The University of Texas at Tyler
Master of Science in Computer Science

Course Syllabus

Course Number:	**COSC 5379**
Course Title:	Advances in Remote Sensing and GIS Analysis
Course Description: This course will bring together recent developments in remote sensing and GIS analysis with a particular emphasis on software development techniques. Topics will include GIS data models, software algorithms for data storage, and analysis.	
Pre-requisites:	COSC 2315, COSC 2336
Credits:	3 hours
Text(s): Demers Michal, N. (2009). *Fundamentals of Geographic Information Systems.* John Wiley, Danvers, MA. Additional Text: LANDGREBE, David A. (2003). Signal theory methods in Multispectral Remote Sensing. John Wiley, Danvers, MA.	
Languages Used: (if applicable)	

Topics:

No	Topic	Hours
1	Introduction to digital geography	3
2	Digital geographic data and maps	3
3	GIS data models	6
4	GIS data input	6
5	Remote sensing and multispectral data	6
6	Multispectral data analysis	12
7	GIS and remote sensing applications	6

Additional Materials:	

Evaluation Method: (only items in dark print apply)	
1. Examination/Quiz	2. **Homework**
3. Paper/Report	4. Computer Program
5. **Project**	6. Presentation
7. **Class Participation**	8. Peer Review
9.	10.

Course Objectives[1]: By the end of this course students are expected to:
1. Describe some basic analytical capabilities of a modern GIS and remote sensing techniques [1,2]
2. Know the four primary functions of GIS data input [1,2,5]
3. Understand the relationship between input scale and projection on GIS error [1,2,7]
4. Explain the process and the purpose for measuring polygons to determine long and short axes, perimeters, and areas [1, 2, 7].
5. Be familiar with some of the common thematic map classification systems available, especially for land cover and land use maps [1, 2, 5, 7].
6. Be familiar with various clustering techniques used in multispectral data analysis [1,2,5,7]
7. Understand how to integrate satellite data with maps [1,2,7]
8. Understand and describe the different methods of interpolation, their uses and their advantages and disadvantages [1,2,7].
9. Explain the close relationship between analytical GIS design and GIS database design [1,2,7].
[1] *Numbers in bracket refer to method(s) used to evaluate the course objective.*

Relationship to Program Outcomes: (only items in dark print apply)[2] **This course supports the following computer science graduate program outcomes, which state that our students at the time of graduation are expected to:**
1. possess an enhanced breadth of knowledge in computer science, combined with a depth of knowledge in critical core areas of computing [1, 2, 3, 9];
2. possess the skills and knowledge for lifelong learning in computer science;
3. possess knowledge of the theoretical foundations of computing and have strong practical application experience [4, 5, 6, 7, 8];
4. posses and demonstrate oral and written communication skills;
5. understand and respect the professional standards of ethics expected of a computer scientist and be knowledgeable concerning the history of computing field;
6. possess a knowledge of computer security and computer security management;
7. analyze and compare relative merits of alternative software design, algorithmic approaches, and computer system organization, with respect to a variety of criteria relevant to the task (e. g. efficiency, scalability, security) [4, 5, 6, 7, 8]; and
8. implement algorithms in multiple programming languages, on multiple hardware platforms, and multiple operating system environments.
[2]Numbers in brackets refer to course objective(s) that address the Program Outcome.

Prepared By: Arun Kulkarni	Date: November 17, 2008
Reviewed By:	Date: