**II.2.13 FRONTIERS IN MARINE BIOLOGY**

1. **Course description:**
2. **Credit points**: 2 ECTS
3. **Time commitment:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Items | Lecture | Tutorial/  Exercise | Practice/  Assignment | Exam | **Total** |
| No. of hours | 30 |  |  |  | **30** |

1. **Prerequisites**: General Biology, Basics of Biochemistry
2. **Recommended background knowledge**:

Principles of Biological Processes – advanced high-school level will do.

1. **Subject description:**

* characteristics of marine environment and life
* biological processes within & among the marine living components
* interactions of the biological processes in the global context.

1. **Objectives & Outcome:**

* understanding the interactions between marine organisms and their environments at different scales (regional, oceanic, global) and perspectives (organismal, evolutionary, geochemistry, etc)
* understanding the roles of marine life in association with earth science, climate change, pollutions, and other current issues.

1. **Assessment/ Evaluation:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Component | Attendance | Exercises | Assignments | Reports | Midterm | Final |
| Percentage % | 10 | 10 | 20 |  | 20 | 40 |

1. **Prescribed Textbook(s):**

[1]Biology, Kimball http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/

[2] Marine Biology : an Ecological Approach, Nybbaken and Bertness (for selected topics)

[3] Wikipedia for keyword search and self study

1. **Course content & schedule:**

1 features of marine environments and habitat, how diverse they are, and how they affect the biology of marine life

2 major players of the living components in marine ecosystems; biological characters & features

3 producers and consumers in the food web, energy and material flow

4 photosynthesis and respiration in ocean; principles of, types of, uniqueness of

5 important molecules & elements in marine biology, their roles and structure

6 marine microbiology; prokaryote vs eukaryote, essential roles, metabolic importance

7 biogeochemical cycles; how the earth goes on by biological activities

8 molecular ecology – molecular biology in ecological study, molecular tools that distinguishes biological groups

9 molecular evolution – molecules that evolved along with the host organisms, and how we make use of them

10 -omics in marine biology; introduction of genomics, metagenomics, proteomics, transcriptomics, metabolomics, and their use

11 further introduction on trendy molecular tools in recent technology

12 ocean science in contemporary issues (global warming, oceanic carbon sequestration, etc)

13 Mid-term exam at the end of the course, written

14 15 min presentations by small groups of students on topics that selected during the course

15 Final Exam, written

1. **Reference Literature:**

Biological Oceanography: An Introduction by Timothy Parsons & Carol Lalli.