

BIP - Blended Intensive Programme

1. Title

Technologies towards circular economy and environmental sustainability

2. Type of Participants (Learners) /students/staff/Teaching staff)

Bachelor, Master and PhD students from Chemical Engineering, Bioresources Engineering, Environmental Engineering, Industrial Engineering and related areas.

3. Methods and outcomes.

Methods:

- On-line lectures
- Work collectively and simultaneously as a team on specific projects to tackle challenges concerning circular economy and environmental sustainability.
- Hands-on multidisciplinary projects

Outcomes:

- Increased awareness of circular economy principles
- Foster teamwork and multidisciplinary collaboration through laboratory-based projects and real-world environmental challenges
- Build in-depth knowledge about xenobiotics, their environmental impact, and the need for innovative detection methods and to better manage pollution and mitigate its impacts on ecosystems and human health.
- Practical skills in sensor design and development
- Understanding of Life Cycle Assessment principles, framework and familiarity with LCA standards
- Acquire skills in LCA software tools such as OpenLCA to perform assessment
- Critical Thinking for Decision-Making to support sustainable product design, policy recommendations, and business strategies
- Assess key metrics, such as carbon footprint, water use and pollution, resource depletion and ecosystem impact
- Develop critical thinking skills to evaluate and integrate nanomaterials into the creation of advanced analytical tools for environmental monitoring
- Identification of the most effective green extraction method for bioactive compound recovery from the food processing waste.

- Assessment of the potential applications of the extracted compounds in industries such as food, cosmetics, or pharmaceuticals.
- Enhanced understanding of the environmental and economic benefits of waste valorization for sustainable development.
- Develop practical skills in integrating experimental techniques with environmental sustainability assessments and optimization strategies.

4. Priorities Addressed –

Environment and fight against climate change
Strategy on green transition and sustainable development

5. Objectives and Description:

I- Designing processes to convert raw materials into valuable products sustainably, while minimizing environmental impact; green engineering & green chemistry; carbon capture technologies; sustainable and biodegradable materials; recycling technologies.

II- Holistic approaches to designing and managing complex biosystems with sustainability and circularity in mind; optimizing resource flows, integrating circular principles in product and process design, and managing sustainability in supply chains.

III- Optimizing production processes and systems for efficiency, productivity, and sustainability, circular supply chains, and life-cycle assessment of products and processes.

IV- Environmental protection, pollution control, waste management, and sustainable resource use and circularity.

6. Start Date: 10th March 2025

7. End Date: 12th April 2025

8. Physical Activity Duration (days): 6

9. Virtual Component Description:

The virtual component will consist of a collaborative learning environment, based on presentations, lectures and discussions focused on:

- The key objectives and outcomes of the BIP
- The fundamental principles and insights of circular economy, life cycle analysis, and green technologies
- The United Nations' sustainable development goals

- The hands-on multidisciplinary projects that will tackle challenges concerning circular economy and environmental sustainability, which will be developed by the transnational and transdisciplinary teams, firstly online and subsequently finished face to face at the host institution

10.Virtual Component Duration: 10th to 21st March 2025

11.Virtual Component Timing (before/during/after): Before

12.City of venue: Porto

13.Country of venue: Portugal

14: Partners:

ISEP-Instituto Superior de Engenharia do Porto

Brno University of Technology

Gdańsk University of Technology

Universidade de Vigo

Wroclaw University of Science and Technology