<table>
<thead>
<tr>
<th>Curricula</th>
<th>Research topics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Automatic Control and Operational Research</strong></td>
<td>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. 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. 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. - 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 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.</td>
</tr>
<tr>
<td><strong>2. Bioengineering</strong></td>
<td>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. The curriculum offers a wide spectrum of research themes, involving electronic, information and industrial aspects of bioengineering: - 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. 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, advancement in assistive and rehabilitation technologies, optimization of healthcare 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.</td>
</tr>
<tr>
<td><strong>3. Electrical Engineering</strong></td>
<td>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). In particular, the Curriculum in Electrical Engineering aims to develop modern electrical competencies and technologies such as: 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;</td>
</tr>
</tbody>
</table>
Admission requirements

Applicants of any Country and age holding a Master’s degree (second cycle) can submit their application. Such degree must be either:

- an Italian university degree pre-reform system (“vecchio ordinamento”);
- an Italian university degree (laurea specialistica/magistrale - 3+2 years or combined degree BA+MA);
- an academic Master’s degree conferred by foreign institutions/Universities, validated as equivalent (equipollente) to an Italian degree by the Italian Ministry of Education, University and Research (MIUR) or acknowledged as equivalent by the Admission Board for the sole purpose of the selection.

Applicants whose degree are to be awarded after the deadline of the call can participate in the selection but the admission is conditional on obtaining a Masters’ degree before the official start date.

Documents to be attached mandatorily (Artt. 2 and 3 of the call for applications)

- copy of a valid ID with photo
- Curriculum Vitae in English
- Degree transcripts of both BA/BSc and MA/MSc:
  - for degrees obtained in Italy, please submit a signed self-declaration (autocertificazione);
  - for degrees obtained in non-EU countries, please submit the degree certificate issued by the relevant University;
  - for degrees obtained in EU countries (except Italy), you can do either.

The document must, in any case, contain the following information:

- personal data,
- University details,
- degree name,
- final score,
- transcript of results obtained.

For degree transcripts from outside of Italy, an official translation into Italian or English must be attached.

Graduands have to submit the document(s) as above except for the Master’s degree and final score.

- Title, index and abstract in Italian (max 5000 characters not including bibliography and illustrations) of the graduation Master’s thesis; for graduands: title, index and abstract of the graduation Master’s thesis’ draft approved by the Supervisor.

- At least one and no more than three letters of reference from national or international academic referee and/or research professionals declaring the applicant’s interest and skills in research.

  Please do not attach the letters to the application: the instructions available on Studenti Online (http://studenti.unibo.it) shall be followed;

- Research project, in English, emphasizing the activities to be carried out during the first year and containing:
  - clear indication on the frontispiece of the research topic;
  - no more than 20.000 characters, spaces included but index and bibliography excluded (if more than 20.000 characters, the exceeding part will not be considered);
  - state of the art;
  - description of the project
  - expected results
  - project phases and time scheduling
  - criteria for the verification of results
  - bibliography

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

- Summary of research interests (max 1500 characters, spaces included)

Other attachments, if any

- Publications (monographs, articles on scientific magazines, etc)
- Other publications (conference proceedings distributed at national and international level, contributions in monographs, etc.)
- Abstracts and posters presented in national and international conferences
- Specialization degree in subjects consistent with the research topics of the PhD programme;
- Teaching experience in Universities
- Research and working experience
- Internships
- Language certificates
- Mobility experience abroad (e.g.: Erasmus or similar)
- Any other document certifying the applicant’s excellence (prizes, fellowships and grants)

Entrance examinations (Art. 4 of the call for applications)

| Examinations | Timetable (applicants will not receive any further communication) | Publication of results (no personal written communication shall be provided to applicants concerning the examinations results) |
## Evaluation of qualifications and research project

<table>
<thead>
<tr>
<th>Applicants’ presence is not requested</th>
<th>The evaluation of qualifications and research projects results will be available on 15/09/2014 on <a href="http://studenti.unibo.it">http://studenti.unibo.it</a> (select: sintesi delle richieste in corso → vedi dettaglio).</th>
</tr>
</thead>
</table>

### When

<table>
<thead>
<tr>
<th>22/09/2014</th>
<th>Please note that the oral examinations might take more than one day. In this case the relevant timetable will be published on <a href="http://studenti.unibo.it">http://studenti.unibo.it</a> together with the evaluation of qualifications and research project results.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The oral examinations results will be available both in paper copy on the Department bulletin board and, starting from 25/09/2014, on <a href="http://studenti.unibo.it">http://studenti.unibo.it</a> (select: sintesi delle richieste in corso → vedi dettaglio).</td>
</tr>
</tbody>
</table>

### Where

<table>
<thead>
<tr>
<th>Bologna</th>
<th>Viale Risorgimento 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dept of Electrical, Electronic and Information Engineering «Guglielmo Marconi»</td>
<td>Room: Sala Giunta</td>
</tr>
</tbody>
</table>

### Time

<table>
<thead>
<tr>
<th>09:30 CET</th>
<th>For applicants residing abroad, the oral examination can be conducted at a distance through video-conference based on the IP protocol (such as through Skype with webcam). Applicants must clearly indicate such choice and provide their own ID when applying for the call. The request must, nonetheless, be approved by the Admission Board which will make sure that the examination is carried out correctly and upon verification of the identity of each applicant. A specific timetable regarding distance oral examinations will be available on <a href="http://studenti.unibo.it">http://studenti.unibo.it</a> together with the results confirming the admission to such examination. Applicants must guarantee their availability for 3 hours, starting from the time indicated in the above mentioned timetable. In case of unavailability, after 3 attempts from the Admission Board in establishing a contact during the agreed timeframe, applicants will be excluded from the oral examination. All oral examinations, included the remote ones, are public.</th>
</tr>
</thead>
</table>

## Assessment criteria

Scores will be expressed in points out of 100, as follows:

1. **Evaluation of qualifications and research project**
   - Minimum score to be admitted to the oral examination: 30 points
   - Maximum score: 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 - will be taken into consideration.
   Score will be assigned as follows:
   - Evaluation of the degree mark (for applicants who have a university degree at the time of submission of the application) or evaluation of the university exams taken with grades (for applicants who still not have a Master’s degree at the time of submission of the application): max 10 points;
   - Research project: max 15 points;
   - Publications: max 10 points;
   - Curriculum vitae: max 15 points.

2. **Oral examination**
   - Minimum score: 30 points
   - Maximum score: 50 points
   The oral examination will focus on the explanation and discussion of the applicant’s research project and will assess his/her aptitude for scientific research, as well as her/his knowledge of the research topics related to selected curriculum, such as:
   - Optimization and control techniques of complex dynamic systems;
   - Models and control systems for bioengineering;
   - Electrical engineering.
   During the oral examination, the applicant’s knowledge of English will be assessed.
   The oral examination can be held in Italian or English depending on the applicant’s choice.
   Scores will be assigned according to the following criteria:
   - Research aptitude and competence in the programme research topics: max 45 points
   - Knowledge of foreign language: max 5 points
   The Admission Board might add other sub-criteria before the assessment process. In this case, a proper announcement will be posted on [http://studenti.unibo.it](http://studenti.unibo.it)

## Ranking list and enrolment (Art.6 of the call for applications)

Applicants obtaining a total score of at least 60/100 are eligible and will be included in the final ranking list.
The Rectoral Decree containing the final ranking list will be published on [http://studenti.unibo.it](http://studenti.unibo.it) accessible with Unibo username and password.
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 above mentioned Rectoral Decree.

### Positions and scholarships

<table>
<thead>
<tr>
<th>Total available positions (no. with scholarship + no. without scholarship)</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positions with scholarship, financed by</strong></td>
<td>13</td>
</tr>
<tr>
<td>University of Bologna</td>
<td>8</td>
</tr>
<tr>
<td>Italian Ministry of Education, University and Research (FG)</td>
<td>4 of which,</td>
</tr>
<tr>
<td></td>
<td>− 2 dedicated to Scope of Investigation 4 &quot;Advanced manufacturing systems with impact in the machinery industry as well as to “Made in Italy” manufacturing areas as textile, clothing and industrial mechanics&quot;</td>
</tr>
<tr>
<td></td>
<td>− 1 dedicated to Scope of Investigation 9 “ICT and electronic components”</td>
</tr>
<tr>
<td></td>
<td>− 1 dedicated to Scope of Investigation 5 “Strengthening and development of automotive industry, including motorcycle, with low fuel consumption and low environmental impact motors”.</td>
</tr>
<tr>
<td>Private Institutions</td>
<td>1 financed by Pfisterer Sefag AG, dedicated to the research topic: Investigation of insulating materials for HVDC polymeric cable accessories</td>
</tr>
<tr>
<td><strong>Positions without scholarship</strong></td>
<td>4</td>
</tr>
</tbody>
</table>