Spatial Systems Science
Coastal and Marine Systems Science, Geospatial Systems Engineering
Geospatial Computing Sciences Programs
Spring 2019

A. COURSE INFORMATION

Course number/section: CMSS 6330-001, GSEN-5390-001, GSCS-6390-001
Class meeting time: TR 05:30-06:45
Class location: CBI 104
Course Website: Accessed via Blackboard (Bb): https://bb9.tamucc.edu/

B. INSTRUCTOR INFORMATION

Instructor: Dr. Michael J. Starek
Associate Professor of Civil and Geospatial Systems Engineering
School of Engineering and Computing Sciences
Director of Measurement Analytics Lab (MANTIS)
Conrad Blucher Institute for Surveying and Science
Office location: NRC 3407
Office hours: M,W 11:00 AM to 12:30 PM, T 2:00 to 4:00 PM
Telephone: 361.825.3978
e-mail: michael.starek@tamucc.edu
Bb messages are preferred for contact. You are welcome to use my office email for more pressing matters or if you do not hear back from me.
Appointments: Office hours and scheduled by email or phone. The door is always open!

C. COURSE DESCRIPTION

Introduction and advanced usages of mapping datums, coordinate systems, and accuracy requirements for geographic information systems (GIS). Use of GIS tools to investigate statistical patterns and relationships among maps and geo-databases. Derivation of new maps and analysis based on spatial context, patterns, surface configuration, proximity, connectivity and flows.

Geospatial data management and analysis is a fundamental activity in describing, documenting, and modeling the coastal and marine environment. This course will examine the various types of geospatial data, including remote sensing data. We will discuss the acquisition of geospatial data, fundamentals of georeferencing, assessing accuracies, and spatial analysis and modeling techniques for characterization of geospatial phenomenon. Many examples presented will relate to coastal environments but applicable to any environment. A GIS (ArcGIS) will be used to investigate patterns and relationships using various types of geospatial data sets.

D. PREREQUISITES AND COREQUISITES
MATH 5316 Statistical Methods in Research II (or equivalent); a basic working knowledge of ArcGIS/ArcMap; or permission of instructor. Although this course is more applied in construct than mathematical, math and geodesy concepts will be discussed. For some topics, it is helpful to have a basic understanding of calculus and probability but not required.

Corequisites
None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Optional Textbook(s) or Other References
Additional readings and journal articles will be provided.

Software
ArcGIS - student version will be available for use on your laptop. It must be run on Windows or a Windows emulator for Macs.
QGIS (open-source) – may be integrated on some assignments.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT
Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:
1. Characterize different geospatial data types
2. Recognize the different components involved to georeference spatial data
3. Recognize measures of geospatial data accuracy
4. Design and implement a geospatial project in ArcGIS software
5. Perform raster and vector-based geospatial analyses.
6. Integrate and perform basic processing of passive and active remote sensing data including recognizing benefits and limitations for their own research.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

The course will be taught in a lecture, discussion, and case-study format. Weekly reading will be assigned. There will be up to ten assignments requiring the management and analysis of geospatial data. ArcGIS will serve as the main software utilized in these assignments; however, specific assignments may utilize other software tools for data processing and analysis (e.g. open-source). A midterm with short answer and essay formats will be given. A comprehensive final project will be assigned (see grading below).

Online Students

My lectures will be recorded live (audio only) along with my screen shots (e.g. power points) using webex. It is up to the online student to ensure they keep up with the readings, lectures, and other material. Students taking the course must have continuous web access and are expected to keep pace with the course and adhere to all assignment deadlines, exam deadlines, etc.

H. MAJOR COURSE REQUIREMENTS AND GRADING

Your final grade will be based on the following point distribution:

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Midterm Exam</td>
<td>27.5%</td>
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<tr>
<td>Final Project</td>
<td>27.5%</td>
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<tr>
<td>Assignments combined</td>
<td>45%</td>
</tr>
</tbody>
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I. COURSE CONTENT/SCHEDULE

SCHEDULE is tentative and subject to change. The official schedule and required weekly readings will be posted to Bb. Assignments will be provided on weekly to bi-weekly basis.

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
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<tbody>
<tr>
<td>1</td>
<td>Course introduction</td>
</tr>
<tr>
<td>2</td>
<td>Fundamentals of spatial referencing</td>
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<tr>
<td>3</td>
<td>Fundamentals of spatial referencing</td>
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<tr>
<td>4</td>
<td>Vertical datums, tidal datums, geoid, and elevation</td>
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<tr>
<td>5</td>
<td>GNSS positioning. Representation of geospatial data</td>
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<tr>
<td>6</td>
<td>Raster geoprocessing</td>
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<td>7</td>
<td>Vector geoprocessing</td>
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<tr>
<td>8</td>
<td>MIDTERM</td>
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<td>9</td>
<td>Spring Break</td>
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<tr>
<td>10</td>
<td>Spatial statistics and interpolation</td>
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<tr>
<td>11</td>
<td>3D mapping of the natural and built environments</td>
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<tr>
<td>12</td>
<td>Digital terrain modeling</td>
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<tr>
<td>13</td>
<td>Remote sensing and digital mapping</td>
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<td>14</td>
<td>Image classification for landcover mapping</td>
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<td>15</td>
<td>Geospatial data quality</td>
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<tr>
<td>16</td>
<td>Emerging trends in geospatial technology</td>
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<tr>
<td>17</td>
<td>Final Project</td>
</tr>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

Attendance/Tardiness
Regular attendance is expected. In-person students are expected to attend face-to-face lectures and distance students are normally not permitted to attend in-person lectures without prior approval first. Recorded lectures may be restricted to distance students at discretion of the instructor (e.g. in-person attendance is poor due to students watching online as opposed to attending class).

Late Work and Make-up Exams
You are expected to work individually on all assignments/exams unless otherwise stated. Assignment due dates will be specified for each assignment.

Effective as of 12:00 AM on the day following the assignment due date:
- 1 to 3 days late - Minus 3 pts per day past due
- 4 to 7 days - Minus 4 pts per day past due
- > 1 week late – Minus 5 pts per day past due
- After assignment is graded and returned = 0 (typically 1 week!)

If you are not able to meet a particular deadline, you must notify me well before the due date to request an extension. Reduced penalty extensions will be granted on a case-by-case basis and will be refused for repeat offenders. Once an assignment is graded and returned to class you receive a 0.

Cell Phone Use
Cell phones must be TURNED OFF and not utilized during class.

**Laptop Use**  
Laptops can only be used for looking at lecture materials or taking notes during lecture.

**Food in Class**  
Not permitted.

**Missed Exam**  
You are expected to take the exam when scheduled. Make-up exams will only be permitted under department approved circumstances.

**Participation**  
Participation during class discussion is expected.

**Exam Policy for Distance Students**  
Exams will be given in-class. Therefore, distance students must take the same exam on that same day. Online students will be notified of the procedure at least one week in advance. Implementation will either be through Blackboard or exam proctoring service. Exam-proctoring charges may range from $1 - $50.00 per exam. Students may be required to schedule exams at least 24 hours in advance or incur late scheduling charges. All costs for exams are the responsibility of the student. Students may also be responsible for providing webcams to be used in test proctoring.

**Others**  
All work submitted for grading must be the student's own work. Plagiarism will result in a score of 0 (zero) for the work or dismissal from the course and the Dean of Students office will be notified. No copying from another student's work or past work of any type is allowed. It is the student's duty to allow no one to copy his or her work. Anyone found cheating and/or copying, in the exams or assignments, in the instructor's opinion, may receive an automatic F for the course.

If you are having a problem finishing an assignment or other concerns, please talk to me. My goal is to help you succeed in the course.

**K. COLLEGE AND UNIVERSITY POLICIES**

- **Academic Integrity (University)**  
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.
• **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

• **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

• **Deadline for Dropping a Course with a Grade of W (University)**
  The grade of W will be assigned to any student officially dropping a course. Please consult with the instructor before you decide to drop to be sure it is the best thing to do. Just stopping attendance and participation **WILL NOT** automatically result in your being dropped from the class. Should dropping the course be the best course of action, visit the Office of the University Registrar for the Course Drop Form that must be submitted. No student is eligible to receive a W without completing the official drop process by this deadline. Please consult the Academic Calendar ([http://www.tamucc.edu/academics/calendar/](http://www.tamucc.edu/academics/calendar/)) for the last day to drop a course.

• **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the
grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  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 call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

  [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

### L. OTHER INFORMATION

- **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

### GENERAL DISCLAIMER
I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.