Marlan and Rosemary Bourns College of Engineering

Suggested Course Plan for a UC Riverside Major in

COMPUTER SCIENCE

Revised December 2023

Catalog Year: 2023

Fall Quarter	*Unit*	*Winter Quarter*	*Units*	*Spring Quarter*	*Units*
FIRST YEAR					
CS 010A	4	CS 010B	4	CS 010C	4
C++ Programming I		*C++ Programming II*		*Intro to Data Structures & Algorithms*	
ENGL 001A	4	ENGL 001B	4	MATH 009C	4
Beginning Composition		*Intermediate Composition*		*First Year Calculus*	
ENGR 001I	1	MATH 009B	4	Breadth _____	4
Professional Dev. & Mentoring		*First Year Calculus*		*Humanities/Social Sciences*	
MATH 009A	4	MATH/CS 011	4		
First Year Calculus		*Intro to Discrete Structures*			
SECOND YEAR					
CS 061	4	EE/CS 120A	5	STAT 155	4
Machine Org. & Assembly Lang. Prog.		*Logic Design*		*Probability & Statistics for Engr*	
CS 100	5	CS 111	4	PHYS 040C	5
Software Construction		*Discrete Structures*		*Physics (Electricity/Magnetism)*	
PHYS 040A	5	PHYS 040B	5	Breadth _____	4
Physics (Mechanics)		*Physics (Heat/Waves/Sound)*		*Humanities/Social Sciences*	
Breadth _____	4	Breadth _____	4	ENGR Breadth Elective	4
Humanities/Social Sciences		*Humanities/Social Sciences*		*See below for course options*	
THIRD YEAR					
CS 141	4	CS 150	4	ENGR Depth Elective	4
Interm. Data Structures & Algorithms		*Theory of Automata & Formal Language*		*See below for course options*	
CS 161	4	MATH 031 or EE 020B	5	ENGR 180W*	4
Design & Architec. of Comp. Sys. & Lab		*Applied Linear Algebra*		*Technical Communications*	
MATH 010A	4	Technical Elective**	4	CS 153	4
Multivariable Calculus		_____		*Design of Operating Systems*	
Breadth _____	4	ENGR 101I	1	Technical Elective**	4
Humanities/Social Sciences		*Professional Dev. & Mentoring*		_____	
FOURTH YEAR					
CS 179(E-Z) or CS 178A*	4	CS 178B* or Technical Elective**	4	Technical Elective**	4
Proj in Comp Sc or Proj Seq in CSE		*Proj Seq in CSE or Technical Elect*		_____	
Technical Elective**	4	Technical Elective**	4	Technical Elective**	4
_____		_____		_____	
Breadth _____	4	CS 152	4	Technical Elective**	4
BIOL 002, or 003, or 005A/LA		*Compiler Design*		_____	
		Breadth _____	4		
		Humanities/Social Sciences			

Totl Units: 180
Maximum Units: 220

To earn a B.S., you must complete all College and University requirements. For a complete list: catalog.ucr.edu.

ENGLISH COMPOSITION*

A C or better is required in three quarters of English Composition courses to satisfy the graduation requirement. ENGR 180W fulfills the third quarter of English Composition.

BREADTH REQUIREMENTS

For an approved list of Breadth courses: http://student.engr.ucr.edu/policies/requirements/breadth.html.

Humanities: (3 courses)
- A. World History: _____
- B. Fine Arts, Lit., Phil. or Rlst: _____
- C. Human Persp. on Science: _____

Social Sciences: (3 courses)
- A. Econ. or Posc.: _____
- B. Anth., Psyc, or Soc.: _____
- C. General Social Science: _____

Biological Science _____

Ethnicity: (1 course)
1. _____

Upper Division: (2 courses)
1. _____
2. _____

TECHNICAL ELECTIVES **

Please note that Technical Electives may be offered throughout the Academic Year. Consult with your Academic Advisor about potential offerings. Proposed offerings may be found at: http://www.cs.ucr.edu/education/undergraduate/courses/. See approved technical electives on back.

Course Plan is subject to change.

Computer Science Technical Electives

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You must complete eight (8) courses (at least 32 units) of Technical Electives chosen from the list below. At least four (4) Technical Electives must be from Computer Science courses. ***If a student has taken CS 178A and CS 178B project sequence, an additional CS 179 (E-Z) cannot be taken to satisfy a Technical Elective. Only 4-units of CS 179 (E-Z) or CS 178B will count towards a Technical Elective***.

Course	Course Title (Units)
CS 105	Data Analysis Methods (4)
CS 108	Data Science Ethics (4)
CS 110	Web Development (4)
CS/EE 120B	Intro to Embedded Systems (4)
CS 122A	Intermed. Embedded & Real-Time Systs (5)
CS 122B	Adv. Embedded & Real-Time Systems (5)
CS 130	Computer Graphics (4)
CS 131	Edge Computing
CS 133	Computational Geometry (4)
CS 135	Virtual Reality (4)
CS 142	Algorithm Engineering (4)
CS 144	Algorithms for BioInformatics (4)
CS 145	Combinatorial Optimization Algorithms (4)
CS/EE 147	GPU Programming (4)
CS 160	Concurrent Programming & Parallel Systems (4)
CS 162	Computer Architecture (4)
CS 164	Computer Networks (4)
CS 165	Computer Security (4)
CS 166	Database Management Systems (4)
CS 167	Intro to BIG-DATA Management (4)
CS/EE 168	Intro to Very Large Scale Integration (VLSI) Design (4)
CS 169	Mobile Wireless Networks (4)
CS 170	Introduction to Artificial Intelligence (4)
CS 171/EE 142	Introduction to Machine Learning and Data Mining (4)
CS 172	Introduction to Information Retrieval (4)
CS 173	Intro to Natrual Language Processing (NPL) (4)
CS 175	Entrepreneurship in Computing (4)
CS 177	Modeling & Simulation (4)
CS 178B	Project Sequence in CSE (4)
CS 179E	Project in CS: Compilers (4)
CS 179F	Project in CS: Operating Systems (4)
CS 179G	Project in CS: Database Systems (4)
CS 179I	Project in CS: Networks (4)
CS 179J	Project in CS: Computer Architecture and Embedded Systems (4)
CS 179K	Project in CS: Sofware Engineering (4)
CS 179M	Project in CS: Artificial Intelligent Systems (4)
CS 179N	Project in CS: Graphics and Electronic Games (4)
CS 180	Introduction to Software Engineering (4)
CS 181	Principles of Programming Languages (4)
CS 182	Software Testing and Verification (4)
CS 183	UNIX System Administration (4)
CS 193	Design Project (4 units maximum)
MATH 120	Optimization (4)
MATH 126	Combinatorics (4)
MATH 135A	Numerical Analysis (4)
MATH 135B	Numerical Analysis (4)
PHIL 124	Formal Logic (4)

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Engineering Depth Elective Options: One 4-unit course is required. Courses with + have additional prerequisites.

BIEN 010	Overview of Bioengineering (4)	MATH 046	Differential Equations (4)
EE 030A & 030LA +	Fund of Elec Circuits I (4)	ME 002	Intro Mechanical Engineering (4)
EE 005	Circuits & Electronics (4)	ME 005	The Science of Mythbusting (4)
EE 016	Data Analysis in Engr Apps (4)	ME 018A	Intro to Engineering Computation (4)
EE 020A	Fund Math Methods in ECE (4)	ME 018B +	Intro to Engineering Computation (4)
ENSC 001	Intro to ENSC: Natural Resources (4)	ME 009	Engineering Graphics & Design (4)
ENSC 002	Environmental Quality (4)	ME 010	Statics (4)
MATH 010B	Calculus of Several Variables (4)		

Engineering Breadth Elective Options: One 4-unit course is required. Courses with + have additioanl prerequisites.

CHEM 001A/LA or CHEM 01HA/HLA	General Chemistry (5)	LING 021	Grammar (4)
CHEM 001B/LB or CHEM 01HB/HLB	General Chemistry (5)	PHIL 125 +	Intermidiate Logic (4)
CHEM 001C/LC or CHEM 01HC/HLC	General Chemistry (5)	PHIL 126 +	Advanced Logic (4)
CHEM 008A/08LA or CHEM 008HA/08HLA +	Organic Chemistry (4)	PHIL 127 +	Advanced Topics in Logic (4)
ECON 005 +	Data Analysis for ECON and BUS (5)	STAT 004	Elements of Data Science (4)
ECON 060	Engineering Economics (4)	STAT 008	Statistics for Business (5)
LING 020	Language and Linguistics (4)	STAT 010	Intro to Statistics (5)

+ Requires Additional Prerequisites

Computer Science Course Details

ENGR 001I: Required for first year students. Offered **ONLY** in Fall quarter. ENGR 001I is waived for transfer students.

ENGR 101I: For Junior standing. Offered **ONLY** in Winter quarter.

CS 161: Computer Science major students are only required to complete CS 161. Note that CS 161L is not a major requirement.

Project in Computer Science: Students can either complete CS 178A & CS 178B or one course in CS 179 (E-Z) to satisfy the Project in CS requirement.

Project in Computer Science: ENGR 180W is a prerequisite to all CS project courses. There are additional course prerequisites. Please be sure to check.

CS 178A & CS 178B: This is the CS two quarter project sequence. CS 178A will satisfy the Project in Computer Science area of your degree audit and CS 178B will count as a Technical Elective.

ENGR 180W: Students must enroll in the corequisite of ENGL 007 (.5 units)