Computer Science Major Checksheet (Modified October 2025)

Computer science is about creating innovative solutions to complex, real-world problems. Students in this major study step-by-step computational methods for solving problems by encoding, storing, tracking and transforming information. Computer science is much broader than just programming. It is informed by the theory and architecture of computing devices, and the tools and practices used to design and implement software.

A Computer Science degree includes AUCC courses, CS starting courses, CS common core, and a concentration as defined on the following sheets. Minimum Credit Requirements: 120 total credits required, with at least 42 upper division credits.
Please review with a CS Advisor.

AUCC (All-University Core Curriculum)		
Category	**Course**	**Credit**
1A)	CO 150 or HONR 193	3
1B)	MATH 156 or MATH 160	4
1C)		3
2) Advanced Writing		3
3A) Biological and Physical Science w/ lab (from CS list)		4
3A) Biological and Physical Science (from CS list)		3
3B) Arts & Humanities	See Intro CS courses below	3
3B) Arts & Humanities	CS 201/PHIL 201	3
3C) Social & Behavioral Sciences		3
3D) Historical Perspective		3

CS-Approved Biological & Physical Sciences
AA 100 & AA 101
ANTH 120 & ANTH 121
BZ 110 & BZ 111; BZ 120
(CHEM 107 & CHEM 108) or (CHEM 111 & CHEM 112)
(GEOL 120 or GEOL 122 or GEOL 124) & GEOL 121 OR (GEOL 150)
HONR 292A
LIFE 102, LIFE 103, LIFE 201A; LIFE 201B; LIFE 220/LAND 220
NR 150
(PH 121 or PH 141); (PH 122 or PH 142)
Underlined courses can fulfill lab requirement.

Intro CS Courses, complete one group of the course from this table		
Course	**Course Title**	**Credits**
Group A:		
CS 150B	Culture and Coding (Arts & Humanities AUCC)	3
CS 164	CS 1 - Computational Thinking with Java	4
Group B:		
CS 152	Python for STEM	2
CS 162	CS 1 - Introduction to Java Programming	2
AUCC	3B) Arts/Humanities	3
Group C:		
CS 163	CS 1 - No Prior Programming Experience	4
AUCC	3B) Arts/Humanities	3

CS Common Core, must complete ALL courses in this table		
Course	**Course Title**	**Credits**
MATH 369 or DSCI 369	Linear Algebra	3-4
STAT 301, 307, or 315(†)	Statistics	3
CT 301 (*)	Programming with C++	2
CS 165	CS2 - Data Structures	4
CS 214 (*)	Software Development	3
CS 220	Discrete Structures	4
CS 250 (*)	Computer Systems Foundations	4
CS 314	Software Engineering	3
CS 320	Algorithms: Theory & Practice	3
CS 370 (±)	Operating Systems	3
† STAT 302A can also be used if a student already has credit for STAT 201 or 204		
* CS 253 will meet the requirement for CS 214 and CT 301; and CS 270 or CS 280a1 will meet requirement for CS 250		
± CS 370 not required for Computing for Creatives concentration		

Computer Science Major Concentrations

General Concentration

The general Computer Science major provides students with a broad background in the field of computer science as well as optionally gives students the opportunity to complement their computer science major with a minor in a field of their choosing. Students will find that there is a great need for knowledge in the combination of computer science with other disciplines.

Artificial Intelligence and Machine Learning

Artificial intelligence (AI) and machine learning (ML) are about creating intelligent systems – systems that perceive and respond to the world around them. AI and ML systems are everywhere, in our cars and smartphones, and businesses of all sizes are investing in these areas. The AI/ML concentration combines a rigorous computer science degree with coursework in AI, ML, and big data. This concentration also provides you the necessary foundational coursework and skills in math, statistics, and data science.

Computer Science Education

Computers Science Educators seek to advance the fundamental quality of computer science education by having a deeper understanding on how students learn combined with the complexities of the computational mindset that is developed through computer science. Computer Science Education students will engage in coursework related to both computer science and education, and their intersection, the growing field of computer science education. Through course work, service learning, and student teaching, this degree will prepare students to enter the field as a K-12 teachers. Furthermore, this degree will serve as preparation for admission into advanced degree programs and college level teaching and research in the field of computer science education. Course work includes the same core foundation expected of all computer science concentrations, and course work specific to computer science education and teaching standards including web development, software engineering, and networking.

Computing for Creatives

The Computing for Creatives concentration is intended for students who seek to work at the interface of computer science and creative fields such as design. The concentration combines the core computing curriculum with computationally-focused study in creative fields. This degree will provide advanced computing skills to create artifacts such as games and 3D simulations that interact with people visually and aurally, as well as demonstrate design, narrative, and human factors skills required to create those artifacts.

Computing Systems

Computer systems are integrated devices that input, output, process, and store data and information. Computing systems encompass a wide range, from simple sensors and hardware components to phones, laptops, desktops, and entire data centers. Computer systems specialists are challenged to provide ever increasing levels of performance from these systems. The computer systems concentration provides you the necessary tools to solve important and demanding systems problems at scale. You will learn how to design and assess computer systems from a holistic perspective that encompasses distributed and parallel algorithms, big data, systems software, networking, compiler design, and artificial intelligence/machine learning.

Human Centered Computing

Human-centered computing (HCC) focuses on developing tools that improve the relationship between people and technology so that people can concentrate on the problem rather than the technology. The ultimate goal of HCC is to make the computer invisible. Human-centered computing involves designing, developing, and deploying human-centric computer systems. In this concentration you will learn techniques for human-computer interaction using gestures, mobile devices, large surfaces, and virtual environments. You will also learn how to design and conduct human-subject experiments and understand the role of HCC in developing human-centric artificial intelligence systems. The concentration provides rich interdisciplinary training in computer vision, machine learning, design and psychology.

Networks & Security

Networks connect computers and other devices so they can share information. The networks and security concentration involves designing, building, and maintaining networks and protecting them from cyberattacks. Network and security technology is vitally important to almost every modern field of human endeavor including biology, physics, agriculture, medicine, defense, and more. There is explosive demand for professionals who can understand the underlying principles of networks and security, incorporate them into products and practices, and provide defensive capabilities against cyber threats.

Software Engineering

Software engineering involves designing, implementing, and maintaining computer programs. Developing modern software systems requires more than programming skills and core computer science concepts. It requires software engineering skills, which are in high demand in the software industry. The software engineering concentration focuses on the concepts, techniques, and tools necessary for software analysis, design, testing, maintenance, and teamwork. Your courses will include hands-on work with the software engineering tools used in industry.

Computer Science Major Concentration Requirements

Computer Science - General Concentration	Credits
△Select 2 CS courses numbered 300- or above	6-8
1)	
2)	
△Select 3 CS courses numbered 400- or above	12
1)	
2)	
3)	
Plus Choose Group A or B	
Group A:	
△CS course numbered 400- or above	4
1)	
✢Select 6 credits of Technical Electives (At least 3 credits must be upper division)	6-8
OR Group B:	
Minor or Second Major or Certificate (at least 12 credits must be unique from CS major requirements. See CS Advisor to discuss further)	~21

Networks and Security Concentration	Credits
CS 356	3
△Select 1 CS Course numbered 300- or above	3-4
1)	
CS 456	4
CS 457	4
Select 1 course from: CS 430, CS 458	4
1)	
△Select 1 CS course numbered 400- or above	4
1)	
✢Select 6 credits Technical Electives (At least 3 credits must be upper division)	6-8

Computing Systems Concentration	Credits
△Select 2 CS Courses numbered 300- or above	6-8
1)	
2)	
Select 3 Systems Courses from: CS 435, 453, 455, 457, 475	12
1)	
2)	
3)	
Select 1 system elective from: CS 440, 445, 422	4
1)	
✢Select 6 credits of Technical Electives (At least 3 credits must be upper division)	6-8

Technical Electives for General Concentration, Networks & Security Concentration, Computing Systems Concentration ✢
BZ 350, BZ 360
CIS 320, CIS 350, CIS 360, CIS 413, CIS 455
DSCI 235
ECE 452
ENGR 422
JTC 372, 472
MATH 161, 256
MGT 330, MGT 340, MGT 420
NR 322
PHIL 410, 411, 415
PSY 252, PSY 352, PSY 452, PSY 454, PSY 456, PSY 458
✢△ Any CS, CT, DSCI, IDEA, MATH, or STAT course numbered 300- or above

Artificial Intelligence and Machine Learning Concentration	Credits
MATH 161 or 256	4
CS 345	3
△Select 1 CS Course numbered 300- or above	3-4
1)	
Select 2 capstone courses: from CS 425, 440, 445	8
1)	
2)	
Select 1 CS course from: CS 425, 430, 435, 440, 445, 455, 462, 464, 465, 475	4
1)	
Select 1 CS systems course from: CS 435, 455, 475	4
1)	
✢Select 6 credits AI/ML Technical Electives (to the right)	6-8

Technical Electives for AI & ML Concentration
DSCI 235, DSCI 320, DSCI 335, DSCI 336, DSCI 473, DSCI 475
MATH 261, MATH 301, MATH 331, MATH 360, MATH 430/ECE 430, MATH 450
STAT 341, STAT 342, STAT 400, STAT 420
CT 303

△ Course numbered 300- or above; or 400- or above; excludes 380-399 and 480-499 unless explicitly stated

✢ Double counting of required course for AUCC's or CS Common Core as technical elective credits is not allowed (including STAT 301, 302A, 307, 315, MATH 369, DSCI 369, and IDEA 210)

Computer Science Major Concentration Requirements

Software Engineering Concentration	Credits
CS 356	3
CS 414 or CS 480A7	4
CS 415	4
△Select 1 Software Engineering Upper Division Elective course from: CS 312, CS 345, CS 400- or above	3-4
1)	
Select 2 Depth courses from: CS 430, 435, 440, 453, 455, 462,464, 465	8
1)	
2)	
CIS 320	3
CIS 360	3

Computing for Creatives Concentration	Credits
IDEA 210	3
CS 345	3
△Select 1 CS Course numbered 300- or above	3-4
1)	
Select 1 Capstone Course from: CS 462, 464, 465	4
1)	
△Select 2 CS courses numbered 400- or above	8
1)	
2)	
Select 9 credits of Design Thinking Courses from: IDEA 310B, 310H, 310L, 310O, 310Q, 310R, 310U, 310T, 380A3, 450, or IDEA/MGT 455	9

Human-Centered Computing Concentration	Credits
CS 345	3
△Select 1 course from: CS 310H/IDEA 310H; CS 312, CS 400- or above	3-4
1)	
△Select 1 CS Course numbered 300- or above	3-4
1)	
Select 1 CS Capstone Courses from: 464, 465	4
1)	
Select 2 CS Depth Courses from: CS 440, 445, 462	8
1)	
2)	
✢Select 9 credits of HCC Technical Electives (at least 6 credits must be upper division) (to the left)	9

Computer Science Education Concentration	Credits
△Select 2 CS course numbered 300- or above	6-8
1)	
2)	
Select 2 CS Education Standards courses from: CS 312, 414, 430, 457	7-8
1)	
2)	
△Select 1 CS course numbered 400- or above	4
1)	
EDUC 275 (Social Behavioral Sciences AUCC)	3
EDUC 340 - Literacy and the Learner	3
EDUC 331 - Educational Technology and Assessment	2
EDUC 350 - Instruction I - Individualization/Management	3
EDUC 386 - Practicum: Instruction I	1
EDUC 450 - Instruction II - Standards and Assessment	4
EDUC 486E - Practicum: Instruction II	1
EDCT 465 - Methods and Materials in Technology Education	3
EDCT 485 - Student Teaching	11
EDUC 496A - Seminar: Professional Relations	1

Technical Electives for HCC Concentration
✢ IDEA 210, Any IDEA course numbered 300- or above, excluding 380-399 and 480-499
PSY 252, PSY 253, PSY 452, PSY 454, PSY 456, PSY 458
Any STAT course numbered 300- or above, excluding 301, 302A, 307, 315,380-399 and 480-499

△ Course numbered 300- or above; or 400- or above; excludes 380-399 and 480-499 unless explicitly stated

✢ Double counting of required course for AUCC's or CS Common Core as technical elective credits is not allowed (including MATH 369, DSCI 369, and IDEA 210)

CS Course Offering Schedule

CS Lower Division Courses

Course Number	Course Name	Semester Offered
CS 110	Personal Computing	F / S / SS
CS 150B	Culture and Coding: Python	F / S / SS
CS 152	Python for STEM	F / S
CS 162	CS 1 - Introduction to Java Programming	F / S
CS 164	CS 1 - Computation Thinking with Java	F / S / SS
CS 165	CS 2 - Data Structures	F / S / SS
CS 192	First-Year Seminar - Computer Science	F
CS 201 (or PHIL 201)	Ethical Computing Systems	F / S / SS
CS 214	Software Development	F / S
CS 220	Discrete Structures and their Applications	F / S / SS
CS 250	Computer Systems Foundations	F / S / SS
CS 253	Software Development with C++	No longer offered- see CS 214 and CT 301
CS 270	Computer Organization	No longer offered - see CS 250
CS 295	Independent Study	F / S / SS

CT Courses

Course Number	Course Name	Semester Offered
CT 301	Programming with C++	F / S / SS
CT 303	Advanced Python	Varies

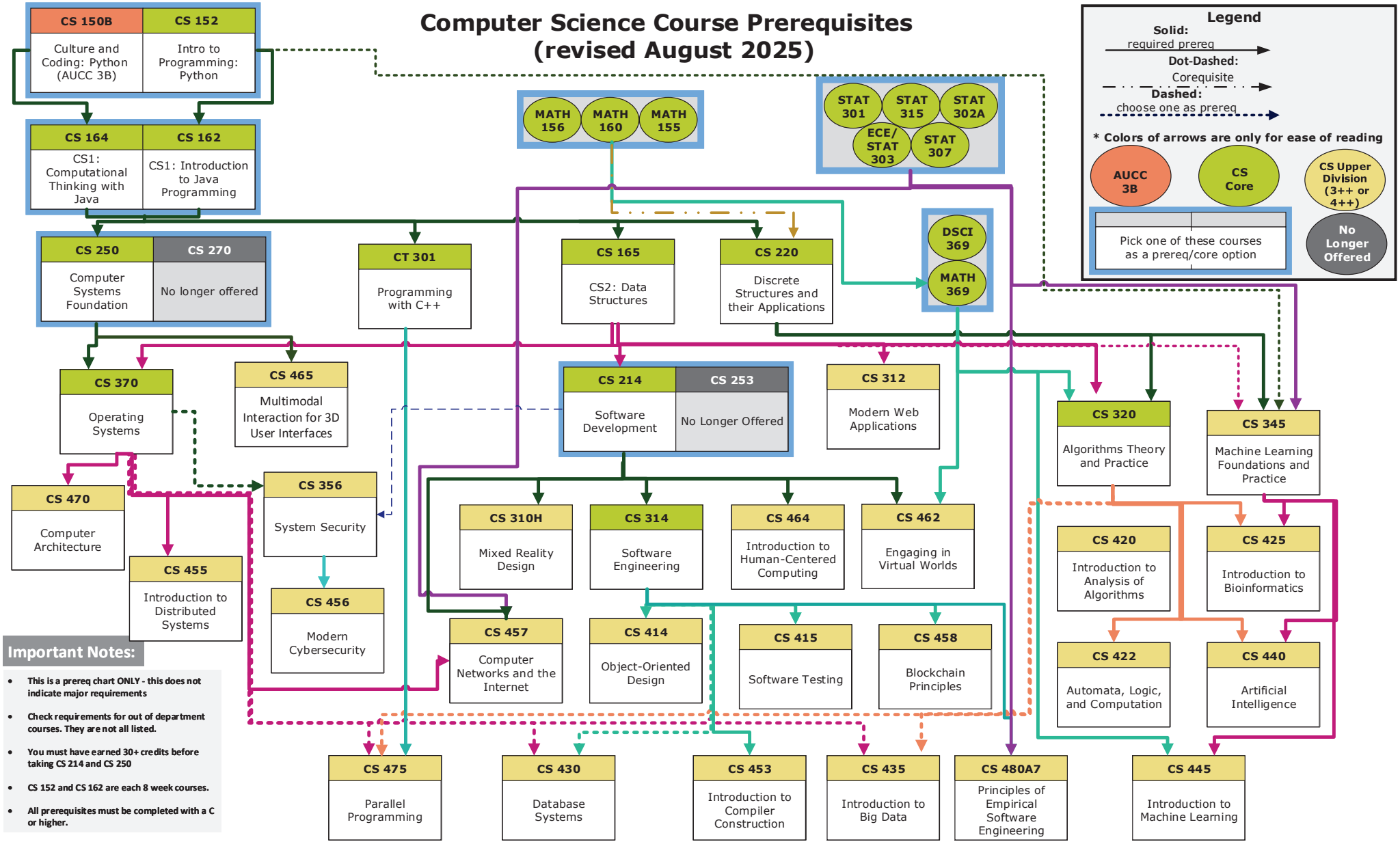
CS Upper Division Courses

Course Number	Course Name	Semester Offered
CS 310H	Design Thinking Toolbox: Mixed Reality Design	Every other F, even years
CS 312	Modern Web Applications	S
◇ CS 314	Software Engineering	F / S
◇ CS 320	Algorithms: Theory & Practice	F / S
CS 345	Machine Learning Foundations	F / S
CS 356	System Security	F / S / SS
◇ CS 370	Operating Systems	F / S / SS
CS 408	CS Education	*F
CS 414	Object-Oriented Design	F *Not offered FA25
CS 415	Software Testing	S
CS 420	Introduction to Analysis of Algorithms	*S
CS 422	Automata, Logic, and Computation	*F
CS 425	Introduction to Bioinformatics Algorithms	S
CS 430	Database Systems	S / SS
CS 435	Introduction to Big Data	F
CS 440	Introduction to Artificial Intelligence	F
CS 445	Introduction to Machine Learning	S
CS 453	Introduction to Compiler Construction	*S
CS 454	Principles of Programming Languages	Varies
CS 455	Introduction to Distributed Systems	Varies
CS 456	Modern Cybersecurity	F
CS 457	Computer Networks and the Internet	F
CS 458	Blockchain Principles and Applications	Varies
CS 462	Engaging in Virtual Worlds	F
CS 464	Principles of Human Computer Interaction	F
CS 465	Multimodal Interaction for 3D User Interfaces	S
CS 470	Computer Architecture	Varies
CS 475	Parallel Programming	Varies
CS 48x	Special offerings that often can sub for CS upper division requirement, example CS 481A4 Digital Forensics	*F, *S
◇ CS 486	Practicum (Internship)	F / S / SS
◇ CS 495	Independent Study	F / S / SS
◇ CS 498	Research	F / S / SS

◇ Cannot be used to fulfill concentration (CS Upper Division: CS 300- or above) or tech elective credits

* Semester offered, if offered

Computer Science Course Prerequisites (revised August 2025)



Computer Science Course Prerequisites can also be found in the CSU Course Catalog