COMPUTER SCIENCE, BS, CONCENTRATION IN COMPUTER INFORMATION SYSTEMS

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

Program Requirements

This concentration is intended for training application programmers or for those who wish to apply computer science in another discipline.

Code	Title	Units
General Education Requirements		
First-Year Seminar (FYS)		2
Lower Division Area A: Foundational Skills [3]		9
Lower Division Area B: Natural Sciences [3]		3
Lower Division Area C: Arts and Humanities		6
Lower Division Area D: Social and Behavioral Sciences [3]		0
Lower Division Area E: Student Enrichment and Lifelong Learning (SELF) [4]		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) [3]		0
Upper Division Thematic Area C and D [3]		0
General Education Capstone [3]		0
General Education Subtotal [3]		*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 2680	Web Programming I: Client -side Web Programming	3
Upper Division		
CMPS 3120	Algorithm Analysis	3
CMPS 3350	Software Engineering	4
CMPS 3390	Application Development	4
CMPS 3420	Database Systems	4
CMPS 3500	Programming Languages	3
CMPS 3560	Artificial Intelligence	3
CMPS 3600	Operating Systems	4
CMPS 3620	Computer Networks	4
CMPS 3640	Distributed and Parallel Computation	3
CMPS 3680	Web Programming II: Server-side Web Programming	3
CMPS 4910	Senior Project I	2
CMPS 4928	Senior Project II	2
Elective Courses or Discipline-based Minor		
Twelve (12) units are required for this area. Students can opt to take either a discipline-based minor or general Computer Information System (CIS) elective courses to satisfy the 12 unit elective requirement. If a minor is chosen, it must be a discipline-based minor and cannot be a general education thematic minor.		12
General CIS elective courses: [1]		
ENGR 2350	Engineering Graphics	
ENGR 2360	Intermediate CAD in Engineering	
CMPS 2240	Computer Architecture I: Assembly Language Programming	
CMPS 2650	Linux Environment and Administration	
CMPS 2770	Special Topics	
CMPS 2771	Special Topics Laboratory	
Any other 3000-level or 4000-level CMPS course		
Advanced Elective Course		
Select one of the following:		4
CMPS 4350	Advanced Software Engineering	
CMPS 4420	Advanced Database Systems	
CMPS 4430	Introduction to Data Science	
CMPS 4450	Data Mining and Visualization	
CMPS 4480	Computer Animation	
CMPS 4490	Game Development	
CMPS 4510	Vulnerability Analysis	
CMPS 4560	Advanced Artificial Intelligence	
CMPS 4620	Network and Computer Security	
Required Cognate Courses [2]		
MATH 2200	Introduction to Statistical Concepts and Methods	4
Select one of the following:		3-8
MATH 1030	Precalculus I and II Combined, Dual Enrollment Program	
MATH 1040	Precalculus I and II Combined	
MATH 1050 & MATH 1060	Precalculus I and Precalculus II	
PHIL 3318	Professional Ethics	3
Major Subtotal		*80-85*
Additional Units Needed Towards Graduation [5]		**3-8**
Total Units		**115-125**

[1]   *Only a combined total of 4 units of CMPS 277x, 377x, 477x, and 48xx courses may be used for elective credit.*
Students may substitute courses from other departments relevant to this concentration, such as ECE, MATH or PHYS, for elective courses with permission of their department advisor.

[2]   Higher level mathematics courses (Calculus I or higher) may be used for either of (or both of) the mathematics requirements.

[3]   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 1040 Precalculus I and II Combined, MATH 1050 Precalculus I, MATH 1060 Precalculus II, MATH 2200 Introduction to Statistical Concepts and Methods, or Calculus I 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.

[4]   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 SELF, the course will add additional units to that student's general education pathway.

[5]   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.

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.