Graduate Council Report
October 6, 2011

New Course Requests:

ANSC 621. Issues in the Equine Industry. (3-0). Credit 3. Integration of cumulative knowledge acquired in the equine science curriculum to demonstrate critical thinking and communication skills to address critical issues in the equine industry. Prerequisite(s): Approval of instructor or enrollment in Master of Equine Industry Management Program. Stacked with ANSC 423.

CHEM 640. Laboratory Methods in Biological Chemistry. (1-6) Credit 3. Chemical biology is an ever-expanding scientific field that involves the application of chemical techniques to the investigation and/or manipulation of biological systems. This laboratory will provide students with a hands-on opportunity to gain an understanding and appreciation for chemical biology techniques. Prerequisite(s): Graduate standing or approval of instructor.

CHEM 644. Natural Products Biosynthesis. (3-0). Credit 3. This course will present a survey of the chemical reactions occurring in living systems, describe the experimental methods used to study these reactions and examine the biosynthesis of the major families of natural products, with an emphasis on the mechanistic chemistry of the biosynthetic pathway. Prerequisite(s): Graduate standing or approval of instructor.

CVEN 765. Advanced Civil Engineering Systems. (3-0). Credit 3. Formulation of decision making problems at different hierarchical levels: strategic, planning and operational; includes application problems in project selection, networks, allocation, routing/scheduling, distribution, and multi-objective; introduction to exact and approximate solving techniques: optimization, heuristics, simulation, and decision analysis; solution interpretation and sensitivity analyses. Prerequisite(s): CVEN 322 or equivalent.

FINC 649. Financial Modeling. (3-0). Credit 3. Computer-based modeling of contemporary problems in investments and corporate finance including asset pricing, portfolio optimization, valuation, capital budgeting, cost of capital, risk assessment, and option pricing; using models to evaluate financial decision variables and alternative investment strategies. Prerequisite(s): Graduate classification; classification 6 students may not enroll in this course; FINC 421 or FINC 632; FINC 434 or FINC 629.

FINC 660. Fixed Income Analysis. (3-0). Credit 3. Characteristics of fixed income securities including Treasury issues, federal agency issues, corporate and municipal bonds, mortgage-backed and asset-backed securities; institutional features fixed income markets; risks of bond investing; fixed income valuation; term structure; trade strategies, modeling and assessing credit risks; hedging with fixed income derivatives. Prerequisite(s): Graduate classification, classification 6 students may not enroll in this course; FINC 421 or FINC 632; FINC 434 or FINC 629.

PETE 656. Advanced Numerical Methods for Reservoir Simulation. (3-0). Credit 3. Numerical simulation of flow in porous media based on numerical methods for partial differential equations; supplemented by published papers and research topics; development of a reservoir simulator. Prerequisite(s): Graduate classification; Basic Reservoir Simulation or equivalent class; Linear Algebra and Matrix Computations or equivalent class; Advanced Calculus or equivalent class; Programming experience.
SCSC 644. Forage Ecology and Management. (3-0). Credit 3. Investigation of multidisciplinary approaches toward the development of integrated forage, livestock, and wildlife production systems that are economically feasible and environmentally sustainable. Prerequisite(s): Approval of instructor and graduate classification. Stacked with 444.

VIBS 620. Cytogenetics. (3-0). Credit 3. Examination and analysis of variation in chromosome structure, behavior and number, developmental and evolutionary effects of this variation. Prerequisite(s): GENE 603. Cross-listed with GENE 620.

VLCS 622. Equine Disease & Epidemiology. (3-0). Credit 3. Principles and methods of epidemiology applied to equine health and prevention and control of selected equine infectious diseases. Prerequisite(s): Enrollment in Equine Certificate and Graduate Student Classification, or Approval of Instructor. Stacked with VLCS 422.
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

1. Request submitted by (Department or Program Name):
   Department of Animal Science

2. Course prefix, number and complete title of course:
   ANSC 621. Issues in the Equine Industry

3. Catalog course description (not to exceed 50 words):
   Integration of cumulative knowledge acquired in the equine science curriculum to demonstrate critical thinking and communication skills to address critical issues in the equine industry.

4. Prerequisite(s):
   Approval of instructor or enrollment in Master of Equine Industry Management program.

   Cross-listed with:
   Stacked with:
   ANSC 423

   Cross-listed courses require the signature of both department heads.

5. Is this a variable credit course? ☑ No
   If yes, from _______ to _______

6. Is this a repeatable course? ☑ No
   If yes, this course may be taken ______ time(s).
   Will this course be repeated within the same semester? ☑ No

7. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
      Master of Equine Industry Management
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
      M.S. in equine science related degrees

8. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

9. Prefix  Course #  Title (excluding punctuation)
    ANSC 621  ISSUES EQUINE INDUSTRY

    Lect.  Lab  SCH  CRP and Fund Code
    0  3  0  0  0  3  0  1  0  3  0  7  0  0  0  0  5  0  2  7  0  1  2  -  1  3  0  0  3  6  3  2

    Approval recommended by:
    H. Russell Cross
    Department Head or Program Chair (Type Name & Sign)  Date  David Reed
    Chair, College Review Committee   Date
    Mark Hussey
    Dean of College   Date  OCT 06 2011
    Chair, GC or UCC  Date
    Mark T. Zorlan  Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu
Curricular Services – 3/10
Course title and number  ANSC 423/621 – Issues in the Equine Industry
Term  Spring 2012
Meeting times and location  TBD
Credit Hours  3 (Lecture)

Course Description and Prerequisites

This course is designed to incorporate skills and information gained throughout the Equine Industry Leadership curriculum. Students will discuss current industry issues, and will participate in broad-ranging discussions led by industry leaders who will act as guest lecturers.

Prerequisites: Junior or Senior classification; Approval of instructor OR Enrollment in the Master of Equine Industry Management program

Learning Outcomes or Course Objectives

Upon completion of this course, students will have demonstrated the ability to draw on skill sets and information from the whole of their undergraduate experience in order to think critically about a problem or topic, articulate well-formed opinions and arguments, and speak intelligently about the equine industry. Students will have demonstrated the ability to communicate in through oral and written exams and presentations.

Instructor Information

Name  Jim Heird, PhD (lead instructor); Eleanor Green, DVM (associate instructor)
Telephone number  979-845-6098
Email address  jimheird@tamu.edu
Office hours  By appointment
Office location  202B Centeq

Textbook and/or Resource Material

Class handouts.

Grading Policies

Additional Requirements for Graduate Level: Students will be required to complete an independent study project on a particular issue. Included in this will be interviews with supporters from both sides of the issue, a complete background evaluation and understanding of both sides of the issue, a professional paper and an oral report.

For students enrolled in ANSC 423 exams will comprise 100% of the final grade. (Midterm Exam = 50%, Final Exam = 50%)

For students enrolled in ANSC 621 the Midterm Exam, Final Exam and Project will comprise 35%, 35% and 30% of the final grade respectively.

Grading Scale:

Minus grades will not be used.

A = 90-100
B = 80-89
C = 70-79
D = 60-69
F = <60
Course Topics, Calendar of Activities, Major Exam Dates

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Exams</th>
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<tbody>
<tr>
<td>1</td>
<td>Overview: Graduating &amp; Entering the Industry</td>
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<td>2</td>
<td>Overview: Issues Facing the Equine Industry</td>
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<td>3</td>
<td>Operating &amp; Managing Successful Equine Businesses</td>
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<td>4</td>
<td>Understanding &amp; Working With Legislatures &amp; Legislators</td>
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<td>5</td>
<td>Understanding &amp; Working With Industry Organizations &amp; Institutions</td>
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<td>6</td>
<td>Understanding &amp; Developing Investment Strategies</td>
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<td>7</td>
<td>Understanding Ethical Decision Making</td>
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<td>8</td>
<td>Critical Thought &amp; Professionalism in the Equine Industry</td>
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<td>9</td>
<td>Written &amp; Oral Communication in the 21st Century</td>
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<td>10</td>
<td><strong>Midterm Exam (Essay Format)</strong></td>
<td><strong>Midterm Exam – Essay Format</strong></td>
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<tr>
<td>11</td>
<td>Critical Industry Issues</td>
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<td>12</td>
<td>Critical Industry Issues</td>
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<td>13</td>
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<td>14</td>
<td>Critical Industry Issues</td>
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<tr>
<td>15</td>
<td><strong>Final Exam (Essay Format)</strong></td>
<td><strong>Final Exam</strong></td>
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</table>

Other Pertinent Course Information

Some course information will be distributed through email or eLearning.

Americans with Disabilities Act (ADA)

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 Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit [http://disability.tamu.edu](http://disability.tamu.edu)

Academic Integrity

For additional information please visit [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor)

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Attendance Policy and Grading Scale Examples

Attendance Policy:

Class attendance and participation is vital to success in this course. As such, attendance will be taken at lecture meetings. If planning to miss lecture sessions, students are encouraged to contact the instructor prior to the absence. Unexcused absence from more than two sessions will result in the lowering of the student’s final course grade by one letter grade per session missed. Unexcused absence from 6 or more sessions will result in a grade of "F" for the course.

"The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07."
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

1. Request submitted by (Department or Program Name): Department of Chemistry

2. Course prefix, number and complete title of course: Chem. 640 - Laboratory Methods in Biological Chemistry

3. Catalog course description (not to exceed 50 words):
   Chemical biology is an ever-expanding scientific field that involves the application of chemical techniques to the investigation and/or manipulation of biological systems. This laboratory will provide students with a hands-on opportunity to gain an understanding and appreciation for chemical biology techniques.

4. Prerequisite(s): Graduate standing or approval of instructor
   Cross-listed with:  
   Stacked with: Cross-listed courses require the signature of both department heads.

5. Is this a variable credit course?  Yes  No  
   If yes, from _______ to _______.

6. Is this a repeatable course?  Yes  No  
   Will this course be repeated within the same semester?  Yes  No  
   If yes, this course may be taken _______ times.

7. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

8. M.S., Ph.D. in Chemistry
   If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

9. Prefix  Course #  Title (excluding punctuation)
   CH  E  M  6 4  0  LAB  M  ETH  O  D  S  I  N  B  IO  L  C  H  E  M
   Lect.  Lab  SCI  CIP and Fund Code
   0  1  0  6  0  3  4  0  0  5  9  9
   Admin. Unit  Acad. Year  FICE Code
   0  6  0  0  1  2  1  3  0  0  3  6  3  2
   Level  6

Approval recommended by: Michael P. Kosynka
Date  9/19/11

Chair, College Review Committee
Date  9/19/11

Dean of College
Date

Chair, GC or UCC
Date  OCT 06 20

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 3/10
CHEMISTRY 640-Laboratory Methods in Biological Chemistry

Chemical biology is an ever-expanding scientific field that involves the application of chemical techniques to the investigation and/or manipulation of biological systems. This laboratory will give you a hands-on opportunity to gain an understanding and appreciation of the field and are divided into 5 modules. You will be exposed to a variety of modern techniques and instrumentation such as cellular assays (ELISA, cytotoxicity assays), site-directed mutagenesis, DNA techniques (isolation, quantitation, amplification, cloning, electrophoresis, genome mining/screening with degenerate probes), protein expression and purification (kinetic measurements, SDS-PAGE analysis), organic synthesis (including basic characterization methods: $^1$H-NMR, $^{13}$C-NMR, UV, IR, mass-spec), chemoenzymatic synthesis (chemical synthesis using enzymes for catalysis), reporter assays, and activity assays (both in vitro and in vivo). You will also learn to formally communicate these results using clear, concise, and precise writing as all results will be communicated in journal article format.

Prerequisites
Approval from instructor

Required Materials
(1) Handouts will be supplied to supplement these labs
(2) Safety Goggles: These are available at the MSC bookstore and are usually sold the first week of class by The Local American Chemical Society Student Affiliate Section in the chemistry department
(3) Laboratory Notebook: 5x5 Quad Ruled, Roaring Spring #77110 (available in the TAMU Bookstore)
(4) Optional: You might consider obtaining a lab coat. They are required if you plan to wear shorts (a lab coat of sufficient length to cover your knees would be needed).

Instructor Information
Coran M. H. Watanabe, Room 1125, Ph: 979-458-8094
office hours: TBA and by appointment (call or e-mail)
e-mail: watanabe@mail.chem.tamu.edu

Lectures (Once per week)

The lecture component of this course is mandatory. We will discuss fundamentals, techniques, and topically interesting material related to the laboratory you will be performing in the upcoming week.

Preparation and Success in the Laboratory

Considering that only a small fraction of your grade is based on quizzes, it is absolutely necessary to come completely prepared for a laboratory session before coming to the lab. The more prepared you are for this laboratory, the more successful your laboratory experience will likely be. This will not only carry over into your graduate work in your respective research labs, but also when you enter your research careers. That is, you should be very familiar with the protocols and techniques you will be performing or using. A critical part of this preparation is the completion of your prelab report, detailed below. Beyond this, it is imperative that you do any assigned readings. Attending lecture will also greatly benefit your pre-lab preparation. Quizzes will also gauge your level of preparation on these experiments.

Pre-Labs

Pre-lab reports will be written in your laboratory notebooks. The requirements for each prelab will be
specified in the lab handout provided in lecture.

Lab Report Format

All laboratory reports should follow the style of *Organic Letters* (see sample report hand out). The Word template (Mac or PC) for this can be downloaded at the American Chemical Society Paragon Plus website at: http://pubs.acs.org/paragonplus/submission/orle7/index.html. Once you have it downloaded, you can save the template for all experiments. The laboratory handouts will specify any material to be submitted as supplementary material.

Techniques to Be Covered

- Bacterial cell culture and determination of MIC (minimal inhibitory concentration)
- Gene cloning and verification by sequencing
- Site directed mutagenesis
- Reporter assay
- Protein overexpression in *E. coli* and purification (His-tagged system), verification by SDS page and Western blot and enzymatic assay (measurement of Km and kcat)
- Chemoenzymatic synthesis
- Flash column chromatography
- Synthesis of a simple chemical library and cell-based screening
- Compound characterization (1H-NMR, 13C-NMR, IR, UV, mass spec)
- Screening with degenerate probes
- ELISA assay

Module 1  Screening with Green Fluorescent Protein (GFP) and Effects of Site-Directed Mutagenesis  In the first part of this lab you will generate an active site mutant and evaluate the effect on fluorescence of the protein. In the second portion of this lab, you will evaluate the response of a GFP reporter (under the control of a DNA damage protein promoter) to methyl methane sulfonate (MMS, a DNA alkylating agent).

Module 2  Chemoenzymatic Synthesis  In this lab you will overexpress and purify a protein involved in carbohydrate synthesis. You will evaluate the enzyme’s ability to catalyze the formation of a sugar analogue. Kinetic measurements will be made on the reaction and the compound characterized by UV, IR, 1H-NMR, 13C-NMR and mass spec.

Module 3  Combinatorial Library Synthesis and Screening  In this lab you will synthesize a chemical library in 96-well format. The library will be examined for their cytotoxic effects against *E. coli*. “Active” compounds will be synthesized in large scale, isolated, purified, and characterized by UV, IR, 1H-NMR, 13C-NMR and mass spec.

Module 4  Genome Mining for β-Lactamases and Their Role in Antibiotic Resistance  In the first part of the experiment you will clone and express a gene from *B. subtilis* that appears to be a β-lactamase based upon DNA homology. The ability of this gene to confer resistance to ampicillin will be examined in *E. coli*. In the second part of the lab you will design degenerate probes against β-lactamases and screen them against intestinal microbiota DNA to assay for the presence or absence of these genes.

Module 5  Screening by ELISA  In this lab, you will explore the use of ELISA to detect the levels of biotin within *E. coli* that have been manipulated (e.g. a chemical inhibitor, an *E. coli* auxotroph) as compared to wild-type *E. coli*.

Grading

The grading in this course will be curved. The techniques covered in this course will be integrated into a total of 5 modules or experimental projects that run anywhere from 1-5 weeks in length. Each of
these modules will be worth 100-200 pts. Points will be awarded for the prelab quiz, completing the experiment, obtaining the requested data, interpretation of data, keeping a proper notebook, carrying out correct calculations, and writing up the results. The exact point breakdown for each week’s experiment(s) will be given to you prior to that experiment.

Module 1 Bioluminescence/GFP Lab  
200 pts
Module 2 Chemoenzymatic Synthesis Lab  
200 pts
Module 3 Combinatorial Libraries  
200 pts
Module 4 β-lactamase and Antibiotic Resistance Lab  
200 pts
Module 5 Biotin ELISA Lab  
100 pts

As a general guide: >80 % is an A; 79-65 % is a B; 64-50 % is a C; 40-49% is a D; <40% is an F

Absences

To prevent a University absence from counting against you or receiving a zero for a quiz you miss, you must see me or e-mail me prior to the laboratory or lecture you will miss or, at the latest, prior to performing the next experiment. You will be required to provide valid documentation regarding a University excused absence. Make-up laboratory experiments can be scheduled with your TA but only after providing documentation to me regarding the excused absence. A makeup quiz will only be given if you can provide documentation supporting a university excused absence. If you cannot provide such documentation, you will receive a zero for that quiz. If you are unable to take a quiz due to an excused absence, please contact me by phone or e-mail.

Americans with Disabilities Act (ADA) Policy Statement

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Academic Integrity Statement and Policy

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Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
- Submit original form and attach a course syllabus.

1. Request submitted by (Department or Program Name): Chemistry
2. Course prefix, number and complete title of course: Chem 644 - Natural Products Biosynthesis
3. Catalog course description (not to exceed 50 words): This course will present a survey of the chemical reactions occurring in living systems, describe the experimental methods used to study these reactions and examine the biosynthesis of the major families of natural products, with an emphasis on the mechanistic chemistry of the biosynthetic pathway.

4. Prerequisite(s): Graduate standing or approval of instructor

Cross-listed with: Stacked with:

Cross-listed courses require the signature of both department heads.

5. Is this a variable credit course? ☐ Yes ☒ No If yes, from _______ to _______

6. Is this a repeatable course? ☐ Yes ☒ No If yes, this course may be taken _______ times.

Will this course be repeated within the same semester? ☐ Yes ☒ No

7. This course will be:
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S. in geography)

   M.S. or Ph.D. in Chemistry

8. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

9. Prefix: Course # Title (excluding punctuation)

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<th>Course #</th>
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<th>Lect. Lab</th>
<th>SCCH</th>
<th>CIP and Fund Code</th>
<th>Admin. Unit</th>
<th>Acad. Year</th>
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<td>0 6 0 0</td>
<td>1 2 1 3</td>
<td>0 0 3 6 3 2</td>
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</tbody>
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Approval recommended by:

Department Head or Program Chair (Type Name & Sign) Date

Chair, College Review Committee Date

Dean of College Date

Chair, GC or UCC Date

Submitted to Coordinating Board by:

Associate Director, Curricular Services

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 3/10
Course title and number  Natural Products Biosynthesis
Term (e.g., Fall 200X) Fall 2011
Meeting times and location WF 3:00-4:15; CHEM 2101

Course Description and Prerequisites

This course will apply the principles of organic chemistry to develop a mechanistic understanding of the strategies used to biosynthesize the organic molecules found in living systems. The course will consist of four modules. The first module will present a survey of the chemical reactions found in living systems from a mechanistic perspective. The experimental methods used in modern natural product biosynthetic studies will be covered in the second module. The third module will examine the biosynthesis of the major families of natural products, with an emphasis on the chemical logic of the biosynthetic pathway. A poster session, followed by in-class presentations on student-selected posters, will complete the course.

Natural products biosynthesis is a logical extension of any two-semester organic chemistry course and studying Mother Nature’s synthetic toolkit is one of the easiest ways for organic chemistry students to learn to apply their knowledge of reactions and mechanism to biological systems. Undergraduates who have completed two semesters of organic chemistry are welcome in the class.

Learning Outcomes or Course Objectives

Students will be able to analyze >90% of the reactions found in living systems from a mechanistic perspective.

Students will become familiar with the basic reactivity patterns of the major enzyme cofactors. Students will learn to analyze enzyme active site structure and to relate structure to reaction mechanism.

Students will become familiar with the major databases and literature resources important in biological chemistry.
Instructor Information

Name
Telephone #
Email address
Office hours
Office location

Tadhg Begley
862-4091
Begley@chem.tamu.edu
By appointment
2107 Interdisciplinary Life Sciences Building

Textbook and/or Resource Material

Medicinal Natural Products: A Biosynthetic Approach Paul M. Dewick
Any basic biochemistry text
Organic Chemistry of Biological Pathways John McMurry and Tadhg Begley
Enzyme Mechanisms, Perry A. Frey, Adrian D. Hegeman
Selected papers from the current literature.

Grading Policies

There will be 1 Preliminary Examination, a poster presentation on a topic relevant to the
course and a final exam. The distribution of credit will be as follows:

Preliminary Examination: 15 points
Homework (6 problem sets): 15 points
Poster: 25 points.
Final Examination: 45 points

As a general guide: $>80\%$ is an $A$; $79-65\%$ is a $B$; $64-50\%$ is a $C$; $40-49\%$ is a $D$; $<40\%$ is an $F$

Course Topics, Calendar of Activities, Major Assignment Dates

<table>
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<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction to enzyme chemistry, group transfer reactions</td>
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<td>Protein structure analysis</td>
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<td>2</td>
<td>Substitutions</td>
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<td>Carboxylation and decarboxylation</td>
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<td>3</td>
<td>Rearrangements</td>
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<td>Eliminations and Additions</td>
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<td>4</td>
<td>Aldol and Claisen Condensations</td>
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<td></td>
<td>One-carbon transfer reactions</td>
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<td>5</td>
<td>Redox reactions</td>
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<td>6</td>
<td>Redox reactions</td>
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Experimental methods in natural product biosynthesis

Assembly of biosynthetic pathways from DNA sequence

Nucleotide metabolism
Amino acid metabolism

Polyketide biosynthesis

Terpene biosynthesis
Alkaloid biosynthesis

Nonribosomal polypeptide biosynthesis

Vitamin biosynthesis

Student Poster presentations

Other Pertinent Course Information

None

Americans with Disabilities Act (ADA)

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Academic Integrity

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Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

1. Request submitted by (Department or Program Name): Zachry Department of Civil Engineering

2. Course prefix, number and complete title of course: CVEN765 Advanced Civil Engineering Systems

3. Catalog course description (not to exceed 50 words):
Formulation of decision making problems at different hierarchical levels: strategic, planning and operational; includes application problems in project selection, networks, allocation, routing/scheduling, distribution, and multi-objective; introduction to exact and approximate solving techniques: optimization, heuristics, simulation, and decision analysis; solution interpretation and sensitivity analyses.

4. Prerequisite(s):
CVEN322 or equivalent

5. Is this a variable credit course? ☑ Yes □ No

6. Is this a repeatable course? ☑ Yes □ No

7. This course will be:
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

8. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

9. Prefix: CVEN
   Course #: 765
   Title (excluding punctuation): Advanced Civil Engineering Systems

   Lect. Lab SCH QIP and Fund Code Admin Unit Acad. Year EOC Code
   0 3 0 0 0 3 1 4 0 8 0 1 0 0 6 0 6 3 0 1 2 1 3 0 0 3 6 3 2

   Approval recommended by:

   Dr. John Niedzwiecki
   Department Head or Program Chair (Type Name & Sign) Date

   Department Head or Program Chair (Type Name & Sign) Date
   (if cross-listed course)

   Submitted to Coordinating Board by:

   Associate Director, Curricular Services

   Date Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 3/10

RECEIVED
AUG 3 2011

GRADUATE STUDIES

RECEIVED
JUL 2 7 2011

R. AUTENRIETH
Course title and number  CVEN 765: Advanced Civil Engineering Systems
Term (e.g., Fall 200X)  Spring 2012
Meeting times and location  TR (time TBD)

Course Description and Prerequisites
Formulation of decision making problems at different hierarchical levels for Civil engineering Systems: strategic, planning and operational; includes application problems in project selection, networks, allocation, routing/scheduling, distribution, and multi-objective; introduction to exact and approximate solving techniques: optimization, heuristics, simulation, and decision analysis; solution interpretation and sensitivity analyses.
Prereq: CVEN322 or equivalent

Learning Outcomes or Course Objectives
Course Objectives: Provide students with an overview of CE Systems’ decision making tools and methodologies
Learning outcomes: Students will be able to identify, formulate and solve decision problems of CE Systems

Instructor Information
Name  Luca Quadrifoglio
Telephone number  979-458-4171
Email address  quadrifo@tamu.edu
Office hours  TBD
Office location  CE/TTI 3011

Textbook and/or Resource Material
Instructor’s notes

Grading Policies
Evaluation:  60% Exams
40% Term Paper

Grading:  A = 90+; B = 80 to 89.9; C = 70 to 79.9; D = 60 to 69.9; F = below 60.

Course Topics, Calendar of Activities, Major Assignment Dates

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Required Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>System thinking</td>
<td>Instructor’s notes</td>
</tr>
<tr>
<td>2</td>
<td>Problem Formulations</td>
<td>Instructor’s notes</td>
</tr>
<tr>
<td>3</td>
<td>Linear Programming review</td>
<td>Instructor’s notes</td>
</tr>
<tr>
<td>4</td>
<td>Multi-OF Problems – Pareto Optimality</td>
<td>Instructor’s notes</td>
</tr>
<tr>
<td>5-6</td>
<td>Network Problems</td>
<td>Instructor’s notes</td>
</tr>
<tr>
<td>7-8</td>
<td>IP/MIP Problems</td>
<td>Instructor’s notes</td>
</tr>
</tbody>
</table>
Other Pertinent Course Information

Homework: Assignments will be distributed bi-weekly and will be the basis for Exam questions.

Term Paper: A large portion of your grade for this course will be based on the preparation of a substantial individual research paper. You must devote a significant effort to this paper throughout the course, not just at the end! The objective is to train your individual and independent research capabilities. The topic must be up to you, but you must get instructor’s approval. The paper will be graded on research quality and contribution (25%), organization and format (25%), readability (25%) and your presentation (25%).

Attendance: The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07.

Americans with Disabilities Act (ADA)
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 Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity
For additional information please visit: http://www.tamu.edu/aggiehonor

“An Aggie does not lie, cheat, or steal, or tolerate those who do.”
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
Submit original form and attach a course syllabus.

Form Instructions

1. Request submitted by (Department or Program Name): Department of Finance

2. Course prefix, number and complete title of course: FINC 649 Financial Modeling

3. Catalog course description (not to exceed 50 words): Computer-based modeling of contemporary problems in investments and corporate finance including asset pricing, portfolio optimization, valuation, capital budgeting, cost of capital, risk assessment, and option pricing; using models to evaluate financial decision variables and alternative investment strategies.

4. Prerequisite(s):
   Cross-listed with: Gradient classification; classification 6 students may not enroll in this course; FINC 421 or FINC 632; FINC 434 or FINC 629
   Stacked with:
   Cross-listed courses require the signature of both department heads.

5. Is this a variable credit course? ☐ Yes ☒ No If yes, from __________ to __________

6. Is this a repeatable course? ☐ Yes ☒ No If yes, this course may be taken _______ times.
   Will this course be repeated within the same semester? ☐ Yes ☒ No

7. This course will be:
   a. required for students enrolled in the following degree programs(s) (e.g., B.A. in history)

   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

   Any master's program in business

8. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

9. Prefix Course # Title (excluding punctuation)
   FINC 649 FINANCIAL MODELING

<table>
<thead>
<tr>
<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>CIP and Fund Code</th>
<th>Admin. Unit</th>
<th>Acad. Year</th>
<th>FICE Code</th>
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</tr>
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</table>

Approval recommended by:
R. T. Dye
Department Head or Program Chair (Type Name & Sign) Date: 9/9/11

Chair, College Review Committee Date: 9/12/11

Dean of College Date: OCT 06 2011

Chair, GC or UCC Date: 

Submitted to Coordinating Board by:
Associate Director, Curricular Services Date: 

Effective Date: 

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 3/10
Finance 649: Financial Modeling
Course Syllabus
Spring 2012

Professor: TBD
Office: TBD
Phone: TBD
Email: TBD
Office hours: TBD
Class meets: Twice per week, either TR or MW (exams cover two days) in Reliant Trading Center

Required Text: Excel Modeling in Investments, 3rd edition, by C. Holden
Excel Modeling in Corporate Finance, 3rd edition, by C. Holden

TAMU eLearning http://elearning.tamu.edu/

COURSE DESCRIPTION: Financial Modeling. (3-0). Credit 3. Computer-based modeling of various contemporary problems in investments and corporate finance; asset pricing, portfolio models and valuation; net present value and cost of capital; option pricing; building models to evaluate financial decision variables and alternative investment strategies. Emphasis on theoretical underpinnings necessary to build useful models.

PREREQUISITE: Graduate classification; classification 6 students may not enroll in this course; FINC 421 or FINC 632; FINC 434 or FINC 629. Students should have a strong grasp of concepts from introductory finance, accounting, statistics, and economics. The class is a combination of problem solving labs, discussions, and lectures. Theoretical concepts are emphasized in building applications, which are tested by collecting and analyzing "real world" data.

COURSE OBJECTIVES: Students who complete FINC 649 should be able to build computerized financial models useful for investment management and corporate financial decision making. Constructing theoretically sound models requires students to apply principles and practice of financial management, enhancing understanding of these concepts. This course provides students with comprehensive training in financial modeling primarily using, but not limited to, Excel. Class exercises will mix explanation with implementation, allowing a deeper and more heavily computational examination of financial principles.

COURSE EVALUATION PROCESS:

There will be two major exams and a comprehensive final. Students will also create and submit numerous spreadsheet models as homework assignments. The course grade will be computed as follows:

\[(0.4 \times \text{homework average}) + (0.6 \times \text{exam average}) = \text{course grade}\]

The maximum homework average and exam average are both 100, so course grades will follow the usual 90/80/70/60 scale: 90-100 = A, 80-89 = B, 70-79 = C, 60-69 = D, 0-59 = F.

There will be no early finals or other examinations given for any reason.

If and only if you have a university-approved reason to miss one of the exams, you may take an essay make-up exam. You may review the list of excused absences on the TAMU web site at http://student-rules.tamu.edu/rules7.htm. Students must provide appropriate documentation to verify the absence. It is the student's responsibility to request permission to take the make-up exam and make the necessary arrangements with the instructor.
**ACADEMIC HONESTY:** Students are expected to follow the Aggie honor code: An Aggie does not lie, cheat or steal or tolerate those who do. Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning and to follow the philosophy and rules of the Honor System. Ignorance of the rules does not exclude any member of the Texas A&M University community from the requirements or the processes of the Honor System. For additional information please visit: [www.tamu.edu/aggiehonor/](http://www.tamu.edu/aggiehonor/).

**ATTENDANCE POLICY:** Strict attendance in this class is expected in accordance with University policy. Those who miss classes may penalize themselves by missing material that will be discussed in class, that may not appear in the texts, and over which the class will be tested.

If an absence is excused, the student will be allowed to make up work within 30 calendar days from the last day of the absence. To be excused the student must notify his or her instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence, and provide appropriate documentation for the absence. In cases where advance notification is not feasible (e.g. accident or emergency) the student must provide notification by the end of the second working day after the absence, including an explanation of why notice could not be sent prior to the class. The reasons absences are considered excused by the university are listed in Student Rule 7([http://student-rules.tamu.edu/rule7.htm](http://student-rules.tamu.edu/rule7.htm)). The fact that these are university-excused absences does not relieve the student of responsibility for prior notification and documentation. Failure to notify and/or document properly may result in an unexcused absence. Falsification of documentation is a violation of the Honor Code.

**DISABILITY:** If you are entitled to special accommodations because of a disability, please see me within the first two weeks of class. 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 Disability Services in Cain Hall, Room B118, or call 845-1637. For additional information, visit [http://disability.tamu.edu](http://disability.tamu.edu).

**MAYS FOOD & BEVERAGE POLICY:** We have beautiful, state-of-the-art classrooms in the Wehner Building. We want to maintain the high quality conditions of these classrooms for students in future years. Thus, it is necessary for you to adhere to the established policy of no beverages, food, or tobacco products or animals (unless approved) in WCBA classrooms. Thank you for observing this policy.
<table>
<thead>
<tr>
<th>Week</th>
<th>Subject</th>
</tr>
</thead>
</table>
| 1    | Building good models: documenting and debugging  
      | Excel’s financial functions |
| 2    | Bond pricing, duration, and convexity |
| 3    | The yield curve |
| 4    | Unconstrained and constrained portfolio optimization |
| 5    | Asset Pricing: CAPM and APT using the Fama-MacBeth method |
| 6    | CAPM and SML |
| 7    | - **EXAM 1: Class days 13 and 14** |
| 8    | Data tables and VBA modules  
      | International diversification |
| 9    | Black-Litterman portfolio optimization  
      | Investment performance |
| 10   | Crystal Ball portfolio models and Value at Risk |
| 11   | Term Structure |
| 12   | - **EXAM 2: Class days 23 and 24** |
| 13   | Millionaire Monte Carlo  
      | Binomial option pricing |
| 14   | Option strategies |
| 15   | Final Exams: See official University Schedule |
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions

1. Request submitted by (Department or Program Name): Department of Finance

2. Course prefix, number and complete title of course: FINC 660 Fixed Income Analysis

3. Catalog course description (not to exceed 50 words): Characteristics of fixed income securities including Treasury issues, federal agency issues, corporate and municipal bonds, mortgage-backed and asset-backed securities; institutional features fixed income markets; risks of bond investing; fixed income valuation; term structure; trade strategies; modeling and assessing credit risks; hedging with fixed income derivatives.

4. Prerequisite(s): Graduate classification; classification 6 students may not enroll in this course; FINC 421 or FINC 632; FINC 434 or FINC 629

Cross-listed with: Stacked with: Cross-listed courses require the signature of both department heads.

5. Is this a variable credit course? □ Yes □ No If yes, from _______ to _______

6. Is this a repeatable course? □ Yes □ No If yes, this course may be taken _______ times.

Will this course be repeated within the same semester? □ Yes □ No

7. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

Any master's program in business

8. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

9. Prefix Course # Title (excluding punctuation)
   FINC 660 FIXED INCOME ANALYSIS

   Lec. Lab SCH CIP and Fund Code Admin. Unit Acad. Year FICE Code
   0 3 0 0 0 3 5 2 0 8 0 4 0 0 1 6 1 1 1 0 1 2 1 3 0 0 3 6 3 2

   Approval recommended by:

   R. T. Dyck
   Department Head or Program Chair (Type Name & Sign) Date 9/19/11
   Chair, College Review Committee Date 9/12/11

   Department Head or Program Chair (Type Name & Sign) Date
   (if cross-listed course)
   Dean of College Date OCT 06 2011

   Submitted to Coordinating Board by:

   Chair, UCC Date
   Mark J. Zoran Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 3/10
FINC 660 Fixed Income Analysis
Spring 2012
Hwagyun (Hagen) Kim
hagenkim@tamu.edu

Class Meets: TBD
Class Website: http://elearning.tamu.edu and use Vista Logins, TAMU (NetID)
Office Hours: TBD Office: Wehner 360P
Phone: 979.862.3267 (voice), 979.845.3884 (fax), 979.845.3514 (FINC Department)

Course Description: Finance 660 Fixed Income Analysis examines the determinants of price and yield for fixed income securities including Treasury issues, federal agency issues, corporate bonds, municipal bonds, mortgage-backed and asset-backed securities. Topics include features of fixed income securities, risks of bond investing, fixed income valuation, term structure, trade strategies, fixed income derivatives and credit risk. Coverage of all topics will emphasize conceptual theoretical foundations. Students who complete this course will be able to

- value each type of security covered in class;
- develop models of term structure, duration, and convexity and use them to devise profitable trading strategies and to manage interest rate risk;
- value fixed income derivatives and use them to hedge risk;
- model and evaluate credit risk.

Prerequisites
Graduate classification; classification 6 students may not enroll in this course; FINC 421 or FINC 632; FINC 434 or FINC 629.

Required Material

You will need a financial calculator to solve the bond pricing problems in this course. Students will not be allowed to share a calculator during exams.

Suggested Material
For more explanations on the institutional details of bond markets, students are referred to


In addition, you are expected to read, on a daily basis, the Wall Street Journal or the financial section of a major newspaper.

Academic Integrity

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

The Aggie Honor Code affirms that honesty, truthfulness, trust, fairness, respect, moral conduct, and individual responsibility guide the conduct of the Texas A&M community. Commitment to these ideals
produces in each of us integrity, which fosters the will to make difficult choices, to accept responsibility for and consequences of our actions, even at great personal cost.

It is the responsibility of both students and instructors to maintain academic integrity by refusing to participate in or tolerate academic misconduct. Committing any of the following acts constitutes academic dishonesty. This list is not exclusive of any other acts that may reasonably be said to constitute scholastic dishonesty.

**Cheating:** Intentionally using or attempting to use unauthorized materials, information, notes, study aids, or other devices or materials in any academic exercise.

**Complicity:** Intentionally or knowingly helping (or attempting to help) another to commit an act of academic dishonesty.

**Plagiarism:** Failing to give appropriate credit for or presenting as your own another person’s words, ideas, results, or processes.

**Multiple Submission:** Submitting substantial portions of the same work (including oral reports) for credit more than once without authorization from the second instructor.

**Falsification:** Changing or omitting data or results, or manipulating research materials, equipment, or processes such that the research is not accurately represented in the research record.

**Fabrication:** Recording or reporting made up data or results, or submitting fabricated documents.

I will proactively promote academic integrity and adhere to the Aggie Honor System Office’s policies pertaining to reporting and adjudication of violations of the Aggie Honor Code. For detailed definitions of academic misconduct and complete Honor Council Rules and Procedures, please visit [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor).

**Classroom Care**

We have beautiful, state-of-the-art classrooms in the Wehner Building. We want to maintain the high quality conditions of these classrooms for students in future years. Thus it is necessary for you to adhere to the established policy of no beverages, food, or tobacco products or animals (unless approved) in WCBA classrooms. Please do not leave trash in the room. If you bring newspapers, etc., to class, either carry them out again or put them in the trash containers. Thank you for observing this policy.

**Attendance**

You are expected to attend class regularly, in accordance with university policy. I will routinely check attendance. You will be held responsible for any assignments, material covered, amendments to the syllabus, or announcements made in class, whether you are present or not.

If you miss any graded exercise without a valid, documented university excuse, you will receive a grade of zero. According to university policy, there are exactly eight types of excused absences. These are listed in Texas A&M University Regulations and on the TAMU website at [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07)

You can make up a graded exercise only if an absence is excused. To be considered excused, you must notify the instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence and provide appropriate documentation for the absence. In cases where advance notification is not
feasible (for example, accident or emergency) you must provide notification by the end of the second working day after the absence, including an explanation of why notice could not be sent prior to the class. The fact that these are university-excused absences does not relieve you of responsibility for prior notification and documentation. Failure to notify and/or document properly may result in an unexcused absence.

Falsification of documentation is a violation of the Honor Code.

It is noteworthy that job interviews are not considered excused absences. It’s never too soon to begin practicing managing your calendar in a professional manner. Arrange your job interviews and any necessary travel on dates other than those on which class meets.

**Grading**

A total of 350 points is possible for the semester. We will have three exams, worth 100 points each, plus several assignments to be handed out and graded, worth 50 points. When planning unexcused absences, remember that the following exam dates will not be changed.

Exam 1: TBD, approximately 10th class day (assuming class meets two days per week)
Exam 2: TBD, approximately 20th class day (assuming class meets two days per week)
Exam 3: TBD, university final exam schedule.

Your course grade will be determined as follows. Let $\text{SCORE}$ represent the total number of points you collect during the semester.

\[
\begin{align*}
\text{SCORE} \geq 315 & \quad \text{A} \\
315 > \text{SCORE} \geq 280 & \quad \text{B} \\
280 > \text{SCORE} \geq 245 & \quad \text{C} \\
245 > \text{SCORE} \geq 210 & \quad \text{D} \\
210 > \text{SCORE} & \quad \text{F}
\end{align*}
\]

The Finance Department expects grades to accurately reflect the University’s published grading system: Excellent = A, Good = B, Satisfactory = C, Passing = D, and Failing = F. To implement this philosophy and to promote a culture of excellence among finance majors, the department has adopted a target overall GPA of 3.20-3.50 for FINC 660. The complete departmental grading guideline document has been disseminated to all finance majors.

Late submissions of assignments are subject to the following penalties:

<table>
<thead>
<tr>
<th>If the project is submitted…</th>
<th>Penalty Maximum</th>
<th>Possible Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>before deadline</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>1st 24 hours after deadline</td>
<td>20%</td>
<td>80%</td>
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<tr>
<td>2nd 24 hours after deadline</td>
<td>40%</td>
<td>60%</td>
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<tr>
<td>3rd 24 hours after deadline</td>
<td>60%</td>
<td>40%</td>
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<tr>
<td>4th 24 hours after deadline</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>5th 24 hours after deadline</td>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Even if you have a documented excused absence, please arrange to have your assignment delivered to me by its due date unless an emergency situation makes this impossible. Late assignments accompanied by a documented university excuse will not be subject to penalty.
When any graded work is returned to you, you have one week from the date it is returned to bring any grading errors to the instructor’s attention. After the one-week deadline has passed, no further grade changes will be made for that particular item. The purpose of this deadline is not to discourage grade changes due to errors, but to assure that any necessary ones are promptly made.

**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 Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit [http://disability.tamu.edu](http://disability.tamu.edu).

**Course Agenda**

<table>
<thead>
<tr>
<th>Module</th>
<th>Week</th>
<th>Topic</th>
<th>Chapters</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Bond Myths, Security Types, Arbitrage Principle, Prices vs. Yield to Maturity</td>
<td>1, 2</td>
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<tr>
<td></td>
<td>2</td>
<td>Zeros (Strips), Spot Rates, Forward Rates</td>
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<td>3</td>
<td>Term Structure, Empirical Yield Curves, Yield Spreads</td>
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<td>Macaulay Duration, Modified Duration, Convexity</td>
<td>5, 6</td>
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<td>5</td>
<td>Barbell vs. Bullet, EXAM 1</td>
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<tr>
<td>2</td>
<td>6</td>
<td>Risk-neutral Probability, Interest Rate Trees</td>
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<td>7</td>
<td>Binomial Bond Pricing, Ho-Lee Model</td>
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<td>8</td>
<td>Vasicek Model, BDT Model</td>
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<td>9</td>
<td>Continuous Time Models</td>
<td>13, 14</td>
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<td>10</td>
<td>CIR Model, EXAM 2</td>
<td>14</td>
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<td>11</td>
<td>Lab Sessions</td>
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<td>4</td>
<td>12</td>
<td>Common Mortgages, Mortgage Backed Securities, PSA Model</td>
<td>21</td>
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<tr>
<td></td>
<td>13</td>
<td>Credit Ratings, KMV Model, Credit Derivatives (Credit Default Swaps)</td>
<td>Notes</td>
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<tr>
<td>5</td>
<td>14</td>
<td>Advanced Pricing Techniques for Fixed Income Derivatives</td>
<td>Notes</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>Final Exam</td>
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</tbody>
</table>
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

Form Instructions

1. Request submitted by (Department or Program Name): Petroleum Engineering

2. Course prefix, number and complete title of course: PETE 656 - Advanced Numerical Methods for Reservoir Simulation

3. Catalog course description (not to exceed 50 words): Numerical simulation of flow in porous media based on numerical methods for partial differential equations; supplemented by published papers and research topics; development of a reservoir simulator.

4. Prerequisite(s): Graduate classification; Basic Reservoir Simulation or equivalent class; Linear Algebra and Matrix Computations or equivalent class; Advanced Calculus or equivalent class; Programming experience.

5. Is this a variable credit course? No

6. Is this a repeatable course? No

7. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

   M.S., M.E., Ph.D. in Petroleum Engineering or related Engineering.

8. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

9. Prefix: PETE
   Course #: 656
   Title: Advanced Numerical Methods for Reservoir Simulation

   Lect. Lab SCH CIP and Fund Code Admin. Unit Acad. Year FI CE Code
   0 3 0 0 0 3 1 4 2 5 0 1 0 0 0 2 2 1 0 1 2 - 1 3 0 0 3 6 3 2

   Approval recommended by:
   Stephen Holditch
   Department Head or Program Chair (Type Name & Sign) Date
   Chair, College Review Committee Date
   Dean of College Date
   Mark Zoran
   Chair, GC or UCC Date
   Submitted to Coordinating Board by:
   Effective Date

   Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
   Curricular Services – 3/10
Course title and number: PETE 656: Advanced Numerical Methods for Reservoir Simulation
Term (e.g., Fall 200X): Spring 2012
Meeting times and location: MWF, 1:50-2:40 p.m., RICH 208

Course Description and Prerequisites
This class covers the numerical simulation of multiphase flow in heterogeneous porous media with emphasis on advanced techniques based on numerical methods for discretization of partial differential equations combined with state-of-the-art linear and nonlinear solvers and well modeling; The students are expected to develop a numerical reservoir simulator and benchmark against commercial-of-the-shelf software;
Prerequisites: Basic Reservoir Simulation or equivalent class; Linear Algebra and Matrix Computations or equivalent class; Advanced Calculus or equivalent class; Programming experience.
Graduate classification. Attendance will be limited to a maximum of 20 students.

Learning Outcomes or Course Objectives
The objectives of the course are for students to:
1. Develop an in-depth understanding of current approaches to building models of flow in porous media and their numerical simulation.

Instructor Information
Name: Dr. Eduardo Gildin
Telephone number: (979) 862-4578
Email address: eduardo.gildin@pe.tamu.edu
Office hours: TR @ 1:30pm (or by appointment – send e-mail)
Office location: 401J Richardson Building

Textbook and/or Resource Material
The main source of material for the course will be a series of notes and slides handed out to the students. Complementary textbooks are:
*Understanding and Implementing the Finite Element Method* by Mark S. Gockenbach, SIAM, 2006.
*Theory and Practice of Finite Elements* by Alexandre Ern and Jean-Luc Guermond, Springer, 2004
*Finite Volume Methods for Hyperbolic Problems*, Randall LeVeque, 2004

Grading Policies
Homework .............................................................. (30%)
Mid-Term Exam ...................................................... (30%)
Final Project .......................................................... (40%)
Total ................................................................. (100%)
Course Topics, Calendar of Activities

Week  Topic

1  Introduction to reservoir simulation and partial differential equations
   - Research issues
   - Understanding the overall iterative workflow
   - Introduction to partial differential equations
   - PDE's solution methods

2-3 Porous Media Flow and Transport Equation
   - Single-phase flow
   - Two-phase flow
   - Rock and Fluid Properties
   - Multiphase flow
   - Black-oil model

4-9 Numerical Methods - Discretization
   - Finite difference methods → Mid Term Project: Two-Phase Finite Differences
   - Standard Finite Element Methods
   - Control Volume Methods – TPFA and MPFA
   - Mixed Finite Element Methods
   - IMPES and AIM
   - Convergence, Accuracy, and Stability

10-12 Solution to Linear and Nonlinear Systems
   - Gaussian Elimination
   - CG
   - GMRES
   - Preconditioning
   - Multigrid Methods

13-14 Special Topics
   - Linear Hyperbolic equations
   - Conservation laws - Finite Volume Methods
   - Upwind and Godunov's Methods
   - High resolution methods (TVD)
   - Convergence, Accuracy, and Stability
   - Model Reduction
   - Gridding
   - Other requests

15 Class Projects → Final Project: Two-Phase Finite Volume/Elements
   - Simulator Results
Course Projects

Mid Term Project → usually assigned at the 7th-8th week
Representation of a single and two-phase (oil-water) partial differential equations;
Finite Differences discretization;
Well Modeling;
Direct Solvers (Gaussian Elimination)
Project Report: mathematical formulation and discretization; codes and results

Final Project → usually assigned at the 13th. week
Representation of a two-phase (oil-water or oil-gas) partial differential equations;
Finite Volumes/Elements discretization;
Well Modeling;
Iterative Solvers (GMRES, CG, BICGSTAB)
Project Report: mathematical formulation; codes and results; comparison of iterative and direct solvers

Other Pertinent Course Information
Since general reservoir simulation concepts will be discussed with no emphasis on specific areas, all engineering majors are welcome to attend the class. Also, mathematics and applied mathematics students are well suited to attend this course, although there will be no specific emphasis on the numerical algorithms and theorem proofs. The prerequisites for the class are the following: Basic Reservoir Simulation or equivalent class; Linear Algebra and Matrix Computations or equivalent class; Advanced Calculus or equivalent class; Programming experience. Although Matlab will be emphasized in this class, any other language that the student is familiar with (Fortran, C, C++, etc) will be fine as well.

Americans with Disabilities Act (ADA)

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 Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity

For additional information please visit: http://www.tamu.edu/aggiehonor

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
Submit original form and attach a course syllabus.

1. Request submitted by (Department or Program Name): Soil and Crop Sciences
2. Course prefix, number and complete title of course: SCSC 644 Forage Ecology and Management
3. Catalog course description (not to exceed 50 words): Investigation of multidisciplinary approaches toward the development of integrated forage, livestock, and wildlife production systems that are economically feasible and environmentally sustainable.

4. Prerequisite(s): and graduate classification
Cross-listed with: SCSC 444
5. Is this a variable credit course? ☐ Yes ☑ No If yes, from _____ to _____
6. Is this a repeatable course? ☐ Yes ☑ No If yes, this course may be taken _____ times.
Will this course be repeated within the same semester? ☐ Yes ☑ No
7. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in agronomy)

8. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

9. Approval recommended by:

   David D. Ballentuncan
   Department Head or Program Chair (Type Name & Sign) 7/19/11

   David Reed
   Chair, College of Agriculture
   Date

   Alan Adams
   Dean of College
   Date

   Mark Zobman
   Chair, GCC of UCC
   Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or swilliams@tamu.edu.
Course prefix and number: SCSC 444 / 644
Term: Fall
Meeting times and location: TBA
Course Credit: (3-0) Credit 3

Course Description and Prerequisites

This course investigates multidisciplinary approaches towards the development of integrated forage, livestock, and wildlife production systems that are economically feasible and environmentally sustainable.

Prerequisites: Approval of instructor and graduate classification

Learning Outcomes

Demonstrate comprehensive knowledge of crop resources, adaptation, management, and improvement.
- Describe the physiology, symptoms and management of water, temperature, light, and nutrient stress in plants.
- Name and relate changes in morphological structure, phenological stages, yield, and quality of crops to spatial variation of soil, temperature, photoperiod, and management conditions.
- Describe and explain the effects of soil chemical, physical, and microbiological properties on plant nutrient, water, and carbon cycling.
- Describe and explain selection of an appropriate crop species based on intended use, plant genetics and adaptation, as well as soil, climatic and resource constraints.

Demonstrate comprehensive knowledge of water movement in soils and plants and the resulting impacts on water yield and quality.
- Describe and explain interactions among soil, plants, water and the atmosphere.

Apply knowledge of science and technology for precision management of sustainable agricultural, natural, urban, and engineered ecosystems.
- Design and defend plans for plant management systems that incorporate best management practices and maximize value for relevant stakeholders based on the environment and availability of other resources.
- Develop and deliver multi-crop pest management programs that are environmentally sensitive and address resistance management.
- Synthesize knowledge on government policies, stakeholder’s interests, current events and new technology to derive sustainable actions.
- Evaluate and apply current and new technologies to improve a problematic situation including environmental and socio-economic constraints.

Apply knowledge of soil, plant, and water interactions to manage water resources and mitigate impacts on water yield and quality.
- Develop and defend a management plan for sustainable production that benefit the producer, soil, water, air, native species, and other aspects important to stakeholders.

**Communicate effectively in speaking and writing.**
- Deliver a convincing presentation and/or paper, with critical analysis and develop the ability to accept and positively respond to criticism.

**Solve problems using scientific reasoning and critical thinking.**
- Apply theoretical concepts to solve real-world problems.
- Think critically and make sound decisions with incomplete information.

### Instructor Information

<table>
<thead>
<tr>
<th>Name</th>
<th>Dr. Larry Redmon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone number</td>
<td>979-845-4826</td>
</tr>
<tr>
<td>Email address</td>
<td><a href="mailto:l-redmon@tanu.edu">l-redmon@tanu.edu</a></td>
</tr>
<tr>
<td>Office hours</td>
<td>By appointment</td>
</tr>
<tr>
<td>Office location</td>
<td>Heep 349</td>
</tr>
</tbody>
</table>

### Textbook and/or Resource Material

Forages: An introduction to grassland agriculture (v. 1; 5th Ed.) R.F. Barnes, D.A. Miller, and C.J. Nelson (eds.)

### Grading Policies

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Undergraduates</th>
<th>%</th>
<th>Graduates</th>
<th>%</th>
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<tbody>
<tr>
<td>Exams</td>
<td>3 major exams</td>
<td>70</td>
<td>3 major exams</td>
<td>50</td>
</tr>
<tr>
<td>Oral Presentation</td>
<td>1 presentation</td>
<td>10</td>
<td>2 presentations</td>
<td>10</td>
</tr>
<tr>
<td>Reaction Papers</td>
<td>2 written summaries of instructor-approved, peer-reviewed journal articles</td>
<td>20</td>
<td>4 written summaries of instructor-approved, peer-reviewed journal articles</td>
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<tr>
<td>Team Project</td>
<td>None</td>
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<td>Problem case investigation and summarization</td>
<td>20</td>
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</table>

Oral presentations and reaction papers will be graded using a rubric that will be handed out in class.

**Letter grades** will be assigned as follows:
- A = 90 % and above
- B = 80 to 89 %
- C = 70 to 79 %
- D = 60 to 69 %
- F = 59 % and below

No late work is accepted except in the case of a University Excused Absence. Missed exams, and laboratory assignments can only be made up in the case of a University Excused Absence.
Attendance Policy

“The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07.”

No late work is accepted except in the case of a University Excused Absence. Missed exams, and laboratory assignments can only be made up in the case of a University Excused Absence.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1    | Introduction:  
|      | - Forages defined  
|      | - The importance of forages in society  
|      | - Grassland agriculture and ecosystems  
|      | - Rangelands versus introduced species  
|      | Forages as a component of sustainable agriculture |
| 2    | Important forages of the United States  
|      | - Grasses  
|      | - Warm and cool season grasses  
|      | - Perennial versus annual species  
|      | Characteristics of important forage grasses |
| 3    | Important forages of the United States:  
|      | - Legumes  
|      | - The utilization of legumes in forage-livestock systems  
|      | Characteristics of important forage legumes |
| 4    | Reaction paper 1 (undergraduate and graduate students)  
|      | Important forages of the United States:  
|      | - Biological di-nitrogen fixation  
|      | - Legume inoculation  
|      | - Plant growth promoting rhizobacteria  
|      | Differences in nutritive value among various forage groups |
| 5    | Exam 1  
| 6    | Grass growth and development  
| 7    | Forage establishment  
|      | - Goals, timing, companion crops  
|      | - Species selection  
|      | Abiotic factor considerations (climate, soil texture, upland versus bottomland)  
|      | Reaction paper 2 (graduate students only)  
| 8    | Forage Establishment  
|      | - Seedbed preparation  
|      | Crop land versus existing forage base, soil test, fertility, equipment  
| 8    | Forage nutritive value  
|      | - What is forage nutritive value?  
|      | - What factors effect forage nutritive value?  
|      | - Species, fertility, stage of maturity  
|      | - Methods of determining nutritive value |
Exam 2

- Carbohydrate dynamics, storage organs, & reserves
- Endophytes
- Antiquality factors
- Forage toxicity issues
  - Nitrates, prussic acid, bloat, toxic plants

10 Reaction paper 3 (undergraduate and graduate students)

Forage Management

- Forage fertilization
  - Soils: NRCS soil survey, appropriate use, pH
  - The importance of soil fertility and the appropriate use of fertilizers
  - Nutrient cycling in forage systems: Nitrogen, Phosphorus, Potassium
- Hay
  - Production, storage, feeding

11 Forage Management:

- Silage
  - Definition, production, advantages/disadvantages relative to hay
- Weed management
- Use of prescribed fire
- Economics

12 Livestock production

- Ruminant nutrition versus monogastrics
- Beef, dairy, sheep, goats, horses, wildlife
- Stocking rate
- Reducing winter feeding costs

Reaction paper 4 (graduate students only)

13 Environmental constraints and stresses

- Soil
- Climate
- Water quality as impacted by livestock production
- Soil erosion, lack of water capture, nutrient loss, bacterial contamination of waterbodies

14 Exam 3

Synthesis

- Sustainable cropping systems
- Genetically-modified forages

15 Final Exam

**Americans with Disabilities Act (ADA)**

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
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Academic Integrity
For additional information please visit: http://aggiehonor.tamu.edu

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
• Submit original form and attach a course syllabus.

1. Request submitted by (Department or Program Name): Department of Veterinary Integrative Biosciences

2. Course prefix, number and complete title of course: VIBS 620 • Cytogenetics

3. Catalog course description (not to exceed 50 words):
Examination and analysis of variation in chromosome structure, behavior and number; developmental and evolutionary effects of this variation.

4. Prerequisite(s): GENE 603
Cross-listed with: GENE 620
Cross-listed courses require the signature of both department heads.

5. Is this a variable credit course? □ Yes ☑ No If yes, from _____ to _____

6. Is this a repeatable course? □ Yes ☑ No If yes, this course may be taken _____ times.
Will this course be repeated within the same semester? □ Yes ☑ No

7. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

PhD and MS in Genetics

8. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

9. Prefix Course # Title (excluding punctuation)
   VIBS 620 Cytogenetics

   Admin. Unit Acad. Year FICE Code
   2 8 7 3 1 2 - 1 3 0 0 3 6 3 2

   Approval recommended by:
   Evelyn Tiffany-Castiglioni
   Department Head or Program Chair (Type Name & Sign) Date

   Craig Coates
   Department Head or Program Chair (Type Name & Sign) Date
   (if cross-listed course)

   Submitted to Coordinating Board by:
   Associate Director, Curricular Services

Jane Welsh
Chair, College Review Committee Date

Eleanor M. Green
Dean of College Date

Mark Zoran
Chair, GC or UOC Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.
Curricular Services – 3/10
**VIBS 620 (Cytogenetics)**

Instruction provided by Dr. David Stelly & Dr. Terje Raudsepp. **REVISED 6/23/2011 3:46:00 PM**

**Course Description:** Examination and analysis of variation in chromosome structure, behavior and number; developmental and evolutionary effects of this variation.

**Prerequisite:** GENE 603

**VIBS 620 is a graduate-level introductory survey course on cytogenetics.** In this course, students will be introduced to salient topics in cytogenetics, primarily of plants and animals, but also other taxonomic groups. Coverage is both historical and contemporary. The “survey” nature of the course will be evident from an examination of the course syllabus. A detailed discussion of any one topic could easily occupy a whole semester, so while the main goal is to “hit the main points” and convey key phenomena, we hope to also sprinkle in enough detail to instill appreciation and intrigue.

**Relevance to all biological fields involving eukaryotic organisms:** Eukaryotes rely on chromosomes, the primary means of biologically organizing and manipulating nuclear DNA — in the cell, across cell generations, and across organismal generations. A knowledge of cytogenetic principles and variation is essential if a student aims to become an accomplished eukaryotic geneticist or biologist, whether for basic science or applied research.

Although much is known, we still strive to unravel the roles chromosomes play as dynamic “mega-molecules” that vary in form, constitution. Their behavior and effects continue to command our attention in the rapidly evolving area of genomics. Not only do they undergo a well-choreographed biological ballet each cell generation, they exhibit many other peculiar and novel behaviors. Chromosomes are central to the maintenance, recombination and transmission of genetic material across sexual generations, while chromatin mediates and affects various epigenetic phenomena. Cytogenetic manipulations can provide powerful means of genomic analysis and genetic manipulation for basic and practical applications. Thus, genomes, chromosomes, chromosome behavior, dynamic molecular constitution and many other topics remain areas of intense contemporary research. By mastering the topics in the syllabus, students will gain unique insights into multiple sub-disciplines of genetics, including transmission; reproductive; population, comparative and evolutionary genetics. The course also provides a backdrop to certain aspects of quantitative genetics, breeding, structural genomics, functional genomics and bioinformatics.

**We are strongly committed to providing a balanced and maximally informative class.** The balance is reflected by the expertise in our teaching team -- plant and animal cytogeneticists. Presentations and discussions balance classical concepts and present-day research. Textbook and web-accessible literature, including review articles are used. Students that master the material will acquire a sound understanding of the structure, organization and function of the chromosome, and an appreciation of the context of contemporary research. Their philosophical framework will thereby be strengthened.

**Involvement and participation is encouraged.** Participation in classroom discussions is very important — from several regards. First, the engagement helps create a dialogue that is very conducive to teaching and learning — for all students, not just the individuals who as the questions. Questions are not only relatively entertaining, they are valuable “feedback”, and constitute a means to assess communication, understanding and assimilation of ideas and information. To develop a willingness to ask questions is also a highly beneficial habit to develop. Lastly, when semester grades are borderline, it is sometime feasible to use a student’s habit of making classroom contributions as a basis for nudging that student’s grade upwards.
<table>
<thead>
<tr>
<th>Week</th>
<th>Ch.</th>
<th>Theme(s)</th>
<th>Reading/Handouts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 &amp;</td>
<td></td>
<td>Schedule, expectations, references, handouts, literature, grades,</td>
<td>Syllabus – (Subject to amendment, depending on class progress, travel etc.)</td>
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<tr>
<td></td>
<td></td>
<td>Introduction, Goals.</td>
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<tr>
<td>S</td>
<td></td>
<td>History – events leading to Chr. Theory</td>
<td>Handouts (email and/or hardcopy)</td>
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<tr>
<td>S</td>
<td></td>
<td>History – post-Chr. Theory developments</td>
<td>Handouts (email and/or hardcopy)</td>
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<tr>
<td>R</td>
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<td>Mitosis, cell cycle, life cycles, Chr. replication.</td>
<td>Review: Mitosis (NCB 3 E17, 2001)</td>
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<tr>
<td>R</td>
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<td>Chromosome chemistry &amp; packaging</td>
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<tr>
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<td>Telomeres and NORs</td>
<td>Review: Junk DNA</td>
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<td>3 S</td>
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<td>Centromeres</td>
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<td>Karyotypes and chr. analysis</td>
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<td></td>
<td>Karyotypes and chr. analysis</td>
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<tr>
<td>4 R</td>
<td></td>
<td>Heterochromatin, chr. bands &amp; molecular correlates</td>
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<td></td>
<td>Variations of DNA content, numbers of chromosomes &amp; genomes (ploidy).</td>
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<td>S</td>
<td>Q&amp;A (L) – classroom,</td>
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<td>******* EXAM I – (classroom, class period)</td>
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<td>Meiosis (pt. I)</td>
<td>Review: Meiosis</td>
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<td>Meiosis (pt. II)</td>
<td>Review: Meiosis</td>
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<td>Meiotic abnormalities</td>
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<td>6 S</td>
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<td>Meiotic configuration analysis</td>
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<tr>
<td>S</td>
<td></td>
<td>Sexual polyploidization, 2n gametes</td>
<td>Review: Polyploidy and polyploidization</td>
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<tr>
<td>S</td>
<td></td>
<td>2n gametes: modes, mechanisms, ramifications</td>
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<td>7 S</td>
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<td>Polyploidy</td>
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<td>S</td>
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<td>Polyploidy, Aneuploidy</td>
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<td>S</td>
<td></td>
<td>Aneuploidy</td>
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<td>8 R</td>
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<td>Molecular methods in cytogenetics</td>
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<td>S</td>
<td>Q&amp;A (II) – classroom,</td>
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<td>******* EXAM II – (classroom, )</td>
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<td>Sex determination systems</td>
<td>Review: FISH, cytometry, DNA content</td>
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<td>Sex determination in mammals and the Y chromosome</td>
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<td>Mammalian X-chromosome, dosage regulation</td>
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<tr>
<td>10 S R</td>
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<td>Mammalian X-chromosome inactivation, epigenetics</td>
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<tr>
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<td>Sex chromosome imbalance</td>
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<td>Sex chromosome imbalance</td>
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<tr>
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<td>Human autosomal conditions and phenomena</td>
<td>UPD, imprinting, instabilities (ch. 24), cancer. (ch. 27), fragile sites.</td>
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<tr>
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<td>Structural aberrations - inversions</td>
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<td>Structural aberrations – translocations pt-1</td>
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<td>Structural aberrations – translocations pt-2</td>
<td>Cell differentiation; DNA amplification (ch 22,25)</td>
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<td>Cell cycle modifications. Bizarre eukaryotic sexual systems.</td>
<td>Somatic cell hybridization (ch. 23. +)</td>
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<td>13 S</td>
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<td>B-chromosomes</td>
<td>Jones et al., 2007 Annals Bot.</td>
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<td>******* EXAM III</td>
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<td>Flow cytometry, flow sorting, laser scanning</td>
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<tr>
<td>S</td>
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<td>Cytometry, micro-dissection, optical mapping.</td>
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<td>Cell cycle modifications. Bizarre eukaryotic sexual systems.</td>
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<td>READING DAY</td>
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<tr>
<td>S</td>
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<td>Plant asexual reproduction</td>
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<tr>
<td>S</td>
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<td>Animal asexual reproduction</td>
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<tr>
<td>S</td>
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<td>Cytogenetic manipulations at the organismal level</td>
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<tr>
<td>R</td>
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<td>Contemporary Animal Cytogenetics</td>
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<td>Q &amp; A SESSION (SITE/DAY/TIME TBA)</td>
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VIBS 620 (Cytogenetics)

Instruction provided by Dr. David Stelly & Dr. Terje Raudsepp. REVISED 6/23/2011 3:46:00 PM

TEXTBOOK: Human Chromosomes, Orlando J. Miller and Eeva Therman, ISBN: 038795046X. Springer-Verlag. Pp.: 501. This is a very inexpensive text, and while it is not comprehensive, it will suffice as a skeleton for teaching the main features of cytogenetics. The material will be complemented with reasonably large number of handouts and review articles.

GRADING:
Primarily based on exam grades as indicated.

Exam Grades (approximate value based on numbers of lectures covered, plus extra for the final, given that it will be comprehensive (about 50% will be on material not covered by previous exams, and 50% will be comprehensive across all of the course )

- Exam I = ~15%
- Exam II = ~20%
- Exam III = ~25%
- Final = ~40% (mate) (~3/8 on last material, ~3/8 = other sections or comprehensive)

A = 90-100
B = 80-89
C = 70-79
D = 60-69
F = <60

FINAL GRADE: Exam grades, as noted above, where degree of class participation (asking questions; contributing information; strengthening the learning environment) will be considered as a positive factor in case of borderline grades. We will not demote anyone for not contributing, but we reserve the right to nudge up a borderline case, if deemed appropriate. We cannot over-emphasize that we strongly encourage your contributions to the class — it will be more fun and we all will learn more.

<table>
<thead>
<tr>
<th>Instructor</th>
<th>David Stelly</th>
<th>Bhanu Chowdhary</th>
<th>Terje Raudsepp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office tele.</td>
<td>979-845-2745</td>
<td>979-458-0519</td>
<td>862-2879</td>
</tr>
<tr>
<td>Office email</td>
<td><a href="mailto:stelly@tamu.edu">stelly@tamu.edu</a></td>
<td><a href="mailto:bchowdhary@cvm.tamu.edu">bchowdhary@cvm.tamu.edu</a></td>
<td><a href="mailto:traudsepp@cvm.tamu.edu">traudsepp@cvm.tamu.edu</a></td>
</tr>
<tr>
<td>Office site</td>
<td>Blg 965, Agronomy Rd. (see map above.)</td>
<td>Room 306, Vet Res Bldg (VRB) see map above</td>
<td>Room 310, Vet Res Bldg (VRB) see map above</td>
</tr>
</tbody>
</table>

OFFICE VISITS: We encourage these, but please arrange by telephone or email.

ATTENDANCE: Attendance is highly recommended, but not mandatory. If you can, please arrange for a peer to pick up handouts for you. The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07.

ELECTRONIC COMMUNICATION:
We will rely on emails for quickly disseminating information about the course. We will also make use of digitally available publications for review articles. Unpublished information will be distributed in hardcopy and/or at a class-accessible web site (to be named).
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OTHER INFORMATION:

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 Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu.

Academic Integrity
For additional information please visit: http://aggiehonor.tamu.edu
"An Aggie does not lie, cheat or steal, or tolerate those who do."

It has been suggested by the administration that that we share this with students in the class:

- The handouts used in this course are copyrighted. By "handouts," I mean all materials generated for this class, which include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless I expressly grant permission.
- As commonly defined, plagiarism consists of claiming the ideas, words, writings, etc, of another person as your own work. This means you are committing plagiarism if you copy work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated.
- If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section "Scholastic Dishonesty."
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
- Submit original form and attach a course syllabus.

1. Request submitted by (Department or Program Name): Department of Veterinary Large Animal Clinical Sciences

2. Course prefix, number and complete title of course: VLCS 622, Equine Disease & Epidemiology

3. Catalog course description (not to exceed 50 words): Principles and methods of epidemiology applied to equine health and prevention and control of selected equine infectious diseases.

4. Prerequisite(s): Enrollment in Equine Certificate and Graduate Student Classification, or Approval of Instructor

Cross-listed with: Stacked with: VLCS 422

Cross-listed courses require the signature of both department heads.

5. Is this a variable credit course? ☐ Yes ☒ No If yes, from _______ to _______

6. Is this a repeatable course? ☐ Yes ☐ No If yes, this course may be taken ______ times.
   Will this course be repeated within the same semester? ☐ Yes ☐ No

7. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

Graduate Programs in Equine Science related degrees

8. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

9. Prefix Course # Title (excluding punctuation) VLCS 622 EQUINE DISEASE & EPIDEM

<table>
<thead>
<tr>
<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>CIP and Fund Code</th>
<th>Admin. Unit</th>
<th>Acad. Year</th>
<th>FICE Code</th>
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Approval recommended by:

Allen Rousse
Department Head or Program Chair (Type Name & Sign) Date 8/14/11

Bhanu Chowdhury
Chair, College Undergraduate Committee Date

Bhanu Chowdhury
Dean of College Date

Chair, GC or UCC Date

Submitted to Coordinating Board by:

Associate Director, Curricular Services Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845 8201 or sandra.william@tamu.edu.
Course title and number  VLCS 422/622 – Special Topics in Equine Disease/Epidemiology
Term                                              Spring 2012
Meeting times and location                        LAH
Credit Hours                                       3 (Lecture)

Course Description and Prerequisites

This course provides an introduction to the following: 1) epidemiological principles and methods as they apply to equine health; 2) principles of evidence-based animal science; and, 3) selected equine infectious diseases, including their control and prevention.

Prerequisites: Junior or Senior Classification, Approval of instructor

Learning Outcomes or Course Objectives

Upon completion of this course, students will have demonstrated a thorough understanding of the basic principles of equine epidemiology and selected equine infectious disease.

Instructor Information

<table>
<thead>
<tr>
<th>Name</th>
<th>Noah Cohen, VMD, MPH, PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone number</td>
<td>979-845-0741</td>
</tr>
<tr>
<td>Email address</td>
<td><a href="mailto:ncohen@cvm.tamu.edu">ncohen@cvm.tamu.edu</a></td>
</tr>
<tr>
<td>Office hours</td>
<td>By appointment</td>
</tr>
<tr>
<td>Office location</td>
<td>Large Animal Hospital</td>
</tr>
</tbody>
</table>

Textbook and/or Resource Material

Class handouts

Grading Policies

Additional Requirements for Graduate Level: Students will be required to complete an additional project on a topic and in a format approved by the instructor. Potential formats include paper, oral presentation, individual or group project.

For students enrolled in VLCS 422 exams will comprise 100% of the final grade. (Midterm Exam = 50%, Final Exam = 50%)

For students enrolled in VLCS 622 the Midterm Exam, Final Exam and Project will comprise 35%, 35% and 30% of the final grade respectively.
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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| 1.   | Introductions, Expectations, Motivations  
      | History of Epidemiology  
      | Epidemiology: What Is It? Why Does It matter? (Applications to Equine Science) |
| 2.   | Measuring Disease: Incidence, Prevalence,  
      | Morbidity and Mortality  
      | Surveillance and Monitoring |
| 3.   | Epidemiological Measures of Association |
| 4.   | Introduction to Study Designs  
      | Case-Control Study Design  
      | Cohort Study Design  
      | Clinical Trial Study Design  
      | Case-only Designs  
      | Study Design Review |
| 5.   | Bias versus Random Error  
      | Bias – Information Bias  
      | Bias – Confounding Bias  
      | Bias – Misclassification |
| 6.   | Sensitivity and Specificity  
      | Predictive values and likelihood ratios |
| 7.   | Evidence-Based Medicine /Evidence-Based  
      | Equine Science |
| 8.   | EXAMINATION |
| 9.   | Principles and Practice of Biosecurity  
      | Farm-based Biosecurity  
      | Show/Fair Biosecurity |
| 10.  | Investigating an Outbreak of Disease  
      | Biosecurity Case Study |
11. *Streptococcus equi* subsp. *equi*
12. *Rhodococcus equi*
13. Equine Salmonellosis
   Equine Clostridial Diarrhea
   Equine Leptospirosis
14. Equine Herpesvirus 1
   Equine Protozoal Myeloencephalitis
15. FINAL EXAMINATION

**Other Pertinent Course Information**
Some course information may be distributed through email or eLearning.

**Americans with Disabilities Act (ADA)**
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 Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit [http://disability.tamu.edu](http://disability.tamu.edu)

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

**Attendance Policy and Grading Scale Examples**

**Attendance Policy:**
Attendance will not be taken at lecture meetings. However, attendance of lectures will drastically increase a student's ability to perform well on course assignments and exams. If planning to miss lecture sessions, students are encouraged to contact the instructor prior to the absence.

"The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07)"

**Grading Scale:**
Minus grades will not be used.

A = 90-100
B = 80-89
C = 70-79
D = 60-69
F = <60