National Fire Academy

W0512 – Emerging Uses for GIS in the Fire Service
Version: 1st Edition, 3rd Printing, October 2014
Quarter:
ACE Credit: Pending
IACET Continuing Education Units: Pending

Length of Course: 2 Days (16 contact hours)
Prerequisite: None
Curriculum: Planning and Information Management
Training Specialist: Colleen Heilig
Instructor:
Instructor email/phone:
Classroom: J-
Meeting Time: 8 AM – 5 PM

Table of Contents

Course Description (Catalog)

W0512 – "Emerging Uses for GIS in the Fire Service." The course provides a foundation for implementing geospatial technologies in a local emergency service agency. The value, application, and use of geospatial technologies in emergency services and the fundamental skills required for basic implementation will be addressed.

Student Qualifications (Primary and Secondary Audience)

The target audience for this course is:

- Fire service personnel providing technology support, but who are intimately familiar with fire ground needs and operations and fire service planning and development.

- Company level officers and personnel who desire to use this technology in the field and require the necessary skills development.
- Chief/Administrative officers who desire a big-picture understanding and exposure to hands-on software skills.

Course Scope (Goal)

This is a two-day course that provides a foundation for using geospatial technologies (Geographic Information Systems (GIS), remote sensing, and GPS) in a local emergency services agency.

Course Objectives (Course Learning Outcomes – TLOs)

After successfully completing this course, you will be able to accomplish the following:

- Explain the relevance of Geographic Information Systems (GIS) to emergency services.
- Apply geospatial tasks including using toolbars, populating a dataset, creating a large-scale map, and adding data to the map required for preplanning.
- Use ArcGIS tools and skills to develop geographically referenced information for mitigation.
- Apply geospatial technologies to an emergency response.
- Apply ArcGIS tools and skills to develop geographically referenced information for recovery.
- Demonstrate the critical skills covered during this course.

Course Delivery Method

The National Fire Academy (NFA) offers specialized training courses and advanced management programs of national impact in an academic classroom environment on campus at the National Emergency Training Center (NETC) in Emmitsburg, Maryland. This classroom course is designed for the national level fire service officer from State and local fire service organizations. During this 2-day delivery, students will reside in dormitories provided on campus with classes conducted in classrooms designed for critical student/instructor interaction. All course materials are designed for interactive classroom environments, in either paper notebook or electronic formats.

Course Schedule

The purpose of the course schedule is to give you, at a glance, the required preparation, activities, and evaluation components of your course.

DAY 1	DAY 2
Introduction, Welcome and Administrative	Unit 3: Mitigation
Break	*Break*
Unit 1: Geographic Information Systems	Activity 3.1: Mitigation Unit 4: Response
Break	*Break*
Unit 1: Geographic Information Systems (cont'd) Unit 2: Planning Activity 2.1: Understanding Data Needs Activity 2.2: ArcMap Basics	Unit 4: Response (cont'd) Activity 4.1: Reading the U.S. National Grid Activity 4.2: Land Navigation Activity 4.3: Using the U.S. National Grid Within ArcGIS
Lunch Break	*Lunch Break*
Unit 2: Planning (cont'd) Activity 2.3: Creating Feature Classes and Attributes for Preplanning	Unit 4: Response (cont'd) Unit 5: Recovery Demonstration: Creating Customized Large-scale Maps
Break	*Break*
Unit 2: Planning (cont'd) Activity 2.4: Map Layouts Activity 2.5: Wilson Fire Department Data Collection Activity 2.6: Discussion of Preplans	Unit 6: Final Activity Activity 6.1: Final Activity Final Exam

Course Resources (Instructional Materials)

In order to be fully prepared, obtain a copy of the required textbooks and other instructional materials prior to the first day of class.

Required Readings

The student must complete required readings during the course to be able to thoughtfully participate in discussions and activities.

None.

Suggested Reading/Resources

Suggested readings and resources are not evaluated, but may enhance the student's understanding, serve as additional sources for citation and promote discussion of course material.

None.

Required Resources (Course Textbook)

Student Manual.

Supplemental Resources (Supplemental Course Textbook)

None.

Grading Methodology (Evaluation Procedures)

Activity 4.2: Land Navigation — 17 points

Activity 6.1: Final Activity — 48 points

Final Exam — 35 points

The required performance to successfully complete the course is attained by completing the class with a letter grade of a "C" or higher.

Letter Grade	Point Range
A	90-100
B	80-89
C	70-79
F	69 or lower

Required Reading Assignments

Student completion of reading assignments will be done via evaluation of their class participation and will not be a separately graded activity.

Suggested Readings

Suggested readings are not evaluated, but may enhance the student's understanding and promote discussion of course material.

Course Outline

Unit 1: Geographic Information Systems (Day 1)

Objectives

Terminal Objective

The students will be able to:

1.1 Explain the relevance of Geographic Information Systems (GIS) to emergency services.

Enabling Objectives

The students will be able to:

1.1 Describe the need for a standardized coordinate system for geolocation.

1.2 Describe the nature of spatial data.

1.3 Compare and contrast the range of coordinate systems commonly used for geolocation to illustrate the advantages of using the U.S. National Grid (USNG).

1.4 Describe the GPS.

1.5 Describe remote sensing as a source of information about an object or location.

1.6 Define GIS.

Unit 2: Planning (Day 1)

Objectives

Terminal Objective

The students will be able to:

2.1 Apply geospatial tasks including using toolbars, populating a dataset, creating a large-scale map, and adding data to the map required for preplanning.

Enabling Objectives

The students will be able to:

2.1 Identify needed data.

2.2 Navigate within ArcGIS using the Standard and Tools (Pan and Zoom) toolbars.

2.3 Create and populate a polygon feature dataset for use in preplanning.

2.4 Create a large-scale map.

2.5 Given a series of x-y data representing fire stations, add these data to a large-scale map using imagery.

2.6 Identify publicly available sources of geospatial data.

2.7 Compare and contrast preplans created using a Geographic Information System (GIS) to those created using other methods.

Unit 3: Mitigation (Day 2)

Objectives

Terminal Objective

The students will be able to:

3.1 Use ArcGIS tools and skills to develop geographically referenced information for mitigation.

Enabling Objectives

The students will be able to:

3.1 Construct a query based on attributes.

3.2 Construct a query based on location.

3.3 Perform basic tasks such as buffers.

3.4 Calculate required fire flow.

Unit 4: Response (Day 2)

Objectives

Terminal Objective

The students will be able to:

4.1 Apply geospatial technologies to an emergency response.

Enabling Objectives

The students will be able to:

4.1 Successfully plot and navigate to a series of coordinates.

4.2 Given a point on a map, identify the corresponding U.S. National Grid (USNG) coordinates.

4.3 Navigate to assigned locations using USNG.

4.4 Given a scenario, use ArcGIS to geocode locations by street address.

4.5 Given a scenario, use ArcGIS to update a map dynamically as the incident progresses.

Unit 5: Recovery (Day 2)

Objectives

Terminal Objective

The students will be able to:

5.1 Apply ArcGIS tools and skills to develop geographically referenced information for recovery.

Enabling Objectives

The students will be able to:

5.1 Describe the purpose of a complex query.

5.2 Construct a complex query.

5.3 Use complex queries to create a map with customized features.

Unit 6: Final Activity (Day 2)

Objectives

Terminal Objective

The students will be able to:

6.1 Demonstrate the critical skills covered during this course.

Enabling Objectives

The students will be able to:

6.1 Navigate within ArcGIS using the Standard and Tools (Pan and Zoom) toolbars.

6.2 Create and populate a polygon feature dataset for use in preplanning.

6.3 Given a series of x-y data representing fire stations, add these data to a large-scale map using imagery.

6.4 Construct and execute a query based on attributes.

6.5 Construct and execute a query based on location.

6.6 Perform basic tasks, such as buffer.

6.7 Use ArcGIS to geocode locations by street address.

6.8 Use ArcGIS to update a map dynamically as the incident progresses.

Policies

Class Attendance and Cancellation Policy

Attendance

- You are required to attend all sessions of the course. If you do not, you may not receive a certificate.

- If you need to depart the training facility early and miss any portion of the course, you must make the request in writing to the sponsoring agency (e.g., State training director, etc.). The State training director may waive the attendance requirement in order to accommodate you with extraordinary circumstances as long as you complete all course requirements.

Student Substitutions

Substitutions for NFA courses are made from waiting lists; your fire department can't send someone in your place.

Cancellations or No-Shows

NFA's mission for delivery of courses is impaired significantly by cancellations and no-shows. It is very difficult and costly to recruit students at the last minute. Currently there is a two-year ban on student attendance for students who are no-shows or cancel within 30 days of the course start date without a valid reason. If you receive such a restriction, your supervisor needs to send a letter to our Admissions Office explaining the cancellation/no-show.

Course Failure

You can reapply for the failed course or any other NFA course and go through the random selection process. You don't have to successfully complete the failed course before attending another NFA course.

Student Code of Conduct Policy

Students, instructors and staff are expected to treat each other with respect at all times. Inappropriate behavior will not be tolerated.

Writing Expectations

Student writing will conform to the generally accepted academic standards for college papers. Papers will reflect the original work of the student and give appropriate credit through citations for ideas belonging to other authors, publications or organizations. Student written work should be free of grammatical and syntax errors, free of profanity or obscene language or ideas, and reflect critical thinking related to the course subject matter.

Citation and Reference Style

Attention Please: Students will follow the APA, Sixth Edition as the sole citation and reference style used in written work submitted as part of coursework to NFA. Assignments completed in a narrative essay, composition format, abstract, and discussion posts must follow the citation style cited in the APA, Sixth Edition.

Late Assignments

All assignments must be turned in by the established deadline. Late submissions could result in a 10 percent decrease in grade.

Disclaimer Statement

Course content may vary from the outline to meet the needs of this particular group.

Grading

Please review the following rubrics that explain how grades will be awarded. Students who do not complete the entire course will be awarded an Incomplete (I) grade. In accordance with National Fire Academy academic policies, an Incomplete (I) grade must be removed by the end of the next semester following the course, or it automatically becomes a Failing (F) grade.

If you fail an on-campus course, you will not be issued a stipend for that course. You can reapply for the failed course or any other NFA course and go through the random selection process. You don't have to successfully complete the failed course before attending another NFA course.

http://www.usfa.fema.gov/training/nfa/admissions/student_policies_campus_information.html

Academic Honesty

Students are expected to exhibit exemplary ethical behavior and conduct as part of the NFA community and society as a whole. Acts of academic dishonesty including cheating, plagiarism, deliberate falsification, and other unethical behaviors will not be tolerated.

Students are expected to report academic misconduct when they witness a violation. All cases of academic misconduct shall be reported by the instructor to the State training director or host agency and to the NFA Training Specialist.

If a student is found to have engaged in misconduct and the allegations are upheld, the penalties may include, but are not limited to one or a combination of the following:

- expulsion,
- withholding of stipend or forfeiture of stipend paid,
- exclusion from future classes for a specified period; depending on the severity it could range from 1-10 years, and/or
- forfeiture of certificate for course(s) enrolled in at NETC.

Refer to NFA-specific Standard Operating Procedure 700.1 – *Academic Code of Conduct and Ethics* for more information.

Grading Rubrics

RUBRIC

ACTIVITY 4.2: LAND NAVIGATION

Points	Rating
14-17	Completed the following: • Plotted the coordinates correctly for four to six sites. • Navigated to the coordinate correctly for four to six sites. • Identified a marker with two letters for four to six sites. • Recorded the letters for four to six sites.
10-13	Completed the following: • Plotted the coordinates correctly for three sites. • Navigated to the coordinate correctly for three sites. • Identified a marker with two letters for three sites. • Recorded the letters for three sites.
6-9	Completed the following: • Plotted the coordinates correctly for two sites. • Navigated to the coordinate correctly for two sites. • Identified a marker with two letters for two sites. • Recorded the letters for two sites.
1-5	Completed the following: • Plotted the coordinates correctly for one site. • Navigated to the coordinate correctly for one site. • Identified a marker with two letters for one site. • Recorded the letters for one site.
0	Did not turn in assignment.

RUBRIC

ACTIVITY 6.1: FINAL ACTIVITY

Date: _____

Name: _____

Instructor Comments:

Final Activity (Unit 6) Rubric	0 Points Poor	2 Points Fair	4 Points Good	6 Points Excellent	Total Points
1. Navigate within ArcGIS using the Standard and Tools (Pan and Zoom) toolbars.	The student did not attempt this task.	The student attempted this task but did not demonstrate the knowledge and skill to complete it.	The student demonstrated the knowledge and skill necessary to complete this task but was unable to finish.	The student completed this task and attained the desired results.	
2. Create and populate a polygon feature dataset for use in preplanning.	The student did not attempt this task.	The student attempted this task but did not demonstrate the knowledge and skill to complete it.	The student demonstrated the knowledge and skill necessary to complete this task but was unable to finish.	The student completed this task and attained the desired results.	
3. Given a series of x-y data representing fire stations, add these data to a large-scale map using imagery.	The student did not attempt this task.	The student attempted this task but did not demonstrate the knowledge and skill to complete it.	The student demonstrated the knowledge and skill necessary to complete this task but was unable to finish.	The student completed this task and attained the desired results.	
4. Construct a query based on attributes.	The student did not attempt this task.	The student attempted this task but did not demonstrate the knowledge and skill to complete it.	The student demonstrated the knowledge and skill necessary to complete this task but was unable to finish.	The student completed this task and attained the desired results.	
5. Construct a query based on location.	The student did not attempt this task.	The student attempted this task but did not demonstrate the knowledge and skill to complete it.	The student demonstrated the knowledge and skill necessary to complete this task but was unable to finish.	The student completed this task and attained the desired results.	

Final Activity (Unit 6) Rubric	0 Points Poor	2 Points Fair	4 Points Good	6 Points Excellent	Total Points
6. Perform basic tasks, such as buffer.	The student did not attempt this task.	The student attempted this task but did not demonstrate the knowledge and skill to complete it.	The student demonstrated the knowledge and skill necessary to complete this task but was unable to finish.	The student completed this task and attained the desired results.	
7. Use ArcGIS to geocode locations by street address.	The student did not attempt this task.	The student attempted this task but did not demonstrate the knowledge and skill to complete it.	The student demonstrated the knowledge and skill necessary to complete this task but was unable to finish.	The student completed this task and attained the desired results.	
8. Use ArcGIS to update a map dynamically as the incident progresses.	The student did not attempt this task.	The student attempted this task but did not demonstrate the knowledge and skill to complete it.	The student demonstrated the knowledge and skill necessary to complete this task but was unable to finish.	The student completed this task and attained the desired results.	
Possible Total: 48 points				**Actual Total:**	

GRADE LOG

	First Name	Last Name	Activity 4.2 (17 points)	Activity 6.1 (48 points)	Test (35 points)	Final Grade (100 points)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

	First Name	Last Name	Activity 4.2 (17 points)	Activity 6.1 (48 points)	Test (35 points)	Final Grade (100 points)
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						