

## **Introduction to the Ecosystem of Gulf of Eilat: Coral Reef and Subtropical Sea**

MARI/OCEA 3685.03 Syllabus – Dalhousie University  
Offered during break between fall and winter terms

Course coordinator and principal instructor: Dr. Amatzia Genin, Professor, Dept. of Ecology, Evolution & Behavior, Institute of Life Sciences, The Hebrew University of Jerusalem  
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Additional instructors: TBD (physical oceanographer, chemical oceanographer, coral biologist, plankton biologist, marine geologist, sedimentologist, monitoring expert, reef conservation expert)

Number of students: 24 total, 8 Dalhousie students

Number of Teaching Assistants (PhD students): 4

Calendar description: Introduction to physical, chemical, and biological oceanography, marine geology, biogeochemistry, and coral-reef biology. Focus is on subtropical seas, the coral reef ecosystem, and the unique characteristics of the Gulf of Eilat. Lectures, laboratories, demonstrations, field trips, exam, group field research projects in the sea, oral presentation, and scientific research paper.

Pre-requisites: Two years of coursework in natural sciences, including OCEA 2000 and STAT 1060. Students should be in their third or fourth year of a BSc and have a strong academic record. Places in this course are competitive. Special application procedure.

Format: This intense, all-day, two-week course will include lectures, labs, and considerable field work on boats and with scuba or snorkeling. Scuba diving is not mandatory; however students who are certified will be able to use scuba diving for the research projects. All students will stay in the dormitories on site, and cook meals together, for the two-week duration of the course.

Course dates: December 20, 2015 – January 1, 2016. This course is taught entirely in Eilat, Israel, during the break between fall and winter terms.

Objectives: The course will cover basic topics in physical, chemical, and biological oceanography, marine geology, biogeochemistry, and coral-reef biology, focusing on subtropical (warm-water) seas, on the coral reef ecosystem, and on the unique characteristics of the Gulf of Eilat. The course consists of two parts: the first part (6 days) includes lectures, laboratories, demonstrations, and field excursions (snorkeling at the reef and half day research cruise).

The second part is devoted to supervised research carried out by groups of 5-6 students. The students carry out the research project from the stage of planning through presentation of the results and writing the report (in a format of a scientific paper). Most projects have a major part in the sea (coral reef or open water) and are supervised by a TA. Students who want to scuba dive in this course will be required to show proof of scuba certification (e.g., PADI open water) and dive insurance (e.g., DAN).

#### Evaluation of student performance:

Grading is based on:

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| - Exam (multiple choice question) given on the 7 <sup>th</sup> day (Saturday)                                  | 50% |
| - Project presentation and written report (format of scientific paper)   | 40% |
| - Evaluation of the student's motivation, performance and contribution to the course (as determined by the TA) | 10% |

Conversion of numerical grades to final letter grades will follow the Dalhousie University common grade scale: A+ 90-100, A 85-89, A- 80-84, B+ 77-79, B 73-76, B- 70-72, C+ 65-69, C 60-64, C- 55-59, D 50-54, F <50.

#### Tentative schedule:

Thursday, December 17

Departure from Halifax

Friday, December 18

Arrive in Tel Aviv

Saturday, December 19

Local transportation to Eilat

Sunday December 20

Morning: Opening (Overview of IUI, course structure, safety regulations, etc.)

Check dive (for scuba divers)/supermarket trip (buying food)

Introduction to physical oceanography (2 hrs)

Afternoon: Physical oceanography of the Gulf of Eilat (1 hr)

Guided tour: coral reef (underwater observatory)

Introduction to biological oceanography (1.5 hr)

Night: Biological oceanography of the Gulf of Eilat (1 hr)

Monday, December 21

Morning: Geology of the rift valley and the Red Sea (2 hr)

Introduction to chemical oceanography (1 hr)

Chemical oceanography of the Gulf of Eilat (1 hr)

Afternoon: Coral biology (2 hr)

Guided tour of the coral reef (snorkeling) (1.5 hr)

Plankton biology (1.5 hr)

Night: Plankton laboratory (2 hr)

Tuesday, December 22

Morning: Biogeochemistry of the coral reef (1.5 hr)

Marine microbiology: viruses, bacteria, and phytoplankton (2 hr)

Laboratory: marine microbiology (1.5 hr)

Afternoon: Coral reef fishes (1.5 hr)

Reef-plankton interactions (2 hr)

Conservation biology of coral reefs (1 hr)

Night: Methods and instruments in oceanography: intro to research cruise (1.5 hr)

Wednesday, December 23

Morning: Research cruise (5 hr)

Afternoon: Processing cruise data (5 hr)

Night: Presentations of cruise results (1.5 hr)

Thursday, December 24

Morning: Sediment biogeochemistry (2 hr)

Laboratory: sediments (2 hrs)

Afternoon: Paleocoeanography of the Red Sea (1.5 hr)

Light and vision in the sea (1.5 hr)

Laboratory: light and vision (1 hr)

Night: Introduction to research projects (2 hrs)

Friday, December 25

Morning: Physics-biology in the coral reef (2 hr)

Start research projects (in groups)

Afternoon: Research projects

Adjourn for Shabbat (free time to prepare for the exam)

Saturday, December 26

Morning-afternoon: free

Night: Final exam (1.5 hr)

Sunday, December 27

All day: Research projects

Monday, December 28

Morning: Research projects

Afternoon/night: complete research project; data processing

Tuesday, December 29

Morning: Preparing presentations

Afternoon: Group presentations of research projects

Night: start writing final report on research projects (in groups)

Wednesday, December 30

Final report preparation in groups

Thursday, December 31

Final report preparation in groups

Friday, January 1

Reports due

Departure from Eilat