

INFORMATION SESSION

MS Software Engineering, specialization in Cybersecurity





Presenter

- **Afifa Hamad**
Program Specialist

**Graduate & Extended Studies
Charles W. Davidson College of Engineering
San Jose State University**



San Jose State University is...

- **The oldest public University on the West Coast, established in 1857.**
- **The only public University in Silicon Valley**
- **SJSU's Charles Davidson College of Engineering:**
 - ✓ **Offers 13 engineering disciplines**
 - ✓ **Employs 260 faculty and staff**
 - ✓ **Educates 7,000+ undergraduate and graduate students at any given time.**
- **U.S. News & World Report, 2017 edition college rankings, recently ranked SJSU's College of Engineering third in the nation among public engineering programs offering BS and MS degrees.**
- **Local technology firms employ more engineering graduates from SJSU's College of Engineering than from any other Engineering School.**

Why Cybersecurity?

- **Protecting digital information is crucial for consumers, business leaders and government officials**
- **Its importance is only increasing in light of attacks on corporations, government and private citizens**
- **“One million information-security specialists are needed to protect data and digital business”** – 2016 Emerging Cyber Threats Report, Georgia Institute of Technology
- **There aren't nearly enough professionals with the training and expertise required to fill the needs**
- **Cybersecurity specialists are in extremely high demand**

MSSE - Master of Science in Software Engineering Specialization in Cybersecurity San Jose State University

- **MS degree in 2 years – made possible via intense program and cohort structure**
- **Designed to accommodate working professionals**
- **Program is flexible and typically not available in traditional MS programs**
- **Dedicated program specialist**
- **Instructors include SJSU faculty and industry subject matter experts**
- **The program is comprised of three stackable certificates**
- **Cohort of 30-35 students**

Program Delivery

- **Classes are held at the Lucas Business Complex in Santa Clara, with an opportunity for hybrid delivery.**
- **Program is delivered in *cohort-style*, which means students go through the program with the same group of peers from the first course until graduation.**
- **Program is pre-designed and students take courses according to a predetermined schedule. All cohort members are guaranteed seats in each course without waiting**
- **Program is specifically designed for working professionals:**
 - ✓ **Classes are taught in the evening and on weekends**
 - ✓ **One course at a time**
 - ✓ **Courses are 8 weeks long (8 weekday meetings and two Saturday meetings)**
 - ✓ **MS Software Engineering degree in about two years**

Prerequisites

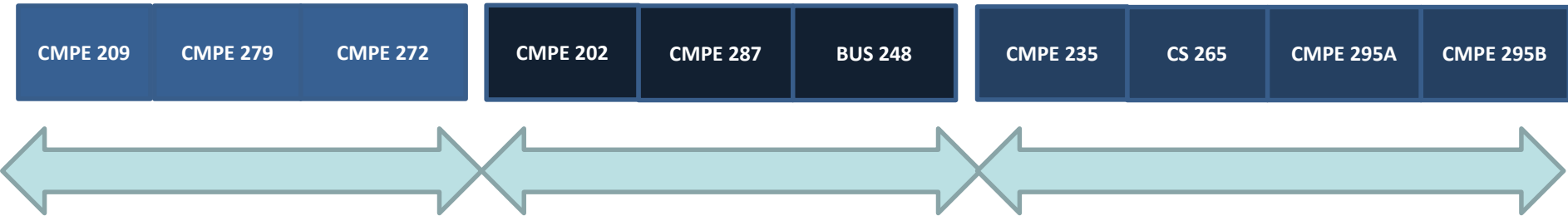
- ✓ **Must have BSCS, BSCE, BSSE or equivalent**
- ✓ **Minimum 3.0 GPA or equivalent**
- ✓ **English Language Proficiency**

See later slide for details

Student's Time Commitment

- **Weekday class sessions are 3.5 hours long (6:00 – 9:30 pm)**
- **Saturday class sessions are 6 hours long (9:00 am – 3:30 pm)**
 - **Plan to attend all real-time lectures in person if possible**
 - **If unable to attend in person, you can join remotely via Zoom**
- **Expect 2-3 hours of study time (homework/projects/reading) for each hour of instruction. Yes, there are periodic exams.**
- **Allow 6-8 months to complete team-based Master/Capstone Project**
- **Work related travel can be accommodated**
 - **Please inform program specialist and professor**

Stackable Certificates



Secure Software Engineering Certificate

[CMPE 209](#)

Network Security

[CMPE 279](#)

Software Security Technologies

[CMPE 272](#)

Enterprise Software Platforms

Secure Test Engineering Certificate

[CMPE 202](#)

Software Systems Engineering

[CMPE 287](#)

Quality Assurance and Testing

[BUS 248](#)

Cyber Risk Management

Advanced Cybersecurity Engineering Certificate

[CS 265](#)

Cryptography and Computer Security

[CMPE 235](#)

Mobile Software System Design

[CMPE 295A](#)

Master Project

[CMPE 295B](#)

Master Project II

Selected Course Topics

(actual topics will adapt to new developments)

Access Control & Mandatory Access Control	Penetration tests	Security Frameworks in Android, iOS, and Windows Phone
Database Security	Ethical Hacking	Crypto and Hashing in iOS, Android, and Windows Phone
Malicious Code	Reconnaissance and Scanning	Common security threat In the wireless world
Hashes & Security Protocols	Exploitation and Gaining Access	iOS Data Storage & Security
Intrusion Detection	Denial-of-Service Attacks	Secure Coding, x86 Assembly Call Stack
Intro to Cryptography	Web-based Exploitation	Vulnerabilities in C - Strings, Pointers, Memory, I/O
Wireless & Mobile Security	Maintaining Access	Security in Java
IPSec and TLS	Covering Tracks and Hiding	Authorization
Firewalls	Overview of Cryptography	Simple Authentication Protocols
Modern Malware	Symmetric Ciphers	Real-World Security Protocols
Security Mindset and SW Security	Number Theory and Finite Fields	Software Flaws and Malware Introduction
Symmetric Encryption & Public Key Cryptography	Message Authentication Code (MAC)	Malware
Law, Ethics & Privacy	Key Management and Distribution	Malware Detection
Web Security	Network Access Control and Cloud Security	Insecurity in Software
Security Management	Cyber Risk Assessment	Operating System and Security
Operating Systems Security & Authentication		

Course Descriptions

- **Core (6 units)**
 - **CMPE 202 – Software Systems Engineering**
 - **CMPE 272 – Enterprise Software Platforms**
- **Specialization (18 units)**
 - **CMPE 209 – Network Security**
 - **CMPE 235 – Mobile-Based Software System Design**
 - **CMPE 279 – Software Security Technology**
 - **CMPE 287 – Software Quality Assurance and Testing**
 - **BUS 248 – Cybersecurity Risk Management**
 - **CS 265 – Cryptography and Computer Security**

Course Descriptions

- **Project (6 units)**
 - **CMPE 295A – Master Project I**
 - **CMPE 295B – Master Project II**
- **Writing competency course (CSU requirement):**
 - **ENGR 200W; Engineering Reports & Graduate Research**
- **Total of 30 credit units (without ENGR 200w)**

Program Schedule – Cohort 3 (Tentative)

Dates	Semester	Course	Course Title	Units
Sept.23 – Nov. 25 2019	Fall2019	CMPE 209	Network Security	3
TBA	Fall 2019	CMPE 279	Software Security Technology	3
TBA	Spring 2020	CMPE 272	Enterprise Software Platforms	3
TBA	Spring 2020	CMPE 202	Software Systems Engineering	3
TBA	Summer 2020	CMPE 287	Software Quality Assurance & Testing	3
TBA	Fall 2020	BUS 248	Cybersecurity Risk Management	3
TBA	Spring 2021	CMPE 235	Mobile-Based Software System Design	3
TBA	Spring 2021	CS 265	Cryptography and Computer Security	3
TBA	Summer 2021	CMPE 295W	Master Project I	3
TBA	Fall 2021	CMPE 295B	Master Project II	3



Admission Steps

Step 1: Pre-qualify:

- ✓ Fill out a web form at <http://ges.sjsu.edu/corporate-programs-prequalification>
- ✓ Your background and program suitability will be reviewed by graduate advisor
- ✓ You will be invited to submit a formal application for admission to SJSU

Apply for Pre- Qualification

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engineering-
techmart@sjsu.edu



Admission Steps

Step 2: Apply to the University:

- ✓ **Four year bachelor’s degree recognized by SJSU in Software Engineering, Computer Science, Computer Engineering, or closely related technical field**
- ✓ **3.0 or above GPA (last 60 semester units or last 90 quarter units)**
 - ✓ Conditional admissions might be granted to applications with extensive experience if their GPA meets SJSU minimum requirement of 2.5
- ✓ **Meet English Language Proficiency Requirement (TOEFL, IELTS, PTE)**
- ✓ **Send Transcripts OR [World Education Services](#) evaluation**
 - ✓ **All applicants with foreign coursework are required to provide “document-by-document” basic WES evaluation**
 - ✓ **Transcripts/Mark Sheets must be sent directly to WES and SJSU Admissions must receive the academic record and the evaluation directly from WES**
 - ✓ **SJSU will not accept evaluations from institutions other than WES**



Program Cost

- **San Jose State University application fee: \$55**
- **Tuition: \$850 per unit or \$2,550 per course**
- **Entire Program: \$25,500 (10 courses)**
- **Books and other materials (software, for example) are not included in the course fees and must be purchased separately.**



Testimonials

- **88%** of students and graduates recommend the program to friends.
- “The CyberSecurity program has vastly improved my understanding of the many facets of Computer Security. This program effectively combines the business, technical, and platform knowledge needed by professionals in this field. Highly recommended- a must have for engineers in this field.”
- " I learned a lot around security, both from a technical and business perspective, as well as the challenges facing cybersecurity today and in the future."



http://www.sjsu.edu/ees/

ENGINEERING EXTENDED STUDIES
SAN JOSÉ STATE UNIVERSITY

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SJSU Home > Engineering Extended Studies



Engineering Extended Studies

"SJSU is Silicon Valley's FIRST CHOICE for new engineering HIRES." - Silicon Valley Business Journal

Welcome to the Engineering Extended Studies Department

Engineering Extended Studies (EES) Department at San Jose State University is

- one.SJSU
- Canvas
- Athletics
- Give to SJSU
- LinkedIn
- YouTube

Apply for Pre-Qualification

OFF-CAMPUS

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EES Events

EES Programs Webinar

• Tuesday, Feb. 5th at 4PM



Questions?

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APPENDIX

Course Descriptions for Advanced Certificate in Secure Software Engineering

- **CMPE 209 – Network Security:** Course covers network security protocols and applications, cryptography algorithms, authentication systems, intrusion detection, network attacks and defenses, system-level security issues and building secure systems.
- **CMPE 279 – Software Security Technology:** Course provides the concepts, methods and tools used to design and implement software security technologies for constructing trustworthy centralized, distributed or enterprise-wide software systems.
- **CMPE 272 – Enterprise Software Platforms:** Course covers standards and emerging technologies for enterprise software, system and virtualization platforms. Covers OSs, NOS, security, databases (OLTP, Big Data, Analytics), transactions, groupware, components, web services, web, systems management and app development.

Course Descriptions for Advanced Certificate in Secure Test Engineering

- **CMPE 202 – Software Systems Engineering:** Integrated approach to software design and development including requirements elicitation and analysis, system design and construction through studying multiple facets of software development processes, design methodologies, modeling approaches, and implementation techniques.
- **CMPE 287 – Software Quality Assurance and Testing:** Software testing concepts, processes, models, criteria, and methods. Software unit testing, integration, function validation, system performance measurement, and reliability evaluation. Software security testing methods, assurance criteria, and validation tools. Software security assurance process, standards, techniques, and case study.
- **BUS 248 – Cyber Risk Management:** Course surveys cyber risk management concepts and best practices. Topics include cyber security threats, countermeasures, vulnerabilities, cost/benefit analysis, incident handling / response, business contingency planning, ethics, and legal imperatives within the organizational context.

Course Descriptions for Advanced Certificate in Cyber Security Engineering

- **CMPE 235 – Mobile-Based Software System Design:** Study of wireless-based software systems in design and engineering, underlying networks, infrastructures and frameworks, wireless security, mobile user security & privacy, emergent mobile programming platforms and technologies, mobile commerce and service application systems.
- **CS 265 – Cryptography & Computer Security:** Course covers topics related to major technical security challenges in each of the following four areas: access control, protocols, malware detection and software.
- **CMPE 295W – Master Project:** Comprehensive plan and preliminary design of a software engineering project; integration of knowledge in technologies, processes and management to support program outcomes.
- **CMPE 295B – Master Project II:** Completion of an in-depth project to achieve the program outcomes and satisfy the cumulating experience; write a detailed project report; make a comprehensive presentation and demonstration.