FORT LEONARD WOOD, MO
NONCOMMISIONED OFFICERS ACADEMY
SYLLABUS FOR 12Y3O
ADVANCED LEADER COURSE

GEOSPATIAL ENGINEER ALC

Purpose:

The 12Y30 Geospatial Engineer Advanced Leader Course is designed to develop Geospatial Engineers Non-Commission Officers to lead Soldiers who perform geospatial analysis in support of military and government operations. The 12Y30 Geospatial Engineer performs duties of preceding skill level, supervises lower grade Soldiers and provides technical guidance to Soldiers in the accomplishment of their duties. Supervise topographic analysts at division, Corps and EAC topographic units to include maintenance of assigned equipment. Evaluate source materials for military geographic information analysis. Supervise quality assurance during all stages of topographic operations to include finish compilation of geospatial data into printable map/products and printing of hardcopy geospatial information. Ensures required administrative, intelligence, source data and reference files are maintained. Advise command and staff officers on all aspects of topographic operations and doctrine.

FORT LEONARD WOOD, MO
NONCOMMISIONED OFFICERS ACADEMY
SYLLABUS FOR 12Y3O
ADVANCED LEADER COURSE

GEOSPATIAL ENGINEER ALC

Course Scope:

This course provides the knowledge and implementation of GIS to conduct military and environmental analysis in support of military and government applications.

Specific Learning Outcomes:

- By the end of this course, students will:
- Assess the weather and climate in support of operations.
- Discuss the GIS Process and understand the fundamentals of GIS.
- Use advanced GIS editing tools to produce and analyze geographic data.
- Use Spatial Analysis tools to analyze Remote Sensed Imagery.
- Process and manipulate Remote Sensed and Hyperspectral Imagery.
- Produce 3-D Visualization Product.
- Write a formal paper that describes the terrain and its effects on military operations.
- Complete two (2) Analyses of the Area of Operation capstone exercises.

Format and Procedures:

This course is a 535 hour course, which is completed in 14 weeks A Computer lab-oriented course introduces the student to the realm, principles, and capabilities of geographic information systems (GIS). Lectures, discussions, and practical exercises are employed to develop understanding of and practically apply fundamental and advanced concepts of GIS. Emphasis is placed on military-based applications of GIS technology.

FORT LEONARD WOOD, MO
NONCOMMISIONED OFFICERS ACADEMY
SYLLABUS FOR 12Y3O
ADVANCED LEADER COURSE

GEOSPATIAL ENGINEER ALC

Course Prerequisites:

1. Security Clearance Required: Prior to October 2011, Soldier must meet SECRET security eligibility requirements to be awarded and maintain this MOS. Effective October 2011; the Soldier must meet ***TOP SECRET (TS)*** and ***Sensitive Compartmented Information (SCI)*** access eligibility requirements to be awarded and retain this MOS.

2. Language Requirements: A score of 75 on the English Proficiency Test is required.

3. Aptitude level: As established by the Office of Personnel Management Skilled Technical Score of 100.

4. Physical: As determined by the individual Service; normal color vision.

5. Obligated service requirement: As prescribed by the individual Service or Office of Personnel Management.

6. Other prerequisites: A visual stereoscopic acuity of 175 seconds of arc or less.

GEOSPATIAL ENGINEER

Security Clearance: ***TOP SECRET (TS)*** and ***Sensitive Compartmented Information (SCI)***

Course Length–Weeks: 13 **Days:** 2 **Hours:** 535

Class Sizes – Optimum: 16 **Min:** 8 **Max:** 16

Administrative Time:

Module: A / 001 15.5
Title: **Weather**

Academic Time:

Module: B / 001 37.5
Title: **Intermediate GIS Analysis**

Module: C / 001 40.0
Title: **Data Production and Editing Techniques (DPET)**

Module: D / 001 73.0
Title: **Spatial Analyst for GEOINT (SAGI)**

GEOSPATIAL ENGINEER

Academic Time:

Module: E / 001 59.5
Title: **Environment for Visualizing Images (ENVI)**

Module: F / 001 34.5
Title: **Terrain Visualization**

Module: G / 001 16
Title: **Military Writing for the Geospatial Engineer/MDMP**

Module: H / 001 72.0
Title: **Operational Analysis of the AAO (Production Phase)**

Module: I / 001 155.5
Title: **Tactical Analysis of the AAO (Production Phase)**

Module: J / 001 31.5
Title: **Administrative Hours**

GEOSPATIAL ENGINEER

Module: A / 1
Title: Weather
Purpose: This module provides instructions on the relevance of weather effects on military operations. It also discusses how to comprehend the difference between weather and climate. It provides information about weather impacts on historical military operations. This module provides a detailed description on the effects of weather on different soils as well as the effects of solar and lunar illumination. The module concludes with an evaluation on conducting a weather brief with analysis of weather effects on military operations.
Remarks: None

Technique(s) of Delivery:
Small Group Instruction (SGI) (SG)
Hours
15.5
Security Clearance: ***TOP SECRET (TS)*** and ***Sensitive Compartmented Information (SCI)***

Lesson Title: Diagnostic Exam
References: 12Y3O A-010

Lesson Title: Entrance Exam Peer To Peer Classes
References: 12Y3O A-010-2

Lesson Title: Weather Effects On Terrain
References: 12Y3O H-010

Lesson Title: Daily Weather Briefing Overview
References: 12Y3O A-020

Lesson Title: Intro to Terrago Technologies
References: 12Y3O A-080

GEOSPATIAL ENGINEER

Module: B / 1
Title: Intermediate GIS Analysis
Purpose: This module provides detailed instructions on how to apply the concepts associated with the fundamentals of GIS to include GIS data types, geodesy and map composition. This module also reviews the ArcGIS software and functions.
Remarks: None

Technique(s) of Delivery:
Small Group Instruction (SGI) (SG)
Hours
37.5
Security Clearance: ***TOP SECRET (TS)*** and ***Sensitive Compartmented Information (SCI)***

Lesson Title: Fundamental GIS Review
References: 12Y3O B-010
Lesson Title: Data Management
References: 12Y3O B-020
Lesson Title: Military Analyst
References: 12Y3O B-030
Lesson Title: Geocoding
References: 12Y3O B-040
Lesson Title: Geostatistical Analysis
References: 12Y3O B-050
Lesson Title: Utility Network Analysis
References: 12Y3O B-060
Lesson Title: Spatial Analysis
References: 12Y3O B-070
Lesson Title: 3D Analysis
References: 12Y3O B-080
Lesson Title: Demonstrate Modeling in ARCGIS
References: 12Y3O B-090
Lesson Title: B Block Review
References: 12Y3O B-090-2
Lesson Title: GIS for Analysis Capstone Exercise
References: 12Y3O B-100

GEOSPATIAL ENGINEER

Module: C / 1
Title: Data Production and Editing Techniques (DPET)
Purpose: This module provides detailed instructions on how to create features visually and geometrically. It provides instructions on editing features with map topology and Geodatabase topology. The module concludes with an examination on Data Production and Editing Techniques.
Remarks: None

Technique(s) of Delivery:
Small Group Instruction (SGI) (SG)
Hours
40
Security Clearance: ***TOP SECRET (TS)*** and ***Sensitive Compartmented Information (SCI)***

Lesson Title: DPET Intro
References: 12Y3O C-010
Lesson Title: Importing And Loading Data
References: 12Y3O C-020
Lesson Title: Correcting Coordinate Systems
References: 12Y3O C-030
Lesson Title: Spatially Adjusting Features
References: 12Y3O C-040
Lesson Title: Data Loading Project
References: 12Y3O C-040 CE
Lesson Title: Creating Features Visually
References: 12Y3O C-050
Lesson Title: Creating Features Geometrically
References: 12Y3O C-060
Lesson Title: Editing Features
References: 12Y3O C-070
Lesson Title: Editing With Map Topology
References: 12Y3O C-080
Lesson Title: Creating Attributes
References: 12Y3O C-090
Lesson Title: Editing Attributes And Tables
References: 12Y3O C-100
Lesson Title: Find Attribute Errors And Edit Tables
References: 12Y3O C-040 CE
Lesson Title: Editing With Geodatabase Topology
References: 12Y3O C-120
Lesson Title: Data Maintenance Project
References: 12Y3O C-120-CE
Lesson Title: Creating Features With Coordinate GEO
References: 12Y3O C-140
Lesson Title: DPET Exam And Review
References: 12Y3O C-150

GEOSPATIAL ENGINEER

Module: D / 1
Title: Spatial Analyst For GEOINT (SAGI)
Purpose: This module provides detailed instructions on recognizing raster coordinate systems and resolutions; recognizing raster cell coincidence and registration; employing raster resample; employing raster geo-referencing; recognizing raster cell values and attribute tables; recognizing raster zones, regions and various raster formats; employing raster analysis, geo-processing, and toolbar environments; model building and employing map algebra functions. The module concludes with an examination on Spatial Analyst for GEOINT utilizing only the Spatial Analyst Tools.
Remarks: None

Technique(s) of Delivery:
Small Group Instruction (SGI) (SG)
Hours
73
Security Clearance: ***TOP SECRET (TS)*** and ***Sensitive Compartmented Information (SCI)***

Lesson Title: Intro To Spatial Analyst
References: 12Y3O D-050
Lesson Title: Raster Concept Overview
References: 12Y3O D-060
Lesson Title: Read Chapters 9 & 10 GIS Fundamental
References: 12Y3O D-060-1
Lesson Title: Working With Rasters
References: 12Y3O D-070
Lesson Title: Intro To Map Algebra
References: 12Y3O D-080-1
Lesson Title: Map Algebra Functions
References: 12Y3O D-080-2
Lesson Title: Raster Processing Tools
References: 12Y3O D-090
Lesson Title: Interpolation Tools
References: 12Y3O D-100
Lesson Title: Surface Analysis Tools
References: 12Y3O D-110
Lesson Title: Distance Tools
References: 12Y3O D-120
Lesson Title: Spatial Modeling
References: 12Y3O D-130-1
Lesson Title: Model Builder
References: 12Y3O D-130-2
Lesson Title: Advanced Display Techniques
References: 12Y3O D-140
Lesson Title: IED Analysis 201
References: 12Y3O D-170
Lesson Title: Spatial Analysis For GEOINT Review
References: 12Y3O D-180
Lesson Title: Spatial Analysis For GEOINT Exam/Review
References: 12Y3O D-190

GEOSPATIAL ENGINEER

Module: E / 1
Title: Environment For Visualizing Images (ENVI)
Purpose: This module provides detailed instructions on exploring the ENVI software. The exploration of the ENVI software includes processes and tools. These processes and tools include the mosaic and subset of imagery; map projections; the SPEAR tool; image enhancement; target detection; terrain classification. The module concludes with an examination on the basic comprehension of using ENVI, its tools and running processes through ENVI.
Remarks: None

Technique(s) of Delivery:
Small Group Instruction (SGI) (SG)
Hours
59.5
Security Clearance: ***TOP SECRET (TS)*** and ***Sensitive Compartmented Information (SCI)***

Lesson Title: Exploring Envi Zoom
References: 12Y3O E-010
Lesson Title: Visual Exploration And Annotation
References: 12Y3O E-020
Lesson Title: Mosaic And Subset Imagery
References: 12Y3O E-030
Lesson Title: Map Projections
References: 12Y3O E-040
Lesson Title: SPEAR Tools
References: 12Y3O E-050
Lesson Title: Create & Use Topographic Products
References: 12Y3O E-060
Lesson Title: Feature Extraction With Rule Based CLS
References: 12Y3O E-070
Lesson Title: ARCGIS Interoerability
References: 12Y3O E-080
Lesson Title: ENVI NITF Module & LiDAR TDA
References: 12Y3O E-090
Lesson Title: Intro To Fund. Spec. Exploit & Analysis
References: 12Y3O E-100
Lesson Title: Remote Sensors Overview
References: 12Y3O E-110
Lesson Title: Prop. Of the EM Wave Inter. With Phy.Mat.
References: 12Y3O E-120
Lesson Title: Phenmenology Of The EM Spectrum
References: 12Y3O E-130
Lesson Title: TCPED
References: 12Y3O E-140
Lesson Title: E Block Pretest
References: 12Y3O E-140-1
Lesson Title: Intro to ENVI And ENVI Zoom
References: 12Y3O E-150
Lesson Title: Importing & Exporting Images With ENVI
References: 12Y3O E-160
Lesson Title: Reproject An Image
References: 12Y3O E-170
Lesson Title: Register An Image
References: 12Y3O E-180
Lesson Title: Enhancing Images Using ENVI
References: 12Y3O E-190
Lesson Title: Image Sharpening Using ENVI
References: 12Y3O E-190-1
Lesson Title: Target Detection
References: 12Y3O E-200
Lesson Title: Terrain Categorization Unsupervised
References: 12Y3O E-210
Lesson Title: SAN DIEGO
References: CP1
Lesson Title: Final Capstone Exercise
References: 12Y3O E-220
Lesson Title: E Block Exam Review
References: 12Y3O E-230

GEOSPATIAL ENGINEER

Module: F / 1
Title: Terrain Visualization
Purpose: This module includes detailed instructions on the utilization of the TerraBuilder program. In this module students will create, edit and maintain a realistic 3D model of the earth. Students will combine data to create a 3D backdrop for overlays or other content that uses Terra Explorer. The module concludes with an evaluation on correctly producing a 3D elevation model with overlays.
Remarks: None

Technique(s) of Delivery:
Small Group Instruction (SGI) (SG)
Hours
34.5
Security Clearance: ***TOP SECRET (TS)*** and ***Sensitive Compartmented Information (SCI)***

Lesson Title: Intro To Skyline Terrasuite
References: 12Y3O F-020

Lesson Title: Intro To Terrabuilder Version 1.7
References: 12Y3O F-030

Lesson Title: Intro to Terra Explorer Pro
References: 12Y3O F-040

Lesson Title: Capstone Exercise
References: 12Y3O E-050

GEOSPATIAL ENGINEER

Module: G / 1
Title: Military Writing for Geospatial Engineers/MDMP
Purpose: This module includes detailed information on the proper military writing style and the proper use of voice. This module also includes instruction over applying the geospatial engineer responsibilities in the Military Decision Making Process. The module is concluded with an evaluation on writing a Terrain Write-Up.
Remarks: None

Technique(s) of Delivery:
Small Group Instruction (SGI) (SG)
Hours
16
Security Clearance: ***TOP SECRET (TS)*** and ***Sensitive Compartmented Information (SCI)***

Lesson Title: Military Writing For Geospatial Engineers
References: 12Y3O G-040

Lesson Title: Analysis Of The Area Of Operations
References: 12Y3O G-050

GEOSPATIAL ENGINEER

Module: H / 1
Title: Operational Analysis Of The AAO (Production Phase)
Purpose: This module is about applying geospatial engineer skill sets learned throughout the 12Y30 course. Students will conduct operational analysis of the AAO in a scenario based format. Students will produce several tactical decisions aids (TDA's) to display their analysis. Students will brief the analysis they have conducted within the Operational Analysis scenario.
Remarks: None

Technique(s) of Delivery:
Small Group Instruction (SGI) (SG)
Hours
72
Security Clearance: ***TOP SECRET (TS)*** and ***Sensitive Compartmented Information (SCI)***

Lesson Title: Operational Analysis Of The AAO
References: 12Y3O H

Lesson Title: Operational Brief
References: 12Y3O H

GEOSPATIAL ENGINEER

Module: I / 1
Title: Tactical Analysis Of The AAO (Production Phase)
Purpose: This module is about applying geospatial engineer skill sets learned throughout the 12Y30 course. Students will conduct tactical analysis of the AAO in a scenario based format. Students will produce several tactical decisions aids (TDA's) to display their analysis. Students will brief the analysis they have conducted within the Tactical Analysis scenario.
Remarks: None

Technique(s) of Delivery:
Small Group Instruction (SGI) (SG)
Hours
155.5
Security Clearance: ***TOP SECRET (TS)*** and ***Sensitive Compartmented Information (SCI)***

Lesson Title: Tactical I Analysis Of The AAO
References: 12Y3O I

Lesson Title: Tactical Brief
References: 12Y3O I

TECHNICAL ENGINEER SUPERVISOR

Written Examinations

Data Production And Editing Techniques (DPET)
Spatial Analyst For GEOINT (SAGI)
Environment For Visualizing Images (ENVI)
Operational Analysis Of The AAO Brief
Tactical Analysis Of The AAO Brief

Evaluations

APFT
Weather Brief (2)
3D Terrain Fly-Through Brief
Terrain Write-Up (2)
Operational Environment Brief
Student-Led Discussions
Leadership Skills
Contribution to Group Work
Research Ability