Leon H. Charney
School of
Marine
Sciences
UNIVERSITY
OF HAIFA

Dating methods for quaternary and environmental research – 2 credits

Course Number: 224.4993

Lecturer: Prof. Revital Bookman

Office Hours: Multipurpose Building – Room 268, tel. 04 8288792, email: rbookman@univ.haifa.ac.il

Course Type: Lectures

Course Level: MSc/ PhD

Prerequisites: none, the course is intended for geology, geomorphology, and archeology students in their 3rd year and higher. Interested students with no relevant background are welcome to contact Prof. Bookman for participation.

Course Description:

The course is intended for Earth Science, Maritime Civilization, Geography, and Archeology graduate and undergraduate 3rd-year students. The course will present the concept of time and dating and its use to study changes in time. We will start with an overview of the geological timetable, dating materials, and different dating approaches. We will explain the basic concepts of relative dating in the field and using archeological artifacts and will move to radioactivity and radiometric dating. Emphasis will be given to Quaternary dating methods such as Radiocarbon, OSL, and U-series.

We will also explore the use of $\delta^{18}O$ wiggle matching, dendrochronology, tephrochronology, and varve records, and discuss the use of nuclear experiments and disasters as chronological markers for environmental reconstructions.

Topics:

1. Introduction.
2. Radiocarbon dating.
3. Radiation Exposure Dating.
4. Applications for radiocarbon in archeological and prehistorical studies.
5. Dating with long-lived radioactive isotopes.
6. Dating water masses and marine sediments.
7. Techniques to establish age-equivalent chronologies.
8. Banded records and varve chronology.
9. Short-lived radioactive isotopes with reflections on the Anthropocene.

Grading: Home exam with open material (90%), participation, and reading (10%).

Reading List: Quaternary Dating Methods / Mike Walker, and selected papers.