# 1 GIS 220: Mathematical Principals in GIS

## 1.1 Instructor

Jay Laura

Email: jlaura@asu.edu

Office Hours: By Appointment (Google Hangout), BlackBoard Discussion Forum, or Email

## 1.2 Course Web Site

All lecture slides, assignments, and exams will be posted and submitted through Blackboard. Equipment defects, technical difficulties will note be accepted as excuses for late submissions.

## 1.3 Text

No text. Assigned readings and book chapters are used to supplement presented topics.

## 1.4 Prerequisites

MAT 265 / MAT 270 (Calculus I), or equivalent, with a passing grade of C or higher.

## 1.5 Class Policies

### 1.5.1 Assignments

- There will be graded items due on every Thursday at 6:00pm Arizona Time. There is no penalty for early submission, but grades for manually graded assignments will not be posted until after the due date. Please pay attention to due dates and plan accordingly. Late assignments will be accepted, with a deduction of a letter grade per day.
- This is an iCourse reviewing previsouly covered mathematics materials for appliction in the GIScience domain and the introudction of spatial optimization methods. Assignments will be made available via BlackBoard in PDF format. Assignments will be a combination of applicationss and standard mathematical problem sets. You are encouraged to complete the assignment in the medium you find easiest to use, e.g. pencil and paper, as a word document, or using another math formatting tool. Assignments will be submitted using BlackBoard (so pencil and paper assingments will need to be scanned).

- Assignments must show all of the work for full credit. This is especially important if you are having difficulty as it provides insight into your thought process.

### 1.5.2 Exams

There will be a midterm and final exam in this course. These will be in a form similar to the assignments and submitted via BlackBoard.

#### 1.5.3 Participation

Participation is graded based on the BlackBoard discussion forums. Please introduce yourself during the first week. Each subsequent week you will need to:

- Start a new topic describing the application of one of the covered mathematicl principals within the GIScience / Geography domains. Please try to ensure your topic is unique from your peers'.
- Reply to at least one other topic with a substantive comment offering supporting information or an alternative view.

#### 1.5.4 Grading Components

- Participation 15%
- Assignments 35%
- Midterm Exam 20%
- Final Exam 30%

The overall course grade will be based on the sum of the above components as follows: A (93-100%), A- (90-92%), B+ (87-89%), B (83-86%), B- (80-82%), C+ (77-79%), C (70- 76%), D (60-69%), E (0-59%).

Incompletes: Only in the rarest of circumstances will an Incomplete grade be given. As per university policy, an incomplete automatically reverts to an E after one year if the agreed upon work has not been successfully completed.

### 1.6 Academic Integrity

The ASU Student Academic Integrity Policy (http://provost.asu.edu/academicintegrity) states that "[e]ach student must act with honesty and integrity, and must respect the rights of others in carrying out all academic assignments." This policy also defines academic dishonesty and sets a process for faculty members and colleges to sanction dishonesty. Violations of this policy fall into, but are not limited to, the following broad areas: cheating on an academic evaluation or assignment; plagiarism; academic deceit; aiding others to cheat or plagiarize and inappropriate collaboration. See me if you have any questions concerning academic integrity. Sanctions for academic dishonesty are referred to College and University bodies, in accordance with ASU guidelines.

### 1.7 Special Accommodations

To request academic accommodations due to a disability, please contact the ASU Disability Resource Center (Phone: 480-965-1234; TDD: 480-965-9000; Email:disability-q@asu.edu) - http://www.asu.edu/studentaffairs/ed/drc/. In coordination with the Center, every effort will be made to accommodate specific student needs.

### 1.8 Technical Support

- ASU offers technical support within BlackBoard: https://teachonline.asu.edu/2015/01/asu-help-desk-live-chat-now-available-blackboard-courses/
- For technical support outside of BlackBoard: http://asuonline.asu.edu/student-resources/technical-support

### 1.9 Course Syllabus

| Week | Dates | Topic | Assignment |
|---|---|---|---|
| 1 | 8/20 - 8/27 | Introduction - Variables (Algebra Basics), Functions and Equations | 1 |
| 2 | 8/27 - 9/3 | Limits | 2 (Q1-3 & 5) |
| 3 | 9/3 - 9/10 | Derivatives | 2(Q4 & 5) |
| 3 | 9/10 - 9/17 | Integrals | 3 |
| 4 | 9/17 - 9/24 | Matrices I | 4 |
| 5 | 9/24 - 10/1 | Matrices II | 5 |
| 6 | 10/1 - 10/8 | Matrices III | 6 |
| 7 | 10/8 -10/15 | Mid-Term | - |
| 8 | 10/15 - 10/22 | Model Building Fundamentals (Optimization) | 7 |
| 9 | 10/22 - 10/29 | Simplex Method I | 8 |
| 10 | 10/29 - 11/5 | Simplex Review / Big M | 9 |
| 11 | 11/5 - 11/12 | Integer Programming I | 10 |
| 12 | 11/5 - 11/12 | Solvers | - |
| 12 | 11/12 - 11/19 | Integer Programming II | 11 |
| 13 | 11/19 - 11/26 | Integer Programming III | 12 |
| 14 | 11/16 - 12/3 | Heuristics | 13 |
| 15 | 12/3 - 12/10 | Final Exam | - |