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|--|--|
| 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 |
| Proposed Program/Plan Name | Biochemistry |
| Program/Plan Code Abbreviation | BIOCHEM-BA |
| Current Degree Title | Bachelor of Arts |

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 | | 52 | 34.7 | 29 | 5.7 |
| Required credit hours offered by the unit | Minimum | 23 | 15.3 | 16 | 0.7 |
| | Maximum | 23 | 15.3 | 16 | 0.7 |
| Required credit hours offered outside of the unit | Minimum | 29 | 19.3 | 13 | 6.3 |
| | Maximum | 29 | 19.3 | 13 | 6.3 |
| Required prerequisite credit hours not included above | Minimum | 55 | 36.7 | 38 | 1.3 |
| | Maximum | 55 | 36.7 | 38 | 1.3 |

Explain any change in credit hours if the difference is more than 4 semester credit hours between the values listed in columns B and C for any row in the above table

Requirements for the BA have been reduced to be more in line with other BA degrees in the natural sciences, and to accommodate a broader range of student interests. The reduction in credit hours involves core requirements in departments outside the unit. The mathematics requirement has been reduced, as well as the organic chemistry laboratory requirement.

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 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 "Attachments" 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 Major BA Degree Program Request Attachments.pdf: Attachments (letter, rationale, advising, etc)

(Program Proposal. Owner: Swenson, Richard Paul)

- Curricular Map for Biochemistry major- BA degree.pdf: Curricular Map - BA

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

Comments

Workflow Information

| Status | User(s) | Date/Time | Step |
|------------------|------------------------|---------------------|------------------------|
| Submitted | Swenson, Richard Paul | 01/24/2011 03:30 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 Major, B.A. Degree

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 Major (B.A. degree). 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 and as subsequently modified at its December 1, 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 the three exceptions 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 department's current three-quarter "Physical Biochemistry" series (Biochemistry 721.01, 721.02, and 721.03) will also be converted to a two-semester sequence (5721 and 5722 in the semester system). Unlike for the B.S. degree, students pursuing the B.A. degree in biochemistry will have this requirement somewhat reduced from the current two-quarter requirement, i.e. Biochemistry 721.01 and 721.02, to the single semester course, Biochemistry 5721. The content is not expected to be altered significantly as a result.

Rationale for expansion of the core biochemistry series for majors. The three-quarter core biochemistry series (Biochemistry 613-614-615) will be expanded to a three-semester series (5613-5614-5615) rather than to directly convert this three-quarter series to a two-semester plan. Our rationale is as follows. The field is rapidly expanding with new concepts added regularly through the massive efforts in research world-wide. This is especially true in the areas of gene expression and regulation, RNA biochemistry, structure, and processing. To better prepare our students, especially those who plan to enter professional or graduate school, this new material must be included. This expansion brings the department's core biochemistry curriculum more in line with our peer institutions that typically offer such three-semester series. Furthermore, the direct conversion of this three-quarter series to two semesters would have required the redistribution of course content in an inefficient manner. Metabolism, which is currently covered in Biochemistry 614, would likely have had to be split between two quarters, an outcome that was believed to be unacceptable. Continuity within the subject area is essential for the natural re-enforcement of central concepts with subareas and for retention. Also, the inclusion of a portion of metabolism in the second semester course of these series would significantly impair the proposed expansion of the subject areas discussed above. It is also concluded that these changes will bring our major core closer to our peer-institution comparison group. .

Expanding the 613-614-615 quarter series to three semesters will require some changes in the manner in which our students move through the required core curriculum for the Biochemistry major. The principal issue is the smaller "margin of error" resulting from the 1.5 *versus* one year schedule. Students who might fail the first course in this series could lose substantial time in their progress towards graduation. To minimize this potential problem, 5613 will be taught during Spring Semester. Students will be advised to enroll in this course during their second year followed by 5614 and 5615 in the Autumn and Spring, respectively, of their third (Junior) year. With this schedule, students will be taking the final organic

chemistry along with 5613. The course content of 5613 will be adjusted to accommodate a potential lag in acquiring some of the basic organic chemistry concepts required for that course. Finally, having our students begin their biochemistry earlier in their studies will assist efforts by the Department to foster an intellectual community of biochemistry students and to more quickly identify students who may benefit from independent study and/or basic research to augment their education. Under the current system, students typically have difficulties identifying and relating well to faculty who may foster their interests in this discipline.

Rationale for elimination of advanced calculus requirement. To accommodate this expansion as well as to bring our B.A. degree requirements other science majors at Ohio State, the faculty have approved the elimination of the advanced calculus requirement (currently Mathematics 254) and the second organic chemistry laboratory requirement (currently Chemistry 255) while retaining a full year organic chemistry lecture component.

Rationale for Eliminating Chemistry 221 (Analytical Chemistry) requirement. In the course of our 2007 departmental review, students and faculty commented that the laboratory course, Chem 221 (Analytical Chemistry), is insufficiently geared towards a Biochemistry degree, and fails to provide a thorough grounding in basic techniques specific to the Biochemistry or Molecular Biology laboratory. The American Society for Biochemistry and Molecular Biology (http://www.asbmb.org/uploadedFiles/ProfessionalDevelopment/Resources/Curriculum_fnl_02.pdf) does not include most of the topics covered in Chemistry 221 in the recommended curriculum for programs in Biochemistry and Molecular Biology. Furthermore, the conversion to semesters allows us to devote more time in Biochemistry 5621 to the quantitative skills and analytical techniques specific to the biochemical sciences, thus further reducing the need to include Analytical Chemistry laboratory as a core requirement in the major. For these reasons, we have decided to eliminate Chem 221 as a core requirement in the Biochemistry major. This change will benefit biochemistry students by providing more coherence within the major and would better prepare students to exploit and contribute to undergraduate research opportunities. Devoting more time to a joint laboratory experience in Biochemistry 5621 will foster more of a sense of intellectual community among Biochemistry undergraduates.

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

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 | | Math 1152.01 | 5 | |
| Chemistry 1610 (or 1210 or 1910H) | 5 | | Physics 1250 | 5 | |
| Chemistry 1620 (or 1220 or 1920H) | 5 | | Physics 1251 | 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 | | Biochemistry 5613 | 3 | |
| Chemistry 2520 | 4 | | Biochemistry 5614 | 3 | |
| Chemistry 2540 | 2 | | Biochemistry 5615 | 3 | |
| MolGen 4500 or 5606 | 3 | | Biochem 5621 (or H5621) | 4 | |
| | | | Biochem 5721 or Chem 4200 | 3 | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

_____ (29 + 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

Major Program Form

Colleges of the Arts and Sciences

Name _____ Major Biochemistry
last first middle

OSU name.# _____ Degree Sought: BA BS _____ BAJur _____

Local Address _____ (Zip) _____

Phone: _____ Expected date of graduation _____, 20____
(quarter) (year)

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

If completing two majors, list both below and file a separate form for each one:

1) _____ 2) _____

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

| Course | Hours | Grade | Course | Hours | Grade |
|----------------------------|-------|-------|------------------------|-------|-------|
| Bio 113 (H115), 114 (H116) | 5+5 | _____ | Chem 123 or 203 or 163 | 5 | _____ |
| Chem 121 or 201 or 161 | 5 | _____ | Phys 131, 132, 133 | 5+5+5 | _____ |
| Chem 122 or 202 or 162 | 5 | _____ | Math 151, 152, 153 | 5+5+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 |
|--------------------------|-------|-------|----------------------|-------|-------|
| Chem 251 | 4 | _____ | Biochem 613 | 4 | _____ |
| Chem 252 | 4 | _____ | Biochem 614 | 4 | _____ |
| Chem 245 | 3 | _____ | Biochem 615 | 4 | _____ |
| Chem 246 | 3 | _____ | Biochem 521 (H521) | 5 | _____ |
| Chem 221 | 5 | _____ | Biochem 721.01 * | 3 | _____ |
| Math 254 | 5 | _____ | Biochem 721.02 * | 3 | _____ |
| Molgen 500 (or 605, 606) | 5 | _____ | *or Chem 520 and 521 | 3+3 | _____ |
| _____ | _____ | _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ | _____ | _____ |

(52 + optional hours)

Total of Part B only

Check whether this is: original _____ revision _____

See back for information about major programs.

Distribution: One copy each – Student
 College Office
 Denney Hall

Signature of faculty adviser Date

Name of adviser (please print)

Signature of department advisor Date

Biochemistry 292-6771
Department Campus Phone

GENERAL COLLEGE RULES PERTAINING TO ALL MAJORS

(Consult a departmental representative for specifics)

- 1. Requirements for the Major.** The minimum requirement is a coherent program of related work amounting to not fewer than 40 hours of credit in courses numbered 200 or above as prescribed by the student's faculty adviser. (Many departments require more than 40 hours). The major may consist either of courses offered in only one department or of courses found in several allied departments; however, at least 20 of the 40 hours are to be in courses offered by the department of the major unless the major is an interdisciplinary one.

Courses used to meet curricular requirements other than the major may not be used for the major, except for those courses which have been "starred" by the Arts and Sciences Faculty Curriculum Committee as having a significant writing component; such courses may be applied to Category I.A.2.b. of the basic liberal arts core even though they may be part of a major program.

Prerequisites to the major may not be taken on a Pass/Non-Pass basis. Although grades of "D" may be accepted by some departments, others require a minimum "C-" for prerequisites; (consult your faculty adviser). Prerequisites may be applied concurrently to other curricular requirements wherever appropriate.

Transfer credit. In order for a major to be approved with fewer than 20 hours of the program earned at The Ohio State University, the written approval of the faculty adviser, the chairperson of the department and the Vice Provost for the Arts and Sciences must be obtained.

- 2. Grade Standards for the Major.** Courses taken on a Pass/Non-Pass basis may not be applied to the major.

No course in which a grade lower than "C-" has been earned may be used to fulfill a major program requirement. If a student earns a "D+" or lower in a course on the major, the faculty adviser will decide whether the student should a.) repeat the course b.) delete the course from the major c.) substitute another course.

It is incumbent upon the student to notify the faculty adviser if need for such action arises. Notice of the decision (on a major program revision form signed by the faculty adviser) should be delivered by the adviser or the student to the Arts and Sciences College Office.

A minimum cumulative point-hour ratio of 2.00 in all courses comprising the major program is required for graduation.

- 3. Changes in the Major Program.** Changes in a student's major program can be made only with the written approval of the faculty adviser. They must be filed in the Arts and Sciences Office (by the adviser or the student) at the time approval is given. Such revisions require a major program revision form or a new major program signed by the faculty adviser.

- 4. Change of Major.** If a change of major is desired, the student should consult with a faculty adviser representing the new major and submit to the College Office either a PRELIMINARY MAJOR PLANNER or a MAJOR PROGRAM FORM, whichever seems appropriate. It should be borne in mind that changes may result in modifying graduation requirements to such an extent that the date of graduation will be delayed.

- 5. Minimum Hours Required Outside the Department of the Major.**

- a.) For students who entered O.S.U. prior to Autumn 1983 and some transfer students entering later, the requirement is as follows:

For the Bachelor of Arts degree a minimum of 115 hours outside the department of the major is required for graduation. This means that a maximum of 65 hours (including 100-level courses) from a single department may be applied to the usual 180 hours requirement. If hours in excess of 65 are earned, the usual 180 hours requirement is increased by an equal number of hours.

The minimum required outside the major department for the Bachelor of Science degree is 105 hours.

The minimum number of hours outside Journalism required for the Bachelor of Arts in Journalism is 141.

- b.) For students who enter O.S.U. Autumn Quarter 1983 or later, the requirement is the same for the Bachelor of Arts and the Bachelor of Science degree programs:

A minimum of 116 hours outside the department of the major is required. This means that a maximum of 80 hours (including 100-level courses) from a single department may be applied to the usual 196 hours requirement. If hours in excess of 80 are earned, the usual 196 hours requirement is increased by an equal number of hours.

For the Bachelor of Arts in Journalism the minimum hours required outside Journalism remains at 141 hours.

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. 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. 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 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 an extra "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. Students who have not completed the physical (bio)chemistry requirement by their junior year can do so within the semester system without any transitional issues.

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, mathematics, and physics 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. See *Appendix "Example T1 – Four-Year Transition....."* for a tentative 4-year transitional schedule for this group of students.

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 physics and 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. See *Appendix "Example T2 – Four-Year Transition....."* for a tentative 4-year transitional schedule for this group of students.

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 *Appendices “Examples S1 through S3, Four-Year Semester Schedule....”* for 3 different tentative 4-year schedules under a complete semester system.

Transition issues related to Biochemistry 721.01 through 721.03 series. It is rare that students do not complete the entire Physical Biochemistry series (Biochem 721.01-721.02-721.03) within the same academic year. Any student who has started the 721 series, but not completed it at the time of semester conversion will be advised individually as to the options for completing this sequence. The most likely solution will be to offer that student independent study credit for participating in the relevant portions of the semester courses and completing just the missing part of the sequence.

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.

Transition issues related to the dropping of the Chemistry 221 (Analytical Chemistry) requirement. The Chemistry 221 requirement will be phased out based on whether a student has taken Biochem 521 under quarters (Chem 221 IS required) or Biochem 5621 under semesters (Chem 221 is NOT required).

Appendix. EXAMPLE T1 - FOUR-YEAR TRANSITION FROM QUARTER TO SEMESTER SCHEDULE FOR THE BIOCHEMISTRY MAJOR (B.A.)

YEAR 1 UNDER QUARTER SYSTEM (AY 2010-2011):

| <i>Autumn Quarter:</i> | <i>cr hr</i> | <i>Winter Quarter:</i> | <i>cr hr</i> | <i>Spring Quarter:</i> | <i>cr hr</i> |
|-------------------------|--------------|------------------------|--------------|------------------------|--------------|
| Biological Sciences 100 | 1 | Biology 113 or H115 | 5 | | |
| Chemistry 1121 or 161 | 5 | Chemistry 122 or 162 | 5 | Chemistry 123 or 163 | 5 |
| Mathematics 151 | 5 | Mathematics 152 | 5 | Mathematics 153 | 5 |
| GE or Elective | <u>5</u> | | | GE or Elective | <u>5</u> |
| | 16 | | <u>15</u> | | 15 |

YEAR 2 UNDER QUARTER SYSTEM (AY 2011-2012):

| <i>Autumn Quarter:</i> | <i>cr hr</i> | <i>Winter Quarter:</i> | <i>cr hr</i> | <i>Spring Quarter:</i> | <i>cr hr</i> |
|------------------------|--------------|------------------------|----------------|--------------------------------|--------------|
| Chemistry 251 | 4 | Chemistry 252 | 4 | | |
| Chemistry 221** | 5 | Chemistry 245 | 3 | Chemistry 246 | 3 |
| Physics 131 | 5 | Physics 132 | 5 | Physics 133 | 5 |
| Mathematics 254 | <u>5</u> | GE or Elective | up to <u>3</u> | Biochemistry 613 (bridge crse) | <u>4</u> |
| | 19 | | 15 | | 12 |

YEAR 3 UNDER SEMESTER SYSTEM (AY 2012-13):

| <i>Autumn Semester:</i> | | <i>Spring Semester:</i> | | <i>May Term:</i> |
|--|----------|---------------------------|----------------|------------------|
| Biology II (1114)* | 4 | | | |
| Biochemistry II (5614) | 3 | Biochemistry III (5615) | 3 | (TBD) |
| Physical (Bio)chemistry (BC5721 or Chem4200) | 3 | Biochemistry Lab (5621)** | 4 | |
| Molecular Genetics (4500 or 5606) | 3 | | | |
| GE or Elective | <u>3</u> | GE or Elective | up to <u>9</u> | |
| | 16 | | 16 | |

YEAR 4 UNDER SEMESTER SYSTEM (AY 2013-14):

| <i>Autumn Semester:</i> | | <i>Spring Semester:</i> | | <i>May Term:</i> |
|------------------------------------|----------------|-------------------------------------|----------------|------------------|
| Elective or Biochemistry 4193/4998 | 4 | Elective or Biochemistry 4998/4999H | 4 | (TBD) |
| GE or Elective | up to <u>9</u> | GE or Elective | up to <u>9</u> | scrhr: |
| | 13 | | 13 | |

| | | | | | |
|----|--------------------------|---|------------|-------|----------------------|
| 92 | total quarter credit hrs | = | 61 | units | (2/3 conversion) |
| 58 | total semester units | = | <u>58</u> | units | |
| | | | <u>119</u> | units | (>120 crhr required) |

* Students with advanced placement credit should be advised to take Biology 114 before their junior year.

** Students taking Biochemistry 5621 under the semester system will not be required to take Chemistry 221

Appendix. EXAMPLE T2 - FOUR-YEAR TRANSITION FROM QUARTER TO SEMESTER SCHEDULE FOR THE BIOCHEMISTRY MAJOR (B.A.)

YEAR 1 UNDER QUARTER SYSTEM (AY 2011-2012):

| <i>Autumn Quarter:</i> | <i>cr hr</i> | <i>Winter Quarter:</i> | <i>cr hr</i> | <i>Spring Quarter:</i> | <i>cr hr</i> |
|-------------------------|--------------|------------------------|--------------|------------------------|--------------|
| Biological Sciences 100 | 1 | Biology 113 or H115 | 5 | | |
| Chemistry 1121 or 161 | 5 | Chemistry 122 or 162 | 5 | Chemistry 123 or 163 | 5 |
| GE or Elective | up to 10 | Mathematics 151 | 5 | Mathematics 153 | 5 |
| | | | | GE or Elective | 5 |
| Total Credit hours | <u>16</u> | | <u>15</u> | | <u>15</u> |

YEAR 2 UNDER SEMESTER SYSTEM (AY 2012-13):

| <i>Autumn Semester:</i> | | <i>Spring Semester:</i> | | <i>May Term:</i> |
|--------------------------------|----------|-----------------------------|----------|------------------|
| Organic Chemistry I (2510) | 4 | Organic Chemistry II (2520) | 4 | (TBD) |
| Organic Chemistry Lab I (2540) | 2 | Biochemistry I (5613) | 3 | |
| Physics I (1250) | 5 | Physics II (1251) | 5 | |
| GE or Elective | <u>3</u> | GE or Elective | <u>3</u> | |
| | 14 | | 15 | |

YEAR 3 UNDER SEMESTER SYSTEM (AY 2013-14):

| <i>Autumn Semester:</i> | | <i>Spring Semester:</i> | | <i>May Term:</i> |
|--|----------|-------------------------|----------------|------------------|
| Biology II (1114)* | 4 | | | |
| Biochemistry II (5614) | 3 | Biochemistry III (5615) | 3 | (TBD) |
| Physical (Bio)chemistry (BC5721 or Chem4200) | 3 | Biochemistry Lab (5621) | 4 | |
| Molecular Genetics (4500 or 5606) | 3 | | | |
| GE or Elective | <u>3</u> | GE or Elective | up to <u>8</u> | |
| | 16 | | 15 | |

YEAR 4 UNDER SEMESTER SYSTEM (AY 2014-15):

| <i>Autumn Semester:</i> | | <i>Spring Semester:</i> | | <i>May Term:</i> |
|------------------------------------|-----------------|-------------------------------------|-----------|------------------|
| Elective or Biochemistry 4193/4998 | 4 | Elective or Biochemistry 4998/4999H | 4 | (TBD) |
| GE or Elective | up to <u>10</u> | GE or Elective | <u>10</u> | |
| | 14 | | 14 | scrhr: |

| | | | | | |
|----|--------------------------|---|------------|-------|----------------------|
| 46 | total quarter credit hrs | = | 31 | units | (2/3 conversion) |
| 88 | total semester units | = | <u>88</u> | units | |
| | | | <u>119</u> | units | (>120 crhr required) |

* Students with advanced placement credit should be advised to take Biology 114 before their junior year.

Appendix. EXAMPLE S1 - FOUR-YEAR SEMESTER SCHEDULE FOR THE BIOCHEMISTRY MAJOR (B.A.)

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 | Calculus II (Math 1152.01) | 5 | |
| Biology I (1113) | 4 | GEC-"Writing Level 1" (English x110) | 3 | |
| GE or Elective | <u>3</u> | GE or Elective | <u>3</u> | |
| | 18 | | 16 | |

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) |
| Organic Chemistry Lab I (2540) | 2 | | | |
| Physics I (1250) | 5 | Physics II (1251) | 5 | |
| GE or Elective | 3 | Biochemistry I (5613) | 3 | |
| | <u>14</u> | GE or Elective | <u>3</u> | |
| | | | 15 | |

JUNIOR YEAR:

| <i>Autumn Semester:</i> | | <i>Spring Semester:</i> | | <i>May Term:</i> |
|--|-----------|---------------------------|-----------|------------------|
| Biology II (1114)* | 4 | | | |
| Biochemistry II (5614) | 3 | Biochemistry III (5615) | 3 | (TBD) |
| Physical (Bio)chemistry (BC5721 or Chem4200) | 3 | Biochemistry Lab (5621) | 4 | |
| | | Molecular Genetics (4500) | 3 | |
| GE or Elective | 6 | GE or Elective | 3 | |
| | <u>16</u> | | <u>13</u> | |
| | | up to | | |

SENIOR YEAR

| <i>Autumn Semester:</i> | | <i>Spring Semester:</i> | | <i>May Term:</i> |
|------------------------------------|------------------|-------------------------------------|------------------|--------------------------|
| Elective or Biochemistry 4193/4998 | 4 | Elective or Biochemistry 4998/4999H | 4 | (TBD) |
| GE or Elective | 12 | GE or Elective | 9 | |
| | <u>16</u> | | <u>13</u> | |
| | | | | scrhr: |
| | | | major: | 29 (>30 scrhr required) |
| | | | overall: | 121 (>120 crhr required) |
| Total Credit hours | <u><u>64</u></u> | | <u><u>57</u></u> | |

* Students with advanced placement credit should be advised to take Biology 1114 before their junior year.

Appendix. EXAMPLE S2 - FOUR-YEAR SEMESTER SCHEDULE FOR THE BIOCHEMISTRY MAJOR (B.A.)

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 | Calculus II (Math 1152.01) | 5 | |
| Biology I (1113) | 4 | GEC-"Writing Level 1" (English x110) | 3 | |
| GE or Elective | <u>3</u> | GE or Elective | <u>3</u> | |
| | 18 | | 16 | |

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) |
| Organic Chemistry Lab I (2540) | 2 | | | |
| Physics I (1250) | 5 | Physics II (1251) | 5 | |
| GE or Elective | 3 | Biochemistry I (5613) | 3 | |
| | <u>14</u> | GE or Elective | <u>3</u> | |
| | | | 15 | |

JUNIOR YEAR:

| <i>Autumn Semester:</i> | | <i>Spring Semester:</i> | | <i>May Term:</i> |
|-------------------------|-----------|---------------------------|-----------|------------------|
| Biology II (1114)* | 4 | Biochemistry III (5615) | 3 | (TBD) |
| Biochemistry II (5614) | 3 | Biochemistry Lab (5621) | 4 | |
| | | Molecular Genetics (4500) | 3 | |
| GE or Elective | 9 | GE or Elective | 3 | |
| | <u>16</u> | | <u>13</u> | |

SENIOR YEAR

| <i>Autumn Semester:</i> | | <i>Spring Semester:</i> | | <i>May Term:</i> |
|--|------------------|---------------------------------------|-----------|------------------|
| Physical (Bio)chemistry (BC5721 or Chem4200) | 3 | Elective or Biochemistry (4998/4999H) | 4 | (TBD) |
| GE or Elective up to | <u>12</u> | GE or Elective | <u>10</u> | |
| | 15 | | 14 | |
| | | | <u>58</u> | |
| Total Credit hours | <u><u>63</u></u> | | | |

| | | | |
|--|----------|-----|----------------------|
| | major: | 29 | (>30 scrhr required) |
| | overall: | 121 | (>120 crhr required) |

* Students with advanced placement credit should be advised to take Biology 1114 before their junior year.

Appendix. EXAMPLE S3 - FOUR-YEAR SEMESTER SCHEDULE FOR THE BIOCHEMISTRY MAJOR (B.A.)

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 | Calculus II (Math 1152.01) | 5 | |
| Biology I (1113) | 4 | GEC-"Writing Level 1" (English x110) | 3 | |
| GE or Elective | <u>3</u> | GE or Elective | <u>3</u> | |
| | 18 | | 16 | |

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) |
| Organic Chemistry Lab I (2540) | 2 | | | |
| Physics I (1250) | 5 | Physics II (1251) | 5 | |
| GE or Elective | 3 | Biology II (1114)* | 4 | |
| | <u>14</u> | GE or Elective | <u>3</u> | |
| | | | 16 | |

JUNIOR YEAR:

| <i>Autumn Semester:</i> | | <i>Spring Semester:</i> | | <i>May Term:</i> |
|--|-----------|-------------------------|-----------|------------------|
| Physical (Bio)chemistry (BC5721 or Chem4200) | 3 | | | (TBD) |
| Molecular Genetics (4500) | 3 | Biochemistry I (5613) | 3 | |
| GE or Elective | 6 | GE or Elective | 12 | |
| | <u>12</u> | up to | <u>15</u> | |

SENIOR YEAR

| <i>Autumn Semester:</i> | | <i>Spring Semester:</i> | | <i>May Term:</i> |
|-------------------------|-----------------|-------------------------|-----------|------------------|
| Biochemistry II (5614) | 3 | Biochemistry III (5615) | 3 | (TBD) |
| GE or Elective | up to <u>12</u> | Biochemistry Lab (5621) | 4 | |
| | 15 | GE or Elective | <u>8</u> | |
| | | | 15 | |
| | | | <u>62</u> | |
| Total Credit hours | <u>59</u> | | | |

| | | | |
|--|----------|-----|----------------------|
| | major: | 29 | (>30 scrhr required) |
| | overall: | 121 | (>120 crhr required) |

* Students with advanced placement credit should be advised to take Biology 1114 before their junior year.

Appendix B_ Biochemistry BA Major - 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/H113 | Introductory Biology I | 5 | Biology 1113 | Introductory Biology I | 4 | | |
| | Biology 114/H114 | 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 | | |
| | Mathematics 153 | Calculus and Analytic Geometry I | 5 | Mathematics 1152.01 | Calculus II | 5 | | |
| | Physics 131 | Introductory Physics: Calculus-based I | 5 | | | | | |
| | Physics 132 | Introductory Physics: Calculus-based II | 5 | Physics 1250 | Introductory Physics: Calculus-based I | 5 | | |
| Physics 133 | Introductory Physics: Calculus-based III | 5 | Physics 1251 | Introductory Physics: Calculus-based II | 5 | | | |
| Total Prerequisites Quarter Credit Hours: | | | 55 | Total Prerequisites Semester Units: | | 38 | 37 | +1 |
| 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 | | |
| | Biochemistry 721.01 | Physical Biochemistry I | 3 | | | | | |
| | Biochemistry 721.02 | Physical Biochemistry II | 3 | Biochemistry 5721 or Chemistry 4200 | Physical Biochemistry I } Physical Chemistry } | 3 | | |
| | Total Core Major (Dept) Quarter Credit Hours: | | | 23 | Total Core Major (Dept) Semester Units: | | 16 | 15 |
| Core major requirements outside department | Chemistry 251 | Organic Chemistry I | 4 | Chemistry 2510 | Organic Chemistry I | 4 | | |
| | Chemistry 252 | Organic Chemistry II | 4 | Chemistry 2520 | Organic Chemistry II | 4 | | |
| | Chemistry 254 | Organic Chemistry Laboratory I | 3 | Chemistry 254 | Organic Chemistry Laboratory I | 2 | | |
| | Chemistry 255 | Organic Chemistry Laboratory II | 3 | | | | | |
| | Chemistry 221 | Analytical Chemistry | 5 | | | | | |
| | Mathematics 254 | Calculus and Analytic Geometry IV | 5 | | | | | |
| | Mol Gen 500 (or 605 & 606) | General Genetics | 5 | Mol Gen 4500 (or 5606) | General Genetics | 3 | | |
| Total Core Major (nonDept) Quarter Credit Hrs: | | | 29 | Total Core Major (nonDept) Semester Units: | | 13 | 19 | -6 |
| | | | 107 | | | 67 | 71 | -4 |
| Total credit hours/units in major and prerequisites | | | 59% | | | 56% | | |

Major program percentage of minimum hours/units for degree (using 180 quarter credit hours and 120 semester units)