

# MARI 322 Coastal and Shelf Seas Oceanography



Photo: Prof. Abby Smith

MARI 322 allows third-year students to explore physical, chemical, biological and geological aspects of coastal and shelf seas. We provide essential practical and field experience for marine scientists, focussing on research philosophy, workplace-relevant skills, and higher-order scientific questions. Here, at the end of a BSc, is the time to develop the skills you'll need in the future.

## **Overall Learning Outcomes**

**Responsibility:** students are responsible for their own learning; they develop their own thoughts, questions, and conclusions, participating in group workshops and discussions.

**Critical Thinking:** students are able to evaluate the strength and rigour of data; they show scholarship and understand the ethics of science; they can address hypotheses and questions

**Scientific Method:** students design and carry out field research using field and laboratory techniques; they record and store information; they analyse, interpret results, and modify their approaches based on their findings

**Presentation and Communication:** students present their results fairly and clearly in tables and figures and with reference to the scientific literature

**Teamwork:** students work together on data collection, analysis and interpretation; they understand when teamwork is appropriate, and when individual work should be used; they give credit to others when necessary.

**Course Design:** The design of this paper is in six distinct but related modules, each of which includes practical experience in the lab or in the field, essential readings, workshops and discussion groups. Each module is assessed separately, and each will be represented by a synthetic and analytical question on the final exam.

## **Assessment Summary**

<b>Assessment</b>	<b>Due Date for Tuesday Group</b>	<b>Due Date for Wednesday Group</b>	<b>Contribution to final grade</b>
Module 1: Map	21 July, 12 pm	21 July, 6pm	10%
Module 2: CHZ Report	11 Aug, 12 pm	11 Aug, 6pm	5%
Module 3: Sea Level Assignment	25 Aug, 12 pm	25 Aug, 6pm	10%
Module 4a: Tidal Prism	8 Sep, 12 pm	8 Sep, 6pm	5%
Module 4b: Lagrangian Data Report	15 Sep, 12 pm	15 Sep, 6pm	10%
Module 5: Water Chemistry Talk	28 Sep, 9-11am	28 Sep, 9-11am	10%
Module 6: Group Research Report	10 Oct, 7pm	11 Oct, 7pm	20%
Final Examination	TBA		30%

**Terms Requirements:** Students are required to attend the entire field day on 7 October.

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Week	Topics	Monday Workshop	Tues / Wed Practical/Lab	Thursday Workshop	Assignments
1	Intro Position-Fixing Bathymetry Maps & Charts	Introduction Hydrographic Surveying Bottom sampling	<b>Surveying Otago Harbour</b> (and sediment collection) <i>RV Polaris II</i> Warm waterproofs, gumboots	Now what? Multibeam data processing & analysis	
2	Bottom Sampling	Maps and Charts Position-fixing Bathymetry	<b>GIS Workshop</b> Bring laptops <i>Surveying Lab</i>	Put it in practice: make maps	Otago Harbour Map 10%
3	Coastal Management	Coastal Landforms and Erosion	<b>Sediment Processing</b> <i>Portobello Marine Lab</i> bring laptops, lab coats	Natural Sediment Transport	
4		People Move Sediments	<b>Coastal Otago field trip</b> <i>Bus from Castle St</i> Bring camera or phone	Sand Wars -- Managing Humans in the coastal zone	
5		Coastal Hazards	<b>Coastal Hazard Mapping</b> Bring laptop, maps	Put it in practice: Coastal hazards report	Hazards report 5%
6	Sea Level and Climate and coring	Why sea level changes	<b>Reconstructing sea level with Fiordland sediment cores</b> <i>Otago Research Core Facility</i>	Reconstructing past sea-level	
7		Projecting future sea level	<b>Sea-Level Expert Submission</b>	Climate change in context	Sea Level Assignment 10%

## Mid Semester Break

8	Hydro-dynamics and Dispersal	Estuarine dynamics	<b>Eulerian Data Collection</b> <i>Allan's Beach</i> <i>RV Polaris II</i>	Tidal prism and Flushing Time	Tidal prism 5%
9		Dispersal in oceans	<b>Working with Lagrangian Data</b> <i>Hunter CAL</i>	Processing particle data	Drifter data report 10%

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10	Coastal Biogeochemistry and	Phytoplankton Field Planning	<b>Water Sampling and Processing</b> <i>RV Polaris II</i>	Characterising Coastal Waters	
11	Phytoplankton	Phytoplankton and Foodwebs	<b>Water Sample Analysis</b> <i>Mellor Labs</i>	Group Reports (talks)	Group Talk 10%
12	Oceanographic Reporting	Scientific Writing	<b>Planning our report</b> Bring laptops and ideas	Scientific Reading Cruise planning	
13	Oceanographic Reporting	Presenting Oceanographic Data	<b>Putting the report together</b> Bring laptops and data	Feedback and Party	Group Report 20%

**Full Day Field Trip Saturday before last week of term – 8am to 8pm ,  
Portobello Marine Lab and Otago Harbour**

Final Exam -- two hours, six questions (one from each module), answer any four (about 30 mins each) – worth 30%