GEOG 4600 - Geospatial Programming/Online Methods			
	GTCM (2014)		
Student Learning Objective	**Tier Number**	**Subdivision**	**Comments**
Unit 1: Basics of Geoprocessing and its Languages			
Students will learn the basics of GIS modeling and geoprocessing	Tier 4	4.1: Core Geospatial Abilities and Knowledge (GIS, Data Modeling, Programming application development, and geospatial information technology)	The model does not specifically mention Geoprocessing
Introduced to various programming languages available to create/customize geoprocessing applications.	Tier 4, Tier 5	4.1: Core Geospatial Abilities and Knowledge (Programming application development, and geospatial information technology) 5.3: Software And Application Development (Critical Work Functions, Analytical Methods)	
Students will learn though a simple example of geoprocessing application using the selected programming language.	Tier 5	5.3: Software And Application Development (Critical Work Functions, Analytical Methods)	
Unit 2: Programming Fundamentals 1			
Students will learn basic syntax of selected programming language.	Tier 4, Tier 5	4.1: Core Geospatial Abilities and Knowledge (Programming application development, and geospatial information technology) 5.3: Software And Application Development (Critical Work Functions, Analytical Methods)	
Students will learn language essentials including data types, operators, variables methods and events	Tier 5	5.3: Software And Application Development (Critical Work Functions, Analytical Methods, Design Aspects)	
Unit 3: Programming Fundamentals 2			
Students will be introduced Object Oriented Programming including classes, interfaces, libraries/assemblies.	Tier 5	5.3: Software and Application Development (Critical Work Functions)	
Unit 4: Working With Maps, Layers and Layer Rendering			
Students will learn how to program with objects in maps and layers (module).	Tier 5	5.3: Software and Application Development (Critical Work Functions, Design Aspects)	
Students will understand different layer rendering methods and how to implement them by code	Tier 4, Tier 5	4.1: Core Geospatial Abilities and Knowledge (Analytical Methods) 5.3: Software and Application Development (Analysis and Modeling)	
Unit 5: Data Access and Creation With Geodatabase			
Students will learn how to access spatial attribute data form a geodatabase as well as create new dataset and store them into the geodatabase.	Tier 4, Tier 5	4.1: Core Geospatial Abilities and Knowledge (Data Modeling) 5.1: Positioning and Data Acquisition (Critical Work Functions) 5.2:L Analysis and Modeling (Critical Work Functions, Analytical Methods) 5.3: Software and Application Development (Critical Work Functions)	The model does not specifically mention Geodatabase, but there is a lot on knowing databases.
Unit 6: Working With Geometry and Selections			
Students will understand the types of geometry and the topological, relational, and proximity operators.	Tier 4	4.1: Core Geospatial Abilities and Knowledge (GIS, Conceptual Foundations, Geospatial Data, Data Modeling)	
Students will learn how to use operators to make a spatial selection and how to work with the selected set.	Tier 5	5.1: Positioning and Data Acquisition (Critical Work Functions, Geospatial Data) 5.2 Analysis and Modeling (Critical Work Functions, Analytical Methods)	
Unit 7: Working With Map Layout			
Students will be introduced to the elements of a map layout.	Tier 4	4.1: Core Geospatial Abilities and Knowledge (Cartography, Cartography and Visualization)	
They will learn how to create maps with different layout elements by code	Tier 4, Tier 5	4.1: Core Geospatial Abilities and Knowledge (Programming, application development, and geospatial information technology, Professionalism) 5.1: Positioning and Data Acquisition (Critical Work Functions) 5.2: Analysis and Modeling (Critical Work Functions)	
Unit 8: Introduction to Web-based Geospatial Platform			GST 107, Unit 1; Unit: Introduction to geospatial server system; SLO 5

Describe the benefits of a Web-based geospatial applications	Tier 4	4.1: Programming, application development, and GIS	
Identify the components and their roles in a geospatial server	Tier 5	5.3: Software and Application Development/Critical Work Functions	
Demonstrate an understanding of the design, configuration, and optimization of a Web-based geospatial server.	Tier 4, Tier 5	4.1: Programming, application development, and GIS; 5.3: Software and Application Development/Critical Work Functions	
Unit 9: Introduction to Web-based Geospatial Applications			GST 107, Units 2 & 3; Units - Publish geospatial resources to Web services & Customize Web applications; SLO 4 & 3
Develop knowledge about the templates and content building tools used to construct basic Web-based geospatial applications	Tier 4	4.1: Programming, application development, and GIS; 5.3: Software and Application Development/Critical Work Functions	
Design and build a basic Web-based geospatial application using existing templates and content building tools	Tier 4, Tier 5	4.1: Core Geospatial Abilities and Knowledge (Programming, application development, and geospatial information technology, Professionalism) 5.1: Positioning and Data Acquisition (Critical Work Functions) 5.2: Analysis and Modeling (Critical Work Functions)Positioning and Data Acquisition (Critical Work Functions) 5.2: Analysis and Modeling (Critical Work Functions)	
Identify the steps needed to publish geospatial resources to a Web service	Tier 5	5.3: Software and Application Development/Critical Work Functions	
Unit 10: Managing Geospatial Applications and Services			GST 107, Unit 4; Unit - Customize Web applications; SLO 1,2,3
Develop knowledge about basic maintenance of geospatial applications and Services	Tier 4, Tier 5	4.1: Programming, application development, and GIS. 5.3: Software and Application Development/Critical Work Functions	
Identify errors in geospatial applications/services and recommend solutions	Tier 5	5.3: Software and Application Development/Critical Work Functions	
Unit 11: Final Project			
Students will complete a project utilizing the skills they gained from this class.	Tier 4, Tier 5	4.1: Core Geospatial Abilities and Knowledge (GIS, Data Modeling, Cartography, Cartography and Visualization, Analytical Methods, Programming, application development, and geospatial information technology, Professionalism) 5.1: Positioning and Data Acquisition (Critical Work Functions) 5.2: Analysis and Modeling (Critical Work Functions) 5.3: Software and Application Development (Critical Work Functions, Analytical Methods, Design Aspect)	