GEOG 361 - Syllabus
GIScience II - Analysis and Applications

Instructor: James Watson,
Laurie Becker, beckelo@science.oregonstate.edu

Office Hours: TBD
Credits: 4
Meeting time Lecture: 2 hrs/week; Lab: 3 hrs/week
Prerequisites GEOG 360 and MTH 112 and ST 352
Grades: Letter grading (A to F).

Course description: GISCIENCE II: ANALYSIS AND APPLICATIONS. (4) Applications-based course. Development and conduct of geospatial analyses using various spatial data structures, techniques and models. Students acquire, clean, integrate, manipulate, visualize and analyze geospatial data through laboratory work. PREREQ: GEOG 360 and MTH 112 and ST 352.

Course Content:

<table>
<thead>
<tr>
<th>Wk</th>
<th>Dates</th>
<th>Topic</th>
<th>Reading</th>
<th>Quiz</th>
<th>test/assign</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intro: GIScience applications &amp; analysis</td>
<td>Ch. 1</td>
<td>Pretest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Model building in GIS</td>
<td>Ch. 2</td>
<td>Quiz 1</td>
<td>Lab 1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Data Entry and Editing, Digital data sources</td>
<td>Ch. 4, 7</td>
<td>Quiz 2</td>
<td>Lab 2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Tables and relational databases</td>
<td>Ch. 8</td>
<td>Quiz 3</td>
<td>Lab 3</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Basic spatial analysis, OLS, geographically weighted regression</td>
<td>Ch. 9</td>
<td>Quiz 4</td>
<td>Lab 4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Midterm Exam</td>
<td>Midterm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Topics in raster analysis</td>
<td>Ch. 10</td>
<td>Quiz 5</td>
<td>Lab 5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Terrain analysis</td>
<td>Ch. 11</td>
<td>Quiz 6</td>
<td>Lab 6</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Spatial interpolation &amp; kriging; point pattern analysis</td>
<td>Ch. 12</td>
<td>Quiz 7</td>
<td>Lab 7</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Spatial models, Network and location analysis</td>
<td>Ch. 13</td>
<td>Quiz 8</td>
<td>Lab 8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Data standards, quality Review for Final Exam</td>
<td>Ch. 14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Learning Outcomes

By the end of this class, the student will:

<table>
<thead>
<tr>
<th>Learning Outcomes</th>
<th>Assessment Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Recognize and use basic spatial and cartographic concepts (e.g. scale, projection, and coordinate systems), as well as statistical and surveying principles.</td>
<td>Lectures, quizzes, exams</td>
</tr>
<tr>
<td>2. Demonstrate facility in the classification and analysis of geospatial data (e.g. satellite images, digital maps and their associated tabular datasets) and the ability to use geographic information science technology (software, data collection instruments and devices).</td>
<td>Labs</td>
</tr>
<tr>
<td>3. Develop and integrate spatial thinking and the capacity to create visualizations (e.g. images, maps, diagrams, charts, 3D views) of spatial phenomena, including those illustrating natural and human systems and their interactions.</td>
<td>Labs, project</td>
</tr>
<tr>
<td>4. Describe and interpret key advanced concepts of geospatial science: advanced statistical concepts; autocorrelation; projections; scale; coordinate systems; ethics.</td>
<td>Exams, quizzes, labs</td>
</tr>
<tr>
<td>5. Construct and compose the following advanced tools and skills used by geospatial scientists, at multiple scales: conduct sampling; collect, measure data in the field; Import, export, validate data; classify data and imagery; conduct statistical analyses; create and publish visualizations; apply critical thinking and problem-solving skills; apply programming languages (e.g., Python, Java, R); demonstrate working knowledge of GIS hardware and software; create, update, and maintain GIS databases</td>
<td>Exams, quizzes</td>
</tr>
<tr>
<td>6. Demonstrate a conceptual and working knowledge of spatial analysis operations, including interpolation, transformation, spatial statistics and estimation of error and uncertainty.</td>
<td>Labs, exams</td>
</tr>
<tr>
<td>7. Synthesize and integrate concepts of GIS theory and methodology, including data models, data structures, topology and spatial analysis.</td>
<td>Labs, project, exams</td>
</tr>
<tr>
<td>8. Prepare and design appropriate GIS data models and organize GIS data.</td>
<td>Labs, project</td>
</tr>
<tr>
<td>9. Demonstrate intermediate GIS software skills, particularly in ArcGIS, as well as intermediate scientific computing skills.</td>
<td>Labs, project</td>
</tr>
<tr>
<td>10. Describe and explain pertinent policy issues relating to the use of GIS in the public and private sectors.</td>
<td>Labs, project</td>
</tr>
<tr>
<td>11. Employ professional-level verbal and written communication and computer technology skills by way of reports and presentations.</td>
<td>Labs, project</td>
</tr>
</tbody>
</table>
Grading:

Your grade will be based on a series of exercises, a project, and written exams as well as attendance (for those students on-campus). The total point allocation for ECampus students is 950 points (minus 50 points for attendance). For a more detailed breakdown of individual assignments view the Grade Center on Canvas. This point allocation is subject to change.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Point Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance</td>
<td>50</td>
</tr>
<tr>
<td>Project</td>
<td>250</td>
</tr>
<tr>
<td>Lab Exercises</td>
<td>250</td>
</tr>
<tr>
<td>Assessments</td>
<td>450</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1000</strong></td>
</tr>
</tbody>
</table>

Grading Policy:
The due date for each assignment will be posted on Canvas when the assignment is made available. Each assignment is due by the stated date.

The grade will be dropped by 10% a day from the due date for each 24 hours that an assignment is late. If you have a legitimate excuse for not being able to complete the assignment on time, you must present this excuse (Dr.’s note, jury duty, etc) to the instructor before the due date of the assignment.

If for some legitimate reason, supported by official documentation, you are not able to take the exam within the specified period, it is your responsibility to notify the instructor and make other arrangements during the first 2 weeks of the course.

Grades are based on the percentage of maximum points:

A  92–100%      B+ 88–89%      C+ 78–79%      D+ 68–69%      F <60%
A- 90–91%      B  82–87%      C  72–77%      D  62–67%      D-  60–61%
B- 80–81%      C- 70–71%      D- 60–61%

Policy on Incompletes
Incompletes (“I”) are only given for circumstances that are beyond the student’s control that prevent the completion of the course within the quarter. Official documentation may be required to support a student’s request for an incomplete.

In addition, incompletes are only given when the student has successfully completed at least 50% of the course work before the incomplete is requested. In all cases, the remaining course work must be completed by the end of the next quarter. The instructor and student will decide on an appropriate timeline for the completion of the work within that deadline.
Computer hardware and software requirements for class:

On-Campus:
Each computer in the Digital Earth lab (Wilkinson 210) is equipped with DVD-RW drive along with a USB port. You should have a backup system (USB memory stick, DVD, etc) on which to back up all your class work.

ECampus:
**COMPUTER REQUIREMENTS:** There are very specific computer hardware and Internet connectivity requirements that you should carefully review to insure that your computer is capable of running the GIS software with which we will be working. Please refer to this site for minimum computer specifications:


If you do not have regular access to a computer with these MINIMUM specifications, you should NOT take this course until such arrangements have been made or you have purchased a suitable computer. In addition, you should have regular access to a high speed Internet connection. Please test your computer configuration and Internet connectivity via this ECampus site:

[http://ecampus.oregonstate.edu/services/technical-help.htm](http://ecampus.oregonstate.edu/services/technical-help.htm)

Other Information

**Students with Disabilities:** Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at [http://ds.oregonstate.edu](http://ds.oregonstate.edu). DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

**Behavior:** The goal of Oregon State University is to provide students with the knowledge, skill and wisdom they need to contribute to society. Our rules are formulated to guarantee each student's freedom to learn and to protect the fundamental rights of others. People must treat each other with dignity and respect in order for scholarship to thrive. Behaviors that are disruptive to teaching and learning will not be tolerated, and will be referred to the Student Conduct Program for disciplinary action. Behaviors that create a hostile, offensive or intimidating environment based on gender, race, ethnicity, color, religion, age, disability, marital status or sexual orientation will be referred to the Affirmative Action Office. Twenty-three specific behaviors are prohibited, including:

1. Obstruction or disruption of teaching, learning, research, administration, disciplinary procedures, or other institutional activities
2. Obstruction or disruption that interferes with freedom of movement, either pedestrian or vehicular, on institutionally-owned or controlled property.
3. Hazing, defined as any action that endangers the physical, emotional, mental health or safety of an individual, or destroys or damages personal property for the purpose of initiation, membership, admission or participation in a group or organization.
4. Harassment, defined as conduct of any sort directed at another that is severe, pervasive or persistent, and is of a nature that would cause a reasonable person in the victim's position substantial emotional distress
5. Sexual Harassment
6. Discriminatory Harassment

For more information, see http://oregonstate.edu/studentconduct/offenses-0

**Academic Honesty**: Students benefit from studying together, and we encourage you to do this. However, work that is to be turned in for a grade **must be your own unless otherwise stated** – it must not be a copy of anyone else’s work (either of another student or anyone else). If you are uncertain about what constitutes copying or academic dishonesty of any kind, ask a TA or the instructor. Every year that this course has been taught the professor has made at least one official report of academic dishonesty. These reports are serious matters, and result in the student's college and the university being notified that the student has been involved in academic dishonesty. **If you cheat and we catch you, you will be reported.**

Students are expected to be honest and ethical in their academic work. Academic dishonesty is defined as an intentional act of deception in one of the following areas:

* **cheating**: use or attempted use of unauthorized materials, information or study aids
* **fabrication**: falsification or invention of any information
* **assisting**: helping another commit an act of academic dishonesty
* **tampering**: altering or interfering with evaluation instruments and documents
* **plagiarism**: representing the words or ideas of another person as one's own