



Jordan University of Science and Technology
Faculty of Computer & Information Technology
Computer Information Systems Department

CIS 433 Information Security

Course Catalog

3 Credit hours (3 h lectures). The course covers classic security topics, such as applied cryptography, authentication, authorization and basic security principles. Furthermore, it covers some recent topics such as web security and virtual machines security. The topics that the course covers are listed below:

- **Overview:** Confidentiality, Integrity, Availability. Security policy and mechanism. Basic principles of secure system design.
- **Cryptography:** Basic crypto primitives, Secret key crypto, public key crypto, Digital signatures, Message authentication.
- **System security:** Authentication, Access Control, Discussion of popular systems and security protocols.
- **Network Security:** Firewalls, Intrusion Prevention Systems, DHCP spoofing and snooping, MAC flooding.

Course Information

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|-----------------------|---|
| Course Title | Information Security |
| Course Number | CIS 433 |
| Prerequisites | Statistics (Math131) & Data Structures (CIS 328) |
| Course Website | |

Text Book(s)

| | |
|---------------------|---|
| Title | Computer Security: Principles and Practice |
| Author(s) | William Stallings and Lawrie Brown |
| Publisher | Pearson Education |
| Year | 2015 |
| Book Website | https://www.pearsonhighered.com/program/Stallings-Computer-Security-Principles-and-Practice-3rd-Edition/PGM153489.html |
| Edition | 3 rd |

References

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|-----------------------|---|
| Books | Security in Computing by Pfleeger, Pfleeger, Margulies. Prentice Hall, 2015, 5th ed |
| Internet links | https://www.pearsonhighered.com/program/Pfleeger-Security-in-Computing-5th-Edition/PGM25284.html |

Instructors

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|------------------------|--|
| Instructors | Dr. Qussai M. Yaseen |
| Office Location | Engineering Building N2 L0 |
| Office Phone | Ext. 22399 |
| E-mail | qmyaseen@just.edu.jo |

Teaching Assistant

Ftoon abu Shaqrah

Class Schedule & Room

| Section | Time | Days | Room | Instructor |
|---------|--------------|---------------------------|-----------|-------------------|
| 1 | 9:30 – 10:30 | Sunday, Tuesday, Thursday | CIS01 Lab | Dr. Qussai Yaseen |

Office Hours

| Instructor | Days | Time |
|-------------------|---------------------------|---------------|
| Dr. Qussai Yaseen | Sunday, Tuesday, Thursday | 10:30 -11:30 |
| | Monday, Wednesday | 11:30 – 12:30 |

Topics Covered

The schedule is subject to change depending upon the actual class dynamics and workflow during the semester

| Topic | Chapters in Text | Related CLOs | Week No. |
|---|------------------------|--------------------------|----------|
| Introduction. Basic security principles. | Chapter 1 | ILO 1 | 1 |
| Cryptography: Simple symmetric-key ciphers. DES. | Chapter 2 + Chapter 20 | ILO 7 ILO 5 | 2,3 |
| Public-key cryptography and RSA, Diffie-Hellman. | Chapter 2 + Chapter 21 | ILO 7 ILO 5 | 3, 4 |
| User Authentication: Means of Authentication, Password-Based, Token-Based, Biometric, Remote User authentication. Security Issues for User Authentication. | Chapter 3 | ILO 5 ILO 11 | 5 |
| Access Control: Access Control Principles. Subjects, Objects and Access Rights. Discretionary Role-Based Access Control. | Chapter 4 | ILO 5 ILO 3 ILO 11 | 6,7 |
| Database and Cloud Security: Database Access Control. Inference. Database Encryption. Data Protection in the Cloud | Chapter 5 | ILO 4 ILO 3 ILO 11 | 8,9 |
| Malicious Software: Viruses. Worms. Bots. Rootkits. | Chapter 6 | ILO 4 ILO 3 ILO 11 | 10,11 |
| Intrusion Detection: Intruders. Intrusion Detection. Host-Based and Distributed Host-Based Intrusion Detection. Network-Based Intrusion Detection. Honeypots. | Chapter 8 | ILO 4 ILO 3 ILO 11 | 12,13 |
| Network Security, Firewalls and Intrusion Prevention Systems: Firewall Characteristics. Types of Firewalls. Firewall Location and Configurations. Intrusion Prevention Systems. MAC address Flooding, DHCP starvation and Spoofing. | Chapter 7 + 9 | ILO 4 ILO 3 ILO 11 | 14,15 |

Course Objectives

| No. | Course Learning Outcomes (CLOs) | Mapping CLOs to ABET POs | Assessment Methods |
|-----|---|--------------------------|--------------------|
| 1 | A successful student in this course will be able to be familiar with information security concepts and terms. | ILO 1 | Exams |
| 2 | A successful student in this course will be able to use symmetric and asymmetric encryption methods. | ILO 7 ILO 5 | Exams, Labs |
| 3 | A successful student in this course will be able to code a hacking system that teach students how attackers think and hack systems. | ILO 5 ILO 11 | Project |
| 4 | A successful student in this course will be able to analyze access control methods and their differences, and implement an access control method. | ILO 3 ILO 5 ILO 11 | Exams, Project |
| 5 | A successful student in this course will be able to design some types of malicious software. | ILO 4 | Exams, Labs |
| 6 | A successful student in this course will be able to understand how countermeasures works and how intruders may bypass security countermeasures. | ILO 4 | Exams, Labs |

| Relationship to Program Outcomes (score out of 5) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Outcome | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
| Mapping Score | 5 | | 2 | 4 | 4 | | 2 | | | | 4 | | | |

| Evaluation | | |
|------------------------------|--------------------------|---------------|
| Assessment Tool | Expected Due Date | Weight |
| First Exam | TBD | 15% |
| Second Exam | TBD | 15% |
| Activity/ Assignment/Project | TBD | 30% |
| Final Exam | TBD | 40% |

| Teaching & Learning Methods |
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| <ul style="list-style-type: none"> • Class lectures: Class lectures will expose students to the knowledge required by this course • Class Discussions: Relevant issues will be discussed in class. These discussions are supposed to improve the students' communication and problem solving skills by motivating them to express their opinions. • Activity: Students will be expected to work on a group activity. The activity could be a small software project, or a case study of a healthcare provider. In addition to improving the students' technical and analytical skills, this project aims at improving the students' team work, self-management, and planning and organizing skills. • Self-study: Students will be required to study one of the assigned chapters as self-study. A number of questions from the self-study chapter will be included in the exam. This learning method aims at improving the students' learning skills. |

| Other Policies and Notes | |
|---------------------------------|---|
| Attendance | Excellent attendance is expected. In accordance with university regulations, students missing more than 20% of total classes are subject to failure. No excuses will be accepted. If you miss class, it is your responsibility to find out about any announcements or assignments you may have missed. Attendance will be recorded at the beginning or end of each class. |
| Participation | You are expected to participate in class. Participation includes asking and answering questions, raising issues, and suggesting solutions to the discussed problems. |
| Activity | Students are expected to work on an activity within a group of 3-4 students. The activity could be a small software project, or a case study of a healthcare provider. |
| Exams | All exams will be CLOSE-BOOK. The format for the exams is generally as follows: multiple-choice, and short essay questions. |
| Makeup Exams | Makeup exam should not be given unless there is a valid excuse. Arrangements to take an exam at a time different than the one scheduled MUST be made prior to the scheduled exam time. In accordance with university regulations, students should bring a valid excuse authenticated through valid channels in JUST. |
| Workload | Average work-load student should expect to spend is 4 hours/week. |
| Code of Conduct | Quizzes and exams need to be done individually. Copying of another student's work, even if changes are subsequently made, is inappropriate, and such work will not be accepted. Cheating or copying from neighbor on exam is an illegal and unethical activity and standard JUST policy will be applied. All graded assignments must be your own work. |

The Text and Academic Authors Association named *Computer Security: Principles and Practice*, First Edition, the winner of the Textbook Excellence Award for the best Computer Science textbook of 2008. Teaching and Learning Experience. This program presents a better teaching and learning experienceâ€”for you and your students.Â Part one computer security technology and principles. Chapter 2 Cryptographic Tools. 2.1 Confidentiality with Symmetric Encryption.