

METROPOLITAN STATE COLLEGE OF DENVER
Office of Academic Affairs

REGULAR COURSE SYLLABUS

School of Letters, Arts & Sciences

Department: Earth and Atmospheric Sciences

Semester(s) Offered: Spring

Prefix & Course Number: GIS 2710 Crosslisted With*: N/A

Course Title: Global Positioning Systems

Credit Hours: 2 (1+2)

Contact Hours: Lecture 15 Lab 30 Internship _____ Practicum _____

Schedule Type(s): B Grading Mode(s): L

Repeat* (Variable topics): _____

*(Pertinent only if the course can be repeated; enter maximum number of hours that can be earned by taking this course.)

Restrictions (Variable Topics Course): _____

Prerequisite(s): GEG 1220
C or better in prerequisite courses
Or permission of instructor

Corequisite(s): _____

Prerequisite(s) or Corequisite(s):

GIS 2250 recommended

Catalog Course Description: This course is an introduction to the science of land navigation using maps and a Global Positioning System (GPS). Students will navigate positions in the field, and apply cartographic principles to GPS lab and field exercises. Emphasis will be given to the integration of GPS data with Geographic Information Systems (GIS).

Required Reading and Other Materials will be equivalent to (Title, Author, Publisher, Copyright Date):
No text required

Specific (Measurable) Student Behavioral Learning Objectives:

Upon completion of this course the student should be able to:

1. plot courses on maps of various scales;
2. convert representative fractions to working units;
3. understand celestial positioning;
4. use a compass for field location;
5. convert magnetic readings to true and vice versa;

APPROVED:

Department Chair/Institute Director	Date
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Associate VP, Academic Affairs	Date
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*If crosslisted, attach completed Course Crosslisting Agreement Form

Prefix and Course Number: GIS 2710 ____

6. locate hidherself via map inspection;
7. locate hidherself via resection and triangulation;
8. locate spatial information using latitude and longitude, UTM (Universal Transverse Mercator), and other grids;
9. calculate ETA (Estimated Time of Arrival) for various routes;
10. become familiar with the workings of a GPS (Global Positioning System) unit;
11. use GPS for navigation; and
12. use a computer to plot a GPS course.

Detailed Outline Of Course Content (Major Topics and Subtopics) **or Outline Of Field Experience/Internship** (experience, responsibilities and supervision):

- I. Topographic Maps
 - A. Representative fractions and map scales
 - B. Contour lines and intervals
 - C. Grid systems
 1. Township and range
 2. Latitude and longitude
 3. UTM (Universal Transverse Mercator)
 4. State
- II. Celestial Positioning
 - A. Use of sextant
 - B. Role of chronometers
 - C. Solar noon sights
 - D. Polaris sights
- III. Compasses
 - A. Declination: True versus magnetic headings
 - B. Azimuths versus quadrant readings
 - C. Correcting versus un-correcting calculations
- IV. Global Positioning Systems (GPS)
 - A. The satellite constellation
 - B. Estimated position error
 - C. Plotting of latitude and longitude
 - D. Plotting of UTM coordinates
- V. Field Exercises
 - A. Dead reckoning and position estimation
 - B. LOP'S (Lines of Position) and triangulations
 - C. Calculation of ETA (Estimated Time of Arrival) and ETE (Estimated Time En Route)
 - D. GPS treasure hunt
- VI. Computer Exercises
 - A. Downloading waypoints to a computer
 - B. Uploading waypoints to a GPS unit
 - C. Converting GPS files to DXF format

Evaluation Of Student Performance:

1. Class Participation
2. Written Examination
3. Field Examination