

MF303 : Dynamics of geofluids

Shared by choice module(s) :

EX318 Optional unit O91b

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ECTS credits :

3.12

Evaluation :

S1: CC; S2: ET(2h,E,sd,sc)

Number of hours :

Lecture :	24.00
Individual work :	24.00

Teacher(s) :

BONNETON Natalie

Title :

Dynamics of geofluids

Abstract :

Coastal environments are fragile in particular in the context of global climate change. The coastal zone is affected by intense hydrodynamic processes related to waves: swell, tide, tsunami. Submersion and coastal erosion are driven by these hydrodynamic processes. The main objective of this course is to analyse and modelling these coastal environment physical processes.

Plan :

I. Physical and theoretical background (10h)

1 Introduction

Characteristic scales and phenomenology: gravity waves, boundary layer

2 Geophysical dynamic equations

2 - 1 Boussinesq approximation equations

2 - 2 Free surface flow equations

2 Linear and non-linear wave theory

3 Vortex dynamic in a shallow water layer

II. Applications in Coastal Engineering (10h)

Engineers talks :

- Wave modelling for coastal engineering, Michel Benoit, St Venant laboratory, EDF (4h)

- Harbour development project, Christophe Coulet, Artelia (2h)

1 Field experiments

1 - 1 Hydrodynamic measurements in the coastal zone

1 - 2 Examples of field experiments and results :

Tidal bore, rip currents

2 Modelling

2 - 1 Modelling strategy in relation with scales

2 - 2 Example of Modelling results :

Tsunami, rip currents