UNIVERSITY FACULTY SENATE FORMS

Academic Program Approval

This form is a routing document for the approval of new and revised academic programs. Proposing department should complete this form. For more information, call the Faculty Senate Office at 831-2921.

Submitted by: _Louis Rossi_________________________ phone number_831-1880____

Department: _Mathematical Sciences_________ email address_rossi@math.udel.edu

Date: _4 October 2012_____________________________

Action: Revise BS Quantitative Biology Major
(Example: add major/minor/concentration, delete major/minor/concentration, revise major/minor/concentration, academic unit name change, request for permanent status, policy change, etc.)

Effective term_13F__________________________________________________________________________________
(Example: 04F, 05W)

Current degree__BS____________________________________________________________
(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

Proposed change leads to the degree of: __BS_______________________________________
(Example:  BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

Proposed name:__BS in Quantitative Biology___________________________________
Proposed new name for revised or new major / minor / concentration / academic unit
(if applicable)

Revising or Deleting:

Undergraduate major / Concentration: _BS Quantitative Biology________________________
(Example: Applied Music – Instrumental degree BMAS)

Undergraduate minor:___________________________________________________________
(Example: African Studies, Business Administration, English, Leadership, etc.)

Graduate Program Policy statement change:_______________________________________
(Must attach your Graduate Program Policy Statement)

Graduate Program of Study:_____________________________________________________
(Example: Animal Science: MS  Animal Science:  PHD  Economics: MA Economics: PHD)

Graduate minor / concentration:_________________________________________________

Note: all graduate studies proposals must include an electronic copy of the Graduate Program Policy Document, highlighting the changes made to the original policy document.

List new courses required for the new or revised curriculum. How do they support the overall program objectives of the major/minor/concentrations)?
(Be aware that approval of the curriculum is dependent upon these courses successfully passing through the Course Challenge list. If there are no new courses enter “None”)
Explain, when appropriate, how this new/revised curriculum supports the 10 goals of undergraduate education: [http://www.ugs.udel.edu/gened/](http://www.ugs.udel.edu/gened/)

Identify other units affected by the proposed changes:
(Attach permission from the affected units. If no other unit is affected, enter “None”)

None.

Describe the rationale for the proposed program change(s):
(Explain your reasons for creating, revising, or deleting the curriculum or program.)

We are requesting a minor revision to the Bachelor of Science in Quantitative Biology degree. We would like to change the CISC requirement from “Either CISC 106 or CISC 108 or CISC 181” to “CISC 106”. Our rationale is that the CISC courses have evolved over time. CISC 181 now requires CISC 106 or CISC 108 so the existing requirement no longer makes sense. CISC 106 offers some instruction in programming using Python and Matlab. CISC 108 offers instruction in programming using Dr. Racket. The faculty believe that CISC 106 is the most appropriate course for our majors to take.

Program Requirements:
(Show the new or revised curriculum as it should appear in the Course Catalog. If this is a revision, be sure to indicate the changes being made to the current curriculum and include a side-by-side comparison of the credit distribution before and after the proposed change.)

See attached.

ROUTING AND AUTHORIZATION:  (Please do not remove supporting documentation.)

Department Chairperson ____________________________ Date ____________________

Dean of College ____________________________ Date ____________________

Chairperson, College Curriculum Committee ____________________________ Date ____________________

Chairperson, Senate Com. on UG or GR Studies ____________________________ Date ____________________

Chairperson, Senate Coordinating Com. ____________________________ Date ____________________

Secretary, Faculty Senate ____________________________ Date ____________________

Date of Senate Resolution ____________________________ Date to be Effective __________

Registrar ____________________________ Program Code ____________________________ Date ____________________

Vice Provost for Academic Affairs & International Programs ____________________________ Date ____________________

Provost ____________________________ Date ____________________

Board of Trustee Notification ____________________________ Date ____________________

Revised 02/09/2009 /khs
DEGREE: BACHELOR OF SCIENCE
MAJOR: QUANTITATIVE BIOLOGY

The College of Arts and Sciences administers an interdisciplinary major program in Quantitative Biology leading to the Bachelor of Science degree. The major provides a strong background in mathematics, biology, chemistry, and physics appropriate for students who wish to pursue a career or graduate studies in biomedical and life sciences.

CURRICULUM

UNIVERSITY REQUIREMENTS
ENGL 110 Critical Reading and Writing (minimum grade C-) 3

First Year Experience (FYE) 0-4
University Breadth Requirement (minimum grade C-) 12
Up to 3 credits from each of the University Breadth Requirement categories may be used to simultaneously satisfy the College of Arts and Sciences Breadth Requirements.

Discovery Learning Experience (DLE) 3
Multi-cultural Course 3

COLLEGE REQUIREMENTS

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MAJOR: QUANTITATIVE BIOLOGY

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Multi-cultural Course 3

COLLEGE REQUIREMENTS
Writing (minimum grade C-) 3
A second writing course involving significant writing experience including two papers with a combined minimum of 3,000 words to be submitted for extended faculty critique of both composition and content. This course must be taken after completion of 60 credit hours

BREADTH REQUIREMENTS (minimum grade C-)
Eighteen credits from Groups A, B and C, with a minimum of six credits from each group. One of the courses should be in the area of Bioethics.

Group A 6
Group B 6
Group C 6

MAJOR REQUIREMENTS
A grade of C- or better is required for major courses and related work.

Biology
BISC 207 Introduction to Biology I 4
BISC 208 Introduction to Biology II 4
Three of the following three-credit courses 9
BISC 302 General Ecology
BISC 305 Cell Physiology
BISC 306 General Physiology
BISC 401 Molecular Biology of the Cell
BISC 403 Genetic and Evolutionary Biology
One of the following three-credit laboratory classes 3
BISC 312 General Ecology Laboratory
BISC 315 Experimental Cell Biology
BISC 316 Experimental Physiology
BISC 411 Experimental Molecular Biology
BISC 484 Computer Based Genetics Laboratory

Either CISC 106 or CISC 108 (for those with no previous equivalent experience), or CISC 181 3

Chemistry
One of the following options (A, B or C) 8-12
Option A
CHEM 103 General Chemistry 4
CHEM 104 General Chemistry 4
Option B
CHEM 111 General Chemistry 3
CHEM 112 General Chemistry 3
CHEM 119 Quantitative Chemistry I 3
CHEM 120 Quantitative Chemistry II 3
Option C
CHEM 111 General Chemistry 3

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A second writing course involving significant writing experience including two papers with a combined minimum of 3,000 words to be submitted for extended faculty critique of both composition and content. This course must be taken after completion of 60 credit hours

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Option B
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CHEM 112 General Chemistry 3
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CHEM 120 Quantitative Chemistry II 3
Option C
CHEM 111 General Chemistry 3
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 112</td>
<td>General Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 220</td>
<td>Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 221</td>
<td>Quantitative Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 321</td>
<td>Organic Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 322</td>
<td>Organic Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 527</td>
<td>Introductory Biochemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

**Mathematics**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 210</td>
<td>Discrete Mathematics I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 241</td>
<td>Analytic Geometry and Calculus A</td>
<td>4</td>
</tr>
<tr>
<td>MATH 242</td>
<td>Analytic Geometry and Calculus B</td>
<td>4</td>
</tr>
<tr>
<td>MATH 243</td>
<td>Analytic Geometry and Calculus C</td>
<td>4</td>
</tr>
<tr>
<td>MATH 302</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>MATH 349</td>
<td>Elementary Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 350</td>
<td>Probability Theory and Simulation Methods</td>
<td>3</td>
</tr>
<tr>
<td>MATH 426</td>
<td>Introduction to Numerical Analysis and Algorithmic Computation</td>
<td>3</td>
</tr>
<tr>
<td>MATH 450</td>
<td>Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 460</td>
<td>Introduction to Systems Biology</td>
<td>3</td>
</tr>
<tr>
<td>MATH 535</td>
<td>Introduction to Partial Differential Equations</td>
<td>3</td>
</tr>
</tbody>
</table>

**Physics**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHYS 207</td>
<td>Fundamentals of Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 208</td>
<td>Fundamentals of Physics II</td>
<td>4</td>
</tr>
</tbody>
</table>

**OTHER REQUIREMENTS**

- Two one-credit integrative seminars: 2 credits
- MATH 260: Integrative Seminar: 1 credit
- Three integrative or technical electives, 6 credits of which should be integrative electives from a list maintained by the Department of Mathematical Sciences. In addition, undergraduate research is strongly recommended: 9 credits

**CREDITS TO TOTAL A MINIMUM OF** 125

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Although every effort has been made to assure the accuracy of the information in the Catalog, students and others who use the Catalog should note that the policies, rules, regulations, requirements for graduation, course offerings, and other materials reproduced in the Catalog change from time-to-time and that these changes may alter the information contained in this Catalog. See Legal Statement.
Checklist for Curriculum Proposals

_X_. 1. Are all signatures on the hard copy of the proposal?

_X_. 2. Is the effective date correct?

_X_. 3. Is the rationale for the proposal consistent with the changes proposed?

_X_. 4. Does the proposed number of credits match the stated number?

_X_. 5. Have affected units been identified and contacted? Are required support letters attached?

N/A. 6. Is a resolution necessary? If so, is it attached?

(Necessary for: establishing a major; disestablishing a major; a name change to any program with permanent status; a name change to a department or college; a transfer or creation of any department; request for permanent status).

_X_. 7. Are all courses (required or referenced) in the UDSIS Inventory or in the approval process?

_X_. 8. Are all university requirements correctly specified?

   _X_. A. Breadth requirements.

   _X_. B. Multicultural requirement.

   _X_. C. Writing requirement.

   _X_. D. DLE requirement.

_X_. 9. Are all college requirements correctly specified?

_X_. 9. Is a side-by-side comparison provided?