GIS 3420C/6425C: GIS Models for Public Health

Time: MWF Period 5 (11:45 AM - 12:35 PM) **Location:** TUR 3006
Instructor: Dr. Liang Mao   **E-mail:** liangmao@ufl.edu   **Office hours:** M&W 1-3pm @TUR 3121

📖 *Course description:*

This is a methodology course that focuses on designing GIS-based models to address health and health care issues. The lecture component covers a serial of topics, including: a conceptual framework, landscape epidemiology models, disease diffusion models, health accessibility, individual health behavior, and location-allocation models of health services.

This course also has a lab component to help students gain hands-on experience of applying these models with GIS tools. ArcGIS will be used as the primary GIS software.

📖 *Prerequisites:*

Entry level knowledge of statistics (STA2023, GEO3162C, or equivalent) and GIS (GIS3043 or equivalent), or the GEO3452/6421 'Intro Medical Geography' course.

📖 *Lectures and Labs (Schedules may change depending on progress):*

Week	Lecture Topics	Labs
1	Introduction Four steps for GIS modeling	Finding GIS & health data
2	Basic GIS operations for health analysis (I)	Lab 1: Importing health data into ArcGIS
3	Basic GIS operations for health analysis (II)	Lab 2: Basic GIS operations
4	Suitability models and Delphi approach **Quiz 1**	Lab 3: Suitability model for sitting a new hospital
5	Modeling accessibility to healthcare (Gravity and floating catchment models)	Lab 4: Gravity model for hospital accessibility with ArcGIS
6	Linear regression models	Lab 5: Linear regression modeling with ArcGIS
7	Logistic regression models **Quiz 2**	Lab 6: Mapping the risk of WNV using logistic regression model
8	Spatial dependency and spatial regression	Lab 7: Cluster detection and spatial regression
9	Pause for review **Midterm exam**	Discussion on Midterm exam, bibliography, final project
	Spring break	
11	Model validation	Lab 8: Validating spatial models
12	Modeling the diffusion of diseases (I) (SIR) Modeling the diffusion of diseases (II) (Cellular Automata)	Lab9: A mini CA for disease diffusion
13-14	Modeling the diffusion of diseases (III) (Network models) **Quiz 3**	Lab 10: Agent-based epidemic simulation with Netlogo

15	Modeling control strategies for epidemics	Lab 11: ABM for disease control strategies

16-17	Final project help sessions **Quiz 4** **Final project presentations**

📖 *Textbook and additional readings:*
Recommended textbook:
Ellen K. Cromley and Sara L. McLafferty, 2002, *GIS and Public Health*. Guilford Press, New York

📖 *Grading Policies*

Items	Percentage (%)
Lab Assignments	30
Midterm exam	15
Quizzes	20
Annotated bibliography	10
Individual project report & presentation	20
Attendance	5
Total	**100**

The grading scale for this course consists of the standard scale, including minus grades, below:

94 - 100 = A	90 - 93 = A-	87 - 89 = B+	83 - 86 = B	80 - 82 = B-
77 - 79 = C+	73 - 76 = C	70 - 72 = C-	67 - 69 = D+	63 - 66 = D
60 - 62 = D-	Below 60 = E			

"Please note that C- is not considered a passing grade for major, minor, Gen Ed, Gordon Rule, or basic distribution requirements."

More information on current UF grading policies can be accessed by the following link:
http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html

Lab assignments: There will be **11** assignments for lab exercises, with 100 points for each. The average accounts for 30% of the final grade. The assignments should be handed in by due date. Otherwise, **5 points will be deducted per day after due date**. If something unexpected happens, please inform the instructor in advance. The absence of such a notice will prevent students from making up the assignment.

Quizzes: There will be **four** in-class **quizzes** that occur at about a two-week interval, with 100 points for each. The average accounts for 20% of the final grade. These will test you on material covered within the most recent two weeks. The time of quizzes will be announced in class and on the e - learning system. **Quizzes can only be made up if the instructor receives prior notification of absence.**

Mid-term exam: A close book exam will be held in **Week 9 (The week of March 6).** Exam will be tailored for undergrads and grads with different standards.

Annotated bibliography: Each student will review 10 articles and develop an annotated bibliography for each article. The 10 articles should cover **one topic of student's interest** in spatial modeling and public health, **related to your final project**. The bibliography should briefly describe (1) the reference

of the article, (2) the purpose of the study, (3) the data used for the study, and (4) the models used for the study. Furthermore, graduate students are required to write down their Comments and Critics on each article. **The annotated bibliography is due by 11:59pm March 31.**

Individual project & final presentation: Students are asked to select specific health topics based on their interests, and complete a spatial modeling project with ArcGIS. Starting from April 18, students are expected to give a 10-minute talk about their individual projects. After the final presentation, each student needs to hand in an 8-10 page project report in a designated format. **The final report is due by 11:59pm on May 5.**

Attendance/Participation: <u>Attendance is mandatory for all students</u>. To encourage uninterrupted participation in class, it is expected that cell phone and pagers be TURNED OFF prior to entering the classroom. Absences may be excused if they are documentable. For expected absences, students must provide at least two business days advance notice of the absence. Acceptable reasons for absences include but are not limited to personal or family illness or emergency, religious holidays, etc. Oversleeping, missing the bus, etc., are not excusable excuses. Students may be required to provide written documentation in order to receive an excused absence.

If absence is excused, students are responsible for material missed during any class session (lab or lecture). S/he should obtain notes from a peer for the material covered in class. If the absence is unexcused, assignments not turned in at the assigned time will be considered late and a penalty applied.

📖 *Other Important Information*

Academic Integrity: Each student is bound by the academic honesty guidelines of the University and the student conduct code printed in the Student Guide and on the University website:
http://www.registrar.ufl.edu/catalog/policies/students.html

Cheating or plagiarism in any form is unacceptable and inexcusable behavior. The Honor Code states: "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: On my honor, I have neither given nor received unauthorized aid in doing this assignment."

Policy on Make-Up Work: Students are allowed to make up assignments ONLY as the result of illness or other unanticipated circumstances warranting a medical excuse and resulting in the student missing a homework or exam, consistent with College policy. Documentation from a health care provider is required.

For any other non-medical reason, assignments missed will receive a penalty of 5 points per day after the due date, and the mid-exam missed will receive a zero point.

Accommodations for Students with Disabilities: Students requiring accommodations must first register with the Dean of Students' Office. The Dean of Students' Office will provide documentation to the student, who must then provide this documentation to the faculty member when requesting accommodation. If students experience personal, academic, and social issues, please consider either of the following assistances:

University Counseling Services (P301 Peabody Hall – 392-1575)

http://www.counsel.ufl.edu/base.asp?include=counselingServices.inc
Student Mental Health Services in the Student Health Care Center (Room 245, Infirmary Bldg. – 392-1171)
http://www.health.ufl.edu/shcc