



ESIREims
(ESIEC)

International Semester in PACKAGING

2017-2018





SEMESTER A : February to June (Bachelor level)

601A: French Language and second foreign language (English, Spanish, German, Russian...) (1 ECTS)

601C: English for packaging (2 ECTS)

602: Material resistance (4 ECTS)

P603A: Plastic packaging, plastic aging and bioplastic in packaging (4 ECTS)

P605A: Printing technology (2 ECTS)

P605B: Packaging design and development (4 ECTS)

P991: Project (14 ECTS)

SEMESTER B : September to January (Master 1 level)

701B: marketing (1 ECTS)

P702B: English for packaging (1 ECTS)

702C: French Language and second foreign language (English, Spanish, German, Russian...) (1 ECTS)

801A: English conversation (2 ECTS)

P704A: Interaction1, active and intelligent packaging (5 ECTS)

P705C: Packaging design and conception (3 ECTS)

P991: Project (14 ECTS)

607: Project (3 ECTS)

SEMESTER C : February to June (Master 1 level)

801A: English conversation (2 ECTS)

801C: French Language and second foreign language (English, Spanish, German, Russian...) (1 ECTS)

801D: English for packaging (1 ECTS)

803B: Life Cycle Analysis (1 ECTS)

P804 A: Computer-aided design and prototyping (4 ECTS)

P804C: Packaging machinery (4 ECTS)

P805B: Interaction2 (3 ECTS)

P991: Project (14 ECTS)





ESIREIMS
(ESIEC)

SEMESTER A:

FEBRUARY TO JUNE

(BACHELOR LEVEL)





French language

EC

601A

Year: 1st ESIREims

Semester: 6

ECTS: 1

Academic staff:

Number of hours : 26 hours

This module is organized by the CIEF. The International Center for French Studies (CIEF) is an internal structure at the University of Reims Champagne-Ardenne (URCA), one of the oldest universities of Europe. Its main mission is linguistic and cultural preparation of non-Francophone students for their integration into the educational curriculum offered by various components (faculties, institutes, school) University.





ESIREIMS
(ESIEC)

UE 601C

English: PACKAGING

Year: 1st ESIREIMS

Semester: 6

ECTS: 2

Academic staff: (ESIREIMS)

Number of hours: 12 hours

Nature	lectures	tutorials	Practical work	Total
Duration(h)		12		12

Assessment vocabulary / reading and understanding a text: MCQ / questions / Essay

Oral presentation in front of a jury and questions/answers

examinations	Nature	oral	ET
	Duration (h)		
Coefficients	1st session	0.5	1.25
	2nd session	0.5	1.25

Objectives:

To learn the packaging vocabulary (materials ,process , tests)

Oral presentation and written report on a professional topic .(PIDA)

Communication with a foreign counterpart in professional situations or in everyday conversation.

To gain confidence and develop a dynamic synergy in English class.

Prerequisites: B1 level / UE P158

Requirements:

The students must be able to:

- **read and understand** a scientific, technical or general document . Extract the main information.
- **develop** their abilities to speak in various situations . Gain confidence . Communicate effectively during an oral presentation . Improve their vocabulary .
- **understand** English-speaking persons in various situations
- **understand** the packaging specificities and manage the technical and professional vocabulary . Describe a pack .
- **present** a professional topic in a clear and relevant way (power point)
- **look for** some documentation on the internet and among professionals.
- **write** correctly some professional documents (letters / abstracts , report)

Contents:

The students are in small homogeneous groups.

Discovery of packaging (2): (interdisciplinarity with other modules)

Basic vocabulary(booklet): materials (2): plastics, metal, glass , opening and closing systems. Study of authentic documents: texts , extracts, videos et CDs

communication (2): using the communication tools in a professional and real situation (PIDA)

Oral presentation on innovative packs - documentation – contact with companies – team work

Written tasks: written report

Discovering the company: CV/cover letters .Departments . 1st visit





ESIREIMS
(ESIEC)

EC 602

Material resistance

Year: 1st ESIREIMS

Semester: 6

ECTS: 4

Academic staff: Professor S. Fohanno (ESIREIMS)

Number of hours : 54 hours

Nature	Lectures	Tuition	Practical work	Total
Duration	30	12	12	54

Assessment

examination	Nature	ET	CC(TP)
	Duration (h)	2	
Coefficients	1st session	1,75	0,75
	2nd session	1,75	0,75

Objectives:

- To calculate the basics of mechanical resistance calculation of parts .
- To understand mechanical constraints and how to assess them analytically .
- To learn the fundamentals about the dimensioning of parts or assembled parts
- To learn the basics of visco elasticity , visco plasticity and study of the flow.
- To understand the creep resistance and application to rheological models

Required skills:

To be able to foresee the mechanical resistance of parts , to dimension the parts and to foresee the distortion of the polymers regarding time (creep and stress relief)

Prerequisites :

Mathematics: 2 years in higher education (derivatives /integrals and vectors)

Part A: Mechanics of the deformable plastics – material resistance

Part B: resistance of plastic materials

Bibliography:

- Arnaud Delaplace, Fabrice Gatuingt, Frédéric Ragueneau, « Mécanique des structures – Résistance des matériaux », Dunod, Paris, 2008, (ISBN 978-2-10-053958-1).
- T. H. G. Megson, “Structural and stress analysis”, Butterworth-Heinemann, Oxford, 2000, (ISBN 0 340 63196 1).





ESIREIMS
(ESIEC)

EC P603A

Plastic packaging transformation, Bioplastics, Ageing

year: 1st ESIREIMS

Semester: 6

ECTS: 4

Academic staff: Senior Lecturer C. Lacoste and professor I.Vroman (ESIREIMS)

Number of hours : 58 hours

Nature	Lectures	Tutorials	Practical work	Total
Duration(h)	36	6	16	58

Assessment

Examination	Nature	CC	ET	CC(TP)
	Duration(h)			2,5
Coefficients	1st session	0.5	2	0.75
	2nd session		2.5	0.75

Objectives: Présentation of the physico-chemical and mechanical properties of the main plastic materials used in packaging .
Understanding the behaviour of the polymers during their moulding process in the machines .

Good command of the manufacturing and processing tools for plastics packaging so as to understand and optimise the manufacturing process of plastic packaging .

To be able to identify the critical issues regarding the contents and the constraints linked to the process and use of the plastic packaging .

General objective: to be able to define the book of specifications of plastic packaging , to know the manufacturing process regarding the final use so as to be able to discuss in front of a supplier , a customer or a marketing team .

Required skills: To be able to identify the manufacturing process (extrusion, film , tube , sleeve, injection , thermoforming hollowware) and analysed the data linked to the process.

To be able to choose the right polymer to answer the book of specifications of the client and to understand the specificities of the machine to use and its limits .

Prerequisites: macromolecular chemistry , fundamental characteristics of a polymer (T_g, T_f, T_c, Young modulus, cristallinity, amorphous polymer)



**Contents:**1st part: Transformation (24HCM-4HTD-16HTP)

1. generalities
2. structure of the polymers
3. rheology of the polymers
4. presentation of the polymers and their properties.
5. Additives in the formulations
6. Extrusion
7. Packaging films
8. thermoforming
9. injection
10. Hollowware

2nd part: Bioplastics (4H CM)

Definition

Naturally-occurring polymers , microbial polymers, biosourced polymers , synthetic polymers: characteristics and properties.

biodegradable and compostable Polymers

3rd part: polymer ageing (8H CM- 2H TD)

Physical and chemical ageing mechanism: reactions, modifications of the properties and impact , (mechanical , physico chemical properties , modification of the polymer structure)

Polymer stabilisation: general principle, different categories of stabilizers, notion of antagonism and synergy .

Predicting polymer ageing.





Printing technology

UE P605A

Academic year : 1st ESIREIMS

Semester: 6

ECTS: 2

Academic staff: S. Odof (ESIREIMS)

Number of hours: 48

Nature	lectures	tutorials	Practical work	Total
Duration(h)	18	14	16	48

assessment

examinations	Nature	ET	CC (TP)	Oral
	Duration(h)	2		
Coefficients	1st session	2	0,5	
	2nd session	2		0,5

Objectives :

To master the entire graphic chain- traditional and digital . To be able to define and manage the colorimetric problems.

skills: the students must be able to

- perfectly manage the interaction between the graphic chain and the development of a pack in its globality
- master the colour quality control for a pack
- become a privileged interlocutor with the experts of the graphic chain
- become a trained order giving person .

pre requisites:

none.

Contents:

1. preprinting: from the idea to the industrialisation
2. printing technologies
3. assessment
4. colorimetry:
 - Colorimetry of differences**
 - Measurements methods**
 - Colour systems and colour atlas**
 - Digital management of the colour**





Packaging design and development

Year: 1st ESIREIMS

Semester: 6

ECTS: 4

Academic staff: F. Bertrand, C. Moriot (ESIREIMS)

Number of hours: 34 hours + 20h project work(in autonomy)

Nature	lectures	tutorials	Practical work	Total
Duration (h)	22	12		34

Assesement

Examinations	Nature	ET	CC	Oral	Practical
	Duration (h)	2			
Coefficients	1st session	1,5	1,5	0,5	1,5
	2nd session	3,5		1,5	

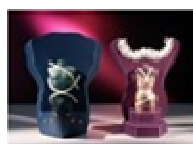
Objectives:

- To understand the role of the packaging engineer in companies , the missions and relationships with other departments.
- To be able to write a book of specifications and functional analysis related to the development , optimisation and purchasing of packaging .
- To be able to write the specifications related to the technical characteristics of packaging
- To be able to draw a quick sketch representing the new pack
- To know the main graphics techniques and perspectives
- The role of design in packaging development and life cycle.

requirements:

Globally, the students must be able to:

- Pose , reformulate , solve a problem even if not well defined, complex or non familiar , with some risks involved ,but also prospect in new fields or emerging sectors.
- Design scientific and technical solutions so as to define the products , the systems and services
- Cooperate with engineers from other specialities worldwide.
- Integrate costs analysis and constraints , quality control , safety ,deadlines in a competitive and unsecure environment
- Integrate a company and develop team spirit
- Be involved , motivate and dynamise a multidisciplinary team from different background and levels.
- Innovate and investigate
- Identify the external constraints of a company (competitors / globalisation) and take them into account .
- Integrate the professional life
- Understand and define a book of specifications
- Approve and qualify a pack with the required tests .





More specifically: to develop the students ability to:

- Manage the role of a packaging engineer in companies.
- Manage the launching process of a pack and the technical follow up of existing packaging so as to optimize quality costs and purchases.
- Define the needs (functions and constraints) of the packs
- Specify the essential characteristics of the packs
- Design and develop new packs meeting the product and its market requirements with a designer approach .

Requirements:

none

Contents:

1st part (C. Moriot)

- Organising the launch of a pack
- Methodology and functional analysis
- Technical specifications

Project:

Writing the functional book of specifications for a product of their choice.

Bibliography:

Norme AFNOR NF X 50-151 (décembre 1991): Analyse de la valeur, analyse fonctionnelle, expression fonctionnelle 2nd part (F. Bertrand)

Design (6h – CM)

Follow up of the project design and development of packs (20h – TD)

Application: how to put into practice the design steps in the development of packs by applying for contests (for example the PIDA project: BillerudKorsnas cardboard manufacturer.)

Bibliography (available at the school library)

- Package Design Now ; éditeur Taschen
- How to Fold (méthodes de pliage) ; éditeur Pépin-presse
- 1000 packaging structure ; éditeur Design Média Publishing

- Special packaging Modèles structuraux de conditionnement ; éditeur Pépin-presse





Project

UE P991

Year: 1st ESIREIMS

Semester: 6

ECTS: 14

Academic staff: depending on the topics

Assessment: writing report and oral presentation

Objectives:

To put in application the packaging skills to a practical project. This research project is supervised by one or several teachers of the school with the support of the technical staff.





SEMESTER B:

SEPTEMBER TO JANUARY

(MASTER1 LEVEL)





ESIREIMS
(ESIEC)
EC 701 B

Marketing-Business Economics

Year: 2nd ESIREIMS

Semester: 7

ECTS: 1

Academic staff: E. Lemaitre (vacataire – ELS-Concept)

Number of hours: 12 hours

Nature	lectures	tutorials	Practical work	Total
Duration(h)	8	4		12

examinations	Nature	oral	ET
	Duration (h)		
Coefficients	1st session		0.5
	2nd session		0.5

Objectives:

Train Engineer students in the company's marketing culture. Transfer students knowledge of key concepts in order to take ownership of market strategies and the main marketing approaches used within companies.

Requirements:

Ability to analyze and synthesize is essential, a good general knowledge, a general knowledge of the company via internships.

Contents:

I General definition

II Marketing Dimensions and Essential Components

- 2.1 Environmental Implications and Implications for Business Operations
- 2.2 The marketing system.
- 2.3 New managerial approaches resulting from customer orientation
- 2.4 Variables influencing the development of marketing within the company
 - Forecasting demand
 - Economic and technological changes
 - The complexity of consumer behavior
 - the proliferation of brands.

III Levels of Marketing

- 3.1 General approach of the enterprise project and declination of levels.
 - 3.1.1 Strategic Marketing
 - Corporate policies (business, specializations, costs)
 - The main strategic orientations.
 - The business plan





3.1.2 Information Marketing

Research, studies, monitoring.

The MDEE matrix.

The Marketing Intelligence System.

3.1.3 Organizational marketing

Modes of operation and management (prerequisites), customer orientation.

3.1.4 Operational Marketing

The Marketing Mix

3.2 Marketing essential process of decision making

References:

1. Marketing Management Kotler Dubois
2. Marketing Business to Business de Ph Malaval
3. Etudes de Marché de Martine Gauthy-Sinéchal Marc Vandercammen

General Competencies:

Be in a position to interact with the company's marketing departments





English

UE P702B
Academic year: 2nd ESIREIMS

Semester: 7

ECTS: 1

Academic staff: (ESIREIMS)

Number of hours

Nature	lectures	tutorials	Practical work	Total
Duration (h)		18H		18H

assessment

examinations	Nature	ET	Oral
	Duration (h)	2	
Coefficients	1st session	1,25	0,5
	2nd session	1,25	0,5

Objectives: the students must be able to

- understand and analyze scientific , technical ,marketing documents . Extract information . Understand the author's aim.
- Develop their autonomy by speaking spontaneously .Express themselves and debate on various topics giving one's opinion and justifying .
- Discover and understand the company world to apply for an internship or a job . Present their professional assets.
- Understand the specificity packaging: have a good knowledge of marketing , machines and packaging line.
- understand English-speaking people in various situations
- Write professional documents .

skills:

- 1/ understand and analyze scientific ,technical and marketing document
- 2/ extract the main information
- 3/ develop autonomy
- 4/ give one's opinion on marketing and professional subjects coherently
- 5/ master marketing and packaging vocabulary
- 6/ see the connection in marketing with other subjects
- 7/ have a good knowledge of the company world in English-speaking countries to apply for a job or an internship
- 8/present oneself in a positive way so as to put forward one's qualities and assets in an interview
- 9/ debate /explain and justify one's professional skills . Answer the questions from the interviewer.
- 10/good command of packaging vocabulary on machines and lines
- 11/ understand English-speaking people in audios
- 12/write correctly professional documents: Cvs /covering letters / internship reports and abstracts.





Contents:

The students are in small homogeneous groups.

- **Packaging:** interdisciplinary with other modules .
Vocabulary (booklet) : introduction to business English : marketing, branding, e-business, advertising sustainability , pharmaceutical industry , cosmetics , labelling , counterfeiting. Work on authentic documents , texts , videos ,case studies.
-
- **Methodology on interviews:** CVs , covering letters , job interview . Internship report
- **Communication:** develop more autonomy and ease in typical professional situation .
- **Oral skills:** interview simulation , case studies , role plays
- **Written skills:** letters CVs.

assessment:

written test: text analysis , vocabulary, questions ; MCQ, essay
oral test: professional interview simulation





ESIREIMS
(ESIEC) **EC 702C**

French language

Year: 2nd ESIREIMS

Semester: 7

ECTS: 1

Academic staff:

Number of hours : 10 hours

This module is organized by the CIEF. The International Center for French Studies (CIEF) is an internal structure at the University of Reims Champagne-Ardenne (URCA), one of the oldest universities of Europe. Its main mission is linguistic and cultural preparation of non-Francophone students for their integration into the educational curriculum offered by various components (faculties, institutes, school) University.




English: conversation

Semester: 7

ECTS: 2

Year: 2nd ESIREIMS

Academic staff: Language assistant .

Number of hours

Nature	lectures	tutorials	Practical work	Total
Duration (h)		12		12

Examinations

exam	Nature	Written exam	Oral
	Duration (h)	x	
Coefficients	1st session	x	1,75 (two sessions)
	2nd session	x	1,75(two sessions)

Assessment: Tutorials (oral text commentary) ; one oral presentation (book or film)

Objectives: Students must be able to:

- **Understand and analyze general documents** . Extract some information . Understand the author's aim
- **Develop their own autonomy to improve their language** skills (by active and spontaneous participation)
- **debate on general ideas and give one's opinion coherently**
- **organize and develop a logically-structured argument**
- **have good knowledge of general English and civilization**
- **develop some autonomy and spontaneity and create some dynamic in English** .
- **develop one's confidence**

Required skills:

B1 level / English UE of first ESIREIMS year

Contents:

The students are in small homogeneous groups: Conversation: formal and informal discussions, Presentation of books:films, Summaries from audios, Tutorials in small groups (text commentaries, Civilisation

Skills:

I can tell the plot of a film / book and my feelings about it in a logical train of thoughts.

I can generate questions / and answer the questions

I can understand the pros and cons in conversation

I can react or interact

I can understand most of a written text and reformulate the key information

I have a good vocabulary in current English





ESIREIMS
(ESIEC)

UE P704A

Interaction I, preservation, smart packaging

Academic year: 2nd ESIREIMS

Semester: 7

ECTS: 5

Academic staff: F. Fricoteaux (ESIREIMS)

I.Vroman (ESIREIMS)

A. Copinet (ESIREIMS)

Number of hours : 60

Nature	Lectures	tutorials	Practical work	Total
Duration (h)	28	16	16	60

Assessment:

examinations	Nature	ET	CC (presentations)	CC(TP)	Oral (TP)
	Duration(h)	3			
Coefficients	1st session	2.5	0,3	0,5	
	2 nd session	2.5			0,8

Objectives:

Understand gas and vapour transportation and the acting factors .

Measure the permeability and analyze the results to choose the best packaging materials

Bring knowledge on degradation mechanisms of alimentary products and bring solutions on packaging materials to slow down the effects .

Bring knowledge on active and smart packaging .

Skills:the students must be able to:

Measure the permeability of packaging materials and use the related data

Choose the best appropriate packs and packages related to the product constraints and environment

Use information linked to the product and its environment to calculate the shelf life (preservation)

Pre requisites:

General knowledge on plastics materials and processes

Knowledge in physico-chemistry (law of the perfect gases , main laws of thermodynamics , Fick Law ,...).

Contents: preservation, Water constraints, Permeability:gas and vapour, Active packaging – smart packaging, Interaction analysis methodology

Bibliography:

- Polymers permeability, J. Conyn, 1985, Elsevier Applied Science
- Food packaging and preservation: theory and practice, ed. M. Mathlouthi, 1985, Elsevier Applied Science Publishers, International Symposium
- L'emballage des denrées alimentaires de grande consommation, G. Bureau, J-L, Multon, 1989, Tec. Doc. Lavoisier, APRIA.





Packaging design and conception

UE P705C

year: 2nd ESIREIMS

Semester: 7

ECTS: 3

Academic staff: F. Bertrand (PAST ESIREIMS - Designer)

Number of hours: 14

Nature	lectures	tutorials	project	Total
Duration (h)	2	12	40	14

Assessment:

examination	Nature	Project work (Theoretical)	Oral presentation (Practical)
	Duration (h)		
Coefficients	1st session	2	2
	2nd session	2	2

Objectives:

The role of design in the development of a pack and the life cycle .

To manage the different steps of design: creative research , aesthetic propositions , (volume, decoration , printing), functional analysis and research , ergonomy , means and materials involved , blanks , digital forms , 3D mock up .

Requirements:

Design and development of packaging in compliance with the product and the market with a designer approach .

To know how to work in team , delegate the tasks and generates ideas.

To be able to achieve the study , from start to end , of a packaging design (technical , social and economic aspects)

To work on all aspects of packaging design: from the first sketches ideas to the positioning on shelves and to the design of additional items which will help to sell the products such as display packs and stands ,and ready shelf packs .

To be able to draw some shapes and concepts either by drawing, CAD or mock up with different techniques (tooling , moulding , folding , ...).

prerequisites:

packaging functions (1A) , marketing basics

Properties and aspects of materials

Adaptability materials /contents , manufacturing process.

To know the graphics techniques and volumetric design .

To be able to present orally one's creative choice and main steps and justify the technical aspects.





Contents:

Tutoring packaging design projects.

Methodology of a packaging design study

Creativity techniques.

Practical work with full study of packaging design (packaging design competitions, prospective studies or / controversial studies given by industrialists.

Project work in team

Presentation and expression techniques: (sketches, drafts, mock ups, CAD on Solidworks,)

Bibliography:

- Package Design Now, éditeur Taschen
- Design, la stratégie produit, éditeur Eyrolles
- Principes universels du design, Eyrolles.





Project

UE P991

Year: 2nd ESIReims

Semester: 7

Academic staff: depending on the topics

Assessment: writing report and oral presentation

Objectives:

To put in application the packaging skill to a practical project. This research project is supervised by one or several teachers of the school with the support of the technical staff.





ESIREIMS
(ESIEC)

Project

UE 607

Year: 2nd ESIREIMS

Semester: 7

Academic staff: depending on the topics

Assessment: writing report and oral presentation

Objectives:

To put in application the packaging skill to a practical project. This research project is supervised by one or several teachers of the school with the support of the technical staff.





ESIREIMS
(ESIEC)

SEMESTER C:

FEBRUARY TO JUNE

(MASTER1 LEVEL)



**English: conversation****EC 801A****Semester:** 8**ECTS:** 2**Year:** 2nd Esireims**Academic staff:** language assistant**Number of hours** 10

Nature	lectures	tutorials	Practical work	Total
Duration (h)		10		10

Assessment

examinations	Nature	ET	Oral
	Duration(h)	x	
Coefficients	1st session	x	1,75
	2nd session	x	1,75

Assessment: Tutorials / oral tasks**Objectives:**

The students must be able to:

- **Understand and analyse** general documents . Extract information . Understand the text in details and the writer's perspectives.
- **Develop their autonomy by speaking spontaneously..** Express themselves and debate on various topics by giving their opinion clearly.
- **Organise their ideas in a well-structured way.**
- **Understand everyday English**
- **Increase their knowledge in civilisation**

Prerequisites:**Level** B1/ 1st year English and 1st semester**Contents:**

The students are in small homogeneous groups.

- **Communication skills: to have better autonomy and fluency :**
oral expression: simulations, case studies, 'role plays', Conversation
- **General English and tutorials :** the students are able to discuss and debate in small groups on news events from written or audio documents.
- **Civilisation:** comparison between several cultures. Enlarging general vocabulary.

Requirements:

- to have autonomy and fluency
- to be able to talk and defend one's ideas.
- to gain confidence.





ESIREIMS
(ESIEC)

French language

EC 801C

Year: 2nd ESIREIMS

Semester: 8

ECTS: 1

Academic staff:

Number of hours : 20 hours

This module is organized by the CIEF. The International Center for French Studies (CIEF) is an internal structure at the University of Reims Champagne-Ardenne (URCA), one of the oldest universities of Europe. Its main mission is linguistic and cultural preparation of non-Francophone students for their integration into the educational curriculum offered by various components (faculties, institutes, school) University





English (Packaging)

UE 801D

Year: 2nd ESIReims

Semester: 8

ECTS: 1

Academic Staff: (ESIReims)

Number of hours

Nature	lectures	tutorials	Practical work	Total
Duration(h)		5h		5h

Assessment

examination	Nature	Oral
	Durée (h)	
Coefficients	1st session	1,75
	2nd session	1,75

Objectives :

The students must be able to :

- Understand the mechanical and technical process linked to packaging .
- Write a professional report (marketing / book of specifications / printing / palletisation
- Sustain and present a true project from A to Z in front of industrialists
- Work in team on a given project
- Develop autonomy and fluency with a dynamic synergy in English class.
- Integrate an international company for an internship

Requirements:

- To work on a given theme and put into practice the theoretical work of the 1st semester and 1st year
- To draw and use resources available: scientific documents , technical ones , marketing
- To extract, understand and sort out information
- To develop a new pack answering the brief
- To write the book of specifications and functional analysis as studied in class
- To describe the different steps of the project
- To lead a meeting and delegate so as to manage the project
- To develop one's autonomy and fluency , to give one's opinion and be able to convince the jury of one's choice
- To sustain an oral presentation professionally with dynamism and in a well structured way .
- To know the packaging vocabulary (printing ,machines, assembly lines)
- To write a professional report with the right rules.
- To understand English-speaking people



| École Supérieure d'Ingénieurs de Reims |

**Contents:**

The students are in small homogeneous groups .

Packaging: interdisciplinarity with the other modules .

Vocabulary (booklet): Machines and robotics , glues and adhesives, palletisation, printing..

Work on authentic supports: texts , articles, videos , translations.

Communication: more autonomy and fluency in typical professional situations

Oral expression :

Project work: design and development /marketing /printing / machines

Team work:

The students are acting like project managers (research , time management , présentation).

Written work:

Two written reports: 1/ part: marketing , book of specifications, functionality , first drafts/ideas 2/ part: technical description / machines/ printing/palletisation / final choice and mock up .

Project in autonomy (28 hours): team work / time management / research

Assessment:

Oral presentation (oral skills / question time)

Two written reports





Life cycle Analysis

EC 803 B

Semester: 8

ECTS: 1

Year: 2nd ESIREIMS

Academic staff: Professor: A. Copinet (ESIREIMS)

Number of hours: 18

Nature	Lectures	Tutorials	Practical work	Total
Duration (h)	8	10		18

Assessment:

examinations	Nature	ET
	Duration (h)	1 H
Coefficients	1st session	0.75
	2nd session	0.75

Objectives:

To know how to make and organise a life cycle analysis (LCA)

Prerequisites: none

Contents:

1. Definition and objectives of the LCA (life Cycle Analysis)

- origin, definition, concept , use of the specific tool: from the origin of the concept to the practical applications.
- Legal issues: generic introduction
- Fields of application and limits
- Economic data : costs of the tool , expected economic and financial impact

2. Preparation and realisation of a LCA: methods and practical tools

- Definition of the need
- Define the field of investigation
- Choose the appropriate method (functions, parameters and flow)
- Parameter the system , flow and impact (review and assessment of impacts)
- assess duration and cost analysis
- identify the main steps of the analysis
- Dynamic simulation: analysis, interpretation and check up

Workshop: to learn how to use the software on a specific example of products (computer room)

to choose the method - to parameter the systems , flow and impacts - to identify and define the main steps of the analysis - to partially put into practice the tool - case studies: critical analysis and drawing conclusion from the practical studies .

Requirements:

To be able to draw a LCA in compliance with the standards so as to design and develop products (goods, services , process)

To gain knowledge to understand similar related fields or packaging technical fields





ESIREIMS
(ESIEC)

To combine theory and practice to solve engineering issues and offer reliable solutions
 To manage the objectives and the computer solutions .
 To know the concepts and manipulate the data bases

Bibliography

Bare, J.C., D.W. Pennington, and H.A. Udo de Haes. 1999. Life cycle impact assessment sophistication, International Workshop, International Journal of LCA, 4: 299-306.

Bare, J.C., P. Hofstetter, D.W. Pennington, and H.A. Udo de Haes. 2000. Life Cycle Impact Assessment Midpoints vs. Endpoints - the Sacrifices and the Benefits, International Journal of LCA, Vol. 5: 319-326.

Carter W., 2000. Updated maximum incremental reactivity scale for regulatory applications. California Air Resources Board.





ESIREIMS
(ESIEC)

UE P804 A

CAD/CAM and digital simulation

Year: 2nd ESIREIMS

Semester: 8

ECTS: 4

Academic staff: Professor : R. Ayad (ESIREIMS)

Number of hours : 48

Nature	lectures	Tutorials	Practical work	Total
Duration(h)	12	27	9	48

Assessment

Examination	Nature	ET	Project
	Duration (h)	1	9
Coefficients	1st session	1	1
	2nd session	2	

Objectives:

- To deepen CAD methodology
- To get the basics of digital simulation by finite elements
- To know how to optimize the mechanical resistance of packaging under constraints

Requirements :

- To know how to choose the right model of mechanical behaviour of a pack
- To manage the design of packs (plain cardboard and corrugated)
- To manage the digital simulation tools

prerequisites:

Basic notions in finite elements 1D and 2D, Basic knowledge of material resistance, o know how to use a CAD tool (computer assisted design)

Contents: CAD software: Solidworks, Modélisation by finite elements: Solidworks Simulation

- Surface and 3D modélisation. Application to packaging
- Modélisation with finite elements of packaging issues
- Study of usual structures in mechanics in continuous fields
- 1D, 2D and 3D finite elements and thin structures (beams , shells and plates)
- Applications on computer to calculate the mechanical resistance of packaging by finite elements
- Design project and optimisation by digital simulation of a pack

Bibliography:

- R. Ayad, "The Concept of - Virtual Laboratory - for Packaging Optimisation Design ", *Proceedings of the 13th WORDPACK Conference of IAPRI 2002*, Vol. N°1, pp. 246-251, Michigan USA , 23-28 juin 2002
- R.Ayad, "Les facettes de l'emballage dans un environnement d'ingénierie collaborative.", *Actes des 4^{èmes} Journées Internationales de l'Emballage*, Reims 9-10 octobre 2002.





Packaging machinery

UE P804C

Academic year: 2nd ESIREIMS
Semester: 7

ECTS: 4

Academic staff: Marie HOLWECK
Catherine LACOSTE

Number of hours : 34

Nature	lectures	tutorials	Practical work	Total
Duration (h)	28	6		34

Assessment

examinations	Nature	ET	project
	Duration(h)	2	
Coefficients	1st session	1.75	0.25
	2nd session	2	

Objectives:

Pumps:

- Understand spray and aerosol functioning
- Know the different choices of pumps and aerosols
- Choose the right pump for the right product

Machines:

- Understand the running of machines used in packaging
- Short review of troubleshooting
- Analyze the different steps of mechanisation for the manufacturing process of a package.
- Choose the right machine for the right packaging manufacturing process.

Pre requisites:

Pumps:

- Glass ,metal and plastics materials
- Physico-chemistry

Machines:

- Glass/plastics , paper and cardboard





ESIREIMS
(ESIEC)

Contents:

- 1 Little History
- 2 Spray pump
- 3 Aerosols
- 4 Valve quality test and control
- 5 manufacturing process
- 6 Manufacturers in France
- 7 Glossary
- 8 Norm
- 9 Bibliography

Pumps and Aerosols:

1. Introduction
2. Structural analysis
3. Transfert and conveying
4. Primary plastics materials
5. Plastics packaging and tertiary packaging
6. sleeving
7. doser and feeder
8. marking and labelling

Machines:

bibliography :

- Fundamentals of packaging technology, Walter Soroka, Institute of packaging professionals, 3rd edition, 2002.
- Pressurised Packaging, G W Hallworth, the institute of packaging, 1989
- Popular Mechanics, oct 1981.
- Handbook of package engineering, J.F. Hanlon *et al.*, 3rd ed., 1998
- Aerosol valve & spray pump handbook, J. Guomin *et al.*, Cosmos Books, 1998
- <http://www.aerosolution.org/>
- Comité français des aérosols
- US 941619 « Invertible miniature atomizer of manual type », T Nozawa, 1978
- The aerosol handbook, M.A. Johnsen, W.E. Dorland, E.K. Dorland, W E Dorland Company, 1st edition, 1972.
- Southern Aerosol Technical Association Aerosol 101 – Three Piece Steel Cans March 23, 2011 - Kevin Richards – BWAY Corporation
- Documents de la société Coty





Interaction II: migration

UE P805B
year: 2nd ESIREIMS

Semester: 8

ECTS: 3

Academic staff: I. Vroman (ESIREIMS)
F. Fricoteaux (ESIREIMS)
Isabelle Séverin (AgroSup Dijon)

Number of hours: 35

Nature	lectures	tutorials	Practicals	Total
Duration (h)	16	10	9	35

Assessment:

examination	Nature	Exams	Oral presentation	practicals
	Duration (h)	2		
Coefficients	1st session	1.75	0.5	0.3
	2nd session	1.75	0.8	

Objectives:

- Understand the migration / sorption phenomena and the critical points responsible for the potential contamination of the contents and the alteration of the properties of the container
- Understand the regulation of packaging materials in contact with food (migration limits)
- Know how to evaluate the conformity of a packaging with food contact.

Requirements:

Physical chemistry of polymers, notions of plasturgy, notions multi-materials (metals, glasses, papers, cartons, glues, ink, varnish.)

Targeted skills:

- Know how to realize a global migration experience
- To be able to use the predictive tools allowing to carry out sized migration tests and to theoretically establish the conformity of a plastic packaging (software of simulation mono and multilayer)
- Control the tree of European regulations or directives relating to materials in contact with food, health monitoring bodies (eg AFSSA, EFSA, DGCCRF, etc.), associations of professionals offering a support service for the application of the regulation
- Predict qualitative and / or quantitative migration: know how to establish and prioritize different scenarios of contamination (case study)
- Awareness of the current scientific / technical issues and issues related to migration phenomena
- Be able to grasp the current areas not covered by the regulations.



**Contents:**

1. Introduction / Definition
2. Potential migrants of packaging materials
3. The consequences of interactions
4. Theoretical aspect of diffusion
5. Factors influencing migration
6. Introduction to regulation
7. Experimental techniques for determining specific and global migrations
8. Migration Prediction Tools
9. Student case study (eg functional barriers, active packaging, recycled PET, PVC plasticizers, CMV monomers, styrene, paper / cardboard case, influence of cooking / reheating mode, case of ionizing radiation, case Pharmaceutical and cosmetic products, reading / presentation / criticism of standards ...)





Project

UE P991

Year: 2nd ESIREIMS

Semester: 8

Academic staff: depending on the topics

Assessment: writing report and oral presentation

Objectives:

To put in application the packaging skill to a practical project. This research project is supervised by one or several teachers of the school with the support of the technical staff.

