1ST DIGITAL AND SUSTAINABLE MANUFACTURING – QUALITY MANAGEMENT

BLENDED INTENSIVE PROGRAMME (BIP)

11th to 15th March 2024 (Face to Face)

26th February until 9th March (online)

EUCLIDES

ISEP INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO

Blend Intensive Program

General Information

- Blended Intensive Programmes (BIPs) are an innovative form of learning, teaching, and training aimed at providing an intensive learning experience that combines physical and virtual components. These programs are developed and implemented by a minimum of three Higher Education Institutions (HEIs) from at least three Member States of the European Union and countries associated with the program, and they are funded through the Erasmus+ mobility program.
- BIPs are short, intensive programs that promote challenge-based and inquiry-based learning. They combine online cooperation with short-term physical mobility abroad (typically lasting one week), allowing participation in teaching and training activities with experts from all partner institutions.
- During these programs, groups of students or academic and administrative staff work together to develop curriculum and blended mobility activities, which include challenges and practical projects. The programs are designed to meet the participants' needs and are developed through a collaborative approach among the partners' institutions.
- The combination of virtual and physical activitie provides an enriching learning experience where participants have the opportunity to work in teams, develop interpersonal and intercultural skills, and enhance their technical and communication skills.
- BIPs are an excellent opportunity for students and staff from higher education institutions to expand their knowledge, experience new cultures, and enhance their professional development. Additionally, they contribute to the development of international cooperation networks among partner institutions, which is crucial for promoting quality higher education on a global scale.

EUCLIDES

ISEP INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO

Blend Intensive Program

Mobility Grants

- Individual support for students and administrative staff for physical mobility should be provided by the sending organization, which can use its own regular Erasmus funds for mobility. In principle, physical mobility lasts for 5 days and is funded with a daily grant of 70 euros.

Recognition

- The minimum duration of the virtual component is not defined yet, but the combined virtual and physical mobility must award students a minimum of three ECTS credits.

Example of ISEP BIP: https://www.isep.ipp.pt/Department/DepartmentOtherCourses/12

EUCLIDES

ISEP INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO

LOCAL ORGANIZING TEAM

Susana Nicola
Adjunct Professor
Mathematic department
sca@isep.ipp.pt

Maria João Raposo
Adjunct Professor
Management department
mrp@isep.ipp.pt

Manuel Pereira Lopes
Coordinator Professor
Mechanical department
mpl@isep.ipp.pt

José Carlos Sá
Adjunct Professor
Mechanical department
cvs@isep.ipp.pt

Mónica Cardoso
Assistant Professor
Mechanical department
mon@isep.ipp.pt

Eduarda Pinto Ferreira
Coordinator Professor
Mathematic department
epf@isep.ipp.pt

EUCLIDES

ISEP INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO

Areas

Mechanical Engineering: computational mechanical design, sustainability, and green computing

Manufacturing/Automation: digital manufacturing and automation; digital manufacturing and management

Industrial Engineering: logistics and production, quality management, sustainability

EUCLIDES

ISEP INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO

BIP/ISEP Objectives

Emphasizing Sustainability Principles

Understanding Digital Technologies

Integrating Digital and Sustainable Strategies/Practices in industrial context

Understanding Quality Management Principles and Techniques

Integrating sustainability and green computing

Managing logistics and production

Case Studies and Real-world Applications

EUCLIDES

ISEP INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO

Hours 84=3 ECTS

	Institution	Country	Professor	Title	Number Hours
Face to Face	Free University of Bozen-Bolzano (UniBZ)	Italy	Margherita Molinaro	Sustainability implementation in companies and supply chains	1.5
	Free University of Bozen-Bolzano (UniBZ)	Italy	Prof. Yuri Borgianni	Additive Manufacturing and Sustainability: Friends or Foes?	1.5
	Graz University Techonology (TUG)	Austria	Prof. Volker Koch	Sustainable Purchasing	2
	Graz University Techonology (TUG)	Austria	Prof. Marco Berger	Industrial Marketing	2
	University of Antwerpen	Belgium	Prof. Amelie Chevalier	Industrial automation and networks	2
	University Politehnica of Bucharest	Romania	Prof. Cristian Mustata	Trend and Modern Logistics	1.5
	Instituto Superior de Engenharia do Porto	Portugal	Prof. Mónica Cardoso	Sustainabily Design	2
	University of Galway	Ireland	Prof. Olivia McDermott	Lean Six Sigma for Sustainability	2
	Free University of Bozen-Bolzano (UniBZ)	Italy	Prof. Renato Vidoni	Industrial Collaborative Robotics: introduction and case-studies	2
	University of Applied Sciences and Arts Dortmund	Germany	Prof. Dino Schönberg	Sustainability from the Club of Rome (1972) till today	2
	Instituto Superior de Engenharia do Porto	Portugal	Prof. José Sá	Lean Six Sigma for Sustainability (Part.2)	1
			All Professors	Lab Project	17.5
				Total contact hours	**37**
online	Free University of Bozen-Bolzano (UniBZ)	Italy	Prof. Yuri Borgianni	Additive Manufacturing(an Introduction	2
	Graz University Techonology (TUG)	Austria	Prof. Volker Koch	Sustainable Purchasing	3
	Instituto Superior de Engenharia do Porto	Portugal	Prof. Mónica Cardoso	Sustainabily Design	2
	HE2B - Haute Ecole Bruxelles-Brabant	Belgium	Prof. Pire Clément	CAD Design for additive manufacturing	3
	University of Galway	Ireland	Prof. Olivia McDermott	Lean Six Sigma for Sustainability	1
	Rzeszów - University of Technology	Poland	Prof. Katarzyna Antosz	Advanced methods and tools for quality management	3
			All Professors	Lab Project	33
				Total contact hours	**47**

*** LabProject - hours to work in the development of the project, presentation, and report.**
Labproject will be done with academic mentoring.

LECTURES

Prof. Margherita Molinaro

Title: *Sustainability implementation in companies and supply chains*

Program: After a brief introduction of the concept of sustainability, the lecture will provide an overview of the main sustainability practices that can be implemented within companies and along supply chains to reduce the environmental impacts of their activities and support social advancements of workers and communities. The relationship between the three sustainability pillars (i.e., environmental, social and financial performance) will also be analysed and discussed.

Outcomes: The students will gain a complete understanding of the sustainability concept, as well as a preliminary knowledge of the main methods and approaches of implementing sustainability practices in companies and supply chains.

Prof. Yuri Borgianni

Title: *Additive Manufacturing and Sustainability: Friends or Foes?*

Program: The lecture illustrates examples where AM has been used consistently with sustainability principles, but also many aspects to be considered in this respect. In particular, the lecture will deconstruct the myth that associates AM with material and resource saving a-priori. Far from being a green technology, the actual sustainable performances of AM largely depend on its use and numerous circumstances. In the end, it is demonstrated that the sustainable use of AM are mostly due to correct design and product development assumption.

Outcomes: The students learn the dimensions to be taken into account when evaluating the sustainable performances of a technology in the right context and without undue assumptions.

Prof. Yuri Borgianni

Title: *Additive Manufacturing an introduction (online)*

Program: The lecture illustrates the technologies that are formally ascribable to Additive Manufacturing (AM), along with the advantages of AM with respect to traditional fabrication technologies. The lecturer will provide a guide, which students can use to select appropriate AM technologies based on capabilities, performances, costs, etc.

Outcomes: The students get familiar with the world of AM and acquire preliminary skills to evaluate the convenience of using AM to fabricate parts, products or prototypes.

Prof. Volker Koch

Title: *Sustainable Purchasing*

Program: Circular Supply Chain

Outcomes: At the end of this Module, participants should be able to:

a) describe different circular supply chain strategies and apply them to specific company contexts.

b) Learning objectives:

- Understanding the core principles of the circular economy
- Get to know how a circular economy can be implemented
- Understand the different strategies in the R framework
- Identify different circular strategies in the supply chain

Prof. Marco Berger

Title: *Industrial Marketing*

Program: Introduction Industrial Marketing & Marketing Research

Outcomes: By the conclusion of this Module, attendees should:

a) possess the capability to elucidate "industrial marketing" and employ the most frequently utilized methods for marketing research in practical scenarios.

b) Learning objectives:

- Grasp the principles of industrial marketing.
- Comprehend the importance and process of conducting marketing research.
- Get to know how to get data for market research.

Prof. Amelie Chevalier

Title: *Industrial automation and networks*

Program: Industrial automation and networks

Outcomes: The students will have a notion of how to establish an industrial network for automation with comprehensive examples.

Prof. Cristian Mustata

Title: *Trends in modern logistics*

Program:

Outcomes:

- Analyze emerging technologies: Students should be able to identify and evaluate the impact of emerging technologies on logistics operations, such as artificial intelligence, Internet of Things (IoT), blockchain, autonomous vehicles, and data analytics.
- Understand sustainability in logistics: Students should grasp the importance of sustainable logistics practices and how they can contribute to reducing environmental impacts, optimizing resources, and addressing societal concerns.
- Explore global logistics challenges: Students should be able to analyze and understand the challenges and opportunities that arise in logistics due to the global nature of supply chains, including cross-border logistics, customs regulations, and geopolitical influences.

Prof. Renato Vidoni

Title: *Industrial Collaborative Robotics: introduction and case-studies*

Program: Standard vs collaborative industrial robots; safety concepts and rules in industrial collaborative robotics; examples and case-studies.

Outcomes: Knowledge of the main differences between standard and collaborative industrial robots; ability to understand the main features and safety issues in industrial collaborative robotics.

Prof. Mónica Cardoso

Title: *Sustainability Design (ONLINE)*

Program: Basic concepts of 3D modelling in SolidWorks

Outcomes: This lecture is designed to assess student familiarity with SolidWorks. To check if they are currently using SolidWorks and if they have the software installed on their personal computers. Students must complete a practical exercise consisting of a design task in which they must create a basic 3D model using SolidWorks.

Prof. Mónica Cardoso

Title: *Sustainability Design*

Program: This lecture explores the benefits of sustainable design, from reduced environmental impact to significant cost savings and improved human health and well-being, and how sustainable design positively impacts various aspects of our lives.

Outcomes:

Students will

a) Have a heightened awareness of the importance of sustainable design in addressing global environmental challenges.

b) Gain a solid understanding of the basic principles of sustainable design, including concepts such as energy efficiency, materials selection, and life cycle analysis.

c) Understand the many benefits of sustainable design, such as reduced environmental impact, cost savings and improved human health and well-being.

Prof. José Carlos Sá

Title: *Lean Six Sigma for Sustainability*

Outcomes: To demonstrate how the Lean Six Sigma philosophy can contribute to the sustainability of companies.

Prof. Katarzyna Antosz

Title: *Advanced Methods and Tools in Quality Management (Online).*

Program: The lecture will present an overview/reminder of traditional methods used in quality management. Then, new, advanced methods and tools such as machine learning methods, will be presented, which can be used to analyze qualitative data. The principles of their use, approach and their practical application in the enterprise will be presented.

Outcomes: Students will gain knowledge about the possibility of using advanced methods and tools, such as machine learning methods, to analyze data from the production process and the quality control process.

Prof. Dino Schoenberg

Title: *Sustainability from the Club of Rome (1972) till today*

Program: Studium Oecologicum

Outcomes: At the end of this lecture, participants should be able to:

a) describe how the word has been between the second world war and 1972, when the Club of Rome presented the book "The limit to growth".

b) understand how sustainability has been developed and what was the previous topic, what kind of political keywords has been discussed till today. Cloroflurocarbon (CFC),Ozon hole, Carbone dioxide, different kind of Pollution, Atomic waste, Alternative energy e.c.t.

PROJECTS

EUCLIDES

ISEP INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO

Project 1 – Prof. Yuri Borgianni

Title: *Sustainability-oriented critical analysis of case studies and literature sources presenting applications of AM.*

- Outcomes: The project aims to gather and analyse case studies and experimental literature contributions that have formally investigated the relation between AM and sustainability. The students learn how to tackle this kind of activities and develop methods that can be replicated also in other contexts

EUCLIDES

ISEP INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO

Project 2 – Prof. Pire Clément

Title: *Provide project support including 3D design*

Outcomes: Putting into practice CAD design

EUCLIDES

ISEP INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO

Project 3 – Prof. Volker Koch

Title: *Applied Circular Strategies*

Outcomes: At the end of this Project, participants should be able to use the R framework and the circular strategies on a business case.

EUCLIDES

ISEP INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO

Project 3 – Prof. Marco Berger

Title: *Marketing Research*

Outcomes: At the end of this Project, attendees should possess the capability to utilize various marketing research methods on a business case.

EUCLIDES

ISEP INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO

1ST DIGITAL AND SUSTAINABLE MANUFACTURING – QUALITY MANAGEMENT

BLENDED INTENSIVE PROGRAMME (BIP)

11th to 15th March 2024

EUCLIDES

ISEP INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO