

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



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NextGenerationEU



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Section “Available Positions and Scholarships” integrated on 19/07/2022

Section “Available Positions and Scholarships” integrated on 22/07/2022

Section “Available Positions and Scholarships” integrated on 03/08/2022

Section “Available Positions and Scholarships” integrated on 26/08/2022

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| PROGRAMME’S NAME | ELECTRONICS, TELECOMMUNICATIONS AND INFORMATION TECHNOLOGIES ENGINEERING |
| DURATION | 3 years |
| PROGRAMME START DATE | 01/11/2022 (DD/MM/YYYY) |
| LANGUAGES | English |
| COORDINATOR | Prof. Aldo Romani (aldo.romani@unibo.it) |
| RESEARCH TOPICS | Detailed list at the bottom of the present document |
| PhD POSITIONS | 16 |
| ADMISSION PROCEDURE | Qualifications and Research proposal evaluation Oral examination |

Available Positions and Scholarships

| Pos. n. | Financial Support | Description | Position linked to a specific research topic |
|---------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | PhD Scholarship Ex M.D. 351/2022 - PA | 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) – Public Administration | Smart-city services for public administrations based on 5G |
| 2 | PhD Scholarship Ex M.D. 351/2022 - NRRP 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) – NRRP Research | ICT for digitalization, innovation and competitiveness |
| 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, Investment 3.3 (MD 352/2022) and by Telebit Spa | Advance methodologies for the design, operation and management of virtualized infrastructures for end-to-end network service provisioning |
| 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 | Low Power RISC-V based architecture for edge applications |

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| | | 4, Component 2, Investment 3.3 (MD 352/2022) and by Leonardo | |
| 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 Fondazione Ugo Bordoni | Optimization in the use of the radio spectrum towards 6G mobile systems with the aid of Artificial Intelligence |
| 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 Evidence S.r.l. | AI and data-driven methods for industry |
| 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 Interuniversitair Micro-Electronica Centrum vzw IMEC | Reliability and performance optimization of the D-mode HEMTs and Schottky barrier diodes in a p-GaN HEMT based GaN-IC platform |
| 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 STMicroelectronics S.r.l. | Artificial Intelligence: Automotive Applications and In-memory computing |
| 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 STMicroelectronics S.r.l. | GaN-based smart power integrated circuits for automotive applications |
| 10 | Research grant | Provided by the Department of Electrical, Electronic, and Information Engineering "Guglielmo Marconi" with funds made available by the projects JTI-EuroHPCPILOT G.A. n.101034126 (ref. prof. Davide Rossi) and EUPEX (ref. prof. Andrea Bartolini). The research grant will have a duration of 12 months, renewable up to 36 months, and a gross percipient amount of €19367. | HW and SW co-design of advance power management solutions for RISC-V processor |
| 11 | PhD Scholarship | Funded by the Department of Electrical, Electronic, and Information Engineering "Guglielmo Marconi" in collaboration with STMicroelectronics S.r.l. | Characterization and electric field simulation of molding compound and interfaces, for High Voltage IC in automotive and industrial applications |
| 12 | PhD Scholarship | Funded by the Department of Electrical, Electronic, and Information Engineering "Guglielmo Marconi" in collaboration with STMicroelectronics S.r.l. | Modeling and characterization of galvanic isolation in BCD technology |
| 13 | PhD Scholarship | Funded by the Department of Electrical, Electronic, and Information Engineering "Guglielmo Marconi" in collaboration with STMicroelectronics S.r.l. | Micro power converters in BCD technology |
| 14 | Research grant | Provided by the Department of Electrical, Electronic, and Information Engineering "Guglielmo Marconi" with funds made available by the project STMicroelectronics Srl. The research grant will have a duration of | High frequency power converters with galvanic isolation |

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| | | 36 mesi and a gross percipient amount of €77,000.00. | |
| 15 | Research grant | Provided by the Department of Electrical, Electronic, and Information Engineering "Guglielmo Marconi" with funds made available by the project STMicroelectronics Srl. The research grant will have a duration of 36 mesi and a gross percipient amount of €77,000.00. | Fault Tolerant Solutions for Electronic Circuits and Systems in Automotive Applications |
| 16 | Research grant | Provided by the Department of Electrical, Electronic, and Information Engineering "Guglielmo Marconi" with funds made available by the project STMicroelectronics Srl. The research grant will have a duration of 36 mesi and a gross percipient amount of €77,000.00. | Advanced Design for Testability Techniques for Safety Automotive Circuits and System |

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.

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 | |
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| 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: <ul style="list-style-type: none"> - it must mention on the cover page the main research topic/s 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; articulation of the proposal and implementation times; outline of the proposed findings assessment criteria; references. |

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| | The research proposal that successful applicants shall carry out during their PhD career may possibly differ from the one proposed at the application stage. This shall be defined together with the supervisor and approved by the Academic Board. |
| SUPPORTING DOCUMENTS | |
| Personal Statement | The statement shall include the reasons prompting the applicant to attend the PhD Programme and those relevant experiences and research interests , that make the applicant suitable for the specific PhD Programme (3000 characters maximum, including spaces). |
| Reference letter/s | No more than 2 reference letters signed by Italian and international academics and professionals in the research field, which do not form part of the Admission Board, attesting the suitability of the applicant and his/her interest in the scientific research. Letters shall be uploaded following the procedure detailed in the Call for Applications (Art. 3.2). |
| 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 | <ul style="list-style-type: none"> - Postgraduate vocational programmes and/or specialisation programmes relevant to the PhD Programme - 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 - Work activity - Curricular and non-curricular training internships - Documents attesting the applicant's foreign languages proficiency - Periods of study abroad, 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 degree (Master's) final mark. Graduands shall be evaluated according to the Weighted Average Mark (WAM) | 12 points max |
| | Publications | 5 points max |
| | Other evaluable documents | 12 points max |
| Research proposal evaluation | Scientific value and ground-breaking nature of the proposal | 7 points max |
| | Structure of the proposal | 7 points max |
| | Proposal feasibility | 7 points max |

2. Oral examination

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

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| English language proficiency | 5 points max |
| Research proposal presentation | 35 points max |
| General knowledge of issues encompassed by the PhD Programme | 10 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

- Analog and digital circuits and electronic systems
- Analysis and simulation of semiconductor devices
- Applications of Information technologies: smart cities, smart grid, etc.
- Cyber-physical systems
- Communication theory and its applications

- Telecommunications architectures, systems, and networks: wireless, cellular, fixed / mobile terrestrial / satellite, wired and optical
- Electromagnetic theory, antennas, antenna systems, beamforming, electromagnetic characterization of materials, channel propagation models
- Near- and Far- field wireless power and information transmission
- Internet-of-Things and applications
- Electronic devices
- Electronics for telecommunications
- Power electronics, power converters and semiconductor devices
- Embedded systems
- Energy harvesting
- Information theory and its applications
- Intelligent sensors
- Micro and nano-technologies
- Microwave Photonics
- Microwave and millimetre wave circuits and systems
- Navigation and positioning systems and applications
- Network control and management: software defined networks
- Performance evaluation of communication networks
- Statistical signal processing and its applications
- Ultrasonics
- Wireless power and data transfer
- Science of Creative Thinking with Applications in the ICT Domain
- Precision agriculture and IoT circuits, systems for pervasive monitoring
- Reconfigurable intelligent surfaces