



UNIVERSITY  
OF TRENTO - Italy

# SCHOOL OF DOCTORAL STUDIES IN ENVIRONMENTAL ENGINEERING

## EXECUTIVE REGULATIONS

Approved by the Committee of the Department of Civil and Environmental Engineering  
on April 7<sup>th</sup>, 2004 and successively amended in the Committee meeting of November 9<sup>th</sup>

2005



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## SCHOOL OF DOCTORAL STUDIES IN ENVIRONMENTAL ENGINEERING

### **Executive Regulations relating to the University Regulations for PhD Research Programmes issued with the Rector's Decree no. 997 of 16 December 2003**

#### **Art. 1: Institution and denomination of the Doctoral School**

With these Executive Regulations, the “Scuola di Dottorato in Ingegneria Ambientale” (hereinafter also “the School”) is founded in the Department of Civil and Environmental Engineering at the University of Trento (hereinafter also “DICA”). This denomination is considered the official name of the School and must be used in this form in any document where the name is cited.

For all documents redacted in a language other than Italian, the English version, *School of Doctoral Studies in Environmental Engineering*, shall be applied.

#### **Art. 2: Objectives and scope**

In accordance with Art. 8, para. 3 herein these Executive Regulations, redacted pursuant to the entrance into force of the University Regulations for PhD Research Programmes (hereinafter also “the Regulations”) issued with Rector's Decree no. 997 of 16 December 2003, regulate the activities of the School with particular reference to the general objectives under Art. 3 of the Regulations - defined together with the Faculty of Engineering -, the internal organization and the code of conduct of the doctoral students attending it. They apply to the teaching staff and all researchers who are members of School bodies and the students enrolled until doctoral degree conferral.

#### **Art. 3: Definition and general characteristics**

The School organizes a three-year doctoral course for an annual number of no fewer than six students, of which at least three receive a study grant. Each year, one or more announcements, redacted in Italian, are published for the public selection of candidates. The announcement shall specify the number of openings and study grants offered. These announcements will also be redacted in English, although only the Italian version has legal value.



The School seeks to enrol the most qualified students regardless of sex, age, nationality, religion, race or social status.

The official languages of the School are English and Italian. English will be normally used during classroom instruction, in the intermediate reports of doctoral students, in the final thesis and in its defence before the Examination Committee, unless other arrangements are made pursuant to agreements with foreign universities or research bodies.

#### **Art. 4: Scientific areas involved**

The interdisciplinary nature of the School is motivated by the interdisciplinary nature of environmental issues, the variety of research issues pertaining to the environmental sector, the specific need for innovation in the sector and the multiplicity of aspects that must be considered in the planning and design of works and control, protection and enhancement interventions for the environment.

The School is also characterised by its particular attention to the problems of the mountain and piedmont regions.

The scientific areas involved are listed below together with reference to ministerial codes:

ICAR/01	Hydraulics
ICAR/02	Hydraulic and Maritime constructions and Hydrology
ICAR/03	Sanitary - Environmental Engineering
ICAR/06	Topography and cartography
ICAR/10	Building Construction
ICAR/14	Urban and Building Design
ICAR/17	Drawing
ICAR/20	Spatial Planning
ING-IND/11	Environmental Engineering Thermodynamics and Heat Transfer

The aims of the doctoral course are pursued in six theme areas, divided into the two curricula of specialization set up by the School:

#### **1) Environmental engineering:**



- A) Environmental fluids mechanics: mechanics of turbulence; dynamics of water bodies (rivers, estuaries, lagoons, lakes); surface and subsurface hydrology; dynamic processes in the atmosphere boundary layer; dispersion processes of pollutants in surface and underground water bodies and in the atmosphere; river hydraulics and morphodynamics (sediment transport, mechanics of debris- and mud-flows, plane-altimetric evolution of rivers).
- B) Environmental protection: hydrometeorology; geomorphology of catchment areas; organization of waterways; prevention and control of hydro-geological instability, landslides and snow avalanches; protection from flooding; rain water draining; treatment processes and disposal of civil and industrial waste water; intervention techniques for restoring environmental quality.
- C) Environmental resources management: management and distribution of water and energy resources; systems of detecting and monitoring environmental quality; geographic information systems, environmental data processing and digital cartography; integrated waste management; renewable energy and the impact of energy conversion processes.
- D) Computational models for environmental engineering: mathematical models and innovative techniques of numerical solutions to apply in the field of environmental engineering (hydrodynamic and geophysical fields, transport phenomena of sediments and pollutants, morphodynamic processes, distribution of water resources, rain water draining).

## **2) Building engineering-Architecture and planning for sustainable development:**

- E) Building engineering-architecture: methods and techniques for design of energy-conserving buildings; conservation and management of the historic and cultural architectural heritage in sensitive areas; methods and techniques for the rational use of resources in producing building components and recycling construction materials; innovative housing projects, especially as regards support for accessibility and higher living standards of weaker users.
- F) Spatial planning for sustainable development: processes of territorial organization; processes and methods of design, decision-making, management, participation and communication;



quantitative and qualitative analysis of the settlement processes; methods and procedures of environmental analysis and assessment; strategic environmental assessment; methods and experiences of sustainable development.

In accordance with Art. 5, paragraph 2, and in conformity with Art. 12 of the Regulations and with Art. 6 below, the Doctoral School Committee is responsible for defining the curricula of specialization.

### **Art. 5: Bodies of the School**

The Doctoral School Committee and the Head are bodies of the School.

#### a) The Doctoral School Committee

The Doctoral School Committee consists of full and associate professors and of researchers, at least 8 of which hold tenure with the University of Trento. Membership is approved based on the proven scientific experience in the research areas of the School, documented by scientific publications in the last five years and by research project coordination work. After completion of the first three cycles after institution of the School, if the prerequisites for participation in the Doctoral School Committee have been maintained, membership is renewed by the methods foreseen by Art. 8 and Art. 10 of the Regulations. Save for the provisions pursuant to Art. 12 of the Regulations, a member of the Doctoral School Committee may not belong to more than one Doctoral School Committee instituted at any Italian university. Representatives of the doctoral students can take part in the meetings of the Doctoral School Committee only when issues concerning the general performance of the School and the training courses are in the agenda. Two student representatives are elected annually from among those enrolled in the School.

The Doctoral School Committee:

- a. organizes the training and research activities of the School and defines its specialization curricula in accordance with Art. 5 of the Regulations;
- b. organizes the redaction of the Manifesto of Studies each year, including all the teaching activities and the course calendar;
- c. supervises the progress of the training and research activity of each doctoral student;



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- d. approves the individual syllabus of the students at the beginning of each academic year, establishing the dates and methods for submission and verification of intermediate reports;
- e. identifies a supervisor, internal or external to the Doctoral School Committee, for each doctoral student;
- f. approves participation of the students in training periods, work placements and research organized at Italian and foreign public bodies or private organizations if the study session is to last longer than six months;
- g. approves advancement of the doctoral student from one year to the subsequent year;
- h. approves the admission of the doctoral students to the final examination at the end of the course;
- i. submits an opinion on the work done by each student to the Examination Committee;
- j. appoints the Head of the School;
- k. approves the participation of new members to the Doctoral School Committee;
- l. can set up the Executive Committee and designate persons in charge of the specialization curricula;
- m. approves the annual report drawn up by the Head;
- n. declares whether degrees obtained abroad are acceptable for the sole purposes of admission to the competitive selection for the doctoral programme in which the candidate intends to participate;
- o. submits to the Rector the names of the members of the Admission Committee to the School and of the Examination Committee;
- p. promotes partnerships with other Italian and foreign universities as well as public bodies and private organizations in order to improve the research activities.

Meetings have a quorum when at least half plus one of the members of the Doctoral School Committee is present, minus any justified absences. More than four consecutive absences at the meetings will eliminate that member from the Doctoral School Committee. Resolutions are adopted with the favourable opinion of the majority of those presents. In the event of a tie, the Head shall have the final vote.



b) The Head

The Head is elected by the Doctoral School Committee from among the 1st and 2nd level full-time tenure professors who are members of the Doctoral School Committee and who work at the University of Trento. The Head is responsible for the School, steers its work and represents it.

The Head remains in office for three years.

The Head:

- a. co-ordinates and organizes the training and administrative work of the School;
- b. calls and chairs meetings of the Doctoral School Committee and implements the respective resolutions;
- c. authorizes doctoral students, in agreement with the respective supervisors, to leave the university to conduct further research work or work placements at Italian or foreign universities for periods of less than six months;
- d. reports to the competent Administrative Offices in cases where doctoral students do not fulfil their obligations under Art. 24 of the Regulations and implements the appropriate disciplinary measures (suspension of payment of the grant or expulsion of the student from the School);
- e. at the end of every academic year, redacts a detailed report on the status of the School that year, which will be submitted to the University Internal Evaluation Committee;
- f. designates a Deputy-Head who will stand in for him or her in the event of illness or impediment.
- g. can authorize the doctoral student to conduct ancillary or supplementary educational activities and extra-curricular research activities.

In order to carry out his/her administrative duties, the Head can be aided by the Department Assistant; in particular, the Assistant draws up the minutes and other documentation, handles international relations, organizes the selections and the final examinations, and handles relations with the central office. The Assistant may be invited to participate in the meetings of the Doctoral School Committee without voting rights, assuming the function of secretary and taking the minutes.



### **Art. 6: Supervisor**

Every student is supervised by a supervisor usually selected at the start of the course from among the professors and researchers in the Doctoral School Committee or belonging to the DICA. The supervisor, who also fulfils the role of tutor, assists the doctoral student in the choice of the individual training programme and in choosing the topics for his/her research activity. The supervisor guides the student in his/her research activity through periodic meetings. The primary objective is to promote the doctoral student's gradual acquisition of autonomy in carrying out scientific research activity, written and oral presentation of the results of the research, preparation and management of parts of research projects and his or her insertion in the international scientific circuit.

In special cases and/or on specific research projects, the Doctoral School Committee can assign the doctoral student a second supervisor, who need not be a member of the Department.

### **Art. 7: Specific objectives**

The School sets its sights on training young researchers in Environmental Engineering, through acquisition and development of knowledge, capabilities and skills necessary for planning, managing and conducting research activity.

The specific objectives lie mainly in acquiring post-graduate methodological skills in the scientific sectors that characterise Environmental Engineering, by taking part in training activities concentrated largely in the first year of the course. To achieve this goal, the School has initiated partnerships with similar doctoral programmes at other universities. The School also requires the students to develop specific and in-depth skills in the sector of research dealt with in the final dissertation.

The objectives of the research activity in the specific topic selected by the candidate fall into two main categories:

- a. an understanding of significant phenomena and processes in the environmental field through formulation and implementation of innovative interpretational models;
- b. experimentation on and transfer of highly innovative solutions and technologies able to cope with the great complexity of the environmental problems.



For the purposes of the doctoral course, the student must also have developed the ability to conduct research autonomously and effectively communicate the results and methods used to an international audience, both orally and in writing. The candidate must develop the skills necessary to formulate research projects and manage such projects in national and international contexts, while acquiring the tools necessary to conduct the research work individually and in groups.

The doctoral course also aims to develop an exploratory approach to the themes of research and transfer of important and specialized scientific results to problems and applied contexts, with a view to reinforcing the ties between basic and applied research in environmental studies which are important for the society and call for the development of highly innovative technologies, methods, and solutions.

#### **Art. 8: General methods of carrying out the course**

a) Articulation of the course and credits assigned.

The course is divided into two parts: classroom instruction and research.

To complete the School, the student must earn **180 credits** as follows:

- **60 credits** for attendance in classroom instruction, according to a personal syllabus formulated by each doctoral student with the assistance of the supervisor and submitted for the approval of the Doctoral School Committee, which includes:

- **53 credits** earned by attending institutional courses with final exams, offered during the first year as part of the doctoral course (or within partnerships with similar doctoral courses at other Italian universities) or by attending specialized courses of a similar level offered by Italian or foreign university institutions;

- **7 credits** in “elective” courses, earned through other forms of instruction such as seminar courses, summer schools, workshops, and work placements at public and private entities and companies; the Doctoral School Committee evaluates the congruity of such activities with respect to the training objectives of the School and the specific research activities of the student and establishes the number of credits to award;



- **120 credits** for carrying out research activity on the topic of the final dissertation, including any research sessions spent at Italian or foreign universities or research institutions.

b) Attendance at the courses and achievement of credits related to the training activities

The courses offered by the School aim to expand the student's basic preparation on its specific topics and on the methodological tools of investigation in the mathematical-numeric and experimental fields, and in the field of computer management of environmental and territorial data.

The institutional courses are usually divided into three two-month sessions (Dec.-Jan., March-Apr.; June-July) with one-month intervals in between for study and testing.

To earn the 53 credits, the attendance of 9 courses, 2 with qualified tests and 7 with standard tests or tutorials (assisted practical work) is required.

Course credits are assigned according to the criteria cited in the following table:

Type of course	Credits	Total
Institutional courses offered by Trento and/or equivalent institutions	Attendance and qualified test 9 credits	<b>53 credits</b>
	Attendance and standard test or tutorial 5 credits	
Other advanced training activities (workshops, seminars, summer schools, etc.)	1 credit for every 10 hours of activity + 1 credit if a test is administered	7 credits
Teaching of the Specialist Degree Courses	Attendance and passing the test: credits required in the respective Manifesto of Studies	
	Attendance without test: 50% of the credits required in the respective Manifesto of Studies	



The tests are divided into: 1) standard test: examination on a part of the syllabus, on a case study, or assisted practical work (tutorial); 2) qualified test: examination on the whole syllabus or in depth on a specific research subject.

The doctoral student may submit for the approval of the Doctoral School Committee, an individual syllabus, drawn up in agreement with the supervisor, in which up to a maximum of 3 courses can be substituted by other courses of the same level. The Committee may also approve individual syllabuses that envisage the substitution of more than 3 courses if the School has not started a sufficient number to cover the teaching offer relative to the specialist curricula.

Seminar courses recognized to earn credits include post-graduate courses on advanced themes of research in the scientific sectors of the course or other courses that contribute to the scientific and professional training of the students (interpersonal skills, ethics and methods of scientific research, time management, planning and management of research projects and the work group, laying out scientific texts in English, specific legislation, etc).

The educational instruction of the curriculum in Environmental Engineering entails that the student has completed a training course comparable to the one necessary for gaining the Specialist Degree in Environmental and Land Engineering.

The educational instruction of the curriculum in Building Engineering-Architecture and Planning for Sustainable Development entails that the student has completed a training course comparable to the one necessary for gaining the Specialist Degree in Building Engineering, Architecture, Territorial Planning, or Civil Engineering.

After hearing the supervisor, the Doctoral School Committee can request the student to supplement the training programme offered in the specialist degree course, if adequate skills for attending the institutional courses were not gained during the previous study curriculum.

The student who has already acquired specific skills on the themes proposed in the institutional courses of the first year can submit a personal syllabus, modified to meet the needs of the School, for approval of the Doctoral School Committee.



c) Research activity

By the end of the first year, every student with the help of his or her supervisor prepares the research proposal to develop during the doctoral course and submits it for the approval of the Doctoral School Committee.

The second and third years are chiefly dedicated to developing the research proposal that will be explored in the final thesis.

The doctoral student will conduct most of his/her research activity at the DICA. During the three years of the course, doctoral students are encouraged to study or do research for at least three months abroad.

The doctoral student can conduct studies or research at Italian or foreign universities or other institutions, for a period that cannot exceed 18 months. The Head authorizes study periods of less than six months; for periods equal to or greater than six months, the Doctoral School Committee must issue its approval.

During the second and third year of the course, the doctoral student is required to present the results of his/her research in seminars organized by the School and open to the public.

**Art. 9: Admission requirements**

Admission to the School is made by a selective procedure evaluating the qualifications and the exams. When submitting the application, the candidate must select a specialization curriculum; this choice is binding and may not be changed. If the candidate changes specialization, he or she can be excluded from the selection procedure.

The qualifications evaluated by the Committee are:

- the study qualifications and the results of the candidate's previous university career;
- any other credential considered useful for evaluating the aptitude of the candidate to the scientific research (scientific publications, prizes, grants, study activities and post-graduate research, etc.).

The exam consists in a written test and an oral interview that verify the candidate's preparation in relation to one of the research areas of the School and the student's overall aptitude for scientific research.



The specific topics of the tests are defined annually in the admissions announcement.

The oral test will also certify the student's proficiency in English and Italian (for foreign candidates).

For all else not expressly mentioned here, the provisions of Article 19 of the Regulations shall apply.

#### **Art. 10: Criteria for admission to the years following the first**

At the end of each academic year, the doctoral student must submit to the Doctoral School Committee an annual report on the activities completed. If there is documented proof that the student was negligent or neglectful in his or her studies, the Doctoral School Committee can suggest the Rector of the University of Trento to exclude him/her from continuing in the doctoral course. To be admitted to the third year, the student must have obtained 54 credits in the educational activity.

Every doctoral student must demonstrate a proficiency in English by the end of the course. This knowledge may be evaluated by a written and oral presentation of the research done, including drawing up a final report. The University strongly recommends foreign doctoral students to learn Italian.

#### **Art. 11: General criteria for drawing up the Manifesto of Studies**

Before the start of the academic year, the Doctoral School Committee approves the Manifesto of Studies, which is published on the Internet on the School web site.

The Manifesto, redacted in English, will consist of :

- a brief outline including, in chronological order: the titles of the courses, the total number of hours, the professor in charge, the number of credits obtainable;
- a detailed description of each course: the professor in charge and other professors involved, the programme, and bibliographical references;
- any provisions relating to educational, preliminary and/or supplementary activities of the courses.



### **Art. 12: Rights and duties of doctoral students**

Students enrolled in the School have the rights, duties and responsibilities described under Art. 24 of the Regulations, which apply for anything not expressly foreseen by these Executive Regulations.

### **Art. 13: Doctoral degree conferral**

The Doctoral School Committee designates the Examination Committee to confer the doctoral degree, observing the matters laid down under Title V of the existing Regulations.

A basic prerequisite for doctoral degree conferral is that the research activity carried out by the candidate leads to scientifically valuable results documented in the final dissertation.

By the end of the course, the doctoral students enrolled in the final year must submit to the Doctoral School Committee an application for admission to the final exam.

The Doctoral School Committee requests the opinion of the supervisor on the quality of the dissertation written by the doctoral student and then decides on his or her admission to the final exam, concurrently formulating a detailed opinion concerning the work done by the candidate. The opinion of the Doctoral School Committee, supplemented by the presentation of the supervisor, is attached to the copies of the thesis sent to the components of the Examination Committee.

The doctoral student is admitted to final examination when the Doctoral School Committee issues a positive opinion on the dissertation.

The final exam is conducted before the Examination Committee and entails a public discussion of the dissertation.

### **Art. 14: Doctoral degree conferral and publication of the dissertation**

After passing the final examination, the doctoral student is bestowed the title "Dottore di ricerca in Ingegneria Ambientale" followed by the specialization curriculum chosen.

The final dissertation is published with the permission of the author in the collection *Monographs of the School of Doctoral Studies in Environmental Engineering*, in the electronic format, by the University of Trento press.



### **Art. 15: Evaluating the prerequisites of the School**

The Doctoral School Committee appoints an Internal Evaluation Committee of the School, comprised of at least three components of the Committee.

The Internal Evaluation Committee has the following responsibilities:

- a. preparing the annual report on whether the course met the educational objectives, particularly in reference to:
  - the scientific production of the members of the Doctoral School Committee and the supervisors;
  - the use of financial resources and operating structures;
  - the evaluation of the teaching and instruction based on anonymous questionnaires prepared by the Internal Evaluation Committee, filled out by the doctoral students;
  - the scientific production of the doctoral students (presentations made during conferences, published works, etc) and the partnerships established with other research institutions and with public and private entities aimed at offering work placement opportunities;
- b. carrying out surveys with a view to ascertaining the work done by the students during at least the first three years after receiving their doctoral degree, especially in the following areas:
  - importance of the experience acquired during the doctoral course in entering the working world (value assessment of the work done; recognition of the doctoral degree; comparison of the working world with respect to the training received in the doctoral studies);
  - whether the skills received were appropriate to conducting the upper level research, evaluated indirectly on the basis of the scientific relevance of the works published by the students in the first three years after receiving their doctoral degree.
- c. suggesting possible changes to make in the doctoral course structure, based on the information gathered in points a) and b) in order to improve the quality of the instruction offered and the scientific production of the students.

At the end of every three-year period, the work done in the doctoral course is submitted to verification by two independent evaluators, who are appointed by the Committee of the Department of Civil and Environmental Engineering and selected from among the tenured



professors in the reference areas of the School, based on a report prepared by the Head in conjunction with the Internal Evaluation Committee.

**Art. 16: Amendments to the Executive Regulations**

According to Art. 8, paragraph 4, of the Regulations and successively to the first year of the School, any change to these Executive Regulations must be approved by the DICA, after hearing the opinion of the Doctoral School Committee, and enters into force from the date of publishing in the DICA web site.

**Art. 17: Referral rule**

For all else not expressly mentioned in these Executive Regulations, the provisions established by Italian law and the Regulations shall apply.