

**ADVISING INFORMATION FORM**  
**M.S. CYBER SECURITY DEGREE REQUIREMENTS (36 hours)**

(Proposed Fall 2023; CAPP Effective in Fall 2024)

**Please refer to your Degree Plan for official requirements. Complete this form prior to seeing your advisor.**

- Fill in the grade received next to courses you have taken. • Place a T next to courses you are currently taking.
- A grade of C or better is required for all prerequisite courses.
- An average of B or higher is required in undergraduate leveling courses; B or higher required in CSCI 3302.
- Apply for Graduation eight months before planned graduation date. [graduation@sfasu.edu](mailto:graduation@sfasu.edu) <https://www.sfasu.edu/registrar/630.asp>

Name:	Student ID:	Semester:
<b>A. Leveling</b> <input type="checkbox"/> CSCI 1302 Computer Science Principles (Advanced math score #) <input type="checkbox"/> CSCI 2302 Computer Programming Principles (CSCI 1302) <input type="checkbox"/> CSCI 2314 Computer Organization and Architecture (CSCI 2302) <input type="checkbox"/> CSCI 3302 Data Structures (CSCI 2302; CSCI 2311 recommended) <input type="checkbox"/> CSCI 3331 Object-Oriented Programming Methods (CSCI 2302, 2311) <input type="checkbox"/> CSCI 3341 Principles of Operating Systems (CSCI 2314, 3302)		___ / <b>18 Hours</b>
<b>B. Required</b> <input type="checkbox"/> CSCI 5312 Web Security (CSIT 4355 or CSCI 4347/5347 or Instructor Permission. CSCI 5362 recommended) <input type="checkbox"/> CSCI 5322 Defensive Coding and Security (CSCI 3302 or 3331, CSIT 4355 or CSCI 4347/5347; or Instructor Permission. CSCI 5362 recommended) <input type="checkbox"/> CSCI 5345 Reverse Engineering (CSCI 3341, CSIT 4355 or CSCI 4347/5347; or Instructor Permission. CSCI 5362 recommended) <input type="checkbox"/> CSCI 5348 Digital Forensics (CSCI 3302 or 3331, CSIT 4355 or CSCI 4347/5347; or Instructor Permission. CSCI 5362 recommended) <input type="checkbox"/> CSCI 5362 Penetration Testing (CSCI 3302 or 3331, CSIT 4355 or CSCI 4347/5347; or Instructor Permission)		___ / <b>15 Hours</b>
<b>C. Electives</b> <input type="checkbox"/> CSCI 5175 Advanced Graduate Studies (Approval of Program Directory and Department Chair) <input type="checkbox"/> CSCI 5180 Practicum in Cyber Security I (maximum of 3 hours; Approval of Project Director and Department Chair) <input type="checkbox"/> CSCI 5313 Software Development Principles (Nine advanced hours of computer science) <input type="checkbox"/> CSCI 5320 Data Base Management Systems *[CSCI 4325] (CSCI 3302, CSCI 3321 or 3331, CSCI 3323 or 3333 or 3341 or 3342) <input type="checkbox"/> CSCI 5324 Database Management Systems-Architecture and Management (CSCI 4325/5320 or approval of computer science graduate adviser) <input type="checkbox"/> CSCI 5347 Cyber Security Concepts and Practices *[CSCI 4347] (CSCI 3302, 3331) <input type="checkbox"/> CSCI 5360 Computer Networking *[CSCI 4335] (CSCI 3302, CSCI 3323 or 3333 or 3341 or 3342) <input type="checkbox"/> CSCI 5363 Computer Networks and Distributed Systems (CSCI 3342 and six advanced hours of CSCI. CSCI 4335/5360 recommended) <input type="checkbox"/> CSCI 5365 Computer Architecture and Parallel Processing (Nine advanced hours of CSCI. CSCI 2314 recommended)		___ / <b>12 Hours</b>
<b>D. Complete 3 hours from:</b> <input type="checkbox"/> CSCI 5181 Practicum in Cyber Security II (3 Hours Completed from CSCI 5180) <input type="checkbox"/> CSCI 5185 Internship (Approval of Internship Director and Department Chair)		___ / <b>3 Hours</b>
<b>E. Statistics: Choose two courses from:</b> <input type="checkbox"/> STAT 5340 Statistical Analysis I <input type="checkbox"/> STAT 5341 Statistical Analysis II <input type="checkbox"/> STAT 5342 Regression Analysis <input type="checkbox"/> STAT 5343 Stochastic Processes <input type="checkbox"/> STAT 5344 Applied Multivariate Analysis <input type="checkbox"/> STAT 5345 Applied Nonparametric Statistics <input type="checkbox"/> STAT 5346 Applied Time Series <input type="checkbox"/> MATH 5350 Mathematical Statistics I <input type="checkbox"/> MATH 5351 Mathematical Statistics II		___ / <b>6 Hours</b>

\*[Cross-listed courses]. You may not receive credit for this course if you have credit for the undergraduate version. See descriptions below.

Advising: <http://www.sfasu.edu/academics/colleges/sciences-math/computer-science/student-resources/advising>

Syllabi: <http://www.sfasu.edu/academics/colleges/sciences-math/computer-science/about/faculty-resources>

Course Rotation: <http://www.sfasu.edu/academics/colleges/sciences-math/computer-science/student-resources/advising/course-rotation>

## M.S. Cyber Security Course Titles

CSCI 5312 Web Security (3 hours) - Fundamental coverage of issues and techniques in developing secure web-based applications; related topics such as network security, web server security, application-level security, and web database security. Prerequisite: graduate student in good standing.

CSCI 5313 Software Development Principles (3 hours) - State-of-the-art principles of software design and development. Theories, methodologies, techniques, and tools of software engineering. Case studies. Prerequisite: Nine advanced hours of computer science.

CSCI 5320 Data Base Management Systems (3 hours) - Study of database management systems. Design and implementation of applications using database management systems. Cross-listed with CSCI 4325. Prerequisite(s): CSCI 3302.

CSCI 5322 Defensive Coding and Security (3 hours) - Provides a foundation for building secure software by applying security principles to the software development lifecycle. Topics covered include: security in requirements engineering, secure designs, risk analysis, threat modeling, deploying cryptographic algorithms, defensive coding, penetration testing, fuzzing, static analysis, and security assessment. Includes case studies, data protection via coding and secure access methodology, and vulnerability identification, and modern security coding techniques. Prerequisite: graduate student in good standing.

CSCI 5324 Database Management Systems-Architecture and Management (3 hours) - Examination and appraisal of the fundamental technology of database management systems and of the practice of database systems design, database administration and DBMS acquisition. Prerequisite(s): CSCI 4325/5320 or approval of computer science graduate adviser.

CSCI 5345 Reverse Engineering (3 hours) - Coverage of incorporating security technologies and methods into new and existing systems; learning how attackers expose vulnerabilities; analyzing threats; applying methods to prevent and defeat attacks; and understanding the ethical responsibilities and obligations associated with developing, acquiring, and operating software systems. Prerequisite: graduate student in good standing.

CSCI 5347 Cyber Security Concepts and Practices (3 hours) - Study of computer and internet security, concepts and practices. Introduction to cryptography and information security. Understanding the different types of malware and how to prevent them. Cloud computing and emerging technologies, security risks and practices. Cross-listed with CSCI 4347. Prerequisites: CSCI 3302.

CSCI 5348 Digital Forensics (3 hours) - Study of computer and cyber forensics. Learn and demonstrate understanding of different aspects of computer and cyber-crime and ways in which to uncover, protect, exploit, and document digital evidence. Students will be exposed to different types of tools (both software and hardware), techniques and procedures, and be able to use them to study and practice forensic investigations. Prerequisite: graduate student in good standing.

CSCI 5360 Computer Networking (3 hours) - Functional evolution and role of data communications. Considerations in data communications. Applications in general. The design issues. System components and their interrelationships. Networks. Cross-listed with CSCI 4335. Prerequisite(s): CSCI 3302.

CSCI 5362 Penetration Testing (3 hours) - Examination of the techniques and technologies for the penetration of networks, detection of attacks, and prevention of attacks. Addresses the techniques, technologies, and methodologies used by cyber intruders (hackers) to select a target and launch an attack. Assesses the various countermeasures to keep the system out of the "sights" of the hacker and to keep the hacker out of the perimeter of the target network. Explores the laws and the legal considerations in prosecuting computer crime. Prerequisite: graduate student in good standing.

CSCI 5363 Computer Networks and Distributed Systems (3 hours) - Communication models and protocols. Distributed algorithms and analysis. Distributed systems architectures and communications. Latest developments in communication technology including hardware, software, and applications. Prerequisite: CSCI 3342 and six advanced hours of CSCI. CSCI 4335/5360 recommended.

CSCI 5365 Computer Architecture and Parallel Processing (3 hours) - Organizational and operational analysis of digital computers at the component and functional levels. Design and performance issues. Algorithms and architectures for parallel processors. Prerequisite: Nine advanced hours of CSCI. CSCI 2314 recommended.

CSCI 5175 Advanced Graduate Studies (1-3 hours) - Individual assignments. May be repeated under different topics.

CSCI 5180 Practicum in Cyber Security (1-3 hours) - Design of a selected project. May be repeated for a total of three credit hours. Prerequisite(s): Approval of project director and the department chair

CSCI 5181 Practicum in Cyber Security (1-3 hours) - Development and implementation of a selected project. May be repeated for a total of three credit hours. Prerequisite(s): 3 hours from CSCI 5180

CSCI 5185 Internship in Cyber Security (1-3 hours) – Internship in cyber security. Prerequisites: Completion of internship application form and approval of the Internship Coordinator and department chair.

CSCI 5189 Thesis Research (3-9 hours) - Research necessary to initiate the thesis work. Grade withheld until completion of thesis. Prerequisites: Completion of 12 semester hours of graduate computer science courses and approval of the thesis director and department chair.

CSCI 5390 Thesis Writing (3-9 hours) - Writing of the thesis. A student must be enrolled in this course the semester of graduation. Prerequisites: CSCI 5389, admission to degree candidacy, approval of thesis prospectus, and approval of the thesis director and department chair.

### **M.S. Cyber Security – Recommended Statistics Courses**

STAT 5341 Statistical Analysis II - Analysis of variance, multiple comparisons, blocking designs, higher factorial experiments, unbalanced designs, fixed and random effects, nested designs, split-plot designs, analysis of covariance.

STAT 5342 Regression Analysis - Linear regression, non-linear models, multiple regression.

STAT 5343 Stochastic Processes - Markov chains, Poisson and renewal processes, continuous-time Markov processes, including birth and death processes, queuing theory.

STAT 5344 Applied Multivariate Analysis - Cluster analysis, factor-analysis, discriminant analysis, canonical correlation analysis and multivariate analysis of variance and covariance.

STAT 5345 Applied Nonparametric Statistics - An introduction to nonparametric analysis of the following: dichotomous data problems, one- and two-sample location problems, dispersion problems, and the one- and two-way layout. Nonparametric measures of association and basic nonparametric methods in regression.

STAT 5346 Applied Time Series - Time series of regression, autocorrelation and partial autocorrelation functions, autoregressive moving average models, model identification and specification techniques, stationarity and invertibility conditions, seasonal and nonseasonal modeling, forecasting.

MATH 5350 Mathematical Statistics I – Random variables, discrete and continuous distributions, multiple random variables, distributions of functions of random variables and convergence concepts. Requires familiarity with undergraduate calculus and mathematical proof.

MATH 5351 Mathematical Statistics II - Sufficient and complete statistics, likelihood and moment estimation, properties of estimators, interval estimation and hypothesis tests. Requires familiarity with undergraduate calculus and mathematical proof.