Number and Title of Course: ISEN 689 Sp Tp in Spatial Optimization
Term: Spring 2012
Meeting Times and Location: F 9:00am - 12:00pm, Room 3024, ETB.
Hours: Lecture 3 Credits 3
Prerequisites: ISEN 416, ISEN 420 (or ISEN 620), ISEN 424 or consent of the instructor

Course Description: Introduce principles of geographic information systems and spatial analysis techniques for application in optimization, data collection and validation and data management within a GIS, methods for determining spatial properties and the effects of spatial properties on optimization problems.

Learning Outcomes:
- Data collection and validation strategies
- Effective use of GIS to manage and pre-process data for optimization
- Implement statistical methods for the identification of significant spatial patterns/properties
- Develop integrated optimization models that incorporate spatial considerations
- Represent visually and effectively the outcomes of optimization/spatial analysis

Course Instructor: Justin Yates  E-mail Address: jtyates@tamu.edu
Telephone Number: 979-458-2337  Office Location: 4079 ETB
Office Hours: by appointment

Textbook(s):

Software:
- ESRI ArcGIS 10 (includes ArcView/ArcInfo licenses with extensions) - provided by instructor
- HAZUS-MH - Department of Homeland Security’s Loss Estimation Methodology - optional

Grading Policy: Project I 20%
Proposal 40%
Case Assignments 30%
Participation 10%

Projects and Case Assignments will be graded based on content and demonstrated understanding of the selected topical area(s), correctness of the model(s) implemented or developed and the quality of the report. Grades will be calculated as a weighted average with the weights given above and all assignments will be graded on a 100 point scale. The points can be curved based on class average at the instructor’s discretion and may change the following standard as necessary:

A  90 - 100
B  80 - 89
C  70 - 79
D  60 - 69
F  59 and lower
Course Outline by Major Topics and Approximate Time Assigned to Each:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Weeks</th>
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<tbody>
<tr>
<td>1. Course Overview and Introduction to GIS</td>
<td>1</td>
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<tr>
<td>2. Exploring ArcMap and ArcCatalog: Mapping Fundamentals</td>
<td>1</td>
</tr>
<tr>
<td>3. Networks, Vulnerability and Risk Analysis</td>
<td>2</td>
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<tr>
<td>4. Obtaining, Preparing and Processing Network and Spatial Data</td>
<td>3</td>
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<td>5. ArcGIS Functionality and Spatial Analysis Methods</td>
<td>2</td>
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<tr>
<td>6. Integration of Optimization and Spatial Methodologies</td>
<td>3</td>
</tr>
<tr>
<td>7. Visualization and Mapping</td>
<td>2</td>
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<tr>
<td>8. Applications on Water Networks</td>
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<td>9. Applications on Energy Networks</td>
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<td>10. Applications in Cyber Security</td>
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<tr>
<td><strong>Total</strong></td>
<td>14</td>
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</tbody>
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