

College of Science
Bachelor of Science in Systems Biology
Major in Systems Biology
For students entering under UG catalog 2023-2024

I. Pathways to General Education (49 credit hours)

All courses used for the Pathways to General Education must be on the University's approved list.

Pathway 1f – Foundational Discourse (6 credit hours)

_____ 3__ _____ 3__

Pathway 1a – Advanced Discourse (3 credit hours)

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Pathway 2 – Critical Thinking in the Humanities (6 credit hours)

_____ 3__ _____ 3__

Pathway 3 – Reasoning in the Social Sciences (6 credit hours)

_____ 3__ _____ 3__

Pathway 4 – Reasoning in the Natural Sciences (8 credit hours)

#PHYS 2205 General Physics* 3__ #PHYS 2206 General Physics* 3__

#PHYS 2215 General Physics Laboratory* 1__ #PHYS 2216 General Physics Laboratory* 1__

Pathway 5f – Foundational Quantitative and Computational Thinking (8 credit hours)

MATH 1225 Calculus of a Single Variable* 4__ MATH 1226 Calculus of a Single Variable* 4__

Pathway 5a – Advanced Quantitative and Computational Thinking (3 credit hours)

#STAT 3005 Statistical Methods* OR #STAT 3615 Biological Statistics* 3__

Pathway 6a – Critique and Practice in the Arts (3 credit hours)

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Pathway 6d – Critique and Practice in Design (3 credit hours)

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Pathway 7 – Critical Analysis and Equity and Identity in the United States (3 credit hours)

_____ 3__

II. Systems Biology Degree Core (31 credit hours)

#SYSB 2024 Fundamentals Systems Biology* 3__ #SYSB 2034 Math. Methods Systems Biology* 3__

#SYSB 3035 Genomics and Bioinformatics* 4__ #SYSB 3036 Genomics and Bioinformatics* 4__

#SYSB 3115 Network Dynam & Cell Physiol* 4__ #SYSB 3116 Network Dynam & Cell Physiol* 4__

#SYSB 4065 Research Exper in Systems Biol* 2__ #SYSB 4066 Research Exper in Systems Biol* 2__

#SYSB 4024 Careers & Prof Systems Biology* 2__ #SYSB 4114 Appl Models Gene Reg Networks 3__

III. Additional Mathematics and Science (29 credit hours)

BIOL 1105 Principles of Biology* 3__ BIOL 1106 Principles of Biology* 3__

#BIOL 1115 Principles of Biol Lab* 1__ #BIOL 1116 Principles of Biol Lab* 1__

#BIOL 2004 Genetics* 3__ # MATH 2114 Introduction to Linear Algebra* 3__

#CHEM 1035 General Chemistry* 3__ #CHEM 1036 General Chemistry* 3__

#CHEM 1045 General Chemistry Laboratory* 1__ #CHEM 1046 General Chemistry Laboratory* 1__

#CHEM 2535 Organic Chemistry* 3__ #CHEM 2545 Organic Chemistry Laboratory* 1__

CS 1064 Intro to Programming in Python* 3__

IV. Restricted Electives (11 credit hours)

Pick 4 or more of the following courses. At least 6 credit hours must be at the 3000 or 4000 level; at least 3 credit hours must be at the 4000 level.

#BCHM 2024 Concepts of Biochemistry*	3__	#BIOL 2134 Cell Function Differentiation*	3__
#BCHM 3114 Biochem for Biotech*	3__	#BIOL 3134 Human Genetics*	3__
#BCHM 4115 General Biochemistry*	4__	#BIOL 3774 Molecular Biology*	3__
#BIOL 4704 Immunology*	3__	#BIOL 4624 Microbial Genetics*	3__
#BIOL 4634 Microbial Physiology*	3__	#BIOL 4734 Inflammation Biology*	3__
#BIOL 4844 Proteomics & Biol Mass Spec*	3__	#BIOL 4874 Cancer Biology*	3__
#BIOL 4884 Cell Biology*	3__	#BIOL 4854 Cytogenetics*	3__
#CHEM 2536 Organic Chemistry*	3__	#CHEM 2546 Organic Chemistry Laboratory*	1__
#CHEM 3615 Physical Chemistry*	3__	#CHEM 4584 Bioorganic Chemistry*	3__
#CHEM 4615 Phys Chem Life Sci*	3__	#CHEM 4616 Phys Chem Life Sci*	3__
#CMDA 3605 Math Modeling: Methods & Tools*	3__	#CMDA 3606 Math Modeling: Methods and Tools*	3__
#CMDA/CS/STAT 3654 Intro Data Analytics & Visual*	3__	#CMDA/CS/STAT 4654 Intermed Data Analytics & ML*	3__
#CS 2114 Software Design and Data Structures*	3__	#CS/MATH 3414 Numerical Methods*	3__
#CS/CMDA 3634 Comp Sci Foundations for CMDA*	3__	#CS 4214 Simulation and Modeling*	3__
#CS 3824 Intro Comp Bio Bioinformatics*	3__	#CS 4824 Machine Learning*	3__
#CS 4884 Comp Bio & Bioinfo Capstone*	3__		
#MATH 2214 Intro Diff Equations*	3__	#MATH 2204 Intro Multivariable Calculus*	3__
#MATH 4254 Chaos and Dynamical Systems*	3__	#MATH 4454 Applied Mathematical Modeling*	3__
#MATH 4445 Intro to Numer Analysis*	3__	#MATH 4446 Intro to Numer Analysis*	3__
#PHYS 4714 Introduction to Biophysics*	3__	#STAT 2524 Data Science*	3__
#STAT 3006 Statistical Methods*	3__	#STAT 3104 Probability and Distributions*	3__
#STAT 3616 Biological Statistics*	3__	#STAT 4364 Intro to Statistical Genomics*	3__
#STAT 4094 Introduction to R Programming*	1__	#STAT/CMDA 4664 Comp Int Stochastic Mod*	3__
#SYSB 4224 Big Data in Systems Biology	3__		

Prerequisites

Courses in this checksheet marked with a hashtag (#) have prerequisites or corequisites. Students are required to double check course prerequisites and equivalents. Please see your advisor or consult the Undergraduate Course Catalog for more information.

Acceptable Substitutions

BIOL 1105, BIOL 1115-1116, CHEM 1035-1036, CHEM 1045-1046, PHYS 2205-2206, PHYS 2215-2216 can be substituted with ISC 1105-1106, ISC 1115-1116, ISC 2105-2106, ISC 2115-2116 Integrated Science I-II and Integrated Science Lab I-II
 CHEM 1035/1036 can be substituted with CHEM 1055/1056 General Chemistry for Majors
 CHEM 1045/1046 can be substituted with CHEM 1065/1066 General Chemistry Lab for Majors
 CHEM 2535 can be substituted with CHEM 2565 Principles of Organic Chemistry.
 CHEM 2545 can be substituted with CHEM 2555 Organic Synthesis & Techniques Lab.
 CHEM 4615/4616 Physical Chemistry for Life Sciences can be substituted with CHEM 3615/3616 Physical Chemistry.
 CS 1064 can be substituted with CS 1114 Introduction to Software Design.
 MATH 2114 can be substituted with MATH 2114H Introduction to Linear Algebra
 PHYS 2205, 2206, 2215 & 2216 can be substituted with PHYS 2305, 2306.

Foreign Language Requirement

Students who did not successfully complete at least two years of a single foreign, classical, or sign language during high school must successfully complete six semester hours of a single foreign, classical, or sign language at the college level. Courses taken to meet this requirement do not count toward the hours required for graduation. Please consult the Undergrad. Catalog for details.

Satisfactory Progress Towards Degree

Upon having completed 72 credit hours (including transfer, AP, advanced standing, credit by examination, course withdrawal) students must have completed the following courses with a grade of C- or better in two or fewer attempts (including attempts that were withdrawn): BIOL 1105, BIOL 1106, BIOL 1115, BIOL 1116, BIOL 2004, CHEM 1035-1036, CHEM 1045-1046, CHEM 2535, MATH 1225-1226, PHYS 2205-2206, and PHYS 2215-2216. This also applies to acceptable substitutions

Graduation Requirements

120 credit hours are required for graduation. These credits must include the courses required for the major (see above section). To graduate, a student must have at least a 2.0 in-major GPA and 2.0 overall GPA. If 120 credit hours are reached and a student does not meet the GPA requirement, the student must take additional in-major courses to raise the in-major GPA to a 2.0.

*In Major GPA: Courses used to calculate in-major GPA