Università degli Studi di Trieste

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

ATTACHMENT 10   LAST REVISED 16/05/2019

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)	2 - 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
	08b	CIVIL ENGINEERING
	09	INDUSTRIAL AND INFORMATION ENGINEERING
Macro Research Fields *(in alphabetical code order)*	01/A	MATHEMATICS
	01/B	INFORMATICS
	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
	INF/01	INFORMATICS
	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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PhD Academic Board	List of members
Web site	https://web.units.it/dottorato/esfm/en
Email	esfm.adm@units.it
Course description and objectives	This PhD Course aims at the advanced training of students in the field of the Earth System Science, through a multidisciplinary approach, where specific skills integrate with modeling and computational tools that allow to effectively tackle complex problems. Special attention is devoted to the interactions between Mathematics, Scientific Computing, Data Science, Fluid Dynamics, and Earth Sciences. Within Earth Science, advanced methods of investigation are developed in geological, geophysical, atmospheric, oceanographic, and climatological fields. Special attention is paid to issues related to reduction of natural risks, finding of georesources, climate changes. 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, industrial, biological processes, as well as to their interaction with the solid elements. The laws, which these disciplines are based on, are generally expressed by 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	This PhD 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, 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, USA 4 École Polytechnique Fédérale de Lausanne, Switzerland 5 Universidad Complutense de Madrid. Spain