



**COWLEY COLLEGE
& Area Vocational Technical School**

COURSE PROCEDURE FOR

**GEOGRAPHIC INFORMATION SYSTEMS DEVELOPMENT
CIS1765 3 Credit Hours**

Student Level:

This course is open to students on the college level in either the Freshman or Sophomore year.

Catalog Description:

CIS1765 – GEOGRAPHIC INFORMATION SYSTEMS DEVELOPMENT (3 hrs)

This course will prepare students for the ArcGIS Web Application Developer Associate certification. The topics will include creating various web apps for GIS and Python for Geoprocessing.

Prerequisites:

None.

Co-requisites:

None

Controlling Purpose:

This course is designed to prepare students to work with the ArcGIS software to control Geoprocessing and create web apps for GIS. These concepts provide a foundation for further courses in geographic information systems and preparation for the ArcGIS Web Application Developer Associate certification test.

Learner Outcomes:

Upon completion of the course, the student will be able to explain the following topics: creation of various web apps for GIS and use Python to control various aspects of Geoprocessing.

Units Outcomes and Clock Hours of Instruction for Core Curriculum:

The following outline defines the minimum core content not including the final examination period. Instructors may add other material as time allows.

Evaluation Key:

- A = All major and minor goals have been achieved and the achievement level is considerably above the minimum required for doing more advanced work in the same field.
- B = All major goals have been achieved, but the student has failed to achieve some of the

less important goals. However, the student has progressed to the point where the goals of work at the next level can be easily achieved.

- C = All major goals have been achieved, but many of the minor goals have not been achieved. In this grade range, the minimum level of proficiency represents a person who has achieved the major goals to the minimum amount of preparation necessary for taking more advanced work in the same field, but without any major handicap of inadequacy in his background.
- D = A few of the major goals have been achieved, but the student's achievement is so limited that he is not well prepared to work at a more advanced level in the same field.
- F = Failing, will be computed in GPA and hours attempted.
- N = No instruction or training in this area.

UNIT 1: Building Web Apps using ArcGIS Online						
Outcomes: Demonstrate knowledge to create a simple web app						
A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Prepare your data
						Create a web map
						Create a web app using a configurable app template
						Configure a web app
						Share a web app

UNIT 2: Web GIS Layers, Maps, and Apps						
Outcomes: Demonstrate the knowledge necessary to explain layers, maps, and apps for Web GIS						
A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Map CSV data using geocoding
						Edit data in the map viewer
						Configure layer style and pop-up
						Add images and charts to pop-up windows
						Use layers from the Living Atlas
						Create and configure a web app

UNIT 3: Hosted feature layers and volunteered geographic information

Outcomes: Explain the hosted feature layer and create an app to collect data

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Prepare the data
						Publish a hosted feature layer
						Define feature templates
						Use your layer in a web map and define editable fields
						Create a web app for data collection

UNIT 4: Story Maps and More Configurable Apps

Outcomes: Create apps using Compare Analysis, Story Map Swipe, Spyglass, and Story Map Journal

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Describe ArcGIS Open Data
						Map two variables with smart mapping
						Use Compare Analysis to create apps
						Use Story Map Swipe and Spyglass to create apps
						Use Story Map Journal to create apps

UNIT 5: Publishing Map Services with ArcGIS for Server

Outcomes: Describe the techniques of publishing map services with ArcGIS as well as administer the services

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Connect to a GIS server
						Author a map document
						Enable time on map layers
						Publish a map as a service
						Explore services using Services Directory
						Create a time-enabled web map and web app
						Administer web services

UNIT 6: Spatial Analytics and Geoprocessing Services

Outcomes: Create apps with selected analysis tools, Web AppBuilder, and the geoprocessing service

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Create a web app with selected analysis tools
						Perform analysis using the Web AppBuilder Analysis widget
						Design a geoprocessing model
						Run a model
						Publish the execution path as a geoprocessing service
						Explore your geoprocessing service in the Services Directory
						Create an app using the geoprocessing service

UNIT 7: Mobile GIS and Real-Time GIS

Outcomes: Use AppStudio to create an app to collect and monitor data

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Prepare your web map
						Collect data using Collector for ArcGIS
						Monitor live data in Operations Dashboard
						Create native apps using AppStudio for ArcGIS
						Install and test a native app

UNIT 8: 3D Web Scenes

Outcomes: Explain how to create a 3D scene using web scenes in the screen viewer

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Explore and create scenes in ArcGIS scene viewer
						Create a scene in ArcGIS Pro
						Share a web scene

UNIT 9: Introduction to ArcGIS API For JavaScript

Outcomes: Explain how to use JavaScript to interface with ArcGIS

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Understand the basics of 2D views and 3D views
						Adapt a 3D scene view sample
						Debug JavaScript and monitor HTTP traffic
						Combine a 2D view and a 3D view
						Handle JavaScript events

UNIT 10: Geoprocessing in ArcGIS

Outcomes: Explain how Geoprocessing is accomplished using the interface in ArcGIS

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Define geoprocessing
						Describe ArcObjects
						Use toolboxes and tools
						List types and categories of tools
						Run tools using tool dialog boxes
						Specify environment settings
						Use batch processing and scripting
						Use models and ModelBuilder
						Run scripts as tools
						Covert a model to a script
						Schedule a Python script to run at prescribed times

UNIT 11: Geoprocessing using Python

Outcomes: Explain how Geoprocessing is manipulated using Python

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Use the ArcPy site package
						Import ArcPy
						Use tools
						Work with toolboxes
						Use functions, classes, and environment settings

						Work with tool messages
						Run scripts as tools
						Covert a model to a script

UNIT 12: Exploring Spatial Data						
Outcomes: Explain how to traverse through spatial data using constructs in Python						
A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Check for the existence of data
						Describe and list data
						Use lists in for loops
						Work with lists, tuples, and dictionaries

UNIT 13: Manipulating Spatial Data						
Outcomes: Explain how to write programs to manipulate spatial data including cursors, SQL, and text files						
A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Use cursors to access data
						Use SQL in Python
						Work with table and field names
						Parse table and field names
						Work with text files

UNIT 14: Working with Geometries						
Outcomes: Explain how to write programs to manipulate geometry objects and geometries						
A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Work with geometry objects
						Read geometries
						Work with multipart features and polygons with holes

						Write geometries
						Use cursors to set the spatial reference
						Use geometry objects to work with geoprocessing tools

UNIT 15: Working with Rasters						
Outcomes: Explain how to write programs to control raster properties, raster objects, and the ArcPy Spatial Analyst module						
A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						List rasters
						Describe raster properties
						Work with raster objects and the ArcPy Spatial Analyst module
						Use map algebra operators, the ApplyEnvironment function, and classes of the arcpy.sa module
						Use raster functions to work with NumPy arrays

UNIT 16: Map Scripting						
Outcomes: Explain how to use Python to work with ArcPy mapping, data sources, maps, PDFs, and map books						
A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Work with the ArcPy mapping module
						Open and access map documents and their properties and methods
						Work with data frames, layers, and page layout elements
						Fix broken data sources
						Export and print maps
						Work with PDFs
						Create map books
						Use sample mapping scripts

Projects Required:

Varies, refer to syllabus.

Textbook:

Contact Bookstore for current textbook.

Materials/Equipment Required:

None

Attendance Policy:

Students should adhere to the attendance policy outlined by the instructor in the course syllabus.

Grading Policy:

The grading policy will be outlined by the instructor in the course syllabus.

Maximum class size:

Based on classroom occupancy

Course Time Frame:

The U.S. Department of Education, Higher Learning Commission and the Kansas Board of Regents define credit hour and have specific regulations that the college must follow when developing, teaching and assessing the educational aspects of the college. A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work for approximately fifteen weeks for one semester hour of credit or an equivalent amount of work over a different amount of time. The number of semester hours of credit allowed for each distance education or blended hybrid courses shall be assigned by the college based on the amount of time needed to achieve the same course outcomes in a purely face-to-face format.

Refer to the following policies:

[402.00 Academic Code of Conduct](#)

[263.00 Student Appeal of Course Grades](#)

[403.00 Student Code of Conduct](#)

Disability Services Program:

Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If a student has a disability which may impact work in this class and which requires accommodations, contact the Disability Services Coordinator.