UNIVERSITÀ
DEGLI STUDI DI TRIESTE

Area dei Servizi Istituzionali
Settore Servizi agli studenti e alla didattica
Ufficio Dottorati di ricerca

ATTACHMENT 10 LAST REVISED 18/05/2017

PhD IN EARTH SCIENCE, FLUID-DYNAMICS AND MATHEMATICS. INTERACTIONS AND METHODS OVERVIEW

IN BRIEF		
Lines of research	1	Environmental fluid mechanics, fluid mechanics in industrial and technological processes, and in biological systems
	2	Solid and fluid earth geophysics and geology
	3	Mathematical methods and modeling in fluid mechanics and in geophysics, differential equations and inverse problems: qualitative, computational, and numerical aspects.
Administrative location	University of Trieste	
Organizing Department	Department of Mathematics and Geosciences	
Partner University Department	Department of Engineering and Architecture	
Duration	3 years	
Attendance abroad that entitles to a scholarship increase - min. max. of months for each PhD student (over 3 years)	0 - 12	
Official language	English The entrance exams, training activities (courses, seminars, schools, ...), the preparation of annual reports, the drafting and defense of the thesis are to be given in English.	
Subject Areas *(in alphabetical code order)*	01	MATHEMATICS AND INFORMATICS
	04	EARTH SCIENCES
	08a	CIVIL ENGINEERING
	09	INDUSTRIAL AND INFORMATION ENGINEERING
Macro Research Fields *(in alphabetical code order)*	01/A	MATHEMATICS
	04/A	EARTH SCIENCES
	08/A	LANDSCAPE AND INFRASTUCTURAL ENGINEERING
	09/C	ENERGY, THERMOMECHANICAL AND NUCLEAR ENGINEERING
	09/G	SYSTEMS ENGINEERING AND BIOENGINEERING
Scientific Disciplinary Sectors *(in alphabetical code order)*	GEO/02	STRATIGRAPHY AND SEDIMENTOLOGY
	GEO/03	STRUCTURAL GEOLOGY
	GEO/06	MINERALOGY
	GEO/07	PETROLOGY AND PETROGRAPHY
	GEO/10	SOLID EARTH GEOPHYSICS
	GEO/11	APPLIED GEOPHYSICS
	GEO/12	OCEANOGRAPHY AND PHYSICS OF THE ATMOSPHERE
	ICAR/01	HYDRAULICS
	ICAR/02	HYDRAULIC STRUCTURES, MARITIME ENGINEERING AND HYDROLOGY
	ING-IND/10	THERMAL ENGINEERING AND INDUSTRIAL ENERGY SYSTEMS
	ING-IND/34	INDUSTRIAL BIOENGINEERING

	MAT/05	MATHEMATICAL ANALYSIS
	MAT/08	NUMERICAL ANALYSIS
Domain European Research Council	PE	PHYSICAL SCIENCES AND ENGINEERING
ERC Panels	PE10	EARTH SYSTEM SCIENCE: PHYSICAL GEOGRAPHY, GEOLOGY, GEOPHYSICS, ATMOSPHERIC SCIENCES, OCEANOGRAPHY, CLIMATOLOGY, ECOLOGY, GLOBAL ENVIRONMENTAL CHANGE, BIOGEOCHEMICAL CYCLES, NATURAL RESOURCES MANAGEMENT
	PE1	MATHEMATICS: ALL AREAS OF MATHEMATICS, PURE AND APPLIED, PLUS MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE, MATHEMATICAL PHYSICS AND STATISTICS
	PE8	PRODUCTS AND PROCESSES ENGINEERING: PRODUCT DESIGN, PROCESS DESIGN AND CONTROL, CONSTRUCTION METHODS, CIVIL ENGINEERING, ENERGY SYSTEMS, MATERIAL ENGINEERING

WHO'S WHO	
Chair	Prof. Pierpaolo Omari - Department of Mathematics and Geosciences – University of Trieste – phone +39 040.558.2619; email omari@units.it
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Course description and objectives	This doctoral course aims at the interdisciplinary training of students in the field of the interactions between the earth science, fluid dynamics and applied mathematics, with special attention to the interplay of methodological aspects, modeling and applications. This course promotes the preparation of students through the investigation of the scientific themes developed by the research groups belonging to the departments and the research institutions directly involved in the program, as well as through international collaborations with qualified foreign structures that provide students with the opportunity to attend training programs abroad. In the field of earth sciences, the main objective is the transfer of knowledge on advanced methods of investigation with applications to the study of composition, structure, stratigraphy and evolution of our planet, from the close surface up to the deep structures and the characteristics at a global scale. In the context of fluid mechanics, the study of motion of the fluids is mainly addressed with reference to their transport properties, dispersion and mixing in environmental or industrial processes, as well as to their interaction with the solid elements. The fundamental laws, which these disciplines are based upon, are generally expressed through highly complex mathematical models. The qualitative and quantitative study of such models requires the development and the application of sophisticated mathematical tools, and it represents a relevant and topical research field even from the mathematical point of view. Mathematics therefore pervades the entire program, playing a central and unifying role.

Job placement opportunities	The program of this course is designed to prepare students to pursue different careers in research, teaching and industrial use of high technologies in the fields of earth science, fluid mechanics, applied mathematics, and their interactions. The students will be in contact with several local and international environments and gain an important experience in both theoretical and applied problems that originate in the disciplines mentioned above. In addition, the students will develop familiarity and competence in using the most advanced tools (both modeling and experimental) for the analysis of complex physical systems, which will be of great use for future activity in public or private research centers, or for any work in companies with high technological content. The Doctoral School of Environmental and Industrial Fluid Mechanics and the Doctoral Course in Earth Science and Fluid Mechanics, which the present course is a natural continuation and expansion of, have systematically partnered during the last ten years with the departments of several research institutions and services, such as INOGS, ICTP, ISMAR-CNR, ENEA, ARPA-FVG, as well as with various industries in the area. The scholarships funded by such institutions, or factories, and their very presence, stem from their need to acquire highly specialized personnel in the topics addressed in this doctoral program. The students of this course will then have, as a natural outlet, post-doctoral grants, or employments, within the organizations themselves.
Main cooperating international Universities and Research Institutions	1 Princeton University, U.S.A. 2 Technische Universiteit Eindhoven, Low Countries 3 University of California Irvine, U.S.A. 4 École Polytechnique Fédérale de Lausanne, Switzerland 5 Universidad Complutense de Madrid. Spain