GRADUATE COUNCIL REPORT
3 May 2007

Course Change Requests

Title and Description

C606  CVEN 654  Design and Analysis of Construction Engineering Operations

FROM:  Design and Analysis of Construction Engineering Operations
       DES ANALY CONST OPERATNS

TO:    Strategic Construction and Engineering Management
       STRATGIC CONST ENGR MGMT

FROM: Computer simulation modeling techniques for complex construction and project management operations; modeling non-determinate problems and evaluating uncertainty factors; identifying methodologies for schedule versus cost process optimization; productivity improvement; and performance forecasting.

TO:    Strategic and systems perspectives are applied to construction and engineering management in projects, organizations, and industries. The system dynamics methodology is used to model construction and engineering systems to improve understanding of the drivers of performance and the use of feedback and high leverage points to improve performance.

C607  RLEM 622  Nutrient Cycling: Global and Ecosystem Perspectives

FROM:  Nutrient Cycling:  Global and Ecosystem Perspectives
       NUTRIENT CYCLING

TO:    Ecosystem Biogeochemistry
       ECOSYSTEM BIOGEOCHEM

FROM: 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. Prerequisite(s): RENR 205 or equivalent; graduate classification.

TO:    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. Prerequisite(s): RENR 205 or equivalent; graduate classification.

C608 CVEN 632 Transportation System Engineering Management

FROM: Transportation System Engineering Management
TRANS SYSTEM ENGR & MGM

TO: Transportation Engineering
TRANS ENGR : ECON

FROM: Engineering and management principles for transportation systems; engineering evaluation using methods of travel demand, costs, equilibrium and pricing; use of economic principles for the engineering and management of transportation systems.

TO: Engineering and economic principles for transportation systems; engineering evaluation using methods of travel demand, costs, equilibrium and pricing; use of economic principles for the finance, engineering and management of transportation systems.
Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional
Submit original form and 25 copies

1. This request is submitted by the Department of Civil Engineering

2. Course prefix, number and complete title of course: CVEN 654 Design and Analysis of Construction Engineering Operations

3. Change requested:
   a) Prerequisite(s): From ____________________ To ____________________
   b) Withdrawal (reason) ____________________
   c) Cross-list with ____________________
      Cross-listed courses require the signatures of both department heads.
   d) Change in course title and description. Enter complete current course title and current course description; complete proposed course title and proposed course description in items 4 and 5.
   e) Change in credit/contact hours. Complete item 6b. Underscore change(s). Attach a course syllabus.*

   Computer simulation modeling techniques for complex construction and project management operations; modeling non-determinate problems and evaluating uncertainty factors; identifying methodologies for schedule versus cost process optimization; productivity improvement; and performance forecasting

5. Complete proposed course title and proposed course description (not to exceed 50 words): "Strategic Construction and Engineering Management" Strategic and systems perspectives are applied to construction and engineering management in projects, organizations, and industries. The system dynamics methodology is used to model construction and engineering systems to improve understanding of the drivers of performance and the use of feedback and high leverage points to improve performance.

6. a) As currently in course inventory:

   Prefix   Course #   Title (exclude punctuation)   Admin. Unit   FICE Code
   CVEN 654 DES ANALY CONST OPERATNS
   Lect. Lab SCH Subject Matter Content Code 030003140801100060630010366
   Do not complete shaded area.

   b) Changed to:

   Prefix   Course #   Title (exclude punctuation)   Admin. Unit   FICE Code
   CVEN 654 STRATEGIC CONST ENGR MGMT
   Lect. Lab SCH Subject Matter Content Code 0300031408011000606300809010366
   Level 6

Approval recommended by:

Head of Department ____________________ Date ________________

Head of Department (if cross-listed course) ____________________ Date ________________

Submitted to Coordinating Board by:

Director of Academic Support Services ____________________ Date ________________

Chair, College Review Committee ____________________ Date ________________

Dean of College ____________________ Date ________________

* Attach a syllabus according to the guidelines on the Internet site www.tamu.edu/admissions/oaras. To have this form reviewed, please send to Linda F. Lacey, Mail Stop 1265 or fax to 947-8737.
Strategic Construction and Engineering Management

Course Syllabus
Spring, 2008

Course Description
Engineered enterprises such as infrastructures, weapons systems, environmental remediation, research and development projects, and construction operations present a variety of challenges to the designers and managers of industries, organizations, enterprises, and projects. Objectives and problems are often poorly defined. Performance fluctuates, sometimes dipping in and out of crisis conditions many times over the planning and management horizon. Boundaries between the enterprise and its environments are uncertain and changing. Designs and management policies are infused with human decision-making that is typically suboptimal and often tacit and intuitive. Systems respond to efforts to control them with multiple feedback effects, long time delays, and nonlinear responses. Often the challenges above are faced by the enterprise in combination and interact, such as in the design of public policies to design and control weapons systems development or environmental remediation. Many of the most difficult challenges relate to the dynamic nature of engineered enterprises.

Design and development projects such as in traditional construction, marine and aircraft building, technology development, and manufactured product development are an important part of many engineered enterprises that illustrate the challenges of designing and managing engineered systems. For example, the importance of basic performance measures (e.g. cost and schedule) vary across project team members. Management policies such as the use of overtime respond to differences between forecasted performance and targets that evolve throughout a project and, in turn, impact performance, targets, or both. Risks from external influences such as weather or regulatory change add contingency resources and generate game-playing behaviors as managers complete to meet organizational and personal goals.

How can managers improve their understanding of the dynamic complexity inherent in engineered enterprises to develop effective designs and operating policies? How can they understand why some enterprises prosper while others stagnate or die? How can the designers and managers of these complex systems identify and design systems and policies that are not thwarted by unanticipated side effects and are effective across time and variations in operating conditions? Effective design and management requires methods for understanding and managing dynamic complexity. Learning by experimentation in real enterprises is almost always too expensive, slow, or unsafe and often provides information on only one set of circumstances, processes, and management. In contrast, models that accurately reflect important features, processes, resources, and management can be manipulated to allow designers and managers to improve understanding in safe, accelerated learning environments and to design improved processes and policies.

The course has two simultaneous focuses: strategic construction and engineering management and simulation modeling. Simulation of realistic engineering management challenges will be used to explore the causes of common problems such as inadequate resources and delays in satisfying customers. You will build and use
computer simulation models to improve your understanding of some of the important strategic issues that face managers. You will develop a fundamental understanding of the system dynamics methodology and begin to develop the skills needed to build and use system dynamics modeling for the design, management, and analysis of engineering enterprises. You will learn to visualize enterprises in terms of the structures and policies that create dynamics and thereby drive and constrain performance. You will build models to improve your understanding of the ways in which performance is related to internal structure (engineered system design) and operating policies (enterprise management). This understanding and these models will provide you some of the tools needed to design and manage the strategic issues that determine the success or failure of engineering enterprises.

**Course Prerequisites**
Graduate status in the Zachry Department of Civil Engineering or instructor approval

**Course Objectives**
- Exposure to and exploration of issues in the strategic management of engineering enterprises
- Develop skills in building models of engineering enterprises and the use for strategic process and policy design and analysis for improvement
- Experience in the combined use of research literature and computer simulation modelling to investigate a specific engineering management issue
- Experience in team modelling and teamwork

**Topics Covered (partial list)**
- Strategic engineering management issues
- Experiencing the management of project dynamics
- Conceptual modelling of dynamic engineering management systems
- Formal modelling of engineering enterprises
- Model validation, analysis, and use for strategic management

**Instructor**
Dr. David N. Ford
Voice: 845-3759 Email: davidford@tamu.edu
Office: 705D, CE/TTI Building
Office Hours: Tuesday and Thursday 1:00 – 3:00 or by appointment

**Class Schedule**
Class: Tuesdays and Thursdays 11:10 – 12:25 from August 28 to December 5, 2006
Final: December 8, 2006 from 3:00-5:00
See http://www.tamu.edu/admissions/records/academic_calendar.html for exceptions to schedule and redefined days
Location: CE217

**Course Web Page and Work Policies**
The course web page is in CENotes. Register as a student on the course web page.
The Course Work Policies are available on the course web page and are made a part of this syllabus by reference.

**Grading**
<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments and exercises*</td>
<td>25%</td>
</tr>
<tr>
<td>Mid-term Examination</td>
<td>40%</td>
</tr>
<tr>
<td>Term Project:</td>
<td></td>
</tr>
<tr>
<td>- Presentation</td>
<td>10%</td>
</tr>
<tr>
<td>- Report</td>
<td>25%</td>
</tr>
<tr>
<td>Total Grade</td>
<td>100%</td>
</tr>
</tbody>
</table>
* Each set of four exercises that are collected and graded will be aggregated into a single assignment grade. If the final group of exercises is less than four, it will count as a single assignment.
Passing grades for graduate students are A, B, C and S

**Text, Readings, and Notes**

NOTE: Used copies of the text are fine for this course. The text has not been revised yet, so you may be able to save some money (and some trees) by purchasing a used copy of the text.

Other required reading material will be provided on the course web page.

Topics, reading assignments and exercises are described and available on the course web page. Reading assignments should be completed prior to the class lecture. See and follow the course work policies concerning assignments that are linked to the course web page and examinations.

Copies of some of the slides used in some lectures will be attached to the course web page for use by students. They will not be provided for all class periods or for all lectures. They are provided as aids to note-taking, not as a replacement for note-taking. They are provided as-is, meaning that they will often not exactly match what is covered in class. This is partially due to the need to remove slides that make the files very large (e.g. photos) and that lectures evolve over time. Students remain totally responsible for taking notes and for all material covered in class.

**Prerequisite Knowledge, Understanding, and Skills**
The prerequisite knowledge for success in this course is that covered in an undergraduate engineering management program, with the Zachry Department of Civil Engineering at Texas A&M University as the standard. A partial list is attached as a part of this syllabus. Students are responsible for bringing competence in the prerequisite knowledge, understanding, and skills to the course, whether from previous education and experience or developed during the course prior to its use in the course through their own study.

**Special Requirements and Guidelines for Distance Learners**
The following apply only to distance learners. Distance learners are only those students taking the course while not in residence at Texas A&M. There is a special registration fee for distance learners, so if you didn’t pay the extra fee, you are not defined as a distance learner for this course.

1. Distance learners are required to provide the following minimum equipment:
   - PC with XP-Pro operating system
   - Microsoft Word, Excel, and Power Point (suggest latest versions)
   - E-mail
   - Scanning software (Omnipage Pro version 14 or equivalent)
   - Scanner
   - Cable or DSL (Note: 56K modem capacity is not sufficient)

2. Distance learners are required to follow the schedule of resident students taking the course, including but not limited to obtaining the textbook, making submissions by the same due dates and times, interactions with the instructor, and scheduling interactions with team members. This can cause distance learners that do not access the lecture and materials from a class meeting until some time after actual class meeting to have less time to form teams, prepare submittals, etc. While a few hours won’t typically cause problems, longer delays may. Regardless, distance learners should minimize these delays and are responsible for managing them and their impacts. The instructor typically receives emails and phone calls during regular business hours (Monday through Friday, 9am – 5pm). All times are local to College Station, Tx.

3. There are special notes for distance learners at the end of most assignments.

4. Hard copies of submittals called for in assignments do not have to be submitted by distance learners. Replace hard copies with a Word (not pdf) document attached to an email to the instructor. Scan any handwritten or hand
sketched parts of submittals and insert them in the electronic submittal. Try to not send them as a separate pdf attachment.

**Permission to Distribute Minor Graded Papers to Class Members**
By your attendance in this class, and having been assigned to read this material, you grant permission for the professor of this class to return your graded work, other than major exams, during class, by passing it out in a single bundle, for each student to retrieve their own paper. You understand that another student might see your grade, but you are waiving your right to privacy in this instance only. If you do not wish to have your homework papers and similar submittals handed out in class you will notify the professor in writing, and will instead personally pick up your papers from the grader, upon presentation of a photo ID, at a mutually acceptable time and place. In any case, exam papers and projects will be handed out individually and no student will be permitted to pick up another student's major exam or project under any condition.

**Academic Integrity**
"An Aggie does not lie, cheat, or steal or tolerate those who do." Students are expected to understand and abide by the Aggie Honor Code presented on the web at: [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor) No form of scholastic misconduct will be tolerated. Academic misconduct includes cheating, fabrication, falsification, multiple submissions, plagiarism, complicity, etc. These are more fully defined in the above web site. Violations will be handled in accordance with the Aggie Honor System Process described on the web site.

**Students with Special Needs**
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 Cain Hall or call 845-1637.

**Section 7 of Student Rules of Texas A&M University includes...**
"The university views class attendance as an individual student responsibility. Students are expected to attend class and to complete all assignments. Instructors are expected to give adequate notice of the dates on which major tests will be given and assignments will be due. This information should be provided on the course syllabus, which should be distributed at the first class meeting. Graduate students are expected to attend all examinations required by departments or advisory committees as scheduled formally."

"7.1 The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for absence. Among the reasons absences are considered excused by the university are the following:"

"7.5 If the student is seeking an excused absence, the student must notify the instructor as soon as possible after the absence, but no later than the end of the second working day after the last date of absence. If the absence occurs on the same day as a scheduled exam or other graded procedure, the student must notify his/her instructor or department by the end of the next working day after the absence to ensure full rights. The student is responsible for providing satisfactory evidence to the instructor within one week of his or her return to substantiate the reason for absence. If the absence was excused, the instructor must either provide the student an opportunity to make up the exam or other work missed or provide a satisfactory alternative completed within 30 calendar days from the last date of absence."

"7.6 The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence."
Professional Content included (ABET Criteria 4 requirements)
- Engineering science
- Preparation for engineering practice
- Engineering design, incorporating realistic constraints; pick from list: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political

ABET Outcomes
Students successfully completing this course will have developed their:
  a. Ability to apply knowledge of basic mathematics, science, and engineering to solving civil engineering problems
  b. Ability to design and conduct experiments, as well as to analyze critically and interpret data in at least one recognized major civil engineering area
  c. Ability to design a civil engineering system to meet desired needs while incorporating engineering standards and realistic constraints such as those based on economic, environmental, sustainability, constructability, ethical, health and safety, social, and political issues
  d. Ability to function on multi-disciplinary teams
  e. Ability to formulate and solve civil engineering problems
  f. Ability to communicate effectively in oral and written forms
  g. Appreciation and knowledge of current civil engineering issues including professional practice issues such as procurement of work, bidding versus quality selection processes, interactions among design and construction professionals, and the importance of licensure
  h. Ability to use modern tools, techniques, and computation methods necessary for civil engineering practice
  i. Proficiency in construction management
Strategic Construction and Engineering Management

Course Prerequisite Knowledge, Understanding, and Skills
(A partial list in no particular order)

All students should have:

- Competence in basic physics, algebra, geometry, trigonometry, probability and statistics, and calculus and their application to simple structures (e.g., statics and dynamics), including the application of mathematics to basic engineering principles.

- A conceptual understanding of integration and differentiation and their relationship. The ability to differentiate and integrate simple functions and equations.

- An ability to model simple relationships of engineering operations and systems using algebraic equations and consistent meaningful units of measure. A simple example is modeling the relationship among production, work force size, and productivity as: Unit completion rate (units/day) = work force size (persons) * work force productivity (units / (person-day)).

- A descriptive understanding of engineering processes, participants (organizations and individuals), participant roles and relationships, performance measures and their basic drivers and interactions in your engineering domain (e.g., construction, manufacturing, public policy, etc.)

More specifically and in addition, those in a construction management program should have:

- Competence in applying the above to construction processes

- An ability to perform construction project cost estimating at a preliminary and detailed level

- A descriptive understanding of the construction industry and its role in a regional and national economy.

- A functional knowledge of basic construction operations, material, labor, equipment, and subcontracting

- A descriptive understanding of the major systems in constructed facilities, their features, purposes, and major interactions. Examples include foundations, superstructure, facades, mechanical and electrical systems, and utilities.

- Competence in project modeling and analysis with Gantt Charts, Critical Path Method, Net Present Value analysis, Work Breakdown Structures, and Organizational Breakdown Structures, including the ability to develop project construction plans (operations plan, schedule, and cost estimate) from a general description of the work.
Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional

1. This request is submitted by the Department of Range and Ecology and Management

2. Course prefix, number and complete title of course: RLEM 622 Nutrient Cycling: Global and Ecosystem Perspectives

3. Change requested:
   a) Prerequisite(s): From NA To NA
   b) Withdrawal (reason) NA
   c) Cross-list with NA
   d) Change in course title and description. Enter complete current course title and current course description; complete proposed course title and proposed course description in items 4 and 5.
   e) Change in credit/contact hours. Complete item 6b. Underscore change(s). Attach a course syllabus.

4. Complete current course title and current course description: Nutrient Cycling: Global and Ecosystem Perspectives
   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.

5. Complete proposed course title and proposed course description (not to exceed 50 words): Ecosystem Biogeochemistry
   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.

6. a) As currently in course inventory:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
<th>Title (exclude punctuation)</th>
<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>Subject Matter Content Code</th>
<th>Admin. Unit</th>
<th>FICE Code</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>RLEM</td>
<td>622</td>
<td>NUTRIENT CYCLING</td>
<td></td>
<td></td>
<td></td>
<td>03000326130100022465003632</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b) Changed to:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
<th>Title (exclude punctuation)</th>
<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>Subject Matter Content Code</th>
<th>Admin. Unit</th>
<th>Acad. Year</th>
<th>FICE Code</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>RLEM</td>
<td>622</td>
<td>ECO SYSTEM BIOGEOCHEMISTRY</td>
<td></td>
<td></td>
<td></td>
<td>03000326130100022465003632</td>
<td></td>
<td>2007</td>
<td>08</td>
<td></td>
</tr>
</tbody>
</table>

Approval recommended by:

Head of Department: 2/19/07
Head of Department (if cross-listed course): Date

Submitted to Coordinating Board by:

Date

Director of Academic Support Services

Date

Effective Date

10 of 21 D
RLEM 622
ECOSYSTEM BIOGEOCHEMISTRY
SPRING SEMESTER
T-TH 8:00-9:15 AM

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/

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:

Two exams (100 points each) will be given during the course of the semester. An independent research project based on a literature review of some aspect of biogeochemistry will be undertaken by each student and presented to the class at the end of the semester (100 points). In addition, approximately 100 points will be based on brief oral presentations that summarize an assigned reading, written summaries of seminars presented around campus, and other brief assignments. Class participation via informal discussions is expected.

COURSE MATERIALS:

Required textbook: *Biogeochemistry* by W.H. Schlesinger

Assigned reading: available on WebCT [http://elearning.tamu.edu](http://elearning.tamu.edu)

Class notes: available on WebCT [http://elearning.tamu.edu](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 Room 126 of the Koldus Building 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](http://www.tamu.edu/aggiehonor)
LIST OF TOPICS AND CLASS SCHEDULE

RLEM 622 – ECOSYSTEM BIOGEOCHEMISTRY

(A) The Major Biogeochemical Cycles

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tue</td>
<td>Jan. 23</td>
<td>Energy Flow and Hydrologic Cycle in Biogeochemistry</td>
</tr>
<tr>
<td>Thur</td>
<td>Jan 25</td>
<td>Carbon Cycle</td>
</tr>
<tr>
<td>Tue</td>
<td>Jan 30</td>
<td>Nitrogen Cycle</td>
</tr>
<tr>
<td>Thur</td>
<td>Feb 1</td>
<td>Sulfur Cycle</td>
</tr>
<tr>
<td>Tue</td>
<td>Feb 6</td>
<td>Phosphorus Cycle</td>
</tr>
</tbody>
</table>

(B) Key Biogeochemical Processes in Ecosystems

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thur</td>
<td>Feb 8</td>
<td>Soil Respiration</td>
</tr>
<tr>
<td>Tue</td>
<td>Feb 13</td>
<td>Root Turnover</td>
</tr>
<tr>
<td>Thur</td>
<td>Feb 15</td>
<td>Organic Matter Decay</td>
</tr>
<tr>
<td>Tue</td>
<td>Feb 20</td>
<td>Nitrogen Fixation</td>
</tr>
<tr>
<td>Thur</td>
<td>Feb 22</td>
<td>Nitrogen Transformations</td>
</tr>
<tr>
<td>Tue</td>
<td>Feb 27</td>
<td>Phosphorus Loss and Retention</td>
</tr>
</tbody>
</table>

(C) Soil Structure, Biology, and Biochemistry

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thur</td>
<td>Mar 1</td>
<td>Soil Physical Structure</td>
</tr>
<tr>
<td>Tue</td>
<td>Mar 6</td>
<td>Organic Matter Chemistry</td>
</tr>
<tr>
<td>Thur</td>
<td>Mar 8</td>
<td>Dissolved Organic Matter</td>
</tr>
<tr>
<td>Tue</td>
<td>Mar 13</td>
<td>Spring Break</td>
</tr>
<tr>
<td>Thur</td>
<td>Mar 15</td>
<td>Spring Break</td>
</tr>
<tr>
<td>Tue</td>
<td>Mar 20</td>
<td>Soil Microbial Diversity and Function</td>
</tr>
<tr>
<td>Thur</td>
<td>Mar 22</td>
<td>Mycorrhizae</td>
</tr>
<tr>
<td>Tue</td>
<td>Mar 27</td>
<td>Soil Enzymes</td>
</tr>
<tr>
<td>Thur</td>
<td>Mar 29</td>
<td>Soil Animals</td>
</tr>
</tbody>
</table>

(D) Land Uses and Biogeochemistry

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tue</td>
<td>Apr 3</td>
<td>Plant Species Effects, Invasive Species, Vegetation Change</td>
</tr>
<tr>
<td>Thur</td>
<td>Apr 5</td>
<td>Agricultural Lands - Tillage and Rotation Effects</td>
</tr>
<tr>
<td>Tue</td>
<td>Apr 10</td>
<td>Rangelands – Grazing Effects</td>
</tr>
<tr>
<td>Thur</td>
<td>Apr 12</td>
<td>Forests and Rangelands - Fire Effects</td>
</tr>
<tr>
<td>Tue</td>
<td>Apr 17</td>
<td>Urban Areas</td>
</tr>
</tbody>
</table>

(E) Global Changes and Biogeochemistry

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thur</td>
<td>Apr 19</td>
<td>Elevated CO₂</td>
</tr>
<tr>
<td>Tue</td>
<td>Apr 24</td>
<td>Atmospheric Deposition</td>
</tr>
<tr>
<td>Thur</td>
<td>Apr 26</td>
<td>Climate Effects</td>
</tr>
<tr>
<td>Mon</td>
<td>May 7</td>
<td>Final Exam (1-3 PM)</td>
</tr>
</tbody>
</table>
REQUIRED READING LIST AND SCHEDULE FOR 2007

RLEM 622 – ECOSYSTEM BIOGEOCHEMISTRY

(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**


---

**Tue Mar 13**  
**Spring Break**

**Thur Mar 15**  
**Spring Break**

---

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


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


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


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

associated with termite biogenic structures in a dry savanna ecosystem. *Plant 
and Soil* 265: 189-196.

(c) Johnson D, Krsek M, Wellington E, Stott A, Cole L, Bardgett R, Read D, 
*Science* 309: 1047.

(d) Ngai JT, Srivastava DS. 2006. Predators accelerate nutrient cycling in a 

(D) LAND USES AND BIOGEOCHEMISTRY

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

(a) Eviner VT, Chapin FS. 2003. Functional matrix: A conceptual framework 
for predicting multiple plant effects on ecosystem processes. *Annual Review of 

(b) Sperry LJ, Belnap J, Evans RD. 2006. *Bromus tectorum* invasion alters 
nitrogen dynamics in an undisturbed arid grassland ecosystem. *Ecology* 87(3): 
603-615.

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

(a) Grandy AS, Loecke TD, Parr S, Robertson GP. 2006. Long-term trends in 
nitrous oxide emissions, soil nitrogen, and crop yields of till and no-till cropping 

effects of crop rotation, stubble management, and tillage on soil phosphorus 

(3) Tue Apr 10 – Rangelands: Grazing Effects

(a) Patra AK, Abbadie L, Clays-Josserand A, Degrange V, Grayston SJ, Loiseau 
P, Louault F, Mahmood S, Nazaret S, Philippot L, Poly F, Prosser JI, Richaume 

(b) Frank DA, Groffman PM. 1998. Ungulate vs. landscape control of soil C 
2229-2241.
(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**


---

**MON MAY 7**  
**FINAL EXAM (1-3 PM)**
Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional

- Submit original form and 2 copies -

1. This request is submitted by the Department of [Civil Engineering]

2. Course prefix, number and complete title of course: CVEN 632 - Transportation System Engineering Management

3. Change requested:
   a) Prerequisite(s): From __________________________ To __________________________
   b) Withdrawal (reason) __________________________
   c) Cross-list with __________________________
   d) Change in course title and description. Enter complete current course title and current course description; complete proposed course title and proposed course description in items 4 and 5.
   e) Change in credit/contact hours. Complete item 6.b. Underscore change(s). Attach a course syllabus.

4. Complete current course title and current course description: Transportation System Engineering Management - Engineering and management principles for transportation systems; engineering evaluation using methods of travel demand, costs, equilibrium and pricing; use of economic principles for the engineering and management of transportation systems.

5. Complete proposed course title and proposed course description (not to exceed 50 words):
   Engineering Economics - Engineering and economic principles for transportation systems; engineering evaluation using methods of travel demand, costs, equilibrium and pricing; use of economic principles for the finance, engineering and management of transportation systems.

6. a) As currently in course inventory:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
<th>Title (exclude punctuation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN</td>
<td>632</td>
<td>TRAN SYSTEM ENGR &amp; MGM</td>
</tr>
<tr>
<td>Lect.</td>
<td>Lab SCH</td>
<td>Subject Matter Content Code</td>
</tr>
<tr>
<td>03 00 03</td>
<td>14 08 04 00 00 60 63 0</td>
<td>0 0 3 6 3 2</td>
</tr>
</tbody>
</table>

   b) Changed to:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
<th>Title (exclude punctuation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN</td>
<td>632</td>
<td>TRAN ENGR : ECON</td>
</tr>
<tr>
<td>Lect.</td>
<td>Lab SCH</td>
<td>Subject Matter Content Code</td>
</tr>
<tr>
<td>03 00 03</td>
<td>14 08 04 00 00 60 63 08 07</td>
<td>0 0 3 6 3 2</td>
</tr>
</tbody>
</table>

   Approval recommended by:
   Anthony Callic 3/21/07

   Head of Department Date

   Head of Department (if cross-listed course) Date

   Submitted to Coordinating Board by:

   Director of Academic Support Services Date

   Effective Date

To have this form reviewed, please send to Linda F. Lacey, Mail Stop 1265 or fax to 847-8737.