COMPUTER SCIENCE, BS, CONCENTRATION IN INFORMATION SECURITY

Natural Sciences, Mathematics, and Engineering (nsme) (https://catalog.csub.edu/general-information/csub-information/school-natural-sciences-mathematics-engineering/)

Department of Computer and Electrical Engineering and Computer Science (https://catalog.csub.edu/general-information/csub-information/school-natural-sciences-mathematics-engineering/department-computer-electrical-engineering-computer-science/)

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www.cs.csubak.edu (http://www.cs.csubak.edu)

Program Maps for Natural Sciences, Mathematics, and Engineering (https://programmap.csub.edu/academics/interest-clusters/4e942a6e-b8e4-4b60-a1ae-334235acc581/)

Program Description

Computer Science is a constantly evolving discipline. To quote the Association for Computing Machinery, "Computer Science is not simply concerned with the design of computing devices-nor is it just the art of numerical calculation. Computer Science is concerned with information in much the same sense that Physics is concerned with energy; it is devoted to the representation, storage, manipulation, and presentation of information in an environment permitting automatic information systems."

The Computer Science major at CSUB has three pathways that lead to a B.S. in Computer Science. The traditional Computer Science program follows the guidelines recommended by the Association for Computing Machinery (ACM). The Computer Information Systems concentration is intended for training application programmers or for those who wish to apply computer science in another discipline. The Information Security concentration is intended for students who wish to pursue a career in information assurance and security, either with government agencies or with industry. Students in the three pathways will take different advanced courses of their choice. A Computer Science minor is also offered.

The Computer and Electrical Engineering and Computer Science Department moved into a new building in Fall 2008. The department administers its own local area network which includes multiple Unix/Linux servers, two software programming labs, a walk-in lab/tutoring center, one advanced workstation lab, an isolated network lab, an AI/visualization lab, a DSP/communications lab, one digital electronics hardware lab, a power systems/electronics lab, and a robotics/control systems lab. There is also a departmental library/major study room available to students.

An important goal of the department is to enable students to work much more closely with faculty than they would be able to at larger universities.

A detailed description of student learning goals and objectives can be found at https://www.cs.csub.edu/abet/.

Academic Regulation

A grade of C- is the minimal grade acceptable for progression in the CMPS 2010 Programming I: Programming Fundamentals and CMPS 2020 Programming II: Data Structures and Algorithms sequence.

Program Requirements

This concentration is intended for students who wish to pursue a career in information assurance and cyber security, either with government agencies or with industry.

Code	Title	Units
General Education Requirements		
First-Year Seminar (FYS)		2
Lower Division Area A: Foundational Skills [4]		9
Lower Division Area B: Natural Sciences [4]		3
Lower Division Area C: Arts and Humanities		6
Lower Division Area D: Social and Behavioral Sciences [4]		0
Lower Division Area E: Student Enrichment and Lifelong Learning (SELF) [5]		0
Lower Division Area F: Ethnic Studies		3
American Institutions: Government and History		6
Junior Year Diversity & Reflection (JYDR)		3
Graduation Writing Assessment Requirement (GWAR) [4]		0
Upper Division Thematic Area C and D [4]		0
General Education Capstone [4]		0
General Education Subtotal [4]		*32*
Major Requirements		
Lower Division		
CMPS 2010	Programming I: Programming Fundamentals	4
CMPS 2020	Programming II: Data Structures and Algorithms	4
CMPS 2120	Discrete Structures	4
CMPS 2240	Computer Architecture I: Assembly Language Programming	4
Upper Division		
CMPS 3120	Algorithm Analysis	3
CMPS 3140	Theory of Computation	3
CMPS 3350	Software Engineering	4
CMPS 3420	Database Systems	4
CMPS 3500	Programming Languages	3
CMPS 3600	Operating Systems	4
CMPS 3620	Computer Networks	4
CMPS 3640	Distributed and Parallel Computation	3
CMPS 4910	Senior Project I	2
CMPS 4928	Senior Project II	2
Information Security Elective Courses		
Select 12 units from the following: [1]		12
CMPS 2650	Linux Environment and Administration	
CMPS 3560	Artificial Intelligence	
CMPS 3650	Digital Forensics	
CMPS 4450	Data Mining and Visualization	

CMPS 4510	Vulnerability Analysis	
CMPS 4620	Network and Computer Security	
MATH/CMPS 4300	Applied Cryptography	
Required General Cognate Courses		
MATH 2510	Single Variable Calculus I	4
or MATH 2310	Single Variable Calculus I for Engineers	
MATH 2520	Single Variable Calculus II	4
or MATH 2320	Single Variable Calculus II for Engineers	
MATH 3200	Probability Theory	4
PHIL 3318	Professional Ethics	3
Global Intelligence and National Security (GINS) Required Cognate Courses		
Select one GINS Analytical Tools course from the following: [2]		3-4
CRJU 3500	Profiling Violence	
ECON/MIS 3200	Introduction to Geographic Information Systems	
GEOL 4050	GIS for Natural Sciences	
MIS 4100	Information Security and Privacy	
SOC 4010	Social Changes and Social Movements	
Select 8-9 units of GINS upper division focus area courses from the following: [3]		8-9
CHIN 1000 & CHIN 1001	Chinese I and Chinese I Lab	
CHIN 1010 & CHIN 1011	Chinese II and Chinese II Lab	
CRJU 4340	Terrorism	
HIST 3150	Twentieth-Century America	
HIST 3310	Revolutions in Latin America	
HIST 3410	The Rise of Islamic Civilization, 570-1258	
HIST 3420	Science, Technology, and Engineering in Islamic History, 758-1406	
HIST 3490	Modern China	
HIST 4510	The History of European Empires 1500-2000	
PLSI 3040	International Relations	
PLSI 3320	Government and Politics of China	
PLSI 3330	Global Security Issues	
PLSI 3340	Government and Politics of Latin America	
PLSI 3350	Government and Politics of the Middle East	
PLSI 3380	Politics of International Terrorism	
PLSI 3610	American Foreign Policy	
PLSI 3620	Media, Propaganda, and Public Opinion	
PLSI 3630	Political Psychology	
SOC 4020	Globalization and Social Change	
Major Subtotal		*86-88*
Additional Units Needed Towards Graduation [6]		**0-2**
Total Units		**118-122**

[1] At least one course must be at the 4000-level.

[2] *If a Geographical Information Systems (GIS) Tools course is not available, CMPS 3480 Computer Graphics, ECE 4460 Image Processing or ECE 4470 Computer Vision may be substituted for ECON 3200 Introduction to Geographic Information Systems /MIS 3200 Introduction to Geographic Information Systems, or GEOL 4050 GIS for Natural Sciences.*

[3] *Other GINS focus area or strategic language courses may be used with the consent of a program advisor.*

[4] Some of the courses required for the Computer Science major also satisfy General Education requirements. Students who complete each of these courses with the appropriate grade will also satisfy the GE requirement, even if they were to change majors:
  - CMPS 4928 Senior Project II satisfies the Capstone requirement.
  - PHIL 3318 Professional Ethics satisfies UD Thematic Area C and the Computer Science Ethics requirement.
  - MATH 2510 Single Variable Calculus I or MATH 2310 Single Variable Calculus I for Engineers with a grade of C- or better satisfies Foundational Skills B4.
  - PHIL 3318 Professional Ethics satisfies GWAR

  Computer Science majors have the following General Education Modifications (GEMs), which means they do not have to take courses to satisfy these GE requirements. These GEMs are specific to the Computer Science major and students who change to another major will not keep the modifications:
  - LD Area B2 is embedded throughout the curriculum.
  - 3 units of LD Area D is met through Computer Science outcomes 2 and 4.
  - UD Thematic Area D is met through Computer Science outcomes 2 and 4.

[5] The SELF requirement may be met by selecting another General Education course with a SELF overlay or by taking a stand-alone course. If a student opts to take a stand-alone course for SELF, the course will add additional units to that student's general education pathway.

[6] Additional Units are required to meet the 120-unit requirement for graduation. Any accepted university units may be used to meet this requirement, including stand-alone courses for SELF.

Note: One (1) semester unit of credit normally represents one hour of in-class work and 2-3 hours of outside study per week.