

BIOMEDICAL, ELECTRICAL AND SYSTEM ENGINEERING

Section "Positions and scholarships" revised on 21/04/2016

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Programme start date	01/11/2016
Duration	3 years
Programme language	Italian and English
Mandatory stay abroad	Yes (3 months)
Curricula	Research topics
1. Automatic Control and Operational Research	<p>The scientific areas involved in this Curriculum are Automatic Control (ING-INF/04) and Operational Research (MAT/09). These are fundamental subjects for the Master Courses in Management and Information (Electronics, Computer Science, Telecommunications, Biomedical, Automation) Engineering. Moreover, they are also present in most other Master Courses in Engineering and (as far as MAT/09 is concerned) also in Business Administration and Science.</p> <p>The unifying methodological aspect is the System Approach, which provides a very powerful viewpoint to face most problems in modern engineering as well as in many other applied sectors.</p> <p>The basic subjects (system theory, control theory, optimization, estimation methods, filtering and identification, simulation) provide very useful tools to deal with and solve in a formal and general way complex problems that are often faced with special-purpose procedures, sometimes of empirical type.</p> <ul style="list-style-type: none"> - System and control theory - Nonlinear control - Geometric approach to control - Robotics - Motion control - Diagnosis of dynamic systems - Identification of dynamic systems - Aerial traffic control - Electric drives - Combinatorial optimization - Graph theory - Transportation and distribution (logistics) problems - Cutting and loading problems <p>The methodologies of many of these topics are of interest to students in other curricula of the doctorate. For this reason, common events and activities will be organized among the three curricula to encourage interaction among students and the sharing of methodologies, cultural exchange and multidisciplinary education.</p>
2. Bioengineering	<p>The Bioengineering curriculum promotes the acquisition of advanced skills of highly interdisciplinary character (from engineering to medical and biological sciences, from mathematics and physics to computer science) to face – by means of innovative tools and solutions - complex problems in the field of the life sciences.</p> <p>The curriculum offers a wide spectrum of research themes, involving electronic, information and industrial aspects of bioengineering:</p> <ul style="list-style-type: none"> - Biomedical Imaging, Biomedical Signals and Data Processing - Biomechanics and Motor Function Control - Rehabilitation Engineering - Biomaterials, Prosthetics and Artificial Organs - Biomedical Instrumentation - Medical Informatics and Telemedicine - Models of Physiological and Biological Systems - Computational Neuroscience - Molecular, Cellular and Tissue Engineering. <p>Strong connections exist between the various themes; frequently, the training and research activities are placed at the intersection of several themes. Each research project will pursue a specific objective: improvement of physio-pathological knowledge, progress in diagnostic and therapeutic techniques,</p>

	<p>advancement in assistive and rehabilitation technologies, optimization of health-care management. The interaction with the other two curricula - thanks also to common courses and seminars - certainly stimulates the sharing of methodologies, the cultural exchange and the multidisciplinary training necessary for an effective approach to bioengineering problems.</p>
<p>3. Electrical Engineering</p>	<p>The Electrical Engineering curriculum provides a wide scientific and technical-professional training in electrical engineering, with good base knowledge, capacity for technological and design innovation, and specific electrical knowledge. The Ph.D. student must be able to apply the analytical tools and the knowledge concerning the advanced technologies typical of electrical/electromechanical sector also to other engineering leading sectors. The scientific areas involved in this Curriculum are: Electrotechnics (ING-IND/31), Converters, electrical machines and drives (ING-IND/32), Electrical energy systems (ING-IND/33) e Electrical and electronic measurements (ING-INF/07).</p> <p>In particular, the Curriculum in Electrical Engineering aims to develop modern electrical competencies and technologies such as:</p> <ul style="list-style-type: none"> - power electronics - electric drives for automation, robotics, and traction - unconventional electric machines - methods of analysis, management and design of the electric power systems - electricity market - innovative architectures for the electric distribution - computer-aided design of electric power systems and components - rational use of energy and renewable sources - electromagnetic compatibility - interactions of electromagnetic fields with biological systems - electromagnetic characterization of materials - applied superconductivity - applied magneto hydrodynamics - plasma engineering - magnetic system engineering
<p>Admission requirements</p>	
<p>Applicants who have one of the following degrees may participate in the selection:</p> <ul style="list-style-type: none"> - Laurea specialistica or Laurea magistrale (second cycle degree) - Laurea Vecchio Ordinamento (degree obtained under the Italian previous regulations); - Degree granted by AFAM (Alta Formazione Artistica e Musicale) member institutions; - an academic Master's degree obtained abroad, comparable to the above mentioned Italian degrees and recognized as suitable for the admission to doctoral programmes. <p>Undergraduated applicants may also submit applications with the obligation of getting their degree by the start date of the PhD Programme.</p>	
<p>Documents to be attached to the application under penalty of exclusion (only documents in Italian or English will be considered valid and assessed by the Admission Board)</p>	
<ul style="list-style-type: none"> - scanned copy of a currently valid ID document with photo - curriculum vitae - certificates and transcripts of <u>both Bachelor's and Master's degrees</u> containing the following details for each degree held: <ul style="list-style-type: none"> o personal data o university that granted the degree o type of degree (first cycle / second cycle / single cycle) o name of the degree programme o date of graduation o final mark o list of exams taken with their scores (transcript of results) o translation into Italian or English (only for degrees issued in other languages). <p>Applicants who have degrees obtained in:</p> <ul style="list-style-type: none"> o an italian public university have to submit <u>self-declarations</u> bearing date and handwritten signature (of <u>both first and second cycle degrees</u>: Laurea triennale and laurea specialistica/ magistrale/ laurea vecchio ordinamento). o EU Countries, except Italy, can submit <u>either self-declaration or degree certificate</u> (of <u>both Bachelor's and Master's degrees</u>). o non-EU Countries have to submit the degree certificate and transcript issued by the relevant University (of <u>both Bachelor's and Master's degrees</u>). <p>Undergraduated applicants:</p> <ul style="list-style-type: none"> o have to submit the document as above, except for the following details: Master's degree date of graduation and final mark o must add a self-declaration of the scores' weighted average (if not indicated in the transcript of results). <ul style="list-style-type: none"> - abstract of the dissertation of the second cycle degree or, for undergraduated applicants, of the draft dissertation 	

approved by the supervisor (max. 5000 characters, spaces included, and any formulas, and not including title, contents, bibliography or illustrations, if any).

- at least one, and no more than 3, letters of presentation from university professors and/or Italian and international professionals who are not members of the Admission Board attesting the applicant's aptitude and interest in the scientific research.

Note: The applicant should not personally attach the letters of presentation to the application. The applicant should enter the email address of the professor/professional of whom the letter of presentation is requested when filling in the application on the website <http://studenti.unibo.it>. The professor/professional will receive an email containing instructions for uploading the letter of presentation. The letter of presentation should be uploaded by the professor/professional in pdf format only and before the deadline of this Call for Applications.

- long-term research project with particular emphasis on the 1st year activities, which the applicant plans to carry out as part of the PhD programme and must:
 - o state the curriculum/research topic of the PhD programme that the applicant is interested in and that the project concerns on the title page (research projects without this information will not be considered);
 - o have a maximum length of 20,000 characters, spaces and formulas included, and not including title, contents, bibliography or illustrations, if any (anything in excess will not be considered);
 - o be broken down into: state of the art; project description; learning outcomes; structure of the project and execution schedule; criteria proposed to check the results; bibliography.

The research project submitted with the application, however, may not be the one the successful applicant will carry out during the doctoral studies. Supervisors and Academic Board can propose a different one.

- letter stating why the applicant wants to attend the PhD programme and describing the applicant's experience and research interests, which justify the applicant's suitability for the PhD programme (max. 3000 characters, spaces included).

Other documents to be attached to the application, if in the applicant's possession (only documents in Italian or English will be considered valid and assessed by the Admission Board)

- List of scientific publications (essays, articles in scientific journals)
- List of minor publications (conference proceedings distributed at national and international level, contributions in monographs, etc.)
- List of abstracts and posters presented in national and international conferences
- Level 1 or 2 master's degree achieved in Italy in subjects pertinent to the research topics that the PhD programme covers
- Postgraduate and/or specialization programmes in subjects pertinent to the PhD programme research topics
- University level teaching
- Scientific research of any type (basic, oriented, targeted, translational, applied, etc.) and carried out in any capacity, including research grants and taking part in research projects
- Working experience
- Internships
- Knowledge of foreign languages
- Mobility experience abroad (e.g.: Erasmus or similar)
- Any other document certifying the applicant's training and abilities (grants, awards, etc.)

Entrance exams (Art. 4 of the Call for Applications)

Type of exams	Exam book (applicants will not receive any summoning)	Publication of exam results (applicants will not receive any exam result notification)
Assessment of qualifications and research project	The applicant's presence is not required.	The results of the assessment of qualifications and the research project can be consulted starting from 20/06/2016 on the website http://studenti.unibo.it (select: 'summary of the requests in progress' → 'see detail' and open the pdf file named 'risultati valutazione titoli e progetto').
Oral exam	Date	04/07/2016 If there are too many applicants for the oral exam to be carried out in a single day, the oral exam calendar will be published on the website http://studenti.unibo.it together with the results of the assessment of qualifications and of the research project
	Place	Bologna - Viale Risorgimento 2 Dept of Electrical, Electronic and Information Engineering «Guglielmo Marconi» Room: Sala Giunta
	Time	09:30 a.m. (local time)
	Applicants residing abroad can take the oral exam remotely by audio/video teleconference via web (e.g. Skype). Applicants must request this method and specify a valid contact when applying.	

The Admission Board has to authorise this request.
 The Admission Board will assess any requests to take the oral exam remotely that arrive after the Call for Applications expires at its discretion.
 The remote oral exam calendar (with date, time and place where the Admission Board will meet specified) can be consult on the website <http://studenti.unibo.it> together with the results of the exam whose passing gives admission to the oral exam.
 Applicants admitted to the oral exam must make they are available at the contact provided on the application for three hours starting from the time given on the remote exam calendar. Applicants who are not found three times will be considered absent. Oral exams, including the remote exams, are public.

Exam assessment criteria

Judgement is expressed by assigning a total grade in hundredths that is divided up as follows:

1. Assessment of qualifications and research project

- minimum for being admitted to the oral exam: 30 points
- maximum: 50 points

Only qualifications and documents consistent with the research topics and no older than 5 years (up to the deadline of this call for applications) - Bachelor's and Master's degrees excluded - and deemed congruent with the research topics of the PhD programme will be assessed.

The assessment of qualifications grade will be given based on the following criteria:

- degree mark, and for those who are undergraduated students on the date this Call for Applications expires, the weighted average of marks of the exams: up to 15 points
- scientific publications: up to 10 points
- Curriculum Vitae: up to 10 points

The assessment of the research project grade will be given based on the following criteria:

- scientific value and originality of the proposal: up to 5 points
- structure of the proposal: up to 5 points
- feasibility of the proposal: up to 5 points

2. Oral exam

- minimum to be placed on the list of qualified applicants: 30 points
- maximum: 50 points

The final exam is aimed at checking the applicant's aptitude for scientific research and his or her overall preparation on subjects regarding the research topics of the PhD programme.

Knowledge of the English language will be ascertained during the oral exam.

The oral exam is taken in Italian or English, at the applicant's choice..

Scores will be assigned according to the following criteria:

- knowledge of foreign language: up to 5 points
- good argument regarding the project: up to 25 points
- grounding on the PhD programme topics: up to 20 points

If the Admission Board should establish any sub-criteria for assessing the exams before the exams are held, and in any case before having the applications submitted by the applicants at their disposal, they can be consulted on <http://studenti.unibo.it> (select: 'summary of the requests in progress' → 'see detail' and open the pdf file named 'sub-criteri di valutazione').

Final ranking list and enrolment (Art. 6 and 7 of the Call for Applications)

The final ranking list will be published on <http://studenti.unibo.it> (select: 'summary of the requests in progress' → 'see detail' and open the pdf file named 'graduatoria').

No personal written communication shall be provided to applicants concerning the final results and the deadlines for enrolment.

Selected applicants will have to enrol by the date indicated in the final ranking list.

Positions and scholarships

Total positions available

11

Total positions with university scholarship

8, of which

- 7 co-finaced by Unibo central budget and the Dept of Electrical, Electronic and Information Engineering «Guglielmo Marconi»
- 1 co-financed by Unibo central budget and "5 x mille 2013" campaign

Positions for apprenticeship contracts with enterprises (art. 11 D.M. 45/2013)

The Admission Board will determine the eligibility for such assignment by evaluating the applicants' specific skills, experience and competences

1 – for apprenticeship contract with NCS Lab S.r.l., dedicated to the research topic "Neuro-motor functional evaluation and rehabilitation through new generation wearable sensors"

Positions without scholarship (Art. 7 of the Call for Applications)

Eligible applicants can express their interest for such positions, if available, by the deadline set forth in the final ranking list

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