

Fiscal Unit/Academic Org	Biochemistry - D0310
Administering College/Academic Group	Arts And Sciences
Co-administering College/Academic Group	
Semester Conversion Designation	Re-envisioned with significant changes to program goals and/or curricular requirements (e.g., degree/major name changes, changes in program goals, changes in core requirements, structural changes to tracks/options/courses)
Current Program/Plan Name	Biochemistry Minor
Proposed Program/Plan Name	Biochemistry Minor
Program/Plan Code Abbreviation	BIOCHEM-MN
Current Degree Title	

Credit Hour Explanation

Program credit hour requirements		A) Number of credit hours in current program (Quarter credit hours)	B) Calculated result for 2/3rds of current (Semester credit hours)	C) Number of credit hours required for proposed program (Semester credit hours)	D) Change in credit hours
Total minimum credit hours required for completion of program		32	21.3	23	1.7
Required credit hours offered by the unit	Minimum	17	11.3	13	1.7
	Maximum	20	13.3	15	1.7
Required credit hours offered outside of the unit	Minimum	12	8.0	8	0.0
	Maximum	15	10.0	10	0.0
Required prerequisite credit hours not included above	Minimum	35	23.3	23	0.3
	Maximum	35	23.3	23	0.3

Program Learning Goals

Note: these are required for all undergraduate degree programs and majors now, and will be required for all graduate and professional degree programs in 2012. Nonetheless, all programs are encouraged to complete these now.

Program Learning Goals

- 1.1 Demonstrate an understanding of Mendelian, molecular, and population genetics, as well as molecular biology.
- 1.2 Discuss evolution, ecology, and organismal biology as a broader context for biochemical processes.
- 2.1 Understand the chemical, mathematical, and physical concepts required to describe biological processes.
- 2.2 Explain biochemical processes using the relevant chemical, mathematical, and physical concepts, including thermodynamics and kinetics.
- 2.3 Identify and reproduce the structures of biological molecules such as polypeptides, nucleic acids, carbohydrates, and lipids.
- 2.4 Explain how macromolecular structure and dynamics determine biological function of a biomolecule or biomolecular complex.
- 2.5 Describe the relative merits of various methods to determine molecular structure and dynamics.
- 2.6 Illustrate an understanding of enzyme mechanisms and enzyme function, including the ability to utilize Michaelis-Menten kinetics.
- 3.1 Describe how enzymes and other biological molecules interact in metabolic pathways to carry out dynamic chemical changes in cells, including an understanding of feedback loops and energy flow, and how these relate to metabolic disorders.
- 3.2 Describe the regulation and control of gene expression, DNA repair, and DNA replication.
- 4.1 Demonstrate an understanding of the scientific method as it applies to the design of experiments and analysis of outcomes.
- 4.2 Conduct standard biochemical experiments in the laboratory and draw conclusions from experimental data.
- 4.3 Design appropriate experimental approaches to a biochemical problem using the theoretical basis for common laboratory experiments and procedures.
- 4.4 Communicate scientific concepts clearly and concisely, orally and in writing, including knowledge of scientific writing and presentation styles.
- 4.5 Understand the relationship of the major area to broader areas of science.
- 4.6 Interpret research seminars and articles from the current literature to demonstrate broader comprehension of research methods in Biochemistry.

Assessment

Assessment plan includes student learning goals, how those goals are evaluated, and how the information collected is used to improve student learning. An assessment plan is required for undergraduate majors and degrees. Graduate and professional degree programs are encouraged to complete this now, but will not be required to do so until 2012.

Is this a degree program (undergraduate, graduate, or professional) or major proposal? Yes

Does the degree program or major have an assessment plan on file with the university Office of Academic Affairs? Yes

Summarize how the program's current quarter-based assessment practices will be modified, if necessary, to fit the semester calendar.

The assessment plan for the Biochemistry major and minor programs consists of a combination of embedded testing, laboratory reports, colloquium evaluations, Senior thesis (Honors), syllabus review, ASC Senior surveys, and student evaluation of instruction (SEI) for all courses.

The assessment process was evaluated during the summer of 2009 by the NMS Division of the College of Arts and Sciences (report is on file). Although the review panel found aspects for improvement, the report stated, "In almost all cases, the minimal criteria for the goals and objectives were met and often exceeded. A highlight of student achievement was the extensive participation by biochemistry students in undergraduate research."

The assessment methods utilized for each learning outcome and associated course(s) were evaluated during that review. A brief summary of the assessment procedures is provided in a table included in the "Attachment" section.

These data are regularly used for curriculum development and to modify course content as needed as well as to establish trends over time and among instructors and as part of annual faculty/instructor review of course delivery and effectiveness of instruction.

No significant modifications are envisioned during the conversion to the semester system, however

Program Specializations/Sub-Plans

If you do not specify a program specialization/sub-plan it will be assumed you are submitting this program for all program specializations/sub-plans.

Pre-Major

Does this Program have a Pre-Major? No

Attachments

- Biochemistry Minor Program Request Attachments.pdf: Attachments (letter, rationale, advising, etc)

(Program Proposal. Owner: Swenson, Richard Paul)

- Curriculum Map for Biochemistry Minor.pdf: Curricular Map - Minor

(Curricular Map(s). Owner: Swenson, Richard Paul)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Swenson, Richard Paul	01/24/2011 03:34 PM	Submitted for Approval
Approved	Swenson, Richard Paul	01/27/2011 04:52 PM	Unit Approval
Pending Approval	Andereck, Claude David	01/27/2011 04:52 PM	College Approval



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Memo

To: Office of Academic Affairs
From: Mark P. Foster, Interim Chair, Department of Biochemistry
Date: 1/3/2011
Re: Semester Conversion Proposal – Biochemistry Minor

The Department of Biochemistry has the following programs to be converted for the quarter to semester system:

- The Undergraduate Biochemistry major (B.S. degree)
- The Undergraduate Biochemistry major (B.A. degree)
- The Undergraduate Biochemistry minor
- The Graduate Masters Degree (Thesis Option)
- The Graduate Ph.D. Degree (This program is administered by the campus-wide Ohio State Biochemistry Program)

The subject of this proposal is the Undergraduate Biochemistry Minor. Other programs will be submitted separately either by this department or the OSBP.

Prof. Richard P. Swenson served as the Department's Semester Conversion Coordinator. The process began during the fall, 2009 and proceeded through the academic year. Dr. Swenson met regularly with the Department's Curriculum Committee and individually or in groups with the course instructors over this time to obtain both a broad and course specific perspective on the conversion of our undergraduate curriculum and major.

The proposed course conversions and associated changes to the major were discussed at several faculty meetings and final unanimous faculty approval for the undergraduate curriculum conversion was given at the April 7, 2010 meeting.

Program Rationale.

The Biochemistry major (both B.S. and B.A. degree options) and minor were evaluated in 2007 as part of an internal departmental review. The overall conclusion that was reached was that the structure of the major was serving our students well. This conclusion was supported by the Colleges of the Arts and Sciences-instituted exit survey of graduating students in 2006 which indicated that the majority of the students responding were satisfied with the biochemistry coursework and quality of instruction. The structure of the major is built on a solid foundation of prerequisite courses in the physical and biological sciences and mathematics followed by a set of core courses that delve into the molecular biosciences in greater detail while providing the chemical and mathematical tools that are critical to the field of biochemistry. These prerequisite courses along with organic chemistry and advanced calculus are typically completed within the first two years of the program. Students then generally begin their core biochemistry courses during their third year.

With one exception discussed below, the basic core of the curriculum was left largely unaltered during the conversion to the semester format. Most of the prerequisites, non-departmental and departmental core courses will be converted directly following the 2/3 conversion process. Many of the prerequisites are currently three-quarter series and these will straightforwardly transition into a two-semester series format. It is presumed that content will remain largely as is within this format. .

The three-quarter core biochemistry series (Biochemistry 613-614-615) will be expanded to a three-semester series as described and justified within the major (B.S. degree) program request. These changes will not be repeated here. No other changes in the course requirements for the minor are planned.

SUMMARY OF QUARTER TO SEMESTER CONVERSION OF ALL BIOCHEMISTRY COURSES LISTED IN "BOOK 3"

Current Course Number	Current Quarter Credit Hours	Level	Course Number	Suffix	Course Title	Transcript Abbreviation	Semstr Credit Hours	Fixed OR Variable Min	Variable Max	Repeatable?	Credit Hours/ Units Allowed	14 week	7 Week	4 Week (May/term)	12 Week (May + Summer)
H200	2	Undergrad	1200.	Honors	Early Experience in Research in Biochemistry: Seminar	Early Resrch Semin	Fixed	1.0		No		Yes			
H201		Undergrad	1201.	Honors	Early Experience in Research in Biochemistry: Laboratory	Early Resrch Lab	Variable	1.0	3.0	No		Yes			
294		Undergrad	2194.		Group Studies	Group Studies	Variable	1.0	4.0	Yes	8	Yes	Yes	Yes	Yes
211/212	6	Undergrad	2210.		Elements of Biochemistry	Elem Of Biochem	Fixed	4.0		No		Yes			
698.01		Undergrad	3798.01		Study Tour: Domestic	Study Tour-Domesti	Variable	1.0	10.0	Yes	99	Yes	Yes	Yes	Yes
698.02		Undergrad	3798.02		Study Tour: Foreign	Study Tour-Foreign	Variable	1.0	10.0	Yes	99	Yes	Yes	Yes	Yes
693		Undergrad	4193.		Individual Studies	Individual Studies	Variable	1.0	7.0	Yes	28	Yes	Yes	Yes	Yes
694		Undergrad	4194.		Group Studies	Group Studies	Variable	1.0	4.0	Yes	16	Yes	Yes	Yes	Yes
511	5	Undergrad	4511.		Introduction to Biological Chemistry	Intro To Biol Chem	Fixed	4.0		No		Yes			
591	2	Undergrad	4591.		DNA Finger Printing Workshops in Columbus Public Schools	DNA Fingr Prnt CPS	Fixed	1.0		Yes	4				
699		Undergrad	4998.		Undergraduate Research in Biochemistry	Undergrad Research	Variable	1.0	10.0	Yes	10	Yes	Yes		Yes
H783		Undergrad	4999.	Honors	Honors Thesis Research	Honors Research	Variable	1.0	3.0	Yes	10	Yes	Yes		Yes
613	4	Undergrad	5613.		Biochemistry and Molecular Biology I	Biochem&Mol Biol 1	Fixed	3.0		No		Yes			
614	4	Undergrad	5614.		Biochemistry and Molecular Biology II	Biochem&Mol Biol 2	Fixed	3.0		No		Yes			
615	4	Undergrad	5615.		Biochemistry and Molecular Biology III	Biochem&Mol Biol 3	Fixed	3.0		No		Yes			
521	5	Undergrad	5621.		Biochemistry and Molecular Biology Laboratory	Biochem/MolBio Lab	Fixed	4.0		No		Yes			
H521	5	Undergrad	5621.	Honors	Biochemistry and Molecular Biology Laboratory	Biochem/MolBio Lab	Fixed	4.0		No		Yes			
721.01/.02	4.5	Undergrad	5721.		Physical Biochemistry I	Physical Biochem 1	Fixed	3.0		No		Yes			
721.02/.03	4.5	Undergrad	5722.		Physical Biochemistry II	Physical Biochem 2	Fixed	3.0		No		Yes			
(701)/702	6	Graduate	6701.		DNA Transactions; Regulation of Gene Expression	Regul Gene Express	Fixed	4.0		No		Yes			
706	5	Graduate	6706.		Advanced Biological Chemistry Lab	Adv Biol Chem Lab	Fixed	4.0		No		Yes			
708		Graduate			Protein and Enzyme Laboratory [DISCONTINUE]										
710		Graduate			Molecular Biology Laboratory [DISCONTINUE]										
761/766	6	Graduate	6761.		Advanced Biochemistry: Macromolecular Structure and Function	AdvBiochm-Macromol	Fixed	3.0		No		Yes			
762	3	Graduate	6762.		Advanced Biochemistry: Enzymes	AdvBiochm-Enzymes	Fixed	1.5		No		No	Yes		
763	2	Graduate	6763.		Advanced Biochemistry: Membranes and Lipids	AdvBiochm-Membrane	Fixed	1.5		No		No	Yes		
785		Graduate	6785.		Research Principles and Techniques	Res Prins & Techs	Variable	1.0	7.0	Yes	28	Yes	Yes		
795		Graduate	6795.		Special Topics in Biochemistry	Spcl Tpcs Biochem	Variable	1.0	2.0	Yes	28	Yes	Yes		
850	2	Graduate	6850.		Seminar in Biological Chemistry	Biochem Seminar	Fixed	1.0		Yes	28	Yes			
735/736	6	Graduate	6735.		Plant Biochemistry	Plant Biochemistry	Fixed	3.0		No		Yes			
764	3	Graduate	7764.		Advanced Biochemistry: Metabolism and Synthetic Biology	AdvBiochm-Metabol	Fixed	2.0		No		Yes			
765	3	Graduate	7765.		Advanced Biochemistry: Physical Biochemistry*	AdvBiochm-Physical	Fixed	3.0		No		Yes			
770	3	Graduate	7770.		Advanced Biochemistry: Protein Engineering	Protein Engineerng	Fixed	2.0		No		Yes			
775	3	Graduate	7775.		Biophysical Chemistry	Biophysical Chem	Fixed	2.0		No		Yes			
821	3	Graduate	8821.		Advanced Enzymology	Adv Enzymes	Fixed	2.0		No		Yes			
890		Graduate			Interdepartmental Seminar in MCDB [DISCONTINUE]										
892		Graduate			Interdepartmental Seminar in Plant Physiol [DISCONTINUE]										
905	3	Graduate	8900.		Advanced Biochemistry: Biomolecular NMR	Biomolecular NMR	Fixed	2.0		No		Yes			
900		Graduate	8990.		Advanced Topics in Biochemistry	AdvTopics-Biochem	Variable	1.0	2.0	Yes	16	Yes	Yes	Yes	Yes
999		Graduate	8999.		Research for Dissertation or Thesis	Thesis Research	Variable	1.0	12.0	Yes	99	Yes			

Total: 94

Overall, the conversion of all "Fixed" credit hour courses represents a slight expansion (63 to 64) of converted credit hours based on the 2/3 formula. (Excludes discontinued courses)

64.0

COLLEGE OF ARTS AND SCIENCES - BACHELOR OF ARTS/SCIENCES - MINOR: BIOCHEMISTRY

Last name: _____ Address: _____
 First Name: _____
 Middle: _____ City: _____
 OSU ID: _____ Zip Code: _____
 lastname.#: _____
 Expected graduation: _____ Semester: _____ Year: _____
 Additional Majors: 1. _____ 2. _____
 Additional Minors: 1. _____ 2. _____

Have you filed a degree application in the college office? Yes _____ No _____
 (NOTE: This form is **NOT** a degree application)

Part A. Required Prerequisites (and/or supplementary requirements)

Course	Hours	Grade	Course	Hours	Grade
Biology 1113 (or H1115)	4		Math 1151.01	5	
Biology 1114 (or H1116)	4				
Chemistry 1610 (or 1210 or 1910H)	5				
Chemistry 1620 (or 1220 or 1920H)	5				

Part B. Major Program (Minimum grade of "C-" required. Minimum grade average of "C" (2.00))

Core Requirements (Substitutions are rarely, if ever, permitted)

Course	Hours	Grade	Course	Hours	Grade
Chemistry 2510	4		Add'l biochemistry or related physical or biological science } }	2	
Chemistry 2520	4				
Biochemistry 5613	3				
Biochemistry 5614	3				
Biochemistry 5615	3				
Biochem 5621 (or H5621)	4				

_____ (23 + optional hours)

Total of Part B only

Check whether this is: original _____ revision _____

Signature of faculty advisor Date

See back for information about major programs.

Name of advisor (please print)

Distribution: One copy each- _____ Student
 _____ Dept Office
 _____ College Office

Signature of department advisor Date

COLLEGE OF ARTS AND SCIENCES - BACHELOR OF ARTS/SCIENCES - MINOR: BIOCHEMISTRY

Last name: _____ Address: _____
 First Name: _____
 Middle: _____ City: _____
 OSU ID: _____ Zip Code: _____
 lastname.#: _____
 Expected graduation: _____ Quarter: _____ Year: _____
 Additional Majors: 1. _____ 2. _____
 Additional Minors: 1. _____ 2. _____

Have you filed a degree application in the college office? Yes _____ No _____
 (NOTE: This form is **NOT** a degree application)

Part A. Required Prerequisites (and/or supplementary requirements)

Course	Hours	Grade	Course	Hours	Grade
Biology 113 (or H115)	5		Math 151	5	
Biology 114 (or H116)	5		Math 152	5	
Chemistry 161 (or 121 or 201H)	5				
Chemistry 162 (or 122 or 202H)	5				
Chemistry 163 (or 123 or 203H)	5				

Part B. Minor Program (Minimum grade of "C-" required. Minimum grade average of "C" (2.00))

Core Requirements (Substitutions are rarely, if ever, permitted)

Course	Hours	Grade	Course	Hours	Grade
Chemistry 251	4		Add'l biochemistry or related physical or biological science } }	3	
Chemistry 252	4				
Chemistry 253	4				
Biochemistry 613	4				
Biochemistry 614	4				
Biochemistry 615	4				
Biochemistry 521 (or H521)	5				

_____ (32 + optional hours)

Total of Part B only

Check whether this is: original _____ revision _____

Signature of faculty advisor Date

See back for information about major programs.

Name of advisor (please print)

Distribution: One copy each- _____ Student
 _____ Dept Office
 _____ College Office

Signature of department advisor Date

Transition policy statement.

The transition planning by the faculty was conducted in the context of the requirement that the conversion from quarters to semesters would not delay graduate or disrupt progress towards a degree. Most of the course conversions to the core curriculum should have minimal impact on the student's progress. This is especially true for the Biochemistry Minor because fewer course requirements are involved. However, the proposed expansion of the three-quarter Biochemistry 61x to a three-semester plan will have scheduling consequences. This transition has been discussed extensively. In general, students will be strongly encouraged to complete the prerequisites in biology, chemistry, and mathematics during their first and second years at Ohio State. The biochemistry core series should begin in the third year within the current quarter system, but be encouraged, if appropriate, to begin the 3-semester series under the new system. The transition strategy can be summarized as follows:

Current Seniors (AY 10/11): No issues, should have already completed 61x series or can do so under the current quarter system.

Current Juniors (AY 10/11): Again, should be few issues, should be able to complete the biochemistry series under quarter system in next two years.

Current Sophomores (AY 10/11): Should be able to complete series next year (as juniors) under the quarter system and are currently being contacted by their faculty academic advisor and strongly advised to make plans to do so. Student who should fail 613, which is currently offered only in the Autumn Quarter, will have the opportunity to retake a "bridge" offering of this course during the spring of 2012. These students would then continue the semester versions of 614 and 615 (*i.e.* 5614 and 5615) during their senior year.

Current Freshmen (AY 10/11): This group could begin the 561x series under the semester system in their junior and senior years. They shouldn't encounter transition issues with chemistry and mathematics prerequisites as these should be completed under the quarter system in the next two years. However, this group of students is already being contacted on an ongoing basis by their faculty academic advisor (currently Prof. Donald Dean) who is strongly encouraging them to begin this core biochemistry series in their sophomore year by taking the extra "bridge" quarter version of 613 that will be offered in the Spring of 2012. They could then continue with semester versions of 614 and 615 (*i.e.* 5614 and 5615) during their junior year.

Entering Freshmen for AY 11/12: Students will be contacted early in the fall of 2011 and provided detailed information regarding the transition to semesters, instructions and contact information for their academic advisor(s). Students will be advised to complete their mathematics and general chemistry prerequisite requirements under the current quarter systems during their first year. Their organic chemistry prerequisites can straightforwardly be completed under the semester system beginning in their second year along with the initiation of the prescribed semester plan for all biochemistry course requirements, starting the 5613 during the Spring Semester. .

Entering Freshmen for AY 12/13: Will begin under the semester system with no transition issues. The expectation is that they will begin the core biochemistry series (as 5613) in the Spring of their sophomore year and proceed to the second and third courses of this series, 5614 and 5615, during the Autumn and Spring Semesters, respectively, of their junior year. Students will normally have about

2.5 years in which to complete this three-semester series but, again, will be strongly encouraged to begin the series in their sophomore year to provide a one-year “buffer” to accommodate potential delays in an individual’s academic progress. See *Appendix “Example - Four-Year Semester Schedule....”* for a general 4-year schedule under a complete semester system. Although not advisable, students could delay entering the biochemistry core series (Biochemistry 5613, 5614, and 5615) until the Spring Semester of their third (junior) year. However, difficulties could arise if the student fails Biochemistry 5613 and perhaps in scheduling the additional required course in biochemistry, physical or biological science.

Transition issues related to the Chemistry, Physics, and Mathematics prerequisite sequences. In the event that a student has only partially completed Chemistry, Mathematics, or Physics sequences before the conversion to semesters, we will advise the student to follow the respective department’s transition plans for those sequences.

Appendix. EXAMPLE - FOUR-YEAR SEMESTER SCHEDULE FOR THE BIOCHEMISTRY MINOR

FRESHMAN YEAR:

<i>Autumn Semester:</i>	<i>cr hr</i>	<i>Spring Semester:</i>	<i>cr hr</i>	<i>May Term:</i>
Biological Sciences 100 (Survey)	1			(TBD)
General Chemistry I (1210/1610)	5	General Chemistry II (1220/1620)	5	
Calculus I (Math 1151.01)	5	Biology II (1114)*	4	
Biology I (1113)	4	GEC-"Writing Level 1" (English x110)	3	
GE, Elective, Course in Major	<u>3</u>	GE, Elective, Course in Major	<u>3</u>	
	18		15	

SOPHOMORE YEAR:

<i>Autumn Semester:</i>		<i>Spring Semester:</i>		<i>May Term:</i>
Organic Chemistry I (2510)	4	Organic Chemistry II (2520)	4	(TBD)
GE, Elective, Course in Major	up to 12	Biochemistry I (5613)	3	
	<u>16</u>	GE, Elective, Course in Major	up to 9	
			<u>16</u>	

JUNIOR YEAR:

<i>Autumn Semester:</i>		<i>Spring Semester:</i>		<i>May Term:</i>
Biochemistry II (5614)	3	Biochemistry III (5615)	3	(TBD)
GE, Elective, Course in Major	up to 12	Biochemistry Lab (5621)	4	
	<u>15</u>	GE, Elective, Course in Major	up to 9	
			<u>16</u>	

SENIOR YEAR

<i>Autumn Semester:</i>		<i>Spring Semester:</i>		<i>May Term:</i>
Course in biochemistry, physical or biological :	2			(TBD)
GE, Elective, Course in Major	up to 12	GE, Elective, Course in Major	15	
	<u>14</u>		<u>15</u>	
			<u>15</u>	scrhr:
			<u>62</u>	minor: 23 (>20 scrhr required)
Total Credit hours	<u><u>63</u></u>			overall: 125 (>120 crhr required)

* Students with advanced placement credit should be advised to take Biology 1114 before beginning the core Biochemistry series (5613-5615)

NOTE: Although not advisable, a student could begin the biochemistry core series (Biochemistry 5613, 5614, and 5615) during the Spring Semester of their third (junior) year, however, this could generate issues with the scheduling of the required additional course in biochemistry, physical or biological science.

Appendix B_ Biochemistry Minor - Conversion to Semesters (version 1/17/2011)

Segment of major program	Quarter course #	Quarter course name	Current Qtr Credit hours	Semester course #	Semester course name	Proposed Semester Units	Calculated Direct 2/3 Conversion	Change in Credit Hrs	
Prerequisites (some may double-count in GEC)	Biology 113/H115	Introductory Biology I	5	Biology 1113	Introductory Biology I	4			
	Biology 114/H116	Introductory Biology II	5	Biology 1114	Introductory Biology II	4			
	Chemistry 121 or 161	General Chemistry I	5						
	Chemistry 122 or 162	General Chemistry II	5	Chemistry 1210 or 1610	General Chemistry I	5			
	Chemistry 123 or 163	General Chemistry III	5	Chemistry 1220 or 1620	General Chemistry II	5			
	Mathematics 151	Calculus and Analytic Geometry I	5						
	Mathematics 152	Calculus and Analytic Geometry I	5	Mathematics 1151.01	Calculus I	5			
Total Prerequisites Quarter Credit Hours:			35	Total Prerequisites Semester Units:			23	23	+0
Core major requirements in department	Biochemistry 613	Biochemistry and Molecular Biology I	4	Biochemistry 5613	Biochemistry and Molecular Biology I	3			
	Biochemistry 614	Biochemistry and Molecular Biology II	4	Biochemistry 5614	Biochemistry and Molecular Biology II	3			
	Biochemistry 615	Biochemistry and Molecular Biology III	4	Biochemistry 5615	Biochemistry and Molecular Biology III	3			
	Biochemistry 521 (H521)	Introductory Biological Chemistry Laboratory	5	Biochemistry 5621 (H5621)	Biochemistry &Molecular Biology Laboratory	4			
	Additional course in biochemistry or a related physical or biological science		3	Additional course in biochemistry or a related physical or biological science		2			
Total Core Major (Dept) Quarter Credit Hours:			20	Total Core Major (Dept) Semester Units:			15	13	+2
Core major requirements outside department	Chemistry 251	Organic Chemistry I	4						
	Chemistry 252	Organic Chemistry II	4	Chemistry 2510	Organic Chemistry I	4			
	Chemistry 253	Organic Chemistry III	4	Chemistry 2520	Organic Chemistry II	4			
Total Core Major (non-Dept) Quarter Credit Hours:			12	Total Core Major (non-Dept) Semester Units:			8	8	+0
Total credit hours/units in major and prerequisites			67	Total credit hours/units in major and prerequisites			46	45	+1-2
Minor program percentage of minimum hours/units for degree (using 180 quarter credit hours and 120 semester units)			37%	Minor program percentage of minimum hours/units for degree (using 180 quarter credit hours and 120 semester units)			38%		