Common Syllabus revised 12/22/2020

This syllabus contains information common to all sections of IT 366 for the Spring 2021 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

<table>
<thead>
<tr>
<th>Section</th>
<th>Instructor</th>
<th>Campus</th>
<th>Day</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prof. Varghese</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DL1</td>
<td>Prof. Sniegowski</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>DL2</td>
<td></td>
<td>Online</td>
<td></td>
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</table>

Access to Blackboard for each section will be made available no later than the day of the first class for that section.
Course Description

From the University Catalog:

**IT 366: Network Security.** 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<sup>C</sup>, 206<sup>XS</sup>, 209<sup>C</sup>, 209<sup>XS</sup>, CS 211<sup>C</sup> or 211<sup>XS</sup>) and IT 223<sup>B</sup>.

- <sup>C</sup> Requires minimum grade of C.
- <sup>XS</sup> Requires minimum grade of C.
- <sup>B</sup> 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 Tchny Entrepreneurship.

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

**Schedule Type:** Lecture

**Grading:**

This course is graded on the Undergraduate Regular scale.

**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 met 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 Foundations of Cryptography and Security 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.

Supported Student Outcomes at the Program Level

This course supports the following student outcomes of the IT major:

1. The ability to analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

6. The ability to identify and analyze user needs and to take them into account in the selection, creation, integration, evaluation, and administration of computing-based systems.

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.
Course Applicability

IT 366 is an option in the Cyber Security (CYBR) and Network and Telecommunications (NTEL) concentrations of the Bachelor of Science in Information Technology, and an option in the Defense Information Systems Technology (DIST) concentration of the Bachelor of Applied Science, and a Technical Focus Course in the Information Technology Minor and the Information Technology Undergraduate Certificate.

Faculty and Staff

Course Coordinator:
Prof. Lyons

Instructors:
See Scheduled Sections above.
See links to faculty home pages for information on office hours, contact preferences, etc.

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:

<table>
<thead>
<tr>
<th>Network Security Essentials: Applications and Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>William Stallings</td>
</tr>
<tr>
<td>6th edition</td>
</tr>
<tr>
<td>William Stallings</td>
</tr>
<tr>
<td>© 2017; Pearson</td>
</tr>
</tbody>
</table>

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, but those grades may not be applicable as prerequisite grades or towards graduation, depending on the program and the Catalog Year. See the University Catalog for more information.

Raw scores may be adjusted by the Instructor to calculate final grades.
Final grades will be determined based on the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture reviews</td>
<td>15%</td>
</tr>
<tr>
<td>Homework</td>
<td>25%</td>
</tr>
<tr>
<td>Mid-term exam</td>
<td>30%</td>
</tr>
<tr>
<td>Final exam</td>
<td>30%</td>
</tr>
</tbody>
</table>

These components are outlined in the following sections.

**Lecture reviews**
Students will submit online responses as directed to show their comprehension of lecture content.

**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**
The mid-term exam will be held online. The date and time will be announced in Blackboard. Students will receive feedback on the grading of their exams.

**Final exam**
The final exam will be held online. The date and time will be announced in Blackboard. Students will not receive feedback on the grading of their exams.

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.

There are no opportunities for "extra credit" in this course. All students will be given the same opportunities to complete assigned work.

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.

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.
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.

**Schedule**

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

**Important Dates**

Please see the Spring 2021 Academic 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 will conflict with a scheduled course activity must notify the Instructor at least 2 weeks in advance in order to make alternative arrangements.
<table>
<thead>
<tr>
<th>Lecture</th>
<th>Content</th>
<th>Reading*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introductions; Logistics; Course overview</td>
<td>Preface, §§1.0-1.5, Appendix D (optional)</td>
</tr>
<tr>
<td></td>
<td>Networking and security fundamentals</td>
<td>Chapter 14 (optional)</td>
</tr>
<tr>
<td></td>
<td>Legal and ethical issues</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Security policy; Security services; Security architecture</td>
<td>Chapter 1, §2.3, Appendix A, Appendix E (optional)</td>
</tr>
<tr>
<td></td>
<td>Defense in depth;</td>
<td></td>
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<tr>
<td></td>
<td>Distributed denial of service attacks, defenses</td>
<td></td>
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<tr>
<td></td>
<td>Number theory for cryptography</td>
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<tr>
<td>3</td>
<td>Symmetric cryptography</td>
<td>Chapter 2, §4.1</td>
</tr>
<tr>
<td></td>
<td>(including DES, AES, modes of operation)</td>
<td></td>
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<tr>
<td>4</td>
<td>Public key cryptography</td>
<td>§§3.4-3.7, 4.3-4.7</td>
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<tr>
<td></td>
<td>(including Diffie Hellman, RSA, certificates, PKI)</td>
<td></td>
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<tr>
<td>5</td>
<td>Message authentication</td>
<td>§§3.1-3.3, 3.6</td>
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<tr>
<td></td>
<td>(including MACs, digital signatures)</td>
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<tr>
<td></td>
<td>Review for mid-term exam</td>
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<tr>
<td>6</td>
<td>Mid-term exam</td>
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<tr>
<td></td>
<td>Guest lecture</td>
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<tr>
<td>7</td>
<td>Access control; Device authentication: 802.1x</td>
<td>Chapter 4, Appendix F (optional)</td>
</tr>
<tr>
<td></td>
<td>User authentication; Identity management: Kerberos</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Web security: Transport Layer Security</td>
<td>Chapter 6, Appendix G (optional)</td>
</tr>
<tr>
<td>9</td>
<td>Network layer security</td>
<td>§5.1, Chapter 9</td>
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<tr>
<td></td>
<td>IPsec and IPv6</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Email security: PGP, S/MIME, SPF, DKIM, DMARC</td>
<td>Chapter 8, Appendices H, K (optional)</td>
</tr>
<tr>
<td>11</td>
<td>Wireless security: WEP, 802.11i (WPA2)</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>12</td>
<td>Intruders; Intrusion detection and response</td>
<td>Chapter 11</td>
</tr>
<tr>
<td>13</td>
<td>Controlled interfaces; Firewalls; Honeypots</td>
<td>Chapter 12</td>
</tr>
<tr>
<td>14</td>
<td>Network management security; SNMP</td>
<td>Chapter 13 (optional)</td>
</tr>
<tr>
<td></td>
<td>Review for final exam</td>
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<tr>
<td></td>
<td><strong>Final exam</strong></td>
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</tbody>
</table>

* From the textbook

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

Students are expected to complete any required preparatory work (including assigned reading – see Schedule above), and to join each online lecture session in real time and/or to promptly review the recording of the session such that they see the entire lecture no later than the end of the day following the day of the lecture.

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.

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.

Classroom conduct

Students are expected to use the online tools provided solely for learning in relation to this course. Misuse of online tools may result in denial of access to those tools or other consequences under Mason policies.
Communications

Registered students will be given access to a Blackboard section for this course. Blackboard will be 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. Students are advised to use Blackboard, Tools, Send Email, Select Users to originate email messages to an Instructor.

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 Blackboard. 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. For information on student rights and privacy under the Family Educational Rights and Privacy Act of 1974 (FERPA) please see FERPA at Mason.

As described above, issues relating to an individual student will be discussed via email, telephone or in person. Instructors will not disclose protected information identifiable 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 each individual student 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, Teaching Assistants, and staff will take care to protect the privacy of each student's scores and grades.
**Academic Integrity**

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

The IT major has 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 individual work to be submitted is prepared entirely and exclusively by the student submitting it. Students are expressly prohibited from sharing any individual 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. When using online tools to communicate, students are expected to follow the conventions of Netiquette. Mason values diversity: through the Office of Diversity, Inclusion, and Multicultural Education (ODIME), Mason seeks to create and sustain inclusive learning environments where all are welcomed, valued, and supported.

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.

**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.

If a student has an accommodation that allows the student to take an exam in the Disability Services Testing Center, the Instructor will determine the date and time of that exam – the student must not contact Disability Services to schedule the exam until the Instructor has advised the date and time.

**Other Resources**

Mason provides many useful resources for students – see Students - George Mason University. The following resources may be particularly useful:

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

Students in online sections may benefit from these resources:

- Online Learning Resources
- University Libraries - Mason Online