### Annex A

**PHD PROGRAM IN “ENGINEERING FOR ENERGY AND ENVIRONMENT”**

| Department | Dipartimento di Economia e Impresa (DEIM)  
|            | In collaboration with Dipartimento di Scienze Agrarie e Forestali (DAFNE) |
| Partner Institutions | None |
| Program duration | 3 years: 1st November 2019 – 31st October 2022  
|                  | Thesis Defence: within April 2023 |

**Program objectives**

The PhD program in Engineering for Energy and Environment aims to provide a high level of training to a select number of young graduates to make them competitive on a national and international level in private companies with high technological contents, research centers and universities. The main objective of the program (which is structured in two curricula, Energy and engineering systems and Biosystems and environment) is to provide an interdisciplinary view of engineering problems in the energy and environment scientific areas, characterized by a high technological development. The research activities will be devoted to the study of new engineering solutions, novel processing techniques and innovative research methodologies, with a focus on their technology transfer. Students will be engaged in training activities and scientific research in the program subjects, with particular reference to technologies for thermonuclear fusion, energy conversion processes, energy storage, environmental issues, innovations in the fields of mechanical engineering, also in agriculture, and of sensors, biosystems and agricultural issues, with regard to primary production and environmental aspects. The work of the PhD students will be coordinated by the members of the board already active in national and international industrial collaborations and research projects, in innovative and relevant topics, such as hydrogen technologies, renewable energy, biomass, biosystems and thermonuclear fusion.

| No. of positions | Total places | 16 |
|                 | Places with scholarships | 8 |
|                 | Industrial Ph.D. | 2  
| Reserved for Research Center Employees (CREA-IT) | 3 |
|                 | Places without scholarships | 2 |

**Curricula**

(In the application form the candidate must specify the curriculum of interest)

- **Curriculum “Energy and engineering systems”**  
  n.5 places with scholarship, n. 2 places of Industrial Ph.D. and n. 1 places without scholarship

- **Curriculum “Biosystems and environment”**  
  n. 3 place with scholarship and n. 2 place without scholarship, n. 3 places reserved for Research Center Employees (CREA-IT)

- **Curriculum “Energy and engineering systems”**  
  - n. 1 scholarship co-financed by DEIM (PRIN 2017) and University of Tuscia  
  *Topic: Analysis and optimization of multi-energy and energy storage systems with reversible hydrogen technologies*
| Places without scholarship | - n. 1 scholarship co-financed by DEIM (VITROCISET Project) and University of Tuscia  
*Topic:* Advanced mechanical studies for additional heating systems in tokamak fusion devices  
n. 1 scholarship financed by ENEA  
*Topic:* Turbulent transport in the edge region of fusion relevant devices in diverted magnetic configuration  
- n. 1 scholarship financed by University of Tuscia:  
*Balance of plant, system integration, and optimal management of future thermonuclear fusion energy systems*  
- n. 1 scholarship co-financed by DEIM (PON Biofeedstock) and University of Tuscia  
*Topic:* Development of innovative processes for the recovery of agro-industrial waste in a circular economy perspective.  

**Curriculum "Biosystems and environment"**  
- n. 1 scholarship co-financed by DAFNE (SAFEMed project) and the University of Tuscia  
*Topic:* Computational Fluid Dynamics (CFD) modeling for the simulation of microclimatic conditions in agricultural, farming and agro-industrial buildings.  
- n. 1 scholarship co-financed by DAFNE (SAFEMed project) and the University of Tuscia  
*Topic:* Development of advanced systems for farm safety management  
- n. 1 scholarship financed by the company PMB srl  
*Topic:* Precision farming mechanization, and tractor-machinery interaction  

- n. 2 places of industrial Ph.D. reserved respectively to the companies:  
  - By Tek Marketing srl  
*Topic:* Management and analysis of web behavioural data for marketing applications  
  - FinScience srl  
*Topic:* Applications of Natural Language Processing for alternative data in the financial field  

- 3 places reserved for employees of research institutions (CREA-IT)  
*Topics:*  
1. *engineering methods and technologies for traceability in the fruit and vegetable supply chain;*  
2. *implementation of land reclamation techniques on agricultural soils with prevailing skeleton, for the optimization of precision farming systems;*  
3. *energy valorisation of biomasses through composting for the realization of hot beds in protected cultivation.*

| Places without scholarships | **Curriculum "Energy and engineering systems"**  
- n. 1 place *Topic:* Mechanical vacuum engineering studies for fusion tokamak devices  
**Curriculum "Biosystems and environment"**  
- n. 2 place *Topics:*  
  - Mechanization and recovery of marginal areas  
  - Recovery of waste from processing of agri-food products for the
| **Admission requirements** | Application to the public competition is open to all, regardless of age and citizenship, who, by the date this call expires, possess one of the qualifications listed below:
- an Italian “laurea specialistica” degree, obtained according to the Ministerial Decree n. 509/1999;
- an Italian “laurea magistrale” degree, obtained according to the Ministerial Decree n. 270/2004;
- an Italian equivalent university degree obtained under the Italian regulations previously in force, the time-span of which being no less than 5 years;
- a foreign university degree equivalent to those mentioned above.
Admission is also open to university students who will finish their MS degree by October, 31th, 2019. In such cases admission will be “conditional”. The applicants will send by mail (capuani@unitus.it) or hand out to the “Ufficio Offerta Formativa” a self-certification of the relative degree (a certification in case of Non-EU students). Self-certification (or certification in case of Non-EU students) should state the name of the awarding University, award date, grade and type of qualification (“vecchio ordinamento”, “Specialistica”/“magistrale”) and a copy of a valid identity document. Applicants not in posess of the admission requirements must indicate the date by which they expect to obtain the qualification required. |
| **Evaluation of academic qualification and oral examination** | **Assessment of the English Language Knowledge.**
Language for the examination: Italian or English
The evaluation of qualifications is preliminary to the oral exam. The score obtained by candidates after the evaluation of their qualifications will be added to the score of the oral examination. The results will be published on the Tuscia University web site (www.unitus.it) at the section of “Didattica”->“Dottorati di Ricerca”
Together with the application form, candidates should submit a research project, within the themes of Ph.D., up to a maximum of 5 pages, which must be written in Italian or English. The research project will be discussed during the oral exam. |
| **Evaluation of academic qualification (Maximum score: 20 out of 80)** | Master’s thesis: max 5 points
University career (exams taken with the relative grades and final grade): max 4 points
Research and/or study activities in foreign institutions: max 2 points
Professional experiences and other qualifications that each candidate considers useful: max 4 points
Research project submitted by the candidate: max 5 points
Before of the oral exam, the evaluation of academic qualification results will be published on the Tuscia web site www.unitus.it (section “Didattica” -> “Dottorati di Ricerca”). |
| **Evaluation of the oral exam (Maximum score: 60 out of 80)** | Oral exam: maximum score 60 out of 80 points
The minimum score for a positive oral exam will be at least 40 out of 80 points.
The foreign language subject to verification will be English. |
<p>| <strong>Topics of the oral</strong> | The oral test, aimed at ascertaining the candidate aptitude for scientific research, will focus on the discussion of issues related to the PhD |</p>
<table>
<thead>
<tr>
<th><strong>examination</strong></th>
<th>program topics and the research project presented by the candidate. The oral exam will include a verification of the English language knowledge based on reading and translation of sections of a scientific text.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exam dates and locations</strong></td>
<td><em>The exams will be held</em> between 12th –28th <em>September</em> 2018. The timetable for the exams will be published in the section &quot;Didactics&quot;&gt; &quot;Doctoral Studies&quot; of the University's website (<a href="http://www.unitus.it">www.unitus.it</a>) within the deadline of the call for application</td>
</tr>
</tbody>
</table>
| **Contact to information** | Contacts of the course:  
Pro. Danilo Monarca e-mail: monarca@unitus.it  
Pro. Stefano Ubertini e-mail: stefano.ubertini@unitus.it |