



Biology Department

BIO4083: Introduction to Geographic Information Systems

3 Units

Fall 2021

Open my eyes to see wonderful things in your Word. I am but a pilgrim here on earth: how I need a map—and your commands are my chart and guide. I long for your instructions more than I can tell.
-Psalms 119:18-20 (TLB)

Meeting days: Tues. & Thurs.	Instructor title and name: Dr. Walter Cho
Meeting times: 11:00AM-12:15PM	Phone: 619-849-2398
Meeting location: Main Computer Lab (LW 213)	Email: wcho@pointloma.edu
Final Exam: Thurs., 12/16/21, 10:30AM-1PM	Office location and hours (remote or outdoor only): Rohr Science 134; Zoom link on Canvas: Mon. & Fri., 11AM-1PM; Th., 9-10:30AM (PT); & by appointment

PLNU Mission

To Teach ~ To Shape ~ To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

COURSE DESCRIPTION

From the course catalog: Geographic Information Systems (GIS) involves the analysis and management of geographic information. This course is designed to introduce the basic principles and techniques of GIS (including spatial data sources, data structures, projections and coordinate systems), the essential skills of operating a functional GIS (including data creation, data editing and geospatial analysis), and the different applications of GIS technology.

Welcome to BIO4083! In this course we will explore how we gather and use spatial data. We will learn about the concepts and components of a geographic information system (GIS) and practice the use of a functional GIS through the use of the ArcGIS software package. This course will use a combination of lectures and computer lab activities to explore aspects of this growing and important field.

COURSE LEARNING OUTCOMES

- Students will learn how to compile, analyze, and present geospatial data while emphasizing the value of visual communication. By the end of this course, the student will be able to:
- Describe what geography and GIS are
- Articulate the importance of scale, projection, and coordinate systems in GIS
- Articulate the differences between vector and raster data structures and demonstrate the appropriate use of each of these data structures

- Articulate and demonstrate the basics of data capture, storage, analysis, and output in a GIS
- Describe typical uses of GIS in multiple fields including science
- Analyze the spatial distribution of phenomena and provide meaningful analysis of spatial attributes
- Demonstrate proficiency in the use of GIS tools to build maps that effectively convey specific information

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

1. Chang, K. (2019) Introduction to Geographic Information Systems. 9th Ed. McGraw-Hill Education, New York: 464 pp. ISBN: 9781259929649
2. We will also use the software ArcGIS available on the computers in the computer lab.
 - a. A USB flash drive (greater than 2GB) is recommended for saving your work on the lab computers. NOTE: You may also be turning this in occasionally if there is difficulty submitting some of the larger assignments, so getting one just for the class is recommended.

ASSESSMENT AND GRADING

Grades will be based upon a straight percentage of the total possible points available in this course and will include the following requirements:

Approximate Grading Scale:

93-100 = A 90-92 = A- 88-89 = B+ 83-87 = B 80-82 = B- 78-79 = C+
 73-77 = C 70-72 = C- 68-69 = D+ 63-67 = D 60-62 = D- 00-59 = F

Course Requirements:

% Value of Final Grade:

EXAMS:	
Exam #1	15%
Exam #2	15%
FINAL PROJECT	25%
QUIZZES/ASSIGNMENTS	35%
ATTENDANCE/PARTICIPATION	10%
TOTAL	100%

Course Requirements in Detail:

A. Lecture:

The lectures will follow the tentative “tentative course schedule” attached to your syllabus. Due to limitation in time, lectures will cover important key concepts but will not cover all of the information important for this course. You will need to read the appropriate chapters before the lecture to be best prepared for lecture and to participate in classroom discussions. Keep up with the course material and do not be afraid to ask questions.

B. Exams:

There will be 2 exams (15% of your final grade each). Each exam is objective and can consist of multiple-choice, matching, short answer and true/false type questions. There will also be some application questions including synthesis and analysis of important concepts as well as essay/discussion questions. Each exam will only cover material since the previous exam; however, fundamental concepts introduced early on will need to be remembered to address concepts throughout the course.

All materials in the class are potential test topics. This includes lecture materials from the required textbook (text, illustrations), lab information, any handouts or additional reading assignments you might receive, and in-class discussions on relevant topics or questions of interest.

TENTATIVE dates for the exams are: **Exam #1 – October 5, 2021 [T]** and **Exam #2 – November 9, 2021 [T]**.

Dates are subject to change depending on progression through required course material.

NOTE: See above for make-up policy for exams.

C. Final Project:

There is a final class project (25% of your final grade) where you will demonstrate your skills in GIS. The project is an opportunity to investigate a particular geographic question and provide a deeper understanding of GIS. You will need to acquire spatial data, perform some type of spatial analysis, and make a suite of maps. You will present your project on the scheduled day of the final.

D. Quizzes/ Assignments:

Quizzes and assignments may be given throughout the course. These will focus on the reading and lecture materials and are worth 35% of your final grade. The assignments will be taken from the “Tasks” as the end of each chapter and will be worked on in class.

E. Class Attendance/Participation:

Class attendance /participation is a very important part of learning and will count for 10% of your final grade. You are responsible for notifying the instructor of any known excused absence at least one week before the date of that absence.

STATE AUTHORIZATION

State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student’s responsibility to notify the institution of any change in his or her physical location. Refer to the map on [State Authorization](#) to view which states allow online (distance education) outside of California.

INCOMPLETES AND LATE ASSIGNMENTS

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Incompletes will only be assigned in extremely unusual circumstances.

PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one’s own when in reality they are the results of another person’s creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See [Academic Policies](#) for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation.

SPIRITUAL CARE

Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith.

If students have questions, a desire to meet with the chaplain or have prayer requests you can contact the [Office of Spiritual Development](#).

TENTATIVE COURSE SCHEDULE (this will most likely change)

Week	Week of	Topic	Chapters in Chang	Notes
1	8/29/2021	Introduction to GIS & ArcGIS	1	
2	9/05/2021	Geospatial data: Coordinate systems	2	9/06/21: No Class (Labor Day)
3	9/12/2021	Geospatial data: Vector Data	3	
4	9/19/2021	Geospatial data: Raster Data	4	
5	9/26/2021	Data acquisition	5	
6	10/03/2021	Data acquisition: Geometric transformation	6	1st Exam – 10/05/21 in class
7	10/10/2021	Data acquisition: Spatial data	7	
8	10/17/2021	Data management: Attribute data	8	10/22/21: No Class (Fall Break)
9	10/24/2021	GIS data	7, 8	
10	10/31/2021	Data display & Cartography	9	
11	11/07/2021	Data exploration	10	2nd Exam – 11/09/21 in class
12	11/14/2021	Data analysis: Vector	11	
13	11/21/2021	Data analysis: Vector	11	11/24-26/21: No Class (Thanksgiving)
14	11/28/2021	Data analysis: Raster	12	
15	12/05/2021	Final Project	OPEN PERIOD	Time to work on Final Project
16	12/12/2021	Finals Week		FINAL: 12/16/21, 10:30AM-1PM