

# Internal Regulation of the PhD Course in Industrial and Information Engineering

Department of Engineering - University of Perugia

Proposed by the Doctoral Board on 30/06/2021

Approved by the Department of Engineer Council on 13/07/2021

## Part I – General Rules

### Art. 1. Scope of application

This Regulation supplements the Regulation of the PhD Courses of the University of Perugia issued by Rectoral Decree (D.R.) no. 1548 of 7 August 2013 (hereinafter referred to as "Regulation of the University Doctoral Courses") and regulates the objectives, articulation, organizational structures, operation, and organization of the educational offer of the PhD Course in Industrial and Information Engineering.

### Art. 2. Approval and amendment of the Regulations

This Regulation is proposed by the Doctoral Board of the PhD Course in Industrial and Information Engineering, and it is approved by the Department of Engineering Council. Any modification of the Regulation is proposed by the Doctoral Board with a resolution approved by a simple majority of those entitled, and subsequently approved by the Department Council.

### Art. 3. Objectives and articulation of the PhD Course

In addition to the general aims of the doctoral courses (reported in the Regulation of the University Doctoral Courses), the PhD Course aims to study and develop new models, methods, and technologies for the scientific-disciplinary sectors of industrial and information engineering, through a highly qualifying training course, which allows PhD students to achieve autonomous research skills of international level. The training and research activities are organized with the System of Training *Credits* (CF) and divided into *curricula*, which refer to one or more scientific-disciplinary sectors characterizing industrial and information engineering, as reported in the accreditation form of each activated cycle.

## Part II – Organizational Structures and Operation

### Art. 4. Administrative bodies of the PhD Course

The administrative bodies of the PhD Course are the *Doctoral Board* and the *Coordinator*. The functions of these bodies are regulated by Arts. 12 and 13 of the Regulation of the University Doctoral Courses.

## **Art. 5. The Doctoral Board**

1. Composition. The Doctoral Board is composed of full and associate professors, university researchers, and two representatives of the PhD students, elected from among all those enrolled in the PhD Course (paragraph 5 of this article). These representatives participate in the meetings of the Doctoral Body with an advisory function for the discussion of the didactic and organizational problems of the Course; they shall not participate in the discussions and deliberations concerning the annual evaluation of the PhD students and the organization of the final examination. Please refer to art. 12 of the Regulation of the University Doctoral Courses for further details on the composition of the Doctoral Board.
2. Affiliation of new members. The affiliation of new professors and researchers to the Doctoral Board is regulated by Art. 12 of the Regulation of the University Doctoral Courses. The new requests for affiliation must be submitted to the Board by February 15 of each year and will be evaluated by the Board before the activation of each cycle, considering the ANVUR requirements, the scientific criteria provided for by the University Regulations and the ministerial rules, also with reference to the criteria and indicators for the distribution of the MUR Post-Graduate Scholarship Fund. The new members admitted to the Board, by resolution of the Department Council, will be officially affiliated to the Board at the beginning of the new doctoral cycle, subject to the accreditation of the PhD Course.
3. Functions. The functions of the Doctoral Board are regulated by Art. 12 of the Regulation of the University Doctoral Courses. Professors, researchers, and experts in the scientific-disciplinary sectors referred to in Art. 3 of this Regulation can be invited to attend the meetings of the Board and they can be appointed as co-advisors of doctoral students.
4. Referents of the curricula. The Doctoral Board appoints a Referent for each of the curricula referred to in Art. 3 of this Regulation. This Referent has the task of organizing and coordinating the training activities, proposing to the Doctoral Board the measures relating to the individual doctoral students, organizing the tutoring activity, taking care of the progress of the PhD students, to ensure that everyone acquires the methodological tools related to her/his research area.
5. Election of the representatives of the PhD students.
  - a. The Coordinator calls for elections for the renewal of the representatives of the PhD students in the two months prior to the expiry date of the mandate of the representatives in office. The electoral calendar, the number of eligible candidates, the place where the elections are held and the deadline for the presentation of the candidates, set at least ten working days before the date of the elections, are reported in the call for election. The elections take place in a single day.
  - b. The active and passive electorate is made up of all students regularly enrolled in the PhD Course in the academic year during which the elections are held. Applications must be received in writing or by e-mail by the Coordinator, by 12:00 on the last day. The Coordinator verifies the regularity and validity of the applications, and announces the list of candidates by publication on the website of the Department of the course or by e-mail to all the active electorate and to the Doctoral Board. Each candidate may withdraw his/her candidacy by 12:00 on the day before the date of the elections, by sending a written communication or an e-mail to the Coordinator.

- c. The Coordinator appoints the commission, consisting of two professors or researchers, one of whom with the function of President, and a doctoral student who is part of the active electorate and not a candidate.
- d. The elections are held by secret ballot and each student can express up to two preferences. The elections are valid with a number of voters equal to at least one third of those entitled. If the quorum is not reached, new elections will be called within 7 days.
- e. Upon completion of the elections, given the achievement of the quorum, the Coordinator proclaims the candidates who have obtained the highest number of votes, advertising them on the website of the Department of the Course or by e-mail communication to the whole active electorate and to the Doctoral Board. In case of a tie between two or more candidates, the one who has the greatest seniority of enrollment in the PhD Course is elected, and even if the seniority of enrollment is equal, the oldest in age is elected. The term of office of those elected is two years, renewable once consecutively. In the event of renunciation of the appointment or loss of the status of eligibility of one of the elected representatives, the first of the non-elected ones takes over for the remaining term of the mandate. If this is not possible, new elections are held within 30 days.

#### **Art. 6. The Coordinator of the PhD Course**

This article integrates the content of Art. 13 of the Regulation of the University Doctoral Courses, which regulates the office of Coordinator of the Doctoral Program and the related functions.

1. The Coordinator is a full-time full professor or, failing that, a full-time associate professor who is a member of the Doctoral Board. The Coordinator remains in office for three years and can be reconfirmed only once. The appointment and replacement of the Coordinator are ratified by the Department Council by an absolute majority, on the designation of the Doctoral Board (paragraph 3 of this article).
2. The Coordinator calls the meetings of the Doctoral Board at least 5 days in advance. The meetings are valid when half plus one of the members of the Board are present, after deducting justified absences. At the beginning of each session, the Doctoral Board appoints a secretary, who has the function of assisting the Coordinator in drawing up the minutes of the session.
3. Designation of the PhD Coordinator.
  - a. The designation of the new PhD Coordinator takes place following the natural expiration or early termination of the mandate of the Coordinator in office.
  - b. The Dean of the full professors of the Doctoral Board (or in case of his/her absence or impediment, the full professor of the Doctoral Board who follows him/her in order of seniority in the role) collects the applications in the 60 days prior to the natural expiry of the mandate of the Coordinator in office, or within 60 days in case of early termination of the mandate.
  - c. The Dean verifies the regularity and validity of the applications, and announces the list of candidates by publication on the Web site of the Department of the course or by e-mail to all members of the Doctoral Board.
  - d. If there are more candidates, the Dean calls for the voting, which will take place in a meeting of the Doctoral Board. All members of the Doctoral Board can vote. Each candidate may withdraw his candidacy, by communicating in writing to the Dean (also by e-mail), by 12:00 on the day prior to the voting date.

- e. The polling committee is composed of three members appointed by the Dean, who also identifies the President, the secretary, and the scrutineer. Voting takes place by secret ballot. Each voter can express only one preference.
- f. In the first round of voting, the Coordinator is elected by a majority of those entitled to vote (or by an absolute majority). In case of failure to elect, the Dean will call new votes within 15 days. In the second round of voting, there is a ballot between the two candidates who have obtained the highest number of votes in the first ballot and the Coordinator is elected by a majority of the voters (or by a simple majority). Each round of voting is valid only if at least half of those entitled to vote have participated.

### **Art. 7. Internal Evaluation**

Based on Art. 14 of the Regulation of the University Doctoral Courses, the Doctoral Board presents to the Department, as part of the University Quality Assessment, an annual report on the training processes carried out and on their compliance with the pre-established objectives, also in relation to employment opportunities consistent with the level of training acquired, as well as the objectives planned for the following year.

### **Art. 8. How to Access the PhD Course**

1. Access to the Research Doctorate Course in Industrial and Information Engineering takes place with a public selection procedure, with the publication of the list of admitted and eligible candidates no later than 30 September of each year, as required by Art. 15 of the Regulation of the University Doctoral Courses, to which reference should be made for anything not specified in this article. Those who have achieved an evaluation higher than the minimum established by the Doctoral Board for each round of the selection are considered eligible.
2. Participation in the selection procedures requires the submission of an application in response to the call for applications for admission to PhD courses. Please refer to Arts. 15 and 16 of the Regulation of the University Doctoral Courses for the requirements necessary for submitting the application form and for the regulations about the selection announcement.
3. The definition of the Selection Boards for carrying out the selection procedures is governed by Art. 17 of the Regulation of the University Doctoral Courses.
4. To ensure a complete evaluation of each candidate, the selection procedure can be carried out in one of the following ways, based on what is established by the Doctoral Board for each selection round:
  - a. Evaluation of qualifications and interview (on a scale of 60: 30 + 30);
  - b. Evaluation of qualifications, written test and interview (on a scale of 90: 30 + 30 + 30).
5. Based on Art. 15 of the Regulation of the University Doctoral Course, the evaluation of qualifications must concern the university training course, as well as any further training courses and professional and research experiences, and any scientific publications. The degree thesis can be considered in the evaluation of qualifications. The evaluation of qualifications may also concern the elaboration by the candidates of a research project to be developed over the three years of the PhD Course on one of the topics indicated in the call for applications.

6. The interview can be held via videoconference and can be held in Italian or English, depending on the candidate's choice. If taken in Italian, the interview also includes the assessment of knowledge of the English language, through the reading and understanding of a text.
7. If the call for applications reserves some quotas for students graduated from foreign universities, for fellows from foreign countries, or for specific international mobility programs, including holders of research grants financed by the European Union or by other international scientific institutions, the selection procedures for assigning these quotas are carried out as for the assignment of the non-reserved quotas.
8. If the call for applications reserves some quotas for employees of companies in agreement (industrial doctorate or doctorate in higher apprenticeship), the selection procedures for assigning these quotas are carried out as for the assignment of the non-reserved quotas. In the case of other types of doctorates (Marie/Curie, foreign scholarship holders, etc.) the selection procedures are usually governed by specific agreements.
9. At the end of the selection procedures, admission to the Course takes place based on the provisions of Art. 18 of the Regulation of the University Doctoral Courses.

### **Part III – Organization of the training activities and achievement of the title**

#### **Art. 9. Start of the Course and assignment of the Advisor**

1. The PhD Course usually starts after the opening of the academic year and, in any case, after the completion of the selection procedures for accessing the Course.
2. Following the appointment of the winners of the selection procedures, the Doctoral Board indicates an Advisor for each PhD student, also based on the scientific interests of the PhD student. The Advisor will supervise the doctoral theses, proposing a field of research to their PhD students, which will be submitted for approval by the Doctoral Board within three months of the appointment of the winners of the selection. The Advisor is chosen from among the members of the Doctoral Board.
3. Upon request of the PhD students and/or the Advisor, the Doctoral Board may assign to the PhD student one or more co-Advisors, chosen from among the experts of the chosen research sector and not necessarily members of the Doctoral Board. Each co-Advisor can supervise the doctoral thesis.

#### **Art. 10. Training credits and activities of the PhD students**

The organization of the training activities is based on training credits (CF). At the end of the course, the PhD student must have acquired a total of 180 CF. Every year, students are expected to acquire about 60 CF, based on what is summarized in the table in Art. 13 of this Regulation. The CF are obtained in relation to the following teaching and research activities:

- a) Attendance and assessment in institutional teaching modules, hereinafter referred to as *degree teaching modules*, chosen on the recommendation of the Doctoral Board among those provided by Master's or Bachelor's Degree Courses of the University of Perugia or others universities, including foreign ones, provided that they are relevant for the scientific activity

of the PhD student. Each degree teaching module provides 9 CF. Please refer to Art. 11 for further specifications.

- b) Attendance and assessment in specific teaching modules, hereinafter referred to as *doctoral teaching modules*, activated within the scope of this PhD Course or in other PhD Courses, including foreign ones, provided that they are of significant scientific relevance for the PhD student. Each doctoral teaching module provides up to a maximum of 5 CF (1 CF every 4 hours of teaching). Please refer to Art. 12 for further specifications.
- c) Participation in events such as seminars, PhD schools, conferences and workshops of significant scientific interest for the student. Participation in each event provides a number of CF defined by the following rule: (i) an event with a duration equal to  $4k$  academic hours, with  $k$  non-negative integer, provides  $k$  CF; (ii) an event of duration equal to  $(4k + x)$  academic hours, with  $k$  non-negative integer and with  $1 \leq x < 4$ , provides a number of CF equal to  $k + 1$ .
- d) Acquisition of specialized scientific skills, through autonomous or assisted study of scientific notions and results inherent to the specific research field of the PhD student.
- e) Training and research at other universities or research centers, usually abroad.
- f) Assisted research, aimed at the production and publication of innovative scientific contributions related to the specific research field of the PhD student.
- g) Writing of the PhD thesis.

The total number of CF expected for each type of activity and the articulation of these activities in the three years of the PhD Course are specified in Art. 13.

#### **Art. 11. Degree teaching modules**

As specified in Art. 10 of these Regulation, the degree teaching modules correspond to courses already activated in the context of Master's or Bachelor's Degree Courses of the University of Perugia or of other universities, including foreign ones, provided that they are relevant for the scientific activity of the PhD student. The Doctoral Board, having examined the student's university curriculum and in agreement with his Advisor, assigns the student two degree teaching modules, not already present in his/her university curriculum, in order to integrate his/her cultural background. The PhD student carries out his/her study activity within the module through one of the following activities, agreed with the teacher of the module: preparation and presentation of one or more seminars; attendance of lessons and final assessment; development of a project.

#### **Art. 12. Doctoral teaching modules**

As specified in Art. 10 of these Regulation, the doctoral teaching modules are training modules specifically set up as part of PhD courses. They aim to broaden the student's knowledge of his/her research field or synergistic research fields. The Doctoral Board, having examined the scientific interests of the PhD student and in agreement with his Advisor, assigns the student three doctoral teaching modules. These modules are usually chosen from those organized and activated on an annual basis by the Doctoral Board of the PhD in Industrial and Information Engineering of the University of Perugia, but they can also be modules activated in other PhD Programs, including foreign ones, provided that they are of scientific interest for the PhD student's activity.

### Art. 13. Articulation of the training activities

The articulation of the training activities is the same for all the curricula of the PhD Course and consists of:

- 1) *Basic research training*: Includes attendance and assessment in degree teaching modules and doctoral teaching modules; activities a) and b) of Art. 10 of this Regulation.
- 2) *Specialized research training*: Includes participation in seminars, PhD schools, conferences and workshops, the acquisition of specialist scientific skills, as well as a period of training and research at other universities or research centers, usually foreign; activities c), d), and e) of Art. 10 of this Regulation.
- 3) *Research activity*: Includes assisted research activities, with publication of innovative contributions in scientific conferences and journals, as well as writing the PhD thesis; activities f) and g) of Art. 10 of this Regulation.

The following table shows the distribution of the different types of activities in the three years of the PhD Course, along with the corresponding number of CF.

FIRST YEAR						
<i>Basic Research Training</i>		<i>Specialized research training</i>			<i>Research activity</i>	
Type of activity	CF	Type of activity	CF	Type of activity	CF	
degree teaching module	9	acquisition of specialized scientific skills	9	assisted research	20	
degree teaching module	9	participation in seminars, PhD schools, conferences, and workshops	9			
doctoral teaching module	5					
<b>Total of CF – first year</b>	<b>23</b>		<b>18</b>		<b>20</b>	<b>61</b>

SECOND YEAR						
<i>Basic Research Training</i>		<i>Specialized research training</i>			<i>Research activity</i>	
Type of activity	CF	Type of activity	CF	Type of activity	CF	
doctoral teaching module	5	participation in seminars, PhD schools, conferences, and workshops	9	assisted research	25	
doctoral teaching module	5	training and research at other universities or research centers	15			
<b>Total of CF - second year</b>	<b>10</b>		<b>24</b>		<b>25</b>	<b>59</b>

THIRD YEAR						
<i>Basic Research Training</i>		<i>Specialized research training</i>			<i>Research activity</i>	
Type of activity	CF	Type of activity	CF	Type of activity	CF	
		training and research at other universities or research centers	15	assisted research	30	
				writing of the thesis	15	
<b>Total of CF - third year</b>	<b>0</b>		<b>15</b>		<b>45</b>	<b>60</b>

<b>TOTALE CF</b>	<b>33</b>		<b>57</b>		<b>90</b>	<b>180</b>
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Tabella 1: articolazione delle attività formative

#### **Art. 14. Temporal sequence of the training activities**

1. In the first year of the PhD Course, the student:
  - a. Attends the basic research training modules assigned by the Doctoral Board.
  - b. Carries out specialized training research. This training aims to deepen the topics of the PhD student's research field. Training is developed through the acquisition of specific methodological tools (for example, analysis of the state of the art), participation in seminars, PhD schools, conferences, and workshops. The PhD student is instructed to conduct exhaustive bibliographic searches, to their critical use for the highlighting of particularly significant aspects and susceptible of research developments in his/her field, to the drafting of summary reports highlighting the state of the art and the methodological and applicative advances achieved in the field. Also, the student is included in a national and international scientific context.
  - c. Carries out research activities under the supervision and guidance of his/her Advisors.
  - d. Defines, within the research field assigned to him/her by the Doctoral Board at the beginning of the Course, the specific topic of his/her PhD thesis.
2. In the second year of the PhD Course, the student:
  - a. Completes his/her basic research training, by attending the remaining doctoral teaching modules.
  - b. Continues the specialized research training; the student strengthens his/her inclusion in an international scientific context, by participating in seminars, conferences, and workshops, and by spending a period of study and research at a different University or Research Center, usually abroad.
  - c. Makes a substantial progress in his/her research activity towards the completion of the PhD thesis, under the supervision of his/her Advisors.
3. The third year is usually devoted to finalizing the research activity, through the completion of the study and research period at a different University or Research Center, and to writing the PhD thesis.

#### **Art. 15. Study and research at another University or Research Center**

1. The PhD student, generally in a period between the second semester of the second year of the Course and the first semester of the third year of the Course, spends a research stay at another university or research center, usually abroad. The institution in which the student carries out this stay is indicated by his/her Advisors among those most qualified in the research field of the student.
2. The duration of the stay is usually no more than 6 months. In duly justified cases, the duration of the stay can be extended up to a maximum of 18 months, subject to the positive opinion of the Doctoral Board.
3. In exceptional and duly motivated cases, the Doctoral Board may authorize the PhD student to replace the research stay with equivalent activities to be carried out on site.

## Art. 16. Evaluation of the activity carried out and transition to the following years

1. The study and research activities carried out by the PhD student during the three years of the Course are recorded in a *booklet*, filled by the student and his/her Advisors, under the supervision and control of the Coordinator. In particular: (i) the annotations of the degree and doctoral teaching modules followed by the student, along with the relative CF assigned, must be signed by the teachers of the aforementioned modules; (ii) participation in seminars, schools, conferences and workshops, along with the relative CF assigned, must be signed by at least one of the Advisors of the PhD student. If the examination of a teaching module is not taken at the University of Perugia, the booklet for this module can be signed by the PhD Coordinator, on the basis of a recommendation from the teacher of the module, possibly sent by e-mail.
2. At the end of each year of the Course, the activity carried out by the PhD student is subject to evaluation by the Doctoral Board. On the basis of the outcome of the assessment, the Doctoral Board decides on admission to the following year of the Course for first- and second-year students, and it expresses an opinion on the overall activity for each third-year student, as required by art. 24 of the Regulation of the University Doctoral Courses. More specifically:
  - a. By 30 September of the first year of the Course, each PhD student must produce and send to the Coordinator a report on the study and research activity carried out, signed by their Advisors. The report must be in English, according to the specifications in Annex 1 of this Regulation. Based on this report and the activities annotated in the booklet, the Doctoral Board will decide on the evaluation of the PhD student, expressing one of the following three outcomes:
    - *Full admission*. The PhD student is fully admitted to the second year of the Course; in this case all the CF expected for the first year are assigned to him/her, based on the activities carried out and reported in the booklet.
    - *Admission with debt*. The PhD student is admitted to the second year of the Course with a *Training Debt* (DF). This debt cannot exceed 15 CF and must be recovered in the second year.
    - *Rejection*. The PhD student is not admitted to the second year.
  - b. By 30 September of the second year of the Course, each PhD student must produce and send to the Coordinator a report on the study and research activity carried out, signed by their Advisors, which highlights in particular the progress with respect to the activities of the first year. The report must be in English, according to the specifications in Annex 1 of this Regulation. The report must also explicitly list the production of PhD student in terms of scientific publications, showing that the PhD student is an author, also in collaboration, of at least one scientific publication related to his/her research topic, in an international journal or conference with documented anonymous review process, indexed in at least one of the Scopus and WoS (Web of Science) databases or related to internationally renowned publishers (e.g., IEEE, Elsevier, Springer, ..). The student will also have to make an oral presentation of about 20 minutes on the content of his/her report; the oral presentation is given in English. Based on the report, the scientific publications, the oral presentation, and the activities reported in the booklet, the Doctoral Board will decide on the evaluation of the student, expressing one of the following three outcomes:

- *Full admission*. The PhD student is fully admitted to the third year of the Course; in this case all the CF expected at the end of the second year are assigned to him/her, based on the activities carried out and reported in the booklet.
  - *Admission with debt*. The PhD student is admitted to the third year of the Course with a *Training Debt* (DF). This debt cannot exceed 15 CF and must be recovered in the second year.
  - *Rejection*. The PhD student is not admitted to the third year.
- c. By 30 September of the third year of the course, each PhD student must produce and send to the Coordinator a report on the overall activity carried out in the three years, signed by their Advisors. The report must be in English, according to the specifications in Annex 1 of this Regulation. The report must also explicitly list the production of the PhD student in terms of scientific publications, from which one of the following two requirements is satisfied: (i) the PhD student is an author, also in collaboration, of at least three scientific publications related to his/her topic research, in international journals or conferences with documented anonymous review process, indexed in at least one of the Scopus and WoS (Web of Science) databases or related to internationally renowned publishers (e.g., IEEE, Elsevier, Springer, ..); (ii) the student is an author, also in collaboration, of at least two scientific publications that meet the criteria in point (i), but of which at least one is a journal publication in class Q2 or Q1 according to SJR (Scimago Journal & Country Rank - <https://www.scimagojr.com/>), in the year of publication or in the previous one, in one of the subject categories of the journal.

The student will also have to make an oral presentation of about 30 minutes on the overall activity carried out; the oral presentation is in English. Based on the report, the scientific publications, the oral presentation, and the activities reported in the booklet, the Doctoral Board will express a judgment on the overall activity of the PhD student. In accordance with the provisions of Art. 24 of the Regulation of the University Doctoral Courses, which sets the deadline for submitting the PhD thesis as October 31st, this judgment is valid both as a presentation to the final exam commission and as an evaluation of the Course's training activities, according to the predefined objectives. The judgment of the Doctoral Board does not prevent the student to participate in the final evaluation and discussion. As established by Art. 25 of the Regulation for University Doctoral Courses, to which reference should be made, the opinion of the Doctoral Board is sent, together with the thesis and other documents required, to two internationally renowned evaluators, external to the University of Perugia.

#### **Art. 17. Final examination and exam commission**

1. The legislation about the execution of the final exam and the achievement of the PhD degree is described in Art. 25 of the Regulation of the University Doctoral Courses, to which reference should be made.

2. The public discussion of the thesis takes place in front of an exam commission, appointed by decree of the Director of the Department, on the designation of the Doctoral Board. The commission is composed of three Italian or foreign members, chosen from among university professors specifically qualified in the subject of the thesis. At least two members must belong to Italian or foreign universities not formally involved in the PhD Course and must not be members of the Doctoral Board. The commission can be integrated by no more than two experts belonging to public and private research structures, including foreign ones, with specific documented expertise about the subject of the thesis.
3. The effective members of the final exam commission cannot be re-appointed for the two cycles immediately following the one in which they held this role.
4. For reasons of necessity or expediency, the final exam can be carried out electronically or in mixed mode, or with some students or commissioners connected through appropriate telematic channels.

**Article 18. Participation in international programs.**

The students regularly enrolled in the PhD Course in Industrial and Information Engineering can optionally join other international programs promoted by the Doctoral Board. Adherence to an international program can extend the training requirements in Arts. 13-16 of this Regulation, as indicated in a specific Agreement governing this program.

**Art. 19. Transition rule.** This Regulation applies starting from the XXXVII cycle.