I. COURSE DOMAIN AND BOUNDARIES

Geographic Information Systems (GIS) is a system of hardware, software, and procedures designed to support the capture, management, manipulation, analysis, modeling, and display of spatially referenced data for solving complex environmental, health, social, planning, and management problems. GIS applications use both spatial information (maps) and databases to perform analytical studies.

This course will familiarize students with the basic knowledge of GIS and their application to social work and public health practice and research. A conceptual overview of GIS is presented to provide students with foundational knowledge about the theory, purpose, function, and applicability of GIS in practice and research settings. Students will develop critical thinking skills necessary to devise research questions appropriate for a GIS, to develop a GIS, interpret the findings, and to evaluate the spatial relationships between variables.

The technical aspect of the course is designed to provide students with a thorough introduction to the industry leading GIS software, ArcGIS. Particular attention will be given to the tools and analytical functions most appropriate for social work and public health practice and research. The goal of this course is to prepare students to become proficient interactive users of GIS within organizations. Students will also gain facility in relational databases, which have applicability beyond their role in the ArcGIS software.

Students will review the types of datasets currently available. Not all data are appropriate for a GIS; the various types of spatial data will be reviewed and students will gain knowledge in how to match data appropriately to research questions. Students will learn how to access and use US Census data, municipal
administrative address data, and raster data. Students will be expected to have facility in georeferencing, geocoding, data manipulation, and database management.

IIa. CORE COMPETENCIES – PUBLIC HEALTH

- Select and perform (with computer packages) appropriate descriptive statistics and tests for differences in continuous and categorical variables.
- Conduct clear and effective graphical and tabular summaries of basic statistical analysis.
- Define and interpret a public health problem in terms of magnitude, person, time, and place.
- Understand how to translate and disseminate public health research to policymakers and other stakeholders using health information technology.
- Understand how public health information infrastructure collects, processes, maintains, and disseminates data.
- Understand how to communicate basic statistical results and epidemiologic information to diverse audiences.
- Demonstrate professional demeanor in behavior, appearance, and communication.

IIb. MSW COMPETENCIES ADDRESSED IN THIS COURSE

| Identify as a professional social worker and conduct oneself accordingly | C1,C2 | Emphasized |
| Apply social work ethical principles to guide professional practice | C1,C2 | Emphasized |
| Apply critical thinking to inform and communicate professional judgments | C4 | Emphasized |
| Engage diversity and difference in practice | C2 | Reinforced |
| Advance human rights and social and economic justice | C3 | Reinforced |
| Engage in research-informed practice and practice-informed research | C4 | Introduction |
| Apply knowledge of human behavior and the social environment | C4, C9 | Emphasized |
| Respond to contexts that shape practice. | C4, C7 | Reinforced |
| Engage, assess, intervene, and evaluate with individuals, families, groups, organizations, and communities | C7, C8 | Emphasized |
III. BROWN SCHOOL ACADEMIC POLICIES

**Academic Integrity:** Academic integrity in the completion of tests, oral presentations and written assignments (including statistical syntax) is expected. Violations of academic integrity (e.g., plagiarism) are very serious offenses. Violations will result in notification to the Assistant Dean for the appropriate (MSW or MPH) program and may result in referral to the Academic and Professional Integrity Committee, which could lead to dismissal from the program. Please review and adhere to the entire set of Academic Integrity guidelines in the student handbook on Inside Brown:

[Student Handbook 2017-2018](#)

**Accommodations:** If you have a learning disability, sensory, or physical disability or other impairment, and you may need special assistance in lectures, reading, written assignments, and/or exam taking, please contact the Brown School Director of Student Affairs who can provide coordination of accommodations at Washington University and the Brown School. The [Disability Resource Center](#), a University-wide resource, provides diagnostic and academic accommodations support and referrals.

**English Language Proficiency:** If your English language proficiency is such that you may need special assistance in lectures, reading, written assignments, and/or exam taking, please communicate these needs to your instructor who may refer you to the [English Language Program](#) (ELP), a University-wide resource which provides classes and academic English language support designed to increase non-native English speaking students' English language proficiency and to facilitate their academic success at Washington University. You may also find the Academic Assistance resources available through the [Office for International Students and Scholars](#) to be helpful.

**Professional Use of Electronic Devices in the Classroom:** Computers or other electronic devices, including “smart pens” (devices with an embedded computer and digital audio recorder which records the classroom lecture/discussion and links that recording to the notes taken by the student), may be used by students at the discretion of the faculty member to support the learning activities in the classroom. These include such activities as taking notes and accessing course readings under discussion. If a student wishes to use a smart-pen or other electronic device to audio record lectures or class discussions, they must notify the instructor in advance of doing so. Permission to use recording devices will be at the discretion of the instructor, unless this is an accommodation approved by Disability Resources.

Nonacademic use of laptops and other devices is distracting and seriously disrupts the learning process for everyone. Neither computers nor other electronic devices are to be used in the classroom during class for non-academic reasons. This use includes emailing, texting, social networking, and use of the Internet. The use of cell phones during class time is prohibited, and they should be set on silent before class begins. In the case of an emergency, please step out of the room to take the call. The instructor has the right to hold students accountable for meeting these expectations, and failure to do so may result in a loss of participation points, a loss of the privilege of computer use in the classroom, or being asked to leave the classroom.

**Religious Holidays:** The Brown School recognizes the individual student’s choice in observing religious holidays that occur during periods when classes are scheduled. Students are encouraged to arrange with their instructors to make up work missed as a result of religious observance, and instructors are asked to make every reasonable effort to accommodate such requests.

IV. WASHINGTON UNIVERSITY ACADEMIC SUPPORT POLICIES

**Accommodations based upon sexual assault:** The University is committed to offering reasonable academic
accommodations to students who are victims of sexual assault. Students are eligible for accommodation regardless of whether they seek criminal or disciplinary action. Depending on the specific nature of the allegation, such measures may include but are not limited to: implementation of a no-contact order, course/classroom assignment changes, and other academic support services and accommodations. If you need to request such accommodations, please direct your request to Kim Webb (kim_webb@wustl.edu), Director of the Relationship and Sexual Violence Prevention Center. Ms. Webb is a confidential resource; however, requests for accommodations will be shared with the appropriate University administration and faculty. The University will maintain as confidential any accommodations or protective measures provided to an individual student so long as it does not impair the ability to provide such measures.

If a student comes to me to discuss or disclose an instance of sexual assault, sex discrimination, sexual harassment, dating violence, domestic violence or stalking, or if I otherwise observe or become aware of such an allegation, I will keep the information as private as I can, but as a faculty member of Washington University, I am required to immediately report it to my Department Chair or Dean or directly to Ms. Jessica Kennedy, the University’s Title IX Director. If you would like to speak with directly Ms. Kennedy directly, she can be reached at (314) 935-3118, jw kennedy@wustl.edu, or by visiting the Title IX office in Umrath Hall. Additionally, you can report incidents or complaints to the Office of Student Conduct and Community Standards or by contacting WUPD at (314) 935-5555 or your local law enforcement agency. See: Title IX

You can also speak confidentially and learn more about available resources at the Relationship and Sexual Violence Prevention Center by calling (314) 935-8761 or visiting the 4th floor of Seigle Hall. See: RSVP Center

Bias Reporting: The University has a process through which students, faculty, staff and community members who have experienced or witnessed incidents of bias, prejudice or discrimination against a student can report their experiences to the University’s Bias Report and Support System (BRSS) team. See: brss.wustl.edu

Mental Health: Mental Health Services’ professional staff members work with students to resolve personal and interpersonal difficulties, many of which can affect the academic experience. These include conflicts with or worry about friends or family, concerns about eating or drinking patterns, and feelings of anxiety and depression. See shs.wustl.edu/MentalHealth

Additional Issues or Concerns: If you feel that you need additional supports in order to be successful in your time at Brown, beyond the afore mentioned accommodations, please contact Essie Rochman, Director of Student Affairs at errochman@wustl.edu. She can assist you in navigating a myriad of concerns. Her office is in Brown Hall, room 320.

V. TEXT/REQUIRED READINGS

Required Text


Readings as Assigned (via BlackBoard)

Required Software
ArcGIS Desktop 10.5 or later (available through WU), MS Office, Google Earth

Recommended Texts:


VI. ORGANIZATION OF THE COURSE

This course consists of lectures, labs, problem sets, a midterm exam, and a group practicum or community-based project. The first eleven weeks are devoted to introductory matter, including the fundamental mechanics of the ArcGIS software and conceptual issues of GIS and GIS-related research. The final four class sessions are dedicated to students’ projects and more advanced spatial analyses.

This course is meant as an introduction to the role and use of GIS in the applied social sciences and students are encouraged to continue developing advanced analytical skills beyond this course. As a practice course, it is theory-driven in the context of evidence-based practice methods. Students will learn how to develop a GIS and to use a GIS to address important practice and research questions at the organizational and community levels.

Generally, each class is approximately divided into two sections in order to achieve these objectives:

- Conceptual (two hours)
- Learning the ArcGIS software (one hour)

VII. ROLE OF FACULTY AND STUDENT

Role of Instructor

The instructor is responsible for the learning environment and course content. The instructor will grade required assignments and provide appropriate feedback. The instructor will respond to student inquiries regarding the readings and course assignments. The instructor will have regular office hours in the computer lab and is available by appointment. Students are encouraged to offer their questions and ideas and seek guidance throughout the semester.

Role of Students

Class attendance and participation: The developmental nature of learning in this class requires that students keep up with assignments and attend ALL class sessions. It is the student’s responsibility to seek guidance and feedback from the instructors as needed to assure one’s progress. If you are unable to attend class, please contact the instructor in advance, or failing that, immediately afterwards.

Writing style requirements: Please follow the guidelines in the 6th edition of the APA publication manual for format and citations in your written assignment. This manual is available at the campus bookstore, the library, and the writing lab. Please avoid colloquial expressions, proofread all documents, and employ good grammar.
Accommodations/special needs: If you have a disability or impairment that requires an accommodation, please inform the instructor and contact the Disability Student Services at the Disability Resource Center (DRC), Voice/TTY: 935-4062, FAX, 935-8272. The DRC will provide the instructor with official notification of necessary accommodations. If English is your second language and you think that you need accommodations, please let the instructor know by the end of the second week.

VIII. ASSIGNMENTS AND GRADING CRITERIA

General Expectations

This class is designed to blend theory and practice. Thus, theoretical grounding from the class readings is combined with practice experience in the community-based projects. Assigned readings are to be read prior to class and students should come to class prepared to discuss and apply readings to discussions.

In addition to the weekly readings, there are several primary assignments in this course:

1. Ten weekly tutorials, exercises, and/or homework (3% each; 30% of total grade)
2. In-class participation, including attendance and course evaluations (5%)
3. Midterm project (20%)
4. Final project (45%)
   a. Project proposal (5%)
   b. Written assignment (10%)
      i. Group projects also require a one page individual participation summary
   c. GIS poster (30%)

All papers must be double-spaced, and written using APA style, including title and reference pages, section headings, and page numbers. All assignments must be completed by the assigned dates. One letter grade will be deducted for each day a paper is late. Papers and presentations should be grounded in class readings, class discussions and other literature as appropriate. Grammar, presentation style, clarity and conciseness will affect the final grade. Please see the following regarding academic integrity: http://artsci.wustl.edu/GSAS/Policies/ACINTEG03.pdf. This GIS course offers a great opportunity for group work and collaboration. This collaboration does extend to the weekly tutorials. However, each individual is expected to produce their own weekly exercises and to work alone on the in-class midterm.

WEEKLY TUTORIALS AND EXERCISES (30%)
The required text is a series of nine lessons with exercises throughout each tutorial. These tutorials and exercises will comprise the bulk of our first twelve class periods; these are the lab portion of class. Completion of each exercise is mandatory. In addition to the in-class exercises, related homework will be assigned to provide extra practice in the skills just gained in class. These assignments will complement the week’s lecture and lab. All late homework (as determined by date stamp on Blackboard), will have an automatic 1 point deduction.

MIDTERM (20%)
Students will be assigned a midterm project to assess GIS competence to date. The project will incorporate learned GIS techniques and analysis in addition to real-world data preparation. Students will be given 2/3 of one class period to complete the midterm (2hrs).
PRACTICUM OR COMMUNITY-BASED PROJECT (45%)
This project is intended to address a question of concern from a community-based agency, practicum site (Masters students), professor, or your research area (PhD students). This project should address a specific program, policy issue, or research question appropriate for a GIS (e.g., population characteristics and program development; clients’ and agency’s proximity to public transportation and implications to program utilization). Students are expected to submit their results to the appropriate party. The intent of the project is to integrate conceptual and technical aspects of GIS with real world applications that have significant implications for stakeholders and/or the academy. This work will be completed individually or groups of up to three students.

The project includes five separate assignments: 1) project proposal; 2) individual participation; 3) response to questions at poster session; 4) written project; and 5) a public poster presentation.

Project proposal

**Due: February 26th**  
**Length: 3-5 pages**  
**Grade weight: 5%**

The project proposal is intended to provide initial conceptualization of the overall project. It will be primary effort of the student(s) with significant input from the community-based agency. The student(s) will present the research question, a summary of the issue/problem to be addressed, a brief summary of the extant literature, potential data sources, and potential strengths and limitations of the proposed study. It provides the student with initial feedback on the proposed project to determine feasibility and appropriate scope. The proposal is to be 3-5 pages double spaced and is due at the beginning of class.

**Structure:**
1. Cover Page (not included in page count)
2. Background & Summary of the Issue and Agency
3. Research Question to be Addressed
4. Anticipated Methods to be Utilized
5. Data Needs & Availability
6. Anticipated Limitations or Concerns
7. References (must have at least 3 outside scholarly sources; not included in page count)

**Grading Criteria (20 points):**
- Depth and knowledge of issue(s) to be addressed and agency (2)
- Clarity of research question and appropriateness for a GIS (8)
- Knowledge and applicability of data sources (4)
- Critical thinking regarding the strengths and limitations of the study (4)
- Clarity of presentation and writing (2)

Final Written Project

**Due: May 8th (11:59pm)**  
**Length: 5-10 pages**  
**Grade weight: 10%**
The final project should address the primary research question(s). The project shall demonstrate a thorough understanding of the problem/issue, use GIS appropriately to analyze and present the data, and draw conclusions or make recommendations. The written document should be given to your agency. Strive to be concise in your writing.

**Structure:**

1. Cover Page
2. Abstract
3. Background, Summary of the Issue, and Research Question (1-2 pages)
4. Methods (1-2 pages)
5. Results (1-2 pages)
6. Recommendations/Discussion (1-2 pages)
7. Limitations & Conclusion (1-2 pages)
8. References (at least eight, and at least three from academic sources)
9. Appendices (REQUIRED!)
   - Figures
   - Maps
   - Tables
   - Poster
   - Individual participation in group if required

**Format:**

The project shall be 5-10 pages double-spaced and follow APA (6th Edition) guidelines. The page limit does not include the cover page, abstract, references, or appendices. All figures (including maps or other graphical representations of data) and tables shall be included in the appendices; do not place these materials in the text.

**Grading Criteria (100 points):**

- Depth and knowledge of the issue to be addressed (15)
- Thoroughness and accuracy of methods description (15)
- Clarity of findings (20)
- Thoroughness of discussion and applicability of recommendations (20)
- Currency, accuracy, and legitimacy of references (10)
- Accurate and appropriate visual presentation of data and maps (10)
- Overall presentation and writing (10)

**Final Project Presentation and Response to Questions at Poster Session**

**When:** May 7th  
**Length:** 2 hr poster session  
**Grade weight:** 20% / 10%

It is important not only to have facility in presenting GIS information in a written format, but also in a
visual/oral format. Students will present their projects to the class and to relevant stakeholders. Through the presentation, students will share the details of their projects including the purpose, background, research question, a thorough description of methods, and a thorough description of the findings and the recommendations. It is expected that students will have conducted original research and present GIS data in both verbal and visual (i.e., maps) formats. This will be in the form of an academic poster presentation.

Grading Criteria (30 points):
- Thoroughness and clarity of presentation (20)
  - Use of visual aids to present data, findings, and recommendation
- Thoughtfulness in response to questions (10)

GRADING:

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<thead>
<tr>
<th>Score</th>
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<tr>
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<td>A</td>
<td>77 - 79</td>
<td>C+</td>
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<td>90 - 94</td>
<td>A-</td>
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IX. COMPETENCY ALIGNMENT TO ASSIGNMENTS AND COURSE ACTIVITIES

<table>
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<tr>
<th>Graded Assignments</th>
<th>Competency/ies</th>
<th>Dimension/s</th>
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<tr>
<td>Using GIS to create a simple map</td>
<td>C1, C4</td>
<td>Knowledge/Skills</td>
</tr>
<tr>
<td>Using GIS to export a simple map</td>
<td>C1, C4</td>
<td>Knowledge/Skills</td>
</tr>
<tr>
<td>Create project requirement doc</td>
<td>C4, C7</td>
<td>Knowledge/Skills/Cognitive and Affective Processes/Values</td>
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<tr>
<td>Draft Project Statement</td>
<td>C4</td>
<td>Knowledge/Skills/Cognitive and Affective Processes/Values</td>
</tr>
<tr>
<td>Create site selection map</td>
<td>C4, C7</td>
<td>Knowledge/Skills/Cognitive and Affective Processes/Values</td>
</tr>
<tr>
<td>Create choropleth map</td>
<td>C3, C6</td>
<td>Knowledge/Skills/Cognitive and Affective Processes</td>
</tr>
<tr>
<td>Draft critical review of webmap</td>
<td>C9</td>
<td>Knowledge/Values</td>
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<tr>
<td>Create map with clipping and symbology</td>
<td>C4</td>
<td>Knowledge/Skills</td>
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<tr>
<td>Full project proposal</td>
<td>C1, C2, C3, C4</td>
<td>Knowledge/Skills/Cognitive and Affective Processes/Values</td>
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<td>Create a Geodatabase</td>
<td>C4</td>
<td>Knowledge/Skills</td>
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<td>Course Activities</td>
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<tr>
<td>Sharing GIS data with colleagues</td>
<td>C1, C4</td>
<td>Knowledge/Skills/Cognitive and Affective Processes/Values</td>
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<td>Conducting spatial analysis</td>
<td>C4, C6, C7</td>
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<td>Midterm</td>
<td>C1, C4</td>
<td>Knowledge/Skills/Cognitive and Affective Processes/Values</td>
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<td>Automation Techniques for analysis</td>
<td>C4, C7</td>
<td>Knowledge/Skills</td>
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<tr>
<td>Map finishing communicating with maps</td>
<td>C1, C2, C6</td>
<td>Knowledge/Skills/Cognitive and Affective Processes/Values</td>
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<tr>
<td>Project Updates</td>
<td>C1, C2, C4</td>
<td>Knowledge/Skills/Values</td>
</tr>
<tr>
<td>Final Project Poster Session</td>
<td>C1, C4</td>
<td>Knowledge/Skills/Cognitive and Affective Processes/Values</td>
</tr>
<tr>
<td>Final Project Paper</td>
<td>C1, C4</td>
<td>Knowledge/Skills/Cognitive and Affective Processes/Values</td>
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</tbody>
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X. COURSE OUTLINE

**Exact dates shown below may change with notice!!**

**Class Session 1: 22 January 2018**

**Topics:** Course overview and Introduction to GIS

**Readings:** Harder et al. (2011) [Text]. Pages 1-30.

**Exercises:** Assignment 1a and homework assignment (storytelling)

**Assignment Due:** Maps that Inspire! (Due Wed. before first class)

**Class Session 2: 29 January**

**Topics:** Exploratory data analysis

**Readings:** Text. Pages 31-56.


**Exercises:** Assignment 1b and homework assignment  
**Assignment Due:** Assignment 1a & storytelling slides

**Class Session 3:** 5 February

**Topics:** *Describing project requirements, examining data and reframing problem statement*  
*Making a map*

**Readings:** Text. Pages 57-82.  
*To Be Assigned Journal Article / Book Chapter*

**Exercises:** Assignment 2a, 2b, & 2c and homework assignment  
**Assignment Due:** 1b and homework assignment

**Class Session 4:** 12 February

**Topics:** *Projecting and using spatial data, validating data sources*

**Readings:** Text. Pages 81-121.

**Exercise:** Assignment 3a & 3b and homework assignment  
**Assignment Due:** Assignment 2c and homework assignment

**Class Session 5:** 19 February

**Topics:**  
*Managing spatial data, creating geodatabases, projecting and converting feature classes*  
*Project proposal review*

**Readings:** Text. Pages 123-143

**Exercises:** Assignment 4a-4d and homework assignment (Project proposal)  
**Assignment Due:** Assignment 3b and homework assignment

**Class Session 6:** 26 February

**Topics:**  
*Preparing data, Creating data from scratch, GPS*

**Readings:** Text. Pages 143-172.

**Exercises:** Assignment 4e-4h and homework assignment
**Assignment Due:** Assignment 4a-4d & Project proposal

**Class Session 7: 5 March**

**Topics:**  Editing data / Geocoding

**Readings:**  Text. Pages 173-193.

**Exercises:**  Assignment 5a-5b and homework assignment (geocoding)

**Assignment Due:** Assignment 4e-4h

***March 12th SPRING BREAK – NO CLASS***

**Class Session 8: 19 March**

**Topic:**  Conduct the analysis, Midterm review

**Readings:**  Text. Pages 195-239.

**Exercises:**  Assignment 6a-6e

**Assignment Due:** Assignment 5a-5b and homework assignment (geocoding)

**Class Session 9: 26 March**

**Topics:**  Midterm

**Objectives:**  Show-off your newfound GIS skills!

**Assignment Due:** Midterm

**Class Session 10: 2 April**

**Topic:**  Geoprocessing Tools

**Readings:**  Text. none  
*To Be Assigned Journal Article / Book Chapter*

**Exercises:**  in class excercise

Assignment Due: Assignment 6a-6e and homework assignment.
Class Session 11: 9 April

Topics: Automating the analysis / Modelbuilder

           To Be Assigned Journal Article / Book Chapter

Exercises: Assignment 7a-e and homework assignment

Assignment Due: Geoprocessing homework assignment

Class Session 12: 16 April

Topics: Present analysis results / Critical Thinking / Communication with Maps

           To Be Assigned Journal Article / Book Chapter

Exercises: In class

Assignment Due: Assignment 7a - e and homework assignment

Class Session 13: 23 April

Topics: 3x3 project updates./ Creating Research Posters

Readings: None

Assignment Due: Assignment 8a-e and homework (3x3 slides)

Class Session 15: 30 April

Topics: Project working session and course wrap-up

Assignment Due: none

Class Session 16: May 7th

Date May 7th 2pm-4pm (SUBJECT TO CHANGE ON AVAILABILITY OF VENUE)

We will be holding a formal poster session in Brown Lounge. Scheduling may impact the day for this event. Please plan accordingly as this is a required component of your final grade. More information to follow in class.

Important Dates:
May 4th  NOON – Final Poster Due on Blackboard

May 8th 11:59pm – Final Paper Due on Blackboard