Cyber Security Fundamentals (AIT 660)

Dr. Massimiliano Albanese, Department of Information Sciences and Technology

Fall 2018. Mondays, 4:30 pm - 7:10 pm, Nguyen Engineering Building 1107, Fairfax Campus

Office hours. By appointment

CATALOG DESCRIPTION

The course introduces fundamental security principles and real-world applications of cyber security. Topics covered in the course include access control, common classes of attacks, monitoring, attack and intrusion detection, basic cryptography, computer security models, legal and privacy issues, and risk analysis. The course also provides students with opportunities to gain hands-on experience with several security tools (e.g., protocol analyzers).

COURSE GOALS

Upon successful completion of this course, students will:

- master fundamental cyber security principles;
- be knowledgeable about practical security issues arising in a wide range of domains;
- understand how to use existing techniques and tools to minimize security risks for an organization;
- have experience in discussing and writing about security related issues.

PREREQUISITES

Registration in MS, Applied IT program or permission of Instructor.

COURSE FORMAT

The course will employ lectures, in class-quizzes to assess progress, and a final exam. Students will be required to give a group presentation at the end of the course.

TEXTBOOKS AND READING MATERIALS

REQUIRED TEXTBOOK

James M. Stewart, Mike Chapple, and Darril Gibson
ISBN: 978-1-118-31417-3
Wiley, 2012

or
The required textbook is available electronically through the Safari Tech Books Online collection. You can access this book by following these steps:

- Go to http://proquest.safaribooksonline.com.mutex.gmu.edu/
- Type the ISBN number of the book into the search box and click search, then click on the book title in the search results page. The next page that will open is the homepage for the book.
- Click on the Start Reading button to open the book.

### COURSE OUTLINE

Below is an outline of the 15 weekly class meetings.

1. [08-27-2017] - **Introduction to the course** - **Lecture 1**: Accountability and access control
2. [09-10-2017] - **Lecture 2**: Attacks and monitoring
3. [09-17-2017] - **Lecture 3**: Review of networking concepts - **Review session**
4. [09-24-2017] - **In-class quiz n. 1** - **Lecture 4**: Communications security and countermeasures
7. [10-15-2017] - **In-class quiz n. 2** - **Lecture 7**: Malicious code and application attacks
8. [10-22-2017] - **Lecture 8**: Cryptography and symmetric key algorithms
11. [11-12-2017] - **Lecture 11**: Business continuity planning & Disaster recovery planning
13. [11-26-2017] - **Student presentations**
14. [12-03-2017] - **Student presentations**
15. [12-17-2017] - **Final exam**

### COURSE TOOLS

The following tools will be used in this course.

- **Bb Blackboard**: used to post class materials (slides, readings, etc.), and to grade individual class activities.
Piazza: used to post sample quiz questions and solicit answers from students. Students can also post questions of general interest.

**ADDITIONAL RESOURCES & INFORMATION**

Below is a list of additional and useful resources.

- University Catalog
- University Policy
- Office of Academic Integrity
- Mason Diversity Statement
- Student Privacy
- Writing Center
- University Libraries
- Counseling and Psychological Services
- Calendar of Religious Holidays
- Disability Accommodations

Students with a documented learning disability or other condition that may affect academic performance should: (i) make sure this documentation is on file with Office of Disability Services (SUB I, Rm. 4205; 993-2474) to determine the accommodations they need; and (ii) talk with the instructor to discuss their accommodation needs.

**GRADING POLICY**

Grading will be based on class participation, assignments, and exams. Points for course activities will accrue as follows:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Points</th>
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<tbody>
<tr>
<td>Class participation (≠ class attendance)</td>
<td>100</td>
</tr>
<tr>
<td>In-class quizzes (3 @ 70 points each)</td>
<td>210</td>
</tr>
<tr>
<td>Group Presentation</td>
<td>100</td>
</tr>
<tr>
<td>Final exam</td>
<td>150</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>560</strong></td>
</tr>
</tbody>
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Final letter grades are assigned as follows. Breakpoints may be adjusted depending on overall class performance.

<table>
<thead>
<tr>
<th>Point % range</th>
<th>Letter grade</th>
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<tbody>
<tr>
<td>97% - 100%</td>
<td>A+</td>
</tr>
<tr>
<td>93% - 96.9%</td>
<td>A</td>
</tr>
<tr>
<td>90% - 92.9%</td>
<td>A-</td>
</tr>
<tr>
<td>87% - 89.9%</td>
<td>B+</td>
</tr>
<tr>
<td>83% - 86.9%</td>
<td>B</td>
</tr>
<tr>
<td>80% - 82.9%</td>
<td>B-</td>
</tr>
<tr>
<td>70% - 79.9%</td>
<td>C</td>
</tr>
<tr>
<td>0% - 69.9%</td>
<td>F</td>
</tr>
</tbody>
</table>

**Extra Credits.** Students who wish to recover credits lost in other course activities can volunteer to prepare and give short presentations (4-5 content slides, 8-10 minutes) on a topic of their choice. Each short presentation
will earn **up to 25 points**, for a maximum of **two presentations per student** during the entire course. Students must notify the instructor in advance of their intention to give an extra credit presentation. Time and topic of the presentation must be approved by the instructor. Student giving an extra credit presentation must submit their slides to the instructor **no later than 3pm** on the day of the presentation. The last day to give an extra presentation is **November 19, 2018**. Students passing the **CISSP exam** will earn 50 bonus points. No other extra credit opportunities beyond those mentioned here will be offered to students.

**Attendance.** Regular attendance is strongly recommended. Students will be held responsible for all material covered in class. Quizzes and exams are given on the dates specified on the course schedule. **Absence from taking any quiz/exam will result in a score of zero**, unless cleared in advance with the instructor and arranged for a makeup session. Excusable absences are normally related to unavoidable and documented emergency situations.

**Final Grades.** Final grades are non-negotiable, and cannot be disputed once posted. Any request to adjust grades after they have been posted will be denied unless there has been a factual error on the instructor's side.