Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional
• Submit original form and attachments •

1. This request is submitted by the Department of ____________________________
   Ecosystem Science and Management

2. Course prefix, number and complete title of course: ____________________________
   RLEM 622 Ecoystem Biogeochemistry

3. Change requested
   a. Prerequisite(s): From: ____________________________ To: ____________________________
   b. Withdrawal (reason): ____________________________
   c. Cross-list with: ____________________________
      Cross-listed courses require the signature of both department heads.
   d. Change in course title and description. Enter complete current course title and current course
description in item 4; enter proposed course title and proposed course description in item 5.
   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 6. Attach a course syllabus.

4. Complete current course title and current catalog course description:
   Ecosystem Biogeochemistry

5. Complete proposed course title and proposed catalog course description (not to exceed 50 words):
   Biogeochemistry of Terrestrial Ecosystems

6. a. As currently in course inventory:

<table>
<thead>
<tr>
<th>Prefix</th>
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<th>Title (excluding punctuation)</th>
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<td>622</td>
<td>Ecosystem Biogeochemistry</td>
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<th>Lab</th>
<th>SCH</th>
<th>CIP and Fund Code</th>
<th>Admin. Unit</th>
<th>FICE Code</th>
<th>Level</th>
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   b. Change to:

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<td>622</td>
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   Approval recommended by:
   Dr. Steve Whisenant
   Department Head – Type Name & Sign Date
   Chair College Review Committee Date
   Dean of College Date
   Level 6

   Submitted to Coordinating Board by:
   Associate Director, Curricular Services Date
   Effective Date
Texas A&M University  
Departmental Request for a Change in Course

Undergraduate • Graduate • Professional

- Submit original form and 2 copies -

1. This request is approved by the Department of Rangeland Ecology and Management

2. Course prefix, number and complete title of course:

<table>
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<tbody>
<tr>
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<td>NUTRIENT CYCLING</td>
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Lect. Lab SCH Subject Matter Content Code Admin. Unit FICE Code
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Do not complete shaded area.

b) Changed to:

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<tr>
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<td>ECOSYSTEM BIOGEOCHEM</td>
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Lect. Lab SCH Subject Matter Content Code Admin. Unit Acad. Year FICE Code
0 3 0 0 0 3 2 6 1 3 0 1 0 0 2 2 4 6 5 0 7 0 6 0 0 0 6 3 2

Approval recommended by:

Head of Department  
Date

Head of Department (if cross-listed course)  
Date

Submitted to Coordinating Board by:

Registered Nurse

Director of Academic Support Services  
Date

Chair, College Review Committee  
Date

Dean of College  
Date

Dean of College  
Date

Effective Date

To have this form reviewed, please send to Linda F. Lacey, Mail Stop 1265 or fax to 847-8737.
OAR/AS: 504
Suzie,

Attached is the revised form and revised syllabus for RLEM 622, as per Sandra Williams's direction. Also attached is the correspondence supporting the name change from "Ecosystem Biogeochemistry" to "Biogeochemistry of Terrestrial Ecosystems". Changes to the form and the syllabus include:

1. title change
2. addition of a grading scale
3. building & room address in ADA Statement (from Koldus to Cain Hall)

Please let me know if you need anything more.

Thank you,

Lynette

Lynette Huval
Assistant to the Executive Associate Dean and
to the Associate Dean for Graduate Programs and Faculty Development
College of Agriculture and Life Sciences
Texas A&M University
luval@ag.tamu.edu

Jack K. Williams Administration Building, Room 113
2142 TAMU

Tel: 979-847-9325 | Fax: 979-845-9938

http://aglifesciences.tamu.edu (http://aglifesciences.tamu.edu/)
RLEM 622

BIOGEOCHEMISTRY OF TERRESTRIAL ECOSYSTEMS

SPRING SEMESTER
T-R 8:00-9:15 AM
ANIN RM. 229

INSTRUCTOR:

Dr. Thomas W. Boutton
Department of Ecosystem Science and Management

Office: Animal Industry Bldg., Room 419
Phone: 845-8027
Fax: 845-6430
E-mail: boutton@neo.tamu.edu
Home Page: http://rangeland.tamu.edu/people/Boutton/

COURSE DESCRIPTION AND PREREQUISITES:

Biogeochemical cycles of carbon, nitrogen, sulfur and phosphorus and their interaction with biotic and abiotic processes/ biogeochemical processes investigated at the global level and in several types of terrestrial ecosystems; addressing global climate change, deforestation, acid precipitation, ozone depletion.

Prerequisites: RENR 205 or equivalent; graduate classification

BACKGROUND AND PURPOSE:

The biogeochemical cycles of carbon, nitrogen, sulfur, and phosphorus have tremendous contemporary significance due to their critical roles in determining the structure and function of ecosystems, and their influence on atmospheric chemistry and the climate system. Human impacts on these nutrient cycles are now responsible for a multitude of global changes that threaten the sustainability of ecosystem services essential to mankind.
This course provides a framework for understanding biogeochemical cycles, their significance at both global and ecosystem levels of organization, and their contemporary relevance to ecosystem science and management. The cycles of carbon, nitrogen, sulfur, and phosphorus are emphasized due to their significance in the earth-atmosphere-biosphere system. Ecosystem-level processes are studied in forest, grassland, and agricultural ecosystems. Because many of our current environmental problems are manifestations of disturbed biogeochemical cycles, this course is fundamental to understanding environmental issues such as global climate change, changes in atmospheric composition, land cover/land use changes, carbon sequestration, nitrogen saturation, acid precipitation, nonpoint-source pollution, and water quality.

This course is of interest to graduate students in ecology, soil science, geosciences, hydrology, atmospheric sciences, agricultural sciences, and environmental engineering. There are no prerequisites other than graduate standing in one of these disciplines.

**OBJECTIVES:**

1) Define the basic characteristics and properties shared by all biogeochemical cycles, and establish the relevance of energy flow and the hydrologic cycle to all other nutrient cycles.

2) Examine biogeochemical cycles of carbon, nitrogen, sulfur, and phosphorus

3) Investigate key biogeochemical processes at the ecosystem level of organization, and evaluate the role of soil structure, biology, and biochemistry in those processes.

4) Consider biogeochemical cycling in relation to land uses in grassland, forest, agricultural, and urban ecosystems.

5) Study the interactions between biogeochemical cycles and global changes.

**EVALUATION PROCEDURES:**

There will be 2 exams (midterm and final) worth 100 points each. Participation in class discussions over the course of the semester will be worth 100 points. An oral presentation of an independent group research project at the end of the semester will be worth 150 points. Grades will be based on a percentage of the total possible points (450 possible points) earned by the student as follows: A = 90-100%; B = 80-89%; C = 70-79%; D = 60-69%; F = <60%. Inability to complete assignments or exams on the specified dates (and the subsequent completion of those missed course requirements) must be discussed and cleared with the instructor. Attendance is mandatory.

**COURSE MATERIALS:**

Required textbook: *Biogeochemistry* by W.H. Schlesinger
Assigned reading: available on WebCT (http://elearning.tamu.edu)
Class notes: available on WebCT (http://elearning.tamu.edu)

AMERICANS WITH DISABILITIES ACT (ADA) POLICY STATEMENT:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in B118 Cain Hall or call 845-1637.

ACADEMIC INTEGRITY STATEMENT:

"An Aggie does not lie, cheat, or steal or tolerate those who do."

For more information see the Honor Council Rules and Procedures on the web at:
http://www.tamu.edu/aggiehonor
LIST OF TOPICS AND CLASS SCHEDULE

RLEM 622 – BIOGEOCHEMISTRY OF TERRESTRIAL ECOSYSTEMS

(A) The Major Biogeochemical Cycles

Tue Jan. 23 Energy Flow and Hydrologic Cycle in Biogeochemistry
Thur Jan 25 Carbon Cycle
Tue Jan 30 Nitrogen Cycle
Thur Feb 1 Sulfur Cycle
Tue Feb 6 Phosphorus Cycle

(B) Key Biogeochemical Processes in Ecosystems

Thur Feb 8 Soil Respiration
Tue Feb 13 Root Turnover
Thur Feb 15 Organic Matter Decay
Tue Feb 20 Nitrogen Fixation
Thur Feb 22 Nitrogen Transformations
Tue Feb 27 Phosphorus Loss and Retention

(C) Soil Structure, Biology, and Biochemistry

Thur Mar 1 Soil Physical Structure
Tue Mar 6 Organic Matter Chemistry
Thur Mar 8 Dissolved Organic Matter
Tue Mar 13 Spring Break
Thur Mar 15 Spring Break
Tue Mar 20 Soil Microbial Diversity and Function
Thur Mar 22 Mycorrhizae
Tue Mar 27 Soil Enzymes
Thur Mar 29 Soil Animals

(D) Land Uses and Biogeochemistry

Tue Apr 3 Plant Species Effects, Invasive Species, Vegetation Change
Thur Apr 5 Agricultural Lands - Tillage and Rotation Effects
Tue Apr 10 Rangelands – Grazing Effects
Thur Apr 12 Forests and Rangelands - Fire Effects
Tue Apr 17 Urban Areas

(E) Global Changes and Biogeochemistry

Thur Apr 19 Elevated CO₂
Tue Apr 24 Atmospheric Deposition
Thur Apr 26 Climate Effects
Mon May 7 Final Exam (1-3 PM)
REQUIRED READING LIST AND SCHEDULE FOR 2007

RLEM 622 – BIOGEOCHEMISTRY OF TERRESTRIAL ECOSYSTEMS

(A) THE MAJOR BIOGEOCHEMICAL CYCLES

(1) Tue Jan. 23 - Role of Energy Flow and Hydrologic Cycle in Biogeochemistry


(2) Thur Jan 25 - Carbon Cycle


(3) Tue Jan 30 - Nitrogen Cycle


(4) Thur Feb 1 - Sulfur Cycle


(5) Tue Feb 6 - Phosphorus Cycle


(B) KEY BIOGEOCHEMICAL PROCESSES IN ECOSYSTEMS

(1) Thur Feb 8 - Soil Respiration


(2) Tue Feb 13 - Root Production and Turnover


(3) Thur Feb 15 - Organic Matter Decay


(4) **Tue Feb 20 - Nitrogen Fixation**


(5) **Thur Feb 22 - Nitrogen Transformations**


(6) **Tue Feb 27 - Phosphorus Loss and Retention**


(b) Olander LP, Vitousek PM. 2004. Biological and geochemical sinks for phosphorus in soil from a wet tropical forest. *Ecosystems* 7:

(C) **SOIL STRUCTURE, BIOLOGY, AND BIOCHEMISTRY**

(1) **Thur Mar 1 - Soil Physical Structure**


(2) **Tue Mar 6 - Organic Matter Chemistry**

(3) **Thur Mar 8 - Dissolved Organic Matter**


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**Tue Mar 13**  
*Spring Break*

**Thur Mar 15**  
*Spring Break*

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(4) **Tue Mar 20 - Soil Microbial Diversity and Function**


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(5) **Thur Mar 22 - Mycorrhizae**


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(6) **Tue Mar 27 - Soil Enzymes**


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(7) **Thur Mar 29 - Soil Animals**


**D) LAND USES AND BIOGEOCHEMISTRY**

(1) **Tue Apr 3 - Plant Species Effects, Invasive Species, Vegetation Change**


(2) **Thur Apr 5 - Agricultural Lands: Tillage and Rotation Effects**


(3) **Tue Apr 10 – Rangelands: Grazing Effects**


(4) **Thur Apr 12 - Forests and Rangelands: Fire Effects**


(5) **Tue Apr 17 - Urban Areas**


(E) **GLOBAL CHANGES AND BIOGEOCHEMISTRY**

(1) **Thur Apr 19 - Elevated CO₂**


(2) **Tue Apr 24 - Atmospheric Deposition**


(3) **Thur Apr 26 - Climate Effects**


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**MON MAY 7**

**FINAL EXAM (1-3 PM)**
From: Tom Boutton [mailto:boutton@neo.tamu.edu]
Sent: Wednesday, March 21, 2007 9:57 PM
To: schade@ariel.met.tamu.edu; mcguire@geo.tamu.edu; popp@geo.tamu.edu; Bianchi, Tom
Cc: xbw@tamu.edu; SWHISENANT@ag.tamu.edu; rangerider@mac.com
Subject: Name change for RLEM 622

Dear Colleagues:

I have been teaching RLEM 622 (Nutrient Cycling: Global and Ecosystem Perspectives) here at TAMU since 1988. Most of the students who have taken my class since that time have come from the College of Agriculture and Life Sciences, including the RLEM, WFSC, FRSC, SOSC, AGRO, HORT, and BAEN Departments.

The purpose of this note is to let you know that I am going to submit an application to change the name of my course to "Ecosystem Biogeochemistry." The content of my class will not be altered relative to previous years, and the syllabus for my course is attached for your interest.

The reasons for applying for a name change are as follows:

(1) Ever since I began teaching this class, I have used the textbook by W.H. Schlesinger entitled "Biogeochemistry" (Academic Press). The students who take my class are usually active members of the AGU Biogeosciences Division, and the Ecological Society of America Biogeosciences Division. Thus, I think the term "biogeochemistry" is a more contemporary and more appropriate term than "nutrient cycling", it has better name recognition for my potential students, and is entirely appropriate as a descriptor for the content of my class.

(2) Our department name has recently been changed to the Department of Ecosystem Science and Management (following the merger of RLEM and FRSC). Thus, having the term "Ecosystem" as a more prominent modifier is in keeping with our most recent departmental directions.

Although I would be absolutely delighted if this name change could attract a few students from the Geosciences every now and then, I suspect that my class will continue to attract students largely from the College of Agriculture and Life Sciences, and will not impact the enrollment of any related courses that you and your colleagues might be teaching.

If possible, I would appreciate it if each of you could drop me a quick note to let me know if you are OK with my proposed change. Thanks for your help, and I appreciate your input.

Sincerely,
Tom Boutton

Thomas W. Boutton
Department of Ecosystem Science and Management
Texas A&M University
2126 TAMU
College Station, TX 77843-2126 USA

phone:  (979) 845-8027
fax:     (979) 845-6430
e-mail: boutton@neo.tamu.edu
home page: http://rangeland.tamu.edu/people/boutton/
COS profile: http://myprofile.cos.com/raymone

Subject: RE: Name change for RLEM 622
Date: Thu, 22 Mar 2007 07:03:45 -0500
From: "Bianchi, Tom" <tbianchi@tamu.edu>
To: "Tom Boutton" <boutton@neo.tamu.edu>, <schade@ariel.met.tamu.edu>,
    <mcguire@geo.tamu.edu>, <popp@geo.tamu.edu>
Cc: <xbw@tamu.edu>, <SWHISENANT@ag.tamu.edu>, <rangerider@mac.com>

Hi Tom:

We still need to meet, I suppose when Tim is down visiting. Your course looks very interesting. My only thoughts are that it seems more like a Terrestrial Ecosystem, Biogeochem. My reason for saying this is that we could have a nice group of courses that cover the different ecosystems more specifically, rather than the standard course on Biogeochemistry typically offered. For example, I am teaching Biogeochemistry of Estuaries this semester and may teach Marine Biogeochemistry in the near future, this complement of courses would work nicely together. Just my two cents on it.

Tom

From: "Jennifer McGuire" <mcguire@geo.tamu.edu>
To: "Bianchi, Tom" <tbianchi@tamu.edu>,
    "Tom Boutton" <boutton@neo.tamu.edu>, <schade@ariel.met.tamu.edu>,
    <popp@geo.tamu.edu>
Cc: <xbw@tamu.edu>, <SWHISENANT@ag.tamu.edu>, <rangerider@mac.com>
Subject: RE: Name change for RLEM 622
Date: Thu, 22 Mar 2007 11:06:38 -0600

I agree that perhaps a more environment-specific title would help students select the courses that fit best with their interests. It also would help biogeochemistry students put together (as you say) complimentary courses to give them a more comprehensive view. My course (GEOL 646 Biogeochemical Cycling in Subsurface Systems) might also fit nicely with your courses.

Jennifer

Dr. Jennifer T. McGuire
Assistant Professor
Geology and Geophysics
Texas A&M University
310 Michel T. Halbouty Geosciences Bldg.
College Station, TX  77843-3115
(979)845-4520
http://geoweb.tamu.edu/Faculty/McGuire/

Date: Thu, 22 Mar 2007 13:33:11 -0500
To: "Jennifer McGuire" <mcguire@geo.tamu.edu>
From: "Gunnar W. Schade" <schade@ariel.met.tamu.edu>
Subject: RE: Name change for RLEM 622
Cc: "Bianchi, Tom" <tbianchi@tamu.edu>,
    "Tom Boutton" <b Boutton@neo.tamu.edu>, <popp@geo.tamu.edu>,
    <xbw@tamu.edu>, <SWHISENANT@ag.tamu.edu>, <rangerider@mac.com>

As you know, my one and only offer in Fall2005 barely made it and no one signed up a year later. Meteorology students have no interest in these topics at TAMU, that is an unfortunate fact. My only hope for the future re teaching is the Environmental Geosciences Program and MEPS.
With respect to the course offerings among us:
1. In general, the problem is that the undergraduate students do not have enough time. Most students only take the hours required of them, and those will be less (120) in the future. Result: No one will take more than one course in this field, if any ... For graduate students that may differ.
2. If a specific course in each Department (similar to now) is what should be endeavored, I could offer a course called "Trace Gas Biogeochemistry" (but again, the chances of 10 (!) students having sign up for it are remote ...)
3. In conclusion, I think there ought to be ONE, at most two UG courses in Biogeochemistry, because otherwise none of them will make. The course could be co-taught by all of us. Graduate courses, such as now, can be more specific as only 5 students are needed. So my offering would likely by a graduate course.

      Gunnar
From: Tom Boutton [mailto:boutton@neo.tamu.edu]
Sent: Wednesday, March 28, 2007 9:20 AM
To: Gunnar W. Schade; Jennifer McGuire
Cc: 'Bianchi, Tom'; popp@geo.tamu.edu; xbw@tamu.edu; SWHISENANT@ag.tamu.edu;
    rangerider@mac.com
Subject: RE: Name change for RLEM 622

Gunnar, Jennifer, and Tom -

Thanks for your input on the proposed name change for my RLEM 622 class. On the
basis of your comments provided last week, I propose changing the name of my class to
"Biogeochemistry of Terrestrial Ecosystems". Please let me know how you feel about
this when you have a chance. I appreciate your input on this issue.

Best regards,
Tom

Thomas W. Boutton
Department of Ecosystem Science and Management
Texas A&M University
2126 TAMU
College Station, TX 77843-2126 USA

phone: (979) 845-8027
fax: (979) 845-6430
e-mail: boutton@neo.tamu.edu
home page: http://rangeland.tamu.edu/people/boutton/
COS profile: http://myprofile.cos.com/raymone

Subject: RE: Name change for RLEM 622
Date: Wed, 28 Mar 2007 12:34:25 -0500
From: "Bianchi, Tom" <tbianchi@tamu.edu>
To: "Tom Boutton" <boutton@neo.tamu.edu>,
    "Gunnar W. Schade" <schade@ariel.met.tamu.edu>,
    "Jennifer McGuire" <mcguire@geo.tamu.edu>
Cc: <popp@geo.tamu.edu>, <xbw@tamu.edu>, <SWHISENANT@ag.tamu.edu>,
    <rangerider@mac.com>

Sounds great to me...
From: "Jennifer McGuire" <mcguire@geo.tamu.edu>
To: "Tom Boutton" <boutton@neo.tamu.edu>
Subject: RE: Name change for RLEM 622
Date: Wed, 28 Mar 2007 09:26:05 -0600

I like this title. I will be sure to mention it to the students I advise.

Best,

Jennifer