ENVS S102 – Earth and Environment (Cross-listed as GEOG 102)

Upon successful completion of this course, students will be able to:

1. Describe the fundamental workings of the atmospheric, hydrospheric, lithospheric, and oceanic systems of Earth
2. Explain the interactions between these Earth systems
3. Describe the basic geophysical methods used to monitor these Earth systems.
4. Solve basic analytical problems related to these Earth systems.
5. Quantify and describe key environmental parameters in meteorology, climatology, hydrology, and geomorphology using relevant field and laboratory methods.

ENVS S110 – Introduction to ArcGIS (Cross-listed as GEOG 110)

Upon successful completion of this course, students will be able to:

1. Correctly use GIS terminology and describe what it means to think of the world in spatial terms
2. Describe a GIS framework, its capability and its limitations
3. Acquire and compile data, conduct basic analyses and construct maps with ArcGIS, the commonly used GIS software today.
4. Design and execute an independent GIS project.

ENVS S111 – Introduction to Differential GPS (Cross-listed as GEOG 111)

Upon successful completion of this course, students will be able to:

1. Explain the basic principles of how GPS functions, including differential correction
2. Demonstrate the use of various GPS units for purposes of navigation and data acquisition
3. Correctly transfer data to and from GPS equipment, including mapping of GPS data with a geographic information system (GIS).
4. Design and execute an individual GPS project.

ENVS S212 – Natural Hazards (Cross-listed as GEOG 212)

Upon successful completion of this course, students will be able to:

1. Differentiate between natural hazards and natural disasters.
2. Describe how human activities influence our relative safety while living on a tectonically dynamic planet.
3. List strategies for risk assessment and describe how mitigation plans are developed.
4. Identify methods used to collect data from specific natural disaster events.
5. Explain the simple mathematics and statistical methods used to analyze data from specific natural disaster events in determining recurrence intervals, the energy released by the event, and the cost of remediation.
6. Explain how results from the analyses of data from specific natural disaster events can be used in planning for mitigation for future occurrences.
7. List and describe how and where different types of natural hazards occur, and methods to better predict them and/or live with their inevitability.

ENVS S301 – Soil Science

Upon successful completion of this course, students will be able to:

1. Distinguish between the major and minor soil horizons and taxonomies;
2. Assess properties and evolution of soils as a function of location, geology, climate, topography, and land use;
3. Judge the relative strengths and weaknesses of soil management plans;
4. Describe the ecological role and influence of soil at local, landscape, and regional scales.

ENVS S302 – Glaciology

Upon successful completion of this course, students will be able to:

1. Describe fundamental glacial processes and interactions with the atmosphere, ocean, and solid earth.
2. Process and analyze basic glaciological data.
3. Critically read and discuss current glaciological literature.

ENVS S309 – Mobile GIS Technology and Applications (Cross-listed as GEOG S309)

Upon successful completion of this course, students will be able to:

1. Use Geographic Information Systems terminology correctly.
2. Describe a mobile-based Geographic Information Systems platform, its capability and its integration with desktop-based Geographic Information Systems technology.
3. Acquire and map geographical data using mobile and desktop Geographic Information Systems.
4. Design and execute an independent mobile Geographic Information Systems project.

Note: Covers both the 2 credit (ENVS S309) and 1 credit (ENVS S309A) options

ENVS S311 – Technical Writing for Science Majors

Upon successful completion of this course, students will be able to:

1. Participate actively in writing activities (individually and in collaboration) that model effective scientific and technical communication in the workplace.
2. Apply technical information and knowledge in practical documents for a variety of professional audiences (including peers and colleagues or management) and public audiences.
3. Demonstrate basic mastery of the unique qualities of the professional writing style including: sentence conciseness, readability, clarity, accuracy, previewing, objectivity, summarizing, and coherence.
4. Collect, analyze, document, and report research clearly, concisely, logically, and ethically; understand the standards for legitimate interpretations of research data within scientific and technical communities.

ENVS S338 – Introduction to GIS (Cross-listed as GEOG S338)

Upon successful completion of this course, students will be able to:

1. Use Geographic Information Systems technology and software proficiently.
2. Identify and utilize the terminology of Geographic Information Systems and basic cartography.
3. Explain how to acquire datasets and information for use in Geographic Information Systems.
4. Create digital maps as visual aids to communicate concepts.
5. Design, create and present a research poster in semi-professional setting.
6. Explain how Geographic Information Systems technology is used to support critical thinking and decision making.

ENVS S375 – Current Topics in Earth and Ecosystem Research

Upon successful completion of this course, students will be able to:

1. Analyze the state of the science on the topic of the course.
2. Discuss the limitations of that science as well as ways to advance the field.
3. Formulate additional hypotheses related to the topic and identify fruitful future research opportunities.

ENVS S406 – Remote Sensing (Cross-listed as GEOG S406)

Upon successful completion of this course, students will be able to:

1. Use remote sensing and Geographic Information Systems technology and software.
2. Describe the various forms of remotely sensed data, including aerial photography, satellite, and environmental-sensor data.
3. Identify, interpret, and measure physical and environmental features using remotely-sensed data and remote sensing software.
4. Apply remote sensing data to different scientific disciplines.

ENVS S407 – Snow Hydrology (Cross-listed as GEOG S407)

Upon successful completion of this course, students will be able to:

1. Explain the fundamental processes of the snow hydrologic cycle including: the formation of snow in the atmosphere, the development of seasonal snowcover on the ground, and the hydrological effects of snowmelt runoff.
2. Describe how seasonal snow-covers interact with and impact human activities and ecological processes.
3. Measure and describe fundamental properties of seasonal snow-covers including: energy balance characteristics, stability properties, and physical and stratigraphic characteristics.
4. Critique current research papers in snow hydrology.

ENVS S409 – GIS Jam: Projects in GIS and Remote Sensing (Cross-listed as GEOG S409)

Upon successful completion of this course, students will be able to:

1. Use Geographic Information Systems technology and software.
2. Conduct a Geographic Information Systems analysis to address a specific project or work-related need.
3. Incorporate Geographic Information Systems results into a specific deliverable product.

ENVS S410 – Advanced Geographic Information Systems (Cross-listed as GEOG S410)

Upon successful completion of this course, students will be able to:

1. Use geographic information technology proficiently in an analytical context.
2. Demonstrate proficiency with the terminology of geographic information systems, geodesy and technical cartography.
3. Acquire, process, and map datasets accurately in geographic information systems.
4. Carry out a research project with geographic information systems-based, analytical objectives.
5. Design, create and present a research poster in a semi-professional setting.

ENVS S411 – Specialized Training in GIS Software (Cross-listed as GEOG S411)

Upon successful completion of this course, students will be able to:

1. Demonstrate advanced proficiency with Geographic Information Systems technology and software.
2. Use online/distance training as a resource for learning Geographic Information Systems.

ENVS S414 – Biogeochemistry (Cross-listed as GEOG S414)

Upon successful completion of this course, students will be able to:

1. Describe and contrast the biological and geochemical mechanisms that control the carbon, nitrogen, phosphorus, sulfur, and mercury cycles in terrestrial and aquatic ecosystems at scales ranging from the plot to the globe.
2. Explain the influence of the human species on Earth's major biogeochemical cycles.
3. Describe contemporary research techniques that are used to quantify and evaluate the cycling of carbon, nitrogen, and phosphorus at the watershed scale.
4. Critically read and discuss current research papers in biogeochemistry.

ENVS S415 – Biogeography and Landscape Ecology (Cross-listed as GEOG S415)

Upon successful completion of this course, students will be able to:

1. Describe the foundational concepts and theories of landscape ecology
2. Discriminate between different hierarchical scales in ecological drivers
3. Explain the importance of differential spatial landscape patterning
4. Apply spatial patterning theory to disturbance and management scenarios in natural landscapes.

ENVS S422 – Earth's Climate System

Upon successful completion of this course, students will be able to:

1. Interpret systems, equilibrium points, tipping points, and feedbacks.
2. Describe Earth's energy budget and its impact on the atmosphere and oceans.
3. Create simple models of the Earth system that include feedback loops and nonlinearities.
4. Critically read and discuss current research papers in Earth system science.

ENVS S430 – Forest Ecosystems

Upon successful completion of this course, students will be able to:

1. Describe the characteristics of major forest ecosystems around the globe, including their climate, disturbance regime, and structural composition.
2. Describe major nutrient cycling pathways in forests and their interaction with tree/animal species, as well as broad differences and similarities in those pathways between forest biomes.
3. Calculate carbon sequestration rates for forest types, utilizing current literature for carbon stock and flux estimation.
4. Discuss major current practices and trends in exploitation/use of forest ecosystem services by management.

ENVS S431 – Forest Field Ecology Lab

Upon successful completion of this course, students will be able to:

1 Describe how to measure the basic structure and function of forest ecosystems utilizing biomass estimation tools, PAR meters, lasers/GIS, and other appropriate structural equipment and calculations.
2 Identify common plant species in southeast Alaska and discuss their ecology and function in relation to the variables measured in the class.
3 Describe the basic soil structure of forests via soil pits.
4 Calculate basic forest growth metrics and relate to historical climate utilizing tree ring methods.

ENVS S491 – Environmental Science Internship

Upon successful completion of this course, students will be able to:

1 Demonstrate professional behavior in a work environment.
2 Provide evidence of meaningful participation in an advisor-approved project within a science agency or natural resource based industry.

ENVS S492 – Environmental Science Seminar

Upon successful completion of this course, students will be able to:

1. Critically evaluate the fundamental elements of scientific research projects including: spatial and temporal sampling considerations, basic statistical design, and elements of effective data collection.
2. Interact professionally with visiting scientific researchers including: providing introductions, asking relevant questions, and participating in scientific discussions.

ENVS S496 – Juneau Icefield Research Program

Upon successful completion of this course, students will be able to:

1. Describe fundamental glacial processes as they relate to the Juneau Icefield.
2. Design and execute an original research project.
3. Analyze and present field observations.

ENVS S498 – Research in Environmental Science

Upon successful completion of this course, students will be able to:

1. Design, carry out, and report on a scientific research project in collaboration with a faculty mentor.
2. Apply appropriate lab and/or field methods to answer a specific research question.