

**Core Curriculum
Course Proposal Cover Sheet**

Department: Social Science
College: College of Liberal and Fine Arts
Department Head: Dr. Eric Morrow

Course Prefix & Number: GEOG 1451

Course Title: Pre-GIS: GPS, VGI and Cartography

Course Description: Pre-GIS focuses on the knowledge, instruments, and data necessary for GIS. Pre-GIS is a student-centered, hands-on course that will introduce students to the GIS concepts that are intrinsic in introductory and advanced GIS courses. Students will create virtual maps by gathering data points using GPS instruments. Students will then use GIS to create detailed information relating to their map and data points to answer questions posed in the course

Please select the THECB Foundational Component Area for which this course is being submitted. (Please select only one)

Life and Physical Sciences ([download forms](#))

(The “download forms” link for the selected Component Area includes the ***Foundational Component Area Justification Form*** and the ***Student Learning Outcome Alignment Form***)

Checklist:

Course Proposal Cover Sheet
Foundational Component Area Justification Form
Student Learning Outcome Alignment Form

LIFE AND PHYSICAL SCIENCES

FOUNDATIONAL COMPONENT AREA JUSTIFICATION FORM

Rationale: Please provide a rationale for the course which explains how the course being proposed fits into this component based on the component's description. For your convenience, the overall description and rationale for this component are included below.

Life and Physical Sciences (from THECB Chapter 4: 4.28)

- Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method.
- Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.
- The following four Core Objectives must be addressed in each course approved to fulfill this category requirement: Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills, and Teamwork.
 - Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information;
 - Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication;
 - Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions;
 - Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

Rationale for Inclusion in this Category:

Pre-GIS is a course that teaches students how to gather and use data to describe, visualize and explain natural phenomena using the scientific method. For example, a student in Pre-GIS wanting to know whether a current bend in the river will eventually form into an Oxbow Lake will be taught how to gather current river bed data by recording GPS points. Second, the student will then determine the rate of erosion by recording GPS points of the river bed during the course of the semester. Third, using the methods taught in Pre-GIS, the student will plug those points into GIS software, and using spatial statistics will be able to determine the rate of erosion under the current water flow and predict at what point in the future the waterway will erode the bank enough to create an Oxbow Lake. The necessity of having Pre-GIS in the core curriculum isn't just about geology, as the example describes, rather, it is that this same scientific method using Pre-GIS tools and techniques can be used across disciplines. Students would be able to implement this same skill set in determining the rate of

melting glaciers in the Chilean Andes and their effect on the Gauchos grazing their cattle in the same basin, or the correlation between using chemical fertilizers upstream and algae blooms downstream.

Although geography is housed in the College of Liberal and Fine Arts at Tarleton State University, most of the work done using GIS is more related to the Life and Physical/Natural Sciences and STEM. Pre-GIS uses and teaches students to use technical instruments such as GPS units, GIS software, Satellites, Drones and Satellite/Drone imagery. The Pre-GIS course also has a lab requirement like the other core courses in Life and Physical/Natural Sciences. Therefore this course is being proposed as a core course in this area. It is proposed that we remove GEOG 2301: Geography of Texas from the core, and add Pre-GIS to the core in its place in the area of Life and Physical/Natural Science.

The importance of including Pre-GIS into the core curriculum at this point in time is due to the popular rise in GIS use across disciplines, especially in the life and natural sciences. GIS is predicted to be the 5th fastest growing occupation in the U.S. over the next several years. It is becoming a "core" source of knowledge that students will need to not only be successful but to also have an advantage over other job applicants in the future job market.

Instructions for the Student Learning Outcomes Alignment Form

The core objectives that are listed are those that must be addressed in each course in this category. You can add additional as you wish, however you may not delete any that are listed.

You may choose to use your own student learning objectives for the course as long as they somewhat match those adopted at Tarleton which are those shown. If it is a stretch to see how they fit, they may get rejected.

Make sure the learning activities and means of assessment match the objectives. Perhaps embedded multiple choice questions may not be useable to grade oral communication. If you are going to use a rubric to grade an essay then please include it with your submission.

STUDENT LEARNING OUTCOME ALIGNMENT FORM
Life and Physical Sciences

Course Prefix/Number: Geog 1451 – 010/510

Course Title: Pre-GIS: GPS, VGI & CARTOGRAPHY

Core Objective: Critical Thinking CT1: Students will be able to evaluate evidence in analysis, interpretation or arguments

Course SLO(s): Students will *identify*, and *spatially conceptualize* a natural phenomenon, and logically argue for the use of geospatial techniques in addressing the problem

Learning Activities: Students will be introduced to the basics of mapping and GIS through the use of GPS instruments, analyzing satellite imagery, and preparing computer models for 3D printing.

Means of Assessment: This student and learning objective will be assessed using a research proposal. Students will develop a proposal that justifies the use of geospatial techniques in addressing a natural phenomenon.

Core Objective: Critical Thinking CT2: Students will be able to synthesize varied components of information to form a rational conclusion.

Course SLO(s): Students will *design* geospatial technical approaches that can be used in synthesizing the various components of the problem identified in SLO 1

Learning Activities: Students will be introduced to relevant geospatial techniques that are used in solving spatial problems through GIS computer software, lectures, labs, and fieldwork exercises.

Means of Assessment: This student and learning objective will be assessed through lab exercises and assignments. Students will include in their proposal, relevant geospatial techniques that would be used in addressing the identified problem in SLO 1. Students will have hands-on practice of relevant geospatial techniques in GIS with cumulative lab exercises.

Core Objective: Communication C1: Students will express ideas in written, visual or oral forms to a range of diverse audiences in multiple settings.

Course SLO(s): Students will present findings from analyzing and interpreting field data with oral presentations and written reports embedded with high quality maps that addresses the problems.

Learning Activities: Students will be introduced to the science and art of map making using a GIS software in lectures, labs, and fieldwork exercises.

Means of Assessment: This student and learning objective will be assessed through a map creation and presentation assignment. Students will design and produce high quality maps that communicate effectively to their audience and that will be embedded in their reports and oral presentation.

Core Objective: Empirical and Quantitative EQS1: Students will gather, interpret or use numerical data/observable facts to arrive at an informed conclusion.

Course SLO(s): Students will gather relevant spatial data with a GPS, interpret the data and use GIS to spatially analyze the data to solve the problem identified in SLO 1

Learning Activities: Students will gather relevant geospatial data with a GPS, and apply relevant geospatial techniques in interpreting and analyzing the data in GIS through lectures, labs, and fieldwork exercises.

Means of Assessment: This student and learning objective will be assessed through a research/report assignment. Student will include in their reports, conclusions arrived at from analyzing and interpreting the field data that were collected.

Core Objective: Teamwork TW1: Students will work in coordination to complete specific tasks.

Course SLO(s): Students will work together as a team to collect GPS data and form data layers that will be posted in the course online geospatial data repository. Together the teams will create a full GIS data bank comprised of various layers.

Learning Activities: Students will be introduced to team work practices in GIS by gathering volunteer geographic information (VGI) through GPS units and WebGIS using crowdsourcing techniques and OpenStreetMap.

Means of Assessment: This student and learning objective will be assessed through a team work assignment activity. Students will be assigned areas to work on by group.

Students will be graded based on the amount and quality of geographic data that is contributed to the repository.

As department head, I will ensure that all faculty that teach this course are aware of the requirements that these core objectives and learning strategies be incorporated into the above referenced course. This action is taken so that Tarleton State University will be in compliance with Texas Higher Education Coordinating Board foundational component area and core objective requirements for the General Education Core Curriculum.

Signature _____

A handwritten signature in blue ink, appearing to read "Kelly Lemmons", is written over a horizontal line.

We, the undersigned faculty, support the proposed changes to this course and agree to incorporate them into our section of the above referenced course. This action is taken so that Tarleton State University will be in compliance with Texas Higher Education Coordinating Board foundational component area and core objective requirements for the General Education Core Curriculum.

(Signed document should be kept in department office, listing names below on the electronic document implies acceptance)

Dr. Kelly Lemmons
Dr. Opeyemi Zubair