Geospatial Programming Techniques – GSEN 6355.001/W01
Department of Computing Sciences
Spring 2020

A. COURSE INFORMATION
Course number/section: GSEN 6355.001/W01
Class meeting time: 001: Monday 04:20 – 06:50 PM
W01: Fully online
Class location: CBI 104
Course Website: http://bb9.tamucc.edu

B. INSTRUCTOR INFORMATION
Instructor: Hongzhi Song
Office location: CBI 108
Office hours: M 11 – 12 PM (WebEx), M 2 – 4 PM; TR 11:00 – 12 PM
or by appointment
WebEx: https://tamucc.webex.com/meet/hsong
Telephone: 361-825-3198
e-mail: hongzhi.song@tamucc.edu
Appointments: Email to make an appointment.

C. COURSE DESCRIPTION
Catalog Course Description
Course teaches programming techniques in geospatial fields, such as how to automate GIS
tasks using Python and other scripting languages. Automation can make your work easier,
faster, and more accurate, and knowledge of a scripting language is a highly desired skill in
GIS analysts.

D. PREREQUISITES AND COREQUISITES
Prerequisites
None
Corequisite
None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES
Recommended Textbook(s)
Suggested Supplies

- Windows Operating System.
- ArcGIS 10.5 or higher with 3D Analyst and Spatial Analyst, or ArcGIS pro. This is provided in lab on campus. If attending online, software will be provided as a download.
- Some practice problems has been extended to support Python 3, though you can continue to use Python 2 if you wish to.
- PyScripter or Pythonwin
- Adobe PDF viewer. (e.g. Adobe Acrobat Reader).
- Web browser with Java Virtual Machine installed.
- Video player able to play MPEG-4 video (VLC, Windows Media Player).
- Speakers/headphones.
- **Online students:** Microphone and webcam.
- **Online students:** Consistent, weekly access to high-speed internet.

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. Apply object-oriented programming concepts.
2. Develop Python programs to script cartographic models.
3. Demonstrate an understanding of programming concepts, methods, and approaches such as debugging, error checking, and documentation.
4. Demonstrate an awareness of advanced concepts such as external libraries.
5. Implement advanced Python techniques in geospatial context.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

Face-to-face/online lectures will be given in class and up to 24% online. All learning materials and learning activities will be posted on Blackboard. Fully online section will be via WebEx and Blackboard.

H. MAJOR COURSE REQUIREMENTS AND GRADING

Student learning outcomes will be assessed through assignments, exams, mini project, and participations.
<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Exams</td>
<td>30</td>
</tr>
<tr>
<td>Assignments</td>
<td>50</td>
</tr>
<tr>
<td>Mini Project(s)</td>
<td>15</td>
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<tr>
<td>Participations</td>
<td>5</td>
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I. COURSE CONTENT/SCHEDULE (*Subject to Change*)

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
</tr>
<tr>
<td>2</td>
<td>Python &amp; GIS</td>
</tr>
<tr>
<td>3</td>
<td>Python scripting for geoprocessing</td>
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<tr>
<td>4</td>
<td>Python scripting for geoprocessing</td>
</tr>
<tr>
<td>5</td>
<td>Python scripting for geoprocessing</td>
</tr>
<tr>
<td>6</td>
<td>Python scripting for map automation</td>
</tr>
<tr>
<td>7</td>
<td>Python scripting for map automation</td>
</tr>
<tr>
<td>8</td>
<td>Python scripting for Add-ins</td>
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<tr>
<td>9</td>
<td>Python scripting for Add-ins</td>
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<tr>
<td>10</td>
<td>Python scripting for Add-ins</td>
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<tr>
<td>11</td>
<td>Problems Solving with Python</td>
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<tr>
<td>12</td>
<td>Problems Solving with Python</td>
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<tr>
<td>13</td>
<td>Problems Solving with Python</td>
</tr>
<tr>
<td>14</td>
<td>Problems Solving with Python</td>
</tr>
<tr>
<td>15</td>
<td>Final</td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. See Blackboard for details and updates. More specific topics cover ArcGIS Pro, python, and data setup; ArcPy documentation; using geoprocessing tools to automate workflows; performing GIS inventory; working with cursor; using mapping modules, etc.

J. COURSE POLICIES

Attendance/Tardiness
Students are expected to attend the lectures. Online students are expected to regularly log in to the course website, watch lectures, and submit assignments.
Late Work and Make-up Exams
A 10% penalty per day will be applied to late assignments up to one week after they are due date/time. This means that assignments handed in late on the due date or the next calendar day get a 10% point-deduction, for 2 days late this gives a 20% penalty, and so on. Assignments will NOT be accepted if handed in more than one week (7x24 hours) after the due date/time. If you know in advance that you will be late for an assignment, let the instructor know in advance (via email with an official document), and it will be decided by the instructor whether an exception can be made on a case-by-case basis. Make-up Exams and assignments are not permitted except for official documentation, exceptional reasons.

Email
Consider email as official correspondence warranting professional language. Professional emails include elements such as a short descriptive subject line, salutation, complete inquiry in the body of the message, your full name, and course and section number. Unprofessional emails will result in a non-response and request for proper correspondence.

Technological Excuses
Hard drive crashes and other computer woes will not be accepted as excuses for late submission. Students should, given the complexity of the tasks they will pursue, be sure that they maintain adequate backup copies of all aspects of their work. Additionally, plan ahead so that you will have time to use the on-campus computers and printers if necessary. You may NOT submit papers/assignments by e-mail. If for some reason you feel you have to do this, you must ask for, and receive, permission ahead of time; furthermore, you may not consider an e-mailed paper/assignment to be submitted until you have received a reply confirming that I have received the paper/assignment.

Communication about Life Events
It is the your (student’s) responsibility to keep up with the course instruction, assignments, and examinations. Should a life event interrupt your ability to meet these responsibilities, you must inform the instructor about this as soon as possible and within a reasonable amount of time so that a course of action can be determined. Communicating with the instructor about these life events in an unreasonable time frame is not acceptable and will not change the outcome of missed work nor will it be a valid reason to receive an ‘Incomplete’ designation for the course.

Originality of Work
Every quiz, exam and assignment for this class must be your own work. You may ask for clarification and assistance for figuring out an algorithm, but you may not copy or use anyone else’s code for any reason in this course, unless explicitly stated in a lab assignment or exam.

Digital Assignment Submission Instructions
Assignments submitted through the course website must follow the requirements. Failure to follow the steps outlined in this document may result in deducted points for the assignment. Assignments submitted through the course website will be returned through the course website.

**Note to Online Students**

It is your responsibility to check emails and Blackboard often, so you will stay up with the course. You are responsible for contacting the professor if you have any questions/concerns.

**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)**
  I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. *Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to*
**drop this course.** Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic 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, and the College of Science and Engineering Grade Appeals webpage at 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/

- **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 accessible.
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.