

Master Syllabus
Department of Geography

GEOG 101: Earth, Sea and Sky: A Geographic View

Course Description

Selected aspects of the physical environment and their relationships to the human occupancy of the earth. Regularly scheduled laboratory. (3 credit hours).

Course Objectives

Learning objectives of GEOG 101 are detailed below. Methods employed by instructors of GEOG 101 include—but are not limited to—laboratory exercises, in-class assignments, in-class discussion periods, textbook readings, utilization of geospatial technologies such as GIS, written exercises, and analyses of primary and secondary source material. The GEOG 101 course objectives meet the UCC-21 cognitive skills. Students completing GEOG 101 will be able to:

- **Define** the key terms, concepts, and principles of physical geography
- **Explain** the earth and its systems within the context of environmental sustainability
- **Recognize** and **assess** the effects that humans have on the environment (and the environment on humans) and **apply** theory to **predict** how changes in human behavior will impact the environment (and vice versa)
- **Identify** the spatial patterns that exist within the earth's physiographic spheres
- **Demonstrate** skills in critical thinking on issues related to the physical-human interactions (e.g. global warming and climate change, groundwater depletion, soils and agriculture)
- **Identify** the methods and techniques used by physical geographers
- **Describe** the scientific method
- **Explain** how wind, water, ice, and radiative energy act as agents of geographic change
- **Apply** known principles of physical geography to data and **analyze** information
- **Communicate** geographic knowledge graphically, symbolically, orally, and/or numerically

Course Rationale for Inclusion of Geography 101 in UCC-21

Earth, Sea, and Sky: A Geographic View (GEOG 101) is well positioned to further the goals and intentions of the Natural Sciences domain within UCC-21. GEOG 101 engages the student learner by instilling in her or him an understanding of the earth through examining and synthesizing the physical earth systems—climatic, geomorphic, biologic—which impact (and are impacted by) the presence of humans. As a

geography course, GEOG 101 offers a uniquely spatial perspective. To attain this understanding, students move from Experience (E) to Information (I) to Knowledge (K). To transfer student learners along the shift from E to I, instructors of GEOG 101 ask them to consider the natural aspects of the planet they live on—and interact with (E)—and place those interactions within the context of physical facts (I). These facts are, then, examined with respect to their own experiences. To advance them from I to K, the students examine their assembled facts and observations; they inspect these data and query them, investigating the existence (or conspicuous lack thereof) of spatial patterns, analyze the data to determine whether biases exist, combine information from various sources to solve a problem; these and other skills enable our student learners to “make sense” of data and to better comprehend the earth.

The transformation from E→I→K is accomplished and assessed by myriad avenues and techniques. The **transformation** is discussed in detail below.

E→I

To move the student learner from experience to information, instructors utilize numerous skills employed by practitioners in the natural sciences. In GEOG 101, the importance of observation to construct or develop information about the earth and its systems is accomplished by ways including the following:

- a. **Describing** the earth and its systems within the context of the scientific method
- b. **Comprehending** the importance of evidence by recording observations or acquiring data from existing sources (e.g. topographic maps, Geographic Information Systems [GIS] files, remotely sensed imagery) or other methods typically employed by natural scientists, including physical geographers
- c. **Understanding** the roles that experimentation, observation, and theory play in physical geography
- d. **Utilizing** various techniques to describe the connections and interplays between the myriad phenomena on earth
- e. **Comprehending** the importance of measurement tools
- f. **Critiquing** and **assessing** the validity and relevance of data and of the methods employed

Cognitive skills assessed are:

- Describing the scientific method
- Explaining the importance of observation, experimentation, and theory as tools
- Procuring data and explaining how these data become information

These skills are developed within the context of learning about the earth and its physical geography.

I→K

To continue to meet the goals of UCC-21, students move from information to knowledge by advancing, critiquing, querying and interpreting the information gathered in the first part of the transformation (E→I). Here, the students derive meaning from their information, as part of the transformation into true knowledge.

- a. **Constructing** and **organizing** a structure of observations, utilizing verbal, graphical, symbolic, and numerical languages
- b. **Investigating** either independently or with other student learners to acquire and create new knowledge
- c. **Analyzing** the data to discern whether or not expected spatial patterns exist
- d. **Describing** and **explaining**, using the scientific method, the generation of knowledge

Cognitive skills assessed are:

- Organizing observations and data into knowledge constructions
- Communicating knowledge constructions via graphic, verbal, symbolic, and/or numeric languages
- Investigating information to create new knowledge
- Integrating geospatial data from different sources to examine spatial patterns

These skills are developed within the context of learning about the earth and its physical geography.

Sample Performance Outcomes for Experience to Information to Knowledge Transformations

Students exhibit their understanding of the subject in various ways. They gather data and subsequently interpret that data to produce knowledge, which they share and disseminate in diverse ways; these include (but are not limited to) individual and collaborative laboratory assignments, oral presentations, and in-class exercises or problem-based quizzes. Students also demonstrate their abilities to utilize the relevant data, discern whether potential information biases exist, place the information into an organized (and interpretable) structure, and identify spatial patterns that are meaningful. Such demonstrations may take several forms, including the construction of scientific graphs, generation of data tables, interpretation of map data, and GIS analyses. By moving from Experience to Information to Knowledge, students in GEOG 101 develop the skills necessary to interpret the earth and its systems in a way that is important and meaningful.

Course Content Outline and Format

Course instructors for GEOG 101 typically follow a format similar to that which is detailed below. Because GEOG is taught by multiple instructors, there may be some deviations from this format (e.g. the order of topics may differ).

Introduction to Geography

- What is Geography?
- Physical and Human Geography
- Geographic Techniques and Methods
- The Scientific Method
- Geographic Foundations
- Latitude and Longitude
- Maps, Projections, Scales, Units
- Earth-Sun Relations
- Time

The Atmosphere

- The Atmosphere—Structure and Composition
- Radiation and the Energy Balance
- Heat and Temperature
- Winds and the Global Circulation
- Weather Systems—Air Masses, Cyclones, Fronts

Atmospheric Hydrosphere and Climates

- Atmospheric Moisture and Precipitation
- Water and the Hydrologic Cycle
- Condensation and Adiabatic Processes
- Global Distribution of Climates
- The Soil Water Balance
- Groundwater

The Lithosphere

- Structure of the Earth and Plate Tectonics
- Tectonic and Volcanic Landforms; Earthquakes
- Weathering and Mass Wasting
- Surface Hydrology and Fluvial Geomorphology
- Arid Landforms and Rock Structure
- Oceans, Coasts and Shorelines
- Glaciers and Glacial Landforms

The Biosphere

- Biogeography
- Biomes and Ecosystems
- Terrestrial Flora
- Zoogeographic Regions
- Soils

The course format comprises lectures (with in-class discussions and question-answer sessions), weekly laboratory meetings and assignments, and in-class exercises and other activities.

Laboratory exercises serve as an integral component (and complement) to the lecture portion of the course. GEOG 101 instructors meet annually to discuss the content of the course and the corollary laboratory exercises. The exercises are selected based on content common to all instructors.

Laboratory topics covered are:

- The Scientific Method as a Tool for Investigation
- Latitude and Longitude
- Time—Solar (Sun) and Standard Time
- Earth-Sun Relationships
- Topographic Map Interpretation
- Logical Contouring and Profile Construction
- The Weather Station Model
- The Polar Front Storm and Weather Maps
- Differential Heating of Land and Water
- Adiabatic Heating, Adiabatic Cooling, and Orographic Precipitation
- Köppen Climate Classification System
- Water Balance
- Soil Testing
- Biomes
- Landforms
- Remote Sensing and the Environment
- North American Physical Geography

Assessment of Student Learning Outcomes

Student learning outcomes for GEOG 101 are assessed in a variety of ways. Both content and cognitive skills are evaluated. Methods of assessment include:

- Laboratory exercises
- In-class exercises

- Multiple-choice examinations
- Essay and other written assignments
- Problem-based examinations
- Oral presentations
- Evaluation of artifacts (especially for teacher education)

Course instructors for GEOG 101 employ various methods to assess the progress and understanding of their student learners. The following tables are not exhaustive; rather, they detail **some** of the methods of assessment employed by the various GEOG 101 instructors. Instructors may utilize their own creativity to assess the learning outcomes of their student learners in ways not identified in the following tables.

| Experience → Information (E→I) | |
|---|---|
| <i>UCC-21 Cognitive Skills</i> | <i>How Cognitive Skills are Assessed in GEOG 101</i> |
| Describe the scientific method and the earth and its systems (within the context of the scientific method) | <ul style="list-style-type: none"> • In-class exercises (discussion-based or written) in which learners describe what is and isn't based on the scientific method • Multiple-choice examination questions which query students in a meaningful manner on the scientific process • Relevant videos addressing the earth's systems (from which discussion-based exercises and quizzes will be generated) |
| Explain the importance of observation, experimentation, and theory as tools to comprehend the earth's physiography | <ul style="list-style-type: none"> • In-class exercises (discussion-based or written) based on the roles played by observation, experimentation, and theory • Laboratory exercises • Outside written assignments engaging students in the differences between observation, experimentation, and theory and how one may move between observation and theory |
| Procure data (by observation or by using an existing data source) and explain how these data become information | <ul style="list-style-type: none"> • Laboratory exercises • Usage of geospatial technology (e.g. GIS) to download and describe data • Homework assignments |

| Information → Knowledge (I→K) | |
|--|---|
| <i>UCC-21 Cognitive Skills¹</i> | <i>How Cognitive Skills are Assessed in GEOG 101</i> |
| Organize observations and data into knowledge constructions within the scientific method and communicate these using graphic, verbal, symbolic, and/or numeric languages | <ul style="list-style-type: none"> • Laboratory exercises • Assignments which ask students to construct graphs, tables, or sets of equations or other relationships to construct knowledge from existing information • Problem-based examinations and quizzes |
| Investigate (independently or with fellow student learners) information to create new knowledge | <ul style="list-style-type: none"> • Laboratory exercises completed alone or with student partners • Homework assignments • In-class exercises that ask students to derive conclusions to geographic questions using instructor-delivered data • Exercises asking students to use geospatial technology (remotely sensed imagery, GIS) to ascertain the presence or absence of expected spatial patterns |
| Integrate data from various sources and use geospatial and other tools to determine whether spatial patterns exists | <ul style="list-style-type: none"> • Laboratory exercises • Homework assignments requiring students to gather data and analyze this information for spatial patterns • In-class activities utilizing GIS overlay analyses to identify patterns of natural phenomena (e.g. precipitation, wind direction) • Class projects which ask students to gather data over the course of a given time period (e.g. semester) and to make conclusions based on potentially changing patterns over time |

WISER+ Designation

There are no WISER+ designations for GEOG 101.

Course Assessment

The assessment of GEOG 101 as a course (as opposed to the direct assessment of student learning outcomes) is founded on two methods: embedded questions (within multiple-choice examinations) and evaluations of laboratory exercises and examinations.

Test questions are embedded into the exams given by the various instructors. These are selected by the committee of GEOG 101 instructors, who choose the questions that address material copied by all instructors (because several faculty teach GEOG 101, there may be some slight deviations among the instructors). The responses, both correct and incorrect, are tallied and records kept to assess whether students comprehend GEOG 101 material and to determine (by the responses) whether the course addresses the UCC-21 goals. Appraisals of the results will be done by the committee of GEOG 101 instructors.

Evaluations of laboratory exercises and laboratory examinations also constitute part of the GEOG 101 course assessment. Student grades for exercises and exams are recorded and tracked each semester; these are then analyzed as a whole. This information is then examined to determine whether the learning goals and outcomes are being met.

These assessment methods further the UCC-21 goals by analyzing whether GEOG 101 moves students along the $E \rightarrow I$ and $I \rightarrow K$ continuum. While students are assessed individually, the aggregated information (embedded questions and grouped laboratory exams and exercises) allows the Department of Geography to determine whether the course meets the UCC-21 goals by establishing the performance of students as a whole. Should the goals be met, then GEOG 101 is, indeed, serving our students well. For example, examining the performance of the aggregated laboratory exercises permits us to see whether students are taking their own observations and placing them within the context of the scientific method ($E \rightarrow I$); further use of such data may involve the construction of scientific graphs and the interpretation of said graphs ($I \rightarrow K$). Embedded questions particularly address $I \rightarrow K$. We look to see that the majority of students performs satisfactorily, which then becomes an assessment of the course itself.

Faculty Qualifications for Domain Course

GEOG 101 is positioned within the Natural Sciences domain. All GEOG 101 instructors hold a master's or doctoral degree in Geography or a related discipline.

Supplemental Rationale or Other Statement

GEOG 101 serves as an artifact builder for Teacher Education.

Skills derived from the final (05/09/08) version of the Instructions for a UCC-21 Course Rationale: Natural Sciences Domain