## Suggested Course Plan for a UC Riverside Major in Robotics

### Catalog Year: 2022

<table>
<thead>
<tr>
<th>Fall Quarter</th>
<th>Units</th>
<th>Winter Quarter</th>
<th>Units</th>
<th>Spring Quarter</th>
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<td><strong>FIRST YEAR</strong></td>
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<tr>
<td>ENGL 001A</td>
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<tr>
<td>Beginning Composition</td>
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<tr>
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<td>First Year Calculus</td>
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<tr>
<td>CS 010A</td>
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<td>CS 010B</td>
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<td>CS 010C</td>
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<tr>
<td>Intro to Computer Science I</td>
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<td>Intro to Computer Science II</td>
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<td>Intro to Data Structures &amp; Algorithms</td>
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<tr>
<td>ME 009</td>
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<td>PHYS 040A</td>
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<td>PHYS 040B</td>
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<tr>
<td>Engineering Graphics &amp; Design</td>
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<td>Physics (Mechanics)</td>
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<td>Physics (Heat/Waves/Sound)</td>
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<td><strong>SECOND YEAR</strong></td>
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<tr>
<td>CS 100</td>
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<td>EE 106</td>
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<td>CS 061</td>
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<td>Software Construction</td>
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<td>Programming Practical Robotics</td>
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<td>Machine Org &amp; Assembly Lang Prag</td>
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<tr>
<td>MATH 010A</td>
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<td>MATH 046</td>
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<td>MATH 011</td>
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<td>Multivariable Calculus</td>
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<td>Differential Equations</td>
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<td>Intro to Discrete Structures</td>
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<td>PHYS 040C</td>
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<td>EE 005</td>
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<td>Physics (Electricity/Magnetism)</td>
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<td>Circuits and Electronics</td>
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<td>Applied Linear Algebra</td>
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<td>Biological Science</td>
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<td>Statics</td>
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<td><strong>THIRD YEAR</strong></td>
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<tr>
<td>EE/ME 144</td>
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<td>CS/EE 120A</td>
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<td>Foundations of Robotics</td>
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<td>Logic Design</td>
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<td>Embedded Systems</td>
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<tr>
<td>EE 111</td>
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<td>EE 114</td>
<td>4</td>
<td>EE 132</td>
<td>4</td>
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<tr>
<td>Digital &amp;Analog Sig &amp; Systems</td>
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<td>Prob, Rand Variables &amp; Rand Process</td>
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<td>Automatic Control</td>
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<tr>
<td>ME 120</td>
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<td>ME 103</td>
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<tr>
<td>Linear Systems and Control</td>
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<td>Dynamics</td>
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<td>Breadth_________</td>
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<td>ENGR 180W</td>
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<td>Technical Communication</td>
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<td><strong>FOURTH YEAR</strong></td>
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<tr>
<td>EE 142 / CS 171</td>
<td>4</td>
<td>EE/ME 145</td>
<td>4</td>
<td>Technical Elective</td>
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<tr>
<td>Intro to Mach Learning &amp; Data Mining</td>
<td></td>
<td>Robotic Planning and Kinematics</td>
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<tr>
<td>SENIOR DESIGN 1*</td>
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<td>SENIOR DESIGN 2*</td>
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<td>Technical Elective</td>
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<td>ENCS, ELEN or MCEN</td>
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<td>ENCS, ELEN or MCEN</td>
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<tr>
<td>Breadth_________</td>
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<td>Technical Elective</td>
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<td>Breadth_________</td>
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<tr>
<td>Humanities/Social Sciences</td>
<td></td>
<td></td>
<td></td>
<td>Humanities/Social Sciences</td>
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</tbody>
</table>

To earn a B.S., you must complete all College and University requirements. For a full list of requirements, refer to www.catalog.ucr.edu.

### ENGLISH COMPOSITION*

A "C" or better is required in all 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, go to 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:

- 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. See approved technical electives on back.

Course Plan is subject to change.

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* Students have the option to complete one of the following sequences to satisfy senior design:

- ENCS (CS 178A & 178B), ELEN (EE 175A & 175B) or MCEN (ME 175B & 175C)

Total Units: 184

Maximum units: 223
Robotics Technical Electives

You must complete 4 courses (at least 16 units) of Technical Elective coursework.

**Technical Electives**

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>CS 111:</td>
<td>Discrete Structures</td>
<td>4</td>
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<tr>
<td>CS 122A:</td>
<td>Intermediate Embedded and Real-Time Systems</td>
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<tr>
<td>CS 122B:</td>
<td>Advanced Embedded and Real-Time Systems</td>
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<tr>
<td>CS 135:</td>
<td>Virtual Reality</td>
<td>4</td>
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<tr>
<td>CS 141:</td>
<td>Intermediate Data Structures and Algorithms</td>
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<tr>
<td>CS 145:</td>
<td>Combinatorial Optimization Algorithms</td>
<td>4</td>
</tr>
<tr>
<td>CS 150:</td>
<td>Automata and Formal Languages</td>
<td>4</td>
</tr>
<tr>
<td>CS 160:</td>
<td>Concurrent Programming and Parallel Systems</td>
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</tr>
<tr>
<td>CS 170:</td>
<td>Introduction to Artificial Intelligence</td>
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</tr>
<tr>
<td>CS 173:</td>
<td>Introduction to Natural Language Processing</td>
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<tr>
<td>ME 110:</td>
<td>Mechanics of Materials</td>
<td>4</td>
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<tr>
<td>ME 122:</td>
<td>Vibrations</td>
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<tr>
<td>ME 130:</td>
<td>Kinematic and Dynamic Analysis of Mechanisms</td>
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<tr>
<td>ME 131:</td>
<td>Design of Mechanisms</td>
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<tr>
<td>ME 133:</td>
<td>Introduction to Mechatronics</td>
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<tr>
<td>ME 153:</td>
<td>Finite Element Methods</td>
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<tr>
<td>EE 100A:</td>
<td>Electronic Circuits</td>
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<tr>
<td>EE 115:</td>
<td>Introduction to Communication Systems</td>
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<tr>
<td>EE 128:</td>
<td>Sensing and Actuation for Embedded Systems</td>
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<td>EE 141:</td>
<td>Digital Signal Processing</td>
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<td>EE 146:</td>
<td>Computer Vision</td>
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<td>EE 147:</td>
<td>Graphics Processing Unit Computing and Programming</td>
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<tr>
<td>EE 150:</td>
<td>Digital Communications</td>
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<td>EE 151:</td>
<td>Introduction to Digital Control</td>
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<tr>
<td>EE 152:</td>
<td>Image Processing</td>
<td>4</td>
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<tr>
<td>ENGR 160:</td>
<td>Introduction to Engineering Optimization Techniques</td>
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