Fall 2020 Course Descriptions as of 04/05/2020 08:11 PM

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Geographic Info Systems Tech (GIST)

GIST 214: Introduction to Map Science (3 units)
Description: This course is intended to provide a comprehensive introduction to the use of maps and map-like images for communication, analysis, and decision support.. Students will learn to acquire, read and interpret visual representations of the earth. These scientific principles are required for advancement and understanding of all geospatial technologies including geographic information systems, global positioning systems, and remote sensing.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring

GIST 314: Cartographic Design and Production (3 units)
Description: Cartography is a fundamental tool of geography; it is also a science and art in its own right. Cartography uses principles of design, perception, statistics, and communication. This course introduces students to the design, production and interpretation of maps, a fundamental skill in GIST. Laboratory exercises give students additional experience with GIS-based skills, through the use of ArcGIS software.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring

GIST 315: GIST Programming I (3 units)
Description: This course is an introduction to the fundamentals of programming for Geographic Information Systems using Python. Students will be taught elements, methods and theories of scripting in Python including how to write and manipulate functions, loops, strings, lists, dictionaries, and classes with an emphasis on how to apply these tools to writing scripts in the ArcGIS environment. The only way to learn programming is by doing, and therefore this course is based on weekly coding assignments, supplemented by traditional readings and lecture materials that will build students' conceptual understanding of their burgeoning skills. Assessment will be based on weekly assignments, two midterm exams, and one in class presentation.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Lecture Required
Also offered as: GEOG 315
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring

Recommendations and additional information: An introduction to GIScience as well as an introduction to ESRI's ArcGIS is needed to understand the principle concepts.
Enrollment requirement: RNR 417

GIST 330: Introduction to Remote Sensing (3 units)
Description: Introduction to remote sensing principles, techniques, and applications, designed principally for those with no background in the field.
Grading basis: Regular Grades
Career: Undergraduate
Flat Fee: $50
Course Components: Laboratory May Be Offered
Lecture Required
Equivalent to: GEN 330, GEOS 330, SW 330, SWES 330, WSM 330
Also offered as: ENVS 330, GEN 330, GEOG 330, GEOS 330, WSM 330
Course typically offered:
Main Campus: Fall
Online Campus: Fall, Spring, Summer

Home department: School of Geography and Development
Student Engagement Activity: Discovery
Student Engagement Competency: Interdisciplinarity

-SA represents a Student Abroad & Student Exchange offering
-CC represents a Correspondence Course offering
May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

GIST 414: Web Mobile GIST (3 units)
Description: GIST 414 Web and Mobile Design is a required skills course for the BSGIST major. GIST 414 introduces students to the expanding field of web and mobile-based mapping applications development. Students will apply skills gained in GIST I and Programming I and II to learn how to build interactive web and mobile apps that use geospatial data in an attractive format.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Lecture Required
Also offered as: GEOG 414
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring

Enrollment requirement: GIST315 and RNR417/GIST417

GIST 415: GIST Programming II (3 units)
Description: This course builds upon the scriptwriting skills students learned in GIST 315. In this class, students will write scripts to automate workflows in ArcGIS and extend the tools already available in the ArcToolbox to achieve creative problem solving. Topics include using Python with Model Builder, preparing data as strings, lists, tuples, and dictionaries prior to use, using Python to run SQL queries, working with rasters in Python, automating mapping tasks, and developing custom scripting tools. In addition to weekly assignments and readings, assessment will be oriented around a single, student-directed project that will take the second half of the semester to complete. It will require students to write a simple script to accomplish a specified task in ArcGIS and present the results of their work to peers.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Lecture Required
Also offered as: GEOG 415
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring

Recommendations and additional information: GIST 315.

GIST 416E: Geovisualization (GIS) (3 units)
Description: Introduces principles and practices of Geovisualization (Geoviz) and softwares (Community and ERDAS Image).
Grading basis: Regular Grades
Career: Undergraduate
Flat Fee: $50

Course Components:	Laboratory	May Be Offered
	Lecture	Required

Equivalent to: RNR 416E
Also offered as: GEOG 416E, RNR 416E
Course typically offered:
Main Campus: Fall, Spring

Home department: School of Geography and Development
Enrollment requirement: GEOG/RNR 416A or RNR/GEOG 417.
Student Engagement Activity: Creative Expression
Student Engagement Competency: Diversity and Identity

GIST 417: Geographic Information Systems for Natural and Social Sciences (3 units)
Description: Introduction to the application of GIS and related technologies for both the natural and social sciences. Conceptual issues in GIS database design and development, analysis, and display.
Grading basis: Regular Grades
Career: Undergraduate
Flat Fee: $50

Course Components:	Laboratory	Required
	Lecture	Required

Equivalent to: GEOG 417, SW 417, SWES 417
Also offered as: GEOG 417, RNR 417
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring, Summer

Recommendations and additional information: Basic knowledge of computer operations.
Home department: Renewable Natural Resources

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GIST 418: Analysis of Geospatial Data (3 units)
Description: Introduction to spatial analysis and modeling techniques. Students will learn how to use calculate spatial measurement, apply spatial statistical methods, create surfaces, and develop spatial modeling. Assignments will allow students to apply the methods to various real world problems.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Lecture Required
Also offered as: GEOG 418, RNR 418
Course typically offered:
Main Campus: Fall
Online Campus: Fall

Home department: Renewable Natural Resources
Enrollment requirement: RNR/GEOG/GIST 417, and Statistics (MATH 163, or MATH 263, or SBS 200, or PSY 230, or equivalent).

GIST 420: Advanced Geographic Information Systems (3 units)
Description: Examines various areas of advanced GIS applications such as dynamic segmentation, surface modeling, spatial statistics, and network modeling. The use of high performance workstations will be emphasized.
Grading basis: Regular Grades
Career: Undergraduate
Flat Fee: $50
Course Components: Laboratory Required
Lecture Required
Also offered as: GEOG 420, RNR 420
Course typically offered:
Main Campus: Spring
Online Campus: Spring

Recommendations and additional information: RNR 417.
Home department: Renewable Natural Resources

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GIST 457: Statistical Techniques in Geography, Regional Development and Planning (3 units)
Description: Methods of gathering and analyzing data for the solution of geographical, urban, and regional planning problems, with emphasis on quantitative and statistical techniques used in spatial analysis and cartography, on the one hand, and program planning, on the other.
Grading basis: Regular Grades
Career: Undergraduate
Flat Fee: $50
Course Components: Laboratory — May Be Offered
Lecture — Required
Equivalent to: PLAN 457, PLG 457, PLN 457, PLNG 457
Also offered as: GEOG 457, PLG 457
Course typically offered:
Main Campus: Fall

Home department: School of Geography and Development

GIST 482: Integrated Geospatial Technologies (3 units)
Description: The course will cover resource mapping concepts and technologies. Students are expected to have a background in GIS and remote sensing. Topics will include survey methods (e.g. GPS), Internet Mapping Technologies (e.g. Google Earth), remoting sensing technologies such as LiDAR and digital imagery, classification methods, and data integration. Students will be required to complete an independent mapping project.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Lecture — Required
Also offered as: GEOG 482, RNR 482
Course typically offered:
Main Campus: Spring
Online Campus: Spring

Home department: Renewable Natural Resources
Enrollment requirement: RNR 417, GEOG 330, and GEOG/GIST 315.

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GIST 483: Geographic Applications of Remote Sensing (3 units)
Description: Use of aircraft and satellite imagery for monitoring landforms, soils, vegetation and land use, with the focus on problems of land-use planning, resource management and related topics.
Grading basis: Regular Grades
Career: Undergraduate
Flat Fee: $50
Course Components: Lecture Required
Equivalent to: PLAN 483, PLN 483, PLNG 483, RNR 483, SWES 483
Also offered as: ENVS 483, GEOG 483, PLG 483, RNR 483
Course typically offered:
Main Campus: Spring
Online Campus: Spring

Home department: School of Geography and Development
Enrollment requirement: GEOG/GEN/GEOS/ENVS/WSM/GIST 330.
Student Engagement Activity: Discovery
Student Engagement Competency: Interdisciplinarity

GIST 496: Applied GIS (3 units)
Description: Applied GIST emphasizes applied problem solving approach within the context of a student-directed project. Specific GIS skills covered including project planning, spatial data sources and acquisition, data compilation, coding, analysis, representation, and presentation of results. The course can be repeated for credit, as each course will examine a different urban or environmental issue in the natural and social sciences using geographic information systems technology.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Seminar Required
Repeatable: Course can be repeated a maximum of 2 times.
Also offered as: GEOG 496
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring

Enrollment requirement: RNR/GEOG/GIST 417.

GIST 498: Senior Capstone (3 units)
Description: A culminating experience for majors involving a substantive project that demonstrates a synthesis of learning accumulated in the majors, including broadly comprehensive knowledge of the discipline and its methodologies. Senior standing is required.
Grading basis: Alternative Grading: S, P, F
Career: Undergraduate
Course Components: Independent Study Required
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring

Enrollment requirement: Senior status only.
Writing Emphasis: Writing Emphasis Course

GIST 601: Intro to Geographic Information Systems & Tech I (6 units)
Description: This course will introduce the fundamental concepts of geographic information systems technology (GIST). It will emphasize equally GISystems and GIScience. Geographic information systems are a powerful set of tools for storing and retrieving at will, transforming and displaying spatial data from the real world for a particular set of purposes. In contrast, geographic information science is concerned with both the research on GIS and with GIS. As Longley et.al., notes (2001, vii) ¿GIS is fundamentally an applications-led technology, yet science underpins successful applications.¿ This course will combine an overview of the general principles of GIScience and how this relates to the nature and analytical use of spatial information within GIS software and technology. Students will apply the principles and science of GIST through a series of practical labs using ESRI¿s ArcGIS software.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Also offered as: INFO 601
Course typically offered:
Main Campus: Spring
Online Campus: Fall, Spring

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May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

GIST 601A: Geographic Information Science (3 units)
Description: This course will introduce the fundamental concepts of geographic information systems technology (GIST). It will emphasize equally GISystems and GIScience. Geographic information systems are a powerful set of tools for storing, retrieving, transforming and displaying spatial data from the real world for a particular set of purposes. In contrast, geographic information science is concerned with both the research on GIS and with GIS. As Longley et.al., notes (2001, vii) "GIS is fundamentally an applications-led technology, yet science underpins successful applications." This course will combine an overview of the general principles of GIScience and how this relates to the nature and analytical use of spatial information within GIS software and technology. Students will apply the principles and science of GIST through a series of practical labs using ESRI's ArcGIS software.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Fall, Spring
Online Campus: Fall, Spring

GIST 601B: Remote Sensing Science (3 units)
Description: This course provides an introduction to the scientific principles and practices of remote sensing. Topics that will be covered in this course include issues of spatial resolutions, the electromagnetic spectrum, remotely sensed sensors, spectral characteristics, digital and digitalization issues, multispectral and LiDAR image processing and enhancement, and land-use and land-cover classifications (LULC) and change detection. The course also emphasizes integration issues and analysis techniques that arise when merging remotely sensed data with geographic information systems (GIS).
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Fall, Spring
Online Campus: Fall, Spring

GIST 602A: Raster Spatial Analysis (3 units)
Description: This course exams the principles and practices associated with raster data development and analysis, particularly the development of real world surfaces and statistical analysis based on these surfaces. The course is presented in a lecture/laboratory format. The lecture portion will deal with conceptual issues necessary for the use of raster approaches within a GIS framework. The laboratory portion will provide practical experience with rasters in an ArcGIS environment.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Fall, Spring
Online Campus: Fall, Spring

GIST 602B: Vector Spatial Analysis (3 units)
Description: This course focuses on providing students with an introduction vector based spatial analysis and their application in GIS software. Students will learn about how to analyze distribution, direction, orientation, clustering, spatial relationships and processes, and how to render analytic outcomes into cartographic form. This course provides foundational knowledge of global positioning systems, data collection, geodatabase development, and georeferencing.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Fall, Spring
Online Campus: Fall, Spring

GIST 603: Advanced Geographic Information Systems & Tech I (6 units)
Description: This course focuses on providing students with an introduction to spatial statistics, spatial analysis and their application in GIS software, and GIS programming. Students will learn about descriptive spatial statistics, multivariate spatial statistics, and normality, how to analyze distribution, direction, orientation, clustering, spatial relationships and processes, and how to render analysis into cartographic form. GIS programming skills focus on calculating values needed for analyses, building models to perform repetitive tasks, and creating customized GIS interfaces.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Summer
Online Campus: Spring, Summer

GIST 603A: Geographic Information Systems Programming and Automation (3 units)
Description: The goal of this course is to gain an introductory understanding of geographic programming and data automation techniques using ModelBuilder and the Python language.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring, Summer

GIST 603B: WebGIS (3 units)
Description: The goal of this course is to gain an understanding of web mapping using applications like ArcGIS for Server, ArcGIS Online (AGOL), WebAppBuilder (WAB), web-enabled geoprocessing, Story Maps, AppStudio, and the Javascript API
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Fall, Spring
Online Campus: Fall, Spring

GIST 604: Advanced Geographic Information Systems & Tech II (6 units)
Description: This course focuses on the integration of remote sensing with GIS and advance spatial analysis techniques. Principles of remote sensing examined include digital and multispectral image processing and enhancement, georectification, spectral characteristics, and land-use and land-cover boundary detection. As remote sensing deals with raster based data, there will also be an emphasis on integration of remotely sensed imagery and analysis with vector based data within ArcGIS. This leads to integrative (raster/vector) based issues such as projection, scale, map overlay functionality, as well as analysis techniques that require the transformation of data (vector to raster, or raster to vector) to perform advanced spatial analysis. The advanced spatial analysis portion of the course examines Z-score evaluation, point pattern analysis, kernel density analysis, spatial interpolation methodology, map algebra, and error and uncertainty estimations.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Fall
Online Campus: Fall, Summer

GIST 604A: Applied Geographic Information Systems (3 units)
Description: This course focuses on an applied project GIS project that simulates a "real world" application of GIS towards a practical problem. On the first few nights in the course a specific geographic problem will be presented, data needed to address the problem will be reviewed, and key deadlines for the course will be set. No late assignments will be accepted unless circumstances are related to the course attendance policy. As this course simulates a business environment, deadlines must be met which will be used to evaluate your course grade and your progress toward completing the project on time. The first deadline requires two items to be evaluated: (1) a GIS database you will construct to address the geographic problem; (2) a review of your maps that will form the basis of your final presentation.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Fall, Spring
Online Campus: Fall, Spring

GIST 604B: Open Source GIS (3 units)
Description: The focus of this class is to examine and apply GIS open source programming. We will examine common languages used like Python, Java, html 5, as well as APIs, JSON, html, and SQL, to automate workflows, extend the tools, and create interactive web and mobile GS platforms. Topics include preparing data as strings, lists, tuples, and dictionaries prior to use, using Python to run SQL queries, working with roasters in Python, automating mapping tasks, and developing custom scripting tools. In addition to weekly assignments and readings, assessment will be oriented around a single, student-directed project that will take the second half of the semester to complete. It will require students to write a simple script to accomplish a specified task in ArcGIS and present the results of their work to peers.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Fall, Spring
Online Campus: Fall, Spring

GIST 909: Master's Project in Geographic Info Systems Tech (1 - 6 units)
Description: The Master's Project includes a formal report and presentation submitted in lieu of a Master's Thesis and reflects what a student has learned from the MS in GIST program. This course requires a student to formulate, design, implement and present results related to a specific normative and/or scientific geographic problem. This course will involve data capture, compilation and manipulation, and formulating methods and analysis to address a geographic problem in a given timeline. The geographic problem under investigation will require research to be completed out side of class in the form of field work, ground truthing, or background research in the library or through other sources. Your Master's Project can focus on subjects related to personal interests, work done through an employer or an internship, or work that is supervised by a faculty or staff members on campus.
Grading basis: Alternative Grading: S, P, F
Career: Graduate
Course Components: Independent Study Required
Repeatable: Course can be repeated for a maximum of 8 units.
Course typically offered:
Main Campus: Fall, Winter, Spring, Summer
Online Campus: Fall, Winter, Spring, Summer

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