New Course Proposal

1. **Course number:**
   BIOL 111

2. **Full course title:**
   Marine Biology of the Chesapeake Bay

3. **Catalog description:**
   Introduction to the ecology and biological diversity of the Chesapeake Bay and its watershed. Environmental issues facing the Bay will be explored through direct data collection, observation, and hands-on activities. This is a service-learning course and students will join local 5th grade classrooms to help teach elementary students about the Bay. Three lecture and three laboratory hours a week.

4. **Prerequisites (if any):**
   None.

5. **Hours of credit:**
   4 credit hours OR 1 unit

6. **Estimate of student enrollment:**
   40 students

7. **By whom and when the course will be offered:**
   Offered By: Malcolm Hill
   Frequency: Every other year

8. **Staffing implications:**
   None.

9. **Adequacy of library, technology, and other resources:**
   Library and other resources are adequate. Some of the activities in the course will revolve around the creation of appropriate modules for 5th grade students. Ms. Sue McGinnis (in the TLC) has indicated an interest in serving as a resource to students in the class. Ms. McGinnis is an expert web designer and was a 4th and 5th grade teacher in Chesterfield County, Virginia. As a teacher, Ms. McGinnis created a set of curricular activities built around a virtual explorer known as "Vern." Ms. McGinnis has indicated that she could easily help students create Bay-specific activities using Vern as the medium.
10. **Relation to existing courses and curricula in other departments, programs, and schools:**
Marine Biology of the Chesapeake Bay would fit within the Biology Department’s offerings as a Field of Study option. This course does not overlap with any of the other non-science major offerings within the department.

11. **Indication of approval by department or program:**

12. **Purpose and rationale for the course:**
There is generally broad interest among undergraduates in the marine sciences. This course will provide an opportunity for these students to explore the biology and ecology of the Chesapeake Bay, the largest estuary in the United States. The Chesapeake and its associated watershed is a major environmental resource for the entire mid-Atlantic region and the proposed course will provide students with opportunities to learn more about this fragile system. They will also gain important skills in reading scientific literature, mastering the scientific method, and synthesizing their understanding of complex scientific issues. This course also addresses one of the objectives that the university is interested in expanding, namely service learning. As stated on the UR’s web page, “to achieve its educational objectives, the institution is committed to the "development of civic responsibility" in students, as well as to provide them opportunities for "social commitment and public service."
(http://oncampus.richmond.edu/academics/tltcenter/servicelearn/)

13. **Brief outline of the course:**
See attached syllabus.

14. **Sign-offs for items 8 & 9:**
Staffing (Dona Hickey)
Library Resources (Department Liaison)
Classroom Technology (Gardner Campbell)
Classrooms (Susan Breeden)
International Education Committee* (Uliana Gabara) *If the course includes international travel
Written Explanation for Purpose of Fields-of-Studies Course Proposal

BIOL 111: Marine Biology of the Chesapeake

*Marine Biology of the Chesapeake* (MBC) is a course designed to specifically address each of the goals for fields-of-study courses at the University of Richmond. Furthermore, *MBC* is specifically designed to be a service-learning experience for the students who enroll. A partnership has been developed, through the Bonner Center for Civic Engagement, with 5th grade classes at Overby-Sheppard Elementary School in the Highland Park area of Richmond.

The overarching purpose of MBC is to familiarize students with questions that marine biologists who work in the Chesapeake Bay ask. There is generally broad interest among undergraduates in the marine sciences. The Chesapeake, and its associated watershed, is a major environmental resource for the entire mid-Atlantic region and has helped shape the identity of the city of Richmond. Students will be introduced to the biological diversity, geological uniqueness, and physical properties of the Bay. Students will also be asked to explore the complex environmental problems facing the Bay. As these goals are achieved, students will be exposed to methodologies commonly used by biologists working in this system.

A major objective of *MBC* is to educate students, in a general sense, about the scientific enterprise. Particular attention will be paid to the scientific method, and students will come to appreciate the power of this way of learning about the natural world. Through the analysis of data, students will learn to discriminate between science and pseudoscience. Students will be given opportunities to read/interpret scientific literature (to increase their scientific literacy) and synthesize their understanding of complex scientific issues.

To achieve the goal of increased scientific proficiency, students in MBC will themselves become teachers. While our undergraduates will be asked to generate and test hypotheses, perform experiments and evaluate data, they will also be asked to teach what they know to students in a local elementary school. University of Richmond students will visit Overby-Sheppard classes and work with students on a number of projects. In the process, they will share their general understanding of marine systems and particular
This course expands on the number of service learning options available to UR students, which is one of the stated objectives of the university. As stated in Mission Statement for the Center for Teaching, Learning & Technology, "the institution is committed to the "development of civic responsibility" in students, as well as to provide them opportunities for "social commitment and public service." This course will achieve these goals by employing our students in the service of a school system that has a demonstrated need (in the form of lower than expected SOL scores) and a stated desire to have UR students get involved.
Biology 111: Marine Biology of the Chesapeake Bay

Instructor Information
Instructor: Malcolm Hill, Ph.D.
Email: mhill2@richmond.edu
Office: (Gottwald) B-114
Phone: x6628
Office hours: T 1:00 - 3:30 pm & by appointment

Course Information
Meeting Times: Lecture – T R 9:20-10:10
Lab – T R 1:35-4:25 both in A-113; or as noted

Text: Life in the Chesapeake Bay 3rd Ed. 2006 (ISBN 0-8018-8338-5) by Alice Jane Lippsen and Robert L. Lippsen (in bookstore). Supplemental readings will be posted on the Blackboard website. Lab handouts will also be available at this site.

Objectives:
The purpose of BIOL 111 is to introduce you to the branch of the biological sciences that focuses on marine systems – specifically the Chesapeake Bay and its associated watershed. We will study many of the organisms in this unique ecosystem. We will also explore factors that influence and control the abundance and distribution of species in this community and environmental issues the Chesapeake currently faces. We will also examine basic types of questions marine biologists ask and the methods they employ, which will necessitate a thorough understanding of the scientific method. You will be expected to think critically about all aspects of this diverse science. Laboratory- and field-based activities will be used to illustrate various aspects of the biology of the Chesapeake. Several of the labs will take place outside and we will conduct research in any weather that Mother Nature presents (barring dangerous conditions). We will go out in the rain, snow, cold, heat or humidity – whatever nature throws at us. Please come dressed for the weather. It is a good idea to bring foul-weather gear even if the weather looks nice.

This is a service-learning course. As stated on the UR web page, “to achieve its educational objectives, the institution is committed to the ‘development of civic responsibility’ in students, as well as to provide them opportunities for ‘social commitment and public service.’” We will be partnered with a local elementary school in inner city Richmond. We will visit the school on several occasions to work with the students and share our experiences with the Bay and understanding of the biology of the Bay. Among other activities, we will discuss environmental problems in the Bay, perform demonstrations with a variety of organisms, supervise art projects, and organize and lead a trip into the field with the students.

Pedagogical Approach to the Course:
The course will include traditional lectures based on assigned readings from our textbooks. There may be some need to modify the syllabus as the semester progresses depending on whether the class requires more or less time on particular topics, but any
changes to the content of the course will be communicated well in advance. Lecture
periods will also be used for inquiry-based activities designed to illustrate particular
topics. Problem sets, computer activities, in-class discussions, and student
presentations will be part of the course. The laboratory will involve student-centered
activities that rely on independent thought and creativity. A major portion of the course
will involve developing curricular materials (e.g., lab and field activities) for 5th grade
classes that are learning about marine systems.
Exams will be a combination of problem solving, short-answers and short-essays. The
dates of exams are provided below; therefore, none of the exams should take you by
surprise. If you miss an exam without notifying me, you will receive a zero on the exam.
Lab attendance is mandatory. We will have two weekend field trips to the Chesapeake
Bay associated with lab; both trips require a Saturday commitment. Participation in
lecture and laboratory will influence your final grade.

Course website: The website will contain lecture outlines, lab handouts, and keys to
exams.

Academic dishonesty: You have all pledged to follow the honor code upon
matriculation at the University of Richmond. Thus, academic dishonesty is not expected,
and will not be tolerated. I will follow all guidelines established by the Honor Council for
dealing with infractions.

Grading:
- Two scheduled 1-hour exams each worth 15% of final grade. NO MAKE-UP
  EXAMS! These exams represent 30% of your total grade.
- A short essay (8 pages) on a topic concerning the environmental health of the
  Bay (15% of the total grade).
- Final exam (cumulative); 30% of final grade.

The Laboratory portion of the course represents 25% of your final grade.
- Working in groups of 2, you will be responsible for producing a curricular program
covering a current topic important in the biology of the Chesapeake that is
appropriate for 5th grade classes. The final product will be presented to the class
at the end of the semester. This assignment represents 15% of your final grade.
- A lab practicum will be conducted near the end of the semester to test species
  identification skills and general understanding of the equipment and approaches
to studying marine biology (5% of your final grade).
- Participation in discussions will account for 5% of your total lab grade.
### Marine Biology of the Chesapeake Bay

**SPRING, 2007**

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture</th>
<th>Reading</th>
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<tbody>
<tr>
<td>1/15</td>
<td>Introductions &amp; Description of Service Learning in MBCB</td>
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<td>1/17</td>
<td>What is Marine Biology?</td>
<td>Handout</td>
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<td>1/19</td>
<td>What is an Estuary? Introduction to the Chesapeake.</td>
<td>Handout</td>
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<td>Basic Ecology</td>
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<td>Ecology of the Bay</td>
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<td>The Chesapeake Watershed</td>
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<td>Classification of Animals &amp; Plants</td>
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<td>How Sand Beaches Form</td>
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<td>Stressors on the Beach &amp; Organism Adaptations</td>
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<td>Meiofauna and Plants of the Tidal Flats</td>
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<td>Life in the Plankton</td>
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<td>Food webs in the Plankton</td>
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<td>Food webs in seagrasses</td>
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<td>3/5-9</td>
<td>SPRING BREAK WEEK</td>
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<td>3/12</td>
<td>Wetlands: Upland Areas</td>
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<td>3/14</td>
<td>Prepare for visit to Overby-Sheppard</td>
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<tr>
<td>3/16</td>
<td>VISIT OVERBY-SHEPPARD</td>
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<td>3/23</td>
<td>Blue Crabs and the Blue Crab Fishery</td>
<td>Handouts</td>
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3/26 Deeper Waters of the Bay
3/28 Fin Fish Fisheries
3/30 Infrequent Visitors to the Bay

4/2 EXAM TWO
4/4 Prepare for Visit to Overby-Sheppard
4/6 VISIT OVERBY-SHEPPARD

4/9 Environmental Problems: Eutrophication
4/11 Environmental Problems: Overfishing
4/13 Environmental Problems: Pollution

4/16 Environmental Problems: Watershed Issues
4/18 Environmental Problems: Climate Change
4/20 Environmental Regulations & Improvements

4/23 Essay Critiques
4/25 Essays Due
4/27 REVIEW

FINAL: TBA

LAB SYLLABUS – Marine Biology of the Chesapeake Bay SPRING, 2007
Week 1 Water Sampling & Intro to Organism ID On-campus
Week 2 Ecological Sampling On-campus;
Week 3 Species of the Piers & Jetties In Lab
Week 4 SATURDAY MEETING Chesapeake Shore
Week 5 Species of the Shallow Water & Seagrass Meadows In Lab
Week 6 SATURDAY MEETING Chesapeake Shore
Week 7 Water quality sampling Off-campus
Week 8 SPRING BREAK
Week 9 Project Work In Lab
Week 10 Project Work In Lab
Week 11 VISIT OVERBY-SHEPPARD Off-campus
Week 12 VISIT OVERBY-SHEPPARD Off-campus
Week 13 Student Presentations In Lab
Week 14 Student Presentations In Lab
Week 15 Student Presentations In Lab