ASU ARIZONA STATE UNIVERSITY

GENERAL STUDIES COURSE PROPOSAL COVER FORM
(ONE COURSE PER FORM)

1.) DATE: **2/16/10**	2.) COMMUNITY COLLEGE: **Maricopa Co. Comm. College District**

3.) COURSE PROPOSED: Prefix: **GPH** Number: **220** Title: **Intermediate GIS Using ArcGIS** Credits: **3**

CROSS LISTED WITH: Prefix: Number: ; Prefix: Number: ; Prefix: Number: ;

Prefix: Number: ; Prefix: Number: ; Prefix: Number:

4.) COMMUNITY COLLEGE INITIATOR: **KAREN BLEVINS** PHONE: **480/461-7358**

FAX:

ELIGIBILITY: Courses must have a current Course Equivalency Guide (CEG) evaluation. Courses evaluated as NT (non-transferable are not eligible for the General Studies Program.

MANDATORY REVIEW:

☒ The above specified course is undergoing Mandatory Review for the following Core or Awareness Area (only one area is permitted; if a course meets more than one Core or Awareness Area, please submit a separate Mandatory Review Cover Form for each Area).

POLICY: The General Studies Council (GSC-T) Policies and Procedures requires the review of previously approved community college courses every five years, to verify that they continue to meet the requirements of Core or Awareness Areas already assigned to these courses. This review is also necessary as the General Studies program evolves.

AREA(S) PROPOSED COURSE WILL SERVE: A course may be proposed for more than one core or awareness area. Although a course may satisfy a core area requirement and an awareness area requirement concurrently, a course may not be used to satisfy requirements in two core or awareness areas simultaneously, even if approved for those areas. With departmental consent, an approved General Studies course may be counted toward both the General Studies requirements and the major program of study.

5.) PLEASE SELECT EITHER A CORE AREA OR AN AWARENESS AREA:

Core Areas: **Computer/statistics/quantitative applications (CS)** Awareness Areas: **Select awareness area...**

6.) **On a separate sheet, please provide a description of how the course meets the specific criteria in the area for which the course is being proposed.**

7.) DOCUMENTATION REQUIRED

☒ Course Description
☒ Course Syllabus
☒ Criteria Checklist for the area
☒ Table of Contents from the textbook required and/or list or required readings/books
☒ Description of how course meets criteria as stated in item 6.

8.) THIS COURSE CURRENTLY TRANSFERS TO ASU AS:

☒ DEC **GPH** prefix
☐ Elective

Current General Studies designation(s): **CS**

Effective date: **2010 Spring** Course Equivalency Guide

Is this a multi-section course? ☒ yes ☐ no

Is it governed by a common syllabus? ☒ yes ☐ no

Chair/Director: **JOHN SHAFFER, PH.D.** Chair/Director Signature:

AGSC Action: Date action taken: ☐ Approved ☐ Disapproved

Effective Date:

Proposer: Please complete the following section and attach appropriate documentation.

ASU--[CS] CRITERIA

A COMPUTER/STATISTICS/QUANTITATIVE APPLICATIONS [CS] COURSE MUST SATISFY ONE OF THE FOLLOWING CRITERIA: 1, 2, OR 3

YES	NO		Identify Documentation Submitted
		1. Computer applications*: courses must satisfy both a and b:	
☒	☐	a. Course involves the use of computer programming languages or software programs for quantitative analysis, modeling, simulation, animation, or statistics.	Syllabus Modules One thru Five Modules One thru Five Readings
		b. Course requires students to analyze and implement procedures that are applicable to at least one of the following problem domains (check those applicable):	
☒	☐	i. Spreadsheet analysis, systems analysis and design, and decision support systems.	Module One Module One Readings Module Two Module Two Website
☐	☒	ii. Graphic/artistic design using computers.	
☐	☒	iii. Music design using computer software.	
☒	☐	iv. Modeling, making extensive use of computer simulation.	Module Three Module Three Readings Module Five Module Five Readings
☒	☐	v. Statistics studies stressing the use of computer software.	Module Four Module Four Readings

*The computer applications requirement cannot be satisfied by a course, the content of which is restricted primarily to word processing or report preparation skills; learning a computer language or a computer software package; or the study of the social impact of computers. Courses that emphasize the use of a computer software package or the learning of a computer programming language are acceptable, provided that students are required to understand, at an appropriate level, the theoretical principles embodied in the operation of the software and are required to construct, test, and implement procedures that use the software to accomplish tasks in the applicable problem domains.

		2. Statistical applications: courses must satisfy both a and b.	
☒	☐	a. Course has a minimum mathematical prerequisite of College Mathematics, College Algebra, or Precalculus, or a course already approved as satisfying the MA requirement.	

ASU--[CS] CRITERIA			
☒	☐	b. The course must be focused principally on developing knowledge in statistical inference and include coverage of all of the following:	
YES	NO		Identify Documentation Submitted
☒	☐	i. Design of a statistical study.	Module Four Module Four Readings
☒	☐	ii. Summarization and interpretation of data.	Module Four Module Four Readings Module Five Module Five Readings
☒	☐	iii. Methods of sampling.	Module Four Module Four Readings
☒	☐	iv. Standard probability models.	Module Four
☒	☐	v. Statistical estimation	Module Four
☒	☐	vi. Hypothesis testing.	Module Four Module Five Module Five Readings
☒	☐	vii. Regression or correlation analysis.	Module Four Module Four Readings
		3. Quantitative applications: courses must satisfy both a and b.	
☒	☐	a. Course has a minimum mathematical prerequisite of College Mathematics, College Algebra, or Precalculus, or a course already approved as satisfying the MA requirement.	
		b. The course must be focused principally on the use of mathematical models in quantitative analysis and design making. Examples of such models are:	
☒	☐	i. Linear programming.	Module Four Module Four Readings
☒	☐	ii. Goal programming.	Module Five Module Five Readings

ASU--[CS] CRITERIA			
☒	☐	iii. Integer programming.	Module Five Module Five Readingsl
YES	NO		Identify Documentation Submitted
☐	☐	iv. Inventory models.	
☐	☐	v. Decision theory.	
☐	☐	vi. Simulation and Monte Carlo methods.	
☒	☐	vii. Other (explanation must be attached)	Geostatistical Models Cartographic Modeling

Course Prefix	Number	Title	Designation
GPH	220	Intermediate to GIS Using ArcGIS	CS

Criteria (from checksheet)	**How course meets spirit** (contextualize specific examples in next column)	**Please provide detailed evidence of how course meets criteria** (i.e., where in syllabus)
Computer Applications	The course is computer-based and requires students to perform a variety of data management/manipulation/ calculations within the specified software.	**Module One:** Student creates and populates a geodatabase. **Module Two:** Student utilizes SQL expressions to manage, manipulate, and perform calculations on tabular data within the geodatabase created in Module One. **Module Three:** Student enters VBA code in the VBA environment of the specified software; student writes VBA code that displays their Name and the date/time of their class. **Module Four:** Student develops two geostatistical (kriging) models that will generate 1) a surface from point data representing atmospheric CO2 levels and 2) a surface from point data representing temperatures in Arizona. **Module Five:** Student will develop a cartographic model simulating the decision making process identifying Pronghorn Antelope habitat in Chino Valley, AZ.
Statistical Applications	The student is required to apply / develop a geostatistical model.	**Module Four:** Student develops two geostatistical (kriging) models that will generate 1) a surface from point data representing atmospheric CO2 levels and 2) a surface from point data representing temperatures in Arizona.
Quantitative Applications	The student is required to assess measured error for a geostatistical model; student is required to develop a weighting scheme for cartographic model.	**Module Four:** Student develops two geostatistical (kriging) models that will generate 1) a surface from point data representing atmospheric CO2 levels and 2) a surface from point data representing temperatures in Arizona. **Module Five:** Student will develop a cartographic model simulating the decision making process identifying Pronghorn Antelope habitat in Chino Valley, AZ.

Official Course Description: MCCCD Approval: 06/22/04

GPH220 20046-99999 LEC 3 Credit(s) 3 Period(s)

Intermediate GIS Using ArcGIS

Further development of knowledge and skills in Geographic Information Systems (GIS), including evolution of GIS, GIS users, statistical applications, spatial databases, spatial analysis and related technology, and overview of spatial data. Prerequisites: GPH219 or permission of instructor.

Go to Competencies Go to Outline

MCCCD Official Course Competencies:

GPH220 20046-99999 Intermediate GIS Using ArcGIS

1. Identify and explain the three geographic aspects of GIS. (I)
2. Trace the evolution of GIS technology. (II)
3. Identify and describe common applications of GIS in government, the private sector, and research. (III)
4. Identify and describe legal and ethical issues related to use of GIS and spatial data. (IV)
5. Explain the uses of statistical data, classifications, and levels of measurement. (V)
6. Identify and describe the design, development, and implementation considerations for the spatial database. (VI)
7. Explain the software development lifecycle. (VI)
8. Explain spatial analysis functions and relevant technologies in regards to vector and raster data. (VII)
9. Define and explain Structured Query Language (SQL)expressions and functions. (VIII)
10. Explain how to work with various types of datasets. (IX)

Go to Description Go to top of Competencies

MCCCD Official Course Outline:

GPH220 20046-99999 Intermediate GIS Using ArcGIS

I. Fundamentals of GIS
- A. Purpose
- B. Components
- C. Capabilities
- D. Relevant Technologies
- E. Geographic aspects
  1. Spatial inquiry
  2. Cartographic design
  3. Human-physical relationships

II. Evolution of the Technology
- A. Early users

- B. Ties to government
- C. Private vendors
- D. Professional organizations

III. Applications
- A. Government
  1. Federal
  2. State
  3. Local
- B. Utilities
- C. Business and industry
- D. Academic research

IV. Legal and Ethical Issues in GIS
- A. The value of information
  1. The information industry
  2. Information economics
- B. Government's role in information dissemination 1 Federal information acts
  2. State/local information acts
- C. Access to information
  1. Functional access
  2. Database access
  3. Support access
  4. Mode of funding access
- D. Collateral issues
  1. Proprietary authority
  2. Privacy
  3. Liability for GIS products/services
  4. User fees, antitrust law & undue competition
  5. Equal treatment
  6. Copyright, contracts, and control of proprietary interest

V. The Role of Statistics in GIS
- A. Statistical applications
- B. Describing and determining the meaning of data
  1. Descriptive statistics
     a. Measures of central tendency
     b. Measures of dispersion
     c. Graphical displays (histograms/charts)
  2. Levels of measurement
     a. Nominal
     b. Ordinal
     c. Interval
     d. Ratio
- C. Feature classifications
  1. Natural breaks
  2. Equal interval
  3. Quantile
  4. Standard deviation
- D. Normalizing data

VI. Fundamentals of the Spatial Database
- A. Types
  - 1. Enterprise
  - 2. Personal
- B. Software development lifecycle
- C. Working with the spatial database
  - 1. Design
    - a. Data sources
    - b. Tables
    - c. Fields
    - d. Relationships
    - e. Other considerations
  - 2. Development
    - a. Creating tables/fields/relationships
    - b. Gathering/importing data
  - 3. Implementation
  - 4. Maintenance

VII. Spatial Analysis Operations
- A. Vector data and relevant technologies
- B. Raster data and relevant technologies
- C. Vector and raster data
- D. Other considerations

VIII. Fundamentals of SQL
- A. SQL as data manipulation language (DML)
- B. SQL as data definition language (DDL)
- C. SQL functions

IX. Working with Datasets
- A. Control framework
- B. Planimetric features
- C. Topographic features
- D. Cadastrel features
- E. Area boundary features
- F. Facilities/utilities
- G. Natural features

Go to Description Go to top of Competencies Go to top of Outline

Intermediate GIS Using ArcGIS Course Syllabus

Course Number: GPH 220
Section Numbers: #####
Days / Room: ########
Lat/Long: 33° 23' 17" N, 111° 54' 21" W
Lecture Time: ########
Instructor: ########
Office Hours: ########
or by appointment
Office & Office Phone: SC52 / 480-461-7358
Email: ##########

Course Description: This course is designed to increase your understanding of the underlying mathematical, cartographical, geographical, and technological concepts and foundations of Geographic Information Systems. This course is not intended to teach you a specific GIS software; however, we will work within ESRI's ArcGIS environment.
You will have the opportunity to work with the software during class time but much of our class time will be dedicated to lecture materials, class discussions, and in-class exercises. I recommend you obtain a trial version of the software for use outside of the classroom. Visit the ESRI website http://www.esri.com or purchase the book "Getting to Know ArcGIS Desktop" to obtain a limited-time, limited functionality version of the software.
For specific information regarding the competencies for this class and others please visit the MCC website at http://www.mc.maricopa.edu
NOTE: It is assumed you are comfortable in the PC/Windows environment including directories, Windows Explorer, downloading from the internet, and other basic PC operations.

Readings: *Required readings for several modules will be distributed in class at the appropriate time.*

Attendance: Attendance is mandatory. Students with more than TWO unofficial absences will be failed or withdrawn from the class. No points are given for attending class; however, if you exceed the maximum amount of allowed absences you will not received credit for the course. Obviously, allowance will be made if unforeseen circumstances interfere with your ability to attend class YOU MUST INFORM THE INSTRUCTOR AS SOON AS POSSIBLE IN ORDER TO MAKE ANY SPECIAL ARRANGEMENTS. Refer to the MCC Catalog for further information on unofficial vs. official absences.

Withdrawals: If you are unable to complete the course I will give you a withdrawal up to the final week; however, if you fail to complete a withdrawal slip you will receive a failing grade for the semester. **Incompletes are not offered except in extreme circumstances.**

Electronic Devices: Specifically cell phones and pagers – turn them off or switch to manner mode. Store all electronic devices out of sight. If you receive a call please quietly leave the room to continue your conversation or tell the caller you will return their call when class is over.

Grades: Grades will not be given on a curve. If you are interested in taking this class for a Pass/Fail option, please see me by the end of the first week. **If you are taking this class as part of the GIS Technician Certificate this option is not available.**

Assignments:

Exams:	2 @ 100	points
Modules:	6 @ 50	points

Total Possible Points: **500 points**

Point Breakdown:	
A	450-500 points
B	400-449 points
C	350-399 points
D	300-349 points
E	less than 300 points

Assignments, etc.: **Modules:** Modules are designed to be completed outside of class and during the class workshop time provided. The GIS Lab will be open 10 hours during the semester; lab hours will be posted by second week of semester.

NOTE: Modules will be submitted as an MS Word document uploaded using the Assignment Dropbox on WebCT. Download the assignment template from the WebCT course site to ensure you format your Word document appropriately.

Points will be given for the following:
Neatness
Legibility
Creativity (in other words, did you put thought into the assignment)
Comprehension (do you understand the concepts covered for the assignment)
Timeliness

Late Assignments: Modules will be accepted up to five days after the initial due date with a one point penalty for each day late. You will be able to upload each assignment using the Assignment Dropbox for up to five days after the official due date.

Materials: You will need to purchase CDs or a flash drive (recommended) to record your data as well as any materials necessary to complete the assignments. You need an MCC email account to access the WebCt online resources.

Additional Assistance: The instructor is willing to make any reasonable accommodations for students with limitations due to documented disability, including learning disabilities. Please contact Disability Resources and Services to discuss any special needs you may have.

Disability Resources and Services:
URL:
http://www.mc.maricopa.edu/students/disability/
Phone: 480-461-7447
TTY: 480-969-5587
Fax: 480-461-7907

Student Handbook: Please read the Student Handbook, Section 2.5, Student Rights and Responsibilities.
http://www.mc.maricopa.edu/students/pdfs/handbook06_07.pdf/

Please Note: Any changes to this course syllabus will be announced in class. Students are responsible for being aware of any such *announced* changes. Students agree to accept and comply with these requirements by choosing to remain enrolled after learning of these course conditions. Students are responsible for processing a withdrawal form should they wish to discontinue enrollment in the class. Failure to complete the withdrawal process will result in a failing grade for the semester.

MCC Early Alert Program (EARS)
Mesa Community College is committed to the success of all our students. Numerous campus support services are available throughout your academic journey to assist you in achieving your educational goals. MCC has adopted an Early Alert Referral System (EARS) as part of a student success initiative to aid students in their educational pursuits. Faculty and Staff participate by alerting and referring students to campus services for added support. Students may receive a follow up call from various campus services as a result of being referred to EARS. Students are encouraged to participate, but these services are optional.

Early Alert Web Page with Campus Resource Information can be located at:
http://www.mesacc.edu/students/ears
or locate the "Early Alert" selection at the "mymcc" link from MCC's home page.

Intermediate GIS Using ArcGIS Course Schedule

NOTE: THIS SYLLABUS MAY CHANGE DURING THE SEMESTER IT IS YOUR RESPONSIBILITY TO KEEP INFORMED OF THESE CHANGES

Date	Lecture	Assignment	Due Date
	Introduction to the Course / GIS Review		
	Introduction to Spatial Databases	**Module 1**	**#####**
	Geodatabase Workshop		
	Introduction to SQL	**Module 2**	**#####**
	SQL Workshop		
	Introduction to the VBA	**Module 3**	**#####**
	VBA Workshop		
	Midterm		
#######	**SPRING BREAK**		
	Introduction to Geostatistics	**Module 4**	**#####**
	Geostatistics Workshop		
	Introduction to Cartographic Modeling	**Module 5**	**#####**
	Cartographic Modeling		
	Introduction to Cartographic Visualization	**Module 6**	**#####**
	Visualization Workshop		
	Final Exam		

Objectives:

- To know how to implement a geodatabase
- Understand the implications of and create an attribute domain within ArcGIS
- Understand the implications of and create a relationship class within ArcGIS
- Understand the implications of and create relationships within MS Access
- Understand the implications of and design, implement, and populate tables within MS Access
- Understand the implications of data type and its relationship to primary/foreign keys

Deliverables:

- Perform the operations outlined in the following steps and provide answers to the 18 questions that appear throughout the module and listed in Part VI of this module.

Readings:

- spatialDatabases.pdf

Data:

- All data for this exercise are located on the server: Z://GISData/ALRISnad83/
- Ensure the datum for all datasets is NAD83

Part I. Creating & Populating a Personal Geodatabase

In ArcCatalog

1. Create a Personal Geodatabase called modOne in your folder on the desktop
   NOTE: Import the spatial reference information from the counties.shp on the server when creating each dataset. Click <Next> at the Vertical Coordinate System and the XY Tolerance dialogs
2. Create a feature dataset called azInfo
3. Create a feature dataset called azGeology
4. Import the following shapefiles as feature classes into the azInfo feature dataset:
   - aztowns.shp
   - cities.shp
   - counties.shp
5. Import the following shapefiles as feature classes into the azGeology feature dataset:
   - faults.shp
   - geology.shp
6. Look at the counties shapefile from within ArcCatalog. Review the NAME field. Create an attribute domain called azCtyCodes based on the county name. For example, AP→APACHE. Make sure the coded value domain (TEXT) values are entered in alphabetical order according to the county name.
7. Create a field of type TEXT in the azTowns and the counties shapefiles called cntyCode. Associate the attribute domain you created with these fields. REMEMBER THE DATA TYPE & LENGTH MUST MATCH.
8. Open the geology shapefile from within ArcCatalog. Review the DATA field. This is a coded value. Use your browser to navigate to the ALRIS web site:
   http://www.land.state.az.us/alris/layers.html
9. Find the Geology layer in the list of datasets
10. Click on the <Metadata> link listed to the right
11. Click on the "Entity_and_Attribute_Information" link located in the list of links at the top of the page

Q1. What is the definition of the DATA attribute?

Q2. Of what is this coded value field an example?

Q3. How could you use this information found on the website to your advantage?

continued

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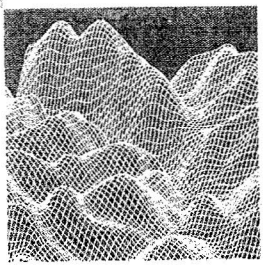
1



An Introduction to Spatial Databases

"Where shall I begin, please your Majesty?" he asked.

"Begin at the beginning," the King said very gravely, "and go on till you come to the end: then stop."

LEWIS CARROLL
Alice in Wonderland

CONTENTS

Objectives:

- Gain experience creating SQL expressions
- Know how to access SQL view within MS Access
- Know the difference between SQL DML and SQL DDL

In This Module You Will:

- Learn how to access the SQL View in MS Access
- Learn how to write basic SELECT expression
- Learn how to write basic SELECT / WHERE expression
- Learn how to write basic SELECT / LEFT / RIGHT / JOIN expressions
- Learn how to write basic DML & DDL expressions

Deliverables:

- Complete tables and/or provide examples where requested
- Perform the operations, provide a copy of all expressions used and answers to all related questions

Data:

- Use the ModONE personal geodatabase created in Module One
- Refer to http://www.w3schools.com/sql/default.asp if you need help

Part I. Prework

In ArcCatalog

1. Ensure the appropriate cntyCode value has been assigned to each feature in the aztowns feature class
2. Ensure the appropriate cntyCode value has been assigned to each feature in the counties feature class

Modify the Cities Feature Class

3. Create a column in the "cities" feature class called "County" of type TEXT, Length 4 DO NOT ASSOCIATE THE cntyCode attribute domain with this field
4. Following the format for the county abbreviations created in the attribute domain, insert the appropriate county code in the "County" column for each feature in the cities feature class

Q1. Create a JPG of the new county text field in design view created in the "cities" feature class

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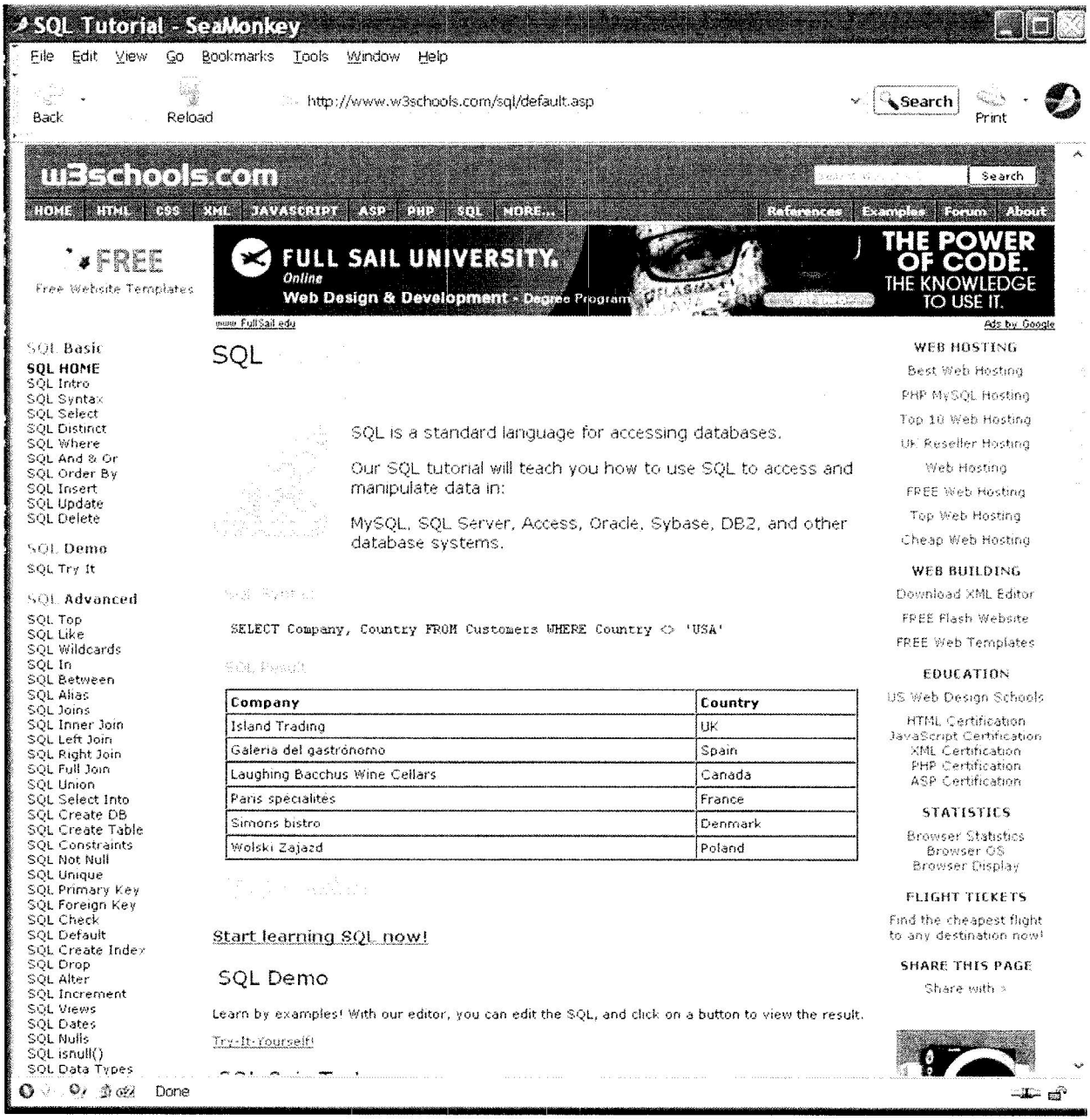
SQL Tutorial - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Back Reload http://www.w3schools.com/sql/default.asp Search Print
w3schools.com
Search
HOME HTML CSS XML JAVASCRIPT ASP PHP SQL MORE... References Examples Forum About
FREE
Free Website Templates
FULL SAIL UNIVERSITY.
Online
Web Design & Development - Degree Program
THE POWER OF CODE.
THE KNOWLEDGE TO USE IT.
www.FullSail.edu
Ads by Google
SQL Basic
SQL HOME
SQL Intro
SQL Syntax
SQL Select
SQL Distinct
SQL Where
SQL And & Or
SQL Order By
SQL Insert
SQL Update
SQL Delete
SQL Demo
SQL Try It
SQL Advanced
SQL Top
SQL Like
SQL Wildcards
SQL In
SQL Between
SQL Alias
SQL Joins
SQL Inner Join
SQL Left Join
SQL Right Join
SQL Full Join
SQL Union
SQL Select Into
SQL Create DB
SQL Create Table
SQL Constraints
SQL Not Null
SQL Unique
SQL Primary Key
SQL Foreign Key
SQL Check
SQL Default
SQL Create Index
SQL Drop
SQL Alter
SQL Increment
SQL Views
SQL Dates
SQL Nulls
SQL isnull()
SQL Data Types
SQL
SQL is a standard language for accessing databases.
Our SQL tutorial will teach you how to use SQL to access and manipulate data in:
MySQL, SQL Server, Access, Oracle, Sybase, DB2, and other database systems.
SQL Syntax
SELECT Company, Country FROM Customers WHERE Country <> 'USA'
SQL Result
Company Country
Island Trading UK
Galería del gastrónomo Spain
Laughing Bacchus Wine Cellars Canada
Paris spécialités France
Simons bistro Denmark
Wolski Zajazd Poland
Start learning SQL now!
SQL Demo
Learn by examples! With our editor, you can edit the SQL, and click on a button to view the result.
Try-It-Yourself!
WEB HOSTING
Best Web Hosting
PHP MySQL Hosting
Top 10 Web Hosting
UK Reseller Hosting
Web Hosting
FREE Web Hosting
Top Web Hosting
Cheap Web Hosting
WEB BUILDING
Download XML Editor
FREE Flash Website
FREE Web Templates
EDUCATION
US Web Design Schools
HTML Certification
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XML Certification
PHP Certification
ASP Certification
STATISTICS
Browser Statistics
Browser OS
Browser Display
FLIGHT TICKETS
Find the cheapest flight to any destination now!
SHARE THIS PAGE
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Done

Objectives:

- To provide hands on experience within the VBA development environment
- Identify the four basic programming objects:
  - ✓Label
  - ✓Textbox
  - ✓Option Button
  - ✓Message Box
  - ✓Command Button
  - ✓Form
- Understand how VBA can be used to manipulate the ArcGIS interface and menus
- Understand the basic concepts of object oriented programming

Overview:

In this module you will customize the ArcMap interface with a small application written within the Visual Basic environment available in the software also known as the API or Application Programming Interface. An API is a set of routines, data structures, object classes and/or protocols provided by libraries and/or operating system services in order to support the building of applications. An API may be language-dependent or language-independent. In our case, we will be creating an application that is language-dependent. For example, many of the routines, data structures, object classes, etc. are only available within the ArcGIS environment.

An application is created when a task is often repeated by a user or group of users. For example, entering data for a selected feature or creating a dataset based on a standard set of features and is for a specific application environment (e.g., the Assessor's Office has applications that are specific to that organization). As a GIS Analyst you use applications all the time. When you use the define projection tool you are accessing a small application created to perform a specific task. However, the much of the software is created using the ABI or Application Binary Interface and is a lower-level language at interacts with the machine (assembly languages are ABIs).

The VB module you create in this exercise is designed to introduce you to common objects and methods that are used to create modules. Since Visual Basic is an object oriented programming (OOP) language you will use objects and methods to develop the module. Object orientation is an approach to software development that uses objects and their interactions to design applications and computer programs. Instead of being perceived as a series or list of tasks, the object oriented program is perceived as a collection of cooperating objects.

Relating object oriented programming language to the English language may help you understand the core components of an OOP language. For example, an object would be a noun. Thus, you may have an object representing dogs. Properties are adjectives; you set the properties of the dog to describe its characteristics. The dog has white fur and brown eyes. Finally, methods are verbs and thus they perform actions: The dog object is able to bark.

As you enter the program at the VB interface think about whether you are creating an object, setting the object's properties, or making the object do something.

Readings:

- vbaForArcGIS.pdf

Data:

Add the following feature classes from the geodatabase you created in Module 1 to a new map document. Follow this naming format: <firstNameInitialLastName>Mod03.mxd for naming your map document file.

- Aztowns
- Geology
- Counties

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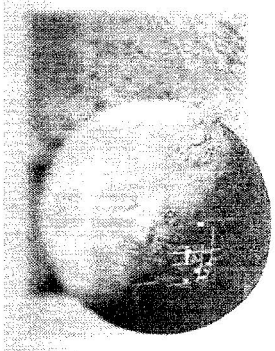

Contents

Objectives:

- Know how to access the Geostatistical Analyst extension
- Interpretation of Voronoi maps
- Understand the components of the semivariogram: sill, nugget, lag, distance
- Understand the concept of autocorrelation and the generation of a surface feature from point data
- Understand the purpose of validating the model

Readings:

- dataVisualization.pdf

Data: Available for download in zip format from WebCT

- Co2AM.shp
- tracts.shp
- azStationTemp.xls - ***I have intentionally left out any information about how to work through the coordinate system for the imported points (x,y event). Consider it a bit of an extra credit problem (OK, 5 points) - obviously, if you just can't work it through let me know but at least give it a shot.***

NOTE: The value field in the Co2AM data you will use is the AVERAGE field. The value field in the temperature data is the HIGH field

Deliverables:

Upload the following items to the assignment dropbox on WebCT

- All maps generated in Parts II through IV
- All maps should have all map elements: Title, scale, legend, direction arrow, and source (your name & class)
- An image of the validation points generated in Part IV
- Answers to the questions in Part V

Discussion:

Semivariograms / covariance functions quantify Tobler's Law which states that things that are closer together tend to be more alike than things further apart. In this exercise you will use the Geostatistical Analyst extension to create two different kinds of surfaces based on point data.

The first surface will represent CO_2 (carbon dioxide) concentrations based on points obtained along several major highways, interstates, and freeways that transect the major Phoenix metropolitan area.

The second surface will represent a temperature surface generated from several weather station data located throughout Arizona.

Part I. Obtain the data

1. Project all datasets to NAD83 NOT NAD83 HARN
2. Create a geodatabase called geoStat.mdb
3. Create a feature dataset called "Census"
4. Create a feature dataset called "sampleSets"
5. Import the tracts data into the "Census" dataset as a feature class
6. Import the Co2AM into the "sampleSets" dataset as a feature class
7. Import the temperature data into an X,Y table

NOTE: Variography is part science and much art so there is no "right answer" to this exercise; however, you will be expected to understand the basic concepts from lecture.

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Objectives:

- To know how to access the Spatial Analyst Extension
- To know how to convert vector format to raster format
- Understand the design and implementation of a raster-based spatial analysis project
- Understand how to generate slope from an elevation dataset
- Understand basic map algebra operations
- Understand how to determine and reclassify spatial data

NOTE: Good organization of your directories and files are essential during this project as many (in terim) files will be generated that may not be used for the final model. REMEMBER: You can always remove datasets from your map that are no longer being used.

Deliverables

- A jpg of your final map displaying the most suitable habitat for Pronghorn Antelope in the Chino Valley
- A maximum two-page document briefly describing the model inputs, final outputs (original classification schemes, interim classification schemes, and final classification scheme) and your rationale for the classification / reclassification approach you took

Description of the Suitability Project

You've been asked by Fish and Game to develop and present the results from a GIS suitability model in representing those areas within the Big Chino Valley area most suitable for Pronghorn Antelope habitat. The inputs for the model are based on research that identifies those characteristics most suitable for Pronghorn Antelope. Use the following reference materials (in-class handouts) to help you determine these characteristics:

- Pronghorn and Their Habitat in Yavapai County (Nature Conservancy)
- California Wildlife Habitat Relationships System (California Wildlife Service)
- Habitat Suitability Index Models: Pronghorn (Fish & Wildlife Service)

From these publications you will be able to obtain requirements pertaining to the following criteria:

- food (types)
- water (distance)
- cover (terrain, slope, elevation)
- land ownership – the following is a list of guidelines for classifying land owners for the model:
  - State Trust & Game & Fish lands are most desirable
  - BLM is preferred over National Forests
  - Private Lands are unacceptable

Coordinate System for this Project:

NAD1983HARNUTMZone12N

Geographic coordinate system name:

GCSNorthAmerican1983

NOTE: You must ensure all data are projected to the same coordinate system.

Data:

\\gisserver\alrisjan09 folder:

cities
places
gfveg
own
streams
streets & interstates

Data for download:

1" NED from USGS Seamless server

Data to create:

binmask shapefile
Additional files will be created as a result of various geoprocessing tasks

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