Coordinator
Prof. Nicolò Cavina
Dept. of Industrial Engineering
Viale Risorgimento 2 - Bologna
nicolo.cavina@unibo.it

Starting date of the PhD Programme
01/11/2019

Duration
3 calendar years

Language of the PhD Programme
Italian

Mandatory stay abroad
Yes (3 months)

Associated Universities
Università di Modena e Reggio Emilia
Università degli Studi di Parma

Curricula

1. Vehicle Design, Manufacturing and Systems Integration
The curriculum pursues the education of researchers and high-qualified engineers, operating in the areas of design and manufacturing of the automotive sector, and able to address issues related to design and research activities in disciplines such as:
- Industry 4.0 and Advanced Manufacturing Technologies
- Supply Chain Management
- Industrial Automation and Robotics
- Big Data and Cloud Computing for Manufacturing
- Materials, Lighting Technology and Design Methods for improving Efficiency and Safety of Vehicles

2. Energy Systems, Powertrains, Vehicle Performance
The curriculum pursues the education of researchers and high-qualified engineers, operating in the areas of vehicle dynamics and energy management, and able to address issues related to design and research activities in disciplines such as:
- Electrification and Power Electronics
- Electric, Hybrid and ICE-based Powertrains
- Advanced Combustion and Aftertreatment Systems
- Batteries and Energy Storage Systems
- Vehicle Energy Management and Energy Optimization
- Vehicle Dynamics and Control

3. Vehicle Informatics and Connectivity
The curriculum pursues the education of researchers and high-qualified engineers, operating in the areas of vehicle digitalization and connectivity, and able to address issues related to design and research activities in disciplines such as:
- Vehicle Human Machine Interface and Infotainment systems
- Gamification for Improving Driver Behavior
- Vehicular networks, Vehicular Sensors and Big Data for Mobility
- Automatic and Autonomous Drive - Connectivity for V2I
- Vehicle to Infrastructure, V2V
- Vehicle to Vehicle and V2G
- Vehicle to smart Grid interfacing
- Data Analytics and Advanced Prediction Models

PhD positions and scholarships

<table>
<thead>
<tr>
<th>Position n.</th>
<th>Financial support</th>
<th>Description</th>
<th>Curriculum</th>
<th>Positions linked to research subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PhD Scholarship</td>
<td>Totally funded by the University of Bologna general budget</td>
<td>1</td>
<td>Industry 4.0 and advanced manufacturing technologies</td>
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<tr>
<td>2</td>
<td>PhD Scholarship</td>
<td>Totally funded by the University of Bologna general budget</td>
<td>3</td>
<td>Study of road-vehicle-driver interaction for connected and autonomous mobility</td>
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<tr>
<td>3</td>
<td>PhD Scholarship</td>
<td>Totally funded by the University of Bologna general budget</td>
<td>2</td>
<td>Modeling and control of internal combustion engines and hybrid powertrains</td>
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<td>4</td>
<td>PhD Scholarship</td>
<td>Totally funded by the University of Bologna general budget</td>
<td>1</td>
<td>Optimization of production and logistics systems in the new era</td>
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<tr>
<td>5</td>
<td>PhD</td>
<td>Partly financed from the central</td>
<td>1</td>
<td>Collaborative robotics for Industry 4.0</td>
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<tr>
<td>Scholarship</td>
<td>budget and co-financed by the Department of Industrial Engineering</td>
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<tr>
<td>6</td>
<td>PhD position without scholarship</td>
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<td>7</td>
<td>PhD position without scholarship</td>
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<td>8</td>
<td>PhD position without scholarship</td>
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<td>9</td>
<td>PhD Scholarship - Totally funded by the University of Bologna general budget</td>
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<tr>
<td>10</td>
<td>PhD Scholarship - Totally funded by the University of Bologna general budget</td>
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<tr>
<td>11</td>
<td>PhD Scholarship - Financed by the Università di Parma</td>
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<td>12</td>
<td>PhD Scholarship - Financed by the Università di Parma</td>
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<td>13</td>
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<td>14</td>
<td>PhD Scholarship - Financed by the Università di Parma</td>
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<td>15</td>
<td>PhD Scholarship - Financed by the Università di Modena e Reggio Emilia</td>
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<td>16</td>
<td>PhD Scholarship - Financed by the Università di Modena e Reggio Emilia</td>
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<td>18</td>
<td>PhD Scholarship - Financed by the Department of Industrial Engineering with funds made available by FEV Italia s.r.l. under the agreement for the establishment of a joint research laboratory prot. 0018771 of 12/02/2019</td>
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<tr>
<td>19</td>
<td>PhD Scholarship - Funded by CEMI Mobility Technology Holding Limited</td>
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</table>

Each PhD position is reserved for one of the Curricula covered by the PhD programme. These positions will be awarded on the basis of the Curriculum for which the applicant has expressed his/her preference in the statements made at the time of filling in the application and indicated on the cover page of the research project submitted. In the event the applicant has not indicated the preferred Curriculum as described above, the Admission Board will assign him/her a curriculum based on the research project submitted. Possible unassigned PhD positions related to a specific Curriculum will be proposed to eligible applicants from the general ranking list.

**Positions linked to specific research subjects:** during the oral examination applicants may express their interest in one or more positions linked to specific research subjects. Considering the expressions of interest above, the Admission Board will establish if the applicants can be considered eligible for the allocation of the positions linked to specific research subjects, taking into account their skills, experience and aptitude.

**Positions without scholarship:** within the time limits indicated at the bottom of the final ranking list, non-successful applicants may express their interest in enrolling with a position without a scholarship, should the latter become available.

**Admission requirements**

Please, see art. 2 of the Call for applications

**Mandatory documents to be attached to the application**

Please, see art. 3 of the Call for applications

**Further qualifications that may be attached to the application, if in possession of the applicant** (only qualifications attested by documents drawn up in Italian, English, French, German and Spanish shall be considered as valid and assessed by the Admission Board)

- Abstract of the second cycle master's degree thesis. Undergraduate applicants may submit the draft of the thesis
approved by their supervisor (please, note that abstracts cannot exceed 5,000 characters, including spaces and formula possibly used. The above figure does not include: the title of thesis, the outline, and images such as graphs, diagrams, tables etc. - where present);

- Multi-annual research project, with special emphasis on the activities to be completed during the first-year course. The proposal must meet the following requirements:
  - It must indicate in the cover page the Curriculum of the PhD Programme associated to the research project proposal and for which the applicant is applying
  - It cannot exceed 20,000 characters, including spaces and formula possibly used. This figure does not include: the title of project, the outline, references and images (such as graphs, diagrams, tables etc - where present);
  - It must include: the state of the art; description of the project; expected results; references.

The research projects that successful applicants shall carry out during their doctoral career may possibly differ from the project proposed at the application.

- List of the publications (monographs, articles published on scientific journals, volume chapters).
- Teaching activity carried out at university level.
- Research activity of any kind - whether basic, applied, translational, etc. - carried out in any capacity, including when covered by research grants, and as a staff member of research projects.
- Documents attesting the knowledge of foreign languages
- Study periods completed by students outside their countries of origin (e.g. Erasmus programme or other similar mobility programmes).
- Other qualifications attesting the suitability of the applicants (scholarships, prizes, etc).

### Admission exams (art. 4 of the call for applications)

<table>
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<tr>
<th>Examination type</th>
<th>Schedule (please, note that applicants shall not receive any communication concerning the exams schedule)</th>
<th>Examination results publication (please, note that applicants shall not receive any communication concerning the publication of results)</th>
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</thead>
<tbody>
<tr>
<td>Qualifications and research project evaluation</td>
<td>Non-presentation.</td>
<td>The results of the qualifications and research project evaluation shall be available online starting from the <strong>21/06/2019</strong> at the page <a href="http://studenti.unibo.it">http://studenti.unibo.it</a> (please, select &quot;summary of the requests in progress&quot; - &quot;see detail&quot; and open the pdf file &quot;risultati valutazione titoli e progetto&quot;).</td>
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<tr>
<td>Oral examination</td>
<td><strong>02/07/2019</strong>&lt;br&gt;In case that the oral examination cannot be completed in one day due to the large number of applicants, the oral exam schedule shall be made available at the webpage <a href="http://studenti.unibo.it">http://studenti.unibo.it</a> together with the results of the qualifications and research project evaluation</td>
<td>The results of the oral examination shall be available on the webpage <a href="http://studenti.unibo.it">http://studenti.unibo.it</a> starting from <strong>09/07/2019</strong> (please, select &quot;summary of the requests in progress&quot; - &quot;see detail&quot; and open the pdf file “risultati prova orale”).</td>
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<tr>
<td>Place</td>
<td>Bologna Sala riunioni Macchine – first floor - c/o DIN, Viale Risorgimento 2</td>
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<tr>
<td>Time</td>
<td>09:00 a.m.</td>
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</tbody>
</table>

Applicants can ask to take the exam remotely using Skype. For further details please refer to the relevant provision laid down in art. 4 of the Call for applications.

### Evaluation criteria

Points will be allocated to applications out of a total of 100 on the basis of the following weighting:

1. **Qualifications and research project**
   - Minimum for admission to the oral exam: 30 points
   - Maximum: 50 points

   Only qualifications relating to the last 5 calendar years prior to the calendar year of publication of the Call for applications shall be taken into consideration, with the exception of the University Degree (Diploma di laurea). Please, note that qualifications must be consistent with the PhD Programme.

   Points relating to qualifications shall be allocated on the basis of the following criteria:
   - Graduation final mark. Undergraduates shall be evaluated on the basis of the Weighted Average Mark (WAM): max 20 points
   - Publications and other qualifications: max 5 points

   Points relating to the research project shall be allocated on the basis of the following criteria:
- Scientific value and ground-breaking nature of the proposal: max 15 points
- description and structure of the proposal: max 5 points
- proposal feasibility: max 5 points

2. Oral examination
- Minimum for inclusion in the final ranking list: 30 points
- Maximum: 50 points

Oral examination includes the presentation of the research project and is intended to assess the suitability of the applicant to pursue scientific research as well as the general knowledge of issues connected to the Curricula of the PhD Programme. During the oral examination, knowledge of English language shall be assessed.

The oral examination is carried out in Italian or in English.

Points relating to the oral examination shall be allocated on the basis of the following criteria:
- knowledge of the English language: max 5 points
- research project presentation: max 30 points
- general knowledge of issues connected to the PhD Programme: max 15 points

Possible evaluation sub-criteria will be available on the Unibo website, selecting the relevant PhD Programme → “PhD programme information” at the bottom of the page in the section “Notices”.

**Final ranking list and enrolment (arts.6 and 7 of the Call for applications)**

After the publication of the results of the oral exam, the final ranking list will be available on the Unibo website, selecting the relevant PhD Programme → “PhD programme information” at the bottom of the page in the section “Notices”.

Following the publication of the final ranking list, successful applicants must enroll on http://studenti.unibo.it by the deadline indicated on the Unibo website, selecting the relevant PhD Programme → “PhD programme information”.