

# Introduction to Information Security (IST323)

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## **Instructor**

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## **Class Time/Place**

TBD.

## **Audience**

Undergraduate students.

## **Description**

This 3-credit undergraduate course (IST323, Introduction to Information Security) is intended to teach fundamental elements in information security and introduce the key areas of security challenges, countermeasures, and real-life examples. The course will focus on a comprehensive understanding of information security rather than a specific security area. Topics include security properties, vulnerabilities, cryptography, security policies, access control, authentication, firewalls, wireless security, Internet security protocols, security management, security evaluation, and case studies. Students will also have hands-on experiences in information security through customized online labs.

## **Credits**

3 credits

## **Learning Objectives**

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

- Explain
  - The fundamental elements of security properties, challenges, countermeasures, and real-life examples.
  - In-depth security knowledge and skills in the security topics that they selected.
- Demonstrate
  - The hands-on ability to analyze security properties and conducting/defending cyber attacks, using various security services and tools.

- 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 contents learned from this course.

### **Texts/Supplies—Required**

- Textbook
  - Corporate Computer Security (4<sup>th</sup> Edition)
    - Authors: Randall Boyle and Raymond Panko
    - ISBN-13: 978-0133545197
    - ISBN-10: 0133545199
    - Available through the Syracuse University Bookstore and other online bookstores.
  - In addition to the lecture slides and the textbook, additional class materials may be posted within the course Blackboard.
- 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 semester.
  - ISBN: 9781284147292 (about \$75).
  - You may purchase the access code from the SU bookstore or directly online at [www.shopjblearning.com](http://www.shopjblearning.com)
  - After you purchase the access code, you will receive instructions how to access the lab environment. You will be required to provide the course code “5290” for the process.
  - Once you log in the lab environment, you can start the online labs for this course anytime. Please make sure that you use the customized lab manuals provided by the course, instead of the ones available in the lab environment.



### **Bibliography/Texts/Supplies—Additional**

- 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 find a specific database (e.g., ACM Digital Library or IEEE Xplore) first by selecting Databases under the Find menu. (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.

The screenshot shows the 'Subject Guides' page for Syracuse University Libraries. The main heading is 'Databases A-Z: IEEE'. Below this, there are search filters: 'All Subjects', 'All Database Types', 'All Vendors / Provid', and a search box containing 'IEEE' with a 'Go' button. A navigation bar lists letters A through Z, with 'I' highlighted. Below the navigation bar, it says '1 Databases found for IEEE' with a 'Clear filters' button. The search results list 'IEEE Xplore' with a description: 'IEEE Xplore includes content from both IEEE and the UK's Institution of Engineering and Technology (IET) with access to full text journal articles, cutting-edge conference proceedings, and all IEEE published and approved standards. All documents are in PDF with selected papers also available'. To the right, there is a 'Recommended Databases' section featuring 'JSTOR' with a description: 'Full-text archive of scholarly publications in mathematics, science, the arts and human and the social sciences. For complete lists and collections, please refer to http://www.jstor.org/action/collectionsAvailable'.

**Requirements**

| Activities                         |            | Points                               |
|------------------------------------|------------|--------------------------------------|
| Class Participation                |            | 15 points                            |
| Assignment #1                      |            | 5 points                             |
| Assignment #2                      |            | 20 points                            |
| Exam                               |            | 20 points                            |
| Hands-on Labs                      | 4 Required | 20 points<br>(5 points for each lab) |
|                                    | 4 Optional | 8 points<br>(2 points for each lab)  |
| Security Project (Real-life Cases) |            | 20 points                            |
| Total                              |            | 108 points                           |

- Class Participation:** Real-world professionals are expected to attend and participate in all meetings that are concerned with the work. Therefore, students are expected to participate in all the class activities on time, including lectures, class discussions, and presentations. Attendance will be taken throughout the semester in both lectures and other class activities. If you arrive late or leave early, you will be marked absent. There are no excused absences unless documented by the university. Each student may have two absences without penalty. Attendance sign-in sheets will be used often, but are not the only means of taking attendance for a given class. It is each student’s responsibility to ensure that they have signed the sheet when the sheet is passed around. Students who are absent and have others sign the sheet for them will be considered to have violated University academic integrity rules, and this will include the student who falsely signs for someone else. Significant consequences may result from this practice.
- Assignment#1 (in 300 words):** Each student is required to post his/her **brief bio, Security Presentation topic**, career goal, security courses/experiences taken so far, and other comments (if any). Please use **“Your Full Name”** as the “Subject” of

your posting in a separate thread (not under somebody else’s name). Attach your professional looking **photo**. You may give a link to your existing homepage (the link should be accessible without a login process).

- **Security Project (Individual):** Each student is required to choose a research topic and present his/her research outcomes to the class (about 15 min./presentation including Q&A). The topic can be in all aspects of security and privacy issues. For instance, topics of interest may include, but are not limited to: Target/Sony/JPMC/HomeDepot/Apple/Google/Yahoo security breaches, Ransomware, Bitcoin, Stuxnet, Apple/Samsung Pay, Privacy in Facebook/Twitter, hacktivism, new security vulnerabilities/tools/attacks, etc. Each presentation should cover the key points of the chosen topic, **lessons learned**, and **at least 5 references** (e.g., published news, journal articles, conference proceedings, online resources, etc.) relevant to the topic, providing the URL, PDF, or other reference information. The presenting student is required to post his/her presentation materials (e.g., slides, video/audio clips, etc.) to the class Blackboard **24 hours before the scheduled class** so that the other students can preview them before the class. No other submission is required.
- **Assignment#2:** Each student is required to summarize **one** presentation that you select (excluding his/her own work) from **each presentation session**. (In 1000 words for **each** summary, including the key ideas of the presentation (< 800 words) and the lessons (< 200 words) you learned from it.) Submit all the summaries together as Assignment#2 in the end of the semester. Typically, there will be 5-6 presentation sessions throughout the semester.
- **Hands-On Labs:** Each student will conduct hands-on labs based on the class contents. Each student is required to submit the **lab report** for each lab by the due date. There will be four required labs and four optional labs. After you finish each required lab (5 points each), you may conduct the optional lab in the topic area and earn extra points (2 points each). For each lab, a customized lab manual will be provided.
  - Host Protection
    1. Identifying and Removing Malware on a Windows System (Required).
    2. Securing Internet Client and Server Applications on Windows (Optional).
  - Cryptography
    3. Using Encryption to Enhance Confidentiality and Integrity (Required).
    4. Authenticating Messages with Digital Signatures (Optional).
  - Secure Communications
    5. Encrypting and Decrypting Web Traffic with HTTPS (Required).
    6. Applying Hashing Algorithms for Secure Communications (Optional).
  - Network Security Analysis
    7. Penetration Testing a pfSense Firewall (Required).
    8. Using Wireshark and NetWitness Investigator to Analyze Wireless Traffic (Optional).

**Grading Scale**

| Points Earned | Grade |
|---------------|-------|
| 90–100        | A     |
| 85–89         | A–    |

|          |    |
|----------|----|
| 80–84    | B+ |
| 75–79    | B  |
| 70–74    | B– |
| 65–69    | C+ |
| 60–64    | C  |
| 55–59    | C- |
| 50–54    | D  |
| Below 50 | F  |

**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.

**Tentative Class Schedule**

| Week No. | Topics   | Class Activities  | Readings  | Assignments Due*                                |
|----------|--|---|---|---|
| #1       | Introduction<br>(Security Programs, Course Overview, Security Properties, Security Trends) | Ice Breaker<br><br>Assignment #1<br>(Short Bio + Security Presentation Topic) | Lecture Materials in Blackboard                                   |   |
| #2       | Security Concerns<br>(Threat Environment, Security Incidents, Basic Terminologies)         | Class Discussion<br>(Why security becomes more critical than ever?)           | Lecture Materials in Blackboard<br><br>Textbook:<br>Chap. 1.1-1.6 | Assignment #1<br>(Post to Bb Discussion Board.) |
| #3       | Security Policies  |   | Lecture Materials in Blackboard                                   |   |

|    |   |  |   |   |
|----|---|--|---|---|
|    | (Security Policy Principals, Security Policy Examples, Planning)                                      |  | Textbook:<br>Chap. 2.1-2.3,<br>2.6-2.7                                    |   |
| #4 | Access Control (Access Control Models, BLP Rules, RBAC Concepts)                                      | Lab #1 (Required)<br>Lab #2 (Optional)     | Lecture Materials in Blackboard<br><br>Textbook:<br>Chap. 5.7,<br>5.11    |   |
| #5 | Secret Key Cryptography (Operational Scheme, Basic Algorithms, Attack Analysis)                       | Security Project #1<br>Assignment #2 (1/5) | Lecture Materials in Blackboard<br><br>Textbook:<br>Chap. 3.1-3.3,<br>3.9 | Presenters Only:<br>Presentation Materials (Post to Bb at least 24 hours before the class.) |
| #6 | Public Key Cryptography (Operational Schemes, Basic Algorithms, Digital Hashes, Digital Certificates) | Lab #3 (Required)<br>Lab #4 (Optional)     | Lecture Materials in Blackboard<br><br>Textbook:<br>Chap. 3.1-3.3,<br>3.9 | Lab #1 Reports (Submit via Bb)  |
| #7 | Authentication (Passwords, Physical Devices, Biometrics, Cryptographic Techniques, Kerberos)          | Security Project #2<br>Assignment #2 (2/5) | Lecture Materials in Blackboard<br><br>Textbook:<br>Chap. 5.1-5.6         | Presenters Only:<br>Presentation Materials (Post to Bb at least 24 hours before the class.) |
| #8 | Internet Security Protocols (SSL/TLS, IPSEC, SSH)   | Lab #5 (Required)<br>Lab #6 (Optional)     | Lecture Materials in Blackboard<br><br>Textbook:<br>Chap. 3.10-<br>3.11   | Lab #2 Reports (Submit via Bb)  |

**COURSE SYLLABUS**

|     |   |  |  |  |
|-----|---|--|--|--|
| #9  | Firewalls   | Security Project #3<br>Assignment #2 (3/5)                           | Lecture Materials in Blackboard<br><br>Textbook:<br>Chap. 6.1-6.5                            |  |
| #10 | Wireless Security   | Class Discussion<br>(How to make the future systems more secure?)    | Lecture Materials in Blackboard<br><br>Textbook:<br>Chap. 4.6                                | Lab #3 Reports<br>(Submit via Bb)  |
| #11 | Exam  | Lab Make-up<br>(You may earn up to 50% of the original full points.) |  | Make-up Lab Reports<br>(Submit via Bb)   |
| #12 | Security Management<br>(Application Security, Data Protection, Incident Response) | Security Project #4<br>Assignment #2 (4/5)                           | Lecture Materials in Blackboard<br><br>Textbook:<br>Chap. 8.1<br>Chap. 9.1-9.2<br>Chap. 10.5 | Presenters Only:<br>Presentation Materials<br>(Post to Bb at least 24 hours before the class.) |
| #13 | Security Evaluation<br>(Orange Book, Common Criteria, Security Auditing)          | Lab #7 (Required)<br>Lab #8 (Optional)                               | Lecture Materials in Blackboard<br><br>Textbook:<br>Chap. 5.8                                | Presenters Only:<br>Presentation Materials<br>(Post to Bb at least 24 hours before the class.) |
| #14 | Special Topic   | Security Project #5<br>Assignment #2 (5/5)                           | Lecture Materials in Blackboard  | Presenters Only:<br>Presentation Materials<br>(Post to Bb at least 24 hours before the class.) |
| #15 | Course Wrap-Up  |  | Lecture Materials in Blackboard  | Lab #4 Report<br>(Submit via Bb)   |

|  |  |  |  |               |
|--|--|--|--|---------------|
|  |  |  |  | Assignment #2 |
|--|--|--|--|---------------|

**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. For more information about the policy, see <http://academicintegrity.syr.edu>.

**Disability-Related Accommodations**

Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), [disabilityservices.syr.edu](http://disabilityservices.syr.edu), located at 804 University Avenue, room 309, or call 315.443.4498 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue “Accommodation Authorization Letters” to students as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible. Our goal at the iSchool is to create learning environments that are useable, equitable, inclusive and welcoming. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, please meet with me to discuss additional strategies beyond official accommodations that may be helpful to your success.

**Religious Observances Notification and Policy**

SU’s religious observances policy, found at [supolicies.syr.edu/emp\\_ben/religious\\_observance.htm](http://supolicies.syr.edu/emp_ben/religious_observance.htm) , recognizes the diversity of faiths represented in the campus community and protects the rights of students, faculty, and staff to observe religious holy days according to their tradition. Under the policy, students should have an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors no later than the end of the second week of classes through an online notification form in MySlice listed under **Student Services/Enrollment/My Religious Observances/Add a Notification**.



**Student Academic Work Policy**

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. Before using your work for that purpose, I will either get your written permission or render the work anonymous by removing all your personal identification.

**Course Evaluations**

There will be an end-of-course evaluation for you to complete this term, described below. This evaluation will be conducted online and is entirely anonymous. You will receive a notification from the Syracuse University Office of Institutional Research & Assessment (OIRA) department in your e-mail account with the evaluation website link and your passcode. End-of-semester evaluation will be available for completion in Week 10 prior to your final exams week. This evaluation is slightly longer and it is used to gauge the instructor's performance and make adjustments to the course to ensure it meets our students' needs.

We faculty work hard to do the best possible job when preparing and delivering courses for our students. Please understand that not only does the school use the course evaluations to make decisions about the curriculum in order to improve where necessary, but they also use them to make decisions about faculty members. Please take the time and fill out this evaluation as your feedback and support of this assessment effort is very much appreciated.

**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.