Computer Science and Computer Engineering Electives

This document lists the courses that can be used to meet CSE Elective requirements for the Computer Science and Computer Engineering programs for the 2024-25 academic year. Note that older catalogs may have different course numbers, different options, and/or different requirements. Check with the Department Undergraduate Advisor concerning possible courses not listed including several 5000-level courses that may be suitable for undergraduate students. This list is provided as a guide; the Undergraduate Catalog remains as the definitive source of requirements. *Note that not all of the courses listed below will be offered in any given academic year. Also note that with ongoing faculty hiring we expect to have some new electives in fall 2024 and spring 2025 not yet listed here.*

Notes:

1) See USF Course Inventory for course descriptions and a listing of prerequisites.
2) CIS 4930 is the designation for special topic courses. These courses could be software, hardware, or theory, depending on course content.
3) The nominal prerequisite for all elective courses (including CIS 4930 and CIS 4900, CIS 4915, and CIS 4940) is Computer Logic and Design (CDA 3201) and Data Structures (COP 4530), however some elective courses may have a prerequisite other than CDA 3201 and COP 4530; this may be noted in OASIS. USF Course Inventory lists courses prerequisites. At the bottom of this document is a partial list of elective courses that do not require COP 4530 as a prereq.
4) Students are allowed to count a maximum of three (3) hours of an elective programming language as a software elective.
5) Students are allowed to count as elective credit a maximum of six (6) hours combined of CIS 4900 and/or any other supervised individual study (that is, CIS 4915 and CIS 4940). No more than 3 hours of CIS 4940 in a single company unless explicit permission from supervising professor

Courses listed below are identified as elective or required by program.

Software courses

Course ID	Course Name	Computer Science	Computer Engineering
CAP 4034	Computer Animation Fundamentals	Elective	Elective
CAP 4103	Mobile Biometrics	Elective	Elective
CAP 4160	Brain-Computer Interfaces	Elective	Elective
CAI 4002 CAP 4621 (old)	Introduction to AI	Elective	Elective
CAI 4841 CAP 4410 (old)	Computer Vision	Elective	Elective
CAI 4842 CAP 4401 (old)	Image Processing Fundamentals	Elective	Elective
CAP 4628	Affective Computing	Elective	Elective
CAP 4641	Natural Language Processing	Elective	Elective

CAP 4662	Introduction to Robotics	Elective	Elective
CDA 4621	Control of Mobile Robots	Elective	Elective
CEN 4020	Software Engineering	***Required***	Elective
CEN 4072	Software Testing	Elective	Elective
CIS 4212	Trustworthy Infrastructures	Elective	Elective
CIS 4345	Big Data Storage Analysis with Hadoop	Elective	Elective
CIS 4930	Computational Methods for Imaging	Elective	Elective
CIS 4930	Cyber-Physical Systems	Elective	Elective
CIS 4930	Deep Learning Fundamentals	Elective	Elective
CIS 4930	Capture the Flag	Elective	Elective
CIS 4930	Human Computer Interaction	Elective	Elective
CIS 4930	Secure IoT	Elective	Elective
CIS 4930	Social Media Analysis	Elective	Elective
CNT 4004	Computer Networks I	Elective	Elective
CNT 4411	Computing and Network Security	Elective	Elective
CNT 4419	Secure Coding	***Required***	Elective
COP 4020	Programming Languages	Elective	Elective
COP 4365	Software Systems Development	Elective	Elective
COP 4520	Programming on Massively Parallel Sys	Elective	Elective
COP 4620	Compilers	Elective	Elective
COP 4710	Database Design	Elective	Elective

Hardware courses

Course ID	**Course Name**	**Computer Science**	**Computer Engineering**
CDA 4203/4203L	Computer System Design & Lab	Elective	***Required***
CDA 4213/4213L	CMOS/VLSI Design & Lab	Elective	***Required***
CDA 4323	Practical Hardware Security	Elective	Elective
CDA 4253	FPGA Design and Analysis	Elective	Elective
CDA 4321	Cryptographic Hardware and Embed Sys	Elective	Elective
CDA 4322	Principles of Secure Hardware Design	Elective	Elective
CIS 4930	Digital Circuit Synthesis	Elective	Elective
CIS 4930	Embedded Systems	Elective	Elective
CIS 4930	Hardware Accelerators for ML	Elective	Elective
CIS 4930	VLSI Testing	Elective	Elective

Theory courses

Course ID	**Course Name**	**Computer Science**	**Computer Engineering**
CIS 4930	Cryptography Theory and Practice	Elective	Elective
COT 4210	Automata Theory and Formal Languages	Elective	Elective
COT 4521	Computational Geometry	Elective	Elective
COT 4601	Quantum Computing	Elective	Elective

Other courses

Course ID	Course Name	Computer Science	Computer Engineering
CIS 4900	Independent Study	Elective	Elective
CIS 4910	Senior Project	Elective	***Required***
CIS 4915	Supervised Research	Elective	Elective
CIS 4940	Industry Internship	Elective	Elective

Elective courses that do not require COP 4530 Data Structures as the prerequisite are listed below. Students can use USF Course Inventory to determine the prerequisite for any course.

- CAP 4034 Computer Animation Fundamentals – Prereq is COP 3514
- CAP 4103 Mobile Biometrics – Prereq is COP 3514
- CAP 4160 Brain-Computer Interfaces – Prereq is COP 3514
- CDA 4321 Cryptographic Hardware and Embed Sys – Prereq is CDA 3201
- CDA 4203/4203L Computer System Design & Lab – Prereq is CDA 3201
- CDA 4213/4213L CMOS/VLSI Design & Lab – Prereq is CDA 3201
- CDA 4323 Practical Hardware Security – Prereq is CDA 3201
- CDA 4621 Control of Mobile Robots – Prereq is COP 3514
- CIS 4345 Big Data Storage Analysis with Hadoop – Prereq is COP 3514
- COT 4210 Automata Theory and Formal Languages – Prereq is COT 3100

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