Syllabus
ESSP 332 - Applied GIS & GPS
Geographic Information Systems (GIS) and Geographic Positioning Systems (GPS)
Fall Semester 2002, CSUMB

Instructors:

Dr. Rikk Kvitek
Phone: 831-582-3529
Office: Bldg. 46A, Rm. A103
Office Hours: Tu 12 noon - 1:30 PM, Wed 10:30 AM – 12 noon
Email: rikk_kvitek@csumb.edu

Mr. Pat Iampietro
Phone: 831-582-4214
Office: Bldg. 46A, Rm.104
Office Hours: M,W 12-1 PM
Email: pat_iampietro@csumb.edu

Mr. Eric Sandoval (GPS)
Phone: 831-582-4441
Office: Bldg. 46A, Rm. A125
Email: eric_sandoval@csumb.edu,

Textbooks and Materials

Learning ArcGIS I from the ESRI Virtual Campus (http://campus.esri.com/).
Getting to Know ArcGIS Desktop (Ormsby et al., ESRI Press, 2001. $60)
Certified GPS Mapping Training Manual - Trimble Navigation.
Digital version provided by Trimble through your certified trainer (Rikk Kvitek).
Optional Texts (order from ESRI, we may be able to get educational discount):
ArcGIS User Guides – Bundle (Documentation for ArcGIS, ESRI press, 2001. $120)

CSUMB/ESSP Major Learning Outcomes (MLO): Successful completion of this course fulfills the advanced proficiency requirement of the old ESSP MLO #4 (selection and use of appropriate tools for data acquisition, analysis and display), and the new ESSP MLO#5 (Data Acquisition, Analysis and Display).

Course Learning Outcomes
Learning Outcome 1 (GIS): Participants will be able to demonstrate their understanding of the theory, operation, and application of Geographic Information Systems (GIS) technology. To earn a "C" or better in the class a student must demonstrate their ability to successfully apply each element within the **Minimum Required GIS Skill Set** which includes: data acquisition and organization into a database, creation and display of thematic maps to visualize a database, and effective analysis and presentation of results (successful participants will receive a certificate from ESRI for completing the Virtual Campus course **Learning ArcGIS I**).

<u>Learning Experiences</u>
1. Instructor led GIS presentations with on-line ESRI tutorial.
2. Home work assignments and quizzes
3. Hands-on **Model Project** work covering each of the Minimum Required GIS Skills.

<u>Learning Assessments</u>
1. Three GIS Quizes/Homework Assignments (graded).
2. Comprehensive 3 hr pass/fail GIS practical exam covering the Minimum Required GIS Skills (pass/fail)
3. Final report for **Model Project** (pass/fail & graded).

Learning Outcome 2 (GPS): Participants will be able to demonstrate their understanding of the theory, operation and application of GPS and Differential GPS technology. To earn a "C" or better in the class a student must demonstrate their ability to successfully apply each element within the **Minimum Required GPS Skill Set** which includes: pre-mission planning, field data acquisition, post-processing and export of GPS data to GIS. (Successful participants will receive a GPS Certified Training certificate from Trimble Navigation.)

<u>Learning Experiences</u>
1. Trimble GPS Certified Training program on the acquisition, processing, display and export to GIS of spatial data.
2. Hands-on field training with Trimble GPS mapping receivers and Pathfinder Office post-processing software.

<u>Learning Assessments</u>

1. Comprehensive 3 hr pass/fail GPS practical examination: Design and completion of independent field mapping exercise including pre-mission planning, field data acquisition, post-processing and export of GPS data to GIS (pass/fail).

Learning Outcome 3: Each participant will be able to develop, propose and execute an independent **Custom Project** that will integrate and apply GIS and GPS technologies to answer a specific research question. Through this process the student will collect, synthesize and analyze spatial data to produce the new information required to answer their research question. To earn a grade of "C" or better in the class each student must complete all phases of the independent project.

<u>Learning Experiences</u>

1. Design, propose and successfully complete a spatial data project involving the integrated use of GIS and GPS to answer a specific research question.

<u>Learning Assessments</u>
1. Oral Custom Project proposal presentation
2. Written Custom Project proposal.
3. Oral mid- Custom Project status report.
4. Oral final Custom Project presentation.
5. Written final Custom Project report.

ESSP 332 Products & Assessment
Minimum & necessary requirements for earning a "C" in ESSP 332
Participants who successfully complete the following will earn at least a "C" in the class.

       GIS Practical Exam (successfully complete all elements)   pass/fail

GPS Practical Exam (successfully complete all elements)   pass/fail
Model Project Final Report, GIS Map Layout and files   pass/fail
Custom Project (complete minimum required elements)   pass/fail
        Project scope includes GIS, GPS and accuracy assessment
             Formal project proposal – oral
             Formal project proposal – written
             Mid-project report – oral
             Final project report – oral (PowerPoint presentation)
             Final project report – written (as technical report or E-size poster)

Assessment breakdown for earning a grade above a "C" in ESSP 332
To earn a grade above the level of "C" in the class, the participant must perform **above** the minimum level of competency. As a result, the following products will also be assessed for quality and scope. Accordingly, you will receive a set of scores for quality and scope above and beyond the minimum requirements for earning a "C" in the class.
These scores will be **weighted (given point values)** as follows:

GIS Tutorial Work Quality:		**30 points**
GIS quiz & homework assignments	10 points	
Model Project final report & layout	20 points	
Individual Project Work Quality:		**65 points**
Project Proposal (Oral)	5 points	
Project Proposal (Written)	15 points	
Mid-Project Report (Oral)	5 points	
Final Project Report (Oral)	10 points	
Final Project Report (Written)	30 points	
Independent Integration of Techniques & Products		**5 points**
(Based on student's mastery of and ability to work independently with GIS and GPS)		
TOTAL QUALITY & SCOPE SCORE		**100 points**

Assignment of letter grades in ESSP 332
To earn a grade of "C" or better in ESSP 332, all minimum requirements must be fulfilled (see above) regardless of a student's cumulative points for the class. Once these minimum requirements have been fulfilled, a student's cumulative score for ESSP 332 products is graded on a straight percentage of 10% for each whole grade. Pluses and minuses are given at the upper and lower ends of each grade range.

A+	98-100%		B	83-87
A	93-97		B-	80-82
A-	90-92		C+	78-79
B+	88-89			

NOTE: A score of "D" is highly unlikely because you will either earn at least a "C" for successfully meeting all pass/fail requirements, or if you do not successfully pass all pass/fail requirements, you fail the course and receive an "F" or incomplete. When you pass all pass/fail requirements, you have earned a "C". Grades above "C" are based on the number of points you earn for the quality and scope of your work as indicated above.

ESSP 332 CLASS SCHEDULE Fall 2002

Date	DOW	Faculty	Topic or Activity
27 Aug	Tu	Pat	Introduction to ESSP 332
29 Aug	Th	Pat	Introduction to GIS/ESRI Virtual Campus Basics of ArcGIS (Mod.1)
3 Sept	Tu	Pat	Displaying & Georeferencing, (Mod.2) Understanding Projections (Mod. 1) QUIZ #1
5 Sept	Th	Pat	Working w/ Spatial Data (Mod. 3) Georeferencing Tutorial (in class)
10 Sept	Tu	Pat	Working with Attributes (Mod. 4) QUIZ #2
12 Sept	Th	Pat	Querying your Database (Mod. 5)
17 Sept	Tu	Pat	Presenting Data (Mod. 6)
19 Sept	Th	Pat	California Fisheries and ArcGIS
24 Sept	Tu	Pat	California Fisheries and ArcGIS, review, and special topics HW #1 (due)
26 Sept	**Th**	**Pat**	**GIS Practical Exam**
27 Sept	**F**	**Pat**	**Model Project Due 5pm: Written report, Poster, Files**
1 Oct	Tu	Rikk&Eric	GPS 1
3 Oct	Th	Rikk&Eric	GPS 2
Fall Break (October 7 – 11) No Classes			
15 Oct	Tu	Rikk&Eric	GPS 3
17 Oct	Th	Rikk&Eric	GPS 4
22 Oct	Tu	Rikk&Eric	GPS 5
24 Oct	**Th**	**Rikk&Eric**	**GPS 6 Practical Exam**
29 Oct	Tu	Eric	Advanced GPS
31 Oct	**Th**	**All**	**Oral Custom Project Proposal**
1 Nov	**Fri**		**Written Custom Project Proposal Due 5pm**
5 Nov	Tu	Pat/Eric	Advanced GIS, *Custom Project Work & Mentoring*
7 Nov	Th	Pat	*Custom Project Work & Mentoring*
12 Nov	Tu	Pat	*Custom Project Work & Mentoring*
14 Nov	Th	Pat	*Custom Project Work & Mentoring*
19 Nov	Tu	Pat	*Custom Project Work & Mentoring*
21 Nov	**Th**	**All**	**Oral Mid-Project Report Presented**
26 Nov	Tu	Pat	*Custom Project Work & Mentoring*
Thanksgiving Break (November 27 – 28) No Classes			
3 Dec	Tu	Pat	*Custom Project Work & Mentoring*
5 Dec	Th	Pat	*Custom Project Work & Mentoring*
10 Dec	Tu	Pat	*Custom Project Work & Mentoring*
12 Dec	Th	Pat	*Custom Project Work & Mentoring*
17 Dec	**Tu**	**All**	**Oral Final Project Reports Presented**
19 Dec	**Th**	**All**	**Oral Final Project Reports Presented**
20 Dec	**Fri**		**Written Final Project Report Due 5pm**

Last Day of Fall Semester Classes is December 13
Note that 16-22 December are Assessment Days

GIS CERTIFICATION SUB-SYLLABUS Fall 2002

Certified GIS Training

You will receive a certificate from ESRI for successfully completing the ESRI Virtual Campus online course during class time. You will register for the online course **Learning ArcGIS I** with the ESRI course subscription for ESSP332.

LEARNING ARCGIS I COURSE MODULE	LESSON 1	LESSON 2
Basics of ArcGIS	Introducing GIS	Introducing ArcGIS
Displaying & Georeferencing Data in ArcGIS	Displaying data	Understanding georeferenced data
Understanding Map Projections and Coordinate Systems	Shape, size, and location	Putting it on the map
Working with Spatial Data in ArcGIS	Spatial data formats	Editing spatial data in ArcGIS
Working with Attributes in ArcGIS	Displaying and manipulating attributes	Working with tables in ArcGIS
Querying Your Database in ArcGIS	Getting information from maps	Finding features using spatial relationships
Presenting Data in ArcGIS	Introduction to mapping	Introduction to map design and production

TRIMBLE GPS CERTIFICATION COURSE SUB-SYLLABUS Fall 2002
Certified GPS Training

You are enrolled in a Certified Trimble GPS Mapping Training Course for the GeoExplorer III System, taught by a Certified GPS Trainer (Dr. Rikk Kvitek). Students who successfully complete this course will receive a Trimble Certificate of GPS Training and be eligible to check out GPS receivers for use while at CSUMB. This GPS training class is outcomes based. Student assessment will be based entirely on the GPS Field-to-Finish Practical Examination.

GPS 1	Chap 1 Chap 2 Chap 3 Chap 4	**Introduction** **GPS Fundamentals** **Accuracy** **Planning Your Project**	**Intro Field Session**
GPS 2	Chap 4 (cont.)	**Planning Your Project** (continued) Data dictionary & Quick Plan	Exercises 4.1-4.7
GPS 3	Chap 5 Chap 6 Chap 7	**Equipment Setup** Geoexplorer config. **Field Session** GPS status & Data collection **Data processing with PFO 8** Pathfinder Office setup & Data transfer	Exercise 5.1-5.2 **Field-session 1** Exercises: 6.1-6.2 Exercise: 7.1
GPS 4	Chap 7 (cont.)	Configure Pathfinder Office Differential Correction Data display & edit Review Tutorial	Exercises 7.2-7.6
GPS 5	Chap 7 (cont.)	Export to GIS Practice for practical	Exercises 7.6 **Field-session 2**
GPS 6		GPS Final Exam: Field-to-finish	**Field-session 3 & Practical Exam**
Advanced GPS		Real Time DGPS, Laser range finder, Trimble ProXR	Demonstration and field session

Ground rules for ESSP 332

Will late submissions be accepted? Late submission of any class work for assessment (homework, proposals, reports, practicals) will be accepted for pass/fail, but will have their quality scores devalued 10% for each week that the item is late.

Will incompletes be given for ESSP 332? No incompletes will be given unless there are circumstances beyond the student's control that led to the work not being completed in a timely manner. Generally this situation only applies when the only available source of data required for a student's project is unable to provide those data in time for the student to complete the work.

Can students work in teams on their class project? Students may work in teams on the class project; however, each student must have an individual, complete project within the team project that includes GIS, GPS, spatial analysis (including accuracy assessment data), and visualization technologies. If any of these components are missing or too weak, the value of the final project will be reduced accordingly.

How are students assessed for the "Independent integration of techniques & products" category (5% of total score for the class)? The "Independency of Project Work" score is to address a problem that has arisen in past project work. That problem is the practice of a student having the instructors and other students actually do most of the processing operations for a project. This practice takes excessive time from the instructors and peers, and results in the student not really learning the techniques. Each instructor will provide an "independency" evaluation for each student, and the lowest score given will be the score that is used. This rule makes sure that score from the instructor whose time was most heavily impacted is given full weight.

Where can examples of required work be found? CSUMB Home Drive (see above).
How should completed class work be submitted? We strongly encourage all project work (proposals & written reports) to be submitted in electronic format.
- Final model project report, poster and files should be submitted on zip disk or CD to Pat Iampietro by the due date.
- Written Proposals should be emailed to Rikk Kvitek as attached word document files without figures or images by the due date.
- Final oral powerpoint presentations and written reports, posters and files for the Custom project should be either: 1) placed on a ZIP disk or burned to a CD and turned in to Rikk Kvitek by the due date, or 2) put into the 332 **inbox** on **Home Drive** by the due date with notification of this action sent to Rikk Kvitek via email. If there is room on the disk include with all associated project and data files. We will assess your file and data management skills based on how well your submission disk is organized.

How will project proposals and reports be assessed? The attached guidelines and grading criteria will be used for assessing project proposals and final products for the individual class projects.

Guidelines for the Preparation of
ESSP 332 Custom Project Proposals

The purpose of the proposal is to present the full details for how you will conduct your ESSP 332 GIS Custom Project. The goals are that the project make use of the primary technology skills taught in this class (GIS and GPS), and that you analyze your results such that new information is created to answer a specified research, management or policy question. The proposal should present: (1) the question you seek to answer, why it is important and to whom; (2) your specific objectives; (3) the methods you will use for each task needed to reach each objective; (4) the types of resource and data support you will need; and (5) a description of your expected final product. Sufficient information should be provided so that your reviewers will be able to evaluate the proposal in accordance with the established Proposal Evaluation Criteria listed below. You may use the Example Project Proposal on Home Drive as a guide in preparing your Custom Project Proposal.

Title

The title of the project should be brief, scientifically or technically valid, and intelligible to a scientifically or technically literate reader.

Abstract

The abstract should be a brief one-paragraph statement of:

- The issue or problem of concern
- Why it is of importance
- Who cares
- The question you will seek to answer with new information that you will create using geospatial data and analysis
- The steps required to create this new information and answer your question
- The methods and data types you will use
- Your target audience and how they will benefit from your newly created GIS information
- What your final product will be

Project description & background

The main body of the proposal should be a clear statement of the work to be undertaken including the objectives and related tasks for the period of the proposed work as well as the expected products and their significance. The statement should outline the general plan of work and provide an adequate description of the methods and procedures for each of the technologies that you will be using (GIS and GPS). The statement should also describe the target audience and how your product will be of benefit to them. Brevity will help reviewers quickly process and return proposals to the authors.

The project description should include the following sections:

Introduction

- Statement of an identified need for the new spatial information that you will create to answer a specific research, management or policy question for your target audience/sponsor.
- Background information: The history of the issue you are investigating, who cares about it and why.
- State your question, hypothesis, why your expected results will be important and who will benefit from them.
- Brief description of the general approach you will use to answer your question with spatial data and the GIS products that you will create.

<u>Goals, Objectives</u>
What are your goals, and the objectives that you will have to meet to achieve these goals?
<u>Methods, tasks and time line</u>
Describe and list the technologies and data that you will use, and how you will apply them to answer your research question. Also describe how you will assess the **spatial accuracy** of your major GIS layers. For each objective and product, list the specific tasks that you will have to complete. Provide a schedule and time estimate for the completion of each task.
<u>Expected products, significance & dissemination</u>
This section should cover the expected outcomes and benefits to target audience, including:
Value-added to existing GIS layers, new GIS layers that you will create, what your final GIS product will look like, how and in what format you will deliver your results to the target audience.
Format - MS Word document, 2-5 single spaced page equivalents.

Evaluation Criteria for Assessing
ESSP 332 Final Geospatial Project Reports
27 August, 2002
- Is the report written concisely, using correct grammar and spelling?
- Have the research question, goals, objectives and general approach been clearly stated?
- Was the GIS product and the new information that it contains clearly described?
- Did the project require the use of some aspect of GIS GPS, and accuracy assessment?
- Did the author identify a target audience and their need for a spatial data product?
- Do the final products and conclusions meet the stated needs of the target audience and/or the author's stated goals for the project?

Grading criteria for the written project final report:

100 Maximum score: 100   Ranking: <u>Excellent, Very Good, Good, Fair, Poor</u>
    10 Composition: 10
        3 spelling 3
        3 grammar 3
        4 logical argument/composition 4
    20 Introduction & justification: 20
        5 Background information 5
        5 Target audience needs identified 5
        10 Research question and spatial data product to be created 10
    20 Methods: 20
        5 GPS 5
        5 GIS 5
        5 Analysis 5
        5 accuracy assessment 5
    20 Results: 20
        5 GPS 5
        5 GIS 5
        5 Analysis 5
        5 accuracy assessment 5
    20 Final products - created as planned? 20
    10 Conclusions & recommendations from analysis 10