GÉNIE DE L'OCÉAN ET DU LITTORAL

COASTAL AND OCEAN ENGINEERING

Lecturers: Richard PERKINS

| Lecturers : 16.0 | TC : 0.0 | PW : 4 | Autonomy : 0.0 | Study : 8 | Project : 0.0 | Language : AN

Objectives

The aim of this course is to provide a physical understanding of the basic processes involved in Ocean and Coastal engineering. The first part of the course addresses the dynamics of surface waves and the second part applies this to interaction with structures and with the sea bed.

Keywords : Ocean, coastline, waves, currents, tides, fluid-structure interaction, sediment transport, offshore engineering, coastal protection

Programme

1. Introduction
The composition and physico-chemical properties of the oceans - stratification and vertical stability - Ocean currents and their interaction with the seabed and the atmosphere -tides

2. Small amplitude surface waves
Different wave regimes - General formulation, linearisation of the boundary conditions, the dispersion relationship, fluid particle kinematics - Energy, reflection, shoaling, refraction, diffraction - wave current interaction - mass transport, momentum flux

Learning outcomes

- Students should be able to calculate the properties of a wave as a function of period, depth and wave height.
- Students should be able to calculate the variation in wave properties as the wave approaches the coast.
- Students should be able to calculate the wave and current-induced forces on a simple structure.
- Students should be able to estimate the threshold of movement for sediments exposed to the action of waves and currents.

Independent study

Objectifs :

Méhodes :

Core texts

DEAN, R.G. & DALRYMPLE, R.A., *WATER WAVE MECHANICS FOR ENGINEERS AND SCIENTISTS*, Prentice-Hall
PEDLOSKY, J. *GEOPHYSICAL FLUID DYNAMICS.*, Springer Verlag
SLEATH, J.F.A.*SEA BED MECHANICS*, Wiley

Assessment

Written exam (2h): 40%; Lab reports and design exercises (3): 60%