Geographic Information Systems (GIS)

Geographic Information Systems (GIS) Classes

GIS 189 : GIS, Mapping, and Society

Credits: 3
Class Hours: 3 lecture
Prerequisites:
Qualified for ENG 100.
Description:
Geographic Information Systems (GIS) is a computerized system used to design, capture, store, manipulate, analyze, manage, and present geographically referenced information or data. It combines cartography, statistical analysis, and databases to manipulate spatial areas for a given application. This introductory course will cover the use and application of GIS combining an overview of general principles of GIS and practical experience in the analytical use of spatial information. Students will gain an overall knowledge of GIS, analyze the social context of mapping and knowledge production, examine the diverse range of GIS applications, and complete a final project with a practical component involving the use of an analytical software package: ArcGIS by ESRI (Environmental System Research Institute).
Semester Offered: Fall, Spring
Designation: Diversification: Social Sciences — DS

Course Student Learning Outcomes (CSLOs):

1. Identify the advantages and disadvantages of geospatial information technologies in relation to geographic and social representation of place.
2. Analyze and discuss sustainability planning in relation to GIS and advanced mapping technologies.
3. Describe and analyze basic geospatial information technologies including GIS, GPS (Global Positioning Systems), and Remote Sensing.
4. Identify, analyze, and describe geographic applications using GIS technologies in multiple disciplines, including environmental science, marine science, anthropology, health, agroecology, and landscape ecology, among others.
5. Explain and illustrate concepts, techniques, and software tools of GIS with emphasis on geovisualization, data management, geospatial analysis, and case-study applications.
6. Analyze and identify political influences in human geography and mapping including the effects of the past on current maps.
7. Identify components of strategies for complex problem solving that include geospatial information using GIS.

GIS 200 : Interpreting and Creating GIS Maps

Credits: 3
Class Hours: 3 lecture
Prerequisites:
"C" or higher or concurrent enrollment in GIS 189.
Description:
This course introduces advanced geospatial analysis techniques, including Global Positioning Systems (GPS), Geographic Information Systems (GIS) database and overlay creation, data classification, location analysis, distribution and density, geovisualization techniques, and map interpretation through the use and application of GIS. This course will combine an overview of general principles of GIS and practical experience in the analytical use of spatial information. Students will gain greater in-depth knowledge of geospatial analysis and examine the social context of mapping and knowledge production, examine the diverse range of GIS applications, and complete a final project with a practical component involving the use of a geospatial analysis software package. Special emphasis and concentration will focus on sustainability, considering the current and future use and protection of resources in light of land management.
Semester Offered: Fall, Spring

Course Student Learning Outcomes (CSLOs):

1. Use advanced geospatial information technologies and techniques including Geographic Information Systems, Global Positioning Systems, and Spatial Analysis to create maps for an area of interest to the student, such as sustainability, site suitability analysis and resource management.
2. Analyze and describe geographic information representation and use of GIS mapping software, identifying how to address complex problems with GIS technologies and to create solutions. Special emphasis and concentration will focus on sustainability, considering the current and future use and protection of resources in light of land management.
3. Differentiate advantages and disadvantages of various geospatial information technologies, both advanced and basic.
4. Apply concepts, techniques, and software tools that are part of Geographic Information Systems, with emphasis on GPS use, geovisualization, data and database development, geospatial analysis, and case-study applications.

GIS 205 : GIS Database Design and Programming

Credits: 3
Class Hours: 3 lecture
Prerequisites:
"C" or higher in GIS 189 and GIS 200.
Corequisite Courses: GIS 205L
Description:
This course will cover advanced compilation, database design, and production of maps, including the use of Global Positioning Systems (GPS), Geographic Information Systems (GIS), data export-to-CAD, research, presentations, and illustration using ArcGIS mapping software. Special emphasis and concentration will focus on sustainability, considering the current and future use and protection of resources in light of land management. Class includes a required lab.
Semester Offered: Fall, Spring

Course Student Learning Outcomes (CSLOs):
1. Describe and analyze advanced geodatabase design, including spatial analysis, topology, model building, and automated geospatial processing.
2. Analyze and describe geographic information representation and use of GIS mapping software, addressing complex geographic information problems with GIS technologies and creating solutions.
3. Analyze and identify advantages and disadvantages of various geospatial information technologies, both advanced and basic.
4. Apply concepts, techniques, and software tools that are part of advanced Geographic Information Systems, with emphasis on GPS use and data transformation, geovisualization, geodatabase construction and design, data modeling, topology, advanced geospatial analysis, and case-study applications.
5. Apply intermediate geospatial knowledge, technologies, and techniques to create a map focused on a particular application, such as sustainability, site suitability analysis, and resource management.
6. Apply strategies for complex problem solving that include geospatial databases, including using GIS, GPS, geo-database modeling, and automated geoprocessing.

GIS 205L : GIS Database Design and Programming Laboratory

Credits: 1
Class Hours: 3 lab
Prerequisites:
"C" or higher in GIS 189 and GIS 200.
Corequisite Courses: GIS 205
Description:
This course will cover the technical exercises of advanced compilation, design, and production of maps, including the use of Global Positioning Systems (GPS), Geographic Information Systems (GIS), research, presentations, and illustration using mapping software. Special emphasis and concentration will focus on sustainability, considering the current and future use and protection of resources in light of land management.

Semester Offered: Fall, Spring

Course Student Learning Outcomes (CSLOs):

1. Apply concepts, techniques, and software tools that are part of advanced Geographic Information Systems, with emphasis on GPS use and data transformation, geovisualization, geodatabase construction and design, data modeling, topology, advanced geospatial analysis, and case study applications.
2. Apply intermediate geospatial knowledge, technologies and techniques to create a map focused on an area of interest, such as sustainability, site suitability analysis, and resource management.
3. Describe and analyze advanced geodatabase design, including spatial analysis, topology, model building, and automated geo-spatial processing.
4. Analyze and identify advantages and disadvantages of various geospatial information technologies, both advanced and basic.
5. Apply strategies for complex problem solving that include geospatial databases, including using GIS, GPS, geo-database modeling, and automated geoprocessing.
6. Analyze and describe geographic information representation, addressing complex problems with GIS technologies and creating solutions.

GIS 213 : Advanced Geospatial Techniques

Credits: 3
Class Hours: 3 lecture
Prerequisites:
"C" or higher in GIS 205 and GIS 205L.
Description:
This course covers the applications of advanced Geographic Information Systems (GIS) technologies to various problems or issues in the social, natural, and environmental sciences. Remote sensing techniques, radar, and satellite imagery map design will be introduced along with an overview of current advances in geospatial technology, including 3D mapping, online, and cloud mapping.
Semester Offered: Fall, Spring

Course Student Learning Outcomes (CSLOs):

1. Identify the advantages and disadvantages of advanced remote sensing technologies.
2. Identify, analyze, and describe geographic information representation and use of advanced GIS mapping software, addressing complex geographic information problems with GIS technologies to create solutions.
3. Describe and analyze advanced geospatial radar and satellite imagery and techniques, in addition to industry advancements in cloud and 3D mapping.
4. Apply strategies for complex problem solving that include geospatial information, using GIS and GPS, Radar and Satellite Imagery, and Remote Sensing.
5. Apply intermediate geospatial knowledge, technologies, and techniques to create a map focused on an area of interest, such as sustainability, site suitability analysis, and resource management.
6. Apply techniques and software tools that are part of advanced Geographic Information Systems, with an emphasis on radar and satellite imagery, remote sensing, and earth observation systems.

GIS 214 : Practicum in GIS

Credits: 3
Class Hours: 3 lecture
Prerequisites:
"C" or higher in GIS 205 and GIS 205L.
Comments:
May be repeated for a maximum of 6 credits.
Description:
This course is a practicum that will assist students entering the Geographic Information Systems (GIS) job market through internship opportunities in applied geography under professional and faculty supervision. Field placement is integrated with academic study.
Semester Offered: Fall, Spring

Course Student Learning Outcomes (CSLOs):

1. Practice GIS, GPS, and Advanced Geospatial techniques in the field in an internship with an active organization or institution.
2. Analyze and identify future directions for employment and applied GIS work.
3. Identify concepts, techniques, and project planning in the application of GIS to local applications in Hawai'i.
4. Discuss strategies for complex problem solving that include geospatial information, using GIS and GPS.
5. Identify, analyze, and describe geographic information representation and use of GIS mapping software, addressing complex geographic information problems with GIS technologies, creating solutions to current and practical issues.