Syllabus: Physical Oceanography – course 224.4998

2 credit points, semester B

Time: Monday 15:15-17:15

Teachers: Smadar Ben-Tabou de-Leon and Yoav Lehahn

Tutor: Tal Ben-Ezra

Office hours:

Prof. Smadar Ben-Tabou de-Leon, upon request: **sben-tab@univ.haifa.ac.il**

Dr. Yoav Lehahn, upon request: **yombav@gmail.com**

Tal Ben-Ezra, upon request: **tal.benezra13@gmail.com**

Course Type: Lectures and tutorials

Course Level: MA, MSc

Pre-Requisites: None

Course Overview:

The course physical oceanography aims to teach advanced students about the physical properties of ocean water and the physical processes within them, emphasizing the physical aspects that influence marine organisms. The course will discuss external (e.g., sun, earth rotation, winds, etc.) and internal (e.g., temperature and density) factors that drive physical processes in the ocean (stratification, currents, waves, etc.). Common mathematical formalism used to study these processes and get predictions will be introduced and practiced. The course will also describe the connection between physical factors and processes to biological processes and ecological systems.

Topics:

1. Physical properties of seawater – temperature, salinity, density and pressure.
2. Vertical structure of the water column: Ocean stratification, potential temperature and density, stability of the water column.
3. Wind driven circulation, measurements, advection, upwelling, transport.
4. Basic conservation laws in oceanography and the equations of motion including friction and Reynolds number.
5. Eddy viscosities, wind driven inertial flow in the ocean and Ekman transport, Rossby number.
6. Geostrophic balance and mesoscale eddies, Small scale motion.

7. Waves, tsunamis, and light in the water.

Requirements: 80% attendance in the classes and 100% completion of the exercises.

Grading: 30% - Exercises, 70% - Test.

Website: Moodle