Graduate Council Report (Corrected)
7 September 2006

New Course Requests

A671 AGRO 663 Applied Spatial Statistics (2-2) Credit 3. An introduction to the theory and practice of spatial statistics as applied to the natural resources. Spatial analyses focusing primarily on ordinary kriging, point processes, and lattice data. Prerequisite(s): Math 141, 142, STAT 651, or equivalents; FRSC 651 preferred. Cross-listed with FRSC 663.

A672 ELEN 640 Thin Film Science and Technology (3-0) Credit 3. The course focuses on the thin film technology in semiconductor industry. Topics include the basic growth mechanisms for thin films (growth models, lattice matching epitaxy and domain matching epitaxy), the instrumental aspects of different growth techniques and advanced topics related to various applications. Prerequisite(s): Graduate Standing.

A670 FRSC 663 Applied Spatial Statistics (2-2) Credit 3. An introduction to the theory and practice of spatial statistics as applied to the natural resources. Spatial analyses focusing primarily on ordinary kriging, point processes, and lattice data. Prerequisite(s): MATH 141, 142; STAT 651; or equivalents; FRSC 651 preferred. Cross-listed with AGRO 663.

A668 MKTG 670 Marketing Leadership (1-0) Credit 1. Seminar on the application of marketing concepts and theories through guest lectures and discussions with marketing-thought leaders in business and academia. Prerequisite(s): MKTG 621 or equivalent.

A669 MKTG 687 Seminar in Marketing Models (3-0) Credit 3. Review and discussion of the foundations of modeling and recent developments in research using marketing models. The seminar is designed to provide participants with new ways to think about modeling marketing phenomena and enable them to generate new ideas, research topics, and modeling applications for marketing problems. Prerequisite(s): Doctoral classification.

A673 PETE 636 Horizontal, Multilateral and Intelligent Wells (3-0) Credit 3. Advanced well architectures, primarily horizontal, multilateral and intelligent wells, all aspects of these types of wells, including well completions, reservoir flow, and wellbore flow conditions, and well deliverability; optimization of well design and field applications will be demonstrated with field cases. Prerequisite(s): PETE 662, graduate classification.
Texas A&M University

Undergraduate • Graduate • Professional

Submit original form and 2 copies. Attach a course syllabus to each.

1. This request is submitted by the Department of Soil & Crop Sciences

2. Course prefix, number and complete title AGRO 663 Applied Spatial Statistics

3. Course description (not more than 50 words) An introduction to the theory and practice of spatial statistics as applied to the natural resources. Spatial analyses focusing primarily on ordinary kriging, point processes, and lattice data.

4. Prerequisite(s) Math 141, 142; Stat 651, or equivalents; FRSC 651 preferred. Cross-listed with FRSC 663. Cross-listed course requires approval 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 the course be repeated within the same semester/term? Yes ☐ No ☒

7. Has this course been taught as a 489/689? Yes ☐ No ☒ If yes, how many times? once. Indicate the number of students enrolled for each academic period it was taught. 6 students

8. 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. or Ph.D. in Soil Science, Agronomy, MEPS, Plant Breeding and Natural Sciences degree, GIS certificate

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

10. Prefix Course # Title (exclude punctuation) AGRO 663 Applied Spatial Statistics

    Lect. Lab SCH Subject Matter Content Code Admin. Unit Acad. Year FICE Code
    0 2 0 2 0 3 3 7 0 5 0 1 1 0 0 2 4 6 0 0 6 0 7 0 0 3 6 3 2

    Do not complete shaded area.

    Approval recommended by:

    Head of Department Date 8-4-06
    Carol Koster Date 8-4-06
    Head of Department (if cross-listed course)

    Submitted to Coordinating Board by:

    Director of Academic Support Services Date

    Dean of College Date

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

    OARAS-504

2 of 34 B
Texas A&M University  
Applied Spatial Statistics  

SYLLABUS  

Instructors: Dr. Marian Eriksson, Centeq 230 or HFSB 320, Phone: 845-6638  
meriksson@tamu.edu  

Dr. Cristine Morgan, Heep Center 545, Phone: 845-3603  
cmorgan@ag.tamu.edu  

Office Hours: By appointment  

Course Description: An introduction to the theory and practice of spatial statistics as applied to the natural resources. Spatial analyses focusing primarily on kriging; point processes; lattice data. Prerequisites: MATH 141, 142; STAT 302; FRSC 461, or the equivalent.  

Objectives: The specific objectives of this course are to introduce the student to the field of spatial statistics and to give the student an opportunity to analyze and interpret data sets associated with the natural sciences. Spatial statistics and other spatial modeling techniques are being used at an increasing rate in the natural resources fields and are often misunderstood. Practitioners often want to use the "push-button" approach to analyzing spatial data and lack an understanding of the tools they are using. As such, assumptions underlying the statistical tools may not be met and/or an intuitive and thorough understanding of the results is lacking. The objective of this course is toward the application of spatial statistics. But proper application of the tools and understanding of the results requires some basic knowledge of the theory behind the tools. Students will not leave this course as experts in the field of spatial statistics, but with a sufficient understanding of the tools and their use so that they are equipped to build on their knowledge as their careers, academic and professional, demand.  

Students should leave this course with:  
(1) An appreciation of the difference between spatial smoothing and spatial interpolation and between stochastic and deterministic fitting of models to spatial data.  
(2) An understanding of the foundations upon which simple and ordinary kriging models are built.  
(3) An understanding of spatial correlation, spatial covariance, variograms, and the relationships between these quantities.  
(4) An appreciation of how covariance/variogram models are fitted, the use of computer software to fit variogram models, and an awareness of some of the differences between spatial statistical computer programs.  
(5) An appreciation of the effects of trend and how to deal with trend and an awareness of other kriging and spatial regression models.  
(6) An awareness of characteristics of point processes, contagion, and of various tests for spatial randomness and distribution.  
(7) An awareness of the characteristics lattice data that differentiate it from "geostatistical" data and the existence of spatial regression models based on BW configurations.  

Course Conduct: The course will be divided into four distinct sections. In the first section, lasting about four weeks, we will review matrix algebra, constrained and unconstrained minimization of polynomials, simple linear regression and multiple linear regression as motivated by geographically weighted regression. In the second section, about two weeks, we will focus on measures of spatial dependence and will introduce analysis tools for lattice-type data; the third section, lasting about five weeks will introduce the concepts of covariance/variogram modeling and spatial interpolation using kriging. In the final section, we will consider tests for spatial distribution of regular, random, and clustered point processes.
Formally, the course is comprised of two hours of lecture and two hours of lab each week. Weekly or bi-weekly homework will be assigned. All materials will be downloadable from the course website at http://tasp.tamu.edu. You will also use this website to upload digital solutions; written solutions may, of course, be given to the instructors. Your initial login password will be your first initial, dash, last name (all lower case) as in m-eriksson. YOU SHOULD CHANGE this password the first time you log in.

The importance of homework assignments cannot be overemphasized. Almost all of your learning will take place while working on the assigned problems and studying for exams. You are encouraged to work together if that is how you believe you best learn, but the work is expected to be your own. In the case of “hand” calculations, you must show all of your work in order to receive full credit.

**Literature review:** Toward the end of the semester each student will choose a peer-reviewed journal article that covers a topic addressed in class. We ask each student to read and write a summary synthesizing their chosen article. Each student will present their summary to the class.

**Exams:** There will be two exams. The format will be open-book and open-notes and may consist all or in part of a take-home component. You will be informed as to format at least one week prior to each exam. Strict time-limits will be placed on take-home components and the date-stamp of submission to the website will be monitored.

**Grading:**

- Regular Homework/Labs: 70%
- Exams: 20%
- Article Summaries: 10%

No “special” extra credit will be made available. Bonus points may be specified for particular homework, quiz, or exam questions. If a discrepancy or disagreement should arise over the grading of any material in this course, the student should write an explanation of the problem and why he or she believes some adjustment should be made, attach the explanation to the material in question, and present the material to the instructor within one week of when the material was returned to the student. The instructor will evaluate all written requests of grading reviews, make any necessary adjustments, and return the material as quickly as possible.


**Aggie code of honor:** “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. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. For additional information please visit www.tamu.edu/aggiehonor/

**Americans with Disabilities Act (ADA) Policy Statement:** The Americans with Disabilities Act (ADA) is a federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Room 126 of the Koldus Building or call 845-1637.
## Tentative Schedule

<table>
<thead>
<tr>
<th>Wk</th>
<th>Lect #</th>
<th>Date</th>
<th>Topic</th>
<th>Lab/Homework Exercise*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Jan. 17</td>
<td>Housekeeping; Review Matrices</td>
<td>R and Octave basics; Matrices</td>
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<td></td>
<td>Matrix algebra; Review calculus; Constrained and unconstrained</td>
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<td>minimization</td>
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<td>2</td>
<td>3</td>
<td>Jan. 24</td>
<td>Review simple linear regression; Correlation</td>
<td>Regression in R and Octave</td>
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<td></td>
<td>4</td>
<td>Jan. 26</td>
<td>Multiple linear regression; Models</td>
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<tr>
<td>3</td>
<td>5</td>
<td>Jan. 31</td>
<td>Generalized least squares</td>
<td>OLS; GLS; ANOVA</td>
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<td></td>
<td>6</td>
<td>Feb. 02</td>
<td>Geographically weighted regression</td>
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<tr>
<td>4</td>
<td>7</td>
<td>Feb. 07</td>
<td>Continue GLS; GWS; Assumptions</td>
<td>GLS; GWR; Neighborhood</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Feb. 09</td>
<td>Lattice; Neighborhood Structures</td>
<td>Structures</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>Feb. 14</td>
<td><strong>FIRST EXAM</strong></td>
<td>Analyzing data using Geary’s C and Moran’s I</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Feb. 16</td>
<td>Moran’s I, Geary’s C</td>
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<tr>
<td>6</td>
<td>11</td>
<td>Feb. 21</td>
<td>SAR CAR</td>
<td>Using CAR and SAR Models</td>
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<tr>
<td></td>
<td>12</td>
<td>Feb. 23</td>
<td>SAR CAR</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>13</td>
<td>Feb. 28</td>
<td>Kriging as an Interpolator; MSPE; Kriging equations; Minimization of</td>
<td>Intro kriging in R and Octave; Visualizing surfaces</td>
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<tr>
<td></td>
<td>14</td>
<td>Mar. 02</td>
<td>the Lagrangian</td>
<td></td>
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<tr>
<td>8</td>
<td>15</td>
<td>Mar. 07</td>
<td>Equivalence of covariance and variogram versions; Simple kriging</td>
<td>Varioigram models; Generating covariance (varioigram) matrices; Turn in discussion of lattice-data paper</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Mar. 09</td>
<td>Varioigram models</td>
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<td><strong>Spring Break</strong></td>
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<tr>
<td>9</td>
<td>17</td>
<td>Mar. 21</td>
<td>Varioigram modelling; Assumptions and Implications; Local vs global;</td>
<td>Varioigram modelling; Fitting options</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Mar. 23</td>
<td>Window specifications; Anisotropy; &quot;Conversion to isotropic&quot;; Nuggets; Stationarity</td>
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<tr>
<td>10</td>
<td>19</td>
<td>Mar. 28</td>
<td>Mike Sherman: Assuming Isotropy</td>
<td>Transformations and anisotropy</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Mar. 30</td>
<td>Exploratory data analysis; Removal of trend; Universal kriging</td>
<td></td>
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<tr>
<td>11</td>
<td>21</td>
<td>Apr. 04</td>
<td>Other interpolators; Other kriging models (indicator, disjunctive, etc)</td>
<td>Presentation and discussion of geostatistics application papers</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Apr. 06</td>
<td>Introduce point processes</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>23</td>
<td>Apr. 11</td>
<td><strong>SECOND EXAM</strong></td>
<td>Testing Quadrant Data</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Apr. 13</td>
<td>SSP: Random, Regular, cluster, quadrants</td>
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<tr>
<td>13</td>
<td>Apr. 18</td>
<td></td>
<td>SSP: quadrant, Lhat</td>
<td>Analyzing Point Processes,</td>
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<td></td>
<td>Apr. 20</td>
<td></td>
<td>Ghat, F and K tests</td>
<td>L,G, K, H tests</td>
</tr>
<tr>
<td>14</td>
<td>Apr. 25</td>
<td></td>
<td>Mike Sherman: applied problems with SSP</td>
<td>Presentation and discussion of point process papers</td>
</tr>
<tr>
<td></td>
<td>Apr. 27</td>
<td></td>
<td>Catch up; Review</td>
<td></td>
</tr>
</tbody>
</table>

*One lab per week; lab lasts 2 hours*
Glenda Kurten - RE: I need your approval - RE:our spatial stats class

From: "Simon Sheather"
To: "Cristine L. Morgan"
Date: 8/14/2006 3:32 PM
Subject: RE: I need your approval - RE:our spatial stats class

Cristine

Thank you for your email. I am happy to endorse your course

AGRO/FRSC 653 Applied Spatial Statistics.

Please let me know if you require anything else.

Regards

Simon

Simon Sheather
Professor and Department Head
Department of Statistics
Texas A&M University
3143 TAMU
College Station, TX 77843-3143
E-Mail: sheather@stat.tamu.edu
 Telephone: 1 979 845 3141
 Fax: 1 979 845 3144

Assistant: Jennifer S. Reyes
Telephone: 1 979 845 3191
E-mail: jennifer@stat.tamu.edu

From: Cristine L Morgan [mailto:cmorgan@ag.tamu.edu]
Sent: Monday, August 07, 2006 11:02 AM
To: Simon Sheather
Subject: I need your approval - RE:our spatial stats class

Dear Simon,
Marian and I are applying for a number for the applied spatial stats class we taught this past spring. The class went very well and Mike Sherman gave an excellent guest lecture for the course.

We want to give it a AGRO/FRSC 653 number and call the class Applied Spatial Statistics. If you prefer a different name for the class, we can change it. I would like to have your approval of this request to make this a numbered class.

I have attached the syllabus for your information. Would you please send me an email acknowledging your support for our class? I will then forward the email to Lynette Hovel to accompany our request for a number.

Sincerely,
Cristine

==================================
Cristine Morgan, Ph.D.
Assistant Professor, Dept. of Soil & Crop Sciences
Texas A&M University
Phone: 979.845.3603
E-mail: cmorgan@tamu.edu
Texas A&M University  
Departmental Request for a New Course  
Undergraduate Graduate Professional  
Submit original form and 25 copies. Attach a course syllabus to.

1. This course is submitted by the Department of Electrical Engineering.

2. Course prefix, number and complete title of course: ELEN 640 Thin Film Science and Technology

3. Course description (not more than 50 words):

   The course focuses on the thin film technology in semiconductor industry. Topics include the basic growth mechanisms for thin films (growth models, lattice matching epitaxy and domain matching epitaxy), the instrumental aspects of different growth techniques and advanced topics related to various applications.

4. Prerequisite(s) Graduate Standing   Cross-listed with

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

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

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

   Will the course be repeated within the same semester/term?  □ Yes  X No

7. Has the course been taught as a 489/689?  X Yes  □ No   If yes, how many times?  1

   Indicate the number of students enrolled for each academic period it was taught  12

8. 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., MENG, Ph.D. in electrical engineering

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

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
<th>Title (exclude punctuation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E L E N</td>
<td>6 4 0</td>
<td>Thin Film Science and Technology</td>
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</table>

<table>
<thead>
<tr>
<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>Subject Matter</th>
<th>Content Code</th>
<th>Admin. Unit</th>
<th>Academic Year</th>
<th>FICE Code</th>
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</thead>
<tbody>
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<td>3</td>
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<td>3 1 4 1 0 0 1 0 0 0 6</td>
<td>0 9 4 0</td>
<td>0 8</td>
<td>0 1 0 3 6 6</td>
</tr>
</tbody>
</table>

Approval recommended by:  
Head of Department  
Date: 10-12-06

Chair, College Review Committee  
Date: 10/13/06

Dean of College  
Date: 10/13/06

Submitted to Coordinating Board by:  
Dean of College  
Date

Director of Academic Support Services  
Date  
Effective Date

*Attach a syllabus according to the guidelines on the website www.tamu.edu/courseforms. To have this form reviewed, please send to Linda F. Lacey, Mail Stop 1265 or fax to 847-8737.
Texas A&M University

Departmental Request for a New Course

Undergraduate Graduate Professional

Submit original form and 25 copies. Attach a course syllabus to each.*

1. This course is submitted by the Department of Electrical Engineering

2. Course prefix, number and complete title of course: ELEN 640 Thin Film Science and Technology

3. Course description (not more than 50 words):

The course focuses on the thin film technology in semiconductor industry. Topics include the basic growth mechanisms for thin films (growth models, lattice matching epitaxy and domain matching epitaxy), the instrumental aspects of different growth techniques and advanced topics related to various applications.

4. Prerequisite(s) ELEN or consent of instructor Cross-listed with

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

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

Will the course be repeated within the same semester/term? □ Yes X No

7. Has the course been taught as a 489/689? □ Yes X No If yes, how many times? 12

Indicate the number of students enrolled for each academic period it was taught

8. 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., MENG, Ph.D. in electrical engineering)

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

10. Prefix Course # Title (exclude punctuation)

<table>
<thead>
<tr>
<th>E L E N</th>
<th>Thin Film Sci &amp; Tech</th>
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</table>

Lect. Lab SCH Subject Matter Content Code Admin. Unit Academic Year FICE Code
0 3 0 0 0 0 4 1 0 0 L 0 0 0 0 6 0 9 4 0 0 0 7 6 9 0 0 1 0 0 3 6 6

Do not complete shaded area.

Approval recommended by:

[Signature] 8/10/06
Head of Department Date

Chair, College Review Committee

[Signature] 8/10/06

Date

Dean of College

[Signature] 8/10/06

Date

Submitted to Coordinating Board by:

Director of Academic Support Services

Date Effective Date

*Attach a syllabus according to the guidelines on the web site www.tamu.edu/courseforms. To have this form reviewed, please send to Linda F. Lacey, Mail Stop 1265 or fax to 845-8737
Syllabus - ELEN XXX
Thin Film Science and Technology

Instructor: Dr. Haiyan Wang
Course is to be offered in every Spring semester

Prerequisite
In general, you need to be a graduate student to register this class.

Frequency: The course will be offered twice a week with 75 min long lecture in each class.

Course topics:
This graduate course focuses on thin film science and technology widely applicable in electronic and semiconductor industry. Topics include, but are not limited to, crystal structures and defects in thin films, the basic nucleation and growth mechanisms of thin films (growth models, lattice matching epitaxy and domain matching epitaxy), thin film processing techniques (CVD, MOCVD, MBE, PLD, Laser-MBE etc.), thin film growth instrumentation aspect (energy source, chamber configurations, vacuum systems and growth controllers), and several advanced topics related to defect and dislocation control during the growth of thin films for electrical and optical devices. The following table provides a tentative guideline for course subjects.

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Topic</th>
<th>No. of lectures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overview of thin film technology in semiconductor industry</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Crystal structures of thin films</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Defects in thin films (vacancies and interstitials, dislocations, grain boundaries etc.) Nanocrystalline, polycrystalline and epitaxial thin films</td>
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<tr>
<td>3</td>
<td>Interface and surface of thin films</td>
<td>3</td>
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<td>4</td>
<td>Thin film nucleation and growth models (2D, 3D, and 2D-3D combination)</td>
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<td>5</td>
<td>Epitaxy</td>
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<tr>
<td></td>
<td>Homeoeпитaxy and heteroeпитaxy; Lattice matching epitaxy and domain matching epitaxy; Superlattice structures and quantum wells</td>
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<tr>
<td>6</td>
<td>Diffusions: inter-diffusion, grain boundary diffusions, reaction, and phase transformation</td>
<td>3</td>
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<tr>
<td>7</td>
<td>Thin film growth techniques (Physical Vapor Deposition-</td>
<td>6</td>
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<tr>
<td>8</td>
<td>Thin film growth techniques (Chemical Vapor Deposition-CVD, PECVD, MOCVD)</td>
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<tr>
<td>9</td>
<td>Solution based deposition techniques-Sol-Gel, PAD.</td>
<td>2</td>
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<tr>
<td>10</td>
<td>Liquid phase epitaxy-LPE and other deposition techniques</td>
<td>2</td>
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<tr>
<td>11</td>
<td>Defect generation and control in thin films for electrical and optical devices-doping and dislocations.</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>General overview of thin film characterization techniques (structural, chemical, and electrical characterizations)</td>
<td>3</td>
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</tbody>
</table>

**Course Textbooks**
I will use multiple books as references for this course. A partial list of references is listed below. Handouts and journal papers will also be distributed to serve as course references.


**Student Requirements**
- Take responsibility for individual learning
- Take responsibility for other individual's learning through participation in team activities

**Grading Policy**
Midterm exam (25%)
Homework and quizzes (20%)
Team project on design of thin film deposition system or term paper (20%)
Final exam (35%)

**Absences**
I handle absences as required by the student rules.

**Supplemental Reading Materials**
6. Handouts and reference distributed during class.

**Americans with Disabilities Act (ADA) Policy Statement**

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**Academic Integrity Statement**

**Aggie Honor Code:** "An Aggie does not lie, cheat, or steal, or tolerate those who do."

It is the responsibility of students and instructors to help maintain scholastic integrity at the university by refusing to participate in or tolerate scholastic dishonesty (Student Rule 20. Scholastic Dishonesty, http://student-rules.tamu.edu). New procedures and policies have been adopted effective September 1, 2004. Details are available through the Office of the Aggie Honor System (http://www.tamu.edu/aggiehonor/). An excerpt from the Philosophy & Rationale section states: "Apathy or acquiescence in the presence of academic dishonesty is not a neutral act -- failure to confront and deter it will reinforce, perpetuate, and enlarge the scope of such misconduct. Academic dishonesty is the most corrosive force in the academic life of a university."
Texas A&M University  
Departmental Request for a New Course  
Undergraduate • Graduate • Professional

Submit original form and 2 copies. Attach a course syllabus to each.

1. This request is submitted by the Department of Forest Science

2. Course prefix, number, and complete title: FRSC 663  Applied Spatial Statistics

3. Course description (not more than 50 words): An introduction to the theory and practice of spatial statistics as applied to the natural resources. Spatial analyses focusing primarily on ordinary kriging, point processes, and lattice data.

4. Prerequisite(s): Math 141, 142, Stat 651, or equivalents; FRSC 651 preferred

5. Cross-listed courses require the signatures of both department heads.

6. Is this a variable credit course? □ Yes ☐ No  If yes, from ______ to ______.

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

8. Has this course been taught as a 489/689? □ Yes ☐ No  If yes, how many times? ______ times. Indicate the number of students enrolled for each academic period it was taught. 6 students

9. 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. or Ph.D. in Forest Science, Rangeland ecology or any of the Agricultural or Natural Sciences. GIS certificate

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

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
<th>Title (exclude punctuation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRSC</td>
<td>663</td>
<td>Applied Spatial Statistics</td>
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<table>
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<tr>
<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
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<th>Admin. Unit</th>
<th>Acad. Year</th>
<th>FICE Code</th>
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<tbody>
<tr>
<td>02</td>
<td>03</td>
<td>02</td>
<td>3250111100</td>
<td>06 - 07</td>
<td>00 3 6 3  2</td>
<td></td>
</tr>
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</table>

   Do not complete shaded area.

Approval recommended by:

[Signature]  8/4/06  [Name]  Head of Department

[Signature]  8/17/06  [Name]  Chair, College Review Committee

[Signature]  8/21/06  [Name]  Dean of College

Submitted to Coordinating Board by:

[Signature]  8/21/06  [Name]  Director of Academic Support Services

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

OARAS-564
Texas A&M University
Applied Spatial Statistics

SYLLABUS

Instructors: Dr. Marian Eriksson, Centeq 230 or HFSB 320, Phone: 845-6638
m-eriksson@tamu.edu
Dr. Cristine Morgan, Heep Center 545, Phone: 845-3603
cmorgan@ag.tamu.edu

Office Hours: By appointment

Course Description: An introduction to the theory and practice of spatial statistics as applied to the natural resources. Spatial analyses focusing primarily on kriging; point processes; lattice data. Prerequisites: MATH 141, 142; STAT 302; FRSC 461, or the equivalent.

Objectives: The specific objectives of this course are to introduce the student to the field of spatial statistics and to give the student an opportunity to analyze and interpret data sets associated with the natural sciences. Spatial statistics and other spatial modeling techniques are being used at an increasing rate in the natural resources fields and are often misunderstood. Practitioners often want to use the "push-button" approach to analyzing spatial data and lack an understanding of the tools they are using. As such, assumptions underlying the statistical tools may not be met and/or an intuitive and thorough understanding of the results is lacking. The objective of this course is toward the application of spatial statistics. But proper application of the tools and understanding of the results requires some basic knowledge of the theory behind the tools. Students will not leave this course as experts in the field of spatial statistics, but with a sufficient understanding of the tools and their use so that they are equipped to build on their knowledge as their careers, academic and professional, demand.

Students should leave this course with:

(1) An appreciation of the difference between spatial smoothing and spatial interpolation and between stochastic and deterministic fitting of models to spatial data.

(2) An understanding of the foundations upon which simple and ordinary kriging models are built.

(3) An understanding of spatial correlation, spatial covariance, variograms, and the relationships between these quantities.

(4) An appreciation of how covariance variogram models are fitted, the use of computer software to fit variogram models, and an awareness of some of the differences between spatial statistical computer programs.

(5) An appreciation of the effects of trend and how to deal with trend and an awareness of other kriging and spatial regression models.

(6) An awareness of characteristics of point processes, contagion, and of various tests for spatial randomness and distribution.

(7) An awareness of the characteristics lattice data that differentiate it from "geostatistical" data and the existence of spatial regression models based on BW configurations.

Course Conduct: The course will be divided into four distinct sections. In the first section, lasting about four weeks, we will review matrix algebra, constrained and unconstrained minimization of polynomials, simple linear regression and multiple linear regression as motivated by geographically weighted regression. In the second section, about two weeks, we will focus on measures of spatial dependence and will introduce analysis tools for lattice-type data; the third section, lasting about five weeks will introduce the concepts of covariance variogram modeling and spatial interpolation using kriging. In the final section, we will consider tests for spatial distribution of regular, random, and clustered point processes.
Texas A&M University  
Applied Spatial Statistics  

FRSC/AGRO 689  
Spring 2006

Formally the course is comprised of two hours of lecture and two hours of lab each week. Weekly or biweekly homework will be assigned. All materials will be downloadable from the course website at http://tasp.tamu.edu. You will also use this website to upload digital solutions; written solutions may, of course, be given to the instructors. Your initial login password will be your first initial, dash, last name (all lower case) as in m-eriksson. YOU SHOULD CHANGE this password the first time you log in.

The importance of homework assignments cannot be overemphasized. Almost all of your learning will take place while working on the assigned problems and studying for exams. You are encouraged to work together if that is how you believe you best learn, but the work is expected to be your own. In the case of "hand" calculations, you must show all of your work in order to receive full credit.

**Literature Review:** Toward the end of the semester each student will choose a peer-reviewed journal article that covers a topic addressed in class. We ask each student to read and write a summary synthesizing their chosen article. Each student will present their summary to the class.

**Exams:** There will be two exams. The format will be open-book and open-notes and may consist all or in part of a take-home component. You will be informed as to format at least one week prior to each exam. Strict time-limits will be placed on take-home components and the date-stamp of submission to the website will be monitored.

**Grading:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Homework/Labs</td>
<td>70%</td>
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<tr>
<td>Exams</td>
<td>20%</td>
</tr>
<tr>
<td>Article Summaries</td>
<td>10%</td>
</tr>
</tbody>
</table>

No "special" extra credit will be made available. Bonus points may be specified for particular homework, quiz, or exam questions. If a discrepancy or disagreement should arise over the grading of any material in this course, the student should write an explanation of the problem and why he or she believes some adjustment should be made, attach the explanation to the material in question, and present the material to the instructor within one week of when the material was returned to the student. The instructor will evaluate all written requests of grading reviews, make any necessary adjustments, and return the material as quickly as possible.


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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. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU 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)

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<table>
<thead>
<tr>
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<th>Date</th>
<th>Topic</th>
<th>Lab/Homework Exercise*</th>
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<td>1</td>
<td>1</td>
<td>Jan. 17</td>
<td>Housekeeping; Review Matrices</td>
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<tr>
<td></td>
<td>2</td>
<td>Jan. 19</td>
<td>Matrix algebra; Review calculus;</td>
<td>R and Octave basics; Matrices</td>
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<td></td>
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<td></td>
<td>Constrained and unconstrained minimization</td>
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<tr>
<td>2</td>
<td>3</td>
<td>Jan. 24</td>
<td>Review simple linear regression;</td>
<td>Regression in R and Octave</td>
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<td>4</td>
<td>Jan. 26</td>
<td>Correlation</td>
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<td>3</td>
<td>5</td>
<td>Jan. 31</td>
<td>Generalized least squares</td>
<td>OLS; GLS; ANOVA</td>
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<tr>
<td>6</td>
<td>7</td>
<td>Feb. 07</td>
<td>Geographically weighted regression</td>
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<tr>
<td>8</td>
<td>9</td>
<td>Feb. 09</td>
<td>Continue GLS; GWS; Assumptions</td>
<td>GLS; GWR; Neighborhood Structures</td>
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<td>10</td>
<td>Feb. 16</td>
<td>Lattice: Neighborhood Structures</td>
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<td>5</td>
<td>9</td>
<td>Feb. 14</td>
<td>FIRST EXAM</td>
<td>Analyzing data using Geary’s C</td>
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<td>10</td>
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<td>Moran’s I, Geary’s C</td>
<td>and Moran’s I</td>
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<td>6</td>
<td>11</td>
<td>Feb. 21</td>
<td>SAR CAR</td>
<td>Using CAR and SAR Models</td>
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<td>12</td>
<td>12</td>
<td>Feb. 23</td>
<td>SAR CAR</td>
<td></td>
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<tr>
<td>7</td>
<td>13</td>
<td>Feb. 28</td>
<td>Kriging as an interpolator; MSPE;</td>
<td>Intro kriging in R and Octave;</td>
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<td>Kriging equations;</td>
<td>Visualizing surfaces</td>
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<td>15</td>
<td>Mar. 07</td>
<td>Minimization of the Lagrangian</td>
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<td>16</td>
<td>Mar. 09</td>
<td></td>
<td>Equivalence of covariance and</td>
<td>Variogram models; Generating</td>
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<td>variogram versions; Simple kriging</td>
<td>covariance (variogram) matrices; Turn</td>
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<td>in discussion of lattice-data paper</td>
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<td>17</td>
<td>Mar. 21</td>
<td>Spring Break</td>
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<td>Mar. 23</td>
<td>VarioGRAM modelling; Assumptions</td>
<td>Variogram modelling; Fitting options</td>
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<td>and Implications; Local vs global;</td>
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<td>Window specifications</td>
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<td>Anisotropy; “Conversion to isotropic”; Nuggets;</td>
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<td>Stationarity</td>
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<td>10</td>
<td>19</td>
<td>Mar. 28</td>
<td>Mike Sherman: Assuming Isotropy</td>
<td>Transformations and anisotropy</td>
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<td>20</td>
<td>Mar. 30</td>
<td>Exploratory data analysis; Removal</td>
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<td></td>
<td>of trend; Universal kriging</td>
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<td>11</td>
<td>21</td>
<td>Apr. 04</td>
<td>Other interpolators; Other kriging</td>
<td>Presentation and discussion of</td>
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<td>22</td>
<td>Apr. 06</td>
<td>models (indicator, disjunctive, etc)</td>
<td>geostatistics application papers</td>
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<td>12</td>
<td>23</td>
<td>Apr. 11</td>
<td>Introduce point processes</td>
<td>Testing Quadrant Data</td>
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<td>24</td>
<td>Apr. 13</td>
<td>SECOND EXAM</td>
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<td>Apr. 18</td>
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<td>SSP: Random, Regular, cluster, quadrants</td>
<td>Analyzing Point Processes,</td>
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<td></td>
<td>Apr. 20</td>
<td></td>
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<td>L,G, K, H tests</td>
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<td>14</td>
<td>Apr. 25</td>
<td></td>
<td>Mike Sherman: applied problems with SSP</td>
<td>Presentation and discussion of</td>
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<tr>
<td></td>
<td>Apr. 27</td>
<td></td>
<td>Catch up; Review</td>
<td>point process papers</td>
</tr>
</tbody>
</table>

* One lab per week, lab lasts 2 hours
Glenda Karten - RE: I need your approval - RE: our spatial stats class

From: "Simon Sheather"
To: "Cristine L Morgan"
Date: 8/14/2006 3:32 PM
Subject: RE: I need your approval - RE: our spatial stats class

Cristine

Thank you for your email. I am happy to endorse your course AGRO/FRSC 653 Applied Spatial Statistics.

Please let me know if you require anything else.

Regards

Simon

Simon Sheather
Professor and Department Head
Department of Statistics
Texas A&M University
3143 TAMU
College Station, TX 77843-3143
E-Mail: sheather@stat.tamu.edu
Telephone: 1 979 845 3141
Fax: 1 979 845 3144

Assistant: Jennifer S. Reyes
Telephone: 1 979 845 3191
E-mail: jennifer@stat.tamu.edu

From: Cristine L Morgan [mailto:cmorgan@ag.tamu.edu]
Sent: Monday, August 07, 2006 11:02 AM
To: Simon Sheather
Subject: I need your approval - RE: our spatial stats class

Dear Simon,
Marian and I are applying for a number for the applied spatial stats class we taught this past spring. The class went very well and Mike Sherman gave an excellent guest lecture for the course.

We want to give it a AGRO/FRSC 653 number and call the class Applied Spatial Statistics. If you prefer a different name for the class, we can change it. I would like to have your approval of this request to make this a numbered class.

I have attached the syllabus for your information. Would you please send me an email acknowledging your support for our class? I will then forward the email to Lynette Hovels to accompany our request for a number.

Sincerely,
Cristine

================================
Cristine Morgan, Ph.D.
Assistant Professor, Dept. of Soil & Crop Sciences
Texas A&M University
Phone: 979.845.3603
E-mail: cmorgan@ag.tamu.edu
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
Submit original form and 2 copies. Attach a course syllabus to each.

1. This request is submitted by the Department of Marketing

2. Course prefix, number and complete title: MKTG 670- Marketing Leadership

3. Course description (not more than 50 words)
   Summer on the application of marketing concepts and theories through guest lectures and discussions with marketing thought leaders in business and academia

4. Prerequisite(s) MKTG 621 or equivalent
   Cross-listed with
   Cross-listed courses require the signatures 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 the course be repeated within the same semester/term? ☐ Yes ☐ No

7. Has this course been taught as a 489/689? ☐ Yes ☐ No
   If yes, how many times? ______
   Indicate the number of students enrolled for each academic period it was taught. 25

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

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

10. Prefix Course # Title (exclude punctuation)
    MKTG 670 MARKETING LEADERSHIP
    Lect. Lab SCH Subject Matter Content Code Admin. Unit Acad. Year FICE Code
    0 1 0 1 3 1 0 0 3 6 3 2
    Do not complete shaded area.

   Approval recommended by:
   Head of Department __________ Date __________
   Chair, College Review Committee __________ Date __________
   Head of Department (if cross-listed course) __________ Date __________
   Dean of College __________ Date __________

   Submitted to Coordinating Board by:
   Dean of College __________ Date __________

   Director of Academic Support Services __________ Date __________
   Effective Date

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

OAR/AAC 354
MKTG 670 – Marketing Leadership

Semester: Spring 200*(1 hour credit)
Prerequisite: MKTG 621 or equivalent
Instructor: Dr. Stephen McDaniel, Professor of Marketing
Email: s-medaniel@tamu.edu
Tel: (979) 845-5801

Course Description
Seminar on the application of marketing concepts and theories through guest lectures by and discussions with marketing thought leaders in business and academia.

Course Objectives
1. For students to have the opportunity to interact with top marketing leaders in the business world.
2. For students to have the opportunity to hear first-hand the strategic marketing issues being faced by marketing decision-makers.
3. For students to be able to ask questions and dialogue with marketing leaders.
4. For students to summarize their lessons learned from each marketing leader into a notebook for future reference in their coursework and marketing careers.

Course Requirements

1. Attendance at all presentations by guest speakers and other related functions. During the Fall '02 and Spring '03 semesters a total of approximately fifteen or so class sessions will be held in which marketing leaders from the business world and academia will be invited to address the class. Students are expected to attend each presentation, be on-time (preferably early), and stay for the duration of the class.

2. Dress requirements. Students will wear, at a minimum, business casual to all presentations. No jeans, t-shirts, etc.

3. Participation requirements. Students are expected to appropriately participate in the presentations and guest speaker visits. This will include the asking of appropriate questions during/after the presentation, attendance at social events associated with the guest speaker’s campus visit, etc. In many cases there will be a luncheon to give you an opportunity to visit more with the guest speaker and ask him/her additional questions. There will also be other opportunities to interact with the guest speaker, such as hosting a tour of the campus, and taking him/her out to breakfast or dinner.

4. One-page Summaries. Students will take notes of each session and turn in to the Instructor, within a week of the presentation, a one page summary of the session (Double-spaced, 1” margins, 12 point font). One-half page will be a summary of the main points made by the speaker. The other half-page will be a creative assessment/application to your career of something the speaker touched on.
5. **Compilation of Summaries in Notebook.** At the end of the Spring '0* semester, students will turn in a notebook that contains all the one-page summaries previously completed during both semesters.

### Grading

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Class Attendance and Participation</td>
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</tr>
<tr>
<td>One-page Summaries</td>
<td>30 percent</td>
</tr>
<tr>
<td>Course Notebook</td>
<td>20 percent</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100 percent</strong></td>
</tr>
</tbody>
</table>

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## Guest Speakers for MKTG 670 - Marketing Leadership (Tentative)

<table>
<thead>
<tr>
<th>Date</th>
<th>Speaker</th>
<th>Company</th>
<th>Position</th>
<th>Time/Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wed. Feb. 14</td>
<td>Mr. Carl Bracy</td>
<td>Essilor</td>
<td>VP of Marketing</td>
<td>10:30 - 1:00 Coc. Ctr. (Lunch to be served)</td>
</tr>
<tr>
<td>Wed. Feb. 21</td>
<td>Mr. Victor Moran</td>
<td>Swift Energy</td>
<td>Senior V.P. - Chief Compliance Officer</td>
<td>10:30 - 1:00 Rm. 290 (Lunch to be served)</td>
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<tr>
<td>Wed. March 7</td>
<td>Mr. Steve Moore</td>
<td>Texas A&amp;M University</td>
<td>Chief Marketing Officer</td>
<td>10:30 - 1:00 Coc. Ctr. (Lunch to be served)</td>
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<tr>
<td>Wed. March 21</td>
<td>Richard Marcus</td>
<td>Neiman Marcus</td>
<td>Former CEO</td>
<td>11:10 - 12:25 Rm. 184 (Ms. Bridges' class)</td>
</tr>
<tr>
<td>Thur. March 29</td>
<td>Ms. Maxine Clark</td>
<td>Build-A-Bear Workshop</td>
<td>CEO</td>
<td>11:10 - 12:25, Rm. 113 12:30 - Pizza, soft drinks and water served outside room 108 before next class</td>
</tr>
<tr>
<td>Wed. April 4</td>
<td>Mr. Creed Ford</td>
<td>Fired-Up, Inc. (Johnny Carino's, Rudy's BBQ, Ozona, and others)</td>
<td>CEO</td>
<td>10:30 - 1:00 Coc. Ctr. (Lunch to be served)</td>
</tr>
<tr>
<td>Mon. April 9</td>
<td>a) Mr. Sam Duncan</td>
<td>Office Max</td>
<td>a) CEO</td>
<td>Mr. Duncan will be speaking in Dr. Szymanski's class, 9:35-10:50, Rm. 184; Mr. Vero will be speaking in Ms. Bridges' class, 11:10 12:25, Rm. 184. Attend either.</td>
</tr>
<tr>
<td>Mon. April 9</td>
<td>b) Mr. Ryan Vero</td>
<td></td>
<td>b) Chief Merchandising Officer</td>
<td></td>
</tr>
<tr>
<td>Fri. April 20</td>
<td>M.S.-Marketing Advisory Board</td>
<td>Panel Discussion: &quot;Advice on Starting Your Marketing Career&quot;</td>
<td></td>
<td>12:00 - 1:00 Rm. 205 Pizza, soft drinks, water served 1:00 - 2:30 Rm. 490 Panel discussion</td>
</tr>
</tbody>
</table>
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional

Submit original form and 2 copies. Attach a course syllabus to each.

1. This request is submitted by the Department of 

2. Course prefix, number and complete title  MKTG 687: Seminar in Marketing Models

3. Course description (not more than 50 words) Review and discussion of the foundations of modeling and recent developments in research using marketing models. The seminar is designed to provide participants with new ways to think about modeling marketing phenomena and enable them to generate new ideas, research topics, and modeling applications for marketing problems.

4. Prerequisite(s) Doctoral Classification Cross-listed with

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 the course be repeated within the same semester/term? □ Yes □ No

7. Has this course been taught as a 489/689? □ Yes □ No If yes, how many times? ______ Indicate the number of students enrolled for each academic period it was taught.

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

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

10. Prefix Course # Title (exclude punctuation)
    MKTG 687 SEM IN MARKETING MODELS

<table>
<thead>
<tr>
<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>Subject Matter Content Code</th>
<th>Admin. Unit</th>
<th>Acad. Year</th>
<th>FICE Code</th>
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Do not complete shaded area.

Approval recommended by:

Head of Department Date

Chair, College Review Committee Date

Head of Department (if cross-listed course) Date

Dean of College Date

Submitted to Coordinating Board by:

Dean of College Date

Director of Academic Support Services Date

Effective Date

To have this form reviewed, please send to Linda F. Laos, Mail Stop 1265 or fax to 947-8737.

OAR/AS-564
TEXAS A & M UNIVERSITY
Mays Business School

MKTG687: Seminar in Marketing Models

Professor Venkatesh Shankar
240B Wehner
845-3246

Seminar Overview

This seminar will review the foundations, major contributions and recent developments in marketing models. The emphasis will be on foundations of modeling and the most recent developments in research using marketing models. We will examine commonly used models in marketing, as well as emerging ones, and discuss their principles and implications. This review and discussion will provide participants with new ways to think about modeling marketing phenomena. In addition, a principal purpose is to generate new ideas, new research topics, and new modeling applications for existing marketing problems. The seminar is meant to provide an overview of marketing models and will only cover selective research using marketing models.

The seminar in itself will not teach participants research methodologies, but will facilitate their learning of methodologies. Participants are expected to learn research methodologies in depth from courses such as multivariate statistics, applied econometrics, and game theory. However, participants are expected to fully get into the research rigor of modeling in the readings, assignments, and research proposals. Participants are also expected to attend presentations involving marketing models by visiting speakers and candidates and be prepared to discuss the presentation material in class.

The seminar will require that each participant be actively involved in each session. Seminar participants will be assigned readings to present or to discuss. Regardless of assignment, all participants are expected to be fully prepared for every class. In addition, at least one assignment and one research proposal (20 pages, double-spaced) at the end of the semester, are required. All papers and proposals will be presented in the seminar. Further details will be announced in class. All deadlines are absolutely firm.

Required Book:


Recommended/Reference Books:


*Tentative Sessions and Readings*

**Wk1** 8/30

**Introduction to and Overview of Modeling Approaches**

LKM, Chapter 1, "Theory and Models in Marketing."

LKM, Appendix A, "Mathematics for Marketing Models."


EL, Chapter 1, "Mathematical Marketing Models: Some Historical Perspectives and Future Projections."


Reference: EL, Chapter 4, "Competitive Marketing Strategies: Game-Theoretic Models."

**Wk2** 9/6

**Models of Market Pioneering**


**Wk3 Models of Late Mover Effects**

9/13


**Wk4 Competitive Product Positioning Models**

9/20


**Wk5 Defensive Marketing Strategy Models**

9/27


**Wk6 New Product Marketing Models**

10/4 (One-page research proposal due)


**Wk7 Assignment**

**Wk8 New Product Diffusion and Forecasting Models**

10/18


**Wk9 Models of Brand Choice and Price Promotion**

10/25


Reference: BN, Chapters 7 and 8, "Regression Analysis Applied to Sales Promotion," and "Choice and Purchase Timing Models."

**Wk10 Network Effects and e-Commerce Models**

11/1 (Five-page research proposal due)


**Wk11 Models of Advertising, Channels and Retail Pricing**

11/8


EL, Chapter 15, “Marketing-Mix Models.”
LKM, Chapter 6, “Advertising.”

**Wk 12 New Empirical Industrial Organization (NEIO) Models of Competition**

11/15


**Wk 13 Course Review/Wrap-up**
11/22

**Wk 14 Final Proposal Presentations**
11/29

12/13 **Written Final Research Proposal (20 pages) Due**
(by 10 am CST in my mailbox)

**Evaluation:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Class Contribution (Paper presentations and discussion)</td>
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</tr>
<tr>
<td>Assignment(s)</td>
<td>20%</td>
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<tr>
<td>Research proposal</td>
<td>50%</td>
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<tr>
<td>Total</td>
<td>100%</td>
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Americans with Disabilities Act (ADA) Policy Statement

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

Academic Integrity Statement

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. Students will be required to state their commitment on examinations, research papers, and other academic work. 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/
Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional

Submit original form and 2 copies. Attach a course syllabus to each.

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

2. Course prefix, number and complete title: **PETE 636** Horizontal, Multilateral and Intelligent Wells

3. Course description (not more than 50 words): Advanced well architectures, primarily horizontal, multilateral and intelligent wells, all aspects of these types of wells, including well completions, reservoir flow, and wellbore flow conditions, and well deliverability; optimization of well design and field applications will be demonstrated with field cases.

4. Prerequisite(s): **PETE 682**, graduate classification

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

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

7. Has this course been taught as a 489/689? ☐ Yes ☑ No If yes, how many times? 2 times

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

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

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
<th>Title (exclude punctuation)</th>
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<tbody>
<tr>
<td>PETE</td>
<td>636</td>
<td>HORIZ MULTILATERAL INTEL</td>
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<th>Lab</th>
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<td>2 2 1 0 0 7</td>
<td>0 8 2 0 3 6 3 2</td>
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Approval recommended by:

Head of Department: 6/18/06

Chair, College Review Committee: 8/27/06

Dean of College: 8/27/06

Submitted to Coordinating Board by:

Date

Date

Date

Effective Date

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

N.K. ANAND

AUG 2 3 2006

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AUG 9 2006

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Texas A&M University — Department of Petroleum Engineering
Proposed Course Syllabus

Number and Name of Course: PETE 636 Horizontal, Multilateral and Intelligent Wells

<table>
<thead>
<tr>
<th>Hours</th>
<th>Theory</th>
<th>Practice</th>
<th>Total</th>
<th>Credits</th>
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Prerequisites: PETE 662, graduate classification
Curricula requiring this course: [x] None, this course will be an elective.

1. 
2. 
3. 

Description of Course: (Concise Statement of purpose of design)
This course will cover advanced well architectures, primarily horizontal, multilateral and intelligent wells. The course will discuss all aspects of these types of wells, including well completions, reservoir flow, and wellbore flow conditions, and well deliverability. Optimization of well design and field applications will be demonstrated with field cases.

Text Materials:
- Supplemental papers from the literature

Course Outline: (by major topics, and approximate time for each topic)

<table>
<thead>
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<th>Topic</th>
<th>Description</th>
<th>Time</th>
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<tr>
<td>1</td>
<td>Purposes and Applications of Multilateral Wells</td>
<td>1.5 hrs</td>
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<td>2</td>
<td>Horizontal and Multilateral Completions:</td>
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<td></td>
<td>Junction completion techniques – TAML levels</td>
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<td></td>
<td>Lateral completions – openhole, slotted liner, cased-cemented, gravel pack</td>
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<tr>
<td></td>
<td>Completion performance</td>
<td>4.5 hrs</td>
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<tr>
<td></td>
<td>Horizontal lateral completion models</td>
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<td></td>
<td>Skin factors for laterals – formation damage, partial penetration, and perforation effects</td>
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<tr>
<td>3</td>
<td>Horizontal and Multilateral Well Performance Prediction</td>
<td>9 hrs</td>
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<td></td>
<td>Reservoir Inflow Performance for Horizontal Well</td>
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<td></td>
<td>Analytical models of horizontal wellbore inflow</td>
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<td></td>
<td>Point/Line source methods</td>
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<tr>
<td></td>
<td>Reservoir simulation approach</td>
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<td></td>
<td>Gas reservoir performance</td>
<td></td>
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<td></td>
<td>Wellbore flow behavior</td>
<td>6 hrs</td>
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<td></td>
<td>$\Delta p$ in laterals</td>
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<tr>
<td></td>
<td>Main wellbore pressure profile</td>
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<tr>
<td></td>
<td>Multilateral well deliverability</td>
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<td></td>
<td>Coupling of reservoir and wellbore flow behavior</td>
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<td></td>
<td>Wellhead performance prediction</td>
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<td></td>
<td>Determining crossflow conditions</td>
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<td>4</td>
<td>Intelligent (Smart) Wells</td>
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<tr>
<td></td>
<td>Downhole monitoring</td>
<td>3 hrs</td>
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<tr>
<td></td>
<td>Temperature</td>
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<td></td>
<td>Pressure</td>
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<td></td>
<td>Flow rate</td>
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<tr>
<td></td>
<td>Fiber optic measurements</td>
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<tr>
<td></td>
<td>Downhole control</td>
<td>3 hrs</td>
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<td></td>
<td>Sliding sleeves</td>
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<td></td>
<td>Downhole chokes</td>
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<tr>
<td>5</td>
<td>Horizontal Well Stimulation</td>
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<td></td>
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<td>total: 42 hrs</td>
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</table>
Course grading:
- Midterm Exam: (30%)
- Final Exam: (40%)
- Class Projects/Homeworks: (30%)
- Total: (100%)

Course Instructor/Supervisor:
Dr. D. Zhu
Tel. (979) 4584522
Office: Rm. 401k Richardson Building
E-mail: dingzhu@tamu.edu

Miscellaneous:
ABET Classification: Science: ___ Design: ___ Math: ___ Other: ___
Laboratory Requirements: Yes: ___ No: ___ Equipment Required: None

ADA Policy Statement: (Texas A&M University Policy Statement)
Americans with Disabilities Act (ADA) Policy Statement

The following ADA Policy Statement (part of the Policy on Individual Disabling Conditions) was submitted to the UCC by the Department of Student Life. The policy statement was forwarded to the Faculty Senate for information.

The Americans with Disabilities Act (ADA) is a federal antidiscrimination 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 that you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Room 102 of the Koldus Building, or call 845-1637.

Coursework Copyright Statement: (Texas A&M University Policy Statement)
Suggested for Inclusion in Your First Day Handout or Syllabus

The handouts used in this course are copyrighted. By "handouts," this means all materials generated for this class, which includes, but is not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copy-righted, you do not have the right to copy them, unless you are expressly granted permission.

As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., that belong to another. In accordance with this definition, you are committing plagiarism if you copy the 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 about plagiarism and/or copying, please consult the latest issue of the Texas A&M University Student Rules, under the section "Scholastic Dishonesty."

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

Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not excuse 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.