

San José State University
College of Engineering/Electrical Engineering
CMPE/EE209, Network Security, Fall 2017

Course and Contact Information

Instructor:	Juzi Zhao
Office Location:	ENG 371
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Email:	juzi.zhao@sjsu.edu
Office Hours:	TuTh 10am-11.30am and by appointment
Class Days/Time:	TuTh 3pm - 4.15pm
Classroom:	ENG 345
Prerequisites:	EE 281 or CMPE 206 (with grade of “B” or better)

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on Canvas Learning Management System course login website at <http://sjsu.instructure.com>. You are responsible for regularly checking with the messaging system through MySJSU at <http://my.sjsu.edu> and SJSU Canvas to learn of any updates.

Course Description

The course provides the underlying principles and practices of modern network security. Network security architectures and protocols are examined and emphasis is given to their performance and implementation aspects. Symmetric and public-key encryption schemes are discussed in details. Authentication, hash functions, and key management schemes are also covered and their impacts on computer network security are compared. Several aspect of Network Security like OSI Security, IP Security, etc. would also be discussed.

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

1. Learn to identify and define the different threats to network systems: secrecy, authentication and data integrity.
2. Learn Symmetric-Key Algorithms which include Data Encryption Standard (DES), RC4, and Advanced Encryption Standard (AES) are discussed and their performances are compared.
3. Learn the Different types of encryption mode are explained and their pros and cons are discussed

and their hardware implementation impacts on performance: Electronic Code Book Mode, Cipher Block Chaining Mode, Cipher Feedback Mode, Stream Cipher and Counter Modes.

4. Learn public-Key Algorithms Key Distribution: Detailed implementations of the RSA algorithm are provided and when it is more practical to implement Public-Key algorithms is discussed.
5. Learn electronic Digital Signatures: are defined using symmetric-key and public-key approaches. Message Digest, MD5, as alternative solutions to digital signature is also discussed.

Required Texts/Readings

Textbook

W. Stallings, Cryptography and Network Security: Principles and Practice, 7th Ed., Pearson 2017. ISBN 10: 0-13-444428-0, ISBN 13: 978-0-13-4444284-0 Required.

Other Readings

Kaufman, Network Security – Private Communication in Public World, 2nd Ed., Prentice Hall 2002

Handouts posted on the course webpage.

Other technology requirements / equipment / material

This course requires each student to have a personal notebook computer installed with a modern operating system, such as MS Windows™, Mac OS X™, or Linux. The personal computer must be able to connect to Internet and capable of running at least three instances of virtual machines, such as VMware™.

Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in [University Policy S12-3](http://www.sjsu.edu/senate/docs/S12-3.pdf) at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

There will be one midterm exam, a project and a final exam. All exams are CLOSED book and notes. Exams cover the assigned reading materials and class lecture notes. There will be NO make-up exams. Exam solutions will be posted on the web site of the course.

NOTE that [University policy F69-24](http://www.sjsu.edu/senate/docs/F69-24.pdf) at <http://www.sjsu.edu/senate/docs/F69-24.pdf> states that “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

Final Examination or Evaluation

Final exam will be held on December 14 (Thursday), 2.45pm-5pm. It will be comprehensive and will be count as 35% of the total grade.

Grading Information

Grades

Homework assignments and quizzes	20%
Project presentation and reports	20%
Midterm Exam	25%
Final Exam	35%

Total **100%**

The instructor reserves the right to change the percentages

Failure to complete and submit 90% of homework and project assignments will result in a failing grade in this class. Late homework will not be accepted. There will be in-class quizzes.

Plagiarism, i.e., cheating, will result in a grade of F for the class as well being referred to the Department Chair.

Assignments and project reports are to be submitted through Canvas in soft copies.

Grading (tentative):

Grade	Overall Score
A+	98-100
A	94-97.99
A-	90-93.99
B+	85-89.99
B	75-84.99
B-	70-74.99
C	60-69.99
D	50-59.99
F	0-49.99

Classroom Protocol

Students should turn their cell phones off or put them on vibrate mode while in class. Students are expected to participate in class discussions as well as online discussion in the class website. Asking questions during class-time related to the lectures is encouraged. Students are required to engage in classroom activities, submit assignments and reports on time, and take exams and tests on time.

University Policies

Per The [University Course Syllabi Policy S16-9](http://www.sjsu.edu/senate/docs/S16-9.pdf) at <http://www.sjsu.edu/senate/docs/S16-9.pdf>, , university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

Course Schedule

Course Schedule (Subject to change with fair notice as announced by instructor in class)

Week	Date	Topics
1	Aug24	Introduction, Overview
2	Aug 29	Number Theory, Finite Field
2	Aug 31	
3	Step 5	Classical Encryption Techniques, Block Ciphers
3	Step 7	
4	Step 12	Symmetric Ciphers -DES, ASE
4	Step 14	
5	Step 19	Pseudorandom Number Generation
5	Step 21	
6	Step 26	Public Key Crypto, RSA
6	Step 28	
7	Oct 3	Other Public Key Crypto
7	Oct 5	
8	Oct 10	Cryptographic Hash Functions
8	Oct 12	
9	Oct 17	Midterm
9	Oct 19	

Week	Date	Topics
10	Oct 24	Digital Signature, MAC
10	Oct 26	
11	Oct 31	Key Management and Distribution
11	Nov 2	
12	Nov 7	User Authentication Protocols
12	Nov 9	
13	Nov 14	Network Access Control and Cloud Security
13	Nov 16	
14	Nov 21	Transport-Level Security
14	Nov 23	
15	Nov 28	Wireless Network Security
15	Nov 30	
16	Dec 5	IP Security, Review
16	Dec 7	
Final Exam		Dec 14 during 2.45pm-5pm

San Jose State University
Electrical Engineering Department
EE Department Honor Code

The Electrical Engineering Department will enforce the following Honor Code that must be read and accepted by all students.

“I have read the Honor Code and agree with its provisions. My continued enrollment in this course constitutes full acceptance of this code. I will NOT:

- *Take an exam in place of someone else, or have someone take an exam in my place*
- *Give information or receive information from another person during an exam*
- *Use more reference material during an exam than is allowed by the instructor*

- *Obtain a copy of an exam prior to the time it is given*
- *Alter an exam after it has been graded and then return it to the instructor for re-grading*
- *Leave the exam room without returning the exam to the instructor.”*

Measures Dealing with Occurrences of Cheating

- *Department policy mandates that the student or students involved in cheating will receive an “F” on that evaluation instrument (paper, exam, project, homework, etc.) and will be reported to the Department and the University.*
- *A student’s second offense in any course will result in a Department recommendation of suspension from the University.*