Some sessions starting in late January are still tentative.
Field trip dates will be adjusted if necessary depending on weather.
Guest lecture dates will be adjusted to accommodate guest lecturer schedules.
An updated syllabus will be posted when dates get firmed up.

Syllabus: SIO 110 - 2017 Winter Minster

Section Information: 2017 Winter Minster
Course Name SIO 110
Section Instructor: Jean Bernard Minster
E-mail jbminster@ucsd.edu
Teaching Assistant: Thomas Chaparro

Lesson 1
Lesson title: Monitoring the Planet's Heartbeat:From Eternity to Here 1960-2016
Date January 11, 2017
Objectives
A view of geodesy through the centuries since 600BC
Topics Focus on how space geodesy and computer technologies have completely changed geography in the past 50 years

Lesson 2
Lesson title: Why do we need precise geodesy and GIS?
Date January 13, 2017
Objectives
Review modern needs for precision geodesy and its applications in GIS. How Precision geodesy and GIS have evolved from scientific requirements to practical societal applications

Lesson 3
Lesson title: GIS Representation
Date January 18,2017
Objectives:
Scale issues
Digital / geographic representations attributes-- discrete vs continuous representations: vectors vs rasters

Lesson 4
Lesson title: GIS Representation (Cont)
Date January 20,2017
Objectives:
Vectors vs rasters, continued. The role of a data model. Examples. Continuous fields vs lines. Douglas-Poiker algorithm. TIN models

Lesson 5
Lesson title: The Nature of Geographic Data
Date January 25, 2017
Role of GIS in government
Maps and databases in GIS
Layers in GIS.
Representations of objects and fields—Projections

Lesson 6
Lesson title: Nature of Geographic data (2)
Date January 27, 2017
Objectives:
Geodetic reference systems

Fractals vs smooth objects
referencing of points, lines and areas
Georeferencing, geolocating, geocoding
Datums, ellipsoids, geoid, planar and spherical coordinates

Lesson 7
Lesson title: Uncertainty (Part 1)
Date February 1, 2017
Objectives:
Importance of uncertainty statements; precision vs accuracy; the matter of scale;

Lesson 8
Lesson title: Uncertainty (part 2)
Date February 3, 2017
Objectives:
Ambiguity. Kappa index. Classification.
Extreme precision in altimetry applications

Lesson 9
Lesson title: Software and Models
Date February 8, 2017
Objectives:
GIS architecture
The importance of DBMS in GIS: Software and hardware tools for various scales

Lesson 10 Special
Guest lecturer Dr. Heather Henter
Lesson title: Review of Species on natural reserve property
Date February 10, 2017
The Natural Reserve system
Objectives: Professor Henter will give a review of the various indigenous and invasive species to be found on the UC Natural Reserve System property in La Jolla, in preparation for the term class projects. Class outing to the Knoll will follow immediately.

Lesson 11
Lesson title: Geographic Databases (1)
Date February 15, 2017
Objectives
Geodatabases
Structured Query Language (SQL)
Geographic database operators
Spatial analysis methods, annotations, topologies

Lesson 12
Lesson title: Geographic Databases (2)
Date February 17, 2017
Objectives:
Topological models Feature classes Multilevel grids
B-Trees, Quad-Trees, R-Trees
Versioning

Lesson 13
Lesson title: Cartography and Map Production
Date February 22, 2017
Objectives:
Use of topologies to build and compose maps
Map maintenance and editing
Graphics primitives
Use of maps over the ages (military)

Lesson 14
Guest lecturer (from ESRI ?)
Date February 24, 2017

Objectives:
Broader applications of GIS in unexpected fields.

Lesson 15
Lesson title: Geovisualization
Date March 1, 2017
Objectives:
Conveying information through map design
Visualization strategies and techniques
Geocoding
Cartogram transformations
3D representations
Virtual reality and GIS

Lesson 16
Lesson title: Spatial Analysis (1)
Date March 3, 2017
Objectives:
Goals of spatial analysis
Approaches
Uses of different planar projections. Representations aimed at geospatial analysis
Scatter plots and trends

Lesson 17
Lesson title: Spatial Analysis (2)
Date March 8, 2017
Objectives:
Transformations: buffering; spatial and temporal interpolation; point-in-polygon algorithm; polygon overlays, cluster detection
Centroids, slopes, dispersion
Travel on a surface: applications of DEM to hydrology
travel on a structured layer (street map)
optimization

Lesson 18
Lesson title: Spatial Modeling and Other Uses of GIS
Date March 10, 2017
Objectives: Management and policy issues
Decision making, legal issues, safety issues, public trust
Spatial Data Infrastructures

Lesson 19
Lesson title: Partnerships, GIS and Society, where is GIS going?
Date March 15, 2017
Objectives: Considerations when implementing a GIS project.
Data access. Open data and privacy concerns.
Global out look. GIS in developing world.
Applications in specialized areas, e.g. public health, climate change

Lesson 20
Guest lecturer TBD
Lesson title (tentative): Open GIS, other platforms. Employment opportunities
Date March 17, 2017
Objectives:

Field Trip 1 (tentative)
Lesson title: Hand-held GPS
Tentative Date January 27, 2017
Objectives:
Learn how to operate a hand-held GPS receiver, and collect suitable metadata
Learn how to get these data processed.
Learn about different GPS receivers from precise receivers to hand held to smart phones
Work: survey the path surrounding the Knoll Natural Reserve

Field Trip 2 (tentative)
Lesson title: sampling species across the Natural Reserve
Date February 10, 2016
Objectives
Field measurements of various plant species on the Knoll Natural Reserve.
Collection of data to add to the past 6 years of observations

Laboratory Syllabus: Introduction to GIS & GPS for Scientists, Winter 2017

Welcome to SIO 110, Introduction to GIS and GPS for Scientists! The laboratory of this class will primarily focus on the hands-on aspect of ArcGIS 10. Attendance is mandatory, as we will be covering crucial steps necessary for comple3ng laboratory assignments.

Teaching Assistant:

Thomas Chaparro
Email: tchaparr@ucsd.edu
Office Hours: Available on request, I'm located at SIO

Laboratory Section Time:

Fridays, 10:00am-12:50pm

Homework:

1. Laboratory Assignments (6)
    a. Assigned each week in laboratory section
    b. Must be **turned in on TED** before the next Friday class (8am)
2. Journal
    a. See topics to include in journal on Ted
    b. Must be **turned in on TED** before the next Friday class (8am)
3. Midterm
    a. The Knoll
    b. Due electronically (emailed to the TA) by Friday, February 5, 8am
4. Final Project
    a. The Knoll
    b. Due electronically – Date TBA

Late Assignments:

No late laboratory assignments will be accepted. If you have an unexpected circumstance, please contact the TA for an extension. Extensions may be granted depending on the circumstance.

Grading:

40% Labs (5) and Class Homework
10% Journal
5% Quizzes
15% Midterm Project
30% Final Project

What to bring to lab:

1. Due Laboratory Assignment and Journal Assignment (due on TED)
2. Laptop (if you want to work on your personal computer)
3. For midterm and final projects, bring any data you were working on (if it won't fit on your home server)
4. OPTIONAL !!!! – BUT VERY RECOMMENDED – small flash drive

SIO 110 Laboratory Schedule and Due Dates

Week	Date	Topics to be Discussed	Due	Special Notes
1	January 13	-Introduction to ArcGIS -Opening, saving files -Navigating through ArcGIS 10 (zoom, pan, identify, find) -Basic steps (bookmarks, distances, layers, selection, colors, labels, attribute table) - Lab 1 assigned		
2	January 20	-Map Components and display -Choropleth maps -File and Column Names -X-Y event files -Lab 2 assigned	Lab 1 due Journal 1 due	
3	January 27	-Field day! The knoll	Lab 2 due Journal 2 due	We will let you know when/where to meet!
4	February 3	-Downloading TIGER/line data files from ESRI -Loading a basemap -Digitizing polygons -Digitizing points -Digitizing lines		Nothing due, but you should be progressing on midterm (should be able to import coordinate data of path into map)
5	February 10	-Field day! The Knoll	Midterm Project Due	We will let you know when/where to meet!
6	February 17	-Data Queries to select by attributes -Exporting features to new layer -Definition Queries -Lab 3 assigned		
7	February 24	-Spatial Analysis -Clip features -Dissolve -Merge -Lab 4 assigned	Lab 3 due Journal 3 due	
8	March 3	-Intersect -Union -Buffers -Rubber sheeting -Lab 5 assigned	Lab 4 due Journal 4 due	
9	March 10	Remaining material/ Final project questions	Lab 5 due Journal 5 due	
10	March 17	Remaining material/ Final project questions		
Finals Week			Final Projects due date TBA	