



UNIVERSITÀ DEGLI STUDI DI TRIESTE

Sezione Ricerca e Dottorati

Ripartizione Dottorati

LAST REVISED 29/02/2012

DOCTORAL SCHOOL IN ENGINEERING SCIENCES

GENERAL DESCRIPTION

SUBJECT AREAS COVERED BY THE SCHOOL:

- main area:
- other areas: ICAR/22, GEO/11, ICAR/01, ICAR/10, ICAR/04, ICAR/08, ICAR/02, ICAR/07, ICAR/09, ICAR/17, ICAR/05, ICAR/06, GEO/10, ING-IND/13, ING-IND/15, ING-IND/01, ING-IND/10, ING-IND/16, ING-IND/14, ING-IND/11, ING-IND/09, ING-IND/02, ING-IND/17, ING-IND/08, ICAR/21, ICAR/14, ICAR/19, ING-IND/29, ICAR/18, AGR/01, SECS-P/06

ORGANIZING DEPARTMENT: Dip. di Ingegneria civile e architettura

DURATION: 3

OFFICIAL LANGUAGE OF THE SCHOOL: Italian

CONTACT INFORMATION

DIRECTOR OF THE SCHOOL: Prof. Diego Micheli - Dipartimento di Ingegneria Civile e Architettura - Università degli Studi di Trieste - tel. 040/5583809, e-mail: micheli@units.it

VICE-DIRECTOR: Prof. Claudio Amadio - Dipartimento di Ingegneria Civile e Architettura - Università degli Studi di Trieste - tel. 040/5583833, e-mail: amadio@univ.trieste.it

SCIENTIFIC PROJECT: The PhD School in Engineering Science is finalized to the formation of researchers with a high scientific preparation and a culture oriented towards the engineering and architecture applications in the sectors of competence, able to conceive and to develop knowledge and innovative methodologies of investigation and design and to develop, with technical-scientific and managerial competences, a highly qualified research activity in public or private bodies.

The Doctors formed by the School will develop their professional activity in the sectors defined by the official research themes of the three Doctorate branches, in which the School is organized:

- MECHANICAL ENGINEERING, NAVAL ARCHITECTURE, ENERGY AND PRODUCTION ENGINEERING
- CIVIL AND ENVIRONMENTAL ENGINEERING
- ARCHITECTURE AND TOWN PLANNING

The School aims to favor the collaboration and the synergies in teaching and research among the different branches. To this end, the actual structure must be intended as a proposal open to other sectors of the engineering, architecture and applied sciences that could take profit of this opportunity of mutual development in future applications for PhD Schools.

The activities of the PhD students will be oriented to the planning, theoretical analysis, soft-computing and advanced experimentation. The first year of the formative project includes the participation to courses of lectures, common to all the branches of the School and partly common to other Doctorate Schools of the University of Trieste and of other Universities (in order to build shared advanced research paths), on basic scientific subjects and organizational aspects of the scientific search. These courses will be integrated by courses belonging to postgraduate (Laurea Magistrale) studies, selected in base to the needs and weaknesses identified in the individual initial preparation, also taking into account the specificities of the selected research themes.

During the first year an analysis of the state of the art will be conducted in the discipline of interest, and the main theme of study will be identified. The second and third year will be devoted to the development of the individual themes of research, and in this frame it will be proposed to the student, preferably during the second year, a period of permanence in a research body of international relevance specialized in the selected sector.

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Important common features to the scientific formation that the School intends to transmit to the PhD students are an open and multidisciplinary approach the problems of the engineering science and architecture. Particular attention will also be devoted to the interaction with the territory, industrial and professional productive world and the theoretical-experimental approach as qualifying aspect of the advanced research. The whole scientific project will be therefore oriented to the valorization of the abilities and individual professionalism of the PhD students, with whom the School assumes a precise responsibility of addressing and collocation of the given formation in the international job market. The correspondence of the planned activities to the obtainment of such objective will be carefully evaluated by the body of teachers and by the Scientific Council, constituted by external experts of known experience and high scientific profile.

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CURRICULUM: MECHANICAL ENGINEERING, NAVAL ARCHITECTURE, ENERGY AND PRODUCTION

GENERAL DESCRIPTION

SUBJECT AREAS COVERED BY THE CURRICULUM:

- main area: ING-IND/08
- other areas: ING-IND/13, ING-IND/15, ING-IND/01, ING-IND/10, ING-IND/16, ING-IND/14, ING-IND/11, ING-IND/09, ING-IND/02, ING-IND/17

RESEARCH FIELDS:

- 1 Theoretical and experimental methodologies for the analysis and design of ships and ocean structures
- 2 Inverse problems and functional and shape optimization in heat transfer
- 3 Design and optimization of fluid machines and power plants
- 4 Design, synthesis and mechanical construction
- 5 Product development, process modeling and optimization, design, management and logistics of industrial plants
- 6 Rational use of Energy in civil and industrial fields

ORGANIZING DEPARTMENT: Dipartimento di Ingegneria Civile e Architettura

FOREIGN PARTICIPATING INSTITUTIONS:

University of Rijeka

Osaka University – Department of Naval Architecture and Ocean Engineering

MAXIMUM NUMBER OF MONTHS TO BE SPENT ABROAD: 12

ADMISSION INFORMATION

NUMBER OF PLACES AVAILABLE:4

- SCHOLARSHIPS: 2

FUNDING BODY/IES:

- [cod MD/2/2] Università degli Studi di Trieste + Dip di Ingegneria Civile e Architettura funded by Area Scienze Park – project ENERPLAN and co-funded by the Department. 1
- [cod D/6/2] Dip di Ingegneria Civile e Architettura funded by NAVALPROGETTI s.r.l. (Project title: “Analysis of offshore Oil and Gas installations with particular reference to Energy and environmental issues”) 1

Candidates who accept an earmarked scholarship are committed to the pre-assigned topic

ACADEMIC QUALIFICATIONS REQUIRED: See Announcement (Art. 1.1 - Requirements)

Degrees required for this curriculum (or equivalent degrees awarded by non-Italian institutions):

- Lauree specialistiche/magistrali:
 - 4/S - in architettura e ingegneria edile
 - 25/S - in ingegneria aerospaziale e astronautica
 - 27/S - in ingegneria chimica
 - 28/S - in ingegneria civile
 - 29/S - in ingegneria dell'automazione
 - 31/S - in ingegneria elettrica
 - 33/S - in ingegneria energetica e nucleare
 - 34/S - in ingegneria gestionale
 - 36/S - in ingegneria meccanica
 - 37/S - in ingegneria navale
 - 38/S - in ingegneria per l'ambiente e il territorio
 - 61/S - in scienza e ingegneria dei materiali
 - LM-4 ARCHITETTURA E INGEGNERIA EDILE-ARCHITETTURA
 - LM-20 INGEGNERIA AEROSPAZIALE E ASTRONAUTICA
 - LM-22 INGEGNERIA CHIMICA



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LM-23 INGEGNERIA CIVILE
LM-24 INGEGNERIA DEI SISTEMI EDILIZI
LM-25 INGEGNERIA DELL'AUTOMAZIONE
LM-28 INGEGNERIA ELETTRICA
LM-30 INGEGNERIA ENERGETICA E NUCLEARE
LM-31 INGEGNERIA GESTIONALE
LM-33 INGEGNERIA MECCANICA
LM-34 INGEGNERIA NAVALE
LM-35 INGEGNERIA PER L'AMBIENTE E IL TERRITORIO
LM-53 SCIENZA E INGEGNERIA DEI MATERIALI

- Lauree vecchio ordinamento
ARCHITETTURA
INGEGNERIA CIVILE
INGEGNERIA AEROSPAZIALE
INGEGNERIA DELLE TECNOLOGIE INDUSTRIALI
INGEGNERIA EDILE
INGEGNERIA EDILE-ARCHITETTURA
INGEGNERIA NUCLEARE
INGEGNERIA ELETTROTECNICA
INGEGNERIA GESTIONALE
INGEGNERIA INDUSTRIALE
INGEGNERIA MECCANICA
INGEGNERIA NAVALE
INGEGNERIA NAVALE E MECCANICA
INGEGNERIA PER L'AMBIENTE E IL TERRITORIO
INGEGNERIA DEI MATERIALI
INGEGNERIA CHIMICA

DEADLINE FOR COMPLETION OF DEGREE: **30.03.2012**

ASSESSMENT CRITERIA: Qualifications + Interview

- FINAL SCORE (the final score is based on the sum total of marks obtained in the interview plus the points given for qualifications and publications) 100
MINIMUM FINAL SCORE REQUIRED: 70/100
- MAXIMUM NUMBER OF POINTS AWARDED FOR QUALIFICATIONS + PUBLICATIONS: 30

QUALIFICATIONS REQUIRED/RELATIVE WEIGHT:

- Art. 11 Rules for Doctorates: all candidates are required to present the following documents, regardless of whether or not a score is assigned to them (see below):
 - a. a detailed curriculum vitae et studiorum: 18/30
 - b. a copy of the Master's degree thesis: 9/30For students with a degree awarded by a non-Italian university, an abstract of the thesis in English or Italian is sufficient.

as well as

1. other qualifications and publications: 3/30

- Qualifications Assessment Form (unless this form is presented, qualifications and publications CANNOT be assessed by the Examining Board)

MINIMUM SCORE REQUIRED FOR QUALIFICATIONS/PUBLICATIONS: 21/30

- ORAL EXAMINATION MARK OUT OF: 70

MINIMUM SCORE REQUIRED FOR INTERVIEW: 49/70

ABSOLUTE DEADLINE FOR RECEIVING CERTIFICATES: **30.03.2012**

ADDRESSES TO WHICH CERTIFICATES SHOULD BE SENT: by email to micheli@units.it (by 30.03.2012 midnight CET) or in person to Segreteria Amministrativa del Dipartimento di Ingegneria Civile e Architettura Via A. Valerio 10 from 9:00 am to

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11:00 am from Monday to Friday – please check beforehand by calling 040/558.3804 or one of the following extensions – 7806 – 3500 – 3813 – 7891.

EXAMINATION SCHEDULE:

- ORAL INTERVIEW: **04.04.2012 at 09.30 a.m.** at Dipartimento di Ingegneria Civile e Architettura – Biblioteca (library) ed. C7 (C7 building).

ALTERNATIVE LANGUAGE TO ITALIAN FOR THE INTERVIEW: English

CEFR LEVEL: B1

DATI GENERALI

COORDINATORE: Prof. Diego Micheli - Dipartimento di Ingegneria Civile e Architettura - Università degli Studi di Trieste - tel. 040/5583809, e-mail: micheli@units.it

VICE: Prof. Alberto Francescutto - Dipartimento di Ingegneria Civile e Architettura – Università degli Studi di Trieste – tel. 040/5583425, fax 040/5583443, e-mail francesc@units.it

SITO WEB DEL DOTTORATO: <http://www.MNEP.units.it>

EDUCATIONAL AIMS AND RESEARCH TOPICS: The scope of this Doctorate is to form researchers with a high scientific preparation and a culture oriented towards the engineering applications in the sectors of competence, able to conceive and to develop knowledge and innovative methodologies of investigation and to develop, with technical-scientific and managerial competences, research activity in public or private bodies in the following subjects:

- DESIGN AND OPTIMIZATION OF FLUID MACHINES AND POWER PLANTS
- RATIONAL USE OF ENERGY IN CIVIL AND INDUSTRIAL FIELDS
- INVERSE PROBLEMS AND FUNCTIONAL AND SHAPE OPTIMIZATION IN HEAT TRANSFER
- DESIGN, SYNTHESIS AND MECHANICAL CONSTRUCTION
- THEORETICAL AND EXPERIMENTAL METHODOLOGIES FOR THE ANALYSIS AND DESIGN OF SHIPS AND OCEAN STRUCTURES
- PRODUCT DEVELOPMENT, PROCESS MODELING AND OPTIMIZATION, DESIGN, MANAGEMENT AND LOGISTICS OF INDUSTRIAL PLANTS

The activity of the PhD students will therefore concern the fields of the thermo and fluid dynamics of machines, of the transmission of heat, of the advanced systems for energy, energy savings in buildings, of the design, construction and control of mechanical systems (with particular reference to the structural and dynamic aspects and to the fatigue damage of materials and biomaterials), of naval architecture and ocean engineering, of the mechanical plants (with particular reference to concurrent and reverse engineering, lean manufacturing and the environmental impact of the industrial plants).

The research activity “at home” will be developed in the laboratories of the Department of Mechanical Engineering and Naval Architecture (DIMN). These structures have consolidated scientific collaborations with universities and research bodies at national and international level. At the same time they have agreements for industrial research and regulations development with regional, national and European industries operating in advanced technology sectors. The following collaborations can be quoted as an example: Area Science Park, SISSA, INSEAN, CETENA, SAIPEM, Fincantieri, Dassault and INRIA Sophiantipolis, EADS, Penn University & VirginiaTech, Sendai & Osaka Universities, Chalmers University of Technology.

The PhD students can avail themselves of a period of formation in a foreign country in centers of excellence like the VKI of Bruxelles or the EPFL in Lausanne.

Important peculiarities of the proposed Doctorate is the offer of third level formation in the sectors of naval architecture, ship construction and plants and the wide offer of themes on energy, close to the environmental thematic treated in the other branch of the School.

Another specificity of the proposed Doctorate will be the collaboration with the Doctorate in Chemistry and Energy Technologies of the University of Udine. This collaboration derives from previous participation of some professors of former Department of Mechanical Engineering and Department of Naval Architecture of University of Trieste, as coordinated University, uninterruptedly since the XII cycle.

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