

STUDY GUIDE

DURABLE MATERIALS AND MULTIFUNCTIONAL COATINGS

Organised by
UNIVERSITE POLYTECHNIQUE Hauts-de-
France
(UPHF)



1. IDENTIFYING DATA.

• Course Name.	Durable materials and multifunctional coatings
• Coordinating University.	Université Polytechnique Hauts-de-France (UPHF)
• Partner University Involved.	
• Course Field(s).	Sustainable Development
• Related Study Program.	
• Course Code.	
• ISCED Code.	
• SDG.	
• Study Level.	Master (M)

• Number of ECTS credits allocated.	4
• Mode of Delivery.	Online
• Language of Instruction.	English
• Delivery Period.	Spring 2022
• Course Dates.	1/3/2022 – 24/4/2022
• Precise Schedule of the Lectures.	Synchronously delivered course activities: 1. Lecture and discussion 1/3/2022 – 10 am to 12 pm 2. Discussion and final exam 25/4/2022 - 2 to 4:30 pm
• Key Words.	Tailor-made coatings, 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.	

• Prerequisites and co-requisites.	B2 level in English
• Number of EUNICE students that can attend the Course.	35
• Course inscription procedure(s).	Eunice Application Portal
• Applications Deadline.	18/2/2022

2. CONTACT DETAILS.

• Department.	INSA (National Institute of Applied Sciences) / Materials Science and Engineering
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• Name of Lecturer.	Philippe Champagne
• E-mail.	Philippe.Champagne@uphf.fr
• Office.	
• Other Lecturers.	

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, etc.)

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.

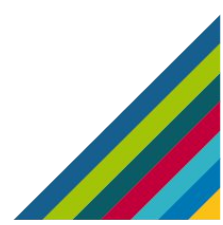
This course will:

- Cover chemical engineering to protect materials,
- Describe different classes of materials,
- Present mechanisms and techniques,
- Illustrate their application.

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.	Multifunctional coating (antibacterial, self-cleaning, etc.)
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.

