

**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 13/07/2022

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

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

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| PROGRAMME’S NAME     | <b>ENGINEERING AND INFORMATION TECHNOLOGY FOR STRUCTURAL AND ENVIRONMENTAL MONITORING AND RISK MANAGEMENT – EIT4SEMM</b> |
| DURATION             | 3 years  |
| PROGRAMME START DATE | 01/11/2022 (DD/MM/YYYY)  |
| LANGUAGES            | English  |
| COORDINATOR          | Prof. Alessandro Marzani ( <a href="mailto:alessandro.marzani@unibo.it">alessandro.marzani@unibo.it</a> )                |
| RESEARCH TOPICS      | <a href="#">Detailed list at the bottom of the present document</a>  |
| PhD POSITIONS        | 5  |
| ADMISSION PROCEDURE  | Qualifications and research proposal evaluation<br>Oral examination  |

**Available Positions and Scholarships**

| Pos. n. | Financial Support   | Description  | Positions linked to research topics   |
|---------|---|--|---|
| 1       | <b>PhD Scholarship<br/>Ex M.D.<br/>351/2022 -<br/>NRRP Research</b> | 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     | Methodologies and technologies for the safety and management of natural systems, structures, infrastructures and production systems |
| 2       | <b>PhD Scholarship<br/>Ex M.D.<br/>352/2022</b>                     | 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 Builti       | Widespread monitoring and artificial intelligence for the security control of civil structures and infrastructures                  |
| 3       | <b>PhD Scholarship<br/>Ex M.D.<br/>352/2022</b>                     | 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 Versalis Spa | Natech risk analysis  |
| 4       | <b>PhD Scholarship<br/>Ex M.D.<br/>352/2022</b>                     | 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 Edilteco Spa | Innovative eco-sustainable materials for the energy and seismic improvement of civil building                                       |

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| <b>5</b> | <b>PhD Scholarship<br/>Ex M.D.<br/>352/2022</b> | 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 CNH Industrial Italia SPA | Advanced Simulation, Visualization and Data Analytics Tools |
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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.

For any other eventual PhD positions, a 6-month research period abroad is mandatory.

## Admission Exams

The admission exams detailed schedule shall be published **starting from July 12<sup>th</sup>, 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        |  |
|---------------------------|--|
| <b>Identity document</b>  | Valid identity document with photo (i.e. identity card, passport)  |
| <b>Curriculum Vitae</b>   | No specific CV format is required  |
| <b>Degrees</b>            | 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)   |
| <b>Research proposal</b>  | Multi-annual research proposal, with special emphasis on the <b>activities to be completed during the first-year course</b> . The proposal must meet the following requirements: <ul style="list-style-type: none"> <li>- it must <b>mention on the cover page up to a maximum of three research topics</b> the proposal is about (see <a href="#">detail of the research topics</a> at the bottom of the present document);</li> <li>- <b>it cannot exceed 10,000 characters</b>, 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).</li> </ul> |
| SUPPORTING DOCUMENTS      |  |
| <b>Personal Statement</b> | The statement shall include the reasons prompting the applicant to attend the PhD Programme and <b>those relevant experiences and research interests</b> , that make the applicant suitable for the specific PhD Programme (3000 characters maximum, including spaces)   |
| <b>Publications</b>       | <ul style="list-style-type: none"> <li>- Full text publications (i.e. monographs, articles on scientific journals)</li> <li>- Full text minor publications (conference papers, etc.)</li> <li>- Full text abstracts and posters presented during national and international conferences, etc.</li> <li>- <b>Max n. 3</b></li> </ul>  |
| <b>Other documents</b>    | <ul style="list-style-type: none"> <li>- Postgraduate vocational training programmes relevant to the PhD Programme main research topics</li> <li>- 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</li> <li>- Work activity</li> <li>- Curricular or non-curricular professional internships</li> <li>- Documents attesting the applicant’s foreign languages proficiency</li> </ul>  |

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|  | <ul style="list-style-type: none"> <li>- Periods of study abroad, completed by applicants outside their countries of origin (e.g. Erasmus programme or other similar mobility programmes)</li> <li>- Other qualifications attesting the suitability of the applicants (scholarships, prizes, etc.)</li> </ul> |
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## 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

|                                     |  |               |
|-------------------------------------|--|---------------|
| <b>Qualifications evaluation</b>    | First (Bachelor's) and second cycle (Master's) degree final marks. Graduands shall be evaluated according to the Weighted Average Mark (WAM) | 20 points max |
|                                     | Publications   | 3 points max  |
|                                     | Other evaluable documents  | 2 points max  |
| <b>Research proposal evaluation</b> | Scientific value and ground-breaking nature of the proposal  | 12 points max |
|                                     | Structure of the proposal  | 8 points max  |
|                                     | Proposal feasibility   | 5 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                               | 25 points max |
| General knowledge of issues encompassed by the PhD Programme | 20 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).

**During the oral examination, the applicant's English proficiency shall be assessed.**

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

The following learning, teaching and research areas have been identified:

- Physical models (analytical and numerical), system identification
- Structural mechanics
- Fluid mechanics, hydrology and soil mechanics
- Geomatics and autoID
- Process safety and loss prevention
- Remote sensing and earth observation systems
- Climate change monitoring and control
- Positioning systems
- Sensors and actuators, interoperability and dependability
- Communication and sensor networks, Internet of Things, Web of Things
- Energy harvesting and power management
- ICT techniques for energy efficiency in buildings and cities
- Nondestructive tests, methods and technologies
- Signal and image processing, computer vision
- HW/SW design of embedded systems
- Machine learning applied to structural and environmental monitoring
- Advanced information processing methodologies, wearable computing, high performance computing
- Information management, big data, crowd sensing, data availability, data privacy and security
- Data modeling, data analysis/uncertainty, learning and cognitive analytics, prediction, decision support
- Domain specific platforms and services
- Modeling and simulation methodologies and tools for complex systems
- Safety, risk analysis and management
- Resilience and resilience engineering

- Logistics (in ordinary and extraordinary conditions)
- Optimization schemes/strategies
- Reliable systems design and project based learning
- Environmental multi-source pollution and control
- Sea pollution control and coastal management
- Emergency management and communication
- Circular economy and circular resource management