College of Arts and Sciences, University of Oregon (Fall 2014)

Curriculum map

Department of Chemistry and Biochemistry/Chemistry Major

Learning outcomes (LOs): Having completed a major in Chemistry, a student will be able to:

1. Master a broad set of chemical concepts concerning the fundamentals in the basic areas of the discipline (organic, inorganic, analytical, physical and biochemistry). Students will demonstrate an understanding of structure, chemical properties, and reactions of chemicals and biomolecules.
2. Demonstrate a firm foundation in the conceptual, quantitative, and computational thinking that underlies the theories and models that form the basis for reasoning about molecular systems. Students should be able to connect this theoretical understanding to the experimental methods used to test those theories and models.
3. Demonstrate excellent critical thinking and problem solving abilities. S/he will be able to integrate chemical concepts and ideas learned in lecture courses with skills learned in laboratories to formulate hypotheses, propose and perform experiments, collect data, compile and interpret results and draw reasonable and logical conclusions. In addition, graduates will be able to rationally estimate the solution to a problem, apply appropriate techniques to arrive at a solution, test the correctness of the solution, and interpret their results.
4. Employ critical thinking and the scientific method to design, carry out, record, analyze and communicate the results of chemical/biochemical experiments. This includes the ability to identify or create an appropriate model, formulate a hypothesis, choose an appropriate set of tools and techniques, and design an experiment that tests the hypothesis and analyze the results from that experiment drawing sound scientific conclusions from the results obtained...
5. Develop the interpersonal skills to function cooperatively in a team setting.
6. Handle, synthesize, purify, and characterize new and existing substances. This includes knowing the proper procedures and regulations for the safe handling, use and disposal of chemicals.
7. Be proficient in the use of both classical and modern tools (e.g., instrumentation, techniques, software) for analysis of chemical systems. Demonstrate effective scientific communication skills, both orally and in writing, to a range of audience levels and for a variety of purposes.
8. Understand how scientific information is shared between peers in modern science, including responsible conduct for acknowledging prior and current contributions.
9. Demonstrate an awareness of the benefits and impacts of chemistry related to the environment, society, and other disciplines outside the scientific community. Be prepared to contribute solutions to society's challenges at the intersection of science and society.
10. Successfully pursue their career objectives in advanced education in professional and/or graduate schools, in a scientific career in government or industry, in a teaching career in the school systems, or in a related career following graduation.
11. Understand and apply ethics and values to all professional activities

    Library-In this context, they must be able to locate, identify and critically evaluate the chemical/biochemical literature.

Key: I = introduces outcome; D = develops outcome; A = assesses mastery of outcome

		Foundational Knowledge/Theory									*Performance/Skills Based*						*Affective*		
Course(s)	**Title/description**	**LO 1**	**Analytical**	**Biochemistry**	**Inorganic**	**Organic**	**Physical**	**Related Fields**	**LO 2**	**LO 3**	**LO 4**	**LO 5**	**LO 6**	**LO 7**	**LO 8**	**Library**	**LO 9**	**LO 10**	**LO 11**
Core Chemistry Courses																			
CH 221	General Chemistry (lecture)	I	I		I		I		I								I		
CH 222	General Chemistry (lecture)	I			I		I		I								I		
CH 223	General Chemistry (lecture)	ID	I				I		I								I		
CH 224H	Honors General Chemistry (lecture)	I	I	I	I	I	I	I	I	I	I	I		I	I	I	I		I
CH 225H	Honors General Chemistry (lecture)	ID	I	I	I	I	I	I	I	D	D	I		I	D	D	D		I
CH 226H	Honors General Chemistry (lecture)	ID	I	I	I	I	I	I	I	D	D	I		I	D	D	D		I
CH 227	General Chemistry Laboratory	I			I		I		I	I	I	I	I	I	I		I		
CH 228	General Chemistry Laboratory	ID	D				I		I	D	I	I	I	I	I		I		
CH 229	General Chemistry Laboratory	ID	D				I		I	D	I	I	I	I	I		I		
CH 237	Advanced General Chemistry Laboratory	I	I		I				I	I	I		I	I	I				
CH 238	Advanced General Chemistry Laboratory	I	I	I	I		I		D	D	D		D	D	I	I			
CH 239	Advanced General Chemistry Laboratory	I		I	I		I		D	D	D		D	DA	I	I		I	
CH 331	Organic Chemistry I (lecture)	I				I			D	D									
CH 335	Organic Chemistry II (lecture)	ID		I		D			D	D									
CH 336	Organic Chemistry III (lecture)	ID		I		D			D	D									
CH 337	Organic Chemistry Laboratory	I	I			I			I	I	I	D	I	I	I		D		I
CH 338	Organic Chemistry Laboratory	ID	I			D			I	D	I	D	D	I	I		A		I
CH 341	Majors Track Organic Chemistry I (lecture)	I				I			I	I							I		
CH 342	Majors Track Organic Chemistry I (lecture)	D				D			D	D							D		
CH 343	Majors Track Organic Chemistry I (lecture)	D				D			D	D							D		
CH 348	Organic Chemistry Lab for Majors	D	D			D			D	D	D	D	D	D	D	I	D		I
CH 349	Organic Chemistry Lab for Majors	DA	D			A			A	A	A	A	D	A	A	D	D		I
CH 360	Physiological Biochemistry (lecture)	ID		ID					I	I					I		I		
CH 401	Research (laboratory)	***DA-specific learning outcomes are dependent on individual project***							DA	DA	DA	DA	DA	DA	D	DA	DA	D	D
CH 411	Physical Chemistry: Thermodynamics (lecture)	D					D		D	D	D	D				D	D	D	D
CH 412	Physical Chemistry: Kinetics (lecture)	DA					DA		DA	DA							D	D	D
CH 413	Physical Chemistry: Quantum Mechanics (lecture)	DA					DA		DA	DA							D	D	D
CH 417,418,419	Physical Chemistry Laboratory	I							ID	D	D	D	D	D	D	D	D		
CH 429	Instrumental Analysis: Laboratory	DA	DA		A		A	A	DA	DA	DA		D	DA	DA	A	D	D	D
Other Degree Requirements																			
PHYS 201, 202, 203 OR 251, 252, 253	General Physics (lecture) OR Foundations of Physics (lecture)								I	I					I				
PHYS 204, 205, 206 OR 290	Introductory Physics Laboratory OR Foundations of Physics Laboratory								ID	ID		I			ID				
MTH 251, 252, 253	Calculus I, II, III (lecture)								I										
MTH 256	Introduction to Differential Equations (lecture)								ID										
MTH 281	Several-Variable Calculus I (lecture)								ID										

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		Foundational Knowledge/Theory									Performance/Skills Based						Affective		
Course(s)	Title/description	LO 1	Analytical	Biochemistry	Inorganic	Organic	Physical	Related Fields	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	Library	LO 9	LO 10	LO 11
Advanced Electives																			
CH 410	Electrochemistry (lecture/lab)	DA	A		D	D	A		A	A	A	D		A	D	A	D		D
CH 410	Biochemistry of Disease (lecture)	ID		ID					ID	IDA				DA	D	DA	ID		
CH 410	Structural Biochemistry (lecture)	DA		DA					DA	IDA				DA	D	DA	ID		
CH 410	Cytoskeleton (lecture)	DA		DA					DA	IDA				DA	D	DA	ID		
CH 410	Biophysics & Evolution (lecture)	DA		DA					DA	IDA				DA	D	DA	ID		
CH 420	Physical Organic Chemistry I (lecture)	A				A			A	A						A			D
CH 421	Physical Organic Chemistry II (lecture)	A				A			A	A						A			D
CH 431	Inorganic Chemistry (lecture)	A				A			A	A	A				A	A	A		
CH 432	Inorganic Chemistry: Bioinorganic Chemistry (lecture)	DA		D	A		D		A	A	A			A	A	A	A		A
CH 433	Inorganic Chemistry: Solid-state Chemistry (lecture)	A			A				A	A	A			A	A	A	A		A
CH 437	Inorganic Chemistry Laboratory	A			A				A	A	A	A	A	A	D	A	D	D	D
CH 441	Quantum Chemistry (lecture)	DA					DA		DA	DA	DA	DA				DA	DA	DA	DA
CH 442	Quantum Chemistry (lecture)	DA					DA		DA	DA	DA	DA				DA	DA	DA	DA
CH 443	Quantum Chemistry and Spectroscopy (lecture)	DA					DA		DA	DA	DA	DA				DA	DA	DA	DA
CH 444	Chemical Thermodynamics (lecture)	DA					DA		DA	DA	DA	DA				DA	DA	DA	DA
CH 445	Statistical Mechanics (lecture)	DA					DA	DA	DA	DA	DA	D				D	D		
CH 446	Chemical Kinetics (lecture)	DA					DA		DA	DA	DA					DA			
CH 447	Computational Chemistry (lecture/lab)	DA		D	D	D	IDA		IDA	IDA	IDA					DA		D	
CH 452	Advanced Organic Chemistry: Stereochemistry and Reactions (lecture)	A							A	A						A			D
CH 461	Biochemistry: Structure and Function Macromolec (lecture)	DA		DA					ID	DA		DA		ID	ID	DA	ID		
CH 462	Biochemistry: Metabolism (lecture)	DA		DA					DA	DA		DA		D	D	DA	ID		
CH 463	Biochemistry: Mechanisms of Regulation (lecture)	DA		DA					DA	DA		DA		D	D	DA	ID		
CH 464	RNA Biochemistry (lecture)	DA		DA					ID	DA				DA	D	DA	ID		
CH 465	Physical Biochemistry (lecture)	DA		DA					DA	DA				DA	D	DA	ID		
CH 467	Biochemistry Laboratory	DA		DA					DA	DA	D	DA	ID	IDA	D	DA	ID	DA	ID
GEOL 471	Thermodynamic Geochemistry (lecture)				DA			IDA		DA									
GEOL 472	Aqueous-Mineral-Gas Equilibria (lecture)				DA			IDA		DA									
GEOL 473	Isotope Geochemistry (lecture)				DA			IDA		DA									
PHYS 412, 413	Mechanics, Electricity, and Magnetism (lecture)				DA			DA		DA									
PHYS 414, 415	Quantum Physics (lecture)				DA			DA		DA									

Learning outcomes explanations
Department of Chemistry and Biochemistry/Chemistry Major

Majors in chemistry and biochemistry provide training for students planning careers in the chemical and biological sciences and also for those in biology, health related disciplines, earth sciences, secondary education, business, journalism and law. Approximately one quarter of the UO undergraduate population will take a course in the Department of Chemistry and Biochemistry. The Department's curriculum is designed to satisfy the diverse needs of all these students.

Chemistry and biochemistry graduates complete an integrated, rigorous program that includes foundational course work in chemistry and biochemistry and additional course work in related fields. The ACS-certified degree further emphasizes laboratory experience and the development of professional skills. Undergraduate research and other educational activities outside the traditional classroom are essential components of these majors. Undergraduate majors also benefit from taking graduate courses in synthetic, physical, materials, computational chemistry, biochemistry molecular biology and modern instrumental techniques.

Graduates of our program will have a robust set of fundamental competencies that are knowledge-based, performance/skills-based, and affective.

Foundational knowledge/theory

All our graduates will be able to:

- Master a broad set of chemical concepts concerning the fundamentals in the basic areas of the discipline (organic, inorganic, analytical, physical and biochemistry). Students will demonstrate an understanding of structure, chemical properties, and reactions of chemicals and biomolecules.

- Demonstrate a firm foundation in the conceptual, quantitative, and computational thinking that underlies the theories and models that form the basis for reasoning about molecular systems. Students should be able to connect this theoretical understanding to the experimental methods used to test those theories and models.

- Demonstrate excellent critical thinking and problem solving abilities. S/he will be able to integrate chemical concepts and ideas learned in lecture courses with skills learned in laboratories to formulate hypotheses, propose and perform experiments, collect data, compile and interpret results and draw reasonable and logical conclusions. In addition, graduates will be able to rationally estimate the solution to a problem, apply appropriate techniques to arrive at a solution, test the correctness of the solution, and interpret their results.

Performance/Skills-Based

All our graduates will be able to:

- Employ critical thinking and the scientific method to design, carry out, record, analyze and communicate the results of chemical/biochemical experiments. This includes the ability to identify or create an appropriate model, formulate a hypothesis, choose an appropriate set of tools and techniques, and design an experiment that tests the hypothesis and analyze the results from that experiment drawing sound scientific conclusions from the results obtained. In this context, they must be able to locate, identify and critically evaluate the chemical/biochemical literature.

- Develop the interpersonal skills to function cooperatively in a team setting.

- Handle, synthesize, purify, and characterize new and existing substances. This includes knowing the proper procedures and regulations for the safe handling, use and disposal of chemicals.

- Be proficient in the use of both classical and modern tools (e.g., instrumentation, techniques, software) for analysis of chemical systems. Demonstrate effective scientific communication skills, both orally and in writing, to a range of audience levels and for a variety of purposes.

- Understand how scientific information is shared between peers in modern science, including responsible conduct for acknowledging prior and current contributions.

Affective

All our graduates will be able to:

- Demonstrate an awareness of the benefits and impacts of chemistry related to the environment, society, and other disciplines outside the scientific community. Be prepared to contribute solutions to society's challenges at the intersection of science and society.

- Successfully pursue their career objectives in advanced education in professional and/or graduate schools, in a scientific career in government or industry, in a teaching career in the school systems, or in a related career following graduation.

- Understand and apply ethics and values to all professional activities.

General Education offerings

Department of Chemistry and Biochemistry

Our general education offerings are designed to enable individuals to form a solid foundation in the conceptual and quantitative thinking that underlies the theories and models that form the basis for reasoning about chemical phenomena.

By introducing and developing a broad set of chemical concepts students will demonstrate an understanding of structure, chemical properties, and reactions of chemicals and biomolecules. Students learn to connect this theoretical understanding to the experimental methods used to test those theories and models. In addition, students will be able to rationally estimate the solution to a problem, apply appropriate techniques to arrive at a solution, test the correctness of the solution and interpret their results.

Our curriculum is infused with strategies and opportunities that enable students to understand how scientific information benefits and impacts society, the environment, and other disciplines outside the scientific community. As students practice critical thinking and become acquainted with the scientific method to analyze and communicate the results of chemical/biochemical experiments, they begin to understand and apply ethics in a multifaceted context of knowledge creation and the impact of that knowledge on society. Our students are prepared to contribute solutions to society's challenges at the intersection of science and society.

Our courses support the development of interpersonal skills to function cooperatively in a team setting and enable students to develop effective scientific communication skills, both orally and in writing to a range of audience levels and for a variety of purposes.

Curriculum map

Department of Chemistry and Biochemistry/Biochemistry Major

Learning outcomes (LOs): Having completed a major in Biochemistry, a student will be able to:

1. Master a broad set of chemical concepts concerning the fundamentals in the basic areas of the discipline (organic, inorganic, analytical, physical and biochemistry). Students will demonstrate an understanding of structure, chemical properties, and reactions of chemicals and biomolecules.
2. Demonstrate a firm foundation in the conceptual, quantitative, and computational thinking that underlies the theories and models that form the basis for reasoning about molecular systems. Students should be able to connect this theoretical understanding to the experimental methods used to test those theories and models.
3. Demonstrate excellent critical thinking and problem solving abilities. S/he will be able to integrate chemical concepts and ideas learned in lecture courses with skills learned in laboratories to formulate hypotheses, propose and perform experiments, collect data, compile and interpret results and draw reasonable and logical conclusions. In addition, graduates will be able to rationally estimate the solution to a problem, apply appropriate techniques to arrive at a solution, test the correctness of the solution, and interpret their results.
4. Employ critical thinking and the scientific method to design, carry out, record, analyze and communicate the results of chemical/biochemical experiments. This includes the ability to identify or create an appropriate model, formulate a hypothesis, choose an appropriate set of tools and techniques, and design an experiment that tests the hypothesis and analyze the results from that experiment drawing sound scientific conclusions from the results obtained...
5. Develop the interpersonal skills to function cooperatively in a team setting.
6. Handle, synthesize, purify, and characterize new and existing substances. This includes knowing the proper procedures and regulations for the safe handling, use and disposal of chemicals.
7. Be proficient in the use of both classical and modern tools (e.g., instrumentation, techniques, software) for analysis of chemical systems. Demonstrate effective scientific communication skills, both orally and in writing, to a range of audience levels and for a variety of purposes.
8. Understand how scientific information is shared between peers in modern science, including responsible conduct for acknowledging prior and current contributions.
9. Demonstrate an awareness of the benefits and impacts of chemistry related to the environment, society, and other disciplines outside the scientific community. Be prepared to contribute solutions to society's challenges at the intersection of science and society.
10. Successfully pursue their career objectives in advanced education in professional and/or graduate schools, in a scientific career in government or industry, in a teaching career in the school systems, or in a related career following graduation.
11. Understand and apply ethics and values to all professional activities

    Library-In this context, they must be able to locate, identify and critically evaluate the chemical/biochemical literature

Key: I = introduces outcome; D = develops outcome; A = assesses mastery of outcome

		Foundational Knowledge/Theory									Performance/Skills Based						Affective		
Course(s)	Title/description	LO 1	Analytical	Biochemistry	Inorganic	Organic	Physical	Related Fields	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	Library	LO 9	LO 10	LO 11
Core Chemistry Courses																			
CH 221	General Chemistry (lecture)	I	I		I		I		I								I		
CH 222	General Chemistry (lecture)	I			I		I		I								I		
CH 223	General Chemistry (lecture)	ID	I				I		I								I		
CH 224H	Honors General Chemistry (lecture)	I	I	I	I	I	I	I	I	I	I	I		I	I	I	I		I
CH 225H	Honors General Chemistry (lecture)	ID	I	I	I	I	I	I	I	D	D	I		I	D	D	D		I
CH 226H	Honors General Chemistry (lecture)	ID	I	I	I	I	I	I	I	D	D	I		I	D	D	D		I
CH 227	General Chemistry Laboratory	I			I		I		I	I	I	I	I	I	I		I		
CH 228	General Chemistry Laboratory	ID	D				I		I	D	I	I	I	I	I		I		
CH 229	General Chemistry Laboratory	ID	D				I		I	D	I	I	I	I	I		I		
CH 237	Advanced General Chemistry Laboratory	I	I		I				I	I	I		I	I	I				
CH 238	Advanced General Chemistry Laboratory	I	I	I	I		I		D	D	D		D	D	I	I			
CH 239	Advanced General Chemistry Laboratory	I		I	I		I		D	D	D		D	DA	I	I		I	
CH 331	Organic Chemistry I (lecture)	I				I			D	D									
CH 335	Organic Chemistry II (lecture)	ID		I		D			D	D									
CH 336	Organic Chemistry III (lecture)	ID		I		D			D	D									
CH 337	Organic Chemistry Laboratory	I	I			I			I	I	I	D	I	I	I		D		I
CH 338	Organic Chemistry Laboratory	ID	I			D			I	D	I	D	D	I	I		A		I
CH 341	Majors Track Organic Chemistry I (lecture)	I				I			I	I							I		
CH 342	Majors Track Organic Chemistry I (lecture)	D				D			D	D							D		
CH 343	Majors Track Organic Chemistry I (lecture)	D				D			D	D							D		
CH 348	Organic Chemistry Lab for Majors	D	D			D			D	D	D	D	D	D	D	I	D		I
CH 401	Research (laboratory)	***DA-specific learning outcomes are dependent on individual project***							DA	DA	DA	DA	DA	DA	D	DA	DA	D	D
CH 411	Physical Chemistry: Thermodynamics (lecture)	D					D		D	D	D	D				D	D	D	D
CH 412	Physical Chemistry: Kinetics (lecture)	DA					DA		DA	DA							D	D	D
CH 417	Physical Chemistry Laboratory	I							ID	D	D	D	D	D	D	D	D		
CH 461	Biochemistry: Structure and Function Macromolec (lecture)	DA		DA					ID	DA		DA		ID	ID	DA	ID		
CH 462 Biochem	Biochemistry: Metabolism (lecture)	DA		DA					DA	DA		DA		D	D	DA	ID		
CH 463 Biochem	Biochemistry: Mechanisms of Regulation (lecture)	DA		DA					DA	DA		DA		D	D	DA	ID		
CH 467 Biochem Lab	Biochemistry Laboratory	DA		DA					DA	DA	D	DA	ID	IDA	D	DA	ID	DA	ID
Other Degree Requirements																			
PHYS 201, 202, 203 OR 251, 252, 253	General Physics (lecture) OR Foundations of Physics (lecture)								I	I					I				
PHYS 204, 205, 206 OR 290	Introductory Physics Laboratory OR Foundations of Physics Laboratory								ID	ID		I			ID				
MTH 251, 252, 253	Calculus I, II, III (lecture)								I										
BI 281H	Honors Biology I: Cells, Biochemistry and Physiology (lecture/lab)	ID		ID		I		I	ID	ID	ID	ID		ID	ID				
BI 282H	Honors Biology II: Genetics and Molecular Biology (lecture/lab)	ID		ID				I	ID	ID	ID	ID		ID	ID				
BI 320	Molecular Genetics (lecture)	ID		ID				ID	ID	ID									

Continued on next page

		Foundational Knowledge/Theory									Performance/Skills Based						Affective		
Course(s)	Title/description	LO 1	Analytical	Biochemistry	Inorganic	Organic	Physical	Related Fields	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	Library	LO 9	LO 10	LO 11
Advanced Electives																			
CH 410	Electrochemistry (lecture/lab)	DA	A		D	D	A		A	A	A	D		A	D	A	D		D
CH 410	Biochemistry of Disease (lecture)	ID		ID					ID	IDA				DA	D	DA	ID		
CH 410	Structural Biochemistry (lecture)	DA		DA					DA	IDA				DA	D	DA	ID		
CH 410	Cytoskeleton (lecture)	DA		DA					DA	IDA				DA	D	DA	ID		
CH 410	Biophysics & Evolution (lecture)	DA		DA					DA	IDA				DA	D	DA	ID		
CH 420	Physical Organic Chemistry I (lecture)	A				A			A	A						A			D
CH 421	Physical Organic Chemistry II (lecture)	A				A			A	A						A			D
CH 429	Instrumental Analysis: Laboratory	DA	DA		A		A	A	DA	DA	DA		D	DA	DA	A	D	D	D
CH 431	Inorganic Chemistry (lecture)	A				A			A	A	A				A	A	A		
CH 432	Inorganic Chemistry: Bioinorganic Chemistry (lecture)	DA		D	A		D		A	A	A			A	A	A	A		A
CH 433	Inorganic Chemistry: Solid-state Chemistry (lecture)	A			A				A	A	A			A	A	A	A		A
CH 437	Inorganic Chemistry Laboratory	A			A				A	A	A	A	A	A	D	A	D	D	D
CH 441	Quantum Chemistry (lecture)	DA					DA		DA	DA	DA	DA				DA	DA	DA	DA
CH 442	Quantum Chemistry (lecture)	DA					DA		DA	DA	DA	DA				DA	DA	DA	DA
CH 443	Quantum Chemistry and Spectroscopy (lecture)	DA					DA		DA	DA	DA	DA				DA	DA	DA	DA
CH 444	Chemical Thermodynamics (lecture)	DA					DA		DA	DA	DA	DA				DA	DA	DA	DA
CH 445	Statistical Mechanics (lecture)	DA					DA	DA	DA	DA	DA	D				D	D		
CH 446	Chemical Kinetics (lecture)	DA					DA		DA	DA	DA					DA			
CH 447	Computational Chemistry (lecture/lab)	DA		D	D	D	IDA		IDA	IDA	IDA					DA		D	
CH 452	Advanced Organic Chemistry: Stereochemistry and Reactions (lecture)	A							A	A						A			D
CH 464	RNA Biochemistry (lecture)	DA		DA					ID	DA				DA	D	DA	ID		
CH 465	Physical Biochemistry (lecture)	DA		DA					DA	DA				DA	D	DA	ID		
Advanced Electives																			
BI 321	Molecular Genetics Research Laboratory	ID						ID		ID									
BI 322	Cell Biology (lecture)	ID						ID		ID									
BI 328	Developmental Biology (lecture)	ID						ID		ID									
BI 360	Neurobiology (lecture)	ID						ID		ID									
BI 422	Protein Toxins in Cell Biology (lecture)	DA						DA		ID									
BI 423	Human Molecular Genetics (lecture)	DA						DA		ID									
BI 424	Advanced Molecular Genetics (lecture)	DA						DA		ID									
BI 426	Genetics of Cancer (lecture)	DA						DA		ID									
BI 428	Developmental Genetics (lecture)	DA						DA		ID									
BI 433	Bacterial-Host Interactions (lecture)	IDA						IDA		ID									
BI 461	Systems Neuroscience (lecture)	IDA						IDA		ID									
BI 463	Cellular Neuroscience (lecture)	IDA						IDA		ID									
BI 466	Developmental Neurobiology (lecture)	IDA						IDA		ID									
BI 480	Evolution of Development (lecture)							IDA		ID									
BI 484	Molecular Evolution (lecture)							DA		ID									
BI 487	Molecular Phylogenetics (lecture)							IDA		ID									
BI 493	Genomic Approaches and Analysis (lecture)							IDA		ID									

Learning outcomes explanations
Department of Chemistry and Biochemistry/Biochemistry Major

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Performance/Skills-Based

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Affective

All our graduates will be able to:

- Demonstrate an awareness of the benefits and impacts of chemistry related to the environment, society, and other disciplines outside the scientific community. Be prepared to contribute solutions to society's challenges at the intersection of science and society.

- Successfully pursue their career objectives in advanced education in professional and/or graduate schools, in a scientific career in government or industry, in a teaching career in the school systems, or in a related career following graduation.

- Understand and apply ethics and values to all professional activities.

General Education offerings

Department of Chemistry and Biochemistry

Our general education offerings are designed to enable individuals to form a solid foundation in the conceptual and quantitative thinking that underlies the theories and models that form the basis for reasoning about chemical phenomena.

By introducing and developing a broad set of chemical concepts students will demonstrate an understanding of structure, chemical properties, and reactions of chemicals and biomolecules. Students learn to connect this theoretical understanding to the experimental methods used to test those theories and models. In addition, students will be able to rationally estimate the solution to a problem, apply appropriate techniques to arrive at a solution, test the correctness of the solution and interpret their results.

Our curriculum is infused with strategies and opportunities that enable students to understand how scientific information benefits and impacts society, the environment, and other disciplines outside the scientific community. As students practice critical thinking and become acquainted with the scientific method to analyze and communicate the results of chemical/biochemical experiments, they begin to understand and apply ethics in a multifaceted context of knowledge creation and the impact of that knowledge on society. Our students are prepared to contribute solutions to society's challenges at the intersection of science and society.

Our courses support the development of interpersonal skills to function cooperatively in a team setting and enable students to develop effective scientific communication skills, both orally and in writing to a range of audience levels and for a variety of purposes.