March 3, 2009

MEMORANDUM

TO:         Norma Allewell
            Dean, College of Chemical & Life Sciences

FROM:       Phyllis Peres
            Associate Provost for Academic Planning and Programs

SUBJECT:    Proposal to modify the curriculum of the B.S. in Biological Sciences (PCC log no. 08049)

On February 27, the Senate Committee on Programs, Curricula and Courses unanimously approved your proposal to modify the curriculum of the B.S. in Biological Sciences. A copy of the approved proposal is attached.

The change is effective Fall, 2009. The College should ensure that the program is fully described in the Undergraduate Catalog and in all relevant descriptive materials, and that all advisors are informed.

CWR/

Enclosure

cc: Carmen Balthrop, Chair, Senate PCC Committee
    Sarah Bauder, Office of Student Financial Aid
    Reka Montfort, University Senate
    Barbara Hope, Data Administration
    Denise Nadasen, Institutional Research & Planning
    Anne Turkos, Archives
    Linda Yokoi, Office of the Registrar
    Scott Wolpert, Undergraduate Studies
    Joelle Presson, College of Chemical and Life Sciences
THE UNIVERSITY OF MARYLAND, COLLEGE PARK
PROGRAM/CURRICULUM PROPOSAL

DIRECTIONS:
- Provide one form with original approval signatures in lines 1 - 4 for each proposed action. Keep this form to one page in length.
- Early consultation with the Office of the Associate Provost for Academic Planning & Programs is strongly recommended if there are questions or concerns, particularly with new programs.
- Please submit the signed form to Claudia Rector, Office of the Associate Provost for Academic Planning and Programs, 1119 Main Administration Building, Campus.
- Please email the rest of the proposal as an MSWord attachment to pcc-submissions@umd.edu.

DATE SUBMITTED __2/10/2009__

COLLEGE/SCHOOL _Chemical and Life Sciences_

DEPARTMENT/PROGRAM __Biological Sciences__

PROPOSED ACTION (A separate form for each) ADD____ DELETE____ CHANGE__ x__

DESCRIPTION (Provide a succinct account of the proposed action. Details should be provided in an attachment. Provide old and new sample programs for curriculum changes.)
Proposal for a two-semester sequence of Calculus for Life Sciences MATH130/131 to replace MATH220 and MATH221 for Biological Sciences major.

Current requirement: MATH140&141 or MATH220&221
Proposed requirement: MATH140&141 or MATH130&131

JUSTIFICATION/REASONS/RESOURCES (Briefly explain the reason for the proposed action. Identify the source of new resources that may be required. Details should be provided in an attachment.)
UM faculty recognize that the traditional biology supporting courses in math, physics, and chemistry must be taught from a biological perspective if our undergraduate curriculum is to serve 21st century student needs and goals. To that end, a collaborative group of faculty, post-docs and graduate students in Mathematics and Biological Sciences have designed and implemented a Calculus for Life Science course sequence, MATH130&131. MATH130/131 will replace MATH220/221 in the BSCI curriculum. Once adopted MATH220/221 will no longer be accepted in the BSCI major. We would like this change to take effect for students who matriculate Fall 2009 and later.

MATH130/132 is scheduled with two discussion sessions per week, while MATH220/221 has one discussion session per week. The College of Chemical and Life Sciences is providing the funds for the extra TA resources this requires but only for CLFS students. Our college is working with various venues on campus to provide funds to open the courses to students outside CLFS.

APPROVAL SIGNATURES - Please print name, sign, and date

1. Department Committee Chair   __Joelle Presson__  __Jaulee Lussan__  __2/10/2009__
2. Department Chair   __Joelle Presson__  __Jaulee Lussan__  __2/10/2009__
3. College/School PCC Chair  __Robert L. Infante__  __2/10/09__
4. Dean   ____  __2/10/09__
5. Dean of the Graduate School (if required)  
6. Chair, Senate PCC  __Catherine Battaglia__  __3/3/09__
7. Chair of Senate  __Phyllis Ceres__  __3/3/09__
Proposal for a two-semester sequence of Calculus for Life Sciences MATH130/131 to replace MATH220 and MATH221 for Biological Sciences majors

Summary

Current requirement:  MATH140&141 or MATH220&221
Proposed requirement: MATH140&141 or MATH130&131

In the past decade, reports from National Science Foundation, The National Academy of Sciences, the Howard Hughes Medical Institute\(^1\), and others have prompted colleges and universities across the country to pursue integrative approaches in the teaching of biological sciences. UM faculty recognize that the traditional biology-supporting courses in math, physics, and chemistry must be taught from a biological perspective if our undergraduate curriculum is to serve 21\(^{st}\) century student needs and goals. To that end, a collaborative group of faculty, post-docs and graduate students in Mathematics and Biological Sciences have designed and implemented a Calculus for Life Science course sequence, MATH130&131.

Mathematics Courses for Biology Students

Modern biology uses mathematics in broad and diverse ways that have greatly expanded over the last half-century. Beyond traditional calculus, students of modern biology need an understanding of fundamental principles of discrete math, dynamical systems, computer modeling, probability theory, statistical inference, and other topics. Upper-level courses in BSCI increasingly rely on such mathematical applications, and the teaching faculty consistently complain that many of our undergraduates do not have adequate mathematical preparation for such applications. Such topics are not found in a traditional applied calculus sequence as taught at many universities. For instance, the applied calculus sequence MATH 220 and MATH 221 at UM is taken by a mixed audience of science, business, and social science students, making the relevance of the course to biology students quite remote. One solution could have been to require all BSCI students to take the traditional Calculus for Scientists and Engineers sequence MATH 140/141, but this is not the best answer. MATH140/141 does not cover the set of topics needed by modern biologists.

Faculty in Biological Sciences and Mathematics have come together to develop a course for Biological Sciences majors, a two-semester math sequence that not only includes the topics in traditional applied calculus with a higher level of rigor, but also focuses on the aspects of calculus and biomathematics applicable to modern biology. The new course sequence is numbered MATH130 & MATH131, and is intermediate in level and rigor between MATH220/221 and MATH140/141. The course sequence is specifically designed to focus on math applications to important biological problems. The BSCI and MATH faculty developed the syllabus they felt most appropriate, based on their own knowledge of the mathematics required for successful students of biology. Indeed, the curriculum developed here matches closely that suggested by BIO2010 and other national agendas. And UM is not the first to develop such a curriculum. A quick web search and information from publishers identifies nearly 40 institutions of higher education with a Calculus for Life Sciences sequence, including the University of Wisconsin, UCLA, and the University of Washington. There are at least five textbooks recently published for this type of calculus sequence.

While the curriculum and textbooks in MATH130/131 match closely the national models for a biological mathematics calculus course, the format of the UM sequence is innovative. Like most applied calculus courses, MATH220/221 has one discussion session per week, led by a mathematics graduate student, in which students go over homework problems and receive answers to questions on basic math techniques. In order for students to gain expertise in using mathematics in biology they need direct experience solving such problems. To achieve this, MATH130/131 is designed to have one additional discussion session per week to address biology math problems. The MATH130/131 team has developed a set of such exercises, and the textbook has such problems as well. During this discussion session students will work in groups and will actively solve one or two biology math problems in class. This discussion section will be led by a graduate student who has both a math and a biology background, most likely from one of the CLFS graduate programs. This innovative course format will allow students to integrate their understanding of mathematics and biology, and to develop skill in using mathematics to understand biology.

Integration of MATH130/131 into the current curriculum

The undergraduate programs committee in CLFS has unanimously approved that MATH130/131 will replace MATH220/221 as an acceptable calculus sequence for Biological Sciences majors. This requirement will apply to students who matriculate as freshmen at UMCP, or transfer students who matriculate elsewhere, Fall 2009 and later. MATH140/141 will still be the course of choice for those students who wish a path toward higher-level mathematics courses. With MATH 130/131, the mathematical skills of BSCI students will be raised uniformly to a level which will better support mathematical applications in advanced courses in the BSCI curriculum.

To clarify the relationship between MATH220/221 and MATH130/131 the syllabi for MATH220/221 and MATH130/131 are attached. The curriculum for this course certainly will evolve as math and biology faculty work to develop and teach the course. For now, the pre-requisite for MATH130 will be the same as for MATH220: MATH112, or MATH113, or MATH115. As students move through the curriculum and we gather data on student success this pre-requisite will likely be re-assessed by the math department. These syllabi make it clear that, compared with MATH220/221, MATH130/131 contains more content on discrete mathematical systems, modeling, and probability. MATH130/131 is considered by the MATH and BSCI faculty to be a higher level math course than MATH220/221. It is in fact in between the level and rigor of MATH220/221 and MATH140/141. MATH130/131 carries the math content required for students studying modern, 21st century, biology.

As noted above, one discussion section per week in MATH130/131 will be devoted to biology problems. Our aim in this discussion is to include biology problems that are conceptually intuitive for students and that do not require sophisticated background knowledge in biology. To achieve this aim, CLFS paid for graduate students to develop a library of such problems that are appropriate for freshmen level BSCI majors. These have been well received by the math instructors and the students in the course. We will continue to monitor the effectiveness of these problems and invest in revising, upgrading, and expanding them.

Students will take MATH130/131 at the same point in their academic career as students have taken MATH220/221. In other words, advisors will encourage students to take the calculus sequence as soon as the pre-requisite has been met. For over 95% of our entering freshmen, this will be their first semester at UM. Since this course sequence will simply replace MATH220/221, there should be no impact on students’ progress toward degree.

The major advantage of implementing MATH130/131 is that students will be better prepared for the biological math applications in their major courses. Math applications begin in the Principles of Biology I, II and III courses and build in upper level courses. Increasingly, students in biology courses must understand probability distributions and basic statistics. In many upper level
courses students are exposed to modeling and other mathematical applications. We anticipate that MATH130/131 will lead our students to be more successful in these areas. Indeed, part of our LOA process involves an assessment of student comprehension of basic principles of probability and this spring we plan to administer this same assessment to students who have completed MATH131. Using these kinds of cross-curriculum assessments we will be able to fine-tune MATH130/131 to optimize student comprehension.

Occasionally students come into the BSCI major with MATH140 and do not wish to continue to MATH141. The Math Department has determined that students with MATH140 can enroll in MATH131. However, students with MATH220 will not be allowed to enroll in MATH130 but will have to take MATH130.

Course resources
MATH130/131 requires more TA resources than MATH220/221. CLFS has agreed to pay for the additional TA resources needed to offer the new math sequence to BSCI majors. We anticipate that this will mean supporting 2.5 TAs each fall and 2 TAs each spring. This will ensure that all BSCI majors have access to the new sequence. CLFS cannot, however, provide funds to offer MATH130/131 to all students and majors who want the course or who are planning to be BSCI majors. CLFS is working diligently with the planning cycle process and Undergraduate Studies to obtain funds to open the course to any student interested in taking it, and to any major on campus that wishes to require it.

Internal transfers
We will make every effort to disseminate this new requirement to other units, especially Letters & Sciences. CLFS will work especially closely with Letters and Sciences to ensure that advisors and students there understand the new BSCI requirements. Students in L&S who are reasonably certain of their interest in BSCI will be encouraged to declare BSCI as a major during summer orientation. This is, in fact, in the students’ interest, since timely graduation in the BSCI major requires careful academic planning and advising, both of which are best delivered in CLFS. Students who are not yet ready to declare BSCI – and who do not enroll in MATH140/141, will be allowed to register for BSCI105 and CHEM131 assuming that have the appropriate math placement. They will be put on in a hold file for MATH130 or MATH131 and any seats open on the first day of classes will be available to them. Otherwise, students with an interest in BSCI will be encouraged to delay calculus until they are certain of their major choice. The advising community in all other colleges on campus will be fully apprised of the new course and the new BSCI requirement. We have assurances from BSOS and AGNR that if a CLFS student transfers to a major in those colleges MATH130/131 will be accepted in place of MATH220/221. Students who matriculate Fall 2009 or later and come to the BSCI major with MATH220/221 will be required to take MATH130/131. This is no different from the current state in majors that require MATH140/141.

External Transfers
External transfers would seem to pose a problem because few if any of the institutions that students typically transfer from would have an equivalent of MATH130/131 for students to take. Luckily, most (about 80%) of the external transfer students who enter CLFS took the equivalent of MATH140/141 at their home institution. These students will have satisfied the BSCI math requirement and will not be required to take MATH130/131. Effective communication to the Maryland community colleges and four-year schools, and updates on ARTSYS, will indicate that transfer students interested in BSCI at UM should take MATH140/141, and thus minimize the transfer problem. For those who do transfer in with MATH220/221 we will initially accept this
sequence as an exception to policy, but will eventually require all BSCI majors to have MATH130/131. Again, this is no different from the situation in majors that require MATH140/141.
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University of Maryland Course Proposal Form

VPAC log no.: 07311491
Date initiated: 11/39/07
Unit Code: 012025001250101
ACAF log no.: 08/0072

Course Prefix and Number: MATH130

Transcript Title: Calculus I for Life Sciences

Title: Calculus I for the Life Sciences

Credits: Minimum 4 Maximum 4

Repeatable to a maximum of 0 if content differs

Hour commitment per week: Lecture: 3 Internship: Discussion: 2 Laboratory: Seminar:

Can this course be waived through an AP exam? No

Has this course been approved to fulfill a CORE distribution requirement? No

Grading Method: Standard Undergraduate

Formerly:

Prerequisite(s): see catalog description below

Corequisite(s):

Recommended course(s):

Restrictions: Restricted to students with majors in CLFS.

Crosslisted with:

Shared with:

Credit will be given for only one of the following courses: MATH 130, MATH 140, MATH 220

Will this course be offered at another location or through an alternate delivery method? No

Catalog Description: Prerequisite: a grade of C or better in MATH 112, 113 or 115 or equivalent; or, permission of department based on 3 1/2 years of college preparatory mathematics (including trigonometry) and satisfactory performance on the MATHEMATICS PLACEMENT EXAM. Not open to students majoring in mathematics, engineering or the physical sciences. Credit will be granted for only one of the following: MATH 130, MATH 140 or MATH 220. Basic ideas of differential and integral calculus, with emphasis on elementary techniques and applications to the life sciences.

Reason for proposal/comments: REASON FOR PROPOSAL. Biology majors need more mathematics then is provided by the calculus sequence MATH 220-221 they currently take, and they need more biological applications. The sequence MATH 130-131 will replace MATH 220-221 as a requirement for life sciences majors and address these needs. A PCC proposal for this from CLFS is in preparation. COMMENTS. The course MATH 130 will consist of three hours (i.e., 150 minutes) of large lecture together with one weekly 50 minute meeting with a Math TA and one weekly meeting with a biologically trained TA. The latter meeting will focus on biological applications. The sequence MATH 130-131 has been developed by Math in close collaboration with CLFS. The biologically trained TA position will be staffed by CLFS in consultation with MATH. MATH 130 was taught as a 4-credit course in Spring 2008, and is being taught in the full large lecture mode now, in Fall 2008. In this Fall 2008 version, the course is offered at 3 credits of MATH 130 and 1 credit of BSCI 130 (which is the bio TA weekly meeting), per an MOU with CLFS in Spring 2008. We are reverting to the 4-credit MATH 130 (no separate BSCI section) as requested by CLFS, which has found the cluster registration arrangement in practice to be awkward and burdensome.
Mike Boyle 19/NOV/2008
Dept. PCO Chair (print name, sign, date)

Jim Yorke 19/NOV/2008
Dept. Chair (print name, sign, date)

James Puerto 11/25/08
College/School PCO Chair (print name, sign, date)

James Puerto 11/25/08
Dean (print name, sign, date)

Chanda Decker 12/12/08
Vice President for Academic Affairs & Provost

For use by Registrar's Office only

Effective Term: 0901
Repeat Table: 11/14
Prereq pop-up: 11/17/09 SBAM
Entered/date: 11/16/09 MB2
Verified: 11/17/09 SBAM

0901
Effective Term
Math 130 Syllabus

1. This course is the first half of the sequence MATH 130-131 and serves as an introduction to calculus for students in the life sciences. The purpose is to train students in basic ideas and techniques of calculus, with special attention to biological applications. An overview of course content is given by the list of specific topics below.

2. After this course, a student should have become familiar with some of the ways that calculus is used to study problems in biology and should be prepared for further learning of applications and further learning of calculus and its applications.

3. Prerequisite to the course: a grade of C or better in MATH 112, MATH 113 or MATH 115 or equivalent; or, permission of the math department based on 3 1/2 years of college preparatory mathematics (including trigonometry) and satisfactory performance on the MATHEMATICS PLACEMENT EXAM. This course is not open to students majoring in mathematics, engineering or the physical sciences. Credit will be granted for only one of the following: MATH 130, MATH 140 or MATH 220.


5. MATH 130 will consist of two 75 minute meetings in the large lecture together with one weekly 50 minute meeting with a MATH TA and one weekly meeting with a BSCI TA. The latter meeting will focus on biological applications.

6. There will be regular office hours during which the professor and TAs will be available to students.

7. The grade will be determined by three written examinations, a final examination and additional assignments and section activity as indicated in the detailed syllabus for the semester.

List of Topics:

Introduction to Discrete-Time Dynamical Systems

Variables, Parameters, and Functions in Biology
Discrete-time Dynamical Systems
Analysis of Discrete-Time Dynamical Systems
Expressing Solutions with Exponential Functions
Oscillations and Trigonometry
An Example of Nonlinear Dynamics

Limits and Derivatives

Introduction to Derivatives
Limits
Continuity
Computing Derivatives: Linear and Quadratic Functions
Derivatives of Sums, Powers, and Polynomials
Derivatives of Products and Quotients
The Second Derivative, Curvature, and Acceleration
Derivatives of Exponential and Logarithmic Functions
The Chain Rule
Derivatives of Trigonometric functions

Applications of Derivatives and Dynamical Systems
Stability and the Derivative
More Complicated Dynamics
Maximization
Reasoning about Functions
Limits at Infinity
Leading Behavior and L'Hopital's Rule
Approximating Functions with Linear Functions and Polynomials
Newton's Method

Differential Equations, Integrals, and Their Applications

Differential Equations
Solving Pure-Time Differential Equations
Integration of Special Functions, Integration by Substitution
Integration by parts
Integrals and Sums
Definite and Indefinite Integrals
Applications of Integrals
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University of Maryland Course Proposal Form
Department/Program: MATH
College/School: CMPS
Action: add

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<th>Course Prefix and Number: MATH 131</th>
<th>Transcript Title: Calculus II for Life Sci</th>
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<td>Repeatable to a maximum of 0 if content differs</td>
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<tr>
<td>Credits: Minimum 4 Maximum 4</td>
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<td>Grading Method: Standard Undergraduate</td>
<td>Formerly:</td>
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<tr>
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<td>Will this course be offered at another location or through an alternate delivery method? No</td>
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Catalog Description: MATH 131 Calculus II for Life Sciences (4) Prerequisite: A grade of C or better in MATH 130 or MATH 140 or equivalent. Credit will be granted for only one of the following: MATH 131, MATH 141, or MATH 221. Continuation of MATH 130, including an introduction to autonomous differential equations, probability (including conditional probability and the normal and binomial distributions), and statistical reasoning (including confidence intervals). Alongside the mathematical concepts will be applications in biology.

Reason for proposal/comments: Biology majors need more mathematics than is provided by the calculus sequence MATH 220-221 they currently take, and they need more biological applications. The sequence MATH 130-131 will replace MATH 220-221 as a requirement for life sciences majors and address these needs. Each week MATH 131 will have 3 hours (150 minutes) of lecture, one 50 minute meeting with a Math TA and one 50 minute meeting with a biologically trained TA. CLFS will submit a PCC proposal on the changed calculus requirement for its majors. MATH 131 is being taught for the first time this semester (Fall 2008) as a small course. In Spring 2009 it will move to the large lecture mode. The meeting with the biologically trained TA will focus on biological applications. The sequence MATH 130-131 has been developed by Math in close collaboration with CLFS. The biologically trained TA position will be staffed by CLFS in consultation with MATH.
Math 131 Syllabus

1. This course is the second half of the sequence MATH 130-131 and serves as an introduction to calculus for students in the life sciences. The purpose is to train students in basic ideas and techniques of calculus, with special attention to biological applications. An overview of course content is given by the list of specific topics below.

2. After this course, a student should have become familiar with some of the ways that calculus is used to study problems in biology and should be prepared for further learning of applications and further learning of calculus and its applications. In particular the student should have come to understand some basic ideas and applications of probability.

3. Prerequisite to the course: a grade of C or better in MATH 130 or MATH 140 or equivalent. This course is not open to students majoring in mathematics, engineering or the physical sciences. Credit will be granted for only one of the following: MATH 131, MATH 141 or MATH 221.


5. MATH 131 will consist of two 75 minute meetings in the large lecture together with one weekly 50 minute meeting with a MATH TA and one weekly meeting with a BSCI TA. The latter meeting will focus on biological applications.

6. There will be regular office hours during which the professor and TAs will be available to students.

7. The grade will be determined by written examinations, a final examination and additional assignments and section activity as indicated in the detailed syllabus for the semester.

List of Topics:
The specific topics covered in MATH 131 in Fall 2008 are listed below. They are taken from the course text, by Frederick R. Adler:

Chapter 4: Differential Equations, Integrals, and their Applications
Chapter 5: Analysis of Autonomous Differential Equations

5.1: Basic Differential Equations
5.2: Equilibria and Display of Autonomous Differential Equations
5.3: Stable and Unstable Equilibria
5.4: Solving Autonomous Differential Equations
5.5: Two-Dimensional Differential Equations
5.6: The Phase Plane
5.7: Solutions in the Phase Plane

Chapter 6: Probability Theory and Descriptive Statistics

6.1: Introduction to Probabilistic Models (light)
6.2: Stochastic Models of Diffusion and Genetics (light)
6.3: Probability Theory
6.4: Conditional Probability
6.5: Independence and Markov Chains
6.6: Displaying Probabilities
6.7: Random Variables
6.8: Descriptive Statistics
6.9: Descriptive Statistics for Spread

Chapter 7: Probability Models

7.1: Joint Distributions
7.2: Covariance and Correlation
7.3: Sums and Products of Random Variables
7.4: The Binomial Distribution
7.5: Applications of the Binomial Distribution
7.6: Waiting Times: Geometric and Exponential Distributions
7.7: The Poisson Distribution
7.8: The Normal Distribution
7.9: Applying the Normal Distribution

Chapter 8: Introduction to Statistical Reasoning

8.2: Confidence Limits
8.3: Estimating the Mean

as time permits:

8.4: Hypothesis Testing
Subject: Fw: moa (fwd)
From: "James Yorke" <Yorke@UMD.EDU>
Date: Mon, 16 Feb 2009 15:42:01 -0500
To: <crector@umd.edu>
CC: "Joelle Presson" <jpresson@umd.edu>, "M. Michael Boyle" <mmb@math.umd.edu>

Dear Claudia,

The Mathematics Department is committed to offering both MATH 130 (Calculus for the Life Sciences I) and MATH 131 (Calculus for the Life Sciences II) every fall and every spring semester.

This is based on the understanding that Math will not be responsible for funding the TAs who lead the biologically oriented sections. Math will be responsible for funding the TA who leads the nonbiologically oriented sections, and for funding the faculty teaching the large lectures.

More details are included in the memorandum of agreement of Nov. 18, 2008, which is attached.

James Yorke, Chair of Mathematics
Distinguished University Professor of Mathematics and Physics
University of Maryland
Memorandum of Agreement

November 17, 2008

The Colleges of Chemical and Life Sciences and Computer, Mathematical, and Physical Sciences agree to enter into a joint offering of the two-course sequence Calculus for Life Sciences, MATH130/MATH131. Each course will carry four credits, and will include 150 minutes of lecture and two 50-minute discussions per week. In general, one discussion per week scheduled with MATH 130/131 will focus on mathematical issues related to the lectures and homework, while the second discussion will have students doing biology applications problems, although the exact activities in each discussion each week will be at the discretion of the instructor. MATH 130 and MATH 131 will both be offered each semester.

This calculus for life sciences sequence will replace MATH220/221 as an acceptable sequence for Biological Sciences majors. Some BSCI majors may opt to take MATH140/141, but it is expected that most BSCI majors will take MATH130/131. This requirement for the BSCI major will become effective the fall semester after VPAC and PCC approval, which will likely be Fall 2009. The structure, oversight and staffing of the course is as follows:

- MATH130 and MATH131 will each be four credit courses and will be scheduled for 150 minutes of lecture each week and two 50-minute sessions for discussion. One discussion session will be lead by a MATH TA, the other by a BSCI TA chosen with input and consultation from the MATH faculty.

- The Mathematics Department will assign faculty to teach MATH130 and MATH 131 each semester.

- Mathematics will hire the TAs for the MATH discussions and fund those TAs in the way it does with its other calculus courses

  - CLFS will provide funds and hire the BSCI TAs, sufficient to provide seats for all declared BSCI majors, and any other CLFS majors with approval to take the course. It is anticipated that this will involve six sections of MATH130 each fall, four sections of MATH130 each spring, and four sections of MATH131 every fall and spring. If CLFS majors grow in number beyond this capacity CLFS will provide support accordingly.

  - CLFS will pursue campus funds to offer enough sections of MATH130/131 to L&S students interested in BSCI, and students in other relevant majors, are able to register for the course.

  - Unless campus funds are forthcoming the course will be restricted to those with CLFS major codes, with the understanding that CLFS will advise CLFS students for whom MATH140/140 are the appropriate courses.
• All TAs will be under the supervision of the faculty member of record for each course.

______________________________  _________________________________
Steven Halperin, Dean CMPS     date                           Norma Allewell, Dean CLFS     date