate and monitor their Mason email accounts to receive important information from the University, including messages related to this class.

Lecture slides are complements to the lecture process, not substitutes for it - access to lecture slides will be provided in Blackboard as a courtesy to students *provided acceptable attendance is maintained*.

All course materials (lecture slides, assignment specifications, *etc*) are published on Blackboard in Adobe® Portable Document Format (PDF). 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.

Online sections will use several tools through the Blackboard course management system. Students are responsible for obtaining Internet access and a compatible platform. Appropriate computers are available on campus in open labs.

Privacy

Instructors respect and protect the privacy of information related to individual students.

As described above, 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.

Homework, quizzes, mid-term exams and other assessable work will be returned to individual students directly by the Instructor (or by a faculty member, staff member, or 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.

Instructors, staff, and Teaching Assistants will take care to protect the privacy of each student's scores and grades.

Disability Accommodations

Disability Services 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 Disability Services as soon as possible and take advantage of the services offered.

Accommodations for disabled students ***must*** be made in advance – Disability Services cannot assist students retroactively. Any student who needs accommodation should contact the Instructor no later than the first class.

Campus Notifications

Students are encouraged to subscribe to the Mason Alert system to receive notifications of campus emergencies, closings, and other situations that could affect class activities.

Each classroom has a poster explaining actions to be taken in different types of crisis. Further information on emergency procedures is available at the Emergency Management Web site. In the event of a possible emergency, students are encouraged to dial 911.

Other Resources

Mason provides many useful resources for students.
The following resources may be particularly useful:

- The Writing Center
- The Academic Advising Center
- The University Libraries
- Counseling and Psychological Services
- University Career Services

See http://www.gmu.edu/resources/students/
for a complete listing of Mason resources for students.

Academic Integrity

All members of the Mason community are expected to uphold the principles of scholarly ethics.

The IT major bas been designed to achieve several specific outcomes. One of those outcomes is: "*An understanding of professional, ethical, legal, security, and social issues and responsibilities.*"

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
- EC-Council Code of Ethics

On admission to Mason, students agree to comply with the requirements of the Mason Honor Code and System. The Honor Code will be **strictly enforced** in this course. Honor Code cases are heard by a panel 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 SafeAssign) 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 ***explicitly 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 or Undergraduate Peer Mentors 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.

Another aspect of academic integrity is the free exchange of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. Please see the Mason Diversity Statement for more information on this topic.

Students are encouraged to ask for clarification of any issues related to academic integrity and to seek guidance from the Instructor, other faculty members, academic advisors, or the Office for Academic Integrity.

