Cloud Computing Security (AIT 670)

Fall 2019. Online
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CATALOG DESCRIPTION

This course offers a survey of security and privacy issues in Cloud Computing systems, along with an overview of current best practices and available technologies. The course examines the Cloud Computing model, the threat model, and security issues related to data and computation outsourcing, and explores practical applications of secure Cloud Computing.

COURSE GOALS

Upon successful completion of this course, students will:

- be familiar with the technology that enables and supports the effective use of Cloud Computing infrastructures;
- be familiar with an array of security and privacy issues in Cloud Computing systems, current best practices, and open problems;
- be familiar with legal and regulatory issues pertaining to Cloud Computing;
- have experience in discussing and writing about Cloud Computing and security related issues.

PREREQUISITES

Registration in MS AIT, AIT 660, or permission of Instructor.

COURSE EXPECTATIONS

- Working online requires dedication and organization. Proper preparation is expected every week. Students are expected to log in to the course each week, and review the materials and complete the assignments in a timely manner.
- Students must check their Mason email messages frequently for course announcements, which may include reminders, revisions, and updates.
- It is expected that students will familiarize themselves with and adhere to the Honor Code. Student members of the George Mason University community pledge not to cheat, plagiarize, steal, and/or lie in matters related to academic work.
- It is essential to communicate any questions or problems to the instructor promptly.

ONLINE LEARNING COMMUNITY

This online course is taught via Blackboard Courses (log into myMason, select the Courses Tab, and the course can be found in the Course List). This course is offered completely online. Each week begins on Monday and ends on Friday. In our online learning community, we must be respectful of one another. Please be aware that innocent remarks can be easily misconstrued. Sarcasm and humor can be easily taken out of context. When communicating, please be positive and diplomatic. You are encouraged to learn more about Netiquette.

### COURSE FORMAT

The course will employ lectures, a mid-term exam to assess progress, and a final exam. Students will be required to write a technical paper on a topic which must be approved in advance by the instructor.

### TEXTBOOKS AND READING MATERIALS

#### REQUIRED TEXTBOOK

**Securing the Cloud**  
*Vic (J.R.) Winkler*  
ISBN: 978-1-59749-592-9  
Syngress, 2011

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

- If you are off-campus, you will be asked to login using your Mason email user name and password.
- Type the ISBN number (978-1-59749-592-9) 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.

#### RECOMMENDED READINGS

Recommended readings include publications from standardization bodies such as NIST, government agencies, and the research community. Below is a partial list of recommended readings:

- “**The NIST Definition of Cloud Computing**”, NIST Special Publication 800-145, September 2011
- “**Amazon Web Services: Overview of Security Processes**”, Amazon, May 2017
- “**Security Guidance for Critical Areas of Focus in Cloud Computing v4.0**”, Cloud Security Alliance, June 2013

Additional readings and lecture slides will be made available by the instructor through Blackboard.

### COURSE OUTLINE

Below is an outline of the weekly modules. During Week 1, students are expected to familiarize with the course, the syllabus, and the tools available to them.

- **[Week 01 - 08-26-2019] - Introduction to the course**
- **[Week 02 - 09-02-2019] - Lecture 1: Introduction to cloud computing (Chapter 1)**
• [Week 03 - 09-09-2019] - Lecture 2: Overview of networking concepts
• [Week 04 - 09-16-2019] - Lecture 3: Overview of security concepts
• [Week 05 - 09-23-2019] - Lecture 4: Cloud computing architecture (Chapter 2)
• [Week 06 - 09-30-2019] - Lecture 5: Security Concerns and legal aspects (Chapter 3)
• [Week 07 - 10-07-2019] - Lecture 6: Securing the cloud: architecture (Chapter 4)
• [Week 08 - 10-14-2019] - Mid-term exam (available online from 10-17-2018 to 10-19-2018)
• [Week 09 - 10-21-2019] - Lecture 7: Securing the cloud: data (Chapter 5)
• [Week 10 - 10-28-2019] - Lecture 8: Securing the cloud: key strategies and best practices (Chapter 6)
• [Week 14 - 12-02-2019] - Lecture 12: Operating a cloud (Chapter 10)
• [Week 15 - 12-09-2019] - Final exam (available online from 12-12-2018 to 12-14-2018)

COURSE TOOLS

The following tools will be used in this course.

• Bb Blackboard: used to post class materials (slides, readings, etc.), for discussions, and to grade individual class activities.
• Skype: used for online appointments with the instructor.

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
• DE Library Services
• Psychological Services and Counseling
• Calendar of Religious Holidays
• Disability Accomodations

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>
</tr>
</thead>
<tbody>
<tr>
<td>Class participation (discussion forums and access to class materials). Discussion forums close on the last day of class, <strong>12/07/2019</strong></td>
<td>150</td>
</tr>
<tr>
<td>Mid-term exam</td>
<td>150</td>
</tr>
<tr>
<td>Term paper, due <strong>12/09/2019</strong> (waived for students passing the <strong>CCSK</strong> or the <strong>CCSP</strong> between <strong>08/26/2019</strong> and <strong>12/07/2019</strong>)</td>
<td>150</td>
</tr>
<tr>
<td>Final exam</td>
<td>150</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>600</strong></td>
</tr>
</tbody>
</table>

Final letter grades are assigned as follows:

<table>
<thead>
<tr>
<th>Point % range</th>
<th>Letter grade</th>
</tr>
</thead>
<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 any course activity can volunteer to 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 prepare a short presentation. Topic of the presentation MUST be approved by the instructor. Presentations MUST be submitted as narrated PowerPoint slides through Blackboard, no later than **December 7, 2019**. No other extra credit opportunities beyond those mentioned here will be offered to students.

**Assignments.** Students will be held responsible for all material covered in class. Exams are administered during the dates specified in the syllabus. **Failure to take any exam during the exam window or to submit an assignment by the due date will result in a score of zero,** unless cleared in advance with the instructor and arranged for a makeup plan.

**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.