

Bishop Dunne Catholic School

Geographic Information Systems II—10th – 12th Grade

Curriculum Guide (revised February 2006)

Course Description:

Geographic Information Systems (GIS) is mapping software linked to databases that produce maps automatically to answer questions. Students learn geographic concepts and the use of GIS software by completing mapping simulation exercises.

In GIS 2 students extend their knowledge by completing more realistic GIS projects with less emphasis on tutorials. Students are required to do more of the data setup and advanced file management as they extend their knowledge in raster GIS.

Created maps are placed in a personal portfolio that may be presented to college admissions counselors and prospective employers. Skills learned include: basic cartography (mapping), Global Positioning Systems (GPS), graphic layout and 3D terrain modeling. Off-campus field data collection is a component of this course. Grade level: 10-12. Semester course.

Quarter Grade:

50% Informal Map Projects (Daily Grades)

50% Formal Map Project or Lab Practical

Course Goals for the Semester

The primary goal of this course is to teach students the basics of GIS. Students should be able to do the following by the time they complete this course:

- Understand what GIS is and how it is used in the world.
- Be able to manage data for a GIS system.
- Learn GIS skills and concepts that will allow them to solve problem in the real world.
- Generate a Portfolio
- Generate Posters for Competition

Unit	Skills	TEKS	NETS	Assessments
Unit 1 – Intro to Spatial Analysis <ul style="list-style-type: none"> ○ GeoTech Scholar Program ○ Intro to Spatial Analyst 	1. Advanced Querying	1A 1C	1.1 2.2	Portfolio Project 1- Monthly Crime Project
<ul style="list-style-type: none"> • Selecting data <ul style="list-style-type: none"> ○ Multiple Querying 	2. Using Density Grid construction	3B 5B	2.2 2.3	
<ul style="list-style-type: none"> • Hotspots <ul style="list-style-type: none"> ○ Calculating Density 	3. Advanced File Management	6A 6B	3.1 3.2	Lab Practical -1- Generating a crime hotspot map
<ul style="list-style-type: none"> ○ How Hotspots are used 	4. Advanced Legend applications	7C 7D	5.1 5.2	
		8D 8C	5.3 6.1	
		9B	6.2	

<ul style="list-style-type: none"> ○ Dangers of hotspots • Spatial Analyst <ul style="list-style-type: none"> ○ Working Directory ○ Calculating density ○ Search Radius • Advanced Legend <ul style="list-style-type: none"> ○ Color ramping ○ The uses of Density mapping 		10A 12B		
<p>Unit 2- Template Building</p> <ul style="list-style-type: none"> • Complex Layouts <ul style="list-style-type: none"> ○ Using Guides ○ Setting relative paths ○ Disclaimers • Template Generation <ul style="list-style-type: none"> ○ How Templates make the difference in your organization ○ Reasons Template Building 	<ol style="list-style-type: none"> 1. Advanced Layout application 2. Writing Disclaimers 	2B 7A 7F 9B	1.2 2.2 3.1 6.1	<p>Project 2 Template of Monthly Crime Report Project</p> <p>Lab Practical 2- Sample Template</p>
<p>Unit 3 – Search and Rescue</p> <ul style="list-style-type: none"> • SAR Review <ul style="list-style-type: none"> ○ Taking Tracks and Marking Waypoints ○ Downloading from the GPS ○ Building a basic SAR project ○ 3D model flight ○ GeoSMART – Mapping Command Team • Advanced SAR-GIS <ul style="list-style-type: none"> ○ Constructing UTM grid referencing systems ○ POA and POD Excel spreadsheets ○ Re-projecting data ○ SAR and UTM ○ The Missing person searching theory • Advanced SAR-GPS <ul style="list-style-type: none"> ○ Zeroing out a GPS/advanced settings ○ Uploading GPS img files ○ Trimble Mission Planning Software ○ GPS limitations 	<ol style="list-style-type: none"> 1. GPS usage 2. GPS uploading and downloading 3. Advanced Projection Skill 4. Setting 3D textures 5. 3D flight 6. Advanced use of excel spreadsheets 7. Re-projecting data 8. Uploading into GPS background systems 9. Use GPS planning software 	1B 2A 4A 7C 7E 8A 9B 10A	1.2 2.2 4.1 3.2 4.2 5.2 5.3 6.1 6.2	<p>Portfolio Project 3-3D modeling- Video production</p> <p>Lab Practical 3- Mock Search SAR Cert. Exam- Cedar Hill State Park</p>
<p>Unit 4 - Advanced DEM and Site Location</p>	<ol style="list-style-type: none"> 1. Data downloading 	4A	1.1	<p>Project 4</p>

<ul style="list-style-type: none"> • Grid Downloading and processing <ul style="list-style-type: none"> ○ Download grid (unzipping) ○ Where to get DEM's ○ Re-projecting DEM's ○ Generating TIN's • Slope analysis <ul style="list-style-type: none"> ○ Finding the slope ○ Rules for CareFlite ○ Remote Sensing: Looking for obstructions. 	<ol style="list-style-type: none"> 2. Unzipping 3. Re-projecting DEM's 4. Generating TIN's 5. Slope Analysis 	4C 6B 7c 10A	2.1 3.2 4.1 5.3 6.2	Helicopter landing map Lab Practical 4 Slope Analysis
Unit 5 - Habitat Neighborhood Part 1 <ul style="list-style-type: none"> • Generating Shapefiles <ul style="list-style-type: none"> ○ advanced editing tools - vertex ○ Habitat Goals • Advanced Labeling <ul style="list-style-type: none"> ○ centering text and multi labeling • Data from a variety of sources <ul style="list-style-type: none"> ○ NCTCOG ○ FEMA ○ Tax roles ○ Data Commonalities • Reviewing Census <ul style="list-style-type: none"> ○ SF-1 vs. SF-3 ○ Joining tables ○ America at your fingertips 	<ol style="list-style-type: none"> 1. Creating Data 2. Adding Program Extensions 3. Project goal setting 4. Advanced text labeling 5. Advanced data downloading 6. Table Joining 	3A 4C 6B 7B 7C 7E 8A 8B 8D 8E 9A 9B 9C 10A 11A 11B 11C 12A 12B 12C 12D	1.1 2.2 3.2 5.1 5.3 6.1 6.2	Portfolio Project 4 (Habitat-scrub, tax, census) Lab Practical 4 Midterm portfolio
Unit 6 - CAD Data Files <ul style="list-style-type: none"> • Importing Cad files <ul style="list-style-type: none"> ○ DRG, DFX ○ Establishing New Housing Developments • Geo-referencing cad files <ul style="list-style-type: none"> ○ setting control points ○ Checking accuracy 	<ol style="list-style-type: none"> 1. Importing CAD files 2. Aligning cad files 3. 	2A 6A 7A 7C 7E 8B 9B 10A 11C 12D	1.2 2.3 3.2 4.1 6.2	Project 6 (New neighborhood) Lab Practical 8
Unit 7 – Historical map 3D project <ul style="list-style-type: none"> • Targeting Data <ul style="list-style-type: none"> ○ Setting project goal ○ Understanding the problem ○ Data Downloading • Image Processing <ul style="list-style-type: none"> ○ Control points ○ Image skewing 	<ol style="list-style-type: none"> 1. Data Downloading 2. Image Alignment 3. Re-projecting 4. Flying 5. Video Recording 	4A 4B 5A 6B 7C 9B 10A 10B 12D	1.1 2.2 3.1 4.1 5.3 6.1	3D Historical Map Lab Practical

<ul style="list-style-type: none">○ File management • Terrain<ul style="list-style-type: none">○ Terrain options (DEM, Contours)○ Downloading○ Reprojecting a grid○ Base Height○ Transparency • 3D flight<ul style="list-style-type: none">○ Flight controls○ Recording video○ Animation manager				