

Draft Syllabus

ESSP 433 - Applied Marine Science Technology

25 August 2004

Instructor:

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Textbooks:Mapping Technology Review

Available in classes/essp/433/campus & world folders or free at:
<http://seafloor.csumb.edu> (<http://seafloor.csumb.edu/taskforce/tech.html>)

Web Resources:

Coastal Geospatial Information

<http://www.csc.noaa.gov/products/datasites>

California Marine Habitat Task Force

<http://seafloor.csumb.edu/>

Ocean Mapping Group @ U. New Brunswick

<http://www.omg.unb.ca/omg/>

Joint Hydrographic Center, NOAA Special Projects

<http://www.ccom-jhc.unh.edu/>

NOAA Center for Operational Oceanographic Products and Services

<http://co-ops.nos.noaa.gov/>

Sea Technology Magazine

<http://www.sea-technology.com/>

SAIC Magazine

<http://www.saic.com/maritime/magazine.html>

National Geodetic Survey Data Sheets

<http://www.ngs.noaa.gov/cgi-bin/datasheet.prl>

Prerequisites: ESSP 220 (Physics 1), ESSP 332 (GIS/GPS), algebra and trigonometry

STUDENTS WITH DISABILITIES who may need accommodations please see me by or AFTER the 2/10/03 add/drop deadline, during office hours or make an appointment by contacting me via phone (582-3529) or email rikk_kvitek@csumb.edu.

ALSO, contact: Student_Disability_Resources@csumb.edu

Phone: 831/582-3672 voice, or 582-4024 fax/TTY <http://www.csumb.edu/student/sdr/>

CSUMB/ESSP Major Learning Outcomes (MLO): Successful completion of this course fulfills ESSP MLO #7 Group III (Area of concentration) and MLO #8 Group III (Scientific inquiry).

COURSE DESCRIPTION & GOALS:

The purpose of this course will be to help students expand their proficiency in GIS and geospatial technology through the application of current hydrographic survey techniques to marine habitat mapping and environmental change detection. This is a hands-on, project oriented, outcomes-based class in which students will use the CSUMB Seafloor Mapping Lab seafloor mapping system and vessel for survey design, data acquisition, analysis and display within the context of a class research project. Specific technologies to be covered include sidescan sonar, multibeam bathymetry, hydrographic survey design, ROV, acoustic tracking, motion correction, GIS, GPS and vessel navigation. Students will learn and become proficient in the use of following software packages: Hypack, CARIS HIPS, Triton-Elics Isis, NobelTec, ArcGIS. This course is ideally suited for supporting a group capstone. **Bring Field Clothes Each Week!**

COURSE LEARNING OUTCOMES

Learning Outcome 1: Research team members will be able to accurately describe the theory of operation and application of sea floor mapping technologies (GIS, GPS, acoustic remote sensing).

Learning Experiences

1. Class lectures, readings, demonstrations, exercises

Learning Assessments

1. Weekly quizzes and/or assignments
2. Informal assessment of performance in the field

Learning outcome 2: Research team members will be able to plan an effective acoustic sea floor mapping survey based on specified deliverables and designed to answer a specific research question.

Learning Experiences

1. Each team member will develop a survey design for a proposed survey site. This design will include a written description, diagrams and related Hypack files.

Learning Assessments

1. Survey designs will be assessed for completeness, accuracy and quality.

Learning outcome 3: Team members will be able to operate each of the various hardware and software components of a sea floor mapping system involved in the acquisition, processing, analysis, GIS integration and display of: multibeam, sidescan sonar and ROV data.

Learning Experiences

1. Execution of a “patch test” (sonar system calibration survey) and the hydrographic survey described in learning outcome 2.

Learning Assessments

1. Each team member will be assessed on their ability to safely, effectively and efficiently operate all the components required for a successful survey.

Learning outcome 4: Team members will be able to review and assess the merits of professionally prepared acoustic survey technical report.

Learning Experiences

1. Members will discuss and prepare a written review of a professionally prepared technical report provided as a model.

Learning Assessments

1. The reviews will be assessed based on completeness and technical insight and quality of the written document

Learning outcome 5: Team members will be able to prepare a written technical report for an acoustic survey of professional quality.

Learning Experiences

1. Each research team member will prepare a final technical report for the class research project describing the importance, purpose, approach, methods, results, and conclusions.

Learning Assessments

1. Written technical reports will be assessed for completeness, quality, attention to detail, technical mastery, integration of parts, and interpretation of results.

ESSP 433 PRODUCTS & ASSESSMENT

Assessment Breakdown

General understanding of seafloor mapping:	20 %
Weekly quizzes & assignments	
Review of Professional Technical Report:	5 %
Technical expertise (acquisition, processing, analysis, display):	60 %
Survey design (Hypack)	10 %
Multibeam sonar	
Reson & Triton-Elics Isis (acquisition)	10%
Caris (processing)	15 %
Sidescan sonar (Triton-Elics Isis)	15 %
GIS integration & analysis (ArcView)	10 %
Written Technical Report (w/GIS project & poster)	15 %
TOTAL	100 %

GROUND RULES FOR ESSP 433

Will late submissions be accepted? Late submission of any class work for assessment (homework, proposals, reports, profiles) will be devalued 10% for each week that the item is late.

Will incompletes be given for ESSP 433? No incompletes will be given unless there are serious circumstances beyond the student's control that led to the work not being done in a timely manner.

How are letter grades assigned? ESSP 433 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%	C+	78-79
A	93-97	C	73-77
A-	90-92	C-	70-72
B+	88-89	D+	68-69
B	83-87	D	63-67
B-	80-82	D-	60-62
		F	<60

How should completed class work be submitted? All written work should be submitted in electronic format for assessment. For each assignment, you will be instructed how to submit files, e.g.: 1) the HOME Drive into the ESSP 433 inbox, 2) email, or 3) CD. Include your last name in the file name. (e.g. "Smith_report.doc" for Smith's Technical Report.) Always send me an email notifying me that you submitted work into the home drive inbox.

ESSP 433 Draft Class Schedule (subject to change)

Date	Topics	Activity, Assignments
27 Aug	Class Intro I	Class Introductions – review syllabus Lecture: Powerpoint - Acoustic Remote sensing & Marine Habitat Mapping. Introduction to Class Research Project – Seasonal change in Monterey Bay Canyon head. Activity: <i>boat house visit, classroom habitat mapping</i> Reading (all on Homedrive/classes/essp/433) 1) Smith et al. Semi-annual patterns of erosion and deposition in Upper Monterey Canyon from serial multibeam bathymetry (Smith_et_al.pdf) 2) Nearshore Ecosystem Database Report, chapters 1,2,4 (NEDP.pdf) 3) Hypack Manual Appendix Chapters: B,C,D (Appendix.doc)
3 Sep	Multibeam bathymetry survey planning	Lectures: A) Multibeam bathymetry theory and application. B) Hydrographic survey design considerations: data density, efficiency, coverage Activity: <i>Use Excel and Hypack to create a cost effective survey design for the class project area</i> Reading (on Homedrive/classes/essp/433) 4) Nearshore Ecosystem Database Report, chapters 1,2,4 (NEDP.pdf) 5) Hypack Manual Chapters: Intro, Prep, Survey Assignment #1 – Create: 1) survey estimator spreadsheet, and 2) hypack line file for Monterey Bay Canyon Survey
10 Sep	Patch Test CRUISE	Field Activity: Conduct patch test aboard R/V VenTresca Reading (on Homedrive/classes/essp/433) 6) CARIS HIPS Manual in Acrobat Reader in Home drive folder (Chapters: All chapters up to and including Calibration) Assignment #2 – Create Hypack project for Monterey Canyon survey.
17 Sep	Multibeam data acquisition CRUISE	Field Activity: Multibeam survey of Monterey Canyon head aboard R/V VenTresca Assignment #3 – System diagram of hydrographic components.
24 Sep	Multibeam patch test processing	Lecture: Multibeam data processing with CARIS HIPS – patch test & vessel configuration Activity: Create CARIS project, patch test, vessel config, Assignment #4 – VCF files
1 Oct	Multibeam data processing – I tide & SVP	Lecture: Multibeam data processing with CARIS HIPS Activity: Create CARIS project, tide & SVP file creation, convert files. Assignment #5 –tide and SVP viles
8 Oct	Multibeam data processing – II swath	Lecture: Multibeam data processing with CARIS HIPS – swath editor & filtering. Activity: Filter survey data in <i>swath editor</i> . Assignment #6 – export preliminary geotiff of shaded relief grid
15 Oct	Multibeam data processing – III subset	Lecture: Multibeam data processing with CARIS HIPS - subset mode. Activity: clean data in subset mode. Assignment #7 – export refined preliminary geotiff of shaded relief grid
22 Oct	Multibeam data processing – IV QA/QC	Lecture: Multibeam data processing - QA/QC. Activity: Export, Fledermaus inspection, final export xyz. Assignment #8 – export final CARIS geotiff, and produce Fledermaus scene fly-through
29 Oct	GIS analysis - I	Lecture: GIS review

	Import & gridding	Activity: Create ArcGIS project, import, <i>Grid and contour in ArcGIS/Spatial Analyst</i> . Assignment #8 – produce GIS project for Monterey Bay canyon head with: coastline, contours, geotiff
5 Nov	GIS analysis - II DEM analysis	Lecture: GIS raster and grid analysis – Spatial Analyst Activity: interannual geomorphic change analysis - Grid subtraction. Assignment #9 – produce difference grids for Sept 2004 vs 2002
12 Nov	Sidescan Sonar – I	Lecture: Sidescan sonar – theory & application Activity: Introduction to Triton Elrics Isis Sonar & Delphmap – process project data files. Assignment #10 – Delph mosaic
19 Nov	Sidescan Sonar – II & GIS habitat analysis	Lecture: Sidescan sonar – habitat interpretation Activity: Creat and export mosaic, produce habitat interpretation in ArcGIS. Assignment #11 – Habitat map in GIS
26 Nov		Fall Break
3 Dec	Complete GIS project - poster	Activity: <i>Complete GIS project</i> . Processing Assignment #13 – GIS project files, written technical report and poster for entire shale bed area
10 Dec	Practice	Practical Exam Practice
17 Dec	Final exam	5 hr Practical Exam