Course Number and Title: GIS 120 Data Acquisition & Management

Campus Location:
Stanton

Effective Date:
2022-51

Prerequisite:
ENG 101, (MAT 183 or higher), GIS 101, SSC 100 or concurrent

Co-Requisites:
None

Course Credits and Hours:
3.00 credits
2.00 lecture hours/week
3.00 lab hours/week

Course Description:
This course addresses the interpretation of a variety of data formats available in global information systems (GIS). It introduces the fundamental concepts of primary GIS data creation and addresses quantitative techniques for collection, classification, management of geographical data, and publication of geospatial services.

Required Text(s):
Obtain current textbook information by viewing the campus bookstore - https://www.dtcc.edu/bookstores online or visit a campus bookstore. Check your course schedule for the course number and section.

Additional Materials:
This course requires the use of a windows computer capable of running ESRI ArcMap and ESRI ArcGIS Pro Software. Please review ESRI's website to learn more about the system requirements for ESRI ArcMap and ESRI ArcGIS Pro

Schedule Type:
Classroom Course
Hybrid Course
Online Course

Disclaimer:
None

Core Course Performance Objectives (CCPOs):

1. Explain the various procedures in data collection. (CCC 4, 5; PGC 1, 7, 8)
2. Collect, record, and edit spatial data. (CCC 2, 4, 5, 6; PGC 1, 3, 5, 7)
3. Create spatial data. (CCC 2, 3, 4, 5, 6; PGC 1, 3, 5, 7, 8)
4. Produce and manage a GIS database. (CCC 1, 2, 3, 6; PGC 1, 3, 5, 7)
5. Publish and maintain geospatial resources to a web service. (CCC 1, 2, 4; PGC 1, 3, 5, 6, 7, 8)
6. Demonstrate professional and ethical conduct, as expected in industry. (CCC 1, 3, 4; PGC 1, 7, 8)

See Core Curriculum Competencies and Program Graduate Competencies at the end of the syllabus. CCPOs are linked to every competency they develop.

Measurable Performance Objectives (MPOs):
Upon completion of this course, the student will:

1. Explain the various procedures in data collection.
    1. Identify the various types of data capture, such as surveying, remote sensing, LiDAR, scanning, and digitizing.
    2. Summarize the advantages and disadvantages to the various types of data capture.
    3. Distinguish between primary data sources and secondary data sources.
    4. Locate and classify publicly available data sources.
    5. Describe the concepts and applications of remote sensing, Global Positioning System (GPS), and other data collection technologies
    6. Describe the stages of data collection projects: planning, preparation, compiling, editing, and evaluation.
2. Collect, record, and edit spatial data.
    1. Describe the similarities and differences between data types, and how data is treated differently within each format.
    2. Define *data quality*, including *geometric accuracy*, *thematic accuracy*, *resolution,* and *precision*.
    3. Discuss the nature of geometry and its relationship to both topological and non-topological features.
    4. Explain how attributes are managed within a raster model to include the differences between integer and floating point values.
    5. Identify the significance of spatial reference systems and their impact on data interoperability.
    6. Convert data between different formats.
    7. Apply editing tools to create, validate, and modify geometry.
    8. Demonstrate the use of the topological editor in identifying and correcting errors in planar topology.
    9. Compute statistical measures of the accuracy of a digital data set.
3. Create spatial data.
    1. Use data acquired from public or private third-party sources.
    2. Create spatial data by digitizing scanned maps and/or images.
    3. Create spatial data from tabular data by means of geocoding.
    4. Compose primary spatial data using GPS, and anticipate common issues associated with GPS data collection.
    5. Create data in accordance with the National Standard for Spatial Data Accuracy.
4. Produce and manage a GIS database.
    1. Recognize the different types of spatial databases and their applications.
    2. Identify the components of a database management system and the various formats, such as hierarchical, network, and relational.
    3. Discuss database concepts such as replication, versioning, and archiving.
    4. Summarize spatial data workflows within multiuser work environments.
    5. Describe and apply best practices in data organization and management.
    6. Explain the purpose of metadata, standards, and infrastructure.
    7. Explain the purpose of a primary and foreign key, as well as simple and composite relationships.
    8. Demonstrate construction of joins and relates of feature classes.
    9. Employ advanced geodatabase features, including domains and subtypes in developing schemas and organizing data.
    10. Import and export an existing database schema.
5. Publish and maintain geospatial resources to a web service.
    1. Identify the different types of web services.
    2. Describe methods to access geospatial web services.
    3. Identify standards for geospatial web services.
    4. Describe the structure of a geospatial web service.
    5. Modify configuration settings for a geospatial web service.
    6. Publish data resources to geospatial web services.
6. Demonstrate professional and ethical conduct as expected in industry.
    1. Identify the need for self-discipline and time management in technical industries.
    2. Communicate and function effectively as a member of a team.
    3. Apply professional and ethical responsibilities under the GIS Certification Institute's Code of Ethics and Rules of Conduct.

Evaluation Criteria/Policies:
The grade will be determined using the Delaware Tech grading system:

90	–	100	=	A
80	–	89	=	B
70	–	79	=	C
0	–	69	=	F

Students should refer to the Student Handbook - https://www.dtcc.edu/handbook for information on the Academic Standing Policy, the Academic Integrity Policy, Student Rights and Responsibilities, and other policies relevant to their academic progress.

Final Course Grade:
Calculated using the following weighted average

Evaluation Measure	Percentage of final grade
Final Project Proposal (Summative)	10%
Final Project (Summative)	20%
Final Project Presentation (Summative)	10%
Final Project Presentation Peer Critique (Summative)	10%
Assignments - Labs, Homework, In-Class Activities, Discussion Boards (Formative)	50%
TOTAL	100%

Core Curriculum Competencies (CCCs are the competencies every graduate will develop):

1. Apply clear and effective communication skills.
2. Use critical thinking to solve problems.
3. Collaborate to achieve a common goal.
4. Demonstrate professional and ethical conduct.
5. Use information literacy for effective vocational and/or academic research.
6. Apply quantitative reasoning and/or scientific inquiry to solve practical problems.

Program Graduate Competencies (PGCs are the competencies every graduate will develop specific to his or her major):

1. Apply knowledge, techniques and skills of geography and geospatial technologies such as geographic information systems (GIS), Global Navigation Satellite System (GNSS), and remote sensing (RS).
2. Employ cartographic design principles to develop effective visual representations of geospatial data, including maps, graphs and diagrams.
3. Design and implement GIS systems using common geospatial software and hardware to acquire, store, manage, analyze and visualize spatial data for a variety of disciplines.
4. Utilize geospatial techniques and common analytical methods to solve problems.
5. Evaluate and employ effective data management and database design techniques.
6. Apply fundamental concepts of programming, application development, geospatial information technology and related technologies.
7. Integrate a commitment to address professional and ethical responsibilities, including a respect for accuracy standards and diversity.
8. Recognize the need for and an ability to engage in self-directed continuing professional development.

Disabilities Support Statement:
The College is committed to providing reasonable accommodations for students with disabilities. Students are encouraged to schedule an appointment with the campus Disabilities Support Counselor to request an accommodation needed due to a disability. A listing of campus Disabilities Support Counselors and contact information can be found at the disabilities services - https://www.dtcc.edu/disabilitysupport web page or visit the campus Advising Center.