

GSC 350: Field Techniques in the Geosciences

Instructor: Team taught (George Kipphut, coordinator) **Office:** 357 Blackburn Science
Department: Geosciences **Phone:** 270-809-2408
Office Hours: variable by instructor **Email:** gkipphut@murraystate.edu
Class meets: Friday, 1:30–4:20 PM + 3 Saturdays (9:00AM-3:00PM)
Classroom: 347 Blackburn Science **Credits:** 3

I. COURSE TITLE: Field Techniques in the Geosciences

II. CATALOG DESCRIPTION: An introduction to the variety of field techniques utilized by geoscientists in the geologic, environmental, and archaeological fields. Emphasis is placed on techniques of field surveying and mapping; locational assessment utilizing Global Positioning Systems; orienteering with compass and topographic map; basic descriptive field geology; soil sampling and description; remote and direct hydrologic assessment; and land cover/land use mapping. Field trips will be taken to locations of geologic or environmental significance to the region. 3 Saturday field trips required. *Prerequisite:* junior status or permission of the instructor.

III. PURPOSE: To provide geosciences students with a hands-on overview of the field techniques used routinely by geoscientists in fields such as geology, environmental geology, water science, and geoarchaeology. Various procedures and techniques are utilized to collect data concerning land forms, geology, soil, streams, and land utilization. Students will learn how to collect data in the field and convert it into digital format for use in Geographic Information Systems.

IV. COURSE OBJECTIVES: At the end of this course, students will be able to:

- A. Set up and use a total station to establish datums and grids;
- B. Navigate between points using a compass and map;
- C. Use Global Positioning Systems to navigate and locate position;
- D. Sample, profile, and texture soils for environmental interpretation and analysis;
- E. Take basic geologic measurements in the field, including strike and dip;
- F. Sample and interpret water, stream and soil quality;
- G. Use a data collector to gather pertinent weather data
- H. Convert field data into digital formats.

V. CONTENT OUTLINE:

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| A. Introduction to Field Research | F. Hydrology & Fluvial Geomorphology |
| B. Field Mapping & GPS | G. Weather & Climate data collection |
| C. Geophysical Prospecting | H. Land Cover & Land Use Mapping |
| D. Descriptive Field Geology | I. Converting field data into digital formats |
| E. Soil Sampling, Profiling, & Texturing | |

V. COURSE OUTLINE: NOTE: days in bold are required Saturday trips (9am-3pm)

DATE	TOPIC	TECHNIQUES	Location	Instructor(s)
Mar 4	Introduction to Field Research Field Mapping <ul style="list-style-type: none"> Map Reading & Orienteering 	Compass Topographic Maps	BL 347 MSU	Staff Busby
Mar 11	Establishing location with GPS	GPS	MSU	Yorke?
<i>Mar 18</i>	<i>NO CLASS—SPRING BREAK</i>			
Mar 25	Geophysical Surveying	Flux Gradiometer GPR	TBD	Ortmann
Apr 1	Visit to USGS stream gauge station		Murray	USGS Kipphut
Apr 8	Hydrology <ul style="list-style-type: none"> Watershed characterization Stream characterization 	Discharge Wetland Delineation	HBS	Kipphut
Apr 9	Field Mapping <ul style="list-style-type: none"> Topographic mapping Establishing Datums & Grids 	Total Station Transit Brunton/Jacob Staff	Wickliffe or LBL	Wesler
Apr 15	Fluvial Geomorphology &/or Fluvial Habitat Assessment		Clarks River or Bee Creek	Keen-Zebert? &/or Homsey
Apr 16	Weather & Climate <ul style="list-style-type: none"> Wind speed/direction Temperature & humidity Solar radiation Soil temperature 	Data collection Data logger	HBS	Hong
Apr 22	Soils <ul style="list-style-type: none"> Soil Profiling Textural & Nutrient Analysis 	Soil Probe & Auger Munsell Color Chart	HBS	Homsey
Apr 23	Fossil Collection (OPTIONAL)		Parsons	Homsey
Apr 29	Land Cover and Land Use <ul style="list-style-type: none"> Interpretation & mapping Ground truthing 	Aerial photography Satellite imagery GPS	Murray	Jane Benson Robin Zhang
Apr 30	Descriptive Field Geology <ul style="list-style-type: none"> Strike & dip Estimating slope & object height Stratigraphic cross sections 	Brunton Compass Geologic Quads Clinometer	Shawnee National Forest	Homsey
May 6	Converting Field Data into Digital Formats Conclusion to Field Research	ArcView ArcGIS	MSU MSU	Jane Benson Robin Zhang Staff

VI. INSTRUCTIONAL ACTIVITIES: Generally, we will briefly meet in the classroom to organize the day's activities. We will spend the remainder of the class meeting in the field.

VII. FIELD, CLINICAL, AND/OR LABORATORY EXPERIENCES: Every class meeting will be spent in the field or in the lab. **Most days class will convene by our regular ending time of 4:20PM; however field trips to more remote locations may not convene until 5:30PM. There will be 3 required Saturday trips to more remote locations than we can access during class.** Since we will be in the field every day, come properly dressed for field work. This includes sturdy, closed toed shoes, long pants, hat and sunglasses. Bring plenty of water, bug spray, and sunscreen. Also, bring lunch as we will not always be close enough to town to purchase food. Each instructor will give you further instructions.

VIII. RESOURCES: Materials and equipment in the MSU Geology Collections, the Mid-America Remote Sensing Center (MARC), and the MSU Archaeology Laboratory. Students will want to buy a sturdy notebook or field book for use in the field. **Check Blackboard frequently as this is our primary means of communication with you.**

IX. GRADING PROCEDURES: **Grades are contingent upon participation in ALL activities; failure to do so will result in a failing grade.** Daily projects will be worth 10 points each; the faculty member instructing each project will grade the final result, such as map or field skill. Your final grade calculated by dividing your total points by the total number of points possible. No portfolios will be collected after the last day of class. Grades will be assigned on a percentage basis: 90-100 = A, 80-89.9 = B, 70-79.9 = C, 60-69.9 = D, below 60 = E.

X. ATTENDANCE POLICY: Since this class only meets once per week **attendance is expected at ALL class meetings. Students should also be prepared to stay until 5:30 on days in which travel is required to and from field locations.** Unexcused absences may result in a failing grade for the course.

XI. ACADEMIC HONESTY POLICY: Cheating and/or plagiarism are NOT permissible at any time. You are encouraged to work in groups, but your answers must be in your own words. We will go after those suspected of copying and a zero will be given for those assignments. A second offense will result in a failing grade for the course.

XII. TEXT AND REFERENCES: There is no textbook for this course.

XIII. PREREQUISITES: Junior status or permission of the instructor.

XIV. NON-DISCRIMINATION POLICY STATEMENT: Murray State University endorses the intent of all federal and state laws created to prohibit discrimination. Murray State University does not discriminate on the basis of race, color, national origin, gender, sexual orientation, religion, age, veteran status, or disability in employment, admissions, or other provision of services and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford individuals with disabilities equal access to participate in all programs and activities. For more information contact Director of Office of Equal Opportunity, 103 Wells Hall. 270-809-3155 (voice), 270-809-3361 (TDD).