**II.2.10 OCEANOGRAPHY**

**A. Course description**

**1. Credit points: 3 ECTS**

**2. Time commitment**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Items | Lecture | Tutorial/  Exercise | Practice/  Assignment | Exam | Total |
| No. of hours | 23 | 7 |  |  | 30 |

**3. Prerequisites:**

Mathematics : ordinary and partial differential equations, complex numbers

**4. Recommended background knowledge**

Fluid mechanics

**5. Subject description**

Basic equations and processes: barotropic and baroclinc flows, vorticity and instabilities, diffusion and dispersion mechanisms. Measurement, modelling and data assimilation concept.

**6. Objectives & Outcome**

This lecture will provide basic knowledge on ocean physics including geophysical flows and ocean processes at different scales

**7. Assessment/ Evaluation**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Component | Attendance | Exercises | Assignments | Reports | Midterm | Final |
| Percentage % | 0 | 0 | 0 | 0 | 30 | 70 |

**8. Prescribed Textbook(s)**

[1] S. Pond & G.L. Pickard, Introductory Dynamical Oceanography Pergamon Press, 1991 [2] A. Molcard, Y. Ourmières, P. Fraunié, lectures notes in oceanography, Université du Sud Toulon Var

**B. Course content**

1) Introduction  
2) The Physical setting (dimension, relief, etc)  
3) Pressure  
4) Temperature, heat, and potential temperature  
5) Salinity and composition of sea water  
6) Density  
7) The Hydrostatic equilibrium or how the pressure changes with depth  
8) Freezing point and sea ice  
9) Interpretation of T-S diagrams  
10) Propagation of light in the sea  
11) Propagation of sound in the sea  
12) General Atmospheric circulation  
13) Introduction to Ocean circuation (Ekman transport and geostrophic currents, wind driven circulatio, thermoaline circulation)  
14) Modelisation of ocean dynamics  
15) In situ and satellite observation of the ocean

**C. Reference Literature:**

[1]. Nathalie Daniault Océanographie Physique, Ecole Navale, 2005

[2]. P. Bouruet Aubertot & A. Stegner, lecture notes Université Pierre et Marie Curie website

[3]. Coastal modelling summer schools 2006 & 2011, université du Sud Toulon Var