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. A checklist is available to assist in the preparation of a proposal. 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: _8 November 2013_____

Action: Revise 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__14 F_____
(use format 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:_____
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")

None.

Supply support letter from the Library, Dean, and/or Department Chair if needed
(all new majors/minors will need a support letter from the appropriate administrator.)

N/A

Supply a resolution for all new majors/programs; name changes of colleges, departments, degrees; transfer of departments from one college to another; creation of new departments; requests for permanent status. **See example of resolutions.**

N/A

Explain, when appropriate, how this new/revised curriculum supports the 10 goals of undergraduate education: http://www.ugs.udel.edu/gened/

Goal 1: Students in the major will attain effective skills in quantitative reasoning and information technology skills through their normal coursework in Mathematics, Biology, Chemistry and Computer Science.

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.)

The relatively new undergraduate program in Quantitative Biology has successfully produced students who enter highly selective graduate programs in the life sciences (biomedical sciences, biochemistry, bioinformatics, etc). Unfortunately, the program has a relatively low number of students (20-30) enrolled because it is so rigorous that it is difficult for a student to switch into this major during their freshmen or sophomore year and still graduate in four years. To address this issue, we have reduced the number of requirements so that students who enter UD majoring in mathematics, chemistry, physics , biology or chemical engineering but are attracted to Quantitative Biology during their first year can enter the program and still finish in four years.

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 example of side by side.**

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

Academic Year: 2013-2014 ▾

[35697]
2013-2014 UD Catalog -->
2013-2014 Undergraduate Programs -->
College of Arts and Sciences -->
Mathematical Sciences -->
BACHELOR OF SCIENCE:
QUANTITATIVE BIOLOGY

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		CREDITS
UNIVERSITY REQUIREMENTS		
ENGL 110 (minimum grade C-)	Critical Reading and Writing	3
First Year Experience (FYE)		0-4
University Breadth Requirement (minimum grade C-) 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.		12
Discovery Learning Experience (DLE)		3
Multi-cultural Course		3
COLLEGE REQUIREMENTS		

Academic Year: 2013-2014 ▾

[35697]
2013-2014 UD Catalog -->
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Mathematical Sciences -->
BACHELOR OF SCIENCE:
QUANTITATIVE BIOLOGY

REVISED

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.

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Discovery Learning Experience (DLE)		3
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
		9

Three of the following three-credit courses

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

		3

One of the following three-credit laboratory classes

BISC 312	General Ecology Laboratory
BISC 315	Experimental Cell Biology
BISC 316	Experimental Physiology
BISC 411	Experimental Molecular Biology
BISC 413	Advanced Genetics Laboratory
BISC 484	Computer Based Genetics Laboratory

CISC 106	General Computer Science for Engineers	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

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
		~~9~~ 6

~~Three~~ Two of the following three-credit courses

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

		3

One of the following three-credit laboratory classes

BISC 312	General Ecology Laboratory
BISC 315	Experimental Cell Biology
BISC 316	Experimental Physiology
BISC 411	Experimental Molecular Biology
BISC 413	Advanced Genetics Laboratory
BISC 484	Computer Based Genetics Laboratory

CISC 106	General Computer Science for Engineers	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
CHEM 112	General Chemistry	3
CHEM 220	Quantitative Analysis	3
CHEM 221	Quantitative Laboratory	1
CHEM 321	Organic Chemistry	4
CHEM 322	Organic Chemistry	4
CHEM 527	Introductory Biochemistry	3

Mathematics

MATH 210	Discrete Mathematics I	3
MATH 241	Analytic Geometry and Calculus A	4
MATH 242	Analytic Geometry and Calculus B	4
MATH 243	Analytic Geometry and Calculus C	4
MATH 302	Ordinary Differential Equations	3
MATH 349	Elementary Linear Algebra	3
MATH 350	Probability Theory and Simulation Methods	3
MATH 426	Introduction to Numerical Analysis and Algorithmic Computation	3
MATH 450	Mathematical Statistics	3
MATH 460	Introduction to Systems Biology	3
MATH 535	Introduction to Partial Differential Equations	3

Physics

PHYS 207	Fundamentals of Physics I	4
PHYS 208	Fundamentals of Physics II	4

OTHER REQUIREMENTS

Two one-credit integrative seminars		2
MATH 260	Integrative Seminar	
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 TO TOTAL A MINIMUM OF **125**

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***

Option C

CHEM 111	General Chemistry	3
CHEM 112	General Chemistry	3
CHEM 220	Quantitative Analysis	3
CHEM 221	Quantitative Laboratory	1
~~CHEM 321~~	~~Organic Chemistry~~	~~4~~
~~CHEM 322~~	~~Organic Chemistry~~	~~4~~
~~CHEM 527~~	~~Introductory Biochemistry~~	~~3~~

Option C is these four courses.

Mathematics

MATH 210	Discrete Mathematics I	3
MATH 241	Analytic Geometry and Calculus A	4
MATH 242	Analytic Geometry and Calculus B	4
MATH 243	Analytic Geometry and Calculus C	4
MATH 302	Ordinary Differential Equations	3
MATH 349	Elementary Linear Algebra	3
MATH 350	Probability Theory and Simulation Methods	3
MATH 426	Introduction to Numerical Analysis and Algorithmic Computation	3
MATH 450	Mathematical Statistics	3
MATH 460	Introduction to Systems Biology	3
~~MATH 535~~	~~Introduction to Partial Differential Equations~~	~~3~~

~~**Physics**~~

~~PHYS 207~~	~~Fundamentals of Physics I~~	~~4~~
~~PHYS 208~~	~~Fundamentals of Physics II~~	~~4~~

OTHER REQUIREMENTS

Two one-credit integrative seminars		2
MATH 260	Integrative Seminar	
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 TO TOTAL A MINIMUM OF ~~**125**~~ 124

ELECTIVES
After required courses are completed, sufficient elective credits must be taken to meet the minimum credit requirements for the degree.

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UNIVERSITY OF DELAWARE

DEPARTMENT OF BIOLOGY
OFFICE OF THE CHAIR

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November 13, 2013

Dr. Louis Rossi
Director of Undergraduate Studies
Department of Mathematical Sciences
University of Delaware
Newark, DE 19716

Dear Dr. Rossi,

This letter is to state my support of the proposed changes in the *Quantitative Biology* program to reduce the number of required courses for this program. As you know, I have always believed that the training of our student in the quantitation of biological studies is essential for our majors to succeed. I believe that this program is an excellent start to increasing our students' knowledge of biological quantitation. While this program has been small during the past five year probationary period with only 10 graduating from the program, you may be right that the current curriculum makes it difficult for students to transfer into and still make a planned graduation date. I am supportive of this change and look forward to more students entering this major.

Since this program is small, there is little impact on the Biology curriculum. Even with an increase in the number of students in this major, I do not expect that this program will significantly impact our course populations. We welcome the addition of these students in our curriculum as an example to our majors of the need for this type of studies for biologists.

In summary, I support the proposed changes to the *QBio* program and look forward to our continued interaction with your department.

Best regards,

Randall L. Duncan

Professor and Chair