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NEPREV/ 609702-EPP-1-2019-1-IT-EPPKA2-CBHE-JP

## Erasmus+ CBHE- NePRev

*Setting up a multidisciplinary joint master degree dedicated to the  
Next Production Revolution (NPR)*

Wyssal ABBASSI



<https://neprev.com/>



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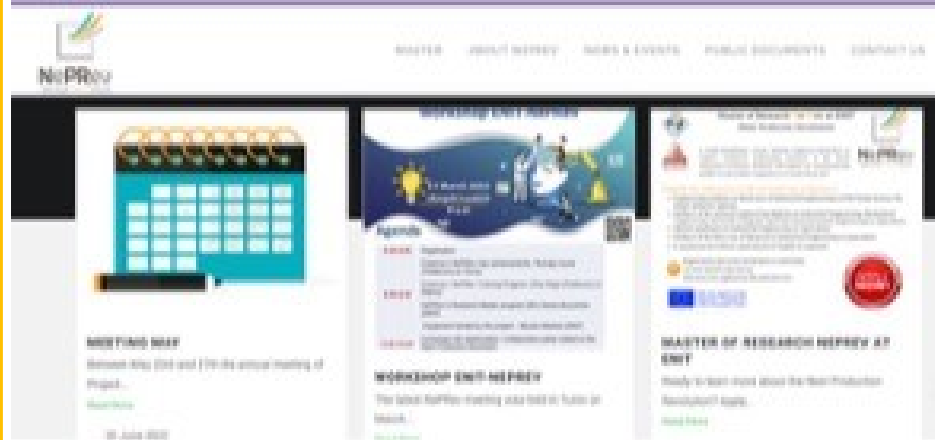




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# Project Overview



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# Origin and Rationale of the Initiative

## The G7 declaration & the Infrastructure Consortium for Africa (ICA) background paper

The G7 Italian Presidency announced at the Taormina Summit the introduction of an “Emerging African Innovation Leaders G7 Exchange and Training Program”, built upon some given pillars

### Unlocking Africa's potential through innovation and human capital development

It was stated that innovation and human capital development can be powerful drivers of sustainable and inclusive development in Africa. The importance of extending the benefits of the New Production Revolution (NPR) to the African continent, drawing inspiration from the G7 People-Centered Action Plan on Innovation, Skills and Labor, was underlined. To this end, awareness has been raised about the need to strengthen the partnership with African countries so as to:

- empower the private sector, also by strengthening traditional SMEs;
- promote innovative entrepreneurial systems, while reinforcing the diversification of production;
- reinforce the development of innovative start-ups and their collaboration with traditional business, starting from the sectors of renewables, agriculture, agri-food and services;
- introduce and spread NPR-enabling infrastructures, such as smart grids and resilient and smart logistics infrastructures;
- strengthen quality employment, through vocational and professional training and the development of new skills, especially for youth;
- empower women and girls and actively promote their inclusion in the labor market



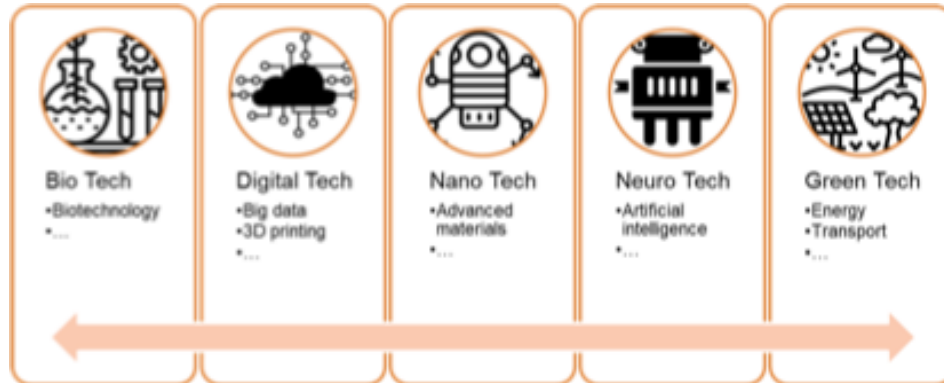


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## The Next Production Revolution (NPR):

- confluence of digital technologies (e.g. 3D printing, IoTs, advanced robotics)
- new materials (e.g. bio- or nano-based),
- new processes (e.g. data-driven production, artificial intelligence).





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# NePRev Objectives

## Master & New Courses

- Design and develop a joint master program open to Tunisian, European, and African participants.

## Socio-Economic

- Reinforce the role of Tunisian universities in connecting with their socio-economic environment

## Research & Industry

- Bridge the gap between academic research and industry

## Innovative Learning

- Improve the knowledge of new technologies and interactive tools as educational means



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# NePRev Consortium

|                     |                |                                                             |
|---------------------|----------------|-------------------------------------------------------------|
| Programme countries | <i>Italy</i>   | <b>Politecnico di Torino, PoliTO</b>                        |
|                     | <i>Italy</i>   | Politecnico di Milano, PoliMI                               |
|                     | <i>France</i>  | CentraleSupélec, CS                                         |
|                     | <i>Spain</i>   | Global Observatory, Obreal                                  |
| Partners countries  | <i>Tunisia</i> | National Engineering School of Tunis (ENIT)                 |
|                     | <i>Tunisia</i> | Institut Supérieur de Gestion Industrielle de Sfax (ISGIS)  |
|                     | <i>Tunisia</i> | Faculty of Juridical, Economic and ... of Jendouba (FSJEGJ) |
|                     | <i>Tunisia</i> | National School of Engineers of Gafsa (ENIGA)               |





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# NePRev – Key results





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## Master & New Courses

### Master & New Courses

- Design and develop a joint master program open to Tunisian, European, and African participants.

**Next Production Revolution Research Master** started at the École nationale d'ingénieurs de Tunis in Academic Year 2021-2022.

Number of enrollment submissions: 306

Number of enrolled students: 25

**ISGIS** updated and introduced a total of 14 courses (33 ECTS in total) belonging to 5 different masters and involving 207 students in total

**FSJEGJ** updated and introduced a total of 11 courses (46 ECTS in total) belonging to 6 different masters and involving 219 students in total

**ENIGA** updated and introduced a total of 10 courses (40 ECTS in total)





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## Collaborations

### Socio-Economic

- Reinforce the role of Tunisian universities in connecting with their socio-economic environment

### Research & Industry

- Bridge the gap between academic research and industry

**Research and Teaching Labs** developed in all 4 Tunisian Universities about additive manufacturing, renewable energy for industrial production, smart production, internet of things, robotics, data analytics and artificial intelligence

**Engagement with stakeholders** into curriculum development, prototyping and joint research

Established **MoUs** with key institutional and private stakeholders



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## Innovative Learning

### Innovative Learning

- Improve the knowledge of new technologies and interactive tools as educational means

**Research and Teaching Labs** developed in all 4 Tunisian Universities

**Blended courses** with research lab activities, projects and interaction with companies

**Internship** in European partner universities and other international universities (10 students in May-July 2022; 9 students in September-November 2022)

Application for an **Erasmus + Mobility Program** (PoliMI and Enit)



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# Design & Actuation of the Master in NPR:

*Research Master NePRev  
(M2)*



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## Master NEPREV: Mission

NePRev is a multi-disciplinary master program, focusing on the training and educating researchers and skilled experts to help industries embracing the 4th Industrial revolution.

The master's program is also aiming to instill entrepreneurial skills in the learning process and preparing students for conducting innovative industry-research projects.



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## Master NEPREV: Target audience

### **Eligible for Admission to M2 (second year of Masters)**

- Engineering students in third year of Industrial Engineering at ENIT (Option : Data Science for Smart Industry);
- Holders of a national engineering diploma in Industrial Engineering, Mechanical Engineering, Electrical Engineering, Computer and Telecommunications Engineering or equivalent;
- Masters graduates in Industrial Engineering or equivalent;
- Holders of M1 (first year of Masters) in Industrial Engineering or equivalent;

*A minimum level B2 (or equivalent) in English is required.*



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# Master NEPREV: Program

| Sem | Teaching Unit (TU)                               | Building block of teaching unit (BBTU) |
|-----|--------------------------------------------------|----------------------------------------|
| 1   | <b>Real Time and Smart manufacturing control</b> | Digital twin for smart manufacturing   |
|     |                                                  | Lean 4.0                               |
|     |                                                  | MES                                    |
|     | <b>Data Science</b>                              | Machine Learning                       |
|     |                                                  | Big Data                               |
|     |                                                  | Artificial Intelligence & applications |
|     | <b>Business &amp; Management of Innovation</b>   | Industrial & Digital Marketing         |
|     |                                                  | E-buisness / Strategy                  |
|     |                                                  | Research Innovation & Entrepreneurship |
|     | <b>Sustainability for Industry</b>               | Advanced Materials for Innovation      |
|     |                                                  | Energy Strategy and Optimization       |
|     | <b>Research &amp; Development</b>                | Research Methodology                   |
|     |                                                  | Intellectual Property                  |
|     |                                                  | Seminars                               |
| 2   | <b>Master Thesis</b>                             |                                        |



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## Master NEPREV: 2021/2022 Statistics

|                   |                                                                                                     |
|-------------------|-----------------------------------------------------------------------------------------------------|
| Applications      | <b>306</b>                                                                                          |
| Selection process | <b>83</b> Shortlist                                                                                 |
|                   | <b>25</b> Final list (17 industrial engineering students + 8 industrial engineers)                  |
| Results           | <b>18</b> validated master exams<br><b>1</b> pending<br><b>6</b> Failed                             |
| Internship        | <b>17</b> scholarships (France, Italy, Canada) :<br>➤ 10 scholarships funded by the Erasmus+ NePRev |



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## Master NEPREV: 2021/2022 The First Class!







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# ***PEDAGOGICAL EQUIPMENT***

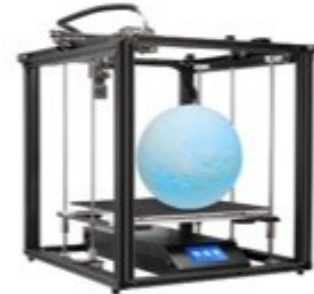




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## Pedagogical Equipment: Cumputer equipment & didactic tools



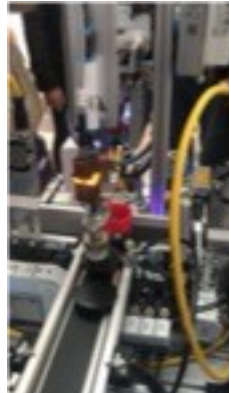


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## Pedagogical Equipment: Modular production system station

Modular system with at least 3 networked stations with several RFID reading/writing heads, HMI with 7" color touch-screen display, Profibus and Profinet interfaces, Educational MES with Webshop, SCADA application with PC-based control



# FESTO



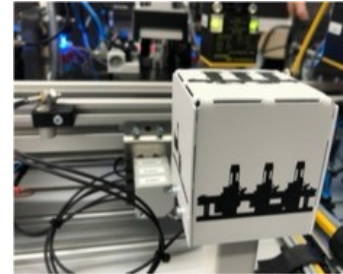


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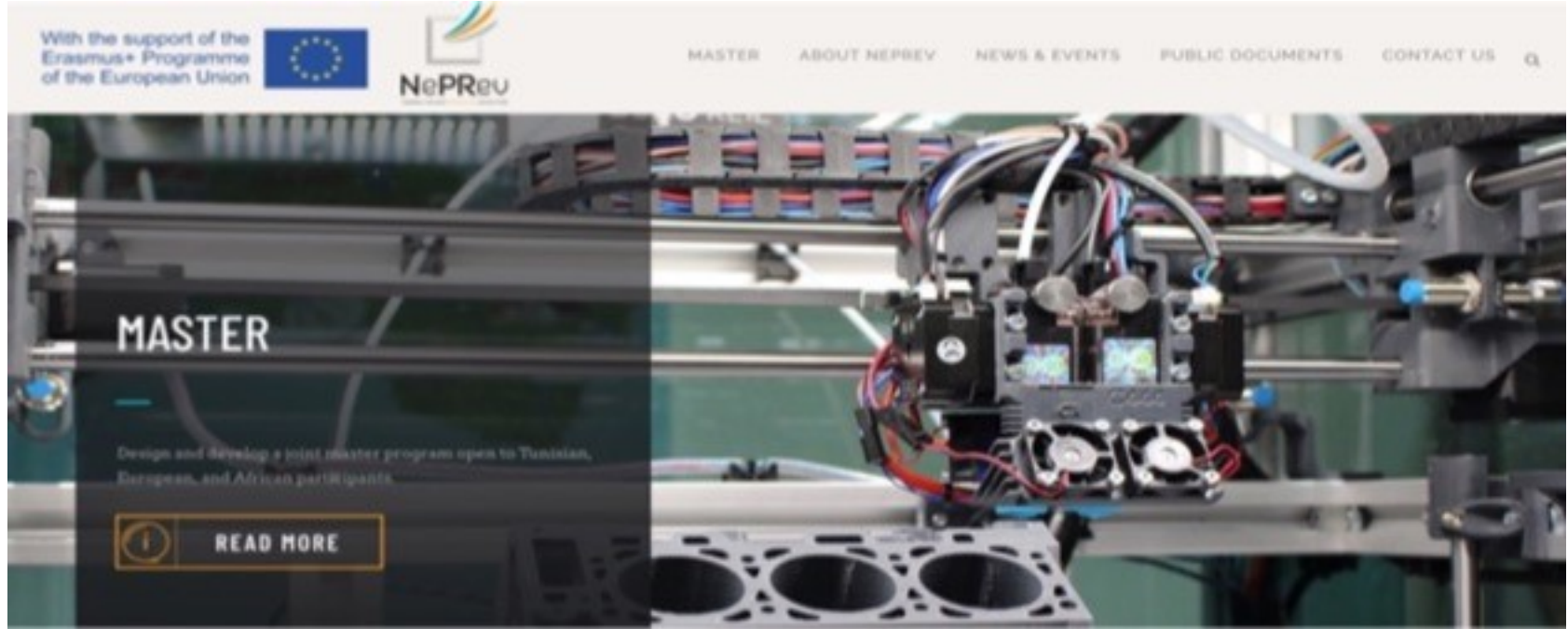
# Pedagogical Equipment: Modular production system station

## FESTO





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