FORM FOR SUBMISSION OF MODULE FOR A EUROPEAN JOINT MASTERS

1.	**Module Title:** Hydro-meteorological hazards and risks at coastal zones
2.	**Module Code:** (not necessary yet)
3.	**Maximum Number of Students:** 15
4.	**Total ECTS Credits:** 2 ECTS
5.	**Month:** First year, second semester
6.	**Notional Learning Hours (Please fill a number in box)**: **(a) Contact Time - e.g in the classroom, or fieldwork** **(b) Private Study - reading time, preparing and taking assessments** **Format of Teaching:** Lectures 7 (a) Laboratories or Practicals Other (computer workshops) 7 (a) Other (private study) 36 (b) **Teaching Strategy:** Theoretical lectures will be given to support practical exercises on a computer/laptop. Theory and practice will be interconnected and one immediately after the other as needed (i.e. exercises will be made after each topic/sub-module). The work to be performed will allow students to put into practice the theoretical learning, identifying risk situations, defining them and discussing management and risk mitigation solutions. The mapping will allow, based on theoretical grounds, aerial photography analysis and base mapping, to determine areas that can be affected by natural phenomena to a given return period and the potential consequences. In this way the student can represent these areas, determine the potential for damage and define mitigation measures thereof. These specific methods are thus the conductive core of the application of theoretical knowledge and practical application.
7.	**Convener:** Óscar Ferreira
8.	**Institution:** University of Algarve (Portugal)
9.	**Level (Please tick Y):** Master Degree
10.	**Language(s) of Tuition**: English

11.	**Pre-requisites:** Basic knowledge on coastal dynamics, tides and waves. A previous course on Coastal Dynamics is not required but would provide a positive background for the student.
12.	**Co-requisites:** Advisable (but not compulsory) that students also enroll in the Coastal Flooding module.
13.	**Programme(s) for which module is core:** Erasmus Mundus Joint Master Degree in Water and Coastal Management (WACOMA)
14.	**Module Description - The Purpose or Aims:** This course has as main objectives: - Understanding the natural processes responsible for the existence of hydro-meteo coastal hazards; - Identify the temporal and spatial scales of action of these processes; - Systematize and apply indicators used in coastal risks. - Develop representative risk mapping in coastal areas by including hazard and exposure/consequence.
15.	**Learning Outcomes:** At the end of this course students should: - Know how to determine the resulting risk of a marine/coastal hydro-meteo phenomenon by calculation and / or use of indicators; - Know to perform risk mapping for coastal areas;
16.	**Summary of Course Content:** Synthesis of concepts of hazard versus risk. Concepts on mitigation, protection and adaptation. Examples for coastal areas. Characterization of hydro-meteorological coastal hazards: shoreline retreat, storm induced coastal erosion, overwash and flooding. Involved processes and their scales (time and space). Coastal hazard indicators. Cartography and representation of coastal risks, including hazard and exposure/consequence.
17.	**Key Skills Taught:** CRAF – Coastal Risk Assessment Framework Coastal risk cartography Coastal hazard indexation

18.	**Assessment Methods:** A 2-3h open assessment with consultation. One main exercise (split in several steps) with the overall aim of mapping coastal risk induced by a given hazard (overwash, erosion, shoreline retreat). The student must produce a report type assessment integrating all information, using at least one of the taught methods, including hazard, exposure and risk cartography. The assessment is made at a computer with internet access.
19.	**Assessment Criteria:** Each part of the report will be analysed and evaluated with the final grade reflecting the sum of all evaluated parts. The grade can range from 0 (no work or completely wrong procedure and results) to 100 (absolutely complete and well performed work and report). This can then be converted on any assessment scale (for instance 0-10). Passing threshold will be 50 and for that it is required a basic knowledge on the distinction of hazard versus risk, and demonstration of a basic knowledge of the taught tools (including cartography) and indexes.

20.	**Resource Implications of Proposal and Proposed Solutions:**

(Recommended Bibliography: compulsory, optional, other sources of information)

Directive 2007/60/EC on the assessment and management of flood risks

Armaroli, C and Duo, E., this issue. Validation of the Coastal Storm Risk Assessment Framework along the Emilia-Romagna coast. Coastal Engineering.

Bosom, E. & Jiménez. J.A. 2011. Probabilistic Coastal vulnerability assessment to storms at regional scale - application to Catalan beaches (NW Mediterranean). Nat. Hazards and Earth System Sciences, 11, 475-484.

Christie, E., Spencer, T., Owen, D., McIvor, A., Möller, I., Viavattene, C., this issue. Regional coastal flood risk assessment for a tidally dominant, natural coastal setting: North Norfolk, southern North Sea. Coastal Engineering

Ciavola, P., Ferreira, Ó.,Haerens, P. et al. (2011). Storm impacts along European coastlines. Part 1: The joint effort of the MICORE and ConHaz Projects, Env. Science&Policy, 14 (7), 912-923.

Ciavola, P., Ferreira, Ó., Haerens, P. et al. (2011). Storm impacts along European coastlines. Part 2: lessons learned from the MICORE project, Env. Science & Policy, 14 (7), 924-933.

Jäger, W.S, Christie, E.K, Hanea, A.M., den Heijer, C., Spencer, T., 2017. Decision Support for Coastal Risk Management: a Bayesian Network Approach. Coastal Engineering.

Ferreira, O., Plomaritis, T.A., Costas, S. (2017) Process-based indicators to assess storm induced coastal hazards. Earth-Science Reviews, 173, 159-167.

Poelhekke, L., Jäger, W.S., van Dongeren, A., Plomaritis, T.A., McCall, R., Ferreira, Ó. (2016). Predicting coastal hazards for sandy coasts with a Bayesian Network. Coastal Engineering 118, 21-34.

Roelvink, D., Reniers, A., van Dongeren, A., van Thiel de Vries, J., McCall, R., & Lescinski, J. (2009). Modelling storm impacts on beaches, dunes and barrier islands. Coastal Engineering, 56, 1133-1152

Stelljes, N., Martinez, G., McGlade, K., 2017. Introduction to the RISC-KIT web based management guide for DRR in European coastal zones. Coastal Engineering.

UNISDR, 2013, Terminology on DRR. http://www.unisdr.org/we/inform/terminology

UNISDR Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters

Viavattene C., Jiménez J.A., Ferreira O., Priest S., Owen D., McCall, R., 2017. Selecting coastal hotspots at the regional scale: the Coastal Risk Assessment Framework. Coastal Engineering.

Specific Resource Implications for Students:

Computers with internet access should be available at all classes. Students can use their own laptops. Programmes to use include Excel and Google Earth (GIS can also be an option for students with background on that tool).

21.	**Does this module replace existing provision? If so, please indicate modules to be replaced:** This module fits in the area of “Geochemistry”
22.	**Start Date:** First year, second semester
23.	**Is it intended that the module be available every year?** Yes