Course Approval Form

Action Requested: [ ] Create new course  [ ] Inactivate existing course  [ ] Reinstall inactive course  [ ] Undergraduate
[ ] Modify existing course (check all that apply)
[ ] Grade Type

College/School: College of Science
Submitted by: [ ] Biology
Ext: Biology

Subject Code: [BIO] Number: 443
(Do not list multiple codes or numbers. Each course proposal must have a separate form.)

Effective Term: [ ] Fall  [ ] Spring  [X] Summer  [X] Year 2014

Title: [ ] Current
Banner (30 characters max w/ spaces)
New
Tropical Ecology

Credits: [X] Fixed or [ ] Variable to

Repeat Status: [ ] Not Repeatable (NR)  [X] Repeatably within degree (RD)  [ ] Repeatably within term (RT)

Fulfills Mason Core Req? (undergrad only)
[ ] Currently fulfills requirement
[ ] Currently fulfills requirement
[ ] Submission in progress

Grade Mode: [X] Regular (A, B, C, etc.)  [ ] Satisfactory/No Credit  [ ] Special (A, B, C, etc. +IP)

Schedule Type: [X] Lecture (LEC)  [ ] Lab (LAB)  [ ] Recitation (RCT)  [ ] Internship (INT)

Prerequisite(s): [BIO] 308 or POI

Restrictions Enforced by System: Major, College, Degree, Program, etc. Include Code.

Corequisite(s):

Catalog Copy for NEW Courses Only (Consult University Catalog for models)

Description (No more than 60 words, use verb phrases and present tense)
An introduction to the abiotic and biotic factors that define tropical habitats. The course emphasizes evolution, taxonomic diversity, and plant-plant interactions in terrestrial tropical forests.

Indicate number of contact hours:

When Offered: (check all that apply) [ ] Fall  [ ] Summer  [X] Spring

Approval Signatures

Department Approval

Date

College/School Approval

Date

If this course includes subject matter currently dealt with by any other units, the originating department must circulate this proposal for review by those units and obtain the necessary signatures prior to submission. Failure to do so will delay action on this proposal.

Unit Name

Unit Approval Name

Unit Approver’s Signature

Date

For Graduate Courses Only

Graduate Council Member

Provost Office

Graduate Council Approval Date

For Registrar Office’s Use Only: Banner Catalog

revised 10/26/14
Course Proposal Submitted to the Curriculum Committee of
The College of Science

1. **COURSE NUMBER AND TITLE:** BIOL 443: Tropical Ecology

   **Course Prerequisites:** BIOL 308 or permission of instructor

   **Catalog Description:** BIOL 443 is an introduction to the abiotic and biotic factors that define tropical habitats. The course emphasizes evolution, taxonomic diversity, and plant-animal interactions in the tropics and focuses on a cross-continental comparison of flora, fauna, and contemporary indigenous cultures.

2. **COURSE JUSTIFICATION:** BIOL 443 is the only undergraduate level course offered that provides a detailed investigation of tropical terrestrial plant and animal biological diversity.

   **Course Objectives:** The purpose of this class is to introduce students to basic ecological and evolutionary concepts within the context of tropical biology. Upon completion of this course, students are expected to understand:

   - The planetary, climatological, geological and geographic conditions that dictate the locations of lowland wet forests and other tropical habitats
   - The physiognomy, diversity and continental variability of contemporary tropical habitats
   - The taxa, diversity, evolutionary origins, and ecosystem services provided by the major vertebrate and invertebrate tropical fauna
   - The taxa, diversity evolutionary origins, and ecosystem services provided by the major flora of tropical forests
   - The role of abiotic and biotic factors in maintaining tropical biological diversity
   - The pre-historic, historic and current distribution of humans within tropical forests
   - The contemporary conservation issues concerning terrestrial, aquatic, and marine tropical habitats

   **Course Necessity:** This course fills a need for upper level elective courses for biology students pursuing conservation, environmental sciences, or certificates. It is critical for students interested in

   **Course Relationship to Existing Programs:** This will be an elective within the BA and BS in Biology.

   **Course Relationship to Existing Courses:** This course is similar Tropical Ecosystems, previously taught as BIOL 543, but this course will be phased out due to declining
enrollment interest at the graduate level. Enrollment in BIOL 543 in Spring 2014 was 13 students; however, only 2 were graduate students.

3. **APPROVAL HISTORY:** This course was previously taught in Spring 2012 and Spring 2014 as BIOL 435. Enrollment in Spring 2012 was 28 students.

4. **SCHEDULING AND PROPOSED INSTRUCTORS:** To be offered on Tuesday and Thursday afternoons from 1:30 to 2:45 in the Spring Semester of even numbered years.

   **Semester of Initial Offering:** Spring 2016

   **Proposed Instructors:** Dr. Rebecca Forkner

5. **TENTATIVE SYLLABUS:** See attached.
TROPICAL ECOLOGY
BIOL 443
Spring 2016

Instructor: Dr. Rebecca Forkner
3016 David King Hall
Email: rforkner@gmu.edu
Phone: (703) 993-4683
Office hours: Tuesday & Thursday, 12:00 a.m. – 1:00 p.m.

Lectures: Tuesday & Thursday, 1:30 – 2:45 p.m.

Textbook: Kricher, J. (1997) A Neotropical Companion: An introduction to the animals, plants and ecosystems of the New World tropics. 2nd ed. Princeton University Press, New Jersey. (recommended text only, additional reading material will be on reserve at the Johnson Center Library)

Course objectives:
The purpose of this class is to introduce you to the basic scientific concepts of tropical biology, including the origin of tropical forests, their structure, diversity and continental variability. After finishing this course, you should be able to

1) Describe the specific planetary, climatological, geological and geographic conditions that define the “tropics” and dictate their locations. This includes being able to discuss how plate tectonics have contributed to current differences in forest composition on different continents.

2) Describe and give examples of the major types and locations of terrestrial and aquatic tropical habitats, and explain how tropical environments differ from temperate or other non-tropical habitats in structure, diversity, and function. This includes being able to explain how lowland tropical wet forests differ from other tropical habitat types.

3) Describe the physical structure of and ecological and evolutionary processes that maintain tropical rainforest plant communities, and list and describe some common types of plant life forms unique to the tropics. This includes being able to discuss what abiotic and biotic aspects contribute to the high productivity of tropical forests and how these factors differ from those of temperate forests.

4) Describe the patterns of tropical plant and animal diversity. This includes being able to a) give examples of plant and animal taxa endemic to specific areas, b) discuss continental differences in the types of plant and vertebrate taxa present, and c) explain the role of evolutionary convergence or divergence in creating similarities and differences in different continental tropical regions.

5) Discuss the abiotic and biotic processes that are hypothesized to create and maintain patterns of tropical biological diversity.

6) Identify and describe contemporary indigenous tropical cultures, and explain the major threats to tropical forests and their inhabitants. This includes being able to identify conservation issues relevant to different continental and marine tropical regions.
**Syllabus (tentative):**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topics Covered</th>
<th>Readings</th>
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<tbody>
<tr>
<td>Jan 21</td>
<td>Tropical Geography &amp; Climate</td>
<td>Kricher – Ch.1, Leopold (1924)</td>
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<tr>
<td>Jan 23</td>
<td>Tropical Regions &amp; Historical Biogeography</td>
<td>Kricher – Ch. 2</td>
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<td>Jan 28</td>
<td>Tropical Habitats &amp; Representative sites</td>
<td>Kricher – Ch. 11</td>
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<tr>
<td>Jan 30</td>
<td>Tropical Habitats &amp; Representative sites</td>
<td>Kricher – Ch. 12, pg 422 – 446</td>
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<tr>
<td>Feb 4</td>
<td>Tropical Plants: Structure &amp; Adaptations</td>
<td>Kricher – Ch. 3</td>
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<td>Feb 6</td>
<td>Tropical Plants: Diversity</td>
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<tr>
<td>Feb 11</td>
<td>Tropical Plants: Diversity</td>
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<tr>
<td>Feb 13</td>
<td>Tropical Productivity and Soils</td>
<td>Kricher – Ch. 10</td>
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<tr>
<td><strong>Feb 18</strong></td>
<td><strong>Exam I</strong></td>
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<tr>
<td>Feb 20</td>
<td>Tropical Animals: Birds</td>
<td>Kricher – Ch.7, Thompson (1989)</td>
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<td>Feb 25</td>
<td>Tropical Animals: Mammals I</td>
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<td>Feb 27</td>
<td>Tropical Animals: Mammals II</td>
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<tr>
<td>March 4</td>
<td>Tropical Animals: Old World Primates</td>
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<tr>
<td>March 6</td>
<td>Tropical Animals: New World Primates</td>
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<tr>
<td>March 18</td>
<td>Tropical Animals: Reptiles &amp; Amphibians</td>
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<td>March 20</td>
<td>Tropical Animals: Insects</td>
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<td>March 25</td>
<td>Tropical Plant-Animal Interactions</td>
<td>Kricher – Ch. 8</td>
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<td><strong>March 27</strong></td>
<td><strong>Exam II</strong></td>
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<td>April 1</td>
<td>Hypotheses of Diversity</td>
<td>Kricher – Ch 4 &amp; 5</td>
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<tr>
<td>April 3</td>
<td>Hypotheses of Diversity</td>
<td>Kricher – Ch. 6</td>
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<td>April 8</td>
<td>Aquatic habitats: Rivers &amp; Floodplains</td>
<td>Kricher – Ch. 12, pg 446 – 462</td>
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<td>April 10</td>
<td>Aquatic habitats: Lakes, mangroves, coral reefs</td>
<td>Kricher – Ch. 12, pg 463 – 468</td>
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<td>April 15</td>
<td>Tropical Islands</td>
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<td>April 17</td>
<td>Tropical Human origins</td>
<td>Kricher – Ch. 13</td>
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<td>April 22</td>
<td>Tropical Cultures: Contemporary cultures I</td>
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<tr>
<td>April 24</td>
<td>Tropical Cultures: Contemporary cultures II</td>
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<tr>
<td>April 29</td>
<td><strong>Exam III</strong></td>
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<td>May 1</td>
<td>Tropical Conservation: Value of Tropics</td>
<td>Kricher – Ch. 14 &amp; 15</td>
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<td><strong>May 13</strong></td>
<td><strong>Comprehensive Final, 12:00 – 2:00 p.m.</strong></td>
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