TEACHING MODULES INFORMATION
EMJMD WACOMA (academic year 2018/19)

1.	**Module Title:** Bioavailability and bioaccumulation Keys for the quality of ecosystems
2.	**Module Code:**
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 8 Hours: a Laboratories or Practicals 6 Hours: a Other (tutorials) 5 Hours: a Other (private study) 36 Hours (b) **Teaching Strategy:** Theoretical lectures will be given to introduce to basic and advanced concepts of bioavailability and bioaccumulation in with special emphasis on marine environments. Introduction to biomarker approaches for biomonitoring. After the theoretical lectures, the students will be asked to implement these concepts in a practical site specific environment of their choice analyzing existing contamination problems and proposing monitoring strategies for risk assessment. This work will be discussed in a workshop carried out with the students. Where they present their projects in an open session in order to assess the possibility to be developed in a real context.
7.	**Convener:** Julián Blasco Miriam Hampel
8.	**Institution:** CSIC / University of Cádiz
9.	**Level (Please tick Y):** Master
10.	**Language(s) of Tuition**: English

11.	**Pre-requisites:** Basic knowledge about biological processes and marine ecosystems and compartments.
12.	**Co-requisites:** None
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 processes related to bioavailability of contaminants in marine ecosystems and bioaccumulation in marine organisms and their consequences. - Identify appropriate biomarkers for biomonitoring. - Develop a strategy for implementation of these approaches in a real environment.
15.	**Learning Outcomes:** At the end of this course students should: - Know the basic and advanced types of biomarkers - Knowledge and use of bioaccumulation in marine organisms as target endpoints. - Be able to implement the bioavailability concept in environmental studies. - Know-how to carry out a biomonitoring programme in real scenarios.
16.	**Summary of Course Content:** - Introduction to bioaccumulation and bioavailability concepts. - Consequences of bioaccumulation effect and mechanisms of response. - Application of concepts in real environments. - New biomarker approaches and use in real scenarios. - Integration of contaminant concentrationand effect data in a biomonitoring programme - Advantages and disadvantages of these approaches.
17.	**Key Skills Taught:** - Knowledge of marine pollution - Risk assessment in coastal areas - Data synthesis for reporting
-	**Assessment Methods:** - Practical work using the introduced concepts and approaches. Public presentation of results and final report. Discussion with student and teachers in open session.

-	**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). Passing threshold will be 50 and for that is required a basic knowledge of the concepts and their use and implementation.
20.	**Resource Implications of Proposal and Proposed Solutions**: ***Core texts*** Arnot JA, Pawlowski S, Champ S (2017) A weight-of-evidence approach for the *bioaccumulation* assessment of triclosan in aquatic species. Science of The Total Environment, In press, corrected proof, Available online 10 October 2017 Blasco J, Chapman P.M., Campana, O., Hampel, M. (eds). Marine Ecotoxicology.2016. Academic Press, 321 pp. London UK. Luoma, S., Rainbow, P.S. Metal Contamination in Aquatic Environment. Sciecne and Lateral management.Cambridge University Press, 573 pp. Cambridge UK. Roig, N., J. Sierra, M. Nadal, I. Moreno-Garrido, E. Nieto, M. Hampel, E. P. Gallego, M. Schuhmacher and J. Blasco (2015). "Assessment of sediment ecotoxicological status as a complementary tool for the evaluation of surface water quality: The Ebro river basin case study." Science of the Total Environment 503-504: 269-278. Rouane-Hacene O, Boutiba Z, Belhaouari B, Guibbolini-Sabatier ME, Risso-de Faverney C (2015) Seasonal assessment of biological indices, *bioaccumulation* and *bioavailability* of heavy metals in mussels Mytilus galloprovincialis from Algerian west coast, applied to environmental monitoring Oceanologia 57(4), 362-374 Ruus A, Allan, I.J., Oxnevad, S., Schaanning M.S., Borga, K., Bakke, T., Naes, K. In vivo bioaccumulation of contaminants from historically polluted sediments-Relation to bioavailability estimates. Sci. Total Envrion., 442(2013) 336-343. **Specific Resource Implications for Students**: Computers with internet access should be available at all classes. Students can use their own laptops. Programme to use include Excel, Power Point and Word.
21.	**Does this module replace existing provision? If so, please indicate modules to be replaced:** The module fits in the area of "Ecotoxicological Evaluation of Risk in Water and Coastal Management"
22.	**Start Date:** First year, second semester
23.	**Is it intended that the module be available every year?** Yes