

Curriculum of the program in Mechanical and Materials Engineering



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Glossary

Program

MECA Mechanical and Materials Engineering

Course codes

CHIM	Chemistry
EASI	Electrical engineering and signal processing
INFO	Computer science
LANG	Foreign languages
MATE	Materials
MATH	Mathematics
MECA	Mechanical engineering
PHYS	Physics
PROJ	Projects and internships
SHES	Humanities and social sciences

General terms

CC	Continuous examination
ET	Final examination
TC	Common course
TD	Exercices
TP	Labs
UE	Program unit

Semester 5

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
UE501 : Professional Environment	6	LANG500	Tutoring in English		12			
		LANG501	English		40.5		4	CCI (écrit et oral)
		SHES501	Sport		21		1	CC/pratique
		SHES505	Business Game		19.5		1	CC (écrit et oral)
UE502 : Engineering Sciences and Tools	12	DDRS501	Sustainable Development	12	9		1.5	CC(45%) + Projets (55%)
		EASI501	Electrical Engineering	13.5	15	12	3	CC(70%) TP(30%)
		INFO501	Number representation and algorithm design	12	10.5	16	3	CC(70%) + TP(30%)
		INFO502	Data base	6	4.5	12	1.5	CC
		MATH500	Mathematics refresher course		21			
		MATH501	Mathematics	21	19.5		3	CC
UE503 : Engineering Sciences	12	MATE551	Material	16.5	12	12	3	CC(70%) TP(30%)
		MECA501a	Applied mechanics	16.5	24		3	CC
		MECA551	Computer Aided Design and Prototyping		4.5	36	3	CC
		PHYS551	Thermodynamics and heat transfer	13.5	15	12	3	CT(75%) + TP(25%)

1. UE501 : Professional Environment

1.1. LANG500 - Tutoring in English

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	12			

Language(s) for the course

- English

Descriptif

1.2. LANG501 - English

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	40.5		4	CCI (écrit et oral)

Language(s) for the course

- English

Descriptif

This course aims at training our engineering students to obtain a minimum score of 785/990 in the TOEIC test (« Test of English for International Communication ») as required by the CTI (the accredited French National Institution supervising the award of engineering degrees. Our students are also trained to improve in all four language skills (listening, reading, writing and speaking) on a variety of (everyday life and professional) topics via the news, videos, oral presentations, mock interviews, debates, writing assignments, etc...

The students are evaluated through continuous assessment.

1.3. SHES501 - Sport

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	21		1	CC/pratique

Language(s) for the course

- French

Descriptif

This course is based on the practice of physical and sports activities and has two axes.

On the one hand, it allows the students to acquire know-how for the sports activities and to put forward their social skills, qualities required for their insertion and their professional success. This axis is based on the values conveyed by the various sports activities and their diversified modes of practice.

On the other hand, it allows the students to acquire collective skills in the realization of a project and the management of a group and also to develop their individual capacities of adaptation and regulation. This axis examines the collective organization and the implementation of a sports event on a session.

1.4. SHES505 - Business Game

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	19.5		1	CC (écrit et oral)

Language(s) for the course

- French

Descriptif

Business Games (or serious games) aim to simulate management process and are used to train and develop knowledge and skills in areas such as strategic thinking, leadership, teamwork management, financial analysis, market analysis and operations management. Like a business, games should involve people, resources and processes. The aim is to give participants an experience comparable to one in 'real-life'. A business has also to remain competitive, so business games are usually competitive in character with compressed time periods, allowing the result of decisions and policies to be seen.

2. UE502 : Engineering Sciences and Tools

2.1. DDRS501 - Sustainable Development

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
12	9		1.5	CC(45%) + Projets (55%)

Descriptif

This course aims to educate engineering students to the issue of sustainable development and its integration in enterprises' policy and enable them to take control of this aspect in their professional life.

2.2. EASI501 - Electrical Engineering

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	15	12	3	CC(70%) TP(30%)

Language(s) for the course

- French

Descriptif

Basics of electrical engineering, transient operations, direct and alternative currents.

2.3. INFO501 - Number representation and algorithm design

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
12	10.5	16	3	CC(70%) + TP(30%)

Language(s) for the course

- French
- French with documents in english

Descriptif

This course aims on the one hand to acquire the basic knowledge on the representation of information in computers and on the other hand to acquire the basics of algorithmics and programming with an introduction to the use of an object language.

2.4. INFO502 - Data base

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
6	4.5	12	1.5	CC

Language(s) for the course

- French

Descriptif

This course introduces some of the key features of relational databases. The practical classes will be applied to both general and professional issues :

- UML Entity Relationship Diagram (ERD)
- Relational Model (RM) and algebra
- SQL

2.5. MATH500 - Mathematics refresher course

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	21			

Descriptif

This course aims to reinforce the bases in mathematics .

2.6. MATH501 - Mathematics

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
21	19.5		3	CC

Descriptif

This course aims to give the basic concepts in analysis useful for engineering sciences

3. UE503 : Engineering Sciences

3.1. MATE551 - Material

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
16.5	12	12	3	CC(70%) TP(30%)

Language(s) for the course

- French

Descriptif

To know the basic concepts associated with the three main families of materials (ceramics, metals and polymers) and to introduce the concepts of composites.

3.2. MECA501a - Applied mechanics

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
16.5	24		3	CC

Language(s) for the course

- French

Descriptif

The course "Applied mechanics" leads (i) to acquire basic knowledge of continuum mechanics, (ii) to analyze the state of solicitations (stress, strain, plasticity criterion) of simple structures and (iii) to solve simple problems of continuum mechanics.

It is composed of:

- statics of non-deformable solids: 2D application,
- the states of stress and strain,
- the elastic and isotropic behavior law,
- the general equations of continuous media and the methods of resolution,
- criteria of plasticity and sizing.

3.3. MECA551 - Computer Aided Design and Prototyping

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	4.5	36	3	CC

Language(s) for the course

- French

Descriptif

This course will describe and master CAD software tools. These tools are used in mechanical engineering and production automation to make industrial prototypes. The CAD software used will be Solidworks.

3.4. PHYS551 - Thermodynamics and heat transfer

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	15	12	3	CT(75%) + TP(25%)

Language(s) for the course

- French with documents in english

Descriptif

The course describes the fundamental principles that govern the evolution of systems undergoing transformations involving energy exchanges in the form of work and heat. The three modes of heat transfer (convection, conduction and radiation) will be explored in more detail.

Semester 6

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
UE601 : Professional Environment	6	LANG600	Tutoring in English		12			
		LANG601	English		40.5		4	CC
		PROJ601	Internship Discovery of the Professional Environment					Quitus diplôme
		SHES601	Introduction to Accounting and Corporate Finance	10.5	9		1	Oral
		SHES602	Introduction to Law	15	4.5		1	CT
UE602 : Engineering Sciences	9	MATH651	Mathematics	21	18		3	CI(40%) CT(60%)
		MECA651	Applied mechanics II: Statics and fluid mechanics	10.5	18	12	3	CC (80%) TP(20%)
		MECA654	Dynamic of Mechanical Systems.	12	15	12	3	CI(30%) + CT(50%) +TP(20%)
UE603 : Digital for engineers	6	MECA652	Numerical mechanics	15	15	8	3	2-4 CC(0,7) + TP(0,3)
		MECA653	Numerical tools for engineering	7.5	7.5	24	3	Project
UE604 : Mechatronics and Mechanical Engineering	9	EASI651	Functions and Component for Electronics	13.5	9	16	3	CC(70%) + TP(30%)
		MATE651	Implementation Materials	13.5	10.5	16	3	CC(70%) TP(30%)
		MECA655	Design and mechanical technology	10.5	12	16	3	CT(70%) + TP(30%)

1. UE601 : Professional Environment

1.1. LANG600 - Tutoring in English

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	12			

Language(s) for the course

- English

Descriptif**1.2. LANG601 - English**

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	40.5		4	CC

Language(s) for the course

- English

Descriptif

This course aims at training our engineering students to obtain a minimum score of 785/990 in the TOEIC test (« Test of English for International Communication ») as required by the CTI (the accredited French National Institution supervising the award of engineering degrees. Our students are also trained to improve in all four language skills (listening, reading, writing and speaking) on a variety of (everyday life and professional) topics via the news, videos, oral presentations, mock interviews, debates, writing assignments, etc...

The students are evaluated through continuous assessment.

1.3. PROJ601 - Internship Discovery of the Professional Environment

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
				Quitus diplôme

Descriptif

Discovery of the professional environment

1.4. SHES601 - Introduction to Accounting and Corporate Finance

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
10.5	9		1	Oral

Language(s) for the course

- French

Descriptif

The objective of this course is to acquire the basics of financial management.

1.5. SHES602 - Introduction to Law

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
15	4.5		1	CT

Language(s) for the course

- French

Descriptif

The objective of this course is to obtain a basic understanding of law

2. UE602 : Engineering Sciences**2.1. MATH651 - Mathematics**

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
21	18		3	CI(40%) CT(60%)

Language(s) for the course

- French

Descriptif

This course is divided into four parts:

- Linear algebra, matrices reductions

- Euclidean and Hermitian spaces
- Sequences and series of functions, different types of convergence
- Fourier transformation

2.2. MECA651 - Applied mechanics II: Statics and fluid mechanics

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
10.5	18	12	3	CC (80%) TP(20%)

Language(s) for the course

- French

Descriptif

This course is composed of two parts:

- Calculation of forces in mechanisms and structures by applying the principle of statics.
- Calculation in incompressible fluid mechanics (statics and dynamics, notions of viscous fluids and friction loss).

2.3. MECA654 - Dynamic of Mechanical Systems.

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
12	15	12	3	CI(30%) + CT(50%) +TP(20%)

Language(s) for the course

- French

Descriptif

Training in modeling methods and calculation of forces, positions and movements in mechanisms.

3. UE603 : Digital for engineers

3.1. MECA652 - Numerical mechanics

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
15	15	8	3	2-4 CC(0,7) + TP(0,3)

Language(s) for the course

- French

Descriptif

The objective of this course is an introduction to numerical methods for the calculation of structures. The content will focus on slender structures such as trusses and beams. These structures will be analyzed analytically to introduce the RDM and then numerical to obtain finite elements.

3.2. MECA653 - Numerical tools for engineering

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
7.5	7.5	24	3	Project

Language(s) for the course

- English

Descriptif

This course aims at making students able to select and use numerical tools in the field of engineering. The general purpose programming languages Python (open source) is used extensively. The course is split into 5 blocks, each of which corresponding to a given topic (image processing, data management, machine learning, *etc...*).

4. UE604 : Mechatronics and Mechanical Engineering

4.1. EASI651 - Functions and Component for Electronics

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	9	16	3	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

The course should allow the student to make the proper choice of the design of a microelectronic model or its basic electronics building blocks for her/his personal application.

4.2. MATE651 - Implementation Materials

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	10.5	16	3	CC(70%) TP(30%)

Language(s) for the course

- French

Descriptif

Presentation and practical knowledge of the main implementation processes for materials (metals and alloys, ceramics, plastics and composites).

4.3. MECA655 - Design and mechanical technology

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
10.5	12	16	3	CT(70%) + TP(30%)

Descriptif

Introductory course in mechanical design, with functional analysis, the rules of industrial design and drawing, as well as some standard components and the basics of tolerancing. The use of software tools for modeling and calculation for the mechanical designer will also be discussed.

Semester 7

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
UE701 : Engineering Sciences MM3	9	CHIM755	Macromolecular chemistry 1 (option in Materials)	13.5	12	12	3	CC(70%) + TP(30%)
		MATE755	Smart Materials	22.5	16.5		3	CC
		MECA753	Design of Mechanical Systems and Components (option in Mechanics)	13.5	13.5	12	3	CT(70%) + TP(30%)
		MECA754	Modeling, Finite Element Method	12	10.5	16	3	CT(70%) + TP(30%)
UE702 : Mechanical, Mechatronical and composite Engineering 1	9	EASI751	Electrical Actuators (option in Mechanics)	3	12	24	3	CC(70%) + TP(30%)
		EASI752	Electronic components and functions (option in Mechanics)	13.5	9	16	3	CC(70%) + TP(30%)
		MATE752	Polymers properties 1 (option in Materials)	22.5	15		3	CC
		MECA751	Mechanics of anisotropic materials (option in Materials)	25.5	12		3	CCI
		PROJ751	Technical Project - Part 1	15	12	12	3	CC
UE703 : Industrialization and Quality	6	MATE754	Rheology (option in Materials)	19.5	10.5	8	3	CC(70%) + TP(30%)
		MECA752	Quality and Operations Management level 1	13.5	13.5	12	3	CT(70%) + TP(30%)
UE704 : Professional environment	6	LANG700w			6			
		LANG701w	English (Below B2 level)		40.5		3	CC
		LANG702w	Foreign languages (B2 level)		35		3	CC

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
		SHES703w	Professional resources and dynamics		15	4	1.5	CC (50%) + rapport et soutenance stage 3A (50%)
		SHES704w	Creativity and innovation management		25.5		1.5	CCI

1. UE701 : Engineering Sciences MM3

1.1. CHIM755 - Macromolecular chemistry 1 (option in Materials)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	12	12	3	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

This course gives knowledge of synthesis of polymers: mechanism of two main reactions.

1.2. MATE755 - Smart Materials

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
22.5	16.5		3	CC

Language(s) for the course

- French

Descriptif

This course describes some materials with specific properties used in the area of composite materials and mechatronics.

- conventional composite materials
- composite materials reinforced with natural fibers (MC)
- nanocomposite materials (MC)
- specific properties of smart materials used in sensors, actuators and mechatronic devices (MMT)
- physical phenomena involved in these materials, description of behavior models, physical properties, and applications are explained.

1.3. MECA753 - Design of Mechanical Systems and Components (option in Mechanics)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	13.5	12	3	CT(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

Learn to analyze the functioning of existing industrial machines and mechanisms, from drawings, to carry out their selection, adaptation, design or maintenance.

1.4. MECA754 - Modeling, Finite Element Method

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
12	10.5	16	3	CT(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

This course will begin with a general description of the computational problems that engineers face, mechanical or thermal, for example, as well as associated essential theoretical concepts. We then discuss the modeling operations and simplification of the model that are commonly performed. The use of a finite elements industrial software will be discussed, with practical ideas to build the model, define the physical boundary conditions and properties. We conclude by discussing the accuracy of the calculations and operating results.

2. UE702 : Mechanical, Mechatronics and composite Engineering 1**2.1. EASI751 - Electrical Actuators (option in Mechanics)**

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
3	12	24	3	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

Electrical actuators are widely present in the world of technical systems. Thus, this course, limited to electrical engines, deals with the basis necessary to understand their proceeding and their driving with static converters. Some features to choose and size these actuators are given and a focus is made on engine technologies widely found in mechanic and mechatronic systems.

2.2. EASI752 - Electronic components and functions (option in Mechanics)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	9	16	3	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

The course should allow the student to make the proper choice of the design of a microelectronic model or its basic electronics building blocks for her/his personal application.

2.3. MATE752 - Polymers properties 1 (option in Materials)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
22.5	15		3	CC

Language(s) for the course

- French

Descriptif

This course deals with glass transition, crystallization in polymers and biodegradable polymers

2.4. MECA751 - Mechanics of anisotropic materials (option in Materials)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
25.5	12		3	CCI

Language(s) for the course

- French with documents in english

Descriptif

This course will introduce students to fundamentals necessary for the understanding of variational formulation in linear elasticity, constitutive laws of anisotropic continuum (i.e. orthotropic and isotropic engineering constants). Orthotropic lamina under plane stress condition and applications to several cases in anisotropic elasticity problems will be presented.

2.5. PROJ751 - Technical Project - Part 1

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
15	12	12	3	CC

Language(s) for the course

- French

Descriptif

Description of the fundamental tools to improve or develop a technical product

3. UE703 : Industrialization and Quality**3.1. MATE754 - Rheology (option in Materials)**

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
19.5	10.5	8	3	CC(70%) + TP(30%)

Language(s) for the course

- French with documents in english

Descriptif

A good understanding of viscoelastic constitutive behavior is essential for industrial design. This course will introduce students to fundamentals necessary for the understanding of Newtonian viscous fluids, non-Newtonian viscous fluids, linear viscoelasticity (creep and relaxation, complex modulus) and measurements rheometry.

3.2. MECA752 - Quality and Operations Management level 1

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	13.5	12	3	CT(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

The aim of this course consists of the basic knowledge in the area of Operation Management and Quality. The mains subjects dealt with are the inventory management, the MRP and MRPII methods and the ISO 9000 Quality Management System.

4. UE704 : Professional environment**4.1. LANG700w -**

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	6			

Language(s) for the course

- English

Descriptif**4.2. LANG701w - English (Below B2 level)**

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	40.5		3	CC

Language(s) for the course

- English

Descriptif

This course aims at training our engineering students to obtain a minimum score of 785/990 in the TOEIC test (« Test of English for International Communication ») as required by the CTI (the accredited French National Institution supervising the award of engineering degrees).

Our students are also trained to improve in all four language skills (listening, reading, writing and speaking) on a variety of (everyday life and professional) topics via the news, videos, oral presentations, mock interviews, debates, writing assignments, etc...

The students are evaluated through continuous assessment.

4.3. LANG702w - Foreign languages (B2 level)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	35		3	CC

Language(s) for the course

- French
- French with documents in english
- English

Descriptif

A 15-hour course in English: Culture, civilisation and language.

And a 20-hour course in a second foreign language in:

- Spanish, German et Italian at Chambéry and Annecy (no beginners).
- Chinese et Japanese at Annecy (beginners accepted)

4.4. SHES703w - Professional resources and dynamics

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	15	4	1.5	CC (50%) + rapport et soutenance stage 3A (50%)

Language(s) for the course

- French

Descriptif

The objective of the module is to lead the students towards a better self-knowledge in order for them to be able to define a professional project, develop a targeted research strategy and present themselves effectively in an interview.

4.5. SHES704w - Creativity and innovation management

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	25.5		1.5	CCI

Language(s) for the course

- French

Descriptif

This module aims to introduce the students to corporate strategy, and thus enable them to be able to understand the current major corporate orientations. The emergence of new competitive practices based on externalization perspectives or cooperation through partnership training in order to share the risks and costs will be studied.

Semester 8

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
UE801 : System Me- chanic, In- dustrializa- tion and Quality	7,5	EASI851	Continuous-time Systems, Vibra- tions (option in Mechanics)	13.5	12	12	2.5	CI(20%) + CT(50%) + TP(30%)
		EASI852	Automation (option in Mechanics)	6	13.5	20	2.5	CC(70%) + TP(30%)
		MATE851	Polymer prop- erties 2 (option in Materials)	13.5	0	24	2.5	CT(25%) + TP(75%)
		MATE853	Industrial process- es for compos- ite materials - Part 1 (option in Materials)	10.5		28	2.5	CT(50%) + TP(50%)
		MECA851	Quality Control	13.5	13.5	12	2.5	CC(75% ; 3 épreuves) + TP(25%)
UE802 : Mechanical, Mechatronic- al and com- posite Engi- neering 2	10,5	INFO851	Embedded Sys- tems (option in Mechanics)	7.5	9	20	2.5	CC(70%) + TP(30%)
		MECA852	Product lifecy- cle management	9	9	20	2.5	CC(060%) + TP(40%)
		MECA853	Elements of Me- chanical De- sign (option in Mechanics)	19.5	18		2.5	CT
		MECA854	Structural analy- sis: Finite ele- ment methods for dynamics (op- tion in Materials)	18		20	2.5	CCI(70%) + TP(30%)
		MECA855	Mechanics of composite struc- tures - Part 1 (op- tion in Materials)	18	19.5		2.5	CC
		PROJ852	Technical Project - Part 2	3	7.5	28	3	CC
UE803 : Internship	6	PROJ801c	Engineering as- sistant internship				6	Rapport écrit et soute- nance orale

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
UE804 : Professional Environment	6	LANG800w	Tutoring in English		6			
		LANG801w	English (below B2 level)		40.5		3	CC
		LANG802w	Foreign languages (B2 level)		35		3	CC
		SHES802w	Integrated Management System QSE (Quality Safety Environment)	9	10.5		1.5	CC
		SHES803w	Organization theory	9	9		1.5	CC

1. UE801 : System Mechanic, Industrialization and Quality

1.1. EASI851 - Continuous-time Systems, Vibrations (option in Mechanics)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	12	12	2.5	CI(20%) + CT(50%) + TP(30%)

Language(s) for the course

- French

Descriptif

The main objective of this course is to give the knowledge to describe the dynamical behavior of continuous time systems by means of transfer functions. First and second order systems are closely analyzed in order to illustrate the important characteristics such as gain, damping, settling time, stability. Graphical descriptions such as Bode plots are introduced in the case of sinusoidal excitation. Vibration of discrete or continuous mechanical systems is an application field of these procedures.

1.2. EASI852 - Automation (option in Mechanics)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
6	13.5	20	2.5	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

Production lines in factories or electric vehicles have many and varied automated or mechatronic systems. This course deals with the basic elements required for modeling, analysis, control and implementation of automated or mechatronic systems.

1.3. MATE851 - Polymer properties 2 (option in Materials)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	0	24	2.5	CT(25%) + TP(75%)

Language(s) for the course

- French

Descriptif

This course is devoted to advanced properties of polymers and composites, especially dynamic viscoelastic properties. The practical classes are also related to MATE752 (crystallization, differential calorimetry, rheometry, ...).

1.4. MATE853 - Industrial processes for composite materials - Part 1 (option in Materials)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
10.5		28	2.5	CT(50%) + TP(50%)

Language(s) for the course

- French

Descriptif

Presentation of the main materials used in the manufacture of composite parts, the methods and the associated parameters for processing thermoset and thermoplastic composite materials.

1.5. MECA851 - Quality Control

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	13.5	12	2.5	CC(75% ; 3 épreuves) + TP(25%)

Language(s) for the course

- French

Descriptif

Training tools for controlling and improving the quality of products in production: Measuring, Modeling, Steering.

2. UE802 : Mechanical, Mechatronics and composite Engineering 2

2.1. INFO851 - Embedded Systems (option in Mechanics)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
7.5	9	20	2.5	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

This course aims to present the main features of an embedded system based on a microcontroller, such a system is designed to be buried in a mechatronic system. After presenting the main features of a microcontroller system and interface circuits that can integrate, the course covers the software aspects related to the management of exchanges (I / O, interrupts, polling, DMA ...). An implementation on a real system is then given as a micro-mechatronics project focused on micro-computer aspects. This work is designed to master the communication mechanisms of a microcontroller with its periphery. The development board used is a kind of Arduino and / or Raspberry, both of which provide an enabling environment for the implementation of these embedded applications.

2.2. MECA852 - Product lifecycle management

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
9	9	20	2.5	CC(060%) + TP(40%)

Language(s) for the course

- French

Descriptif

The Product Lifecycle Management course aims to explain what Product Lifecycle Management (PLM) is, and why it is needed. It gives participants competences that allow to establish the technical specifications, use, configure and implement tools of dedicated information system connected to the industrial product. Four main topics are addressed:

- It describes the environment in which products are developed, made and supported,
- It looks at the components of PLM, such as the product referential, processes and organization from user and administrator point of view
- It positions the technical reference of the product in the information system of the company

- The last part addresses the implementation of PLM, showing the steps of a project and typical activities such as change management.

2.3. MECA853 - Elements of Mechanical Design (option in Mechanics)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
19.5	18		2.5	CT

Language(s) for the course

- French

Descriptif

We explore parts of the machines which are frequently used in products and industrial machinery. We begin by rotating pairs using bearings or plain bearings. We continue with bearing assemblies. Concepts will be extended to sliding pairs. We will also look at gears, transmissions by pulleys and belts and chains. Finally, we consider the transformation of movement by cams, and planetary gear mechanisms, referring to the housing function, lubrication and sealing.

2.4. MECA854 - Structural analysis: Finite element methods for dynamics (option in Materials)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
18		20	2.5	CCI(70%) + TP(30%)

Language(s) for the course

- French with documents in english

Descriptif

This course allows the student who has followed a preliminary course on finite element methods in structural mechanics (static analysis) to obtain a sound foundation in variational calculus, energy methods and finite element approach for structural dynamic analysis.

2.5. MECA855 - Mechanics of composite structures - Part 1 (option in Materials)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
18	19.5		2.5	CC

Language(s) for the course

- French

Descriptif

Mechanical behavior of composite laminate. Micromechanical material laws and failure criteria for composite laminate.

2.6. PROJ852 - Technical Project - Part 2

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
3	7.5	28	3	CC

Language(s) for the course

- French

Descriptif

Implementation of fundamental skills presented in PROJ751 to the design and fabrication of a multi-physical product

3. UE803 : Internship

3.1. PROJ801c - Engineering assistant internship

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
			6	Rapport écrit et soutenance orale

Language(s) for the course

- French
- English

Descriptif

The 4th year internship is an application internship in a professional environment such as a technician or assistant engineer. The engineering student will be responsible for a specific study, the development or adaptation of new techniques or methods. This training period will be carried out in a company or organization whose activity is representative of the chosen specialty.

4. UE804 : Professional Environment

4.1. LANG800w - Tutoring in English

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	6			

Language(s) for the course

- English

Descriptif

Reprise de toutes les bases et renforcement des points de langues. 6h de cours + 6 h de travail en autonomie par semestre en groupe de 15 étudiants.

4.2. LANG801w - English (below B2 level)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	40.5		3	CC

Language(s) for the course

- English

Descriptif

This course aims at training our engineering students to obtain a minimum score of 785/990 in the TOEIC test (« Test of English for International Communication ») as required by the CTI (the accredited French National Institution supervising the award of engineering degrees).

Our students are also trained to improve in all four language skills (listening, reading, writing and speaking) on a variety of (everyday life and professional) topics via the news, videos, oral presentations, mock interviews, debates, writing assignments, etc...

The students are evaluated through continuous assessment.

4.3. LANG802w - Foreign languages (B2 level)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	35		3	CC

Language(s) for the course

- French
- French with documents in english
- English

Descriptif

A 15-hour course in English: Culture, civilisation and language.

And a 20-hour course in a second foreign language in:

- Spanish, German et Italian at Chambéry and Annecy (no beginners).

- Chinese et Japanese at Annecy (beginners accepted)

4.4. SHES802w - Integrated Management System QSE (Quality Safety Environment)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
9	10.5		1.5	CC

Language(s) for the course

- French

Descriptif

The students must be aware that the quality management system, the environmental management system and the occupational health and safety management system are today inescapable in the company. It is thus necessary for them to have sufficient knowledge of these systems to take them into account and integrate them into their engineer's job.

4.5. SHES803w - Organization theory

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
9	9		1.5	CC

Language(s) for the course

- French

Descriptif

The content of this course is deliberately descriptive and follows a very clear chronology. The programme retraces the beginnings of organization management from the end of the XIXth century to today. The course thus analyzes the main theories, research and managerial progress made during the development of companies.

This module is divided into three main themes :

- The foundations of organization management (traditional approach and school of human relations);
- The concept of organizational structure using, for example, the works of Mintzberg which highlight the opportunities and constraints in terms of design, coordination and layout of a company;
- Organizational behavior with the notions of performance, diversity, conflict, negotiation, stress...

This is a basic course in the domain of management. Students can obtain a global overview of company management and thus understand the ins and outs.

Semester 9

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
UE901 : Engineering Tools for MC	7,5	CHIM953	Macromolecul- lar chemistry 2	13.5	12	12	2.5	CC(70%) + TP(30%)
		EASI952	Automation			20	2.5	CC
		INFO951	Embedded Systems 2	9	3	24	2.5	CT(40%) + TP(60%)
		MECA952	Numerical Machining	4.5	3	32	2.5	CT
		MECA953	Robotics	13.5	13.5	12	2.5	CT(70%) + TP(30%)
		MECA954	Industrial performance	13.5	12	12	2.5	CC
		MECA958	Non-linear Mechanics	13.5	7.5	16	2.5	CC(70%) + TP(30%)
		MECA959	Damage, buck- ling and fa- tigue of com- posite structures	21	16.5		2.5	CC
UE901 : Engineer- ing tools for MMT	7,5	CHIM953	Macromolecul- lar chemistry 2	13.5	12	12	2.5	CC(70%) + TP(30%)
		EASI952	Automation			20	2.5	CC
		INFO951	Embedded Systems 2	9	3	24	2.5	CT(40%) + TP(60%)
		MECA952	Numerical Machining	4.5	3	32	2.5	CT
		MECA953	Robotics	13.5	13.5	12	2.5	CT(70%) + TP(30%)
		MECA954	Industrial performance	13.5	12	12	2.5	CC
		MECA958	Non-linear Mechanics	13.5	7.5	16	2.5	CC(70%) + TP(30%)
		MECA959	Damage, buck- ling and fa- tigue of com- posite structures	21	16.5		2.5	CC
UE902 : Mechanical and Mecha- tronical En- gineering	7,5	EASI951	Sampled time Control	13.5	12	12	2.5	CC(70%) + TP(30%)

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
		MECA955	Project : design of composite structures			38	2.5	CC
		MECA956	Mechanics of composite structures - Part 2	15	15	8	2.5	CC
		MECA957	Design of Composite Structures	7.5	15	16	2.5	CC(70%) + TP(30%)
		MECA960	Theory of mechanisms, functional dimensioning and tolerancing	13.5	12	12	2.5	CC(80%) + TP(20%)
		MECA961	Multiphysics modeling and experiments			36	2.5	CCI
UE902 : Composite material Engineering	7,5	EASI951	Sampled time Control	13.5	12	12	2.5	CC(70%) + TP(30%)
		MECA955	Project : design of composite structures			38	2.5	CC
		MECA956	Mechanics of composite structures - Part 2	15	15	8	2.5	CC
		MECA957	Design of Composite Structures	7.5	15	16	2.5	CC(70%) + TP(30%)
		MECA960	Theory of mechanisms, functional dimensioning and tolerancing	13.5	12	12	2.5	CC(80%) + TP(20%)
		MECA961	Multiphysics modeling and experiments			36	2.5	CCI
UE903 : Composites Manufacturing Technologies	5	MATE952	Industrial processes for composite materials - Part 2	4.5	4.5	28	2.5	CT(30%) + TP(70%)
		MATE953	Instrumental methods	13.5		24	2.5	CC(70%) + TP(30%)
		MECA951	Manufacturing processes	19.5	18		2.5	CC
		MECA962	Operations Management level 2	13.5	12	12	2.5	CT(50%) + TP(50%)
UE903 : Mechanical and mechatronical Engineering	5	MATE952	Industrial processes for composite materials - Part 2	4.5	4.5	28	2.5	CT(30%) + TP(70%)

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
		MATE953	Instrumental methods	13.5		24	2.5	CC(70%) + TP(30%)
		MECA951	Manufacturing processes	19.5	18		2.5	CC
		MECA962	Operations Management level 2	13.5	12	12	2.5	CT(50%) + TP(50%)
UE904 : Professional Environment	10	LANG901w	English (Below B2 level)		40.5		2.5	CC
		LANG902w	Foreign languages (B2 level)		35		2.5	CC
		PROJ901w	R and D Project			40	6	Pratique + Rapport + Soutenance
		SHES901w	Management	15	7.5		1.5	CC

1. UE901 : Engineering Tools for MC

1.1. CHIM953 - Macromolecular chemistry 2

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	12	12	2.5	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

Polymerisation methods.

1.2. EASI952 - Automation

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
		20	2.5	CC

Language(s) for the course

- French

Descriptif

Since automated systems have been based on computers, their structures have greatly changed to become distributed. This course introduces the main elements necessary to analyze, model and implement these distributed automated systems.

1.3. INFO951 - Embedded Systems 2

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
9	3	24	2.5	CT(40%) + TP(60%)

Language(s) for the course

- French
- French with documents in english

Descriptif

After a general definition of an embedded system, this course presents the different ways to allow the fabrication of a mechatronic object. The goal is to give the needed knowledge to engineers to choose the correct materials and softwares.

1.4. MECA952 - Numerical Machining

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
4.5	3	32	2.5	CT

Language(s) for the course

- French

Descriptif

This course introduces the student to CAM and with a project to the use of the numerical chain from CAD to the manufacture of the part.

1.5. MECA953 - Robotics

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	13.5	12	2.5	CT(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

This objective of this course concerns Industrial Robotics and the ability to choose a robot according to the expected tasks and industrial context: architecture, main characteristics, modeling and model inversion.

1.6. MECA954 - Industrial performance

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	12	12	2.5	CC

Language(s) for the course

- French

Descriptif

By talking about industrial performance, major concepts are involved, namely decision-making, continuous improvement process and performance measurement systems.

The aim of this course is thus the acquisition of the basic notions around the handling and the control of continuous improvement processes. Particular methods are described, respectively the Lean and the 6 Sigma ones. MACBETH illustrates the decision-making problem with regards to the expression of overall performances.

1.7. MECA958 - Non-linear Mechanics

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	7.5	16	2.5	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

Understand the main non-linear behavior of structures and how to use the associated numerical methods

1.8. MECA959 - Damage, buckling and fatigue of composite structures

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
21	16.5		2.5	CC

Language(s) for the course

- French

Descriptif

Study of damage, buckling, low energy shock and fatigue behaviors of composite structures.

2. UE901 : Engineering tools for MMT

2.1. CHIM953 - Macromolecular chemistry 2

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	12	12	2.5	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

Polymerisation methods.

2.2. EASI952 - Automation

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
		20	2.5	CC

Language(s) for the course

- French

Descriptif

Since automated systems have been based on computers, their structures have greatly changed to become distributed. This course introduces the main elements necessary to analyze, model and implement these distributed automated systems.

2.3. INFO951 - Embedded Systems 2

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
9	3	24	2.5	CT(40%) + TP(60%)

Language(s) for the course

- French
- French with documents in english

Descriptif

After a general definition of an embedded system, this course presents the different ways to allow the fabrication of a mechatronic object. The goal is to give the needed knowledge to engineers to choose the correct materials and softwares.

2.4. MECA952 - Numerical Machining

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
4.5	3	32	2.5	CT

Language(s) for the course

- French

Descriptif

This course introduces the student to CAM and with a project to the use of the numerical chain from CAD to the manufacture of the part.

2.5. MECA953 - Robotics

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	13.5	12	2.5	CT(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

This objective of this course concerns Industrial Robotics and the ability to choose a robot according to the expected tasks and industrial context: architecture, main characteristics, modeling and model inversion.

2.6. MECA954 - Industrial performance

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	12	12	2.5	CC

Language(s) for the course

- French

Descriptif

By talking about industrial performance, major concepts are involved, namely decision-making, continuous improvement process and performance measurement systems.

The aim of this course is thus the acquisition of the basic notions around the handling and the control of continuous improvement processes. Particular methods are described, respectively the Lean and the 6 Sigma ones. MACBETH illustrates the decision-making problem with regards to the expression of overall performances.

2.7. MECA958 - Non-linear Mechanics

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	7.5	16	2.5	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

Understand the main non-linear behavior of structures and how to use the associated numerical methods

2.8. MECA959 - Damage, buckling and fatigue of composite structures

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
21	16.5		2.5	CC

Language(s) for the course

- French

Descriptif

Study of damage, buckling, low energy shock and fatigue behaviors of composite structures.

3. UE902 : Mechanical and Mechatronical Engineering

3.1. EASI951 - Sampled time Control

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	12	12	2.5	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

This course deals with computer controlled systems. First time discretization and discrete transfer function modeling are introduced. Then stability analysis and simple controller design are presented.

3.2. MECA955 - Project : design of composite structures

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
		38	2.5	CC

Language(s) for the course

- French

Descriptif

- Design with Finite element method various composite structures (laminates, sandwiches...)
- Use a specific FEM software for composite structures.
- Design some composite structures (elastic modal and failure behavior)
- Write a report for the mechanical design

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3.3. MECA956 - Mechanics of composite structures - Part 2

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
15	15	8	2.5	CC

Language(s) for the course

- French

Descriptif

Design of composite structures in the case of classical plate theory and first-order shear deformation theory under thermo-elasticity and hygrothermal loadings.

3.4. MECA957 - Design of Composite Structures

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
7.5	15	16	2.5	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

Learning methods and tools for structuring the design process and design of composite structures.

3.5. MECA960 - Theory of mechanisms, functional dimensioning and tolerancing

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	12	12	2.5	CC(80%) + TP(20%)

Language(s) for the course

- French

Descriptif

We begin by calculating the efficiency of mechanical power transmission lines. Then we discuss the effects of friction in the bearings. Mechanism theory will determine the mobility and degree of hyperstaticity in mechanisms. We then discuss the choice of tolerances for mechanical assemblies, and the calculus of targets and tolerances, to meet the functional requirements.

3.6. MECA961 - Multiphysics modeling and experiments

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
		36	2.5	CCI

Language(s) for the course

- French with documents in english

Descriptif

To integrate and implement the knowledge and skills in the mechanical, electrical, instrumentation and signal processing aiming to analyze and design multiphysics systems.

4. UE902 : Composite material Engineering**4.1. EAS1951 - Sampled time Control**

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	12	12	2.5	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

This course deals with computer controlled systems. First time discretization and discrete transfer function modeling are introduced. Then stability analysis and simple controller design are presented.

4.2. MECA955 - Project : design of composite structures

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
		38	2.5	CC

Language(s) for the course

- French

Descriptif

- Design with Finite element method various composite structures (laminates, sandwiches...)
- Use a specific FEM software for composite structures.
- Design some composite structures (elastic modal and failure behavior)
- Write a report for the mechanical design

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4.3. MECA956 - Mechanics of composite structures - Part 2

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
15	15	8	2.5	CC

Language(s) for the course

- French

Descriptif

Design of composite structures in the case of classical plate theory and first-order shear deformation theory under thermo-elasticity and hygrothermal loadings.

4.4. MECA957 - Design of Composite Structures

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
7.5	15	16	2.5	CC(70%) + TP(30%)

Language(s) for the course

- French

Descriptif

Learning methods and tools for structuring the design process and design of composite structures.

4.5. MECA960 - Theory of mechanisms, functional dimensioning and tolerancing

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	12	12	2.5	CC(80%) + TP(20%)

Language(s) for the course

- French

Descriptif

We begin by calculating the efficiency of mechanical power transmission lines. Then we discuss the effects of friction in the bearings. Mechanism theory will determine the mobility and degree of hyperstaticity in mechanisms. We then discuss the choice of tolerances for mechanical assemblies, and the calculus of targets and tolerances, to meet the functional requirements.

4.6. MECA961 - Multiphysics modeling and experiments

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
		36	2.5	CCI

Language(s) for the course

- French with documents in english

Descriptif

To integrate and implement the knowledge and skills in the mechanical, electrical, instrumentation and signal processing aiming to analyze and design multiphysics systems.

5. UE903 : Mechanical and mechatronical Engineering**5.1. MATE952 - Industrial processes for composite materials - Part 2**

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
4.5	4.5	28	2.5	CT(30%) + TP(70%)

Language(s) for the course

- French

Descriptif

Introduction and analysis of industrial processes for high performance composite materials.

5.2. MATE953 - Instrumental methods

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5		24	2.5	CC(70%) + TP(30%)

Language(s) for the course

- French
- English

Descriptif

Presentation and use of the main chemical analysis techniques for polymers in composites, such as Liquid Chromatography, Infra-Red Spectrometry, Nuclear Magnetic Resonance, Mass Spectrometry, ... Use of electrochemical methods for the comprehension of metal corrosion.

5.3. MECA951 - Manufacturing processes

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
19.5	18		2.5	CC

Language(s) for the course

- French

Descriptif

This course explains the manufacturing procedures, it enables the students to establish a manufacturing process, to know the manufacturing parameters, and to know how to optimize the manufacturing conditions.

5.4. MECA962 - Operations Management level 2

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	12	12	2.5	CT(50%) + TP(50%)

Language(s) for the course

- French

Descriptif

The Semester 7 course called « Operation Management » will be extended. New operation management techniques are considered such as the Kanban, the Optimized Production Technology. Flow improvement is viewed through implantation techniques and the Lean Manufacturing approach. The location of the company is also considered to take into account the suppliers and deliverers in the flow management. Moreover the scheduling problem is dealt with through the project and the production management.

6. UE903 : Composites Manufacturing Technologies

6.1. MATE952 - Industrial processes for composite materials - Part 2

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
4.5	4.5	28	2.5	CT(30%) + TP(70%)

Language(s) for the course

- French

Descriptif

Introduction and analysis of industrial processes for high performance composite materials.

6.2. MATE953 - Instrumental methods

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5		24	2.5	CC(70%) + TP(30%)

Language(s) for the course

- French
- English

Descriptif

Presentation and use of the main chemical analysis techniques for polymers in composites, such as Liquid Chromatography, Infra-Red Spectrometry, Nuclear Magnetic Resonance, Mass Spectrometry, ... Use of electrochemical methods for the comprehension of metal corrosion.

6.3. MECA951 - Manufacturing processes

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
19.5	18		2.5	CC

Language(s) for the course

- French

Descriptif

This course explains the manufacturing procedures, it enables the students to establish a manufacturing process, to know the manufacturing parameters, and to know how to optimize the manufacturing conditions.

6.4. MECA962 - Operations Management level 2

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
13.5	12	12	2.5	CT(50%) + TP(50%)

Language(s) for the course

- French

Descriptif

The Semester 7 course called « Operation Management » will be extended. New operation management techniques are considered such as the Kanban, the Optimized Production Technology. Flow improvement is viewed through implantation techniques and the Lean Manufacturing approach. The location of the company is also considered to take into account the suppliers and deliverers in the flow management. Moreover the scheduling problem is dealt with through the project and the production management.

7. UE904 : Professional Environment

7.1. LANG901w - English (Below B2 level)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	40.5		2.5	CC

Language(s) for the course

- English

Descriptif

Our students are trained to enter the professional world where it is essential to be able to work in English. All four language skills (listening and reading, writing and speaking) are regularly practised. Our students are placed in learning contexts and situations where they can keep fine tuning their comprehension and communication skills, through role plays and debates, mock interviews, professional projects...,etc.

7.2. LANG902w - Foreign languages (B2 level)

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
	35		2.5	CC

Language(s) for the course

- French
- French with documents in english
- English

Descriptif

A 15-hour course in English: Culture, civilisation and language.

And a 20-hour course in a second foreign language in:

- Spanish, German et Italian at Chambéry and Annecy (no beginners).
- Chinese and Japanese at Annecy (beginners accepted)

7.3. PROJ901w - R and D Project

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
		40	6	Pratique + Rapport + Soutenance

Language(s) for the course

- French

Descriptif

This work consists of a detailed study concerning:

- a technological or industrial project on a topic given by an industrialist, allowing to analyze the activities of research departments that are experimental, or using technology transfer ;
- a project based on research, proposed by an industrialist or a public/private laboratory, allowing for the initiation to a research process on a joint university-industry topic ;
- a project based on the knowledge of industry which completes the specific courses on the subject.

7.4. SHES901w - Management

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
15	7.5		1.5	CC

Language(s) for the course

- French

Descriptif

Course description: This SHES course is made up of 2 independent modules : Management and Ethics. The objective of this module is to grasp the human and communication aspects of management and to develop the students' managerial assertion

Semester 10

UE	ECTS	Module	Course name	Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
UE001 : Internship	30	PROJ001	Internship				30	Soutenance, rapport écrit, évaluation entreprise

1. UE001 : Internship

1.1. PROJ001 - Internship

Class (h)	Exer. (h)	Lab. (h)	Weight	Examination
			30	Soutenance, rapport écrit, évaluation entreprise

Language(s) for the course

- French

Descriptif

This Internship takes place in a company in which engineering students have one (or more) task (s) to achieve, close (s) to his future engineering function, integrating a project approach with technical, economic and social aspects. These aspects should be highlighted in the written and oral presentation of the course even if the engineering student has not been the direct actor.