GRADUATE COURSE SYLLABUS

Introduction to Information Security (IST623)

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Office Hours: TBA

Course Description:

Fundamental security concepts, challenges, countermeasures, and case studies with hands-on skills.

Additional Course Description:

This graduate course (IST623, Introduction to Information Security) is intended to teach fundamental elements in information security and introduce the key areas of security challenges, countermeasures, and applications. The course will focus on a comprehensive understanding of information security rather than an in-depth analysis of a particular area. Topics include security properties, vulnerabilities, cryptography, public key infrastructure (PKI), security policies, authentication, access control, security protocols, network security, security management, and case studies. Students will also have hands-on experiences in information security. This is the only required course for the Certificate of Advanced Study (CAS) in Information Security Management (ISM).

Prerequisite / Co-requisite:

None

Audience:

Graduate students

Credits:

3 credits

Learning Objectives:

After taking this course, the students will understand the comprehensive aspect of information security and be able to:

- Explain the fundamental security properties, challenges, countermeasures, and real-life examples.
- Describe the key concepts, technical elements, and their tradeoffs in cryptography, access control, authentication, wireless security, firewalls, Internet security protocols.

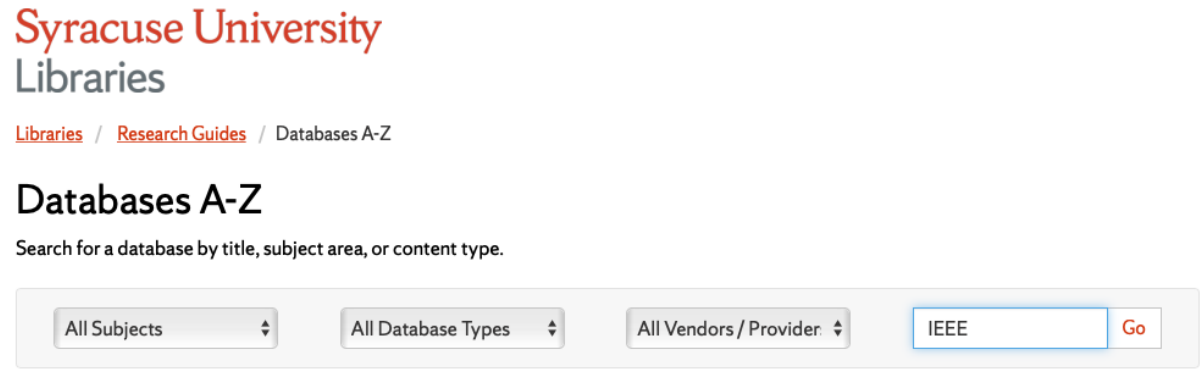
- Explain in-depth security knowledge and skills in the security case studies that they selected.
- Demonstrate the hands-on ability in host protection, cryptography, secure communication, and network security analysis, using various security services and tools.
- Exhibit the ability in research, presentation, and Q&A discussion about information security.
- Develop specialty on a specific area of information security in their further study and career preparation, extending the knowledge and skills learned from this course.

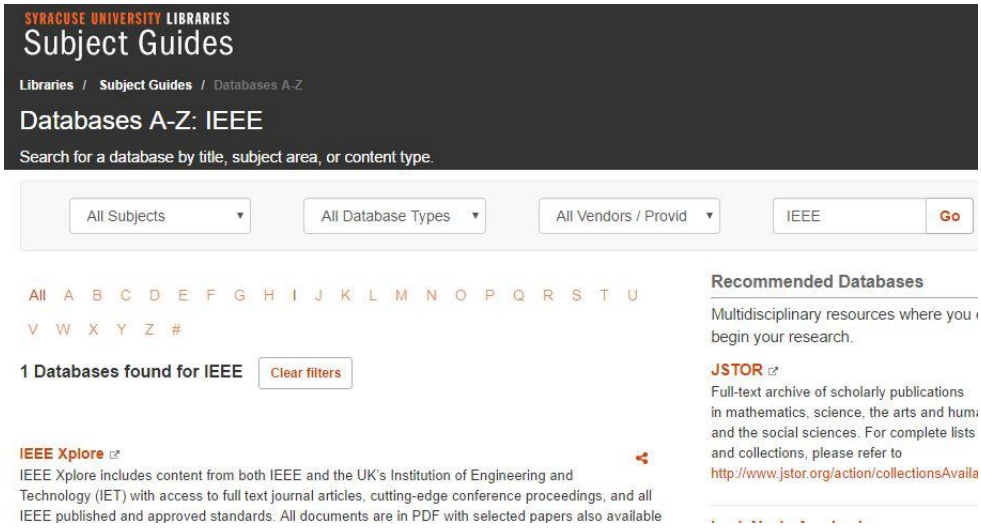
Texts / Supplies – Required:

- This introductory course in information security is intended to teach the comprehensive concepts and core elements in the area. Therefore, there is no single book that covers all the topics of the course. We will use the lecture materials developed by Dr. Park for this course and the textbook along with additional resources.
- Textbook (required)
  - Randall Boyle and Raymond Panko. *Corporate Computer Security (4th Edition).* Pearson.
    - ISBN-13: 978-0133545197 or
    - ISBN-10: 0133545199
  - In addition to the lecture slides and the required textbook, additional class materials will be available within the course LMS.

- Access to customized online labs
  - Each student is required to purchase the lab access code in order to conduct the customized online labs throughout the course.
  - For ordering and access, please refer to the instruction posted within the course LMS.
  - Once you log in the lab environment, you can use the online labs for this course anytime. Please make sure that **you use the customized lab manuals provided by the instructor**, instead of the ones integrated in the lab environment by the publisher.
- Recommended search engines for research articles
  - ACM Digital Library
  - IEEE Xplore
  - CiteSeer (http://citeseer.ist.psu.edu/)
- Note: In order to access the digital libraries with the university's license, your access should start from Syracuse University Libraries (http://library.syr.edu/). You may need to select **Databases** under the Search field and find/select a specific database (e.g., ACM Digital Library or IEEE Xplore) first. I entered "IEEE" and found "IEEE Xplore" in the example screen below.) If your current machine does not use an SU IP (say, you are using a home machine), you will be asked to log in with your SU NetID. Then, you can

use the database for your search.





Course Requirements and Expectations:

Activities	Points	Weight
Assignments	#1—Short Biography: 4 points #2—BLP Analysis: 5 points #3—SKC vs. PKC: 6 points #4—IPsec Modes: 7 points #5—P/F Firewalls vs. Proxy: 8 points	30%
Hands-on Labs	#1: 5 points #2: 7 points #3: 8 points	20%
	Bonus Lab (Optional): 3 points	3%
Case Study (Group)	Presentation: 20 points TME: 10 points	30%
Class Participation	20 points	20%
Total		**103%**

- **Working Groups:** Through the group activities in the course, all the students will have valuable experience working with group members for their case studies. The quality outcomes of the group activities can be counted for part of your professional career development. Typically, working groups will be formed in the second week of the course. Each team typically includes three to five students, with four being the ideal number.
- **Case Study (Group)**: Each group is required to choose a research topic and present its research outcomes to the class (about 30 minutes/group including Q&A) in Week#9 Live Session.
    - The topic can be in all aspects of security/privacy-related **specific cases**. For instance, topics of interest may include, but are not limited to, Target/Sony/JPMC/HomeDepot/iCloud/eBay/Facebook/Uber/Anthem/Yahoo!/Equifax/OPM/Marriott/Xbox security breaches, Wannacry, Heartbleed, EternalBlue, and other security/privacy related cases.
    - At the end of the course, each group is required to present its **final research outcomes** to the class and facilitate the Q&A session about the topic (about 30 minutes/group including Q&A).
    - Each presentation should cover the key points of the chosen topic, **lessons learned**, and **at least five references** (e.g., published news, journal articles, conference proceedings, online resources, etc.) relevant to the topic, providing the URL, PDF, or other reference information.
    - Each group is required to post its presentation materials (e.g., slides, URL links, video/audio clips, etc.) to the course LMS/Wall **before its presentation class (Live Session)**.
- **TME (individual)**: Group work needs a team effort by the members. Each member is required to contribute individually to a whole. To encourage each member's active participation in the group activities and produce a fair grading result, **each student** is required to submit his/her TME (Team Member Evaluation) at the end of the semester, considering self/peer contribution to the group work throughout the semester. TME is an individual evaluation. The instructor will take your TME very seriously for grading each student's group work. You must not share your TME with others. The TME form and the rubric will be available within the course LMS. I would like to urge you to start working with your group members for the group activities as soon as possible so that each member can spend sufficient time on his/her contribution to the team.
- **Hands-on Labs (individual)**: Each student will conduct hands-on labs in the online lab environment based on the class contents. Each student is required to submit the **lab report** after each lab. The customized lab manuals for this course will be provided by the instructor.

Grading:

Grades	Grade points /credit	Total Points Earned
A	**4.000**	90-100
A-	**3.667**	85-89
B+	**3.333**	80-84
B	**3.000**	75-79
B-	**2.667**	70-74
C+	**2.333**	65-69
C	**2.000**	60-64
C-	**1.667**	55-59
F	**0**	Below 55

University Attendance Policy:

- Attendance in classes is expected in all courses at Syracuse University. Students are expected to arrive on campus in time to attend the first meeting of all classes for which they are registered. Students who do not attend classes starting with the first scheduled meeting may be academically withdrawn as not making progress toward degree by failure to attend. Instructors set course-specific policies for absences from scheduled class meetings in their syllabi.
- It is a federal requirement that students who do not attend or cease to attend a class to be reported at the time of determination by the faculty. Faculty should use "ESPR" and "MSPR" in Orange Success to alert the Office of the Registrar and the Office of Financial Aid. A grade of NA is posted to any student for whom the Never Attended flag is raised in Orange SUccess. More information regarding Orange SUccess can be found here, at: http://orangesuccess.syr.edu/getting-started-2/
- Students should also review the University's religious observance policy and make the required arrangements at the beginning of each semester.

Course Policies:

- **Assignment Submission:** Please submit assignments as directed. All the assignments should be submitted in PDF via the course LMS. Do NOT e-mail assignments to the instructor or graduate assistants. E-mail attachments and hard copies will not be accepted. Assignments should be prepared in a professional manner according to the submission guidelines and with correct spelling and grammar.
- **Late Submission:** Considering the real-world constraints and professional responsibilities at work, students are required to submit all the assignments before or on the due date. The deadlines are firm. Late submissions will not be accepted.
- **Make-up Condition:** Make-up assignments will only be allowed if the student can provide a formal documentation through the corresponding office. If you are having problems in keeping up with the class, you should contact the instructor immediately so that appropriate arrangements can be made as soon as possible.

- **Class Participation:** Real-world professionals are expected to attend and participate in all meetings that are concerned with the work. Therefore, weekly Live Session attendance **with your full video connection** is required. Live session participation with Audio-only or video-paused (no streaming) may negatively affect your point. If you arrive late or leave early, you will be marked absent. Your active and constructive involvement with the asynchronous content and live class sessions will help to ensure that you receive the most benefit from this class. Non-attendance in class for part of the semester will be reflected in a decrease in this grade (and most likely in other grades as well). There are no excused absences unless documented by the university.

Syracuse University Policies:

Syracuse University has a variety of other policies designed to guarantee that students live and study in a community respectful of their needs and those of fellow students. Some of the most important of these concerns:

- **Diversity and Disability** (ensuring that students are aware of their rights and responsibilities in a diverse, inclusive, accessible, bias-free campus community) can be found here, at https://www.syracuse.edu/life/accessibilitydiversity/
- **Religious Observances Notification and Policy** (steps to follow to request accommodations for the observance of religious holidays) can be found here, at: http://supolicies.syr.edu/studs/religious_observance.htm
- **Orange SUccess** (tools to access a variety of SU resources, including ways to communicate with advisors and faculty members) can be found here, at: http://orangesuccess.syr.edu/getting-started-2/

Disability-Related Accommodations:

- Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. There may be aspects of the instruction or design of this course that result in barriers to your inclusion and full participation in this course. I invite any student to meet with me to discuss strategies and/or accommodations (academic adjustments) that may be essential to your success and to collaborate with the Office of Disability Services (ODS) in this process.
- If you would like to discuss disability-accommodations or register with ODS, please visit their website at http://disabilityservices.syr.edu./ Please call (315) 443-4498 or email disabilityservices@syr.edu for more detailed information.
- ODS is responsible for coordinating disability-related academic accommodations and will work with the student to develop an access plan. Since academic accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible to begin this process.

Academic Integrity Policy:

Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice.

Educational Use of Student Work:

Student work prepared for University courses in any media may be used for educational purposes, if the course syllabus makes clear that such use may occur. You grant permission to have your work used in this manner by registering for, and by continuing to be enrolled in, courses where such use of student work is announced in the course syllabus. I intend to use academic work that you complete this semester for educational purposes in this course during this semester. Your registration and continued enrollment constitute your permission. I intend to use academic work that you complete this semester in subsequent semesters for educational purposes.

Course Evaluations:

There will be an end of course evaluation for you to complete this term. This evaluation will be conducted online and is entirely anonymous. You will receive an official notification in your email account with the evaluation website link and your passcode. Please take the time and fill out this evaluation as your feedback and support of this assessment effort is very much appreciated. The school carefully reviews ratings and comments that you submit, and these factor into decisions about course, program and instructor development.

University Enrollment Policy:

Only officially registered students are allowed in this course. University policy prohibits students from attending, being evaluated, auditing, or participating in regular semester courses without being officially enrolled.

Schedule Change:

The course schedule is a plan, which may be changed.

Course Schedule:

Week No.	Topics	Class Activities	Readings	Assignments Due*
#1	Introduction (Security Programs, Course Overview, Security Properties, Security Trends, Threat Environment, Basic Terminologies)	Ice Breaker Assignment #1 (Short Biography)	Lecture Materials Textbook: Chap. 1.1–1.3	
#2	Security Policies (Security Policy Levels, Principles, Examples, Security vs. Privacy)	Form Research Groups	Lecture Materials Textbook: Chap. 2.5-2.7	Assignment #1 (Short Bio)
#3	Security Models (Access Control Models, BLP Rules, RBAC Concepts)	Assignment #2 (BLP Analysis)	Lecture Materials Textbook: Chap. 5.1, 5.7	
#4	Secret Key Cryptography (Operational Scheme, Basic Algorithms, Attack Analysis)	Lab #1	Lecture Materials Textbook: Chap. 3.1–3.2	Assignment #2
#5	Public Key Cryptography (Operational Schemes, Number Theory, Basic Algorithms, Digital Hashes, Digital Certificates)	Assignment #3 (SKC vs. PKC)	Lecture Materials Textbook: Chap. 3.6–3.7	Lab #1 Report
#6	Authentication (Passwords, One-Time Passwords, Biometrics, Cryptographic Techniques, Kerberos)	Lab #2	Lecture Materials Textbook: Chap. 5.3–5.6	Assignment #3
#7	Internet Security Protocols (SSL/TLS, IP Tunneling, IPsec)	Assignment #4 (IPsec Modes) Bonus Lab	Lecture Materials Textbook: Chap. 3.10–3.11	Lab #2 Report

		Course Booster Week		
#8	Security in Wireless Networks (Wireless Network Attacks, Wireless Security Protocols, Comparison)	Lab #3 Case Study Q&A (Part I)	Lecture Materials Textbook: Chap. 4.6	Assignment #4 Bonus Lab Report Each Group's Presentation Materials
#9	Case Study Dissemination	Case Study Q&A (Part II)	Group Presentations	Each Group's Presentation Materials Lab #3 Report
#10	Firewalls (Packet Filtering Firewalls, Proxy)	Assignment #5 (P/F Firewalls vs. Proxy) Course Wrap-up	Lecture Materials Textbook: Chap. 6.1–6.3, 6.5	
#11		Final Assignment Submission		Assignment #5 TME