COASTAL AND MARINE BIOLOGY AND ECOLOGY (LM51)

(Lecce - Università degli Studi)

Teaching OCEANOGRAPHY OF MARGINAL SEAS AND OF THE COASTAL ZONE

GenCod A004348

Owner professor Piero LIONELLO

Teaching in italian OCEANOGRAPHY OF MARGINAL SEAS AND OF THE COASTAL

Teaching OCEANOGRAPHY OF MARGINAL SEAS AND OF THE COASTAL

SSD code GEO/12

Reference course COASTAL AND MARINE BIOLOGY AND ECOLOGY

Course type Laurea Magistrale

Credits 6.0

Teaching hours Front activity hours: 48.0

For enrolled in 2020/2021

Taught in 2020/2021

Course year 1

Language ENGLISH

Curriculum Curriculum Marine Biology and Ecology

Location Lecce

Semester First Semester

Exam type Oral

Assessment Final grade

Course timetable https://easyroom.unisalento.it/Orario

BRIEF COURSE DESCRIPTION

The course will describe the characteristics of water masses and the basic instrumentation and methods used for observing the oceans, basic concepts on energy and mass budgets (with a focus on marginal seas), processes involved in air sea interactions and how to describe them, basic dynamical balances in the oceaans, waves and currents in the coastal zone, sea level variations, vertical structure of the water column. The concepts are applied to describe the circulation of the Mediterranean, Baltic and Black Seas. The course will also teach techniques for data visualization based on the Ocean Data View software.

REQUIREMENTS

the students are required a basic knoledge of algebra, calculus and Physics (dynamics and thermodynamics)

COURSE AIMS

The students will acquire a basic knowledge of the processes leading to changes of temperature, salinity and producing currents and waves in the oceans. Description will focus on processes occurring in the coastal zone and on mass, energy and salinity balances in marginal seas and having important effects in the corresponding environments. The students will acquire capability of understanding the basic physical-mathematical language used in physical oceanograpphy. Moreover, the students will learn about basic techniques for presenting (also graphically) oceanographic data.

TEACHING METHODOLOGY

teaching will be based on a sequence of lectures explaining the content of the course. It will be integrated with exercizes (solution of simple problems) and demonstrations of techniques to plot oceanigraphic variables

ASSESSMENT TYPE

The standard exam consists of 2-3 questions, asking you to describe a figure, to describe a process, a phenomenon or the characteristics of a basin, to comment a formula and its use, To describe a measurement device and/or procedure, to describe how some given data are obtained (up to 30 points)

The standard exam can be replaced by two written partial tests to be held during the course. The test includes a) 4 or 5 questions with multiple choices where to mark the correct answer/statement and b) 4 or 5 questions requiring an explicit explanation. The score attribute to both part a) and b) is 15. No penalty for wrong answers. Minimum score in the first test for accessing the second test is 15. The final score is the mean of the two tests. The time for the test is 3 hours.

For both types of exams , the score can be integrated with a short report based on a) the ODV software and the plot of oceanographic data OR b) a summary/report of a relevant scientific paper. The content of the report will be discussed during a short interview (up to 4 points)

During the emergency to face the COVID-19 epidemic, the exam will be carried out using the "Microsoft TEAMS" platform (instructions for students available on https://www.unisalento.it/lezioni-online).

FULL SYLLABUS

detailed list of the subjects covered during the lectures:
Historical notes on the evolution of physical oceanography, generalities on observations (errors, acccuracy, precision), morphology of ocean basins, propagation and attenuation of sound in sea water and echosounders, the sound channel, energy budgets, heat capacity of ocean basins, air-sea interaction (thermal radiation, sensible and latent heat flux), Bulk formulas, vertical and horizontal flux of heat in the ocean, winds and wind stress, salinity, density of sea water, vertical structure of the water column (Mixed layer and its variations, seasonal and permanent thermocline, abyss) , methods and instruments for observing temperature, salinity and currents, hydrostatic pressure, salinity and salt budget, exchanges of mass, heat and salt across straits, temeprature and salinity in the Mediterranean Sea, circulation of the Mediterranean Sea, notes on Baltic, Red and Black Seas, waves in the ocean, forces in the oceans, geostrophic balance, Margules' relation, comments on Gibraltar and Otranto straits, coastal currents, surface waves in shallow water and the surf zone, ekman transport, coastal downwelling and upwelling, storm surges and castal floods, sea level variations at regional scale.

REFERENCE TEXT BOOKS

Introduction to Physical Oceanography
Robert Stewart, Texas A&M University
Pub Date: 2008
Available at
http://oceanworld.tamu.edu/resources/ocng_textbook/PDF_files/book_pdf_files.html

Further recommended readings are the chapters (the books are available in the library of DiSTeBA):
K. Schroeder, J. Garcìa-Lafuente, S. A. Josey, V. Artale, B. Buongiorno Nardelli, A. Carrillo, M. Gac?ic´, G. P. Gasparini, M. Herrmann, P. Lionello, W. Ludwig, C. Millot, E. Özsoy, G. Pisacane, J. C. Sánchez-Garrido, G. Sannino, R. Santoleri, S. Somot, M.V. Struglia, E. Stanev, I. Taupier-Letage, M. N. Tsimplis, M. Vargas-Yáñez, V. Zervakis, G. Zodiatis (2012) **Circulation of the Mediterranean Sea and its Variability** in Lionello P. (Ed.) *The Climate of the Mediterranean Region. From the Past to the Future* , Amsterdam: Elsevier (NETHERLANDS), 187-256, ISBN:9780124160422
And
Tsimplis M., V. Zervakis, S. Josey, E. Peneva, M.V. Struglia, E Stanev, Piero Lionello, Vicenzo Artale, A. Theocharis, Elina Tragou, James Rennell (2006): **Variability of the Mediterranena Sea Level and Oceanic circulation and their relation to climate patterns** in P.Lionello, P.Malanotte-Rizzoli, R.Boscolo (eds) *Mediterranean Climate Variability*. Amsterdam: Elsevier (NETHERLANDS), 227-282