GISCI PreGISP Exam Learning Outcomes

List of learning outcomes based on syllabi submitted by instructors of GIS&T courses taught in the United States.

The last third column lists the most likely matching knowledge area. If there is some ambiguity, then the last two columns list the second and third most likely matching knowledge area.

LOid	*Learning Outcome*	*KA 1*	*KA 2*	*KA 3*
LOid0001	Analyze environmental and other data spatially with web GIS tools using a variety of techniques, including visualization, filtering, map overlay, routing, mean center, and proximity.	CV03	CV01	AM03
LOid0002	Apply cartographic design principles such as symbology, color, and classification methods to create, modify, and critically evaluate effective maps and visualizations.	CV02	CV07	CV03
LOid0003	Create multimedia 2D maps and 3D scenes that effectively communicate an environmental issue, event, or theme, via results of a research investigation.	CV03	CV07	CV02
LOid0004	Demonstrate how to create and map data from spreadsheets, from GPS data, from field surveys, from joining data, and from pre-existing maps.	GD01	DM01	AM03
LOid0005	Identify how society influences mapping, and how mapping influences society, through data availability, data quality, map projections, crowdsourcing, location privacy, the Internet of Things, and design, and examine the connections between Christian ethics, GIS, and environmental science.	GS01	GS06	GS05
LOid0006	Identify ways in which GIS, maps, and geo-visualizations are providing a common language and framework for communication and solving problems.	CV03	CF01	GS07
LOid0007	Select correct tools within the GIS software for properly discovering and navigating spatial data.	DS06	DS01	CV01
LOid0008	Select correct tools within the GIS software for properly symbolizing spatial data.	DS06	CV02	CV03
LOid0009	Select correct tools within the GIS software for properly displaying map elements and spatial data.	DS06	CV02	CV03
LOid0010	Select tabular information through properly structured attribute queries.	AM11	DM01	DS06
LOid0011	Select geographic information through properly structured spatial queries.	AM11	DM01	DS06
LOid0012	Select appropriate geographic and projected coordinate systems.	CF09	GD03	DM04
LOid0013	Construct geographic information through properly preparing, modeling, and analyzing data using geoprocessing tools.	AM03	CF04	DS06

LOid0014	Collect, assimilate, edit, and model accurate and complete vector datasets.	GD01	DM05	AM03
LOid0015	Collect, assimilate, edit, and model accurate and complete tabular datasets.	GD01	DM01	AM03
LOid0016	Use spatial data, geoprocessing, quality assessment, and metadata to perform, assess, and document spatial analysis.	GD02	AM02	CV01
LOid0017	Collect, assimilate, edit, and model accurate and complete raster datasets.	GD01	DM04	AM03
LOid0018	Collect, assimilate, edit, and model accurate and complete 3D datasets.	GD01	DM04	AM03
LOid0019	Describe raster structure, how it models geographic phenomena, and raster-based GIS properties and applications.	DM04	CF03	CF04
LOid0020	Identify raster data sources, their resolution types, and common raster geoprocessing.	GD01	DM04	AM03
LOid0021	List, describe, and perform steps in the raster analysis workflow.	DM04	AM03	GD02
LOid0022	Explain aerial image acquisition and processing	PP02	IP03	GD01
LOid0023	List and differentiate common GIS data elevation models.	DM04	AM01	GD01
LOid0024	Describe the process for acquiring and processing orthorectified imagery from airborne platforms.	PP02	IP03	GD01
LOid0025	Describe the electromagnetic spectrum and how spectral signatures are used to identify features in images.	PP01	PP02	IP05
LOid0026	Explain and perform object-oriented and pixel-oriented classification.	IP05	IP03	GD01
LOid0027	Differentiate between accuracy, precision, and error; and their role in classifying land cover.	GD02	IP05	AM15
LOid0028	Explain how spectral indices are calculated and list common spectral indices.	IP05	IP03	PP02
LOid0029	Describe how to perform and interpret change detection analysis.	IP05	AM02	AM01
LOid0030	Select appropriate data structures, mediums, and workflows for sharing raster information along with metadata.	DM01	GD02	IP02
LOid0031	Explain how data is collected, stored in the tabular model, and analyzed to create information and knowledge.	DM01	CF03	AM02
LOid0032	Use spreadsheet functions to transform text, numeric, and geospatial data.	DM01	GD01	AM03
LOid0033	Visualize data in tables, charts, maps, and dashboards using best practices.	CV03	CV02	DS04
LOid0034	Model tabular and geospatial data using conceptual, logical, and physical entity-relationship diagrams.	DS02	DM01	CF03
LOid0035	Create database schema and relate tables in a Relational Database Management System (RDBMS).	DM01	DS02	DS05

LOid0036	Use Extract, Transform, Load (ETL) tools to assimilate vector, raster, and triangulated data in a geodatabase with subtypes and attribute domains.	DM01	DM04	DM05
LOid0037	Create and edit geospatial data using basic point, line, and polygon construction tools.	GD01	DM05	CF03
LOid0038	Create and edit geospatial data using advanced point, line, and polygon construction tools.	GD01	DM05	CF03
LOid0039	Explain how network, geodatabase, and map topology are used in GIS.	DM05	AM09	GD01
LOid0040	Explain how GPS and DGPS create location data.	GD01	PP01	CF09
LOid0041	Collect GPS field data using the field data collection workflow to minimize errors.	GD01	GD02	DM01
LOid0042	Describe and demonstrate the benefits of using data automation in GIS.	DS05	DS06	GD02
LOid0043	Define maps and cartography and describe how maps are made and used from past to present.	CV04	CV02	CF04
LOid0044	Identify and apply best practices for designing and evaluating a map as a form of visual communication.	CV02	CV03	CV07
LOid0045	Locate and select mappable data from authoritative sources and document data sources	GD01	GD02	AM15
LOid0046	Transform spatial data to model 3D phenomena on a 2D map.	AM01	DM04	CV03
LOid0047	Represent one or more variables on a single thematic map.	CV07	CV03	AM02
LOid0048	Generalize geospatial data and attributes using appropriate strategies.	AM06	CV03	DM04
LOid0049	Effectively use color to convey your story on a map.	CV02	CV07	CV03
LOid0050	Symbolize discrete features and continuous surfaces on a map.	CV02	CV07	CV03
LOid0051	Select correct label placement and properties on a map.	CV07	CV02	CV03
LOid0052	Organize and arrange map elements to reinforce your purpose.	CV07	CV02	CV03
LOid0053	Identify your purpose, audience, and medium to make meaningful maps.	CV02	CV06	CV03
LOid0054	Assemble, critique, and share a GIS portfolio.	OI03	GS01	DS06
LOid0055	List leading-edge technologies and how they are being used in advanced GIS applications.	GC02	GC01	GC03
LOid0056	List factors in designing a sample and explain how deterministic interpolation predicts values between sample points.	AM02	GD01	AM01
LOid0057	Differentiate between deterministic and geostatistical interpolation and describe the steps in the geostatistical workflow.	AM08	AM01	AM03
LOid0058	Identify and create basic network structures and types in GIS.	AM09	DM05	DM01
LOid0059	Describe and perform geometric, transportation, and topological network analyses and workflows.	AM09	AM03	GD01
LOid0060	Define LiDAR, LiDAR sources and properties, and applications in GIS.	PP03	GD01	DM04

LOid0061	Explain how LiDAR attributes are used in classifying LiDAR data.	PP03	IP05	GD01
LOid0062	Describe basic and advanced 3D models in GIS.	DM04	AM01	GD01
LOid0063	Create 3D models and use them to perform and visualize 3D analysis	DM04	CV03	AM03
LOid0064	List common national water resource datasets, their data schema, and where to download them.	GD01	DM04	TA01
LOid0065	Differentiate between hydrography and hydrology and diagram the components and characteristics of drainage runoff.	DM04	TA01	AM01
LOid0066	Analyze hydrologic data using tabular, vector, raster, and triangulated data models.	DM04	TA01	AM02
LOid0067	Describe what automation is and list the benefits and types of automation used in GIS.	DS05	DS06	AM03
LOid0068	List and define the elements in a model diagram and create and troubleshoot a simple model.	DS06	DS05	AM03
LOid0069	Identify commonly used geoprocessing tools and explain how they can be used in ModelBuilder models.	DS06	DS05	GD01
LOid0070	Create and explain a model using custom geoprocessing, parameters, and documentation.	DS06	DS05	AM03
LOid0071	Describe, configure, and successfully run a geoprocessing model with iterators, loops, and branching.	DS06	DS05	AM03
LOid0072	Create and successfully run a model using advanced modeling techniques.	DS06	DS05	AM03
LOid0073	Create and successfully run Arcade code using proper syntax and elements.	DS05	DS07	DS06
LOid0074	Create and successfully run Python in geoprocessing tool code blocks and notebooks using proper syntax and elements.	DS05	DS07	DS06
LOid0075	Create and successfully run SQL expressions using proper syntax and elements.	DS05	DS07	DM01
LOid0076	Create and successfully run an ETL model using proper syntax and elements.	DS05	DM01	IP01
LOid0077	Create and successfully run an ETL model within an ArcGIS model.	DS05	DM01	DS06
LOid0078	Create an ArcGIS Task with documentation that automates an interactive workflow.	DS06	DS05	CF04
LOid0079	Assess how Data Models are applied in GIS.	DM01	CF03	DM05
LOid0080	Source, create, assimilate, and validate appropriate demographic data.	GD01	GD02	TA04
LOid0081	Source, create, assimilate, and validate appropriate administrative data.	GD01	GD02	TA04
LOid0082	Source, create, assimilate, and validate appropriate environmental data.	GD01	GD02	TA01
LOid0083	Source, create, assimilate, and validate appropriate infrastructure data.	GD01	GD02	TA04
LOid0084	Appraise the quality of a GIS dataset and workflow.	GD02	AM15	TA04
LOid0085	Assess how the Project Management Framework is applied in GIS	OI03	GD02	DM01

LOid0086	Create an appropriate Statement of Work (SOW) in support of a real-world GIS project.	OI03	GS06	CF01
LOid0087	Create an appropriate Data Management Plan (DMP) in support of a real-world GIS project.	OI03	DM01	GD02
LOid0088	Design an appropriate Work Breakdown Schedule (WBS), Schedule and Budget in support of a real-world GIS project.	OI03	DM01	CF01
LOid0089	Perform geospatial analyses using GIS.	AM02	AM03	GD01
LOid0090	Present your analysis in an aesthetic and informative medium.	CV03	CV02	CV06
LOid0091	Use the analytical process and GIS workflow to solve geospatial problems.	CF01	AM05	AM02
LOid0092	Use geoanalytic models and methods to analyze geospatial data.	AM02	AM03	GC02
LOid0093	Use critical thinking and the analytical process to write an effective executive summary.	CF01	AM05	GS01
LOid0094	Create accurate vector GIS data through proximity analysis.	AM03	DM05	AM07
LOid0095	Create accurate vector GIS data through overlay analysis.	AM03	DM05	CF03
LOid0096	Create accurate vector GIS data through network analysis.	AM09	DM05	GD01
LOid0097	Create accurate raster GIS data through proximity analysis.	AM03	DM04	AM07
LOid0098	Create accurate raster GIS data through overlay analysis.	AM03	DM04	CF03
LOid0099	Create accurate raster GIS data through path analysis	AM03	DM04	AM09
LOid0100	Create and edit accurate 3D GIS data.	DM04	AM01	GD01
LOid0101	Analyze 3D GIS data.	AM01	AM02	DM04
LOid0102	Visualize 3D data.	CV03	AM01	CV07
LOid0103	Describe what programming is and how it is used in the ArcGIS environment.	DS05	DS06	DS07
LOid0104	Create and successfully run Python code using the basic elements of the language.	DS05	DS06	DS07
LOid0105	Create and successfully run Python code that relies on conditionals, loops, and user-defined functions.	DS05	DS06	DS07
LOid0106	Write Python code that reads and writes to and from files on disk, and that handles and logs errors	DS05	DS06	DS07
LOid0107	Create Python code that interacts with geospatial data and ArcGIS Pro geoprocessing tools.	DS05	DS06	DS07
LOid0108	Create Python code that reads and writes feature geometry and attribute data in geospatial datasets.	DS07	DM05	DS05
LOid0109	Create user-friendly and robust ArcGIS script tools from Python code.	DS07	DS06	CV06
LOid0110	Create Python code that accesses, describes, and manipulates raster data.	DS07	DM04	DS05
LOid0111	Use ArcPy to interact with ArcGIS Pro project files, maps, layers, and layouts.	DS07	DS06	DS01

LOid0112	Use the ArcGIS API for Python to search for, display, and manage geospatial data hosted on the web.	DS07	WB01	WB05
LOid0113	Use the NumPy and Pandas Python packages to interact with and analyze geospatial data.	DS07	DM04	AM02
LOid0114	Use the Matplotlib Python package to create data visualizations.	DS07	CV03	CV02
LOid0115	List the components, their role in the overall system, and different technology stacks for serving up GIS over the web.	WB06	WB01	DS01
LOid0116	Use HyperText Markup Language (HTML) to create and edit a web page.	WB05	DS07	WB04
LOid0117	Use Cascading Style Sheets (CSS) to format a website.	WB05	DS07	WB04
LOid0118	Use JavaScript to create interactive web content.	WB05	DS07	WB04
LOid0119	Use HyperText Transfer Protocol (HTTP) submitted via a Uniform Resource Locator (URL) to interface with embedded website API's.	WB05	WB01	WB06
LOid0120	Diagram and explain the role of map viewers in the client-server model.	WB06	WB05	DS01
LOid0121	Diagram and explain the role of Web servers and Map Servers in the Web GIS system architecture.	WB06	WB05	DS01
LOid0122	Explain how cached, dynamic, and feature services work and are published as basemap and operational services.	WB06	WB04	DM01
LOid0123	Diagram and explain the role of data servers within the Web GIS system architecture.	WB06	DM01	DS01
LOid0124	Diagram and explain the role of data stores within the Web GIS system architecture.	WB06	DM01	DS01
LOid0125	List factors in selecting a Web-served GIS technology stack.	WB06	DM01	OI03
LOid0126	Draft a product requirements document that lists and describes the primary components of a user's experience.	DS04	OI03	CF01
LOid0127	Compose professional documents in a clear, concise, and effective manner	CV12	CV01	GD01
LOid0128	Customize, or use customized scripts to solve engineering-specific problems with GIS	DS05	DS06	TA04
LOid0129	Integrate topics from various civil engineering disciplines to solve realistic problems	CF01	TA04	TA01
LOid0130	Know where to locate, and how to prepare geographic datasets for use in GIS	GD01	DM05	DM04
LOid0131	Produce professional maps and technical reports from geographic data for presentation	CV12	CV07	CV02
LOid0132	Use GIS tools for spatial analysis, understanding, and design of engineering systems	AM03	AM02	TA04
LOid0133	Use graphics in report documentation and presentation	CV03	CV12	CV02
LOid0134	Acquire and develop basic skills in manipulating GIS software packages such as ESRI's ArcGIS Desktop software	DS06	DS01	CV01
LOid0135	Apply this education to satisfy requirements for an entry level technician job in the GIS field	OI03	OI02	GD01

LOid0136	Communicate ideas, concepts and skills by using words, numbers, maps and other graphic devices	CV03	CV12	CV02
LOid0137	Communicate ideas, concepts, and skills by using words, numbers, maps, and other graphic devices	CV03	CV12	CV02
LOid0138	Compare the similarities and differences between and among various spatial phenomena using common cartographic and analytical techniques	CV07	AM02	CF04
LOid0139	Define and explain key terms such as: GIS, data models, file structures, map projections, geocoding and geodatabase	DM05	DM04	CF06
LOid0140	Develop skills for acquiring new knowledge related to the field of GIS by being exposed to available 'help' tools and additional online based knowledge	OI02	GD01	CF05
LOid0141	Employ their understanding of GIS concepts to help become proficient...	CF01-01	CF06-02	AM05-01
LOid0142	Explain these elements of a geographic information system...	CF06-02	CF04-01	DM01-08
LOid0143	Explore potential solutions to GIS questions on their own	CF01-04	CF05-02	CF02-03
LOid0144	Identify, define and understand key terms...	CF02-01	CF06-02	CF03-01
LOid0145	Interpret results from basic spatial analysis...	AM02-05	AM02-04	AM01-03
LOid0146	Recall information presented to them textually, cartographically...	CF01-04	CF02-03	CF02-01
LOid0147	Acquire and develop intermediate skills in manipulating GIS software packages...	DS03-02	DS06-01	DS04-04
LOid0148	Analyze spatially distributed phenomena using techniques such as ...	AM02-05	AM03-05	AM01-05
LOid0149	Apply this education to satisfy requirements for an entry level technician job...	OI02-02	OI04-03	GS07-03
LOid0150	Communicate ideas, concepts and skills by using words...	CV02-08	CV02-05	CF01-05
LOid0151	Communicate ideas, concepts, and skills by using words...	CV02-08	CF01-05	CV02-05
LOid0152	Compare the similarities and differences between...	CF08-02	CF02-03	AM02-03
LOid0153	Define and explain key terms such as...	CF02-01	CF06-02	CF04-01
LOid0154	Develop skills for acquiring new knowledge...	CF01-03	CF07-05	OI02-05
LOid0155	Employ their understanding of GIS concepts...	CF06-02	CF01-01	CF05-01
LOid0156	Explain these elements of a geographic information system...	CF06-02	CF04-01	CF03-02
LOid0157	Identify, define, and understand key terms and concepts...	CF02-01	CF03-01	CF04-03
LOid0158	Interpret results from basic spatial analysis...	AM02-05	AM01-03	AM03-05
LOid0159	Recall information presented to them textually, cartographically...	CF01-04	CF02-03	CF02-01

LOid0160	Acquire and develop advanced skills in manipulating GIS software...	DS04-04	DS03-02	DS06-01
LOid0161	Analyze spatially distributed phenomena...	AM02-05	AM03-05	AM01-05
LOid0162	Communicate ideas, concepts, and skills by using words...	CV02-08	CV02-05	CF01-05
LOid0163	Compare the similarities and differences between...	CF08-02	AM06-03	CF02-02
LOid0164	Define and explain key terms such as: Raster operations...	CF06-02	CF02-01	DM01-05
LOid0165	Develop skills for acquiring new knowledge...	CF01-03	OI02-05	CF08-04
LOid0166	Employ their understanding of GIS concepts...	CF06-02	CF01-01	AM05-01
LOid0167	Explain these elements of a geographic information system...	CF06-02	CF04-01	DM01-08
LOid0168	Interpret results from basic spatial analysis...	AM02-05	AM02-04	AM01-03
LOid0169	Recall information presented to them textually, cartographically...	CF01-04	CF02-01	CF02-03
LOid0170	Will communicate ideas, concepts and skills...	CV02-08	CF01-05	CV02-05
LOid0171	Will identify, define, and understand key terms and concepts...	CF02-01	CF06-02	CF03-01
LOid0172	Analyze numeric data and the results of statistical tests...	AM14-02	AM14-04	AM14-08
LOid0173	Construct one or more legible maps	CV07-03	CV02-05	CV02-13
LOid0174	Define and explain key terms such as mean...	AM14-02	CF02-01	CF06-02
LOid0175	Demonstrate their ability to acquire data...	GD01-02	GD01-05	GD01-07
LOid0176	Demonstrate their ability to gather data...	GD01-02	GD01-01	GD01-10
LOid0177	Communicate results of statistical tests...	AM14-04	CV02-08	CF01-05
LOid0178	Generate one or more statistical measures...	AM14-02	AM14-08	AM14-06
LOid0179	Discuss critically the key concepts of crime mapping...	TA04-07	CF01-02	AM09-03
LOid0180	Formulate a hypothesis and...test that hypothesis...	TA04-07	AM15-02	AM13-02
LOid0181	Identify spatial data dealing with crime...	TA04-07	GD01-04	GD01-07
LOid0182	Interpret crime mapping principles...	TA04-07	CF01-04	CF08-06
LOid0183	Recognize and state essential cartographic concepts...	CV02-11	CV02-12	CV07-02
LOid0184	Discuss and critically evaluate the appropriateness of the datasets...	GD02-02	TA04-07	OI05-01
LOid0185	Discuss and interpret spatial techniques pertaining to GIS	AM02-01	AM05-01	CF01-04
LOid0186	Formulate a hypothesis...by completing a comprehensive GIS project...	AM05-01	AM13-02	AM02-09

LOid0187	Recognize and state essential GIS Concepts	CF04-01	CF06-02	CF03-02
LOid0188	Solve spatial problems using GIS Software (ArcGIS)	DS03-02	DS06-01	AM03-05
LOid0189	Discuss critically the key concepts of land data	TA04-24	CF01-01	GD01-07
LOid0190	Formulate a hypothesis and then test it by inputting…land data	AM15-02	AM13-02	TA04-24
LOid0191	Identify spatial data dealing with land data…	GD01-02	TA04-24	GD01-10
LOid0192	Interpret land management principles…	TA04-24	CF01-03	CF02-03
LOid0193	Recognize and state essential land data concepts	CF06-02	CF02-01	TA04-24
LOid0194	Critically evaluate the accuracy and scale…	GD02-02	AM15-03	TA02-03
LOid0195	Formulate and test a hypothesis…imagery	PS03-09	AM13-02	AM14-01
LOid0196	Interpret spatial techniques of remote sensing…	PS03-09	CF01-04	PS02-03
LOid0197	Recognize and define essential Remote Sensing Concepts	CF02-01	PS03-02	PS03-12
LOid0198	Solve spatial problems using Remote Sensing Software	DS06-01	PS03-09	PS03-13
LOid0199	Apply GIS to a host of environmental studies…	TA01-04	TA04-34	TA04-14
LOid0200	Develop personal experience in using GIS to solve environmental problems…	TA01-04	TA04-34	OI02-03
LOid0201	Identify relevant and valid sources of spatial environmental data…	GD01-01	TA01-04	GD01-05
LOid0202	Recognize the role of GIS in data management…	DM01-08	DM01-10	CF04-03
LOid0203	Understand and use fundamental GIS knowledge…	CF06-02	CF04-01	CF01-03
LOid0204	Demonstrate awareness of fundamental remote sensing…	PS02-02	PS01-08	PS03-02
LOid0205	Demonstrate basic proficiency in map creation and design…	CV02-05	CV07-03	CV05-01
LOid0206	Demonstrate proficiency in the basic functions of geospatial software	DS04-04	DS03-02	DS06-01
LOid0207	Demonstrate proficiency in the creation and acquisition of spatial data	GD01-02	GD01-05	GD01-10
LOid0208	Describe the fundamental concepts of Geographic Information Science and Technology	CF06-02	CF01-01	CF03-03
LOid0209	Determine an appropriate approach to solving a problem…	CF01-04	AM05-01	AM02-08
LOid0210	Organize the data sets resulting from analysis	DM01-02	DM01-10	AM02-08
LOid0211	Prepare data for use in analysis	AM03-02	GD01-02	DM01-05
LOid0212	Present the results of a geospatial analysis…	CF01-05	CV02-08	CV03-06
LOid0213	Run geoprocessing tools…	DS04-04	DS06-01	AM03-01

LOid0214	Categorize and describe different types of maps...	CV07-01	CV02-11	CF02-03
LOid0215	Critique maps for appropriate use of cartographic...	CV06-02	CV07-03	CV02-13
LOid0216	Describe basic physics concepts on which remote sensing...	PP01-05	PP02-02	PP02-06
LOid0217	Describe the components of a map...	CV02-11	CV02-05	CF02-01
LOid0218	Design professional quality maps...	CV02-14	CV02-05	CV07-03
LOid0219	Employ an appropriate geographic referencing system...	CF09-01	CF09-04	GD03-03
LOid0220	Select and apply ethical and appropriate data model...	GS06-02	DM01-05	AM04-03
LOid0221	Apply basic concepts methods and uses of accuracy assessment...	AM15-03	GD02-02	CF05-02
LOid0222	Describe characteristics of passive and active remote sensing systems...	PS03-09	PS03-03	PS03-12
LOid0223	Describe future trends in remote sensing	PS01-06	TA01-02	OI02-05
LOid0224	Describe the fundamentals of Photogrammetry	PS03-03	PS02-03	PP02-04
LOid0225	Perform basic remote sensing workflows...	IP05-03	IP05-12	PS03-05
LOid0226	Select appropriate data set for remote sensing application...	PS03-11	PS01-02	GD01-09
LOid0227	Achieve a higher level of information literacy...	CF01-03	OI02-05	GD02-02
LOid0228	Become knowledgeable about a breadth of environmental problems...	TA01-09	OI02-01	TA04-03
LOid0229	Consider issues in their totality from multiple perspectives...	CF08-04	CF02-02	GS01-01
LOid0230	Deepen and apply their environmental knowledge...	TA04-34	CF01-04	TA01-04
LOid0231	Expand their awareness of the world...	GS01-03	CF01-02	TA01-01
LOid0232	Explore and apply the concept of sustainability...	TA01-06	GS01-01	GS03-01
LOid0233	Improve in their critical reading skills...	CF01-04	OI02-05	AM02-02
LOid0234	Improve in their oral and written communication skills	CV02-08	CF01-05	CV02-05
LOid0235	Improve their critical thinking skills...	CF01-04	AM05-01	CF08-02
LOid0236	Recognize, grapple with, and articulate the ambiguity...	GS01-01	CF07-05	CF08-06
LOid0237	Achieve a higher level of information literacy...	CF01-03	OI02-05	GD02-02
LOid0238	Become knowledgeable about a breadth of environmental...	TA01-09	OI02-01	TA04-03
LOid0239	Consider issues in their totality from multiple perspectives...	CF08-04	CF02-02	GS01-01
LOid0240	Deepen and apply their environmental knowledge...	AM07-03	OI02-04	

LOid0241	Expand their awareness of the world...	AM07-03	GS01	
LOid0242	Explore and apply the concept of sustainability...	AM07-03	GS01	
LOid0243	Improve in their critical reading skills...	CF01-04	OI02-05	AM02-02
LOid0244	Improve in their oral and written communication skills	CV02	CF01	
LOid0245	Improve their critical thinking skills...	GS01	CF01	
LOid0246	Recognize, grapple with, and articulate the ambiguity...	GS01	CF01	
LOid0247	Critically analyze the use of Geographic Information Systems...	CF06	GS01	
LOid0248	Demonstrate proficiency in Geographic Information Systems.	AM03	CF06	
LOid0249	Develop the skill of geographic information interpretation and analysis.	AM02	CF06	
LOid0250	Understand the fundamentals of Geographic Information Systems.	CF06		
LOid0251	Appreciate and evaluate map communication and map exploitation.	CV02	CF04	
LOid0252	Explore the digital mapping revolution	OI02-03	CF06-02	CF04-03
LOid0253	Grasp the basics of map representation...	CV02	CF04	
LOid0254	Review environmental and human applications of GIS-based cartography.	AM07-03	CV02	
LOid0255	Communicate the challenges of remote sensing...	PP02	GS01	
LOid0256	Critically analyze the use of remote sensing...	PP02	GS01	
LOid0257	Demonstrate proficiency in the major remote sensing systems...	PP02	PS02	
LOid0258	Develop the skill of image interpretation and analysis...	PP02	IP05	
LOid0259	Understand the fundamentals of remote sensing science	PP01	PP02	
LOid0260	Critically analyze the use of remote sensing...	PP02	GS01	
LOid0261	Demonstrate proficiency in the core areas of digital image processing	IP03	PP02	
LOid0262	Develop the skills necessary to plan and conduct an applied research project using remote sensing techniques	TA01-04	AM15-02	OI02-03
LOid0263	Understand the fundamentals of the remote sensing process	PP01	PP02	
LOid0264	Communicate knowledge of Python scripting...	DS05	DS07	
LOid0265	Critically analyze the use of the Global Positioning System...	GD03	GS01	
LOid0266	Demonstrate proficiency in a variety of geoprocessing tools in Python	DS05	DS07	
LOid0267	Demonstrate proficiency in using a GPS in concert with a Geographic Information Systems	GD03		
LOid0267	Demonstrate proficiency in using a GPS in concert with a Geographic Information Systems	GD01-10	PS03-09	PS02-02

LOid0268	Demonstrate the ability to think critically about how Python scripting…	DS05	DS07	
LOid0269	Develop the programming skills of map scripting…	DS05	DS07	
LOid0270	Develop the skill of creating a geodatabase…	GD01	DM01	
LOid0271	Understand the fundamentals of the Global Positioning System	GD03		
LOid0272	Understand the fundamentals of the Python scripting…	DS05	DS07	
LOid0273	Demonstrate the use of geographic technologies to analyze real-world problems …	TA04-34	CF01-04	TA01-04
LOid0274	Describe how GIS&T helps to solve problems of a spatial context.	CF06		
LOid0275	Describe how paper maps and Geospatial Technology…	CF06	CV02	
LOid0276	Describe how to access different sources of data…	GD01	GD02	
LOid0277	Evaluate cartographic products in terms of their aesthetic design…	CV02	CF01	
LOid0278	Identify, explain, and interpret spatial patterns…	AM02-05	AM07-05	CF01-04
LOid0279	Interpret maps and mapped data.	CV02	CF01	
LOid0280	Apply Geographic Information Systems (GIS) software…	TA04-34	DM01-08	OI02-03
LOid0281	Discuss the major elements of Geospatial Technology…	CF06	GS06	
LOid0282	Use three major GIS software products…	TA04-34	DS06-01	DM01-08
LOid0283	Work collaboratively on a geospatial project	OI02-04		
LOid0284	Create new GIS databases	DM01-08	DM01-10	CF04-03
LOid0285	Demonstrate the ability to compile existing data…	GD01-01	OI02-05	GD01-05
LOid0286	Demonstrate the process of field data collection…	GD01-02	TA04-14	GD01-10
LOid0287	Describe the concepts and applications of remote sensing…	PP02	CF06	
LOid0288	Evaluate Data Base Management Systems (DBMS)…	DM01-08	DM01-10	AM04-03
LOid0289	Determine an appropriate approach to solving a problem…	CF01-04	AM05-01	AM02-08
LOid0290	Prepare data for use in analysis	AM03-02	GD01-02	DM01-05
LOid0291	Present the results of a geospatial analysis…	CF01-05	CV02-08	CV03-06
LOid0292	Run geoprocessing tools…	DS04-04	DS06-01	AM03-01

LOid0293	Define remote sensing	PP02		
LOid0294	Discuss the applications of remotes sensing…	PP02	CF06	
LOid0295	Discuss the physical basis for remote sensing…	PP01	PP02	
LOid0296	Evaluate three remote sensing platforms…	PS02		
LOid0297	Familiar with common web mapping…	WB01		
LOid0298	Define GIS (Geographic Information Systems)	CF06		
LOid0299	Define Remote Sensing	PP02		
LOid0300	Demonstrate the role of geospatial technology…	CF06	OI02	
LOid0301	Describe how location can be described…	CF09		
LOid0302	Describe the value of location-based information	CF03	GS02	
LOid0303	Identify geospatial technologies	CF06		
LOid0304	Identify the value and common applications of remotely sensed data	PP02	PS01	
LOid0305	Acquire and integrate a variety of field data…	GD01	DM01	
LOid0306	Calculate and interpret statistical measures of the accuracy…	AM14	AM08	
LOid0307	Define Geographic Information Systems	CF06		
LOid0308	Demonstrate understanding of the conceptual foundations…	CF06	CF04	
LOid0309	Describe characteristics and appropriate uses of common geospatial coordinate systems…	CF09		
LOid0310	Describe characteristics and appropriate uses of common map projections..	CF09		
LOid0311	Discuss the elements of geospatial data quality…	GD02		
LOid0312	Discuss the roles of several geometric approximations…	CF09	CF03	
LOid0313	Edit GIS data	DM01-05	GD01-02	AM03-06
LOid0314	Explain the relationship of horizontal datums…	CF09	CF03	
LOid0315	Georeference a paper map or map image	GD03-03	CV02-05	AM12-04
LOid0316	Identify data quality and integration problems…	GD02	DM01	
LOid0317	Recognize raster data structures	CF03	DM04	
LOid0318	Recognize vector data structures	CF03	DM05	
LOid0319	Understand GIS history	CF06	CV04	
LOid0320	Use a computer and related GIS software…	DS03-02	DS06-01	OI02-03

LOid0321	Analyze geographic information systems software	DS06-01	AM04-03	CF04-03
LOid0322	Apply earth geometry and its approximations...	CF09	CF03	
LOid0323	Apply principles of Map Design...	CV02		
LOid0324	Apply the principles of graphic design...	CV02	CV07	
LOid0325	Compose Data input, including field data collection...	GD01-02	GD01-10	GD01-05
LOid0326	Critique the design of a given map ...	CV06-02	CV07-03	CV02-13
LOid0327	Define data quality, including geometric accuracy...	GD02		
LOid0328	Define how maps tell a story	CV07	CV02	
LOid0329	Define the characteristics and the importance of spatial data...	CF03	AM14	
LOid0330	Demonstrate how the selection of data classification...	CV07	CF04	
LOid0331	Demonstrate maps as representations of physical...	CV07	CF04	
LOid0332	Describe the content, limitations, and advantages of geographic scale	CF04	AM06	
LOid0333	Differentiate data considerations for mapping...	GD01	CF09	
LOid0334	Differentiate graphic representation techniques...	CV07	WB01	
LOid0335	Employ cartographic design principles...	CV02	CV07	
LOid0336	Evaluate georeferencing systems...	CF09		
LOid0337	Gain exposure to GIS based cartography	CV02-05	CV07-03	CV05-01
LOid0338	Integrate metadata, standards and structure	GD02	OI05	
LOid0339	Recognize and discuss the primary elements...	CF04	AM06	
LOid0340	Recognize and explain the relationship between cartography...	CV02	CF06	
LOid0341	Apply spatial editing and querying...	AM02-08	DM01-02	DM01-10
LOid0342	Assess data quality	GD02		
LOid0343	Characterize essentials of data...	CF03	DM01	GD02
LOid0344	Characterize methods of geographic data layers...	CF03	GD01	AM02
LOid0345	Develop conceptual, logical, and physical models of a geospatial database...	DM02	DM01	DS02
LOid0346	Develop spatial data models - raster models, vector models	DM04	DM05	CF03
LOid0347	Explore relational data...	DM01	DM02	

LOid0348	Identify data quality and integration problems...	GD02-02	DM01-05	GD01-02
LOid0349	Manage and organize spatial and attribute data...	DM01-08	DM01-10	GD01-05
LOid0350	Select data models...	DM01	DM02	
LOid0351	Analyze the fundamental concepts of internet based geospatial services	WB05	TA01	
LOid0352	Classify geospatial system performance	DS03		
LOid0353	Create geospatial software programs using programming languages	DS05-05	DS07-01	DS06-01
LOid0354	Demonstrate proficiency integrating geospatial services...	WB06-02	OI02-03	DS01-05
LOid0355	Demonstrate the ability to perform geospatial applications programming...	DS05	DS06	DS07
LOid0356	Discriminate geospatial system architecture...	DS01	DS03	
LOid0357	Evaluate application programming interfaces...	DS06		
LOid0358	Identify and discuss geospatial internet technology components	WB05	TA01	
LOid0359	Identify appropriate software development tools	DS04	DS06	
LOid0360	Identify the sources and practical applications...	TA01	WB05	
LOid0361	Analyze earth geometry and its approximations...	CF09	CF03	CF04
LOid0362	Apply map projections	CF09		
LOid0363	Apply principles of surveying...	GD01	AM08	
LOid0364	Calculate and interpret statistical measures...	AM14	AM08	
LOid0365	Compare advantages and disadvantages of standard spatial data models...	DM04	DM05	
LOid0366	Define data quality...	GD02		
LOid0367	Define GIS data types and processes	CF03	CF06	
LOid0368	Describe examples of geospatial data analysis...	AM02	CF08	AM05
LOid0369	Differentiate datums...	CF09		
LOid0370	Evaluate georeferencing systems...	CF09		
LOid0371	Identify sources of geographic data...	GD01	GD02	
LOid0372	Integrate metadata, standards and infrastructure	GD02	OI05	DM01
LOid0373	Interpret conceptual and applied GIS uses of the relational data model.	DM01	DM02	

LOid0374	Perform raster data geoprocessing.	AM03-05	AM03-03	DM04-08
LOid0375	Perform vector data geoprocessing.	AM03-05	AM03-02	DM05-01
LOid0376	Prepare data input...	AM03-02	GD01-02	DM01-05
LOid0377	Use geospatial software tools to perform basic GIS analysis...	AM03-01	AM02-05	DS06-01
LOid0378	Analyze spatial analysis and modeling capabilities.	AM05-01	AM02-08	AM13-01
LOid0379	Create new information from existing data...	AM02-09	AM03-05	DM01-05
LOid0380	Demonstrate the use of networks in data modeling and analysis.	AM05	DM01	
LOid0381	Discuss object models and topology using geodatabases.	DM01	GD04	
LOid0382	Distinguish data models from process models.	DM01	AM01	
LOid0383	Distinguish geostatistics...	AM08		
LOid0384	Evaluate application criteria for selection of models.	AM01		
LOid0385	Execute raster analysis	AM03-05	AM08-04	DM04-08
LOid0386	Explore spatial autocorrelation	AM08	AM14	
LOid0387	Identify criteria for selection of static and dynamic models.	AM01	AM10	
LOid0388	Identify techniques for exploratory spatial data analysis	AM14-08	AM05-01	AM02-02
LOid0389	Identify the characteristics and the importance of statistical relationships...	AM14-06	AM14-02	AM05-01
LOid0390	Model physical processes in terms of spatial relationships	AM02-07	AM10-04	CF01-04
LOid0391	Perform point density analysis	AM14	AM02	
LOid0392	Perform surface visualization and analysis	AM01-03	CV03-04	AM03-02
LOid0393	Perform vector data processing	AM03-05	AM03-02	DM05-01
LOid0394	Relate GIS centric models to linked or model centric analysis.	AM09		
LOid0395	Analyze the physics of electromagnetic energy...	PP01	PP02	
LOid0396	Apply remotely sensed data to the interpretation of...	PS03-09	PP02-06	PS02-02
LOid0397	Describe sources and characteristics of remotely sensed data.	PS01	PP02	PP01

LOid0398	Develop an understanding of the fundamental concepts...	CF06	PP02	PP01
LOid0399	Discuss advantages, limitations, and applications of remote sensing data.	PP02		
LOid0400	Examine evolution of aerial photography and satellite information.	PS01-05	PS02-03	
LOid0401	Identify scientific methods and applications of multispectral imagery.	PP02	PS01	
LOid0402	Identify sources and practical applications of microwave...	PP01		PS01
LOid0403	Interpret remotely sensed data with image analysis software.	IP01	IP03	PP02
LOid0404	Analyze GIS business process	PM03	OI01	
LOid0407	Compare GIS and information technology projects	PM03		
LOid0406	Characterize strategic plan / project relationship	OI01	PM03	
LOid0409	Develop understanding of project lifecycle	PM03		
LOid0408	Develop GIS system requirements analysis	OI01	PM03	
LOid0411	Examine dynamics of project budget and schedule	PM03		
LOid0410	Evaluate information access issues...	GS06	GS05	
LOid0412	Identify how to manage project scope	PM03		
LOid1014	Collaborate with others professionally ...	PM03	OI02	
LOid1027	Collaborate with others professionally ...	PM03	OI02	
LOid0414	Communicate effectively by developing informative.. maps.	CV02	CV07	
LOid0415	Develop accurate work flow charts to plan GIS analyses...	DS04-06	OI03-10	OI03-09
LOid0416	Develop proficiency and independence in a suite of GIS skills...	DS03-02	DS06-01	OI02-04
LOid0417	Download, prepare, and trouble-shoot data for analysis...	GD01-01	OI02-05	DM01-05
LOid0418	Apply cartographic design principles to create, modify, and share maps	CV02	CV07	
LOid0419	Create maps, 3D scenes, and related content in a variety of formats	CV07	OI05	
LOid0420	Critically evaluate maps and visualizations	CV06-02	CV02-13	CV07-03
LOid0421	Describe the components of a map (map elements).	CV02		
LOid0422	Design professional quality maps...	CV02	CV07	
LOid0423	Identify how society influences mapping...	CV08	GS02	
LOid0424	Identify ways in which GIS, maps, and geo-visualizations...	CF01-05	CV03-06	DM01-10

LOid0425	Select and apply ethical and appropriate data model...	CV02	CF09	
LOid0426	Apply an appropriate model to the problem to be solved	AM05-01	AM02-08	AM13-01
LOid0427	Explain basic topics of GIS such as spatial data...	CF06	CF03	
LOid0428	Explain the differences between vector and raster data	DM04	DM05	
LOid0429	Explain the human and organizational issues.	OI0	OI02	
LOid0430	Explain what GIS is and the practical applications...	CF06	OI0	
LOid0431	Use GIS software to build basic graphs and reports	CV03-06	AM03-05	DS06-01
LOid0432	Use GIS software to create and use basic geodatabases	GD04	DM01	
LOid0433	Use GIS software to create basic query features.	AM11-02	AM02-08	DM01-14
LOid0434	Use GIS software to edit basic spatial and attribute data.	GD01-02	DM01-05	AM03-06
LOid0435	Create and use basic geodatabases	GD04	DM01	
LOid0436	Edit basic spatial and attribute data.	GD01-02	DM01-05	AM03-06
LOid0437	Explain basic topics of GIS such as spatial data...	CF06	CF03	
LOid0438	Explain the differences between vector and raster data	DM04	DM05	CF03
LOid0439	Explain the human and organizational issues.	OI0	OI02	GS02
LOid0440	Explain what GIS is and the practical applications...	CF06	OI0	
LOid0441	Use GIS software to build basic graphs and reports	CV03-06	AM03-05	DS06-01
LOid0442	Use GIS software to create basic query features	AM11-02	AM02-08	DM01-14
LOid0443	Combine layers of GIS data and to locate areas of special concern...	AM02-08	AM03-07	CF01-04
LOid0444	Create 3-dimensional representations of landscapes...	CV03-04	AM01-03	DM04-07
LOid0445	Solve route problems from sets of interconnected lines...	AM09-02	AM09-05	AM05-01
LOid0446	Acquire information needed to compare the capabilities...	PS01	PP02	
LOid0447	Differentiate types of resolution ...	PS01	PP02	
LOid0448	Explain the difference between active and passive remote sensing	PP01	PP02	
LOid0449	Explain the use of sampling ground truth data...	PP02	GD02	

LOid0450	Identify and explain types of aerial and satellite imagery...	PS01	PS02	PP02
LOid0451	Perform digital photogrammetric functions...	IP05-02	PS02-03	PP02-04
LOid0452	Define orthoimagery in terms of terrain correction...	IP03-07	PS02-03	PP02-06
LOid0453	Use the concept of the electromagnetic spectrum...	PP01	PP02	PS01
LOid0454	Apply skills and knowledge to a work situation...	OI02		
LOid0455	Apply the rules of ethics and professional responsibility ...	GS05	OI02	
LOid0456	Complete work projects in a group setting	OI02		
LOid0457	Demonstrate soft skills that are needed...	OI02		
LOid0458	Describe the necessity of continuing professional education	OI02		
LOid0459	Discuss journal entries pertaining to the internship ...	OI02		
LOid0460	Engage in professional development and networking ...	OI02		
LOid0461	Plan and document GIS skills in relation to eventual certification...	OI02		
LOid0462	Prepare and present a project detailing workplace experience	CF01-05	OI02-05	GS07-03
LOid0463	Relate knowledge and skills acquired in the classroom...	OI02		
LOid0464	Write an effective resume and demonstrate...	OI02		
LOid0465	Analyze satellite images to make conclusions about landscape change...	PP02	AM07-03	IP05
LOid0466	Apply cartographic design techniques to create a map...	CV02-14	CV02-05	CV07-03
LOid0467	Describe and give specific examples of ethical concerns ...	GS05	GS02	OI04
LOid0468	Describe and give specific examples of the diverse applications...	CF06	AM07-03	OI02
LOid0469	Describe how we can track locations using Global Positioning Systems.	GD01-10	PS03-09	PS02-02
LOid0470	Evaluate and choose appropriate color and classification schemes ...	CV02	CV07	
LOid0471	Identify well- (or poorly) designed maps for the online environment...	CV06-05	CV02-13	CV07-03
LOid0472	Make decisions as to the appropriate map projection...	CF09	CV02	
LOid0473	Obtain geographic datasets and design a map using an online mapping program.	GD01-01	CV03-10	OI02-05
LOid0474	Perform basic geographic analysis using open-source GIS software programs	AM02-05	DS06-01	OI02-03
LOid0475	Use latitude/longitude and decimal degrees ...	CF09		
LOid0476	Develop your land cover/use interpretation skills..	PP02	IP05	AM07-03
LOid0477	Introduce the basic technical aspects of remotely sensed images...	PP02	IP01	
LOid0478	Interpret important landscape phenomena ...	PP02	IP05	AM07-03

LOid0479	Create a GIS project and perform spatial analysis...	AM05-01	AM13-01	CF01-04
LOid0480	Describe the spatial components of a problem...	CF01-04	AM05-01	AM02-08
LOid0481	Know how to apply various GIS analysis tools ...	AM05-01	AM03-01	DS06-01
LOid0482	Obtain geographic/spatial data from outside sources.	GD01	GD02	
LOid0483	Understand the components of a GIS program	CF06		
LOid0484	Analyze geographic data using geospatial tools ...	AM03-02	AM03-05	DS06-01
LOid0485	Comprehend the ethical considerations...	GS05	OI04	
LOid0486	Critique and create well-designed maps ...	CV06-02	CV02-14	CV02-05
LOid0487	Interpret basic aerial photographs and satellite images.	PP02	IP05	
LOid0488	Apply various GIS analysis tools to specific analytical situations	AM05-01	AM02-05	DS06-01
LOid0489	Create a GIS project and perform spatial analysis...	AM05-01	AM13-01	CF01-04
LOid0490	Describe the spatial components of a problem...	CF01-04	AM05-01	AM02-08
LOid0491	Obtain geographic/spatial data from outside sources.	GD01	GD02	
LOid0492	Introduce the basic... aspects of remotely sensed images...	PP02	IP01	
LOid0493	Introduce the methods and software...	CF06-02	DS03-04	DS06-01
LOid0494	Interpret common land covers and uses...	PP02	IP05	
LOid0495	Create well-designed... maps using ESRI arcmap...	CV02-14	CV02-05	DS06-01
LOid0496	Critique maps from other sources...	CV02	CV08	
LOid0497	Design a simple website and upload files...	WB02		
LOid0498	Design informative reference maps...	CV02	CV07	
LOid0499	Influence communication of geographic information.	CF01-05	CV06-05	CV03-01
LOid0500	Understand how factors such as typeface and color choice...	CV02	CV07	
LOid0501	Demonstrate an ability to collect, create, and process spatial data..	GD01-02	GD01-10	AM03-02
LOid0502	Demonstrate an understanding of different types of spatial databases...	DM01-08	DM05-01	DM04-01
LOid0503	Demonstrate an understanding of the fundamentals of GIS data storage...	DM01	GD02	
LOid0504	Demonstrate basic proficiency to collect, record, and utilize spatial data...	GD01-02	GD01-10	AM03-02
LOid0505	Describe and apply best practices in data organization and management.	DM01-08	DM01-10	GD01-01

LOid0506	Describe and explain the similarities and differences between data models...	DM04	DM05	
LOid0507	Describe the collection of field data, digital conversion...	GD01-02	GD01-10	IP03-03
LOid0508	Describe the concepts and applications of remote sensing...	CF06	PP01	
LOid0509	Learn about advanced configurations...	DM01	GD04	
LOid0510	Analyze data using Reading & Tech/Info Literacy and Critical Thinking	CF01-04	OI02-05	AM05-01
LOid0511	Create presentation-quality...maps...	CV02-14	CV02-05	CV03-06
LOid0512	Locate reliable and accurate data...	GD02	OI05	
LOid0513	Manipulate spreadsheet data...	DS04-04	DM01-02	DM01-05
LOid0514	Produce reports...	CF01-05	OI02-03	DS06-01
LOid0515	Synthesize information...	CF01	OI06	
LOid0516	Locate reliable and accurate data...	GD02	OI05	
LOid0517	Manipulate database information...	DM01-02	DM01-08	DM01-10
LOid0518	Analyze data using Reading & Tech/Info Literacy and Critical Thinking	CF01-04	OI02-05	AM05-01
LOid0519	Interpret information...	CF01-04	OI02-05	CF01-03
LOid0520	Create presentation-quality...maps...	CV02-14	CV02-05	CV03-06
LOid0521	Produce reports...	CF01-05	OI02-03	DS06-01
LOid0522	Locate reliable and accurate data...	GD02	OI05	
LOid0523	Evaluate data...	GD02-02	CF01-04	GD01-02
LOid0524	Synthesize information...	CF01	OI06	
LOid0525	Define problem-solving pathways...	CF01-04	AM05-01	OI04-03
LOid0526	Predict outcomes...	AM13-03	GC04-04	AM02-07
LOid0527	Create presentation-quality...maps	CV02-14	CV02-05	CV03-06
LOid0528	Produce reports...	CF01-05	OI02-03	DS06-01
LOid0529	Generate enthusiasm and interest in using GIS...	OI0	GS02	
LOid0530	Increase student awareness of GIS science and technology...	CF06		
LOid0531	Introduce fundamental tools used for mapping	DS06-01	CV02-05	AM03-01
LOid0532	Provide experience in digital spatial analysis...	AM02-01	AM14-08	DS06-01

LOid0533	Provide experience in mapping land cover…	PS03-12	IP05-12	TA04-24
LOid0534	Explain at a minimum the concept of projection on the fly…	GD03-03	CF09-04	DM01-05
LOid0535	Describe how map topology is created…	DM05-07	AM12-06	GD04-03
LOid0536	Analyze consumer behavior by location…	AM13	GS02	
LOid0537	Apply locational analytics…	AM02-05	GD01-10	PS03-12
LOid0538	Describe business decisions by sectors…	GS02	AM13	
LOid0539	Present visual data using geographic information systems…	CV02-14	CV03-06	CF01-05
LOid0540	Synthesize traditional practices, novel approaches…	AM13	GS02	OI06
LOid0541	Discuss and critically evaluate the appropriateness…	GD02	AM14	
LOid0542	Discuss and interpret spatial techniques …	AM02		
LOid0543	Formulate a comprehensive GIS project…	OI03-10	TA01-04	OI02-03
LOid0544	Recognize and state essential GIS Concepts	CF06		
LOid0545	Solve spatial problems using GIS Software (ArcGIS)	AM05-01	DS06-01	TA04-07
LOid0546	Discuss the critical concepts of crime mapping…	TA04-07	CF01-01	GS01-06
LOid0547	Formulate a hypothesis and test … spatial patterns of crime…	AM14-02	AM13-01	TA04-07
LOid0548	Identify spatial data dealing with crime…	GD01-01	TA04-07	GD01-05
LOid0549	Recognize and state essential cartographic concepts…	CV02	CV07	CV08
LOid0550	Interpret crime mapping principles…	TA04-07	CF02-03	AM02-05
LOid0551	Discuss critically the key concepts of land data	TA04-24	CF01-01	GD01-07
LOid0552	Formulate a research project by inputting, editing, and analyzing land data	TA04-24	AM15-02	OI02-03
LOid0553	Identify spatial data dealing with land data…	GD01-01	TA04-24	GD01-07
LOid0554	Interpret land management principles…	TA04-24	CF01-03	CF02-03
LOid0555	Recognize and state essential land data concepts	CF06-02	CF02-01	TA04-24
LOid0556	Analyze the role of GIS in data management, environmental…	DM01-08	TA01-04	TA04-14
LOid0557	Apply GIS to a host of environmental studies…	TA01-04	TA04-34	TA04-14
LOid0558	Develop personal experience in using GIS to solve environmental problems …	TA01-04	TA04-34	OI02-03
LOid0559	Evaluate relevant and valid sources of spatial environmental data…	AM07-03	GD02	GD01

LOid0560	Understand and use fundamental GIS knowledge…	CF06-02	CF04-01	CF01-03
LOid0561	Address global problems using spatially-oriented thinking…	TA01-02	CF08-04	CF01-04
LOid0562	Engage in learning about global relationships…	AM07-03	GS02	GS01
LOid0563	Explain and apply theoretical and computational concepts…	GC02-02	AM05-01	GC04-04
LOid0564	Explore problem solving with GIS …	AM05-01	OI04-03	TA04-34
LOid0565	Think critically about global… issues …	AM07-03	GS01	
LOid0566	Interpret earth surface features … from various types of … imagery	PP02	IP05	AM07-03
LOid0567	Write in scientific language… evaluate peer-reviewed articles…	CF01-05	OI02-05	TA01-02
LOid0568	Digitize and create … ortho-mosaics and Digital Surface Models	IP05-12	PS03-05	PP02-03
LOid0569	Recognize and understand basic terms and concepts in remote sensing	PP02	PP01	
LOid0570	Understand how spatial/spectral/temporal/radiometric resolution …	PS01	PP02	
LOid0571	Understand the basic physics determining how electromagnetic radiation…	PP01	PP02	
LOid0572	Acquire a knowledge of foundational concepts…	CF06		
LOid0573	Appreciate new advances in giscience	OI05-05	CF06-02	GC02-03
LOid0574	Develop skills in problem solving …	AM05-01	CF01-04	OI04-03
LOid0575	Learn to think “spatially”	AM01	CF01	
LOid0576	Understand the methods of scientific investigation…	OI02-02	OI02-05	AM15-02
LOid0577	Understand the processes needed to address real-world…	TA04-34	AM05-01	CF01-04
LOid0578	Understanding of the theoretical foundations of GIS	CF06	CF04	
LOid0579	Ability to think spatially	AM01	CF01	
LOid0580	Skills in spatial data analysis…	AM02-01	AM14-08	DM01-02
LOid0581	Skills in … a GIS awareness event	GS05-02	CV06-05	CF01-05
LOid0582	Evaluate the results and assess how to improve…	AM15-02	CF01-04	OI03-11
LOid0583	Execute an acceptable solution	AM05-01	OI03-10	DS06-01
LOid0584	Develop a proposal that identifies…	OI03-09	CF01-05	OI02-03
LOid0585	Identify components of a spatial problem;	AM05-01	CF01-04	AM02-08
LOid0586	Collect, import and display geospatial data…	GD01-01	AM03-02	IP05-05

LOid0587	Create, analyze, critique, and interpret data using...	CV02	AM02	PP02
LOid0588	Critically analyze mapping applications and technologies	CV06-02	GS01-03	CF06-02
LOid0589	Demonstrate basic proficiency in ... cartographic skills.	CV02-14	CV02-15	CV02-05
LOid0590	Determine basic geographic information ...	CF09	CF04	AM06
LOid0591	Analyze a map and add an appropriate feature	CV07-02	AM03-05	AM03-06
LOid0592	Correctly interpret a map feature	CV06-03	CV06-02	CF08-04
LOid0593	Create a map feature in a way that communicates its data clearly.	CV02	CV07	
LOid0594	Choose the appropriate mode of communication...	CF01-05	OI02-03	CV06-05
LOid0595	Define and describe remote sensing ...	PP02	CF06	
LOid0596	Analyze and explain remote sensing purposes...	PP02	CF06	
LOid0597	Assess remote sensing in a variety of... fields	PP02	AM07-03	
LOid0598	Define and describe basics of electromagnetic spectrum ...	PP01	PP02	
LOid0599	Define and describe remote sensing ... (duplicate, see above)	PP02	CF06	
LOid0600	Describe basic characteristics of remote sensing imagery	PP02	PS01	
LOid0601	Describe industry-specific image sources...	PS01	PP02	AM07-03
LOid0602	Describe sensors and image acquisition methods	PS02	PS01	
LOid0603	Compare and contrast images collected from aerial... sources	PS01	PS02	
LOid0604	Construct a workflow for image analysis...	IP03	PP02	AM01
LOid0605	Create a working image analysis ... process...	IP05-05	IP05-12	PS03-09
LOid0606	Describe basic characteristics of remote sensing imagery	PP02	PS01	
LOid0607	Evaluate and perform image analysis and interpretation	IP05-12	IP05-05	PS03-09
LOid0608	Locate and acquire data sources for remote sensing applications	PS01	GD01	GD02
LOid0609	Use remote sensing principles to identify and explain... images.	PP02	PS01	
LOid0610	Create a GIS database of your own...	DM01-08	DM05-01	GD01-05
LOid0611	Create useful, customized maps...	CV02-14	CV02-05	CV03-06
LOid0612	Know how to perform spatial analyses and models	AM05-01	AM13-01	AM02-05
LOid0613	Understand what types of questions a GIS can help answer	TA04-34	CF01-04	DM01-05

LOid0614	Interpretation and analysis of geographic data	AM02-01	AM14-08	DM01-02
LOid0615	Knowledge of geospatial visualization	CV07		
LOid0616	Knowledge of the basic GIS data structures	DM04	DM05	
LOid0617	Knowledge of the coordinate systems and map projections	CF09		
LOid0618	Knowledge of the definition of GIS	CF06		
LOid0619	Knowledge of the management of geographic data	DM01-08	DM01-10	GD01-05
LOid0620	Knowledge of the real-world applications of GIS	CF06	AM07-03	OI02
LOid0621	Knowledge of the types of geographic data	CF03	DM04	DM05
LOid0622	Knowledge of coordinate systems and map projections (repeat)	CF09		
LOid0623	Knowledge of geocoding	GD03-03	AM12-01	GD01-10
LOid0624	Knowledge of geodatabases	DM01-08	DM05-06	DM04-01
LOid0625	Knowledge of GIS data creation…	GD01-02	GD01-05	DM01-05
LOid0626	Knowledge of GPS collections and data input	GD01-10	PS03-09	PS02-02
LOid0627	Knowledge of model builder	AM05-01	DS04-06	DS06-01
LOid0628	Knowledge of raster analyses	AM03-05	DM04-08	AM08-04
LOid0629	Knowledge of real-world applications of GIS (repeat)	CF06	AM07-03	OI02
LOid0630	Knowledge of vector data editing	AM03-06	DM05-01	GD01-02
LOid0631	Analyze the historical development of cartographic representation…	CV04	CV08	AM01
LOid0632	Apply effective cartographic principles…	CV02-14	CV02-15	CV02-05
LOid0633	Assess the efficacy of two-dimensional cartographic projections…	CF09	CV02	
LOid0634	Illustrate future applications for spatial awareness…	CV08	AM01	AM07-03
LOid0635	Utilize no-cost and open-source geospatial technologies…	OI02-03	DS03-04	DS06-05
LOid0636	Apply a code of ethics to geospatial professionals	GS05		
LOid0637	Apply geospatial technology (GIS, remote sensing, GNSS)…	GD01-10	PS03-09	DM01-08
LOid0638	Apply principles of geography to projects…	AM07-03	CF01	AM01

LOid0639	Choose and apply appropriate map scales and coordinate systems	CF09	CV02	
LOid0640	Convert data between formats.	DM01-12	GD01-01	IP03-07
LOid0641	Create 3D/4D representations.	CV03-04	DM04-07	GD01-03
LOid0642	Create analysis report	CF01-05	OI02-03	DS06-01
LOid0643	Create charts.	CV03-06	AM03-05	GD01-03
LOid0644	Create map templates for cartographic output	CV07-10	CF04-04	CV05-03
LOid0645	Create printed cartographic output	CV05-01	CV02-05	CF04-04
LOid0646	Create tables	DM01-02	CF04-04	AM03-05
LOid0647	Define the data requirements, research sources...	GD01	GD02	DM01
LOid0648	Determine data compatibility...	GD02	CF09	DM01
LOid0649	Develop SQL expressions and run queries	DM01-14	AM11-02	CF04-03
LOid0650	Distribute digital and hard copy products	CF01-05	DM01-10	OI02-03
LOid0651	Interpret data results	AM14-06	CF01-04	GD02-02
LOid0652	Organize file structure...	DM01-08	DM01-10	GD01-05
LOid0653	Participate in GIS awareness events...	GS05-02	GS07-03	CF01-05
LOid0654	Perform geoprocessing through clipping, buffering...	AM03-05	AM03-02	AM03-01
LOid0655	Preprocess geographic data...	AM06	AM02	DM01
LOid0656	Think critically and spatially to analyze ... patterns	AM01	CF01	
LOid0657	Apply a code of ethics... (Repeat)	GS05		
LOid0658	Apply geospatial technology... (Repeat)	GD01-10	PS03-09	DM01-08
LOid0659	Apply principles of geography to projects...	AM07-03	CF01	AM01
LOid0660	Choose and apply appropriate map scales and coordinate systems	CF09	CV02	
LOid0661	Collect field attribute and location data via GPS ...	GD01-10	GD01-02	PS03-09
LOid0662	Constructing a valid query statement ...	DM01-14	AM11-02	CF04-03

LOid0663	Convert data between formats	DM01-12	GD01-01	IP03-07
LOid0664	Create 3D/4D representations	CV03-04	DM04-07	GD01-03
LOid0665	Create map templates for cartographic output	CV07-10	CF04-04	CV05-03
LOid0666	Create printed cartographic output	CV05-01	CF04-04	CV02-05
LOid0667	Create tables	DM01-02	CF04-04	AM03-05
LOid0668	Define the data requirements, research sources...	GD01	GD02	DM01
LOid0669	Determine data compatibility...	GD02	CF09	DM01
LOid0670	Develop ... database(s) including defining geometry...	GD04	DM01	
LOid0671	Develop procedures and schedules for data maintenance	DM01-08	OI03-10	OI02-03
LOid0672	Develop SQL expressions and run queries	DM01-14	AM11-02	CF04-03
LOid0673	Distribute digital and hard copy products	CF01-05	DM01-10	OI02-03
LOid0674	Establish data custodianship and distribute...	DM01-08	GS06-04	GD01-05
LOid0675	Generate mailing labels, logos, posters	CV02-08	CV02-11	CF04-04
LOid0676	Geocode data	GD03-03	AM12-01	GD01-10
LOid0677	Geo-reference digital imagery	GD03-03	IP03-07	AM12-04
LOid0678	Interpret data results	AM14-06	CF01-04	GD02-02
LOid0679	Maintain data QA/QC through update operations	GD02-02	DM01-05	OI03-11
LOid0680	Organize file structure	DM01-08	DM01-10	GD01-05
LOid0681	Participate in GIS awareness events	GS05-02	GS07-03	CF01-05
LOid0682	Perform both COGO, and on-screen digitization...	GD01-05	AM03-06	DM05-03
LOid0683	Perform data maintenance through archival functions	DM01-08	DM01-12	OI03-11

LOid0684	Perform database performance tuning...	DM01-08	DM01-10	GD01-05
LOid0685	Perform quality control (QC) and quality assurance (QA) ...	GD02-02	DM01-05	OI03-11
LOid0686	Rectify images to meet data standards	GD03-03	IP03-07	AM12-04
LOid0687	Scan hard copy images into digital format	IP02-01	IP03-03	DM01-05
LOid0688	Think critically and spatially to analyze ...	AM01	CF01	
LOid0689	Apply a code of ethics...	GS05		
LOid0690	Apply geospatial technology (GIS...	GD01-10	PS03-09	DM01-08
LOid0691	Apply principles of geography to projects...	AM07-03	CF01	AM01
LOid0692	Choose and apply appropriate map scales...	CF09	CV02	
LOid0693	Convert data between formats	DM01-12	GD01-01	IP03-07
LOid0694	Create 3D/4D representations.	CV03-04	DM04-07	GD01-03
LOid0695	Create analysis models through flowcharts...	DS04-06	OI03-10	AM05-01
LOid0696	Create analysis report	CF01-05	OI02-03	DS06-01
LOid0697	Create charts.	CV03-06	AM03-05	GD01-03
LOid0698	Create map templates for cartographic output	CV07-10	CF04-04	CV05-03
LOid0699	Create printed cartographic output	CV05-01	CV02-05	CF04-04
LOid0700	Create tables	DM01-02	CF04-04	AM03-05
LOid0701	Define the data requirements, research sources ...	GD01	GD02	DM01
LOid0702	Determine data compatibility...	GD02	CF09	DM01
LOid0703	Develop SQL expressions and run queries.	DM01-14	AM11-02	CF04-03
LOid0704	Distribute digital and hard copy products	CF01-05	DM01-10	OI02-03
LOid0705	Interpret data results	AM14-06	CF01-04	GD02-02

LOid0706	Organize file structure…	DM01-08	DM01-10	GD01-05
LOid0707	Participate in GIS awareness events	GS05-02	GS07-03	CF01-05
LOid0708	Perform database performance tuning…	DM01-08	DM01-10	GD01-05
LOid0709	Perform image analysis (classification)	IP05-03	IP05-12	PS03-09
LOid0710	Perform quality control and assurance	GD02-02	DM01-05	OI03-11
LOid0711	Think critically and spatially to analyze… (Repeat)	AM01	CF01	
LOid0712	Apply a code of ethics… (Repeat)	GS05		
LOid0713	Apply geospatial technology … (Repeat)	GD01-10	PS03-09	DM01-08
LOid0714	Apply principles of geography to projects…	AM07-03	CF01	AM01
LOid0715	Choose and apply appropriate map scales…	CF09	CV02	
LOid0716	Convert data between formats.	DM01-12	GD01-01	IP03-07
LOid0717	Create 3D/4D representations.	CV03-04	DM04-07	GD01-03
LOid0718	Create analysis models through flowcharts…	DS04-06	OI03-10	AM05-01
LOid0719	Create analysis report	CF01-05	OI02-03	DS06-01
LOid0720	Create charts.	CV03-06	AM03-05	GD01-03
LOid0721	Create map templates for cartographic output	CV07-10	CF04-04	CV05-03
LOid0722	Create printed cartographic output	CV05-01	CV02-05	CF04-04
LOid0723	Create tables	DM01-02	CF04-04	AM03-05
LOid0724	Define the data requirements, research sources…	GD01	GD02	DM01
LOid0725	Determine data compatibility…	GD02	CF09	DM01
LOid0726	Develop SQL expressions and run queries	DM01-14	AM11-02	CF04-03
LOid0727	Distribute digital and hard copy products	CF01-05	DM01-10	OI02-03

LOid0728	Generate descriptive and spatial statistics	AM14-01	AM14-02	DM01-02
LOid0729	Interpret data results	AM14-06	CF01-04	GD02-02
LOid0730	Organize file structure...	DM01-08	DM01-10	GD01-05
LOid0731	Participate in GIS awareness events	GS05-02	GS07-03	CF01-05
LOid0732	Perform database performance tuning...	DM01-08	DM01-10	GD01-05
LOid0733	Perform geoprocessing through clipping, buffering...	AM03-05	AM03-02	AM03-01
LOid0734	Perform quality control and assurance	GD02-02	DM01-05	OI03-11
LOid0735	Preprocess geographic data...	AM06	AM02	DM01
LOid0736	Think critically and spatially to analyze...	AM01	CF01	
LOid0737	Apply a code of ethics...	GS05		
LOid0738	Apply geospatial technology....	GD01-10	PS03-09	DM01-08
LOid0739	Apply principles of geography to projects... (repeat)	AM07-03	CF01	AM01
LOid0740	Assist in writing technical guides...	CF01-05	OI02-03	DS04-04
LOid0741	Choose and apply appropriate map scales... (repeat)	CF09	CV02	
LOid0742	Collect field attribute and location data via GPS	GD01-10	GD01-02	PS03-09
LOid0743	Convert data between formats.	DM01-12	GD01-01	IP03-07
LOid0744	Create 3D/4D representations.	CV03-04	DM04-07	GD01-03
LOid0745	Create analysis report	CF01-05	OI02-03	DS06-01
LOid0746	Create customized software application solution	DS05	DS06	DS07
LOid0747	Create help files and support documentation	CF01-05	OI02-03	DS04-04
LOid0748	Create map templates for cartographic output	CV07-10	CF04-04	CV05-03
LOid0749	Create printed cartographic output	CV05-01	CV02-05	CF04-04
LOid0750	Create scripts	DS05	DS07	

LOid0751	Create tables	DM01-02	CF04-04	AM03-05
LOid0752	Define the data requirements, research sources...	GD01	GD02	DM01
LOid0753	Define user software...	DS06	OI02	
LOid0754	Determine data compatibility...	GD02	CF09	DM01
LOid0755	Develop SQL expressions and run queries	DM01-14	AM11-02	CF04-03
LOid0756	Distribute digital and hard copy products	CF01-05	DM01-10	OI02-03
LOid0757	Establish data custodianship and distribute...	DM01-08	GS06-04	GD01-05
LOid0758	Generate mailing labels, logos, posters	CV02-08	CV02-11	CF04-04
LOid0759	Geocode data	GD03-03	AM12-01	GD01-10
LOid0760	Interpret data results	AM14-06	CF01-04	GD02-02
LOid0761	Organize file structure...	DM01-08	DM01-10	GD01-05
LOid0762	Participate in GIS awareness events	GS05-02	GS07-03	CF01-05
LOid0763	Perform data layer updates and update metadata....	GD04-03	DM01-05	DM03-01
LOid0764	Perform quality control and assurance...	GD02-02	DM01-05	OI03-11
LOid0765	Provide technical training for end-users	CF01-05	DS04-03	OI02-04
LOid0766	Resolve user technical problems	OI06	OI02	
LOid0767	Think critically and spatially to analyze ...	AM01	CF01	
LOid0768	Apply a code of ethics...	GS05		
LOid0769	Apply geospatial technology....	GD01-10	PS03-09	DM01-08
LOid0770	Apply principles of geography to projects...	AM07-03	CF01	AM01
LOid0771	Assist in writing technical guides...	CF01-05	OI02-03	DS04-04
LOid0772	Choose and apply appropriate map scales...	CF09	CV02	
LOid0773	Continue professional education...	OI02		

LOid0774	Convert data between formats.	DM01-12	GD01-01	IP03-07
LOid0775	Create map templates for cartographic output	CV07-10	CF04-04	CV05-03
LOid0776	Create printed cartographic output	CV05-01	CV02-05	CF04-04
LOid0777	Create tables	DM01-02	CF04-04	AM03-05
LOid0778	Define the data requirements, research sources...	GD01	GD02	DM01
LOid0779	Determine data compatibility...	GD02	CF09	DM01
LOid0780	Develop procedures and schedules for data maintenance	DM01-08	OI03-10	OI02-03
LOid0781	Develop SQL expressions and run queries	DM01-14	AM11-02	CF04-03
LOid0782	Distribute digital and hard copy products	CF01-05	DM01-10	OI02-03
LOid0783	Establish data custodianship and distribute...	DM01-08	GS06-04	GD01-05
LOid0784	Interpret data results	AM14-06	CF01-04	GD02-02
LOid0785	Maintain data QA/QC through update operations	GD02-02	DM01-05	OI03-11
LOid0786	Organize file structure...	DM01-08	DM01-10	GD01-05
LOid0787	Participate in GIS awareness events	GS05-02	GS07-03	CF01-05
LOid0788	Participate in professional conferences...	OI02-05	GS05-03	CF01-05
LOid0789	Perform database performance tuning...	DM01-08	DM01-10	GD01-05
LOid0790	Perform quality control (QC) and quality assurance (QA) ...	GD02-02	DM01-05	OI03-11
LOid0791	Perform quality control and assurance	GD02-02	DM01-05	OI03-11
LOid0792	Provide technical training for end-users	CF01-05	DS04-03	OI02-04
LOid0793	Resolve user technical problems	OI06	OI02	
LOid0794	Think critically and spatially to analyze ...	AM01	CF01	

LOid0795	Apply geospatial technology...	GD01-10	PS03-09	DM01-08
LOid0796	Apply principles of geography to projects... (repeat)	AM07-03	CF01	AM01
LOid0796	Apply principles of geography to projects...	AM07-03	CF01	AM01
LOid0797	Assist in writing technical guides...	CF01-05	OI02-03	DS04-04
LOid0798	Choose and apply appropriate map scales...	CF09	CV02	
LOid0799	Continue professional education...	OI02		
LOid0800	Convert data between formats.	DM01-12	GD01-01	IP03-07
LOid0801	Create analysis models through flowcharts...	DS04-06	OI03-10	AM05-01
LOid0802	Create customized software application solution	DS05	DS06	DS07
LOid0803	Create help files and support documentation	CF01-05	OI02-03	DS04-04
LOid0804	Create map templates for cartographic output	CV07-10	CF04-04	CV05-03
LOid0805	Create printed cartographic output	CV05-01	CV02-05	CF04-04
LOid0806	Create scripts	DS05	DS07	
LOid0807	Create tables	DM01-02	CF04-04	AM03-05
LOid0808	Define the data requirements, research sources...	GD01	GD02	DM01
LOid0809	Define user software needs...	DS06	OI02	
LOid0810	Determine data compatibility...	GD02	CF09	DM01
LOid0811	Develop SQL expressions and run queries	DM01-14	AM11-02	CF04-03
LOid0812	Install and maintain software...	DS04-01	DS03-02	DM01-10
LOid0813	Interpret data results	AM14-06	CF01-04	GD02-02
LOid0814	Organize file structure...	DM01-08	DM01-10	GD01-05
LOid0815	Participate in professional conferences...	OI02-05	GS05-03	CF01-05
LOid0816	Perform geoprocessing through clipping, buffering... (repeat)	AM03-05	AM03-02	AM03-01
LOid0817	Perform quality control and assurance...	GD02-02	DM01-05	OI03-11

LOid0818	Provide technical training for end-users	CF01-05	DS04-03	OI02-04
LOid0819	Resolve user technical problems	OI06	OI02	
LOid0820	Think critically and spatially to analyze …	AM01	CF01	
LOid0821	Develop advanced skills… GPS and GIS project	GD01-10	GD01-02	TA04-28
LOid0822	Develop advanced skills…FEMA software..	TA04-14	TA01-04	DS06-01
LOid0823	Develop understanding of spatial data, databases….	DM01-08	DM05-06	GD01-05
LOid0824	Develop advanced… geodatabases	DM01-08	DM05-06	GD01-05
LOid0825	Apply cartographic presentation techniques	CV02-14	CV02-15	CV02-05
LOid0826	Develop an understanding of spatial data, databases….	DM01-08	DM05-06	GD01-05
LOid0827	Develop a hands-on approach to GIS/LIS …systems	DS06-01	TA04-29	OI02-03
LOid0828	Apply cartographic presentation techniques (repeat)	CV02-14	CV02-15	CV02-05
LOid0829	Knowledge of … solving spatial problems using … FOSS4G	TA04-34	PS03-12	DS03-04
LOid0830	Knowledge of the different FOSS4G software…	PS03-12	DS03-04	OI05-05
LOid0831	Understanding of how FOSS4G software … can be used…	PS03-12	DM01-08	TA04-34
LOid0832	Understanding FOSS4G vs COTS…	PS03-12	DS03-04	GS06-01
LOid0833	Understanding the philosophy…of FOSS4G..	OI03		
LOid0834	Understanding principles…of FOSS4G (repeat)	OI03		
LOid0835	Augment spatial analysis skills …using public domain data…	AM14-08	GD01-01	AM02-05
LOid0836	Critique the sources, benefits, limitations…of spatial data…	GD02	AM01	GD01
LOid0837	Develop.. skills in locating…public domain … data	GD01-01	TA04-34	OI05-01
LOid0838	Develop knowledge of organizations producing spatial data…	GD01	OI05	GS02
LOid0839	Summarize the history and …policies… public domain spatial data	GD01	GS03	GS06
LOid0840	Augment spatial analysis skills …using public domain data… (repeat)	AM14-08	GD01-01	AM02-05
LOid0841	Become familiar with the history and …policies… public domain spatial data (repeat)	GD01	GS03	GS06
LOid0842	Develop.. skills in locating…public domain … data (repeat)	GD01-01	TA04-34	OI05-01
LOid0843	Develop knowledge of organizations producing spatial data… (repeat)	GD01	OI05	GS02

LOid0844	Understand the sources, benefits… of spatial data	GD02	AM01	GD01
LOid0845	Craft an understanding of the importance GIS… in planning	TA04-28	CF01-04	TA01-09
LOid0846	Experience firsthand usage of GIS technologies	OI02-03	TA04-28	DS06-01
LOid0847	Feel comfortable executing… GIS …	TA04-28	DS06-01	OI02-02
LOid0848	Understand… applications of GIS to urban planning	TA04-28	CF01-04	TA01-09
LOid0849	Understand the role geospatial data analysis…for policy and planning	TA04-28	AM14-06	AM14-02
LOid0850	Grasp how… software can be used …in urban planning	TA04-28	DS06-01	TA01-09
LOid0851	Craft an understanding of …GIS and planning technology…	CF06-02	TA04-28	CF04-03
LOid0852	Experience firsthand usage of GIS and … software	OI02-03	TA04-28	DS06-01
LOid0853	Feel comfortable …on GIS and planning technology	TA04-28	DS06-01	OI02-02
LOid0854	Understand … applications of GIS … to urban planning	TA04-28	CF01-04	TA01-09
LOid0855	Create bivariate maps … understand storytelling with geotechnologies	AM02-05	CV03-06	AM14-06
LOid0856	Create maps from criteria. Create a web…app	CV03-06	CV07-03	WB05-01
LOid0857	Define a map …as a tool for communication…	CV06-05	CF01-05	CV02-08
LOid0858	Describe how geospatial technologies…society of surveillance	GS05	GS01	CF01
LOid0859	Discover forces, trends, and skills… geotechnologies	CV04	OI02	
LOid0860	Evaluate data quality & when maps lie …	GD02	CV08	AM01
LOid0861	Examine big data, 3D… analytics ..	AM14-05	DM01-08	CV03-04
LOid0862	Examine ethics in mapping and why it matters	GS05		
LOid0863	Explain how data generalization… representation…	AM06	AM02	CV02
LOid0864	Explore web mapping… understand changes over… time	WB05-05	CV03-04	CF08-04
LOid0865	Recognize the characteristics of spatial data	CF03		
LOid0866	Recognize the effects of map scale and… generalization	CF09	AM06	CV02
LOid0867	Reflect on how new geospatial technologies interact with society	GS01	CF01	OI02
LOid0868	Select a map projection appropriate …	CF09	CV02	
LOid0869	Translate tabular data to cartographic symbols	CV02-08	DM01-02	AM03-05

LOid0870	Understand geographic locations through … coordinate systems	CF09		
LOid0871	Understand… location privacy …mapping technologies	GS05	GS01	GS06
LOid0872	Use smart mapping technology… various perspectives	CV03-06	CV07-05	CV02-08
LOid0873	Use Spatial Analysis to identify …solutions	AM02-05	AM05-01	TA04-34
LOid0874	Acquire competency in basic… GIS skills	CF06-02	OI02-03	DS06-01
LOid0875	Apply understanding of data acquisition … in Remote Sensing analysis	GD01	GD02	PP02
LOid0876	Apply learning to solve problems… using GIS data, tools…	TA04-34	OI04-03	AM05-01
LOid0877	Appropriately manage.. spatial reference of GIS data	GD03-03	CF09-04	DM01-05
LOid0878	Clearly explain GIS decisions, analysis,… through maps …	CF01-05	DM01-10	CV06-02
LOid0879	Collect, compile,…range of GIS data	GD01-01	GD01-05	OI05-01
LOid0880	Demonstrate ability to address problems by applying remote sensing …	PS03-09	AM05-01	OI02-03
LOid0881	Demonstrate familiarity with …sources of… image data	PS01	GD01	PP02
LOid0882	Demonstrate understanding of physics… photography & satellite	PP01	PP02	
LOid0883	Demonstrate understanding …concepts of cartography and GIS	CF06	CF09	CV02
LOid0884	Demonstrate understanding.. image interpretation … in class	IP05-12	IP05-05	PS03-09
LOid0885	Improve geographic problem solving …through GIS…thinking	TA04-34	CF01-03	CF01-04
LOid0886	Learn geographic concepts and spatial skills	CF01-01	CF06-02	AM02-05
LOid0887	Sharpen critical thinking skills about geographic information…	GD02	CV08	AM01
LOid0888	Familiar with … aerial and satellite environmental remote sensing systems	PS01	AM07-03	PP02
LOid0890	Understand properties of electromagnetic radiation … for remote sensing	PP01	PP02	AM07-03
LOid0891	Design effective maps	CV02-14	CV02-15	CV02-05
LOid0892	Solve spatial problems using GIS	TA04-34	AM05-01	OI04-03
LOid0893	Demonstrate … core concepts of GIS	CF06-02	CF04-01	CF01-03
LOid0894	Demonstrate …complete original independent research	OI02-02	AM15-02	TA04-34
LOid0895	Integrate …remote sensing with … datasets in a GIS	AM02	IP05	
LOid0896	Know how to acquire, process… remote sensing data…	GD01	GD02	PP02
LOid0897	Understand benefits… of remote sensing …for environmental…	AM07-03	PP02	

LOid0898	Design effective maps (repeat)	CV02-14	CV02-15	CV02-05
LOid0899	Solve spatial problems using GIScience	TA04-34	AM05-01	GC02-03
LOid0900	Demonstrate...core concepts of GIScience (Similar to LOid0893)	CF06-02	CF04-01	CF01-03
LOid0901	Demonstrate ... complete research project ...using geospatial techniques	OI02-02	AM15-02	TA04-34
LOid0902	Demonstrate ...understanding ... Geographic Information Systems	CF06-02	CF04-01	CF01-03
LOid0903	Demonstrate...working in a GIS environment	TA04-34	OI02-03	DS06-01
LOid0904	Demonstrate ...work individually and as a team ...GIS application	OI04-03	GS05-01	GS07-03
LOid0905	Demonstrate ...basic understanding of cartography...coordinate systems...	CF09	CV02	CV07
LOid0906	Demonstrate an understanding of map scale	CF09	CV02	
LOid0907	Demonstrate ...represent data sets and compile a map...	DM04	DM05	
LOid0908	Understand problems ...correlating data from multiple sources	GD02	CF09	DM01
LOid0909	Demonstrate...color theory and models	CV02		
LOid0910	Demonstrate an understanding of map design and layout	CV02-14	CV02-15	CV02-05
LOid0911	Demonstrate ...represent data sets and compile a map... (repeat)	GD01-05	AM03-05	CV02-05
LOid0912	Understand problems ...correlating data from multiple sources (repeat)	GD02	CF09	DM01
LOid0913	Demonstrate ...understanding... of GNSS and GIS	GD01-10	PS03-09	PS02-02
LOid0914	Demonstrate ...working in a GIS environment with GNSS...	PS03-09	GD01-10	OI02-03
LOid0915	Demonstrate ...work individually and...on GNSS... for environmental problem solving	PS03-09	TA01-04	OI04-03
LOid0916	Demonstrate ...collect, create, and process spatial data...	GD01-02	GD01-10	AM03-02
LOid0917	Demonstrate ...understanding of gis data storage and interoperability	DM01-08	DM01-10	GD01-05
LOid0918	Demonstrate ...collect, record, and utilize spatial data and databases	GD01-02	GD01-10	DM01-05
LOid0919	Describe the concepts of remote sensing, gps, etc...	PS03-09	PS02-03	PP02-03
LOid0920	Applying logical statements ...problem solving	OI04-03	AM05-01	CF01-04
LOid0921	Demonstrate understanding of basic Python	DS07		
LOid0922	Designing GIS tool compatible with ...ArcGIS Pro	DS06-01	DS04-06	DS07-05
LOid0923	Understand...functions for ..repeated tasks	DS05		
LOid0924	Use Python ...to solve ..Geospatial ... problems	DS07-01	DS05-05	AM05-01

LOid0925	Utilize coding ... to automate GIS analysis in ArcGIS Pro	DS07-01	DS05-05	AM03-01
LOid0926	Develop...methods...and apply principles...to problems.	OI03-10	OI04-03	AM05-01
LOid0927	Enhancing ... mathematical, scientific and technological skills ...	CF01	OI02	AM02
LOid0928	Provide opportunity to work in groups...problem solving	OI02	PM03	
LOid0929	Apply editing tools to create, validate, and modify topology.	DM05-07	GD04-03	AM12-06
LOid0930	Apply geospatial tools to facilitate Deep Learning	AM02-03	GC03-05	PS03-05
LOid0931	Define data quality and metadata	GD02	DM02	
LOid0932	Demonstrate...collect, create, convert, and process spatial data...	GD01-02	GD01-10	AM03-02
LOid0933	Demonstrate construction of joins and relates...	DM01-14	AM11-02	DM01-10
LOid0934	Demonstrate the use of web apps...	WB01	OI05	
LOid0935	Describe ...similarities between data models...	DM01		
LOid0936	Describe ...similarities between data types	DM01		
LOid0937	Discuss database concepts ...replication, versioning...	DM01-08	DM01-10	AM12-04
LOid0938	Distinguish between primary...data sources	GD01		
LOid0939	Employ advanced geodatabase features...	GD04	DM01	
LOid0940	Explain ...primary and foreign key ...relationships	DM01	DM02	
LOid0941	Identify... components of a database management system ...	DM01		
LOid0942	Identify ...types of data capture...	GD01		
LOid0943	Identifying Web GIS Tools ...	WB05-01	WB06-02	OI02-03
LOid0944	Import and export ...database schema	DM01-12	DM01-10	DS04-04
LOid0945	Install, configure and access ...(RDBMS)	DM01-08	DS04-01	DM01-10
LOid0946	Introduction to SQL	DM01-14	AM11-02	CF04-03
LOid0947	Locate publicly available data sources	GD01	OI05	

LOid0948	Recognize the different types of spatial databases ...	DM01-08	DM05-01	DM04-01
LOid0949	Apply ...fundamentals of photogrammetry ...	PP02-04	IP05-02	PS02-03
LOid0950	Describe current and future trends in remote sensing	PP02	CV04	OI02
LOid0951	Design & implement basic remote sensing workflows ...	PP02	IP01	GD01
LOid0952	Interpret, analyze...results of a remote sensing workflow	IP05-12	PS03-09	AM14-06
LOid0953	Select ... datasets for remote sensing applications ...	AM07-03	GD01	PP02
LOid0954	Demonstrate understanding of ...spatial analysis tools...	AM02-05	AM03-01	DM01-05
LOid0955	Demonstrate ... more complex spatial analysis in GIS	AM05-01	AM13-01	TA04-34
LOid0956	Demonstrate ... more complex spatial statistics	AM14-02	AM14-01	AM05-01
LOid0957	Demonstrate ...implement and present a spatial analysis project	OI03-10	CF01-05	TA04-34
LOid0958	Demonstrate ...interpret datasets... apply tools...for analysis	AM14-06	AM02-01	CF01-04
LOid0960	Demonstrate ...develop advanced geospatial models ...	AM05-01	DS04-06	OI03-10
LOid0961	Demonstrate ... work individually and ...on geospatial application...problems	TA01-04	OI04-03	GS07-03
LOid0962	Competent to use Web-based watershed modeling tools ...	WB06-04	TA01-08	CF04-04
LOid0963	Proficient to develop simulation models ...watersheds.	AM05-01	TA01-08	DS04-06
LOid0964	Design a basic decision support system (DSS) for watershed management	DM01-08	OI03-09	TA01-08
LOid0965	Download ... hydrology data from EPA, NHD, USGS...	GD01	OI05	
LOid0966	Perform ...delineation of watersheds and analysis ...	TA01-08	AM08-04	AM03-05
LOid0967	Proficient in developing hydrologic models ... Model Builder...	AM05-01	DS04-06	TA01-08
LOid0968	Collect and analyze stream samples...evaluate results	OI02-02	TA01-01	GD01-10
LOid0969	Use ...geospatial hydrologic ... models for water analysis	AM05-01	TA01-08	CF04-04
LOid0970	Communicate how ...challenges are addressed by ... spatial modeling and GIS	AM05-01	CF01-05	TA04-34
LOid0971	Describe spatial science concepts ... in spatial modeling	AM09	CF03	
LOid0972	Explain how spatial models ...solve real-world problems	AM05-01	TA04-34	CF01-04
LOid0973	Program small-scale GIS models in Python...	AM05-01	DS07-01	DS04-06
LOid0974	Streamline ...workflows using GIS customization	DS04-06	OI03-10	DS07-05

LOid0975	Define a geographic realm…model diagrammatically… and implement in geodatabase	DM01	GD04	AM09
LOid0976	Discuss …modeling the geographic world in a computer	GC02-03	TA04-34	AM05-01
LOid0977	Explain …databases …for spatial data, …Esri …open-source	DM01-08	DM01-10	DM05-06
LOid0978	Use SQL statements to query spatial databases …	DM01-14	AM11-02	CF04-03
LOid0979	Analyze procedures …for workflows within ArcGIS and Notebooks	OI03-10	DS04-06	AM03-01
LOid0980	Critically evaluate methodologies for developing geospatial applications	OI05-03	AM05-01	DS04-04
LOid0981	Employ programming languages for GIS customization… functionality	DS07-01	DS05-05	DS04-06
LOid0982	Perform object-oriented programming tasks …in Python	DS05	DS07	
LOid0983	Program …GIS-based models in Python … ArcGIS and Notebooks	AM05-01	DS07-01	DS04-06
LOid0984	Recognize software engineering concepts .. methods …	DS05	DS07	DS06
LOid0985	Evaluate benefits of web GIS …including cloud-based	WB06-04	WB04-03	OI05-04
LOid0986	Distinguish… web scripting languages …in web GIS development	WB05-03	DS07-02	WB06-02
LOid0987	Explain how web and mobile GIS … are used	WB06-02	WB04-01	DM04-03
LOid0988	Identify web/mobile map design problems …for improved user experiences	WB05-04	CV06-05	CF01-05
LOid0989	Solve application development challenges…	DS05	DS07	DS06
LOid0990	Apply spatial computing techniques to solve problems	AM05-01	GC02-02	TA04-34
LOid0991	Build applications that combine geographic data …for processing	DS04-05	WB05-02	GD01-10
LOid0992	Critically evaluate spatial computing ..appropriateness	OI05-03	GC02-02	AM05-01
LOid0993	Describe theoretical foundations of geospatial data …	DM01	CF03	
LOid0994	Discuss spatial computing systems … for geospatial data	GC02-02	GC03-05	GD01-10

LOid0995	Select and use spatial computing ...to solve real-world problems	GC02-02	GC03-05	TA04-34
LOid0996	Understand, create.. semantic descriptions of geographic data	DM02	OI05	GD02
LOid0997	Analyze data spatially with web GIS tools...	WB06-04	AM02-01	DM01-10
LOid0998	Apply cartographic design principles ...	CV02-14	CV02-15	CV02-05
LOid0999	Create multimedia maps and 3D scenes...	CV03-04	WB05-04	CF04-04
LOid1000	Demonstrate creating maps and apps from data sources...	DM01-12	WB05-02	AM03-05
LOid1001	Describe drivers of unsustainability	AM07-03	GS02	OI02
LOid1002	Describe sustainable development, GIS & Remote Sensing	AM07-03	PP02	OI02
LOid1003	Discuss...natural resource management	AM07-03	GS02	OI02
LOid1004	Explain how ecosystem services ...relate to well-being	AM07-03	GS02	
LOid1005	How maps & geo-visualizations... problem solving	CV03-06	CF01-04	DM01-10
LOid1006	How society influences mapping...location privacy... design	GS01	CF01	GS05
LOid1007	Analyze data spatially with GIS tools...	AM02-01	AM14-08	DM01-02
LOid1008	Apply environmental ...GIS applications...terrain analysis...	TA01-04	AM03-05	DM01-08
LOid1009	Cite examples of GIS in environmental problem solving	TA01-04	TA04-34	CF01-01
LOid1010	Create multimedia maps to communicate ...	CV03-04	WB05-04	CF04-04
LOid1011	Identify ...principles of GIS for data management, analysis...	CF06	AM02	DM01
LOid1012	Implement GIS techniques ...in real word examples.	TA04-34	AM02-05	DM01-08
LOid1013	Apply principles of ...reference systems ... in ArcGIS	GD03-03	CF09-04	AM12-04
LOid1033	Collaborate with others professionally (repeat)	PM03	OI02	
LOid1015	Communicate ... analysis via maps	CV06-02	CF01-05	DM01-10

LOid1016	Manipulate ...geospatial data using graphic design ...	CV02-13	CV02-08	AM03-02
LOid1017	Recall ... methods of spatial statistical data analysis	AM14-02	AM05-01	DM01-02
LOid1018	Recall data classification methods and thematic symbolization	AM11-01	CV02-08	CV02-14
LOid1019	Recognize ... cartographic design techniques .. and critique...	CV02	CV08	
LOid1020	Utilize web-based GIS etc. to showcase work ...	WB05-01	CF01-05	CF04-04
LOid1021	Implement the remote sensing process ... to real world ...	PP02	IP01	GD01
LOid1022	Use Erdas Imagine ...to... process... imagery	IP05-02	IP05-12	PS03-09
LOid1023	Understand ... concepts ...behind remote sensing	PP02	AM07-03	
LOid1024	Understand ...automated satellite image processing...	PP02	IP01	IP05
LOid1025	Understand ...manual aerial photo interpretation	PS03	PP02	IP05
LOid1026	Build fit-for-purpose maps ... following cartographic principles	CV02-14	CV02-15	CV02-05
LOid1051	Collaborate professionally to achieve goals	PM03	OI02	
LOid1028	Conduct spatial analysis using GIS tools	AM02-01	AM14-08	DM01-02
LOid1029	Demonstrate proficiency in research formulation, data finding, analytical steps using GIS	OI02-02	AM15-02	TA04-34
LOid1030	Describe the theory of Geographic Information Science, GIS purpose, and applications	CF06		
LOid1031	Communicate processes & solutions... using web-based GIS, website, etc.	CF01-05	WB06-02	OI03-10
LOid1032	Recall basic concepts of geographic data, analysis, and technologies	CF06	AM02	
LOid1055	Organize & execute projects ... with deadlines	PM03	OI02	
LOid1034	Communicate geographic analysis via maps.	CV06-02	CF01-05	DM01-10
LOid1035	Critique cartographic styles & implement cartography techniques	CV02	CV08	
LOid1036	Create, manipulate, query and analyze geospatial data	AM03-02	AM11-02	GD01-02
LOid1037	Describe and replicate how GIS is used as an analysis tool	AM05-01	TA04-34	CF06-02
LOid1038	Employ geospatial data types, sources, & metadata ...	GD01	GD02	DM01
LOid1039	Symbolize & classify geospatial data...	AM11-01	CV02-08	CV02-14

LOid1040	Utilize core components ... ArcGIS 10.2	DS06-01	CF06-02	DM01-08
LOid1041	Utilize various outlets ... to showcase work ...	CF01-05	OI02-03	DM01-10
LOid1042	Automate work flows using GIS programming	DS04-06	DS07-05	AM05-01
LOid1043	Create specialized geoprocessing tools	DS04-06	AM05-01	OI03-10
LOid1044	Have fundamental Python knowledge	DS07		
LOid1045	Write and modify Python scripts	DS05-05	DS07-01	CF04-03
LOid1046	Create archaeological maps ...	AM08-04	CV02	AM02
LOid1047	Identify & collect sources of archaeological & historical GIS data..	GD01	AM08-04	OI05
LOid1048	Recognize ethical issues of archaeological data...manage ethically	GS05	AM08-04	GS06
LOid1049	Use ArcGIS for archaeological, historical, anthropological data.	TA04-28	CF06-02	AM02-05
LOid1050	Apply cartographic process... to GIS projects	CV02	AM08-04	
LOid1095	Know how to design and implement a project.	PM03		
LOid1052	Conduct interdisciplinary research using GIS	OI02-02	AM15-02	TA04-34
LOid1053	Communicate processes & solutions... using web-based GIS, website, etc.	CF01-05	WB06-02	OI03-10
LOid1054	Gain theoretical knowledge of spatial analysis, spatial statistics, GIS modeling	AM02	AM09	AM14
LOid0405	Assess project qualitative and quantitative risks	PM04	PM03	
LOid1056	Possess experience applying methods to problems, choosing software	TA04-34	OI03-09	AM05-01
LOid1057	Evaluate, acquire, create, organize data for analysis	GD01	AM02	DM01
LOid1058	Critique cartographic styles & implement cartography techniques	CV02	CV08	
LOid1059	Create, manipulate, query and analyze geospatial data (Repeat)	AM03-02	AM11-02	GD01-02
LOid1060	Describe how GIS is used as an analysis tool (Repeat)	AM05-01	TA04-34	CF06-02
LOid1061	Employ geospatial data types, sources, & metadata ... (Repeat)	GD01	GD02	DM01
LOid1062	Symbolize & classify geospatial data... (Repeat)	AM11-01	CV02-08	CV02-14
LOid1063	Utilize core components ... ArcGIS	DS06-01	CF06-02	DM01-08
LOid1064	Analyze methods for spatial interactions, including location-allocation	AM09-02	AM09-05	TA04-28
LOid1065	Describe factors influencing reliability of spatial analysis	AM02	GD02	AM01

LOid1066	Describe & apply procedures for determining accuracy	GD02		
LOid1067	Describe, implement & compare surface interpolation methods	AM06	AM02	
LOid1068	Implement & evaluate statistical analysis methods for geographic patterns	AM14-02	AM14-06	AM05-01
LOid1069	Explain digital satellite image acquisition.	PP02	GD03	
LOid1070	Describe digital principles of remote sensing.	PP02		
LOid1071	Recognize, describe, select imagery (multispectral, thermal, etc.)	PS01	PP02	AM07-03
LOid1072	Manipulate, process, analyze remote sensing images	IP05-02	IP05-12	PS03-09
LOid1073	Solve real-world issues using remote sensing.	PS03-09	TA01-04	OI04-03
LOid1074	Assess & compare remote sensing sensors for different applications.	PS01	PP02	AM07-03
LOid1075	Explore spatial data using visualization	CV03-06	AM02-05	DM04-08
LOid1076	Interpret the distribution of spatial data;	AM14-08	AM14-02	DM01-02
LOid1077	Describe central and dispersion tendency ...	AM14-01	AM14-02	DM01-02
LOid1078	Generate a sample of data for field collection ...	GD01	AM01	AM14
LOid1079	Analyze spatial patterns;	AM02-01	AM14-08	DM01-02
LOid1080	Map clusters;	AM02-08	CV02-05	DM04-08
LOid1081	Measure geographic distributions;	AM14-08	AM14-01	DM01-02
LOid1082	Model spatial relationship.	AM09	DM01	AM01
LOid1083	Describe GIS concepts, theories, and technical issues.	CF06		
LOid1084	Use ESRI ArcGIS Pro software fluently	DS06-01	TA04-34	DM01-08
LOid1085	Make correct and pleasing maps.	CV02-14	CV02-15	CV02-05
LOid1086	Discover and obtain data from sources.	GD01	OI05	
LOid1087	Collect GIS map data in the field with GPS ...	GD01-10	GD01-02	PS03-09
LOid1088	Publish mobile spatial data to Web GIS.	WB06-02	WB04-03	DM01-10

LOid1089	Analyze spatial data using GIS.	AM02-01	AM14-08	DM01-02
LOid1090	Apply GIS to address geospatial problems.	TA04-34	AM05-01	OI04-03
LOid1091	Evaluate and critique geographic information ....literature.	OI02-05	OI05-03	CF01-04
LOid1092	Apply advanced GIS techniques (geosimulation and spatial modeling).	AM05-01	DS04-06	TA04-34
LOid1093	Apply GIS to ... natural resource, environment, ecology, human health.	TA01-04	TA04-29	PS03-09
LOid1094	Use ArcGIS Pro software fluently (repeat)	DS06-01	TA04-34	DM01-08
LOid0413	Review potential causes for GIS project failure	PM04	PM03	
LOid1096	Communicate GIS project using maps, visualizations, presentations	CV06-02	CF01-05	OI03-10
LOid1097	Improve critical spatial thinking skills	AM01	CF01	
LOid1098	Synthesize literature and write a GIS project report	OI02-05	CF01-05	AM15-02
LOid1099	Develop cartographic products using ArcMap	DM01-08	CV02-14	CV02-15
LOid1100	Create and edit spatial data	GD01-02	AM03-06	DM05-01
LOid1101	Build and write Metadata in ArcCatalog	GD02	DM02	
LOid1102	Incorporate map elements for ...cartographic communication	CV02-13	CV02-08	CV02-14
LOid1103	Learn common planning applications completed with GIS	TA04-28	TA01-09	CF01-03
LOid1104	Communicate concepts of LIDAR data collection and structure	PS03-05	GD01-10	IP05-02
LOid1105	Create textured vector models...	CV03-04	DM04-07	IP02-02
LOid1106	Generate raster models of the earth’s surface	DM04-08	AM08-04	IP05-12
LOid1107	Learn methods to develop ... maps and scenes	CV07-03	CV03-04	CF04-04
LOid1108	Generate Digital 3D scenes...	CV03-04	DM04-07	GD01-03
LOid1109	Know techniques to compare point clouds for change analysis	IP05-12	IP03-03	PS03-05
LOid1110	Manipulate and edit LIDAR point clouds	GD01-02	IP05-02	IP03-03
LOid1111	Process drone photos to produce orthophotos and DSMs	IP05-12	IP05-05	GD01-02

LOid1112	Learn how to create a 3D web map	WB05-04	DM04-03	AM03-05
LOid1113	Create aesthetically pleasing and technically appropriate maps	CV02-15	CV02-14	CV06-02
LOid1114	Formulate & execute an independent GIS project, present results	OI03-10	AM15-02	TA04-34
LOid1115	Solve spatial analysis problems using GIS techniques and tools.	AM05-01	AM02-05	TA04-34
LOid1116	Use spatial analysis for geology problems	TA04-23	AM02-01	AM14-08
LOid1117	View and query database information .... in GIS	GD01-05	DM01-14	DM01-10
LOid1118	Understand spatial data formats, manage and manipulate data sets.	DM01-12	GD01-01	DM01-08
LOid1119	Analyze spatially related problems related to current/recent geopolitical events.	TA04-28	CF08-04	TA01-04
LOid1120	Analyze the controls, distribution, and classification of world climates	AM07-03	AM06	
LOid1121	Compare and contrast landforms	AM07-03	AM06	
LOid1122	Create a map using data from imagery, GPS, etc.	CV02-05	GD01-10	IP05-12
LOid1123	Create shapefiles and develop data sets for analysis	DM05-01	AM03-06	GD01-02
LOid1124	Define a problem, develop a methodology to study and analyze	OI03-09	AM15-02	OI04-03
LOid1125	Select a question to study, collect data, produce a result or hypothesis	OI03-09	AM15-02	AM02-01
LOid1126	Design and complete projects in resources management, visitor services, maintenance, interpretation	AM07-03	PM03	
LOid1127	Design and complete projects in resources management, visitor services,interpretation (repeat)	AM07-03	PM03	
LOid1128	Develop GIS mapping projects & demonstrate GPS use	TA04-34	PS03-09	GD01-10
LOid1129	Develop projects using GIS, GPS, remote sensing	TA04-34	PS03-09	IP05-12
LOid1130	Develop methods to solve discipline-specific problems	OI03-10	OI04-03	TA04-34
LOid1131	Develop plans & designs for park facilities	TA04-28	AM03-05	DM01-08
LOid1132	Discuss concepts of GIS, GPS, and Remote Sensing	CF06	GD03	PP02
LOid1133	Import text, database, grid, vector files into ArcGIS, convert to shapefiles	DM01-12	DM01-08	GD01-01

LOid1134	Run queries on GIS coverages ...	AM11-02	DM01-14	DM01-10
LOid1135	Use wildland fire & emergency medical response techniques	OI02	PM02	
LOid1136	Acquire and process data into shapefiles	GD01-02	DM01-12	IP03-03
LOid1137	Analyze complex spatial relationships using desktop GIS	AM02-05	AM05-01	DM01-08
LOid1138	Collect data using mobile devices.	GD01-10	PS03-09	WB04-03
LOid1139	Describe mobile GIS techniques & integration ...	WB04-03	GD01-10	DM01-08
LOid1140	Develop a location services survey for field data collection	GD01-02	GD01-10	WB04-03
LOid1141	Analyze ... geopolitical events (repeat)	TA04-28	CF08-04	TA01-04
LOid1142	Analyze the controls, distribution, classification of world climates (repeat)	AM07-03	AM06	
LOid1143	Apply GIS, GPS, remote sensing to analyze changes in land & human relationships	PS03-09	TA04-34	TA01-04
LOid1144	Apply statistical methods in GIS	AM14-02	AM14-06	DM01-02
LOid1145	Compare and contrast landforms (repeat)	AM07-03	AM06	
LOid1146	Demonstrate image analysis techniques with UAS images	IP05-05	IP05-12	IP03-04
LOid1147	Demonstrate skill in ... GIS, GPS, and Remote Sensing software	TA04-34	PS03-09	IP05-12
LOid1148	Demonstrate analysis skills using GIS, GPS, and Remote Sensing	AM02-05	PS03-09	IP05-12
LOid1149	Describe the nature and types of spatial data	DM01	CF03	
LOid1150	Identify and use classification methods in analysis	AM11-01	IP05-12	DM01-05
LOid1151	Identify different statistical surfaces for GIS	AM14	DM04	
LOid1152	Identify appropriate statistical analysis measures	AM14-01	AM14-02	DM01-02
LOid1153	Select aircraft and sensor for data collection mission	PS03-10	IP03-05	PS02-03
LOid1154	Create a map using ArcGIS (data from imagery, GPS, etc.) (repeat)	CV02-05	GD01-10	IP05-12

LOid1155	Create ArcGIS shapefiles/maps for analysis (repeat)	DM05-01	AM03-06	GD01-02
LOid1156	Define a problem, develop methodology, and find solutions (repeat)	OI03-09	AM15-02	OI04-03
LOid1157	Select a question to study, collect data, produce a result (repeat)	OI03-09	AM15-02	AM02-01
LOid1158	Develop methods to solve discipline-specific problems	OI03-10	OI04-03	TA04-34
LOid1159	Discuss concepts of GIS, GPS, and Remote Sensing	CF06	GD03	PP02
LOid1160	Import text, database, grid, vector files into ArcGIS, convert to shapefiles (repeat)	DM01-12	DM01-08	GD01-01
LOid1161	Run queries on GIS coverages (repeat)	AM11-02	DM01-14	DM01-10
LOid1162	Create a map using ArcGIS (data from imagery, GPS, etc.) (repeat)	CV02-05	GD01-10	IP05-12
LOid1163	Create ArcGIS shapefiles/maps for analysis (repeat)	DM05-01	AM03-06	GD01-02
LOid1164	Define a problem, develop methodology, and find solutions (repeat)	OI03-09	AM15-02	OI04-03
LOid1165	Select a question to study, collect data, develop results(repeat)	OI03-09	AM15-02	AM02-01
LOid1166	Develop methods to solve discipline-specific problems (repeat)	OI03-10	OI04-03	TA04-34
LOid1167	Discuss concepts of GIS, GPS, and Remote Sensing (repeat)	CF06	GD03	PP02
LOid1168	Import text, database, grid, vector files into ArcGIS, convert to shapefiles (repeat)	DM01-12	DM01-08	GD01-01
LOid1169	Run queries on GIS coverages (repeat)	DM02	AM02	
LOid1170	Analyze remote sensed imagery for land use & condition changes	PP02	IP01	AM07-03
LOid1171	Analyze spatially related geopolitical events (repeat)	TA04-28	CF08-04	TA01-04
LOid1172	Analyze controls, distribution, classification of world climates (repeat)	AM07-03	AM06	
LOid1173	Apply GIS, GPS, remote sensing to analyze changes in land & human relationships (repeat)	PS03-09	TA04-34	TA01-04
LOid1174	Compare and contrast landforms (repeat)	AM07-03	AM06	
LOid1175	Define spectral signature & common phenomena signatures	PP02	IP05	
LOid1176	Define & describe components of aerial photos	PP02-04	GD01-10	IP05-02
LOid1177	Define & describe components of a remote sensing system	PP02	GD03	
LOid1178	Define parts of the electromagnetic spectrum for remote sensing	PP02	PS01	
LOid1179	Demonstrate image analysis techniques with UAS images (repeat)	IP05-05	IP05-12	IP03-04

LOid1180	Demonstrate skill in … GIS, GPS, and Remote Sensing software (repeat)	TA04-34	PS03-09	IP05-12
LOid1181	Demonstrate analysis skills using GIS, GPS, and Remote Sensing (repeat)	AM02-05	PS03-09	IP05-12
LOid1182	Describe the importance of remote sensing in GIS applications	PS03-09	IP05-01	AM02-05
LOid1183	Describe the physical basis for remote sensing	PP02	PS01	
LOid1184	Select aircraft and sensor for data collection mission (repeat)	PS01	GD03	
LOid1185	Define fundamentals of Python and Geoprocessing	DS07	DM01	AM09
LOid1186	Develop web-based GIS applications	WB06-02	WB05-02	DS04-05
LOid1187	Develop scripts for web mapping	DS07	WB01	
LOid1188	Develop web services & scripts for web mapping	DS07	WB01	OI05
LOid1189	Identify fundamentals of Python	DS07		
LOid1190	Identify web-based GIS fundamentals	WB05-01	WB06-02	DM01-10
LOid1191	Understand fundamental cartography concepts	CV02-01	CV02-05	CF09-02
LOid1192	Use multiple coordinate systems, calculate distances, etc.	GD03-03	CF09-04	DM01-05
LOid1193	Interpret aerial photos to map land use/cover change	PP02	PS03	AM07-03
LOid1194	Utilize digital spatial data sources, tools for analysis & communication	GD01-01	AM02-05	CF01-05
LOid1195	Apply web GIS analysis techniques	WB06-04	DM01-10	AM02-01
LOid1196	Develop web-based communication tools	WB06-02	WB05-04	CF01-05
LOid1197	Understand ethical & justice issues with online data	GS01	CF01	GS06
LOid1198	Use a web GIS portal to compile and map data	WB05-01	GD01-05	DM01-10
LOid1199	Understand the physics of photography & satellite imaging	PP02	PS01	
LOid1200	Understand image interpretation and analysis methods	IP05-05	IP05-12	AM02-05
LOid1201	Demonstrate familiarity with remote sensing data sources	PS01	GD01	OI05
LOid1202	Understand data acquisition, quality, & metadata in RS analysis (repeat)	GD02	PP02	IP01
LOid1203	Apply remote sensing analysis methods; design your own RS project	PP02	IP01	AM07-03

LOid1204	Apply cartography best practices and file management	CV02-14	DM01-08	CF04-04
LOid1205	Apply vector and raster analysis methods to project design	AM03-05	AM08-04	TA04-34
LOid1206	Understand data acquisition, quality, & metadata (repeat)	GD02	PP02	IP01
LOid1207	Solve GIS problems posed as questions or tasks	TA04-34	OI03-09	AM05-01
LOid1208	Demonstrate familiarity with GIS/RS data sources	GD01	OI05	
LOid1209	Apply Model Builder with iteration	AM05-01	DS04-06	OI03-10
LOid1210	Use Python for file management & geospatial analysis	DS07-01	DM01-08	DS05-05
LOid1211	Plan, design, implement an advanced GIS project	OI03-10	TA04-34	AM05-01
LOid1212	Recognize geoprocessing tasks in existing Model Builder models	AM05-01	OI05-01	TA04-34