



2022-2023 Three-Credit Hour Course: Computer Science Introduction to GIS

- ▶ **Audience:** *West Virginia Teachers/Educators and Administrators who have not completed the Basic Fundamentals of GIS Two-Credit Hour Course*
- ▶ **Type:** *Self-Paced with Rolling Enrollment*
- ▶ **Enrollment:** *September 1, 2022 - April 14, 2023*
- ▶ **Duration:** *September 1, 2022 - May 19, 2023*

Description: Welcome to Introduction to Geographic Information Systems (GIS). In this course, you are going to explore the many ways that GIS is used in today's society. In addition, you will gain a basic understanding of using a GIS, collect data to be included in a GIS, and create map products from a GIS. In this course, you will create a syllabus to guide instruction for the Introduction to a GIS computer science course. You will also collect artifacts of your own GIS instruction and accomplishments. The ultimate goal of this course is that you will learn technologies, tools, and lessons that you can use in teaching GIS to students.

Course Goals:

- ▶ *Demonstrate successful completion of five (5) prerequisite ESRI training courses.*
- ▶ *Identify how we think geographically every day with mental maps and to highlight the importance of asking geographic questions.*
- ▶ *Explain how the key concepts of location, direction, distance, space, and navigation are relevant to geography and geographic information systems (GISs).*
- ▶ *Define and describe how a geographic information system (GIS) is applied, its development, and its future.*
- ▶ *Define what a map is and describe reference, thematic, and dynamic maps.*
- ▶ *Describe and discuss the concepts of map scale, coordinate systems, and map projections, and explain why they are central to maps, mapping, and geographic information systems (GISs).*
- ▶ *Highlight the decision-making process behind maps and underscore the need to be explicit and consistent when mapping and using geographic information systems (GISs).*
- ▶ *Gain an understanding of the properties of color and how best to utilize them in your cartographic products.*
- ▶ *Understand how to best utilize point, line, and polygon symbols to assist in the interpretation of your map and its features.*
- ▶ *Familiarize basic cartographic principles that contribute to effective map design.*
- ▶ *Convert and prepare data for analysis.*
- ▶ *Create and populate a geodatabase.*
- ▶ *Add layers to a scene.*
- ▶ *Make layer groups to organize data.*
- ▶ *Configure GeoEvent connectors.*
- ▶ *Design and author real-time processing logic.*
- ▶ *Create a web map with real-time data.*
- ▶ *Learn how to administer an ArcGIS organization.*



- ▶ Understand the potential of ESRI Story Maps.
- ▶ Author story maps using interactive builders (Story Map app templates).
- ▶ Use geotagging photos in story maps.
- ▶ Add multimedia to a Story Map.
- ▶ Add images and photography to a Story Map.

Session Overviews

▶ **Session 1 – Basics of Online GIS**

During this session, you will be introduced to the essentials of Geographic Information Systems (GIS), and you will complete lessons specific to topics such as creating a map, finding patterns in a map, adding layers to a map, and configuring a web app. You will view Episode 1 of *The Geospatial Revolution* from Penn State and address information from this video in the session reflection. The course project, 18-week Computer Science – Introduction to GIS Course Syllabus, will be introduced along with the course project rubric. You will complete several sections of the syllabus during this session, submit your work for facilitator review, and complete a review of a sample syllabus. Complete certificates from two (2) prerequisite courses are due.

▶ **Session 2 - Getting Started Using Online GIS**

An online GIS is a powerful tool used in industries around the world. ArcGIS.com is the industry standard online GIS and will be the primary GIS used in this course. In this session, you will come to understand the basics of cartography (map-making) and put those basics to work using an online GIS. In two (2) exercises, you will demonstrate the power of GIS to make decisions for the future and to investigate the past. You will demonstrate your completion of two (2) prerequisite courses which are designed to help you to become better equipped to use an online GIS. You will use these tasks, readings, and videos to continue your final project as you develop a course syllabus for your own GIS course. Completion certificates from three (3) prerequisite courses are due.

▶ **Session 3 - Exploring the Possibilities of GIS**

There are so many possibilities when it comes to using GIS. A quick glance at the “Industries” tab on <http://www.esri.com> demonstrates that GIS is an integral part of just about every industry in the world today. GIS isn’t just about maps; it’s about enabling industries to be productive and efficient as they operate across town or across the globe. In this session, you will continue your reading about cartography and put that information to use as you use GIS to investigate a number of different applications of GIS in today’s world. You will use these tasks, readings, and videos on your final project as you develop a course outline for your own GIS course.

▶ **Session 4 – Scientific Application of GIS**

GIS is the perfect application for science. Science is about investigating the world around us, and there is no better tool to investigate our world than GIS. This week, you will use a GIS to investigate current earth processes that are active today and see how this scientific information can be brought to the public through a GIS, in a way that the public can understand. You will also investigate some current world issues and how GIS allows the data regarding those issues to be used to make decisions. You will use these tasks, readings, and videos on your final project as you continue to develop a course syllabus for your GIS course.



▶ **Session 5 – Collecting Data For GIS**

A GIS is nothing without data. When using a GIS, we do not want to use other people’s data – we want to collect our own. In this session, you will be learning about a powerful tool from ESRI called Survey123. Survey123 allows you to create a form (as simple as a Google form) that is geo-enabled, so that when those who take your survey give you information, they also tell you where the information was collected. This is a powerful tool for scientific, social, agricultural, or even industrial data collection. Best of all, the data is collected on smart phones and then shows up in your map! You will use these tasks, readings, and videos as you continue your GIS Course Project Syllabus.

▶ **Session 6 – Creating Story Maps and Presentations with GIS**

Maps that are not shared only benefit the creator of the map. Story maps are an effective tool to share both maps and content in an engaging, effective, and informative way. In this session, you are going to learn how to create story maps. You will then take this information and imagine ways to task your students with creating story maps of places they find to be important. Story maps have a multitude of uses and exploring them at <https://storymaps.arcgis.com> will surely be interesting! You will use these tasks, readings, and videos to complete your final project as you develop a course project and project rubric to accompany your GIS course syllabus.

Course Grades

All grades in the course gradebook must be a checkmark for successful course completion. A checkmark indicates that all work has been completed and the work meets the expectations for that assignment. Quiz scores must meet the minimum expectations as stated in the course.

