Approved for public release, NGA-U-2026-00908

GEOINT Professional Certification
Applied Sciences: Proficiency Level II (AS-II)
Essential Body of Knowledge (EBK)
9 February 2026

Core Competency 1 – Coordinate System Analysis (12%) Understands datum, coordinate system, and grid system analysis; validates geodetic information on Geospatial Intelligence (GEOINT) products. Understands datum transformations between local datums and the World Geodetic System 1984 (WGS 84) and coordinate conversions between coordinate systems.
Terminal and Enabling Certification Objectives (TCOs & ECOs)
TCO 1: Comprehend fundamentals of reference systems, reference frames (datums), coordinate systems, coordinate frames, and map projections.
ECO 1.1: Define coordinate system, datum, coordinate conversion, and datum transformation.
ECO 1.2: Understand common coordinate systems, datums, reference systems, and map projections.
ECO 1.3: Understand the role of reference systems, reference frames, coordinate systems, and coordinate frames.
ECO 1.4: Understand the WGS 84 reference system and its underlying components.
ECO 1.5: Understand the impact of datum mismatches and transformations on the overall accuracy of products.
ECO 1.6: Discuss the uses of different types of map projections and problems associated with map projection of data.
Core Competency 2 - Information Security (4%) Applies knowledge of policies, procedures, and requirements established under appropriate authorities and agreements to protect Applied Science information and partnerships.
Terminal and Enabling Certification Objectives (TCOs & ECOs)
TCO 2: Apply knowledge of Applied Science information security.

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ECO 2.1: Apply proper security protocols to protect data and partnerships specific to the Applied Science workroles.
Core Competency 3 - Mathematics (17%) Applies mathematical disciplines.
Terminal and Enabling Certification Objectives (TCOs & ECOs)
TCO 3: Apply fundamentals of trigonometry.
ECO 3.1: Apply the six trigonometric functions.
ECO 3.2: Apply the geometric principles that support trigonometry.
ECO 3.3: Understand the applications of spherical, ellipsoidal, and planar geometry and trigonometry.
TCO 4: Apply fundamentals of linear algebra to geodetic, bathymetric, and photogrammetric data.
ECO 4.1: Define matrix, matrix addition, multiplication, transpose, inverse, vector, and scalar.
ECO 4.2: Apply matrix and vector algebra in processing geodetic, bathymetric, and photogrammetric data.
TCO 5: Apply calculus to geodetic, bathymetric, and photogrammetric data.
ECO 5.1: Apply derivatives and partial derivatives.
ECO 5.2: Understand calculus applications to geodetic, bathymetric, and photogrammetric data and data analysis.
Core Competency 4 - Statistical Analysis (17%) Identifies and understands appropriate statistical tools and techniques to examine data, reach conclusions, gain insights, and determine trends.
Terminal and Enabling Certification Objectives (TCOs & ECOs)
TCO 6: Understand fundamentals of statistics and their application to geodetic, bathymetric, and photogrammetric data.
ECO 6.1: Understand the applications of statistics to geodetic, bathymetric, and photogrammetric data.

TCO 7: Comprehend fundamentals of least squares adjustments and their applications to geodetic and photogrammetric data.
ECO 7.1: Define least squares curve fitting and residual values.
ECO 7.2: Explain applications of least squares adjustments to geodetic and photogrammetric data.
TCO 8: Comprehend fundamentals of precision, accuracy, and error.
ECO 8.1: Understand precision, accuracy, and the sample statistics used to describe them.
ECO 8.2: Recognize types of errors (e.g. random, systematic, blunders).
ECO 8.3: Understand quality control processes in mission planning, equipment calibration, and data collection and analysis.
Core Competency 5 - Tools and Methods in Applied Sciences (50%) Applies or adapts existing tools and methods or employs new methodological approaches to advance discipline, domain, or area of work.
Terminal and Enabling Certification Objectives (TCOs & ECOs)
TCO 9: Comprehend fundamental geodetic principles.
ECO 9.1: Distinguish between astronomic, geodetic, and geocentric systems.
ECO 9.2: Understand the four defining parameters of the World Geodetic System 1984 (WGS 84) ellipsoid.
ECO 9.3: Understand the three fundamental surfaces of geodesy (geoid, ellipsoid, and topographic surface) and their relationships with each other.
ECO 9.4: Describe positioning, navigation, and timing as they relate to applied sciences.
ECO 9.5: Describe Earth's magnetic field and its impacts on navigation.
ECO 9.6: Discuss the importance of geodetic principles (e.g. datums, map projections) in mapping.
ECO 9.7: Describe the authorized tools and methods available for datum transformation and coordinate conversion.

TCO 10: Comprehend geodetic surveying principles.
ECO 10.1: Understand the distinctions between geodetic and plane surveys and the appropriate applications of each.
ECO 10.2: Understand traditional surveying methods and describe the horizontal and vertical collection techniques.
ECO 10.3: Identify the principles of astronomic surveying.
ECO 10.4: Describe the principles of gravity surveying.
TCO 11: Comprehend physical geodesy principles.
ECO 11.1: Understand gravity and gravitational potential theory.
ECO 11.2: Understand different types of gravity anomalies and field variations.
ECO 11.3: Understand gravimetric and magnetic analysis and modeling.
ECO 11.4: Describe the importance of gravity and deflection of the vertical and their impact on various weapons and navigation systems.
ECO 11.5: Name the types of gravity collection methods.
ECO 11.6: Understand equipotential surfaces and the importance of the geoid.
TCO 12: Comprehend satellite geodesy principles.
ECO 12.1: Define satellite geodesy and list its applications to Geospatial Intelligence (GEOINT).
ECO 12.2: Describe the purpose and methods of satellite altimetry, especially as they relate to gravity.
TCO 13: Comprehend earth science principles.
ECO 13.1: Describe environmental/meteorological factors and soil/geology characteristics that influence earth science analysis.
ECO 13.2: Understand basic fluvial hydrology and coastal processes and their impact on earth science modeling.
ECO 13.3: Describe the processes influencing geohazards (e.g. earthquakes, volcanoes, landslides).

TCO 14: Comprehend bathymetric principles.
ECO 14.1: Understand bathymetry, hydrography, and oceanographic principles relevant to sea floor measurement.
ECO 14.2: Understand the causes and characteristics of tides and their relationship to chart and vertical datums.
ECO 14.3: Understand the importance of deconflicting bathymetric authorities and data sources.
ECO 14.4: Describe the integration of correctors into hydrographic survey data (e.g. sound speed, vessel motion).
ECO 14.5: Describe the hydrographic data standards produced by the International Hydrographic Organization (IHO), specifically those covering vertical and horizontal uncertainty.
ECO 14.6: Explain the importance of precise positioning in nontraditional sea floor surveys (e.g. dead reckoning).
TCO 15: Comprehend Global Navigation Satellite Systems (GNSS) and reference frame realization principles.
ECO 15.1: Explain NGA's role in GNSS operations and analysis and the connection to the WGS 84 reference frame realization.
ECO 15.2: Describe GNSS orbit estimation methods and identify potential sources of error.
ECO 15.3: Explain how a GNSS is used to compute a position.
ECO 15.4: Understand the importance of Earth orientation and its use in translating between the celestial and terrestrial reference frames.
ECO 15.5: Understand the importance of a reference frame realization.
TCO 16: Comprehend photogrammetric principles.
ECO 16.1: Understand the purpose of triangulation and its applications to photogrammetry.
ECO 16.2: Understand the image orthorectification process and its importance.
ECO 16.3: Understand standard digital elevation model (DEM) types, NGA DEM products, and their uses.
ECO 16.4: Understand the concepts of ground sample distance (GSD), the National Imagery Interpretability Rating Scale (NIIRS), and DEM post spacing.

ECO 16.5: Understand how remotely sensed data sources are used to generate a DEM.
TCO 17: Implement Geographic Information System (GIS) methods in Applied Science.
ECO 17.1: Apply GIS methods to assess and manipulate data.