BS in Computer Science (CS)
Major Checklist
2023-2024 Catalog

Name: _____ Student ID: _____

	Course Number & Title (units)	Prerequisites†
Complete ALL of the following preparatory subject matter courses:		
	ECS 20: Discrete Mathematics for Computer Science (4)	*a 'C-' or better in MAT 16A or 17A or 19A or 21A*
	ONE (1) of the following series options in its entirety: ***mixing of courses between series is not allowed*** □ ECS 36 Series: - ***intended for declared CS/CSE majors*** ECS 36A: Programming & Problem Solving (4) ECS 36B: Software Development & Object-Oriented Programming in C++ (4) ECS 36C: Data Structures, Algorithms, & Programming (4) **OR** □ ECS 32/34 Series: - ***intended for non-majors who want to change to CS or CSE*** ECS 32A: Introduction to Programming or ECS 36A: Programming & Problem Solving (4) ECS 32B: Introduction to Data Structures (4) ECS 32C: Implementation of Data Structures in C (4) ECS 34: Software Development in UNIX & C++ (4)	***ECS 36A:*** *a 'C-' or better in ECS 32A, or must satisfy computer science placement exam* ***ECS 36B:*** *a 'C-' or better in ECS 36A* ***ECS 36C:*** *a 'C-' or better in ECS 20 and in ECS 36B* ***ECS 32A:*** *none* ***ECS 32B:*** *a 'C-' or better in ECS 32A or 36A* ***ECS 32C:*** *a 'C-' or better in ECS 32B* ***ECS 34:*** *a 'C-' or better in ECS 32C*
	ECS 50: Computer Organization & Machine-Dependent Programming (4)	*a 'C-' or better in ECS 34 or 36B*
	MAT 21A: Calculus (4)	*must satisfy mathematics placement requirement*
	MAT 21B: Calculus (4)	*a 'B' or better in MAT 17A, or a 'C-' or better in either MAT 21A or 21AH*
	MAT 21C: Calculus (4)	*a 'B' or better in MAT 17B, or a 'C-' or better in MAT 16C or 17C or 21B or 21BH*
	ONE (1) of the following: □ MAT 22A: Linear Algebra (3) □ MAT/BIS 27A: Linear Algebra with Applications to Biology (4) □ MAT 67: Modern Linear Algebra (4)	***MAT 22A*** *: a 'C-' or better in MAT 16C or 17C or 21C or 21CH; ENG 6 or EME 5 or ECH 60 or MAT 22AL may be taken concurrently* ***MAT 27A:*** *a 'C-' or better in MAT 17C or 21C or 21CH* ***MAT 67:*** *a 'C-' or better in MAT 21C or 21CH*
Complete THREE of the following courses: ***Courses can be from any combination of subjects***		
	□ BIS 2A: Introduction to Biology - Essentials of Life on Earth (5)	*none*
	□ BIS 2B: Introduction to Biology - Principles of Ecology & Evolution (5)	*none*
_____	□ BIS 2C: Introduction to Biology - Biodiversity & the Tree of Life (5)	*a 'C-' or better in BIS 1B or 2B*
	□ CHE 2A: General Chemistry (5)	*a score of 24 or higher on the chemistry placement exam or a 'C-' or better in CHE 1V*
	□ CHE 2B: General Chemistry (5)	*a 'C-' or better in CHE 2A*
_____	□ CHE 2C: General Chemistry (5)	*a 'C-' or better in CHE 2B or 2BH*
	□ CHE 4A: General Chemistry for the Physical Sciences & Engineering (5)	*a score of 28 or better on the chemistry placement exam; MAT 21A (may be taken concurrently)*
	□ CHE 4B: General Chemistry for the Physical Sciences & Engineering (5)	*a 'C-' or better in CHE 4 or CHE 2AH; MAT 21B (may be taken concurrently)*
_____	□ CHE 4C: General Chemistry for the Physical Sciences & Engineering (5)	*a 'C-' or better in CHE 4B or CHE 2B or CHE 2BH; MAT 21C (may be taken concurrently)*
	□ PHY 9A: Classical Physics (5)	*MAT 21B or 21M*
	□ PHY 9B: Classical Physics (5)	*PHY 9A; MAT 21C; MAT 21D (may be taken concurrently)*
	□ PHY 9C: Classical Physics (5)	*PHY 9B; MAT 21D; MAT 22A or 27A (may be taken concurrently)*
Complete ALL of the following depth subject matter courses:		
	ECS 122A: Algorithm Design & Analysis (4)	*ECS 20; ECS 32B or 36C*
	ONE (1) of the following: □ ECS 120: Theory of Computation (4)* □ ECS 122B: Algorithm Design & Analysis (4)*	***ECS 120:*** *ECS 20 or MAT 108* ***ECS 122B:*** *ECS 122A; ECS 34 or 36C*
	ECS 140A: Programming Languages (4)	*ECS 20; ECS 50; ECS 32B or 36C* ***recommended:*** *ECS 150*
	ECS 150: Operating Systems & System Programming (4)	*ECS 34 or 36C; ECS 154A or EEC 170; not open to CS majors in pass one*
	ECS 154A: Computer Architecture (4)	*ECS 50 or EEC 70*
	ONE (1) of the following: □ ECS 132: Probability & Statistical Modeling for Computer Science (4)* □ MAT 135A: Probability (4)* □ STA 131A: Introduction to Probability Theory (4)*	***ECS 132:*** *ECS 20; MAT 21C; ECS 34 or 36B; MAT 22A or 27A or 67* ***MAT 135A:*** *MAT 21C; MAT 67 or 108* ***STA 131A:*** *a 'C-' or better in MAT 21C and in either MAT 22A or 27A or 67*

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Complete 7 courses from the following Computer Science Electives: *a minimum of 4 course must be ECS courses; at least 1 course must be a MAT or STA course*		
	□ ECS 120: Theory of Computation (4) *	*ECS 20 or MAT 108*
	□ ECS 122B: Algorithm Design & Analysis (4) *	*ECS 122A; ECS 34 or 36C*
	□ ECS 124: Theory & Practice of Bioinformatics (4)	*ECS 32A or 36A or ENG 6; STA 32 or 35B or 100 or 131A or MAT 135A or BIM 105 or ECS 132 or EEC 161; BIS 2A or MCB 10*
	□ ECS 127: Cryptography (4)	*ECS 20 or MAT 108; ECS 32A or 36A*
	□ ECS 129: Computational Structural Bioinformatics (4)	*BIS 2A or MCB 10; ECS 32A or 36A*
	□ ECS 130: Scientific Computation (4)	*ECS 32A or ECS 36A or ENG 6; MAT 22A or 27A or 67*
	□ ECS 132: Probability & Statistical Modeling for Computer Science (4) *	*ECS 34 or 36B; ECS 20; MAT 21C; MAT 22A or 27A or 67*
	□ ECS 152A: Computer Networks (4)	*ECS 32B or 36C; ECS 132 or EEC 161 or MAT 135A or STA 32 or STA 35B or STA 100 or STA 131A*
	□ ECS 153: Computer Security (4)	*ECS 150; ECS 152A or EEC 173A*
	□ ECS 154B: Computer Architecture (4)	*ECS 154A or EEC 170 or EEC 180A*
	□ ECS 158: Programming on Parallel Architectures (4)	*ECS 150*
	□ ECS 160: Software Engineering (4)	*ECS 140A*
	□ ECS 161: Modern Programming Tools (4)	*ECS 32B or 36B*
	□ ECS 162: Web Programming (4)	*ECS 34 or 36B*
	□ ECS 163: Information Interfaces (4)	*ECS 32B or 36C*
	□ ECS 164: Human-Computer Interaction (4)	*none*
	□ ECS 165A: Database Systems (4)	*ECS 32B or 36C*
	□ ECS 170: Introduction to Artificial Intelligence (4)	*ECS 32B or 36C*
	□ ECS 171: Machine Learning (4)	*ECS 32B or 36C; STA 032 or 35B or 100 or 131A or ECS 132 or MAT 135A or EEC 161; MAT 022A or MAT 027A or MAT 67*
	□ ECS 172: Recommender Systems (4)	*ECS 32B or 36B; ECS 132 or STA 130A or 131A or ECN 140; MAT 22A or 27A or 67*
	□ ECS 173: Image Processing & Analysis (4)	*a 'C-' or better in MAT 22A or 27A or 67; ECS 32B or 36C*
	□ ECS 174: Computer Vision (4)	*ECS 32B or 36C*
	□ ECS 175: Computer Graphics (4)	*ECS 34 or 36C; MAT 22A or 27A or 67*
	□ ECS 178: Geometric Modeling (4)	*ECS 175*
	□ ECS 179: Gameplay Programming (4)	*ECS 32B or ECS 36C*
	□ ECS 188: Ethics in an Age of Technology (4)	*upper division standing; not open to CS majors in pass one*
	□ ECS 189: Special Topics (4)	*instructor consent*
	□ ECS 191: Software Design Project (4)	*ECS 160*
	□ ECS 192: Internship in Computer Science (3-5) **OR** ECS 199: Special Study (3-5)	*varies; see department website*
	□ ECS 193A **AND** ECS 193B: Capstone Project (6) - *counts as one course*	***ECS 193A:*** *ECS 160 (may be taken concurrently); upper division standing; not open to CS majors in pass one;* ***ECS 193B:*** *ECS 193A IP or better; not open to CS majors in pass one*
	□ Any other ECS course 120-189 not already used in the major (4)	*varies; see department website*
	□ EEC 100: Circuits II (5)	*a 'C-' or better in ENG 17; MAT 22B or 27B*
	□ EEC 171: Parallel Computer Architecture (4)	*EEC 170 or ECS 154B*
	□ EEC 172: Embedded Systems (4)	*EEC 100; EEC 170 or ECS 154A*
	□ EEC 180: Digital Systems II (5)	*EEC 18 or 180A*
	□ ECN 122: Theory of Games & Strategic Behavior (4)	*MAT 16A & 16B, or MATH 21A & 21B, or MAT 17A & 17B, or instructor consent*
	□ LIN 127: Text Processing & Corpus Linguistics (4)	*none*
	□ LIN 177: Computational Linguistics (4)	*instructor consent*
	□ PSC 120: Agent-Based Modeling (4)	*none*
	□ STS 115: Data Sense & Exploration: Critical Storytelling with Analysis (4)	*none*
	□ STA 131A: Introduction to Probability Theory (4) *	*a 'C-' or better in MAT 21C and in either MAT 22A or 27A or 67*
	□ STA 131B: Introduction to Mathematical Statistics (4)	*a 'C-' or better in STA 131A or MAT 135A; instructor consent*
	□ STA 141B: Data & Web Technologies for Data Analysis (4)	*a 'C-' or better in STA 141A*
	□ STA 141C: Big Data & High Performance Statistical Computing (4)	*a 'C-' or better in STA 141B, or a 'C-' or better in STA 141A and ECS 32A*
	□ STA 142A: Statistical Learning I (4)	*a 'C-' or better in STA 141A, and in either STA 130A or STA 131A or MAT 135A*
	□ STA 142B: Statistical Learning II (4)	*a 'C-' or better in STA 142A, and in either STA 130B or 131B*
	□ Any MAT course numbered between 100-189, excluding MAT 111* (3-4)	*varies; see university catalog*

†*Prerequisites are subject to change; consult the University Catalog (https://catalog.ucdavis.edu/) for the most recent updates*

**Completion of a core requirement will not satisfy an elective requirement simulataneously*

ü***Total units required for CS major: 100-106***