Farmingdale State College
STATE UNIVERSITY OF NEW YORK

Geographic Information Systems

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School of Arts & Sciences

Bachelor of Science Degree

Bachelor of Science degree in Geographic Information Systems (GIS) - This is an applied degree in geography and the spatial sciences that aims to generate workforce-ready graduates who are well trained in the technology, theory, and application of geographic information systems. The GIS program provides students with critical thinking skills such as analyzing, synthesizing, visualizing and evaluating data by way of digital maps and/or map imagery to solve problems related to urban and regional design, marketing and industrial location, transportation, agriculture, forestry, environmental systems, engineering, epidemiology, emergency services, crime analysis and utilities.
Completion of the degree would count toward the educational requirement for GISP (GIS Professional) Certification.
Typical Employment Opportunities

GIS Analyst
Geospatial Intelligence Analyst
Geospatial Application Developer
Urban and Regional Design
Agriculture Technology
Natural Resources Analyst
GIS Network Engineer
Epidemiology
Emergency Services
Crime Analysis
Utilities
Local and National Government
GIS Energy Anlayst
GIS Transportation and Logistics Analystp
Geographic Information Systems (BS) Program Outcomes:

- Graduates will utilize the scientific method and various informational and analytical tools for solving problems related to human and physical geography.
- Graduates will apply understanding of the importance of space and place in key issues facing contemporary society, combined with the ability use data to solve pressing problems in the environmental sciences, salesforce management, public health, public policy, etc.
- Graduates will debate, quantify, and qualify the interrelationships between human, physical, and biotic systems on the Earth's surface.
- Graduates will integrate spatial analysis into interdisciplinary research problems.
- Graduates will compose essays that: 1) cogently convey technical information retrieved through independent research; 2) rely on print and/or digital sources of a scholarly nature; and 3) are generally free of grammatical, spelling, punctuation and other errors.

Liberal Arts and Sciences	(42 credits)
EGL 101 Composition I: College Writing (GE)	3
EGL 102 Composition II: Writing About Literature	3
MTH 110 Statistics (GE)	3
American History (GE)	3
Western Civilization History (GE)	3
Humanities (GE)	3
Arts (GE)	3
Foreign Language (GE)	3
Natural Science (GE)	3
Mathematics (GE)	3
Liberal Arts & Sciences Technical Electives	6
Liberal Arts & Sciences Electives	6
Free Electives	(6 credits)
Required: Lower Division	(16 credits)
GEO 110 Maps and Map Analysis (GE)	3
GIS 231 Geospatial Research Methods	3
GEO 211 The World and Its Peoples (GE)	3
GIS 222 Geovisualization I	4
GEO 201 Physical Geography OR	
GEO 222 Human Geography	3
Required: Upper Division	(57 credits)
GIS 321 Geovisualization II	3
GIS 331 Spatial Analysis I	3
GIS 341 Geoprocessing I	3
GIS 342 Geodatabase Management	3
GIS 491 Senior Seminar OR	
GIS 492 Internship	3
Technical Electives 300-400 Level	21

Free Electives 300-400 Level	12
300-400 Level Liberal & Science Electives	9
Total Credits	121

Degree Type: BS
Total Required Credits: 121

Please refer to the General Education, Applied Learning, and Writing Intensive requirement sections of the College Catalog and consult with your advisor to ensure that graduation requirements are satisfied.

Notes:

Liberal Arts Technical Electives

GEO 201 Physical Geography

GIS 201 Mathematical Principles in Geography

GEO 222 Human Geography

GEO 231 Europe and Its Peoples

GEO 232 North America and its Peoples

GEO 290 Topics in Geography

Technical Electives 300-400 Level

GIS 301 GIScience

GIS 302 Remote Sensing

GIS 321 Geovisualization II

GIS 322 Geovisualization III

GIS 332 Spatial Analysis II

GIS 431 Spatial Analysis III

GIS 432 Location Modeling and Analysis

GIS 441 Geoprocessing II

GEO 330 Environmental Interactions

GEO 323 Urban Geography

GEO 325 Globalization and Sustainability

GEO 390 Special Topics

HIS 306 Transformation of America

HIS 310 Technology and Society Russia-1917-Present

HIS 335 Gender and Technology in Historical Perspectives

HIS 342 The History of Television

PHY 304 Big Data and Society

POL 370 International Relations

POL 371 Geopolitics

POL 320 Internet Politics

SOC 326 Visual Sociology

Course Descriptions

EGL 101 Composition I: College Writing (GE)
This is the first part of a required sequence in college essay writing. Students learn to view writing as a process that involves generating ideas, formulating and developing a thesis, structuring paragraphs and essays, as well as revising and editing drafts. The focus is on the development of critical and analytical thinking. Students also learn the correct and ethical use of print and electronic sources. At least one research paper is required. A grade of C or higher is a graduation requirement. Note: Students passing a departmental diagnostic exam given on the first day of class will remain in EGL 101; all others will be placed in EGL 097. Prerequisite is any of the following: successful completion of EGL 097; an SAT essay score (taken prior to March 1, 2016) of 7 or higher; an SAT essay score (taken after March 1, 2016) of 5 or higher; on-campus placement testing. Credits: 3

EGL 102 Composition II: Writing About Literature
This is the second part of the required introductory English composition sequence. This course builds on writing skills developed in EGL 101, specifically the ability to write analytical and persuasive essays and to use research materials correctly and effectively. Students read selections from different literary genres (poetry, drama, and narrative fiction). Selections from the literature provide the basis for analytical and critical essays that explore the ways writers use works of the imagination to explore human experience. Grade of C or higher is a graduation requirement. Prerequisite(s): EGL 101 Credits: 3

MTH 110 Statistics (GE)
Basic concepts of probability and statistical inference. Included are the binominal, normal, and chi-square distributions. Practical applications are examined. Computer assignments using Minitab form an integral part of the course. Prerequisite(s): MP2 or MTH 015 Credits: 3

GEO 110 Maps and Map Analysis (GE)
This course is an introduction to the study and design of map formats, symbology, coordinate systems, and how maps record the historical patterns of human behavior. The course will also examine maps as a tool to analyze human activity and societal development, and include important aspects of map data collection, processing, the Global Positioning System (GPS), quantitative mapping, and GIS-based mapmaking techniques. Note: Students who take GEO 110 may not receive credit for GIS 101 Credits: 3

GIS 231 Geospatial Research Methods
This course exposes students to the process of doing geographic research. Basic epistemological and ontological approaches will be reviewed through the use of readings on research methodologies and selected readings from the geography literature. Class discussion will focus on the identification of research problems, construction of hypotheses, and development of research design. The course will cover a variety of important contemporary geographic theories and will complete exercises to give students hands-on experience in completing qualitative and quantitative geographic research. Prerequisite(s): EGL 101, MTH 110 and Any 200-Level or Higher GEO course. Credits: 3

GEO 211 The World and Its Peoples (GE)
This course is an exploration of the rich diversity of cultures and societies of the contemporary world, as well as an introduction to world geography and how it has shaped major developments in global history. Critical readings of recent ethnography will be used to examine themes such as ethnicity and migration, rural life and traditionalism, and family and kinship. Students will also be familiarized with the growth of cities, demographic changes, the development of a leisure culture, and attitudes towards work as we survey the major world regions (Southern Asia, the Pacific Rim, Sub-Saharan Africa, North Africa and the Middle East, the Americas, Europe, and Oceania). Furthermore, we will examine the interaction between humans and their physical environment, interrogate the role of language on national identity among peoples, and trace the evolution of world religions. Credits: 3

GIS 222 Geovisualization I
Geographic information systems (GIS) are computer systems designed for the creation, storage, retrieval, analysis, and visualization of spatial data. GIS is applied across fields as diverse as urban planning, environmental management, law enforcement, industrial location, and marketing, and for scientific research in many disciplines. This course is a hands-on course with a required lab period which will introduce students to foundational concepts and skills in working with spatial data, including finding and creating data, spatial analysis, and GIS-based map production. This course is a prerequisite for several upper-level GEO courses. Prerequisite(s): EGL 101, GEO 110 Corequisite(s): GIS 221L Credits: 4

GEO 201 Physical Geography OR
This course introduces students to the study of the Earth as a system. We will cover the four major subsystems--the atmosphere, the hydrosphere, the lithosphere, and the biosphere--with a focus on the patterns and processes that shape the planet. The goal of the course is to provide students with a clear understanding of the complex and changing processes associated with physical geography, especially those which are important for solving environmental and economic problems associated with air, water, soil, flora, fauna, and other aspects of the natural world. Prerequisite(s): EGL 101 Credits: 3 This physical geography laboratory course can be taken as standalone (1) credit physical science lab or as accompaniment to the GEO201 Physical Geography course. This course introduces students to the study of the Earth as a system. This laboratory is designed to give an overview of the development, distribution, and interrelationships of landforms, climates, minerals, soils, and water resources. Prerequisite(s): EGL 101 EGL 101 with a grade of C or better Credits: 1

GEO 222 Human Geography

This course provides an introduction to human geography in its multiple forms: social, cultural, environmental, urban, economic, and political. Students will explore human interactions through the lenses of community, culture, and society. While the focus will be on human populations, there will also be discussions of how interaction with nature and the environment shape relationships through an analysis of the so-called "Man-Land Tradition." Globalization, cultural diversity, and migration will serve as important themes throughout the course. Prerequisite(s): Any 100-level HIS or POL course Credits: 3

GIS 321 Geovisualization II

Maps can be powerful devices for communication, but also tools for exploration of relationships among social and physical processes manifesting in space. This course explores the history, science, and art of cartography. Students will use geographic information systems software to make reference and thematic maps. Students will apply principles of cartography, including the use of color, typography, and visual balance, to create maps which are informative, aesthetically pleasing, and ultimately convincing. Prerequisite(s): GIS 222 Credits: 3

GIS 331 Spatial Analysis I

This course will cover statistical techniques for the analysis of spatial data, including spatial cluster detection, factor analysis, ANOVA, and multivariate regression. Special attention will be paid to spatial sampling and spatial autocorrelation. Students will complete computer exercises using statistical software. In addition to standard data visualization techniques (boxplots, histograms, scatterplots), students will learn how to create basic statistical maps for geovisualization. Prerequisite(s): MTH 110 Credits: 3

GIS 341 Geoprocessing I

This course introduces conceptual and practical aspects of programming for geographic applications. The main focus of this course is on developing a solid understanding of basic geoprocessing techniques including variables, looping, conditional statements, nesting, math, strings, and other concepts. Students in this course will develop a proficiency in applying these basic geoprocessing principles to manipulating spatial data sources within the Geographic Information Systems (GIS) environment. NOTE: This course are not substitutes for programming courses by the Computer Systems Department. Prerequisite(s): GIS 222 with a grade of C or higher Credits: 3

GIS 342 Geodatabase Management

GIS database management systems play an important role in domains that involve large and complex data with spatial references. This course is designed to give students an overview of GIS applications, an understanding of spatial and relational database concepts, and the practical experience of using GIS to solve real world problems. NOTE: This courses are not substitutes for programming courses by the Computer Systems Department. Prerequisite(s): GIS 222 with a grade of C or higher Credits: 3

GIS 491 Senior Seminar OR

Students integrate their knowledge of human and physical geography, as well as geographic techniques, to propose solutions to real-world problems. Students gain experience in working in small groups and in written and oral presentation of project results, and will be evaluated with respect to the skills acquired in their degree program. Topics may include, but are not limited to, issues such as sustainable development in rural communities, global and regional food and energy distribution, quantifying and analyzing global or regional indicators of environmental and/or societal trends. Prerequisite(s): Senior status and any 300 level GEO course. Credits: 3

GIS 492 Internship

This internship course will provide students the opportunity to gain hands on experience and knowledge with using geospatial technologies. This internship consists of a structured on and/or off-campus experience in a supervised setting that is related to the student?s major and career interests. Practical experience is combined with scholarly research under the guidance

of geography faculty and the entity providing the internship opportunity. At the end of the internship the student should have more of the necessary skills to help translate their chosen degree into a job, as well as a better understanding of how this degree relates to society. Prerequisite(s): Approval by Program Director or Student?s Dept. Chair Credits: 3