



**CIS 3363**  
**Information Technology Systems Security**  
College of Engineering, Computer Science and  
Engineering

## **COURSE SYLLABUS**

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Semester: Fall 2019  
Class Meeting Days: M, W  
Class Meeting Time: 3:30 to 4:45pm  
Class Meeting Location: NES 103  
Instructor: Dr. Sriram Chellappan  
Office Location: ENB 317  
Office Hours: M, W: 1:45pm to 3:15pm  
Phone Number: 813-974-1379  
Email: [sriramc@usf.edu](mailto:sriramc@usf.edu)

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### **I. Welcome!**

The job market for cyber security students is rapidly expanding with many types of businesses now recognizing their vulnerabilities to cyber attacks. This is a foundational course that will teach you many aspects of cyber threats, attacks and defenses, while keeping discussions more foundational, and applicable in modern IT systems security contexts.

### **II. University Course Description**

This course covers foundations of systems security, including availability, authentication, access control, network penetration/defense, reverse engineering, cyber physical systems, forensics, supply chain management security, and secure systems design.

### **III. Course Prerequisites**

CIS 3213 with a minimum grade of C-, COP 2513 with a minimum grade of C, MAD 2104 with a minimum grade of C

### **IV. Course Purpose**

This class is a foundational and core class on cybersecurity covering critical fundamental principles of why, when and how to rigorously protect modern IT systems from cyber attacks. Any professional in cybersecurity needs to thoroughly understand foundational

principles you will learn in this class. Success in this class will prep you for higher level courses in the cybersecurity program, while also help in your future cybersecurity professional careers.

#### **V. How to Succeed in this Course**

Attend classes, submit assignments on time, ask questions, read about attacks in the industry today/ their impacts, see how the material learned is relevant in current contexts, ask questions, and do well in exams.

#### **VI. Course Topics**

Topics include:

- 1) Emerging vulnerabilities, threats, attacks, defense mechanisms and analysis tools for computer systems security.
- 2) Understand, evaluate and apply core principles of sound cyber security designs.
- 3) How to formally reason about system security issues.
- 4) How to comprehend challenges in securing computing systems today.
- 5) How to transition from theoretical understanding to practical designs.
- 6) The ramifications of system security and its impact to computing technologies today
- 7) Specific understanding of services like authentication, access control, forensics, network security, integrity, service availability and more, and also comprehension of inherent tradeoffs in providing such services
- 8) Comprehend orthogonal tradeoffs in designing secure computer systems from legal, ethical and economics standpoints.

#### **VII. Student Learning Outcomes**

On successful completion of the course the student will be able to:

- 1) Use modern analysis tools to evaluate vulnerabilities, threats, and attack vectors to be design a computer system with appropriate defense mechanisms.
- 2) Answer written and/or oral questions to demonstrate formal reasoning and principles of computer security issues for traditional systems and emerging systems such as cyber-physical systems.
- 3) Develop a secure computer system that demonstrates understanding of the key challenges and trade-offs in systems security, and systems performance/ cost.
- 4) Answer written and/or oral questions to demonstrate how theory is applied to practical designs for securing computer systems.
- 5) Explain the ramifications of computer security to how computer systems are accessed and used to maintain security.
- 6) Evaluate current protocols and design new ones for specific security services like authentication, access control, forensics, network security, integrity and service availability, and conduct detailed analysis on inherent tradeoffs.
- 7) Be able to effectively rationalize orthogonal trade-offs in designing secure computing systems from orthogonal perspective like legal issues, economics, ethical considerations and cost, and find best designs.

**VIII. Readings and Course Materials**

Computer Security (Art and Science), Matt Bishop, ISBN-13: 978-0321712332 ISBN-10: 0321712331, Addison-Wesley Second Edition, 2018. (Recommended)

**IX. Supplementary (Optional) Texts and Materials**

None.

**X. Grading Scale**

Tentative Grading Scale (%)	
94-100	A
90 – 93	A-
87 – 89	B+
84 – 86	B
80 – 83	B-
77 – 79	C+
74 – 76	C
70 – 73	C-
67 – 69	D+
64 – 66	D
60 – 63	D-
0 – 59	F

**XI. Grade Categories and Weights**

Assignments (6):	50%	
Exam 1:	25%	
Final Exam:	25%	(Date and Time TBA)

**XII. Project Assignments and Exams**

- Assignment 1: Access Control – Week 3
- Assignment 2: Authentication – Week 5
- Assignment 3: Network Security – Week 7
- Exam 1: Week 9 - Tentative
- Assignment 4: Hardware Security – Week 11
- Assignment 5: Intrusion/ Penetration Testing – Week 13
- Assignment 6: Secure Systems Design – Week 15
- Final Exam: Finals Week: Monday, April 29<sup>th</sup>, 12:30pm to 2:30pm in class.

### **XIII. Grade Dissemination**

Graded tests and materials in this course will be returned individually. You can access your scores at any time using "Grades" in Canvas. You are strongly recommended to do so.

### **XIV. Course Schedule**

- *Security Basics (1 weeks)*
  - General overview and definitions
  - Security models and policy issues
  - Formal reasoning of system security problems
  
- *Access Control (2 weeks)*
  - Introduction to access control policies
  - Introduction to system and information control
  - Access control protocols and Key Management for Confidentiality
  
- *Authentication (2 weeks)*
  - Introduction to passwords and related attacks
  - Modern authentication techniques and vulnerabilities
  - Protocols for network authentication
  
- *Network Security and Availability (3 weeks)*
  - Introduction to vulnerabilities and attacks in network systems
  - Attacks on Denial of Network/ Service Availability
  - System level defense
  - Network Forensics Techniques
  
- *Intrusion/ Penetration Testing (1 weeks)*
  - Formal models of Intrusion/ Penetration Detection
  - Techniques for Anomaly Detection
  - Defense against Intrusions
  
- *Hardware Security (2 weeks)*
  - Introduction to hardware security and impacts to system/ information security
  - Attacks description
  - Approaches to provide hardware security
  
- *Supply Chain Management (1 weeks)*
  - Principles of system security to supply chain management
  - Best practices

- *Security of Cyber Physical Systems (2 weeks)*
  - Definition and instances of CPS
  - Vulnerabilities and Attacks
  - Defenses
- *Secure Systems Design (2 weeks)*
  - Principles and Trade-off in system design
  - Techniques to address trade-offs like Audit Analysis and Risk Mitigation

## **XV. Course Policies: Grades**

**Late Work Policy:** Late assignments will not be accepted, unless prior arrangements have been made with instructor for unavoidable reasons (other professional commitments, religious events etc.), or documented medical reasons (with a doctor note). No make-ups for exams are allowed, unless prior arrangements are made with instructor, or for documented medical reasons.

**Extra Credit Policy:** There is none

**Grades of "Incomplete":** The current university policy concerning incomplete grades will be followed in this course. An "I" grade may be awarded to a student only when a small portion of the student's work is incomplete and only when the student is otherwise earning a passing grade. The time limit for removing the "I" is one week, and will be considered only under extenuating circumstances.

**Rewrite Policy:** There is none

**Make-up Exams Policy:** No make-ups for exams are allowed, unless prior arrangements are made with instructor, or for documented medical reasons.

**Exam Retention Policy:** They will be retained for one week after the Final exam.

**Essay Commentary Policy:** There are no essays for this class.

**Group Work Policy:** All work must be your own. Group work is not permitted under any circumstances.

**Final Examinations Policy:** All final exams are to be scheduled in accordance with the University's final examination policy.

## **XVI. Course Policies: Technology and Media**

Email is the preferred way of communication for this course. I mostly use Canvas to send emails about assignments, course materials, deadlines, exam dates etc. Please make sure

there is space to receive emails. I also prefer email, or face to face as the best form of communication with me. If you need help learning how to perform various tasks related to this course or other courses being offered in Canvas, please view the following videos or consult the Canvas help guides. You may also contact USF's IT department at (813) 974-1222 or [help@usf.edu](mailto:help@usf.edu). Regarding usage of laptops, it is upto you. Please ensure that other students are not disturbed with your laptop use (via key stroke sounds, audio etc.). You can use audio recorders in class as long they are not intrusive.

## **XVII. Course Policies: Student Expectations**

### **Academic Integrity**

Academic integrity is the foundation of the University of South Florida System's commitment to the academic honesty and personal integrity of its university community. Academic integrity is grounded in certain fundamental values, which include honesty, respect, and fairness. Broadly defined, academic honesty is the completion of all academic endeavors and claims of scholarly knowledge as representative of one's own efforts. The final decision on an academic integrity violation and related academic sanction at any USF System institution shall affect and be applied to the academic status of the student throughout the USF System, unless otherwise determined by the independently accredited institution. The process for faculty reporting of academic misconduct, as well as the student's options for appeal, are outlined in detail in [USF System Regulation 3.027](#).

### **Disruption to Academic Progress**

Disruptive students in the academic setting hinder the educational process. Disruption of the academic process is defined as the act, words, or general conduct of a student in a classroom or other academic environment which in the reasonable estimation of the instructor: (a) directs attention away from the academic matters at hand, such as noisy distractions, persistent, disrespectful or abusive interruption of lecture, exam, academic discussion, or general University operations, or (b) presents a danger to the health, safety, or well-being of self or other persons.

### **Academic Grievance Procedure**

The purpose of these procedures is to provide all undergraduate and graduate students taking courses within the University of South Florida System an opportunity for objective review of facts and events pertinent to the cause of the academic grievance. An "academic grievance" is a claim that a specific academic decision or action that affects that student's academic record or status has violated published policies and procedures, or has been applied to the grievant in a manner different from that used for other students.

### **Disability Access**

Students with disabilities are responsible for registering with Students with Disabilities Services (SDS) (SVC 1133) in order to receive academic accommodations. SDS encourages

students to notify instructors of accommodation needs at least five (5) business days prior to needing the accommodation. A letter from SDS must accompany this request.

### **Sexual Misconduct / Sexual Harassment**

USF is committed to providing an environment free from sex discrimination, including sexual harassment and sexual violence ([USF System Policy 0-004](#)). The USF Center for Victim is a confidential resource where you can talk about incidents of sexual harassment and gender-based crimes including sexual assault, stalking, and domestic/relationship violence. This confidential resource can help you without having to report your situation to either the [Office of Student Rights and Responsibilities](#) (OSSR) or the [Office of Diversity, Inclusion, and Equal Opportunity](#) (DIEO), unless you request that they make a report. Please be aware that in compliance with Title IX and under the USF System Policy, educators must report incidents of sexual harassment and gender-based crimes including sexual assault, stalking, and domestic/relationship violence. If you disclose any of these situations in class, in papers, or to me personally, I am required to report it to OSSR or DIEO for investigation. Contact the [USF Center for Victim Advocacy and Violence Prevention](#): (813) 974-5757.

### **Religious Observances**

All students have a right to expect that the University will reasonably accommodate their religious observances, practices and beliefs ([USF System Policy 10-045](#)). The USF System, through its faculty, will make every attempt to schedule required classes and examinations in view of customarily observed religious holidays of those religious groups or communities comprising the USF System's constituency. Students are expected to attend classes and take examinations as determined by the USF System. No student shall be compelled to attend class or sit for an examination at a day or time prohibited by his or her religious belief. However, students should review the course requirements and meeting days and times to avoid foreseeable conflicts, as excessive absences in a given term may prevent a student from completing the academic requirements of a specific course. Students are expected to notify their instructors at the beginning of each academic term if they intend to be absent for a class or announced examination, in accordance with this Policy.

### **Statement of Academic Continuity**

In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include, but are not limited to: Learning Management System, online conferencing, email messaging, and/or an alternate schedule. It is the responsibility of the student to monitor the Learning Management System for each class for course-specific communication, and the main USF, College, and Department websites, emails, and MoBull messages for important general information ([USF System Policy 6-010](#)). For additional guidance on emergency protective actions and hazards that affect the University, please visit [www.usf.edu/em](http://www.usf.edu/em)

**Attendance Policy:** Attendance is expected for all classes, although you will not be penalized for missed classes.

**Professionalism Policy:** Per university policy and classroom etiquette; mobile phones, iPods, etc. **must be silenced** during all classroom and lab lectures. Those not heeding this rule will be asked to leave the classroom/lab immediately so as to not disrupt the learning environment. Please arrive on time for all class meetings. Students who habitually disturb the class by talking, arriving late, etc., and have been warned may suffer a reduction in their final class grade.

**End of Semester Student Evaluations:** All classes at USF make use of an online system for students to provide feedback to the University regarding the course. These surveys will be made available at the end of the semester, and the University will notify you by email when the response window opens. Your participation is highly encouraged and valued.

**Food and Drink Policy:** Please adhere to the firm policy of no beverages (other than bottled/capped water), food, tobacco products, or like items in the classroom. Your understanding of the necessity for this policy and cooperation will be greatly appreciated. This policy will be strictly enforced.

**The Writing Studio:** The Writing Studio is a free resource for USF undergraduate and graduate students. At the Writing Studio, a trained writing consultant will work individually with you, at any point in the writing process from brainstorming to editing. Appointments are recommended, but not required. For more information or to make an appointment, visit <http://www.lib.usf.edu/writing/>, stop by LIB 2<sup>nd</sup> Floor, or call 813-974-8293.

#### **XVIII. Important Dates to Remember**

Assignment, and Midterm dates are yet to be confirmed. But you be notified in class and via email well in advance. Final exam date, time and venue are below.

Final Examination:                      Monday, April 29<sup>th</sup>, 12:30pm to 2:30pm in class.