

## Computer Science with Business Applications

Fall Quarter	Units	Winter Quarter	Units	Spring Quarter	Units
<b>FIRST YEAR</b>					
CS 010A <i>C++ Programming I</i>	4	CS 010B <i>C++ Programming II</i>	4	CS 010C <i>Intro to Data Structures &amp; 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 001M <i>Professional Dev. &amp; Mentoring</i>	1	MATH 009B <i>First Year Calculus</i>	4	Breadth _____ <i>Humanities/Natural Sciences</i>	4
MATH 009A <i>First Year Calculus</i>	4	CS/MATH 011 <i>Intro to Discrete Structures</i>	4	Breadth _____ <i>Humanities/Natural Sciences</i>	4
<b>SECOND YEAR</b>					
BUS 020 <i>Financial Accounting &amp; Reporting</i>	4	MATH 010A <i>Multivariable Calculus</i>	4	ECON 002 <i>Intro to Macroeconomics</i>	5
CS 061 <i>Machine Org. &amp; Assembly Lang. Prog.</i>	4	CS 111 <i>Discrete Structures</i>	4	MATH 031 or EE 020B <i>Applied Linear Algebra</i>	5
CS 100 <i>Software Construction</i>	5	STAT 155 <i>Probability &amp; Statistics for Engr</i>	4	Breadth _____ <i>Humanities/Natural Sciences</i>	4
ECON 003 <i>Intro to Microeconomics</i>	5	Breadth _____ <i>Biological Sci (Biol 002 or</i>	4	Breadth _____ <i>Humanities/Natural Sciences</i>	4
<b>THIRD YEAR</b>					
BUS 103 <i>Marketing &amp; Distribution Mgmt</i>	4	BUS/STAT 104 <i>Decision Analysis &amp; Mgmt Science</i>	4	CS 153 <i>Design of Operating Systems</i>	4
CS 141 <i>Interm. Data Structures &amp; Algorithms</i>	4	BUS 106/ECON 134 <i>Intro to Financial Mgmt</i>	4	Breadth _____ <i>Humanities/Natural Sciences</i>	4
ENGR 180W** <i>Technical Communications</i>	4	SOC 150 <i>Soc. of Economic Organizations</i>	4	CS Technical Elective*** _____	4
Breadth _____ <i>Humanities/Natural Sciences</i>	5	ENGR 101M <i>Professional Dev. &amp; Mentoring</i>	1	CS Technical Elective*** _____	4
<b>FOURTH YEAR</b>					
BUS Technical Elective <sup>†</sup> _____	4	BUS Technical Elective <sup>†</sup> _____	4	CS Technical Elective*** _____	4
CS Elective <i>CS 164, CS 166, CS 172 or CS 180</i>	4	CS Technical Elective** _____	4	BUS Technical Elective* <sup>†</sup> _____	4
CS Elective <i>CS 164, CS 166, CS 172 or CS 180</i>	4	CS 165 or CS Tech Elec <i>Computer Security</i>	4	BUS Technical Elective* <sup>†</sup> _____	4

To earn a B.S., you must complete all College and University requirements. For a complete list: [catalog.ucr.edu](http://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 third quarter 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./Rlst: \_\_\_\_\_
- C. Human Persp. on Sci: \_\_\_\_\_

#### Natural Sciences: (4 courses)

- A. Biological Science: \_\_\_\_\_
- B. Physical Science: 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_

#### Ethnicity: (1 course)

- 1. \_\_\_\_\_

#### Upper Division: (1 course)

- 1. \_\_\_\_\_

### TECHNICAL ELECTIVES \*\*\*

Please note that Technical Electives may be offered throughout the Academic Year. Consult with your Academic Advisor about potential offerings. See approved technical electives on back.

#### Computer Science Technical Electives:

- 1. \_\_\_\_\_ 3. \_\_\_\_\_
- 2. \_\_\_\_\_ 4. \_\_\_\_\_

#### Business Administration Technical Electives:

- 1. \_\_\_\_\_ (IS) 3. \_\_\_\_\_
- 2. \_\_\_\_\_ (IS) 4. \_\_\_\_\_

Total Units: 179  
Maximum Units: 222

Course Plan is subject to change.

## Computer Science w/Business Applications Technical Electives

### Computer Science Technical Electives:

You must complete at least 16 units of upper division Computer Science Technical Electives which must be distinct from major requirements. These 16 units may be chosen from upper division requirements or technical electives for the Computer Science Major. At least four courses must be in the Department of Computer Science and Engineering.

CS 105	Data Analysis Methods (4)	CS 160	Concurrent Prog. & Parallel Syst. (4)
CS 108	Data Science Ethics (4)	CS 161	Design&Architecture of Comp. Syst. (4)
CS 110	Web Development (4)	CS 167	Intro to BIG-DATA Management (4)
CS 120A	Logic Design (5)	CS/EE 168	Intro to VLSI Design (4)
CS 120B	Introduction to Embedded Systems (4)	CS 169	Mobile Wireless Networks (4)
CS 122A	Inter. Embedded&Real-Time Syst. (5)	CS 170	Introduction to Artificial Intelligence (4)
CS 130	Computer Graphics (4)	CS 171/EE 142	Intro to Machine Learning & Data Mining (4)
CS 131	Edge Computing (4)	CS 173	Intro to Natural Language Processing
CS 133	Computational Geometry (4)	CS 175	Entrepreneurship in Computing (4)
CS 134	Video Game Creation & Design (4)	CS 177	Modeling & Simulation (4)
CS 135	Virtual Reality (4)	CS 178B	Project Sequence in CS (4)
CS 142	Algorithm Engineering (4)	CS 179 (E-Z)	Project in Computer Science (4 units maximum)
CS 144	Algorithm for Bioinformatics (4)	CS 180	Intro to Software Engineering (4)
CS 145	Combinatorial Optimization Algor. (4)	CS 181	Principles of Programming Languages (4)
CS/EE 147	GPU Programming	CS 182	Software Testing and Verification (4)
CS 150	Theory of Automata & Formal Lang. (4)	CS 183	UNIX System Administration (4)
CS 152	Compiler Design (4)	CS 193	Design Project (4 units maximum)

### Business Administration Technical Electives:

You must complete at least 16 units of upper division Business Administration Technical Electives, including at least 8 units of courses listed in the Information Systems concentration within the Business Administration major. These units must be distinct from major requirements and may be chosen from any of the available Business Administration courses.

\* Choose at least TWO from Information Systems courses:

BUS 110	Data Mining & Visual Analytics (4)
BUS 125	Simulation for Business (4)
BUS 128	Project Planning and Control (4)
BUS 163	Technology Entrepreneurship (4)
BUS 171	System Analysis & Design (4)
BUS 172	Information Economics (4)
BUS 173	Introduction to Databases for Mgmt (4)
BUS 174	Electronic Commerce (4)
BUS 175	Business Data Communications (4)
BUS 179	Business App of GIS (4)

\* Choose remaining TWO from:

*ANY AVAILABLE UPPER DIVISION BUSINESS ADMINISTRATION (BUS) COURSES, EXCEPT BUS 101*

Please note the following credit exceptions:

No credit is given for BUS 101

Only one of BUS 171 or CS 180 can be taken for credit

Only one of BUS 173 or CS 166 can be taken for credit

Only one of BUS 175 or CS 164 can be taken for credit

Only one of BUS 125 or CS 177 can be taken for credit

1 Technical Electives may require that you complete additional courses as prerequisites that are not accounted for in the undergraduate program. Please go to [www.catalog.ucr.edu](http://www.catalog.ucr.edu) for course descriptions and prerequisite information.