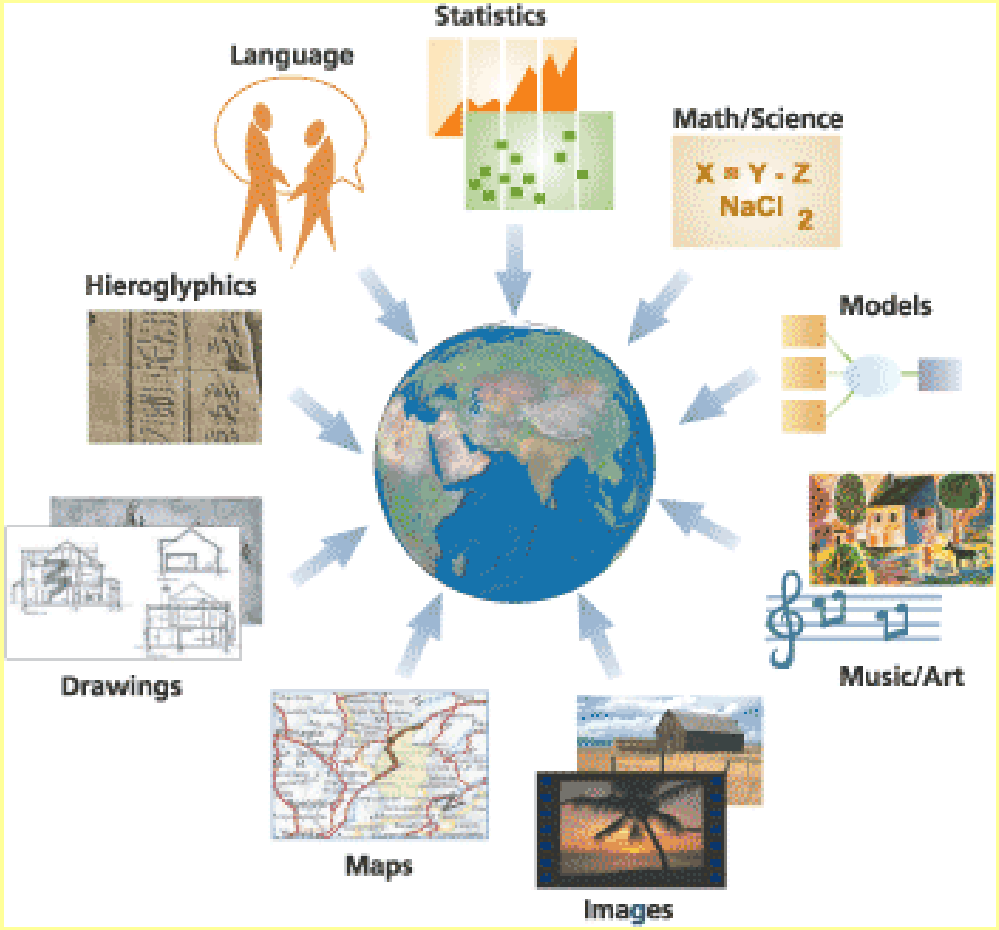
Detroit Public Schools – Youth Technology Corps
Saturday Academy
of
Geographic Information Systems and Geospatial Technologies



October 10, 2015

AGENDA

- INTRODUCTIONS
- NSF ITEST GRACE Program
- GRACE Project Video
- ESRI-WHITEHOUSE - GIS FOR ALL TEACHERS, STUDENTS AND SCHOOLS
- EMU STATEWIDE K-12 ESRI GIS SOFTWARE LICENSE
- ESRI Virtual Campus Intern Qualification Courses
- What is GIS?

GIS/T Resources & Applications for Career Education (GRACE)

GRACE 3-minute Video: http://resourcecenters2015.videohall.com/posters/555

Five thousand explorers, 2,500 investigators, **300 interns** and 120 teachers will receive GIS/T training.

The ConnectED initiative and ESRI

http://www.bloomberg.com/video/esri-pledges-1b-in-software-and-stem-education-3fLLiQ_9RkK8qebp3HpicA.html

Coordination with GIS ED Communities

ConnectED INITIATIVE

In June 2013, President Obama announced the ConnectED initiative, designed to enrich K-12 education for every student in America. ConnectED empowers teachers with the best technology and the training to make the most of it, and empowers students through individualized learning and rich, digital content.

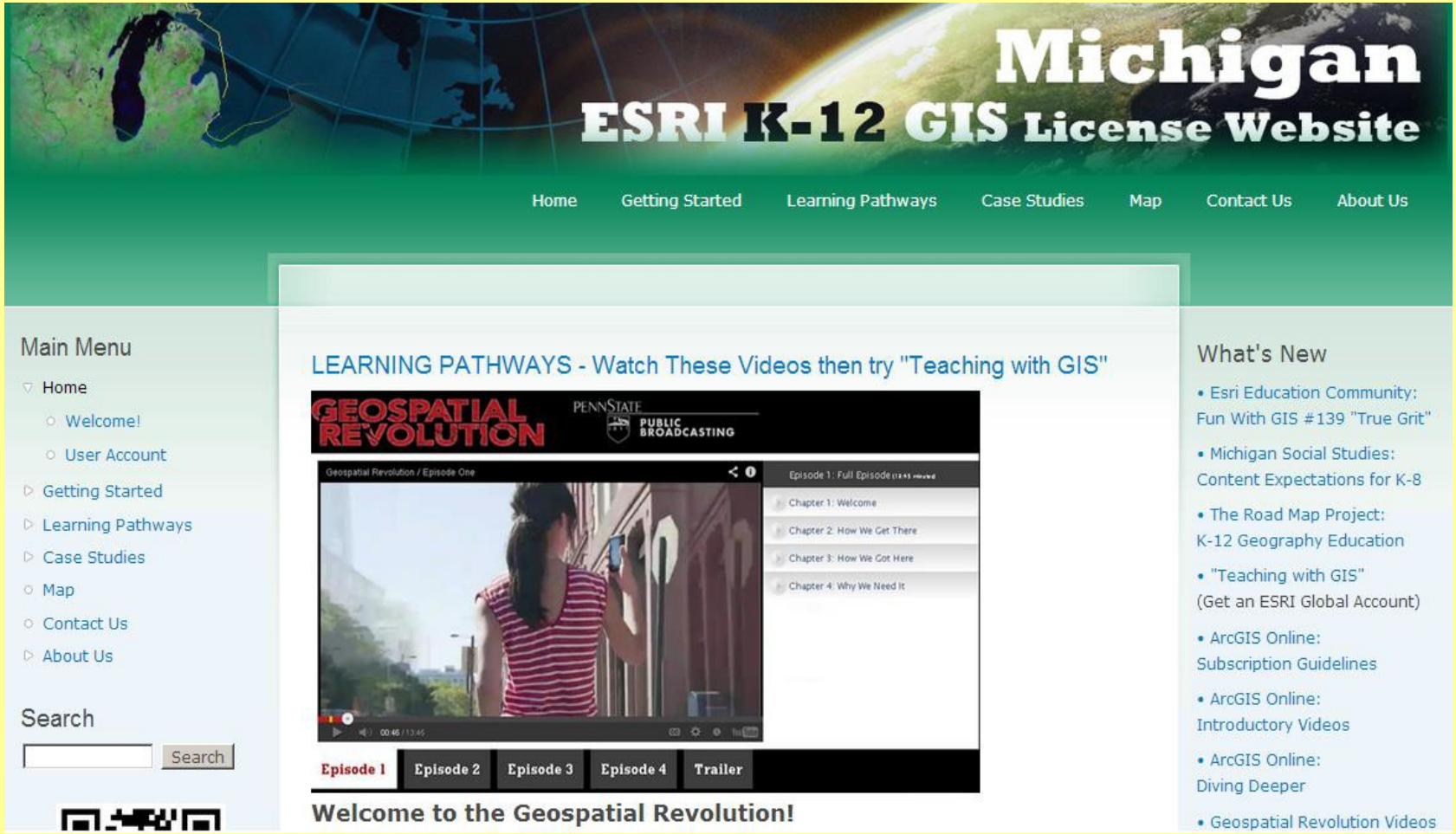
The ConnectED initiative and ESRI

http://connected.esri.com/

Michigan's K-12 GIS LICENSE GATEWAY

Your Portal to the Geospatial Revolution – through Eastern Michigan University

http://esrik-12gis.emich.edu/k12/



http://www.youtube.com/watch?v=poMGRbfgp38#t=20

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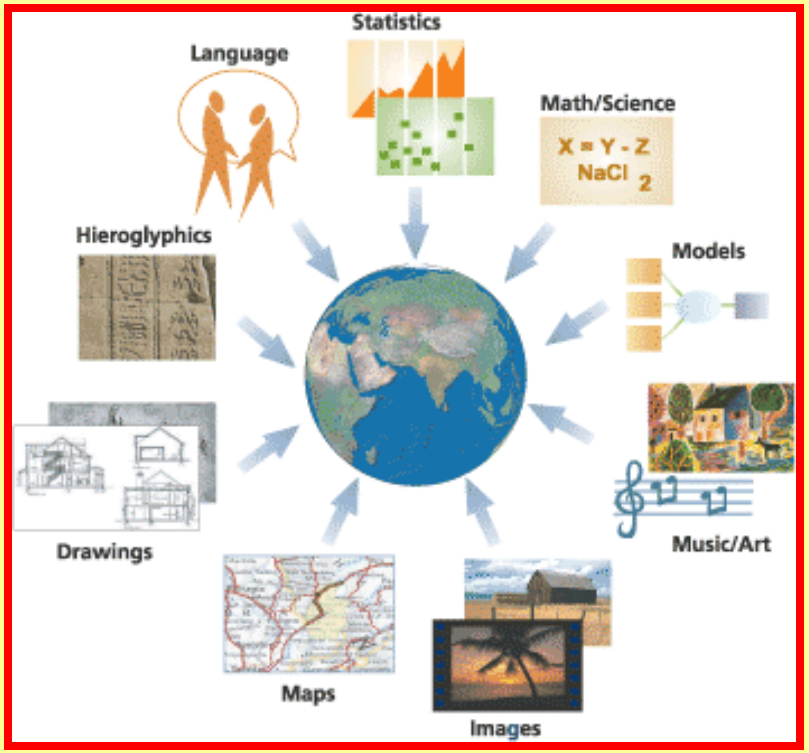
Enhancing STEM Education using GIS Technology

What is GIS?



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The Power of Mapping

- A geographic information system (GIS) lets us visualize, question, analyze, and interpret data to understand relationships, patterns, and trends.
- GIS benefits organizations of all sizes and in almost every industry. There is a growing interest in and awareness of the economic and strategic value of GIS.

Cost Savings from Greater Efficiency

- GIS is widely used to optimize maintenance schedules and daily fleet movements. Typical implementations can result in a savings of 10 to 30 percent in operational expenses through reduction in fuel use and staff time, improved customer service, and more efficient scheduling.
- GIS helped the City of Woodland refine its fleet scheduling, saving fuel and labor. Read more

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Better Decision Making

- GIS is the go-to technology for making better decisions about location. Common examples include real estate site selection, route/corridor selection, evacuation planning, conservation, natural resource extraction, etc. Making correct decisions about location is critical to the success of an organization.
- This GIS-based disaster decision support system helps Taiwan plan for and respond to typhoons. Read more

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Improved Communication

- GIS-based maps and visualizations greatly assist in understanding situations and in storytelling. They are a type of language that improves communication between different teams, departments, disciplines, professional fields, organizations, and the public. Michels Corporation improved collaboration and communication with GIS. Read more

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Managing Geographically

- GIS is becoming essential to understanding what is happening and what will happen in geographic space. Once we understand, we can prescribe action. This new approach to management—managing geographically—is transforming the way organizations operate. Kuwait University used GIS to design and build a multibillion-dollar expansion. Read more

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How GIS Works

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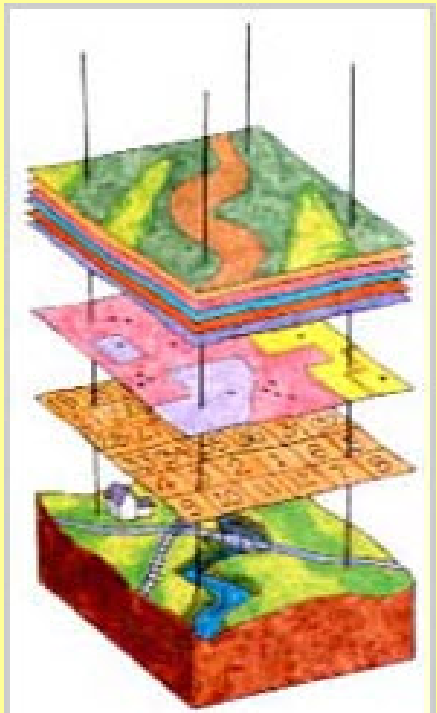
Understand the World around You

- GIS software is designed to capture, manage, analyze, and display all forms of geographically referenced information.
- GIS allows us to view, understand, question, interpret, and visualize our world in ways that reveal relationships, patterns, and trends in the form of maps, globes, reports, and charts.
- GIS software helps you answer questions and solve problems by looking at your data in a way that is quickly understood and easily shared—on a map!



GIS Layers
Credit: Bureau of Land Management

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How Does GIS Work?

A simple five-step geographic inquiry process lets you apply GIS to any business or organizational problem that requires a geographic decision.

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1. Ask

- What is the problem you are trying to solve or analyze, and where is it located?
- Framing the question will help you decide what to analyze and how to present the results to your audience.

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2. Acquire

- Next you need to find the data needed to complete your project.
- The type of data and the geographic scope of your project will help direct your methods of collecting data and conducting the analysis.

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3. Explore

You will only know for certain that your data is appropriate for your study after thoroughly examining it. This includes

- how the data is organized,
- how accurate it is,
- where the data came from.

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4. Analyze

- Geographic analysis is the core strength of GIS. Depending on your project, there are many different analysis methods to choose from.
- GIS modeling tools make it relatively easy to make these changes and create new output.

5. Act

- The results of your analysis can be shared through reports, maps, tables, and charts and delivered in printed format or digitally over a network or on the web.
- You need to decide on the best means for presenting your analysis, and GIS makes it easy to tailor the results for different audiences.

GRACE PROJECT Intern Course GIS Requirements

Increasing critical thinking and problem solving through purposeful applications of technology based education using GIS and Community Based Problem solving activities!

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Professor and Director,
Institute for Geospatial Research & Education
Eastern Michigan University
Principal Investigator NSF – ITEST GRACE PROECT

Randall E Raymond
Geographic Information Specialist
https://GeoNet.esri.com/people/randalleraymond
NSF-ITEST GRACE Project Advisor/Consultant

GRACE PROJECT Intern Course GIS Requirements

GRACE PROJECT student Interns will have successfully completed the following ESRI Virtual Campus courses to qualify for intern activities:

1. Learning ArcGIS Desktop (for ArcGIS 10) – 8 modules – 24 hours credit REQUIRED*
http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=1942
ArcGIS is a system that includes all the tools needed to get the most out of a GIS. This course introduces fundamental concepts of GIS and the major functionality contained within ArcGIS Desktop software. In course exercises, you will follow the GIS analytical process and work with a variety of tools to solve realistic problems. This course emphasizes practical GIS software skills.
2. Getting Started with the Geodatabase – 1 module – 1 hour credit REQUIRED*
http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2026
This course introduces the structure and basic functionality of the geodatabase, the native data storage format for ArcGIS. You will learn how geodatabase components help organize data to meet your organization's needs, the steps to create a file geodatabase, and techniques to efficiently add both vector and raster data to a geodatabase. This course prepares you to take other courses that focus on more advanced geodatabase components.

GRACE PROJECT Intern Course GIS Requirements

3. Creating and Sharing GIS Content with ArcGIS Online – 1 module – 4 hours credit REQUIRED*

http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2777

Organizations use ArcGIS Online to facilitate collaboration and efficient access to maps and other GIS resources. This course shows how to publish data and map layers directly to ArcGIS Online as services, then use those services to quickly build a web map. You will also learn how to turn a web map into a web app to provide a focused experience for your audience. Access to an ArcGIS Online organizational account is needed to complete course exercises.

4. Creating Web Applications Using Templates and Web AppBuilder for ArcGIS – 1 module – 4 hours credit REQUIRED*

http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2893

You can now easily create interactive web applications that feature maps and other geospatial content without writing a single line of code. This course teaches how to use ArcGIS Online templates and Web AppBuilder for ArcGIS to quickly share a web map as a cross-platform application that features the content and geospatial capabilities you need. Access to an ArcGIS Online organizational account is needed to complete course exercises.

GRACE PROJECT Intern Course GIS Requirements

5. Configuring and Administering an ArcGIS Online Organization – 1 module – 4 hours credit REQUIRED*

http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2738

ArcGIS Online helps organizations increase the value of their GIS content by making it more broadly available, enabling individuals and teams to do their work better and faster. This course introduces ArcGIS Online administrators to workflows for configuring general site settings, branding the organization's home page; managing site members, groups, and content; and choosing security options that meet the organization's needs.

6. Finding Geographic Data in ArcGIS – 1 module – 3 hours credit

http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2566

ArcGIS Spatial Analyst software supports a broad range of sophisticated spatial modeling and analysis applications. This course teaches how to use ArcGIS Spatial Analyst to produce and control raster data. Students create a variety of raster surfaces including hillshade relief maps, slope and aspect surfaces, and density and distance surfaces. In course exercises, students work within the ArcGIS geoprocessing environment to create, execute, and automate spatial analysis workflows.

GRACE PROJECT Intern Course GIS Requirements

7. **3D Analysis of Surfaces and Features Using ArcGIS – – 1 module – 3 hours**
   http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2049
   ArcGIS 3D Analyst software provides advanced tools for three-dimensional modeling and analysis. This course teaches what a surface model is and shows how to create both raster and vector surfaces. Working mostly with models of terrain, students display surfaces in three-dimensional perspective, symbolize them, and set three-dimensional properties. Students also create realistic models by draping aerial photographs over surfaces and displaying two-dimensional features in three dimensions.

8. **Getting Started with ArcGIS Pro – 1 module – 3 hours REQUIRED***
   http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2889
   Learn the essential concepts you need to know to jumpstart your productivity with ArcGIS Pro. This course introduces the ribbon-style interface, project-based organization, and key capabilities of ArcGIS Pro. You will get familiar with ArcGIS Pro terminology and practice with tools for mapping and visualization, editing data, performing analysis, and sharing your work.

GRACE PROJECT Intern Course GIS Requirements

9. **Introduction to Editing Parcels Using ArcGIS Desktop 10 – 1 module – 3 hours**
   http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2018
   ArcGIS 3D Analyst software provides advanced tools for three-dimensional modeling and analysis. This course teaches what a surface model is and shows how to create both raster and vector surfaces. Working mostly with models of terrain, students display surfaces in three-dimensional perspective, symbolize them, and set three-dimensional properties. Students also create realistic models by draping aerial photographs over surfaces and displaying two-dimensional features in three dimensions.

10. **Network Analysis Using ArcGIS – 1 module – 3 hours**
    http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2199
    This course teaches how to use network data and ArcGIS Network Analyst software to find optimal facility locations based on your criteria, adjust facility market area boundaries to capture demand and provide the desired level of service, and produce efficient routes for vehicle fleets. Whether the facilities important to your business operations are schools, hospitals, distribution centers, retail outlets, or something else, network analysis can help you increase operational efficiencies and meet your business objectives.

GRACE PROJECT Intern Course GIS Requirements

11. **Address Geocoding with ArcGIS – 1 module – 3 hours**
    http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2514
    This course teaches the workflow to efficiently create geographic features from tabular address data. Many types of organizations collect and store mission-critical address information, such as customer, facility, or public safety incident locations. Geocoding tabular data allows you to visualize address-based data on a map in context with other geographic data, analyze patterns, quickly respond to events, and make informed decisions.
12. **Teaching with GIS: Field Data Collection Using ArcGIS – 1 module – 3 hours REQUIRED***
    http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2868
    Getting students out of the classroom and into the field making observations, taking measurements, and using the latest technology is a great strategy to engage their interest and extend learning on many subjects. This course presents a five-step workflow to prepare for and conduct successful field data collection activities. You will work with the ArcGIS platform to create maps, make them accessible to students in the field, and enable students to collect data for use in problem-based learning activities or community service projects.

GRACE PROJECT Intern Course GIS Requirements

13. **3D Visualization Using ArcGIS Pro – 1 module – 2 hours**
    http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2899
    With ArcGIS Pro, it is easier than ever to create and share realistic 3D visualizations that engage viewers and support informed decision making. In this course, you will get familiar with the ArcGIS Pro 3D environment and learn a variety of techniques to create 3D scenes and enhance them to meet your project needs. This course requires access to an ArcGIS Online organizational account provisioned with ArcGIS Pro.
14. **Basics of Python (for ArcGIS 10) – 1 module – 3 hours**
    http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2114
    Using scripts allows you to automate time-consuming and complex processes and perform your GIS work more efficiently. Python is the free, open-source scripting language that has been integrated with ArcGIS 10. This course teaches fundamental concepts you need to know to create Python scripts in ArcGIS. You will learn guidelines for proper Python syntax, techniques to troubleshoot common errors, and how to use loops to test for conditions and execute different code based on the result.

GRACE PROJECT Intern Course GIS Requirements

15. **Building Geoprocessing Models Using ArcGIS Pro – 1 module – 3 hours**
    http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2908
    This course introduces geoprocessing models and the steps required to create, validate, and run models that automate ArcGIS analysis workflows. You will learn about model components, practice setting and modifying tool parameters, and explore guidelines for building an efficient modeling workflow that produces valid results.
16. **Distance Analysis Using ArcGIS Pro – 1 module – 3 hours**
    http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2895
    Distance analysis is a common type of GIS analysis that produces key information needed for decision making. This course teaches how to create raster surfaces that identify the shortest, straight-line distance between locations as well as cost-effective paths that take into account specific project criteria and constraints.

GRACE PROJECT Intern Course GIS Requirements

17. **Using Lidar Data in ArcGIS 10 – 1 module – 3 hours**
    http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2129
    This course covers essential concepts needed to efficiently use lidar data for visualization and analysis in ArcGIS. Because of its massive size, lidar data can be difficult to use as-is. In this course, you will learn techniques to create smaller, derived datasets from lidar data to support specific applications and how to integrate lidar data with other data sources to create more complete three-dimensional topographic surfaces.
18. **The 15-Minute Map: Creating a Basic Map in ArcMap – 1 module – 3 hours REQUIRED***
    http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=78
    Creating presentation-quality maps does not have to be time-consuming. The map templates included with ArcMap provide attractive default layouts for fundamental map elements such as geographic data, titles, scale bars, and company logos. Using a template is an efficient way to reduce the time spent creating a map. This focused course teaches how to use ArcMap templates to streamline map creation. Students learn how to identify map element properties and defaults, how to modify elements while maintaining proper cartographic design principles, and how to add elements to layouts to create custom ArcMap templates.

GRACE PROJECT Intern Course GIS Requirements

19. **Managing Parcel Data Using ArcGIS Desktop 10 – 1 module – 3 hours**
    http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2019
    As the community changes, you need to update your land records data to reflect the real world while also maintaining a record of historic boundaries and associated information. In this course, you will learn how to use the Parcel Editor tools to update the spatial and attribute information for existing parcels while ensuring the topological integrity of the parcel fabric. You will also learn how to import parcel lines and CAD data to create new parcels and construct multipart parcels to accurately represent real-world parcel features.
20. **Modeling a City Using Esri City Engine – 1 module – 3 hours**
    http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2603
    With Esri City Engine, you can create highly realistic 3D models to visualize urban landscapes, explore impacts of proposed development, generate virtual city simulations, and support geodesign workflows. This course discusses the key elements of a 3D city model and guidelines for GIS data used to create one. You will learn how to import GIS data into City Engine, then apply rules to the data to add rich detail that brings the 3D city to life.

GRACE PROJECT Intern Course GIS Requirements

GRACE PROJECT student Intern logistics for ESRI Virtual Campus courses online learning activities:

- **Teachers and Students will obtain ESRI Virtual Campus course access codes through an email requesting process sent to the GRACE Project Intern Virtual Campus Access Code Request to: aerraymond@aol.com**

- **Teachers and Students will participate in scheduled Adobe Connect Session at least 1 per month to receive instruction and assistance from GeoMentors. Students will become active members of the DPS YTC GRACE Project Intern Group on the ESRI GeoNet making regular contributions.http://geonet.esri.com**

- **The GRACE Project students will use their GIS skills to create StoryMaps in collaboration with community agencies, that highlight the unique and special places in their cities and communities Pure Michigan – GRACE Project campaign. http://storymaps.esri.com**

- **GRACE PROJECT Student Interns will have access to the Statewide ArcGIS Online for Organizations account for all of their online learning activities.**

CONTACT INFORMATION

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