

COMPUTER SCIENCE

Catalog Year: 2024

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

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., _____
- C. Human Persp _____

Social Sciences: (3 courses)

- A. Econ. or Posc _____
- B. Anth., Psyc, o _____
- C. General Socia _____

Biological Scien _____

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.

Total Units: 183

Maximum Units: 267

Computer Science Technical Electives (TE)

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.

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

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 additional 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 + | Intermediate 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 |
| ECON 060 | Engineering Economics (4) | STAT 008 | Statistics for Business |
| LING 020 | Language and Linguistics (4) | STAT 010 | Intro to Statistics (5) |

+ Requires Additional Prerequisites

Specific Course Details

ENGR 001I: Required for first year students. Offered **ONLY** in Fall quarter. Transfer students are not required to complete ENGR 001I.

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

CS 161: Computer Science major students are not required to enroll in CS 161L

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

CS 179(E-Z): ENGR 180W is a prerequisite to all project courses (CS 178A and CS 179E-Z). There are additional course and grade prerequisites. Please be sure to check.

ENGR 180W: Students must enroll in the corequisite of ENGL 007 (.5 units) and be Junior or Senior standing.