Geography (GEOG)

GEOG 1000. Physical Geography (PS). 3 Hours.
Fulfills Physical Science General Education Requirement. Focuses on the physical dynamics of the natural environment, including atmosphere, lithosphere, biosphere, hydrosphere and their integrated patterns of global distribution. Successful completion enables students to be familiar with climates, landforms, soils, water, plants, animals and how they all interact to make up the surface of the earth, provide resources for society, and create natural hazards. One field trip required. GEOG 1005 OR GEO 2000R lab course recommended. Inclusive Access Course Material (electronic book) fees may apply, see Fees tab under each course section for details. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Demonstrate knowledge of the skills required to make informed personal and social decisions about the issues that we will face locally as well as globally. 2. Demonstrate knowledge of basic fundamental laws, concepts, and theories in the physical sciences and be able to apply them to everyday life. 3. Explain and apply the scientific method. 4. Demonstrate knowledge of the process of science by being able to utilize data in the form of tables, graphs, and charts through interpretation and then communicate those finding in oral and or written form. 5. Identify the various types of maps and charts used by geographers to help them better understand how earth's systems work together. 6. Identify and describe the functions of the four main subsystems of the earth. 7. Explain the various aspects of weather and climate and how they relate to the lithosphere and biosphere today as well as the future. 8. Explain the major internal and external processes that are acting upon the earth as well as the materials that make up the earth. 9. Identify and describe various landforms created by those processes. 10. Identify the various types of ecosystems that are the result of weather/climate - lithosphere/tectonic interactions. Course fee required. Corequisites: GEOG 1005. FA, SP, SU.

GEOG 1005. Physical Geography Lab (LAB). 1 Hour.
Lab portion of GEOG 1000. One field trip required. COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Create dichotomous keys to identify some of the major rock-forming minerals as well as the rocks in the three major groups. 2. Explain how relative and absolute dating methods work to determine the age of rocks. 3. Explain how the theory of plate tectonics is proposed based on different types of evidence. 4. Identify the different features of a topographic map. 5. Explain the geological processes that create the relief and grade the earth and identify various landforms created by those processes. 6. Explain the various aspects of weather and climate and how they relate to the other subsystems of Earth. 7. Identify the various types of ecosystems and understand how they are influenced by the climate. Course fee required. Corequisite: GEOG 1000. FA, SP, SU.

GEOG 1300. World Regional Geography. 3 Hours.
The study of different places, countries, and regions of the world. Addresses topics relating to natural environment, ethnic diversity, and regional differences in subjects related to culture, gender, age, class, social structure, spatial organization, and economic activities. Current social conditions within the world's major culture realms are analyzed and compared. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Understand and apply four key concepts -- location, place, link, and region -- to geographical issues of spatial organization. 2. Understand the language of maps -- scale, projection, symbolization -- and map types -- reference & thematic -- for use in problems of spatial analyses. 3. Understand and use basic ideas about basic physical-human processes that interact geographically in the world: environmental settings, population and settlement, cultural patterns, geopolitical frameworks, economic and social development. 4. Apply these concepts and understandings to describe and analyze the basic physical and human characteristics of a region. 5. Examine the global consequences of the basic physical-human geographic forces while understanding persistent geographic diversity. SP.

GEOG 2000R. Natural History of Zion National Park (LAB). 1 Hour.
Fulfills General Education Laboratory Sciences requirement. Provides an opportunity for students to study in a field-research setting and learn about the natural history of Zion National Park. Topics will include plants, animals, geology, environmental issues and human history. The class will be held over a 4-5 day period (overnight stays required). Repeatable up to 2 credits. Offered on sufficient student need. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Demonstrate an understanding of the time and processes necessary for geologic change. 2. Identify and demonstrate an understanding of the differences between plants found in the variety of ecosystems found in and near Zion National Park. 3. Identify and demonstrate an understanding of the differences between animals found in the variety of ecosystems found in and near Zion National Park. 4. Develop the ability to research an environmental issue in Zion National Park. Course fee required. FA, SP, SU.

GEOG 2990. Seminar in Geography. 0.5-3 Hours.
For students wishing instruction that is not available through other regularly scheduled courses in this discipline. Occasionally, either students request some type of non-traditional instruction, or an unanticipated opportunity for instruction presents itself. This seminar course provides a variable credit context for these purposes. As requirements, this seminar course must first be pre-approved by the department chair; second, it must provide at least nine contact hours of lab or lecture for each credit hour offered; and third, it must include some academic project or paper (i.e., credit is not given for attendance alone). This course may include standard lectures, travel and field trips, guest speakers, laboratory exercises, or other non-traditional instruction methods. Note that this course is an elective and does not fulfill general education or program requirements. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Demonstrate learning through original and creative ideas. 2. Collaborate with others to accomplish a shared purpose or goal. 3. Use appropriate strategies and tools to represent, analyze, and integrate seminar-specific knowledge. 4. Develop the ability to think critically about course content. 5. Apply knowledge from seminar to a range of contexts, problems, and solutions. Prerequisite: Instructor permission.

GEOG 3410. Paleoclimatology. 3 Hours.
This course examines the change to the Earth's environments during the last 800 million years (from Snowball Earth to the Anthropocene). Topics to be covered include the causes of climate change, evidence of natural and anthropogenic effects on the global systems (land, oceans, atmosphere), and the response of ecosystems to climate changes. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Differentiate the effects of CO2 and other greenhouse gases, orbital variation, and other natural and anthropogenic cycles, on the Earth's global climate. 2. Critique human activities (emissions/greenhouse gas production, farming practices, resource management) and their impact on global climate changes. 3. Identify the long-term cycles of the Earth in and out of icehouse and greenhouse phases, and the cycles of glacial and interglacial periods within icehouse phases. 4. Debate the concerns and proposed solutions about climate change, taking into consideration political and socioeconomic factors. Prerequisites: ENVS 1210 and BIOL 1610 (Both grade C- or higher). FA (even).

GEOG 3600. Introduction to Geographic Information Systems. 3 Hours.
Introduces the history, theory, and operation of Geographic Information Systems (GIS). Includes an introduction to GIS data sources, database design, data input, spatial analysis, and map production. Offers valuable preparation for careers in geology, geography, geographic information systems, geomatics, planning, surveying, marketing, environmental science, biology, engineering, and other related fields. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Describe the history, theory, and operation of Geographic Information Systems (GIS). 2. Give examples of GIS data sources, database design, data input, spatial analysis, and map production. 3. Articulate how GIS is used in for careers for geology, geography, geographic information systems, geomatics, planning, surveying, marketing, environmental technology, biology, engineering, and other related fields. 4. Explain the technical and theoretical aspects of GIS-based modeling. 5. Develop appropriate spatial and non-spatial data from various sources for use in GIS. Corequisites: GEOG 3605. FA, SP.

GEOG 3605. Introduction to Geographic Information Systems Laboratory. 1 Hour.
A laboratory component of GEOG 3600 to have experience working with GIS software, data sources, database design, data input, spatial analysis, and map production. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Demonstrate the technical skills of GIS to acquire, analyze, and visualize the results of geographic problem solving. 2. Describe the technical aspects involved in spatial data handling and analysis. 3. Develop appropriate spatial and non-spatial data from various sources for use in GIS. 4. Apply the GIS to a field of interest to solve real-world problems. Course fee required. Corequisites: GEOG 3600. FA, SP.

GEOG 3930. Remote Sensing of Landscape: China. 3 Hours.
This course will serve as an introduction to China's landscapes through a combination of field trip to China and remote sensing images interpretation and analysis in class. China is a massive country with a variety of amazing landscapes, and this course offers students a great active learning opportunity to study different landforms in China and explore the world using Remote Sensing. The coursework will be divided in to two parts: 1) The once-a-week lecture (1 hour/week) will introduce all the topics about the basics of landform, physical geography of China, principles of remote sensing, interpretation of aerial photograph and satellite image, and the introduction of the regions of interests (Guilin in China); 2) The ten-day field trip (planned for May) will include all the ground survey and hands-on activities like GPS positioning and landform identification led by the instructor and faculty from the host University in Guilin. For international travel, see studyabroad.utahtech.edu for additional travel costs that may apply. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Use data from remote sensing technologies to explain basic physical principles of remote sensing. 2. Develop an ability to read and interpret geology and geomorphology from air photos and satellite data. 3. Relate the geographic features on the aerial photograph or satellite images to the same feature on topographic maps and on the ground through interpretation. 4. Identify the local terrains of St. George area through aerial photograph and satellite image interpretation. 5. Apply the insights gained from examining local features to Remote Sensing data acquired over remote parts of China to produce a comparative assessment of land cover and land use. 6. Describe the basic understanding of the physical and human geography of China. SP.

GEOG 4140. Advanced GIS Analysis. 3 Hours.
This course is an introduction to advanced conceptual and technical problems associated with developing and working with relational databases, cartographic modeling techniques using vector and raster GIS software tools. The lab sections offer an opportunity to gain hands on experience using a leading commercial GIS to complete a series of real-world tasks. The lab and lecture are one and the same, and each week will consist of a presentation of concepts and background followed by a lab involving hands on GIS analysis. The last third of the course will consist of individual GIS application projects. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Demonstrate their technical knowledge and skills in the common tasks that geographic analysts face in applying a GIS to a variety of spatial problems and/or research questions. 2. Construct maps that can be shared with non-GIS users. 3. Demonstrate proficiency in the use of GIS tools to conduct spatial analyses and build maps that are fit-for-purpose and effectively convey the information they are intended to. 4. Formulate new analyses (unfamiliar to you) using GIS, troubleshooting problems in GIS, and seeking help from the GIS community to solve your problems. Prerequisites: GEOG 3600 and GEOG 3605 (Both Grade C or higher). Course fee required. FA.

GEOG 4180. Geoprocessing with Python. 3 Hours.
This course is an introduction to the basics of Python programming and how to use it with ESRI ArcGIS package. Broadly the course will cover: 1) principles and good practice in computer programming, 2) the Python language, 3) manipulating and analyzing geographic information with Python, 4) scripting with Python in ArcGIS Pro, and 5) Python toolkits for the web, databases, and Graphical User Interfaces (GUIs). The lab and lecture are one and the same, and each week will consist of a presentation of concepts and background followed by a lab involving hands-on programming or scripting. The last third of the course will consist of individual programming projects. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Recall the fundamental definitions and principles to program in Python. 2. Distinguish the inner workings of Python programs for geoprocessing. 3. Develop and code new algorithms for geographic data analysis in the Python language. 4. Develop and code Python scripts for geographic data analysis in ArcGIS. 5. Utilize Python to access a host of libraries for the web, databases, etc. Course fee required. Prerequisites: GEOG 3600 and GEOG 3605 (both grade C or higher). SP (even).

GEOG 4200. Geography of Utah. 3 Hours.
Explores human and physical phenomena that make Utah distinctive. Lectures examine webs of relationships among Utah's people, places, and environments. Students examine Utah's contrasting physical and social environments and explore what is meant by a sense of place. Offered upon sufficient student need. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Be familiar with most aspects of Utah today in the context of themes of geography and other social behavioral sciences. 2. Analyze components of the landscape including: bedrock versus sediment; evidence of surface and ground water; and classifications of major climatic and vegetation regimes and understand how these physical factors have influenced and continue to influence Utah's peoples. 3. Evaluate social and demographic patterns and interpret census data, urban plans, and population pyramids. 4. Understand relationships among Utah's people, places and environments, past and present. 5. Anticipate and better understand how webs of relationships among physical, behavioral, and social conditions will undoubtedly influence their own choices and their futures.