PhD Programme Table - 38th cycle
NRRP "National Recovery and Resilience Plan" Call for Applications

Funded by the European Union
NextGenerationEU

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Section "Available Positions and Scholarships" integrated on 18/07/2022

Section "Available Positions and Scholarships" integrated on 22/07/2022

PROGRAMME'S NAME	AUTOMOTIVE ENGINEERING FOR INTELLIGENT MOBILITY
ASSOCIATED PARTNERS *Pursuant to art. 3 para 2 lett. a) of the MD n. 226/2021*	Università degli Studi di Modena e Reggio Emilia Università degli Studi di Parma
DURATION	3 years
PROGRAMME START DATE	01/11/2022 (DD/MM/YYYY)
LANGUAGES	English
COORDINATOR	Prof. Nicolò Cavina (nicolo.cavina@unibo.it)
CURRICULA	1. Vehicle Design, Manufacturing and Systems Integration 2. Energy Systems, Powertrains, Vehicle Performance 3. Vehicle Informatics and Connectivity
RESEARCH TOPICS	Detailed list at the bottom of the present document
PhD POSITIONS	10
ADMISSION PROCEDURE	Qualifications and research proposal evaluation Oral examination

Available Positions and Scholarships

Pos. n.	Financial Support	Description	Curriculum	Positions linked to research topics
1	***PhD Scholarship Ex M.D. 351/2022 - PNRR Research***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 1, Investment 4.1 (MD 351/2022) – PNRR Research	2	Modeling, control and testing of sustainable powertrain technologies
2	***PhD Scholarship Ex M.D. 351/2022 - PNRR Research***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 1, Investment 4.1 (MD 351/2022) – PNRR Research	2	Development of power electronic converters and high-performance electric drives for automotive applications
3	***PhD Scholarship Ex M.D. 352/2022***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2,	3	Edge computing for secure and robust connected autonomus vehicles

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		Investment 3.3 (MD 352/2022) and by FEV Italia srl		
4	***PhD Scholarship Ex M.D. 352/2022***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (MD 352/2022) and by HPE	2	New Semiconductor technologies for automotive power applications
5	***PhD Scholarship Ex M.D. 352/2022***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (MD 352/2022) and by Cineca Consorzio Interuniversitario	3	Digital twin large scale microscopic traffic simulation
6	***PhD Scholarship Ex M.D. 352/2022***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (MD 352/2022) and by AUTOMOBILI LAMBORGHINI	1	Innovative solutions for process and quality control within the production system
7	***PhD Scholarship Ex M.D. 352/2022***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (MD 352/2022) and by Ferrari	2	Development of control simulation models / strategies for high performance hybrid power units
8	***PhD Scholarship Ex M.D. 352/2022***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (MD 352/2022) and by PODIUM ENGINEERING S.R.L.	1	Laser technology in the manufacture of components in e-mobility
9	***PhD Scholarship Ex M.D. 352/2022***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (MD 352/2022) and by G.D. Spa	1	Application of laser systems in the production process of lithium-based batteries
10	***PhD Scholarship Ex M.D. 352/2022***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (MD 352/2022) and by Ferrari	2	Development of algorithms for the processing of experimental data and the validation of software control strategies for unconventional injection systems

Applicants awarded with Ex M.D. 351/2022 or Ex M.D. 352/2022 PhD scholarships shall have specific obligations (i.e. mandatory research periods abroad and/or in a firm) during their PhD programme. For detailed information, refer to the Call for Applications, articles 1.2 and 1.3, and to the text of the law.

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For any other eventual PhD positions, a 3-month research period abroad is mandatory.

Admission Exams

The admission exams detailed schedule shall be published **starting from July 12th, 2022:**

- on the University website, selecting the relevant PhD Programme > "More information", at the bottom of the page in the section "Notices";
- on Studenti Online (select "summary of the requests in progress" > "see detail" and open the .pdf file at the bottom of the page). **No personal written communication will be sent to applicants**.

Required and Supporting Documents to be attached to the application

All the documents listed below **shall be drawn up in English or in Italian**. In case of documents originally issued in any other language (e.g. identity document, qualifications), an official translation is required.
Only qualifications obtained **during the last 5 calendar years** shall be taken into consideration, except for the University Degree. The Admission Board will assess the relevance of the supporting documents to the PhD Programme.

REQUIRED DOCUMENTS	
Identity document	Valid identity document with photo (i.e. identity card, passport)
Curriculum Vitae	No specific CV format is required
Degrees	Documents attesting the awarding of the first and second cycle degrees, the exams taken and the marks obtained (see Art. 3 of the Call for Applications)
Research proposal	Multi-annual research proposal, with special emphasis on the **activities to be completed during the first-year course**. The proposal must meet the following requirements: - it must **mention on the cover page the main research topic** the applicant is interested to and the proposal is about; - **it cannot exceed 20,000 characters**, including spaces and formula possibly used. This figure does not include: the title of proposal, the outline, references and images (such as graphs, diagrams, tables, etc. - if present); - **it must include**: the state of the art; description of the proposal; expected results; references.
SUPPORTING DOCUMENTS	
Thesis abstract	Abstract of the **second cycle degree thesis.** Graduands applicants may submit the draft of the thesis. Abstracts cannot exceed 5,000 characters, including spaces and formula possibly used. The above figure does not include: the title of the thesis, the outline, references, and images such as graphs, diagrams, tables etc.
Publications	Lists of publications (i.e. monographs, articles on scientific journals), minor publications (conference papers, etc.), abstracts and posters presented during national and international conferences, etc.
Other documents	- Postgraduate vocational training programmes relevant to the PhD Programme main research topics - Teaching activities 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 applicants 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.)

Evaluation criteria*

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

1. **Qualifications and research proposal evaluation**

Minimum score for admission to the oral examination: 30 points, Maximum score: 50 points

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Qualifications evaluation	Second cycle (Master's) degree final mark. Graduands shall be evaluated according to the Weighted Average Mark (WAM)	20 points max
	Publications and other qualifications attesting the applicant's training and skills	5 points max
Research proposal evaluation	Scientific value and ground-breaking nature of the proposal	15 points max
	Structure of the proposal	5 points max
	Proposal feasibility	5 points max

2. Oral examination

Minimum score for eligibility: 30 points, Maximum score 50 points

Foreign language proficiency	5 points max
Research proposal presentation	30 points max
General knowledge of issues encompassed by the PhD Programme	15 points max

Oral examination aims to assess the suitability of the applicant for scientific research as well as the general knowledge of issues encompassed by the PhD Programme (see the list of research topics at the bottom of the present document). **The oral examination is carried out in English**.

* Possible further evaluation criteria will be available on the University website, selecting the relevant PhD Programme > "More information".

Research Topics

Curriculum 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
- Vehicle Lifecycle Assessment. Circular Economy: Vehicle refurbish, re-use of Vehicle Parts**.**

Curriculum 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

Curriculum 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