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EUROPEAN UNIVERSITY FOR CUSTOMISED EDUCATION

STUDY GUIDE

Durable materials and multifunctional coatings

Organised by

Université Polytechnique
Hauts-de-France (UPHF)

Co-funded by the
Erasmus+ Programme
of the European Union

1. IDENTIFYING DATA.	
· **Course Name.**	**Durable materials and multifunctional coatings**
· **Coordinating University.**	Université Polytechnique Hauts-de-France
· **Partner University(ies) Involved.**	none
· **Course Field(s).**	Sustainable development
· **Related Study Programme.**	none
· **Course Code.**	none
· **ISCED Code.**	543
· **SDG.**	4, 12, 17 (https://sdgs.un.org/goals)
· **Study Level.**	Master

· **Number of ECTS credits allocated.**	4 ECTS
· **Mode of Delivery.**	Online live
· **Language of Instruction.**	English
· **Delivery Period.**	Semester 2
· **Course Dates.**	**From 19th January 2024 to 22th March 2024**, (assessment possible until may 10th)
· **Precise Schedule of the Lectures.**	Synchronously delivered course activities: 1. Lecture and discussion **19/01/2024 and 9/02/2024** - 10 am to 12 pm (CET) 2. Discussion and final exam **22/3/2024** - 10 am to 12 pm (CET)
· **Key Words.**	Tailor-made coatings development processes through the use of an eco-design methodology.
· **Catchy Phrase.**	"A course designed for you to set up strategies and to know how to propose a set of tailor-made coatings development processes by using an eco-design methodology."
· **Link to Course Guide.**	none

· **Prerequisites and co-requisites.**	English B2

· Number of EUNICE students that can attend the Course.	35
· Course inscription procedure(s).	Eunice Application Portal

2. CONTACT DETAILS.

· Department.	National Institut of Applied Sciences Hauts-de-France (INSA Hauts-de-France) / Materials Science and Engineering
· Name of Lecturer.	Philippe Champagne
· E-mail.	philippe.champagne@uphf.fr

3. COURSE CONTENT.

The course will focus on the following contents:

- Eco design of durable, efficient and ecological materials - Chemical Engineering to protect materials;
- Elaboration and recycling of materials / Description of the different classes of composite materials with a polymeric, metallic, glass and ceramic matrix;
- Presentation of reinforcement mechanisms;
- Presentation of manufacturing techniques for different composite materials and their characteristics;
- Examples of applications and case studies;
- Multifunctional coating (antibacterial, self-cleaning,...).

4. LEARNING OUTCOMES.

Students will be able to:

- Set up a protection strategy by implementing a deposit adapted to industrial specifications;
- Propose a set of tailor-made coatings development processes, using an eco-design methodology.

5. OBJECTIVES.

This course will:

- Cover chemical engineering to protect materials;
- Describe different classes of materials;
- Present mechanisms and techniques;
- Illustrate their application - By evaluating the strategies of companies according to criteria chosen by the student.

6. COURSE ORGANISATION.	
UNITS	
1.	Eco design of durable, efficient and ecological materials - Chemical Engineering to protect materials
2.	Elaboration and recycling of materials / Different classes of composite materials with a polymeric, metallic, glass and ceramic matrix
3.	Manufacturing techniques for different composite materials and their characteristics
4.	Case studies
5.	Multifunctional coating (antibacterial, self-cleaning,...)
LEARNING RESOURCES AND TOOLS.	
Interactive videos, PowerPoints, PDF files, collaboration tools	
PLANNED LEARNING ACTIVITIES AND TEACHING METHODS.	
Lectures, individual work, group work, collective work	

7. ASSESSMENT METHODS AND CRITERIA.
This course will be assessed by means of a written exam and a presentation of a practical work in the framework of group work.
OBSERVATIONS.

8. BIBLIOGRAPHY AND TEACHING MATERIALS.