

## Bioinformatics and Systems Biology Graduate Program

2023-24 Projected Course Offerings - Updated September 8, 2023

*This is a tentative schedule. Departments may change or cancel the quarter(s) in which their courses are offered.  
Refer to the Schedule of Classes each quarter for an active listing.*

*Patterns of typical quarters and alternating years are subject to change. Don't rely on them for future years.*

*Projected schedules not yet available are highlighted in pink.*

*Wait for the Schedule of Classes or contact the department or instructor for info.*

Summer   Fall   Winter   Spring

BIOINFORMATICS AND SYSTEMS BIOLOGY CORE COURSES AND SEMINARS				
<b>Core Classes for BISB Track</b>				
Bioinformatics II: Introduction to Bioinformatics Algorithms (BENG 202/CSE 282)			X	
Bioinformatics III: Genomics, Proteomics, and Network Biology (BENG 203/CSE 283)				X
Bioinformatics IV: Statistical Methods in Bioinformatics (MATH 283)		X		
<b>For the fourth core class, choose one of</b>				
CSE 280A: Algorithms in Computational Biology			X	
CSE 284: Personal Genomics for Bioinformaticians			X	
ECE 208: Computational Evolutionary Biology				X
BNFO 286/MED 283: Network Biology and Biomedicine [Not offered 2023-24; next will be in 2024-25]				
<b>Seminars for BISB Track</b>				
BNFO 281: Seminar in Bioinformatics and Systems Biology		X	X	X
BNFO 283: Bioinformatics Student Research Talks		X	X	X

BIOMEDICAL INFORMATICS CORE COURSES AND SEMINARS				
<b>Core Classes for BMI Track</b>				
Bioinformatics II: Introduction to Bioinformatics Algorithms (BENG 202/CSE 282)			X	
MED 264: Principles of Biomedical Informatics [BMI students take this instead of BENG 203/CSE 283]		X		
Bioinformatics IV: Statistical Methods in Bioinformatics (MATH 283)		X		
<b>For the fourth core class, choose one of</b>				
CSE 280A: Algorithms in Computational Biology			X	
CSE 284: Personal Genomics for Bioinformaticians			X	
ECE 208: Computational Evolutionary Biology				X
BNFO 286/MED 283: Network Biology and Biomedicine [Not offered 2023-24; next will be in 2024-25]				
Bioinformatics III: Genomics, Proteomics, and Network Biology (BENG 203/CSE 283)				X
<b>Seminars for BMI Track</b>				
MED 262: Current Trends in Biomedical Informatics [BMI students take this instead of BNFO 281]		X	X	X
BNFO 283: Bioinformatics Student Research Talks		X	X	X

OTHER REQUIREMENTS (BOTH TRACKS)				
BNFO 294: Scientific Ethics [Must register on both Tritonlink and ethics.ucsd.edu]	*	X	X	X
Scientific Ethics Refresher every 4 years thereafter [No course number; register on ethics.ucsd.edu]	*	X	X	X
BNFO 298: Research Rotation	*	X	X	X
BNFO 299: Graduate Research	*	X	X	X
BNFO 500: Teaching Assistantship	*	X	X	X
* For summers, contact the Graduate Coordinator to record ethics/rotations/research/TAs, in lieu of course credit				

BIOLOGY ELECTIVES				
<b>Elective BIO-1: Biochemistry</b>				
BENG 230A: Biochemistry		X		
CHEM 209: Macromolecular Recognition		X		
CHEM 213A: Structure of Biomolecules and Biomolecular Assemblies		X		
CHEM 213B: Biophysical Chemistry of Macromolecules			X	
CHEM 216: Chemical Biology		X		
<b>Elective BIO-2: Molecular Genetics</b>				
BICD 100: Genetics	SU1,2	X	X	X
BGGN 206A: Concepts of Reasoning and Experimentation (CORE) I		X		
BGGN 220: Graduate Molecular Biology (4 units)		X		
BGGN 223: Graduate Genetics (4 units)				X
<b>Elective BIO-3: Cell Biology</b>				
BICD 110: Cell Biology		X	X	X
BICD 130: Embryos, Genes, and Development		X		
BGGN 222: Graduate Cell Biology <a href="#">[Still on the books, possibly discontinued]</a>				
CHEM 221 / BGGN 230: Signal Transduction				X

COMPUTER SCIENCE/MATH/STATISTICS ELECTIVES				
<b>Elective CS-1: Algorithms</b>				
CSE 101: Design and Analysis of Algorithms	SU2	X	X	X
CSE 200: Computability and Complexity		X		
CSE 202: Algorithm Design and Analysis		X	X	
CSE 280A: Algorithms in Computational Biology <a href="#">[Also a core option; may not be used as both core and elective]</a>			X	
Bioinformatics III: Genomics, Proteomics, and Network Biology (BENG 203/CSE 283) <a href="#">[Core for BISB, Elective CS-1 for BMI]</a>				X
MATH 261A: Probabilistic Combinatorics and Algorithms <a href="#">[Offered odd years in fall]</a>		X		
<b>Elective CS-2: Machine Learning and Data Mining</b>				
BNFO 285/BENG 285/ECE 204: Statistical Learning in Bioinformatics <a href="#">[Not offered 2023-24]</a>				
CSE 250A: Principles of Artificial Intelligence: Probabilistic Reasoning and Learning		X		
CSE 251A: Principles of Machine Learning: Learning Algorithms <a href="#">[Renumbered from CSE 250B]</a>			X	
CSE 251B: Principles of Machine Learning: Neural Networks for Pattern Recognition <a href="#">[Renumbered from CSE 253]</a>			X	X
CSE 255: Data Mining and Predictive Analytics <a href="#">[Not listed 2023-24]</a>				
CSE 258: Recommender Systems and Web Mining		X		
ECE 208: Computational Evolutionary Biology <a href="#">[Also a core option; may not be used as both core and elective]</a>				X
<b>Elective CS-3: Mathematics and Statistics</b>				
ECE 271A: Statistical Learning I		X		
MATH 274: Numerical Methods for Physical Modeling		X		
MATH 280A: Probability Theory		X		
MATH 281A: Mathematical Statistics		X		
MATH 281B: Mathematical Statistics			X	
MATH 281C: Mathematical Statistics				X
MATH 284: Survival Analysis				X
PHYS 210A: Equilibrium Statistical Mechanics (5 units)				X
PHYS 210B: Nonequilibrium Statistical Mechanics			X	

SYSTEMS BIOLOGY ELECTIVES				
<b>Elective SB-1: Biological Systems</b>				
BENG 211: Systems Biology and Bioengineering I: Biological Components		X		
BENG 212: Systems Biology and Bioengineering II: Large-Scale Data Analysis			X	
BENG 227: Transport Phenomena in Living Systems				X
BNFO 286/MED 283: Network Biology and Biomedicine [Not offered 2023-24; next will be in 2024-25] [Also a core option; may not be used as both core and elective]				
<b>Elective SB-2: Kinetic Modeling</b>				
BENG 125: Modeling and Computation in Bioengineering				X
BNFO 284: Nonlinear Dynamics in Quantitative Biology [Possibly discontinued]				
PHYS 276: Quantitative Molecular Biology			X	
CHEM 220: Regulatory Circuits in Cells [Possibly discontinued]				

BIOMEDICAL INFORMATICS ELECTIVES				
<b>Elective BMI-1: Biomedical Informatics</b>				
MED 263: Bioinformatics Applications to Human Disease (4 units)			X	
MED 264: Principles of Biomedical Informatics (4 units) [Core for BMI, elective for BISB]		X		
MED 265: Informatics in Clinical Environments (4 units) [Alternate years]				X
MED 267: Modeling Clinical Data and Knowledge for Computation (4 units)			X	
MED 268: Statistics Concepts for Biomedical Research (4 units)		X		
MED 276: Grant Proposal Writing Practicum (2 units) [Alternate years]				SP25
MED 277: Introduction to Biomedical Natural Language Processing (4 units)		X		

QUANTITATIVE BIOLOGY ELECTIVES				
<b>Elective QBIO-1: Quantitative Biology</b>				
BENG 226: Foundations of Bioengineering I: Tissue and Cell Properties			X	
BENG 235: Molecular Imaging and Quantitation in Living Cells				X
BGGN 214: Introduction to Q-Biology [May be applied to BIO area elective requirement] [Not listed 2023-24]				
BIOM 262/CMM 262/BGGN 237: Quantitative Methods in Genetics			X	
MAE 263: Experimental Methods in Cell Mechanics				X
PHYS 273: Information Theory and Pattern Formation in Biological Systems [Not listed 2023-24]				
PHYS 274: Stochastic Processes in Population Genetics [Not listed 2023-24]				
PHYS 275: Biological Physics		X		
PHYS 277: Physics of the Cell				X