Articulation Agreement by Major

Effective during the 2022-2023 Academic Year

To: University of California, Los Angeles 2022-2023 General Catalog, Quarter	From: De Anza College 2022-2023 General Catalog, Quarter

Computational and Systems Biology/B.S.

IMPORTANT MAJOR INFORMATION

The Computational and Systems Biology major (formerly Cybernetics) is designed for highly motivated students interested in interdisciplinary studies in life sciences, behavioral sciences, and engineering and computer sciences. **The major provides foundations in mathematical modeling, information processing, and control and system analysis, with an emphasis on quantitative ideas and methodologies. Mathematical and other analytical skills are essential in the major.** Students must be admitted as Pre-Computational and Systems Biology majors in order to major in Computational and Systems Biology. To prepare for this major, you must complete as many of the following courses listed below as possible by the end of spring before transfer. **All courses must be taken for a letter grade. For more information regarding this major and UCLA's transfer selection process, visit** www.cs.ucla.edu/C&SB, https://catalog.registrar.ucla.edu/ and https://admission.ucla.edu.

PLEASE NOTE: the community college courses listed below have been approved to satisfy the preparation for this major at UCLA, but they may not be exact equivalents of the UCLA courses listed.

LOWER DIVISION MAJOR REQUIREMENTS

LIFESCI 7A - Cell and Molecular Biology (5.00)	←	**BIOL 6B** - Cell and Molecular Biology (6.00)
--- And ---		
LIFESCI 7B - Genetics, Evolution, and Ecology (5.00)	←	**BIOL 6C** - Ecology and Evolution (6.00) **--- Or ---** **BIOL 6CH** - Ecology and Evolution - HONORS (6.00)
--- And ---		
LIFESCI 7C - Physiology and Human Biology (5.00)	←	**BIOL 6A** - Form and Function in the Biological World (6.00)

CHEM 20A - Chemical Structure (4.00) **--- And ---** **CHEM 20B** - Chemical Energetics and Change (4.00) **--- And ---** **CHEM 20L** - General Chemistry Laboratory (3.00)	←	**CHEM 1A** - General Chemistry (5.00) **--- And ---** **CHEM 1B** - General Chemistry (5.00) **--- And ---** **CHEM 1C** - General Chemistry and Qualitative Analysis (5.00)

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CHEM 14A - General Chemistry for Life Scientists I (4.00) **--- And ---** **CHEM 14B** - General Chemistry for Life Scientists II (4.00) **--- And ---** **CHEM 14BL** - General and Organic Chemistry Laboratory I (3.00)	←	No Course Articulated
MATH 31A - Differential and Integral Calculus (4.00) **--- And ---** **MATH 31B** - Integration and Infinite Series (4.00)	←	**MATH 1A** - Calculus (5.00) **--- And ---** **MATH 1B** - Calculus (5.00)
MATH 33A - Linear Algebra and Applications (4.00) **--- And ---** **MATH 33B** - Differential Equations (4.00)	←	**MATH 2B** - Linear Algebra (5.00) **--- And ---** **MATH 2A** - Differential Equations (5.00)
STATS 10 - Introduction to Statistical Reasoning (5.00)	←	**MATH 10** - Introductory Statistics (5.00)

--- Or ---

LIFESCI 30A - Mathematics for Life Scientists (5.00)	←	No Course Articulated
--- And ---		
LIFESCI 30B - Mathematics for Life Scientists (5.00)	←	No Course Articulated
--- And ---		
C&S BIO M32 - Essential Calculus for Mathematical Biologists (4.00)	←	No Course Articulated
--- And ---		
MATH 33A - Linear Algebra and Applications (4.00)	←	**MATH 2B** - Linear Algebra (5.00)
--- And ---		
MATH 33B - Differential Equations (4.00)	←	**MATH 2A** - Differential Equations (5.00)

LIFESCI 40 - Statisitics of Biological Systems (5.00)	←	No Course Articulated
--- And ---		
PHYSICS 5A - Physics for Life Sciences Majors: Mechanics, and Energy (5.00) --- And --- **PHYSICS 5B** - Physics for Life Sciences Majors: Thermodynamics, Fluids, Waves, Light, and Optics (5.00) --- And --- **PHYSICS 5C** - Physics for Life Sciences Majors: Electricity, Magnetism, and Modern Physics (5.00)	←	**PHYS 2A** - General Introductory Physics (5.00) --- And --- **PHYS 2B** - General Introductory Physics (5.00) --- And --- **PHYS 2C** - General Introductory Physics (5.00)

--- Or ---

PHYSICS 1A - Physics for Scientists and Engineers: Mechanics (5.00) --- And --- **PHYSICS 1B** - Physics for Scientists and Engineers: Oscillations, Waves, Electric and Magnetic Fields (5.00) --- And --- **PHYSICS 1C** - Physics for Scientists and Engineers: Electrodynamics, Optics, and Special Relativity (5.00)	←	**PHYS 4A** - Physics for Scientists and Engineers: Mechanics (6.00) --- And --- **PHYS 4B** - Physics for Scientists and Engineers: Electricity and Magnetism (6.00) --- And --- **PHYS 4C** - Physics for Scientists and Engineers: Fluids, Waves, Optics and Thermodynamics (6.00)

Physics 4AL and 4BL are not required for admission into the pre-major.	←	No Course Articulated

COMPTNG 10A - Introduction to Programming(C++) (5.00)	←	**CIS 27** - Programming in C++ for C/Java Programmers (4.50) --- Or --- **CIS 22A** - Beginning Programming Methodologies in C++ (4.50) --- And --- **CIS 22B** - Intermediate Programming Methodologies in C++ (4.50)
--- Or ---		
COM SCI 31 - Introduction to Computer Science I (4.00)	←	**CIS 22A** - Beginning Programming Methodologies in C++ (4.50) --- Or --- **CIS 22BH** - Intermediate Programming Methodologies in C++ - HONORS (4.50) --- Or --- **CIS 27** - Programming in C++ for C/Java Programmers (4.50) --- Or --- **CIS 22B** - Intermediate Programming Methodologies in C++ (4.50) --- Or --- **CIS 29** - Advanced C++ Programming (4.50)

END OF AGREEMENT