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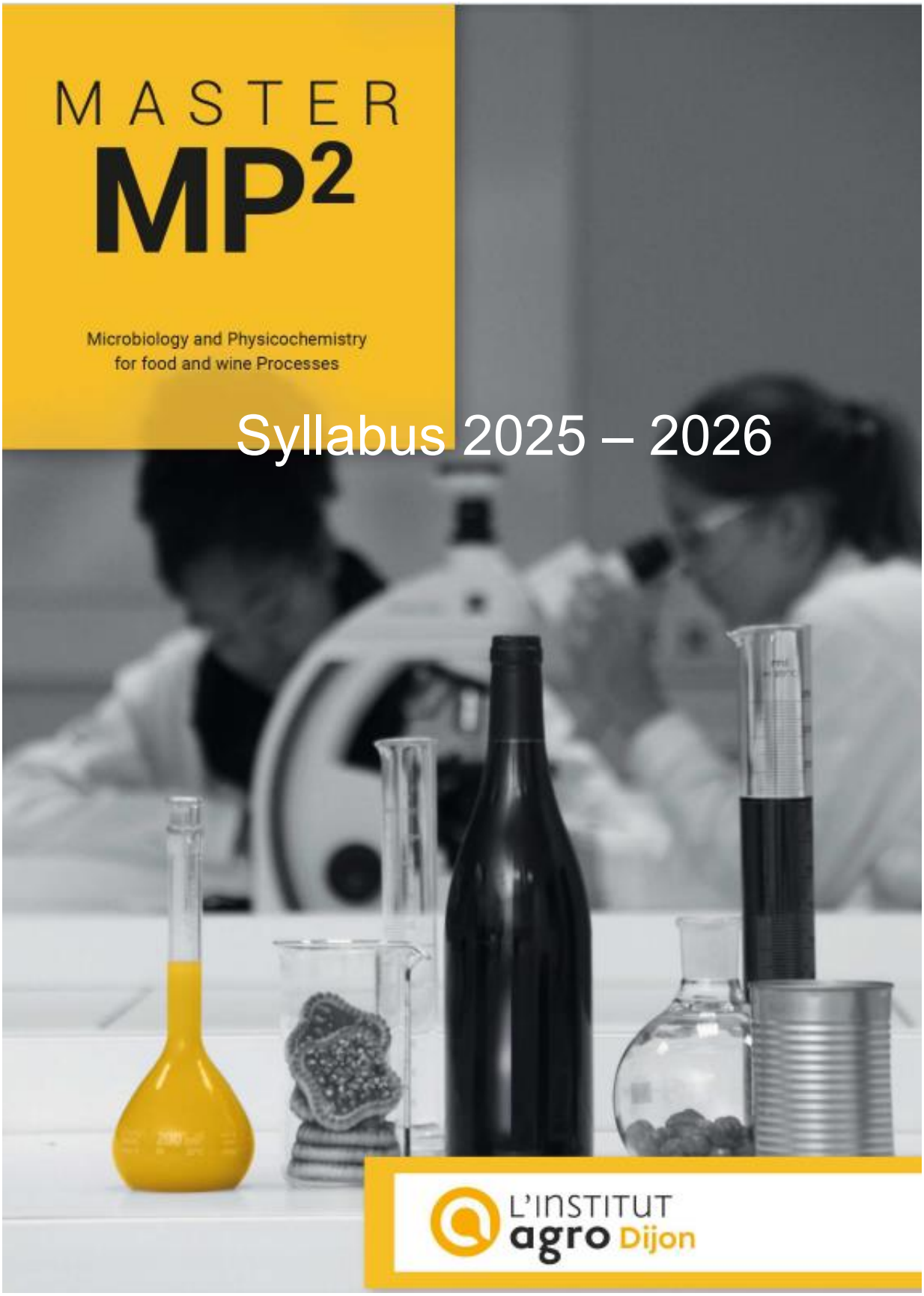
L'INSTITUT agro Dijon

MASTER MP²

Microbiology and Physicochemistry for food and wine Processes



Syllabus 2025 – 2026

L'INSTITUT agro Dijon

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Abbreviations

CM	TD	TP	ST	Vis
Cours Magistraux	Travaux Dirigés	Travaux Pratiques	Stages	Visites
Lectures	Tutorials	Practicals	Internships	Visits

CC: Contrôle Continu – Continuous Exam

CT: Contrôle Terminal – Final exam

Master 1 – Semester 1

Overview

Units 1 to 4 are common courses with the International Master P2FOOD.

Unit	Name of Unit	Names of modules	Hours	ECTS	Coeff.
Unit 1	Toolbox	Team building and intercultural communication	16	4	0
		Computing tools	6		1
		bibliographical research and analysis of scientific articles	8		1
		Discovering the local research environment, visiting laboratories	9		0
Unit 2	Statistics	Descriptive and non-parametric statistics	20	6	2
		Parametric statistics Introduction to multivariate statistics	24		2
Unit 3	Introduction to sensory evaluation	Discriminative testing, evaluation of a simple sensory variable and introduction to sensory profile	13	3	1
		Hedonic and Just-about Right tests	11		2
Unit 4	Food composition and nutrition	Food ingredients, structure and analysis	24	3	3
Unit 5	Fundamentals of food microbiology risks and processes	Basis in food microbiology : food hygiene and pathogenic micro-organisms	9	3	3
		Basis in food microbial processes: data analysis and bioreactor	11		3
Unit 6	Food Chemistry and Physico chemistry	Basis in food physics	30	6	7
		Basis in Wine chemistry	20		5
Unit 7	Microbiology and Microbiological Processes	Microbiology and Microbiological Processses	40	5	6

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-P2FOOD-S1-TC-UE01 : Toolbox
Compulsory module

D-M1MP2-P2FOOD-S1-TC-UE01-M01

Team building and intercultural communication

Nb hours/student	16				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	-	16	-	-	-
Nb groups	-	1	-	-	-

Responsible teachers	Gaelle ARVISENET, Stephane GUYOT, Elias BOU MAROUN
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	
Sustainable development objectives	Resource module, not concerned

Module objectives	- Become familiar with the university studies in France and the field of studies - Control speech and discourse coherence. - Achieve systematic harmonious oral practice using English language - Express an opinion, facilitate a meeting, become familiar with talks and participate in a scientific conversation
Learning objectives	
Pre-requisite	Language Requirements: the language of instruction for master's programs offered by Agrosup Dijon is English. Candidates must demonstrate proficiency in English by submitting standardized English language test scores. The following tests will be requested as a certification of the required English level : CECRL: level B2 minimum TOEFL: 87 points minimum TOEIC: 785 points minimum BULATS: 60 points minimum First Certificate English of Cambridge Bright Language Test: level 3 minimum IELTS : Level 6 minimum Candidates whose mother language is English are normally exempt from this requirement.
Content	

Assessments	CC: certificate of presence
Coefficient	-

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-P2FOOD-S1-TC-UE01 : Toolbox
Compulsory module

D-M1MP2-P2FOOD-S1-TC-UE01-M02

Computing tools

Nb hours/student	6				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	-	6	-	-	-
Nb groups	-	1	-	-	-

Responsible teachers	Gaelle ARVISENET, Stephane GUYOT, Elias BOU MAROUN
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Intervenants Internes	Ludovic JOURNAUX, Pierre-Yves LOUIS, Laurence DUJOURDY

Module objectives	discovering or improving knowledg of computing tools required for several units of the M1
Learning objectives	Become more comfortable using spreadsheets and statistical software
Pre-requisite	
Content	

Assessments	Continuous exam in group
Coefficient	1

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-P2FOOD-S1-TC-UE01 : Toolbox
Compulsory module

D-M1MP2-P2FOOD-S1-TC-UE01-M03

Bibliographical research and analysis of scientific articles

Nb hours/student	8				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	2	6	-	-	-
Nb groups	1	1	-	-	-

Responsible teachers	Gaelle ARVISENET, Elias BOU MAROUN, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	
Sustainable development objectives	Resource module, not concerned

Module objectives	Familiarize students with the tools of scientific literature
Learning objectives	use a reference manager Read a scientific paper Write a structured abstract
Pre-requisite	
Content	use a reference manager Read a scientific paper Write a structured abstract

Assessments	CC: Individual writing
Coefficient	1

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-P2FOOD-S1-TC-UE01 : Toolbox
Compulsory module

D-M1MP2-P2FOOD-S1-TC-UE01-M04

Discovering the local research environment, visiting laboratories

Nb hours/student	9				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	4	-	-	-	5
Nb groups	1	-	-	-	1

Responsible teachers	Elias BOU MAROUN, Stephane GUYOT, Gaelle ARVISENET
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Module objectives	Students will discover Research will visit the main local research lab in their field (CSGA or PAM)
Learning objectives	Meet researchers and doctoral students, understand the research themes for which the Master's degree prepares you, and identify the different ways in which you can enter a career in research after graduating.
Pre-requisite	
Content	Laboratory visits and short presentations of research projects

Assessments	CC: certificate of presence
Coefficient	-

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-P2FOOD-S1-TC-UE02 : Statistics
Compulsory module

D-M1MP2-P2FOOD-S1-TC-UE02-M01

Descriptive and non-parametric statistics

Nb hours/student	20				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	8	-	12	-	-
Nb groups	1	-	0.5	-	-

Responsible teachers	Laurence DUJOURDY, Stephane GUYOT, Elias BOU MAROUN
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Intervenants Internes	Walid HORRIGUE, Pierre-Yves LOUIS, Ludovic JOURNAUX

Module objectives	In this Unit, students will learn to carry out the statistical analyses needed to properly analyze the different data usually collected when studying consumers' choices and behavior.
Learning objectives	Students will learn the different statistical tests and how to choose a test according to the nature of the dataset they need to analyze. They will apply the statistical tests with Excel, R with GUI Jamovi, and R with RStudio
Pre-requisite	
Content	- Descriptive statistics, graphs, - Uni va iate statistics - confidence intervals, estimation - Classical hypotheses tests: Student, Fisher, Rank tests,

Assessments	CC: Oral presentation in group
Coefficient	2

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-P2FOOD-S1-TC-UE02 : Statistics
Compulsory module

D-M1MP2-P2FOOD-S1-TC-UE02-M02

Parametric statistics Introduction to multivariate statistics

Nb hours/student	24				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	12	12	-	-	-
Nb groups	1	1	-	-	-

Responsible teachers	Walid HORRIGUE, Elias BOU MAROUN, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Intervenants Internes	Pierre-Yves LOUIS

Module objectives	In this Unit, students will learn to carry out the statistical analyses needed to properly analyze the different data usually collected when studying consumers' choices and behavior.
Learning objectives	Students will learn the different statistical tests and how to choose a test according to the nature of the dataset they need to analyze. They will apply the statistical tests with Excel, R with GUI Jamovi, and R with RStudio
Pre-requisite	
Content	- One-way ANOVA, tests post-hoc, Kruskal-Wallis - Multi-way ANOVA - Introduction to multivariate analysis

Assessments	CT: Individual writing	CC: Written report in group
Coefficient	1	1

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-S1-AA-UE03 : Introduction to sensory evaluation
Compulsory module

D-M1MP2-P2FOOD-S1-TC-UE03-M01

Discriminative testing, evaluation of a simple sensory variable and introduction to sensory profile

Nb hours/student	13				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	4	-	9	-	-
Nb groups	1	-	-	-	-

Responsible teachers	Gaelle ARVISENET, Elias BOU MAROUN, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Intervenants Internes	Helene LABOURE, Virginie DANTEN

Module objectives	This course will provide students with an introduction to sensory evaluation applied to product development.
Objectifs d'apprentissage -	1) acquiring an understanding of sensory evaluation methodologies and their application to food development; 2) identify the components of a good sensory tests protocol, understanding the importance of a properly writing of protocols 3) interpret the results of discriminative sensory tests, analyse an attribute difference test
Pre-requisite	Statistics (Unit2)
Content -	**What is sensory evaluation** and why using it in sensory evaluation? **Discrimination tests (**triangle test, 2AFC, 3 AFC, 2 out of 5, Tetrad) Principle, preparation of a test, data collection, data analysis & interpretation, report writing. Attribute difference test: data analysis

Assessments	CT: Individual writing
Coefficient	1

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-S1-AA-UE03 : Introduction to sensory evaluation
Compulsory module

D-M1MP2-P2FOOD-S1-TC-UE03-M02

Hedonic and Just-about Right tests

Nb hours/student	11				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	3	8	-	-	-
Nb groups	1	1	-	-	-

Responsible teachers	Gaelle ARVISENET, Helene LABOURE, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Intervenants Internes	Virginie DANTEN

Module objectives	Acquiring an understanding of sensory evaluation methodologies based on hedonic response, and their application to food development;
Learning objectives	Carry out an hedonic test choose a statistical test according to the nature of the dataset to be analyzed Analyse the results, write a report
Pre-requisite	Module "Discriminative testing, evaluation of a simple sensory variable and introduction to sensory profile " of the same Unit
Content	Consumer tests: protocol, data collection, analysis, writting of a report JAR test; data analysis & interpretation

Assessments	CC: Written report in group	CT: Assessment by the tutor
Coefficient	1	1

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-S1-AA-UE04 : Food composition and nutrition
Compulsory module

D-M1MP2-S1-AA-UE04-M01

Food ingredients, structure and analysis

Nb hours/student	24				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	12	-	12	-	-
Nb groups	1	-	1	-	-

Responsible teachers	Gaelle ARVISENET, Elias BOU MAROUN, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	
Sustainable development objectives	Resource module, not concerned

Intervenants Internes	Camille LOUPIAC

Module objectives	Acquire basic knowledge of the structure of food ingredients (proteins, lipids, sugars, other molecules such as vitamins-pigments-minerals) and the means and principles of analysis methods.
Learning objectives	
Pre-requisite	
Content	- Lectures: Proteins. Polysaccharides. Lipids. Antioxydants.Vitamins. Minerals. - Practicals: Proteins. Polysaccharides. Lipids. Antioxydants.Vitamins. Minerals.

Assessments	CT: Individual writing	CC: Written report in group	CC: Individual writing
Coefficient	2	0.5	0.5

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-S1-AA-UE05 : Fundamentals of food microbiological risks and processes
Compulsory module

D-M1MP2-S1-AA-UE05-M01

Basis in food microbiology: food hygiene and pathogenic micro- organisms

Nb hours/student	9				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	4	5	-	-	-
Nb groups	1	1	-	-	-

Responsible teachers	Elias BOU MAROUN, Stephane GUYOT, Gaelle ARVISENET
Department/Pedagogical units	AGRONOMIE, AGROEQUIPEMENTS, ELEVAGE, ENVIRONNEMENT
Skills	
Sustainable development objectives	Sustainable consumption and production, Lutte contre le changement climatique

Intervenants externes	Géraldine Klein

Module objectives	The objective of these courses is to provide a basic knowledge of food microbiology. The course provides an overview of microorganisms of interest (as ferments and probiotics) and undesirable microorganisms (as foodborne pathogens and alteration flora) in the food industry. Special attention will be given to hygiene in food production. A focus on energetic metabolism will be done to allow students to well understand how environmental conditions such as absence/presence of oxygen affect the behavior of microorganisms.
Learning objectives	-Identification of microorganisms of interest -Identification of foodborne pathogens and alteration flora with special attention to pathogen/food matrix combinations -Knowledge of bacterial energy metabolism -Knowledge of hygiene rules for the management of microbiological risk in food
Pre-requisite	Basic knowledge of cell biology: Definition of a cell
Content	Introduction to cell biology with a focus on food microbiology by the means of courses and a oral presentation (student groups)

Assessments	CT: Individual writing	CC: Oral presentation in group
Coefficient	2	1

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-S1-AA-UE05 : Fundamentals of food microbiological risks and processes
Compulsory module

D-M1MP2-S1-AA-UE05-M02

Basis in food microbial processes: data analysis and bioreactor

Nb hours/student	11				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	5	6	-	-	-
Nb groups	1	1	-	-	-

Responsible teachers	Gaelle ARVISENET, Elias BOU MAROUN, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	
Sustainable development objectives	Sustainable consumption and production

Module objectives	The objective of these courses is to learn the main characteristics of microbial growth in appropriate bioreactors (as fermentors). The course is mainly related to the analysis of bacterial growth curves obtained under different conditions to allow students to quantify key parameters such as lag time and growth rate by considering data from growth curves. Growth conditions (e.g. temperature, aw, osmotic pressure) encountered in food matrices as well as in bacterial production will be considered.
Learning objectives	-Know the main characteristics of a bioreactor. -Knowledge of the different steps of bacterial and yeast division at the single cell level. -Knowledge of the main parameters that characterize microbial growth. -Quantify these parameters by considering data from a growth curve (graph and table) -Knowledge of the different types of energy sources for microorganisms (as autotrophic, heterotrophic, phototrophic and chemotrophic species)
Pre-requisite	Basic knowledge of cell biology: Definition of a cell
Content	Courses + oral presentation (poster)

Assessments	CT: Individual writing	CC: Individual writing	CC: Oral presentation in group
Coefficient	2	0.5	0.5

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-S1-AA-UE06 : Food Chemistry and Physico chemistry
Compulsory module

D-M1MP2-S1-AA-UE06-M01

Basis in food physics

Nb hours/student	30				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	12	14	4	-	-
Nb groups	1	1	1	-	-

Responsible teachers	Elias BOU MAROUN, Stephane GUYOT, Gaelle ARVISENET
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	
Sustainable development objectives	Sustainable consumption and production

Intervenants Internes	Dominique CHAMPION, Nicolas SOK, Camille LOUPIAC

Module objectives	- Basic knowledge of the impact of physicochemical parameters applied to food ingredients - Basic knowledge of the principles of chromatography and spectroscopy applied to foods
Learning objectives	
Pre-requisite	
Content	- Lecture: Introduction to Food complexity - Lecture: Biochemistry of food colloids: (lipids, proteins, polysaccharides, ….) structure and functionalities, Impact of processes - Lecture: Physical chemistry: Physical state, stability under T, RH, P… - Lecture: Analytical chemistry applied to food and ingredients structure and stability: chromatography, spectroscopy - Tutorial: Sugars (maillard), proteins (solubility-functionalities) - Tutorial: Physical chemistry: physical state /texture/ stability - Tutorial: Ingridients analysis - Tutorial: Practical class briefing: proteins powders - Practical: Proteins Powders : analysis and functionalities

Assessments	CC: Written report in group	CT: Individual writing
Coefficient	2	5

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-S1-AA-UE06 : Food Chemistry and Physico chemistry
Compulsory module

D-M1MP2-S1-AA-UE06-M02

Basis in Wine chemistry

Nb hours/student	20				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	8	8	4	-	-
Nb groups	1	1	1	-	-

Responsible teachers	Elias BOU MAROUN, Stephane GUYOT, Gaelle ARVISENET
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	
Sustainable development objectives	Sustainable consumption and production

Intervenants externes	Maria Nikolantonaki, Régis Gougeon

Module objectives	The objective of this teaching unit is to provide students with a comprehensive understanding of wine composition and analysis, including the fundamental aspects of grapevine and wine components. Through lectures, tutorials, and practical sessions, students will explore wine oxidation, processing, stability, color, and polyphenols, and will gain hands-on experience with wine analysis techniques and the effects of various factors on wine quality.
Learning objectives	
Pre-requisite	
Content	- Lecture: Introduction to Wine and grapevine composition - Lecture: introduction to wine analysis - Tutorial: wine oxidation and processing and stability - Tutorial: Wine color and proteins powders - Practial: Wine color and polyphenols

Assessments	CC: Written report in group	CC: Individual oral
Coefficient	2	3

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 1

D-M1MP2-S1-AA-UE07 : Microbiology and Microbiological Processses
Module Facultatif

D-M1MP2-S1-AA-UE07-M01

Microbiology and Microbiological Processses

Nb hours/student	40				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	16	16	8	-	-
Nb groups	1	1	-	-	-

Responsible teachers	Elias BOU MAROUN, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	
Sustainable development objectives	Sustainable consumption and production, Recours aux énergies renouvelables, Lutte contre le changement climatique

Module objectives	Knowledge of the microbial world and potential applications (environmental, agri-food) and food processes used to preserve microorganisms of interest and kill unwanted microorganisms. Courses are related to: -Food microbiological processes: preservation processes of microorganisms of interest, food decontamination, innovations and a focus on heat transfer in food processes - Microbial stress response (bacteria and yeasts) -Virulence mechanisms of some foodborne pathogens (such as EHEC, Listeria monocytogenes, Clostridium botulinum and Cronobacter sakazakii) -Fundamentals of food parasitology -Focus on analyzing data, especially statistical analysis
Learning objectives	- Knowledge of major food microbiology processes -Knowledge of heat transfer fundamentals for microbial process design -Knowing how to perform statistical tests to analyze data -Knowledge of the mechanisms of virulence and stress response of food borne pathogens
Pre-requisite	Basic knowledge of cell biology: Definition of a cell Basic knowledge of mathematics
Content	Introduction to microbiological food processes used to preserve microorganisms of interest (ferments and probiotics) and to fight against undesired microorganisms (foodborne pathogens and alteration flora). Introduction to heat transfer in food processes

Assessments	CC: Oral	CT: Individual writing
Coefficient	2	4

Master 1 – Semester 2

Overview

The second semester is organized around an academic mobility amongst our university partners in Europe. The mobility is equivalent to 30 ECTS.

Due to their particular profiles such as a work-study students (alternation) or Eiffel/BGF scholars, a few of our students may have to stay in France during the mobility period.

In order to obtain the compulsory 30 ECTS to validate their 1st year, a back-up programme is proposed. It includes courses and practicals with P2FOOD students and an internship with a report to write and defend.

Unit	Name of Unit	Names of modules	Hours	ECTS	Coeff.
Unit 8	Fundamentals of neuro-psychology	Neurobiology of memory and emotions	26	2	3
Unit 9	Descriptive sensory analysis	Multivariate statistics	14	3	2
		Sensory profile and rapid descriptive sensory tests	18		3
Unit 10	Food texture and aroma	Properties and analysis of aroma compounds	14	3	1
		Food structure and rheological properties	6		1
Unit 11A	Analytical chemistry applied to food fraud	Analytical chemistry applied to fraud in food	24	3	3
Unit 12	Discovering business and research	Job hunting	16	4	0
		Scientific writting	10		3
		Discovering career prospects	10		1
Unit 13A	Internship	Literature review of the internship	6	12	2
		Internship report and defense	0		10
Unit 14A	New sources of proteins	New sources of proteins	24	3	3

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 2

D-M1MP2-S2-AA-UE08 : Fundamentals of neuro-psychology
Compulsory module

D-M1MP2-P2FOOD-S2-TC-UE08-M01

Neurobiology of memory and emotions

Nb hours/student	26				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	20	2	4	-	-
Nb groups	1	1	0.5	-	-

Responsible teachers	Elias BOU MAROUN, Gaelle ARVISENET, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Intervenants externes	Frédérique Datiche

Module objectives	The aim of this course is to present to the students various factors known to influence the process of food choice, translating the acceptance or the rejection of a food.
Learning objectives	Students will discover how the eating habits, even if motivated by internal needs for energy order, stay a voluntary behavior based on the consumer's decision. They will identify the multiple factors involved in this decision, and the 2 systems involved in feeding behavior: the homeostatic system and the hedonic system. Finaly, they will adress the learning and memory processes, the emotional dimension of eating, the food palatability and reward.
Pre-requisite	
Content	lectures: -Neurosciences basics: human brain anatomy -Neuroanatomical and functional basis of memory -Role of learning & memory processes in feeding behavior -Brain and reward circuit

	-Neuroanatomical substrate of emotions Tutorial : physiology of food intake Practical: Brain neuroanatomy : illustration of regions involved in memory, emotions, reward and food intake

Assessments	CT: Individual writing	CC: Oral presentation in group
Coefficient	2	1

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 2

D-M1MP2-P2FOOD-S2-TC-UE09 : Descriptive sensory analysis
Compulsory module

D-M1MP2-P2FOOD-S2-TC-UE09-M01

Multivariate statistics

Nb hours/student	14				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	5	9	-	-	-
Nb groups	1	1	-	-	-

Responsible teachers	Gaelle ARVISENET, Pierre-Yves LOUIS, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Intervenants Internes	Pierre-Yves LOUIS

Module objectives	Students will discover multivariate statistics and their applications.
Learning objectives	Comprehensive exploration of complex datasets obtained in the fields of sensory analysis and consumer science.
Pre-requisite	Unit "Statistics" of 1st semestre of M1 STAAE
Content	ACP, AFC, AFM, DISTATIS, ... HCA and cluster analysis,

Assessments	CC: Written report in group
Coefficient	2

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 2

D-M1MP2-P2FOOD-S2-TC-UE09 : Descriptive sensory analysis
Compulsory module

D-M1MP2-P2FOOD-S2-TC-UE09-M02

Sensory profile and rapid descriptive sensory tests

Nb hours/student	18				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	2	6	10	-	-
Nb groups	1	1	0.5	-	-

Responsible teachers	Elias BOU MAROUN, Stephane GUYOT, Gaelle ARVISENET
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Module objectives	discover rapide descriptive sensory methods
Learning objectives	Understand the interests and limits of the rapids descriptive methods, and be able to choose the most appropriate method to aswer a specific question. Carry out the test, analyze and interpret data
Pre-requisite	Units "Statistics" and "Perception and introduction to sensory evaluation", semester 1 Master 1 STAAE
Content	Students will work in group Introduction to descriptive methods (Lecture, 1h) Bibliography (tutorial, 2h) Choice of a method and conception of a protocol to answer a specific objective (tutorial, 2h) Organization of the test and data collection (practical, 4h) Formatting, checking and analyzing data (tutorial and practical, 6h) Presentation of the method to other groups and professors

Assessments	CC: Oral presentation in group
Coefficient	3

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 2

D-M1MP2-P2FOOD-S2-TC-UE10 : Food texture and aroma
Compulsory module

D-M1MP2-P2FOOD-S2-TC-UE10-M01

Properties and analysis of aroma compounds

Nb hours/student	14				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	8	-	6	-	-
Nb groups	1	-	0.5	-	-

Responsible teachers	Gaelle ARVISENET, Helene LABOURE, Elias BOU MAROUN
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Intervenants Internes	Elias BOU MAROUN
Intervenants externes	Jordi Ballester, Eric Neyraud, Jose Piornos-Martinez

Module objectives	Students will discover the properties and fromation of aroma compounds, as well and the analysis techniques that allow to study compounds responsible of aroma
Learning objectives	Students will discover the properties and fromation of aroma compounds, as well and the analysis techniques that allow to study compounds responsible of aroma
Pre-requisite	
Content	Properties of volatile and aroma compound The properties a volatile compounds must have to be odorant Origin of food aroma compounds Methods of extraction and analysis of aroma compounds

Assessments	CT: Individual writing
Coefficient	1

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 2

D-M1MP2-P2FOOD-S2-TC-UE10 : Food texture and aroma
Compulsory module

D-M1MP2-P2FOOD-S2-TC-UE10-M02

Food structure and rheological properties

Nb hours/student	6				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	2	-	4	-	-
Nb groups	1	-	0.5	-	-

Responsible teachers	Stephane GUYOT, Gaelle ARVISENET, Helene LABOURE
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Module objectives	Students will understand the relation between food structure and texture, and discover rheological methods to study food texture
Learning objectives	Students will understand the relation between food structure and texture, and discover rheological methods to study food texture
Pre-requisite	
Content	

Assessments	CC: Written report in group
Coefficient	1

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 2

D-M1MP2-S2-AA-UE11A : Analytical chemistry applied to food fraud
Compulsory module

D-M1MP2-S2-AA-UE11A-M01

Analytical chemistry applied to fraud in Food

Nb hours/student	24				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	10	6	8	-	-
Nb groups	1	1	0.5	-	-

Responsible teachers	Gaelle ARVISENET, Elias BOU MAROUN, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	
Sustainable development objectives	Resource module, not concerned

Intervenants Internes	Elias BOU MAROUN, Nicolas SOK, Laurence DUJOURDY

Module objectives	The aim of the module is to present the specific use of analytical chemistry applied to the analysis of fraud in raw materials and food. Skills: Knowing the different types of fraud. Knowing how to choose the appropriate analytical technique for the product and especially for the fraud. Being able to lead a group analysis project based on a concrete case.
Learning objectives	
Pre-requisite	
Content	Introduction to types of fraud and their consequences. Presentation of the DGCCRF and the inspector's profession. Visit to an analysis platform. Use of chromatographic methods to detect fraud. Use of spectroscopic methods to detect fraud. Pre-treatment of samples. Statistical processing of analysis results. Chemical assays. Group projects on the use of analytical chemistry in detecting fraud in products such as milk, oils, juices, wine, chocolate, honey, etc.

Assessments	CC: Oral presentation in group
Coefficient	3

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 2

D-M1MP2-P2FOOD-S2-TC-UE12 : Discovering business and research
Compulsory module

D-M1MP2-P2FOOD-S2-TC-UE12-M01

Job hunting

Nb hours/student	16				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	-	16	-	-	-
Nb groups	-	1	-	-	-

Responsible teachers	Gaelle ARVISENET, Elias BOU MAROUN, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Module objectives	Preparation for professional life
Learning objectives	Students will learn to identify their skills and to write a convincing application for an internship or a job
Pre-requisite	
Content	

Assessments	CC: certificate of presence
Coefficient	-

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 2

D-M1MP2-P2FOOD-S2-TC-UE12 : Discovering business and research
Compulsory module

D-M1MP2-P2FOOD-S2-TC-UE12-M02

Scientific writting

Nb hours/student	10				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	-	10	-	-	-
Nb groups	-	1	-	-	-

Responsible teachers	Gaelle ARVISENET, Elias BOU MAROUN, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Module objectives	Develop scientific writing skills in preparation for the writting of M1 internship dissertation and Master's thesis
Learning objectives	Develop scientific writing skills in preparation for the writting of M1 internship dissertation and Master's thesis
Pre-requisite	UNit Toolbox, module "Bibliographical research and analysis of scientific articles" of M1 STAAE
Content	Identify the different types of scientific documents Know the structure of a scientific paper, Identify the main stages in the writing process, Find relevant sources and evaluate their trustfulness Set the context of a scientific project Be able to draw interpretation from scientific results, and to compare them with published results

Assessments	CC: Individual writing
Coefficient	3

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 2

D-M1MP2-P2FOOD-S2-TC-UE12 : Discovering business and research
Compulsory module

D-M1MP2-P2FOOD-S2-TC-UE12-M03

Discovering career prospects

Nb hours/student	10				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	-	-	10	-	-
Nb groups	-	-	-	-	-

Responsible teachers	Gaelle ARVISENET, Elias BOU MAROUN, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	To come
Sustainable development objectives	Resource module, not concerned

Module objectives	Preparation for professional life
Learning objectives	Studients will discover the possible outlets for the Master's degree in companies and research laboratories They will start creating their prefessional network
Pre-requisite	
Content	Students work by group and prepare a presentation about a specific type of outlet. They interview professionals, and prepare a presentation, that will be used for a discussion with the other students of the group

Assessments	CC: Oral presentation in group
Coefficient	1

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 2

D-M1MP2-S2-AA-UE13A : Internship
Compulsory module

D-M1MP2-S2-AA-UE13A-M01

Litterature review of the internship

Nb hours/student	6				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	-	6	-	-	-
Nb groups	-	1	-	-	-

Responsible teachers	Gaelle ARVISENET, Elias BOU MAROUN, Stephane GUYOT
Department/Pedagogical units	
Skills	
Sustainable development objectives	Sustainable consumption and production

Module objectives	
Learning objectives	
Pre-requisite	
Content	

Assessments	CC: Individual writing
Coefficient	2

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 2

D-M1MP2-S2-AA-UE13A : Internship
Compulsory module

D-M1MP2-S2-AA-UE13A-M02

Internship report & defense

Nb hours/student	0				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	-	-	-	-	-
Nb groups	-	-	-	-	-

Responsible teachers	Gaelle ARVISENET, Elias BOU MAROUN, Philippe GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	
Sustainable development objectives	Sustainable consumption and production

Module objectives	
Learning objectives	
Pre-requisite	
Content	

Assessments	CT: Internship report	CT: Internship oral defense
Coefficient	5	5

Master 1 Microbiology and Physicochemistry for food and wine processes - MP² - Microbiologie et physicochimie pour les procédés alimentaires et viticoles
SEMESTRE 2

D-M1MP2-S2-AA-UE14A : New sources of proteins
Compulsory module

D-M1MP2-S2-AA-UE14A-M01

New sources of proteins

Nb hours/student	24				
Pedagogical form.	CM	TD	TP	ST	Vis
Nb hours	6	6	12	-	-
Nb groups	1	1	1	-	-

Responsible teachers	Gaelle ARVISENET, Elias BOU MAROUN, Stephane GUYOT
Department/Pedagogical units	SCIENCES ALIMENTS-NUTRITION
Skills	
Sustainable development objectives	Sustainable consumption and production, Lutte contre le changement climatique

Intervenants Internes	Camille LOUPIAC, Aurelie LAGORCE

Module objectives	To know, understand, and analyze the potential and barriers in terms of the use of unconventional proteins (insects, plant-based, algae) in human and animal food (lectures, tutorials, and practical work in the form of projects).
Learning objectives	
Pre-requisite	
Content	Chemical analysis and functionality of unconventional proteins. Practical work and tutorials based on projects and lectures with contributions from professionals on socio-economic issues and production.

Assessments	CC: Oral presentation in group	CC: Individual written report
Coefficient	1.5	1.5

Master 2 – Semester 3

Overview (in progress)

The structure of the courses for the academic year 2025-2026 is currently a work in progress. The tables and information given here are subject to change.

Note: The following pages are describing the teaching units in general – The description of the included modules will come later.

The organization of the first semester of the second year of the Master MP2 varies according to the option/specialty chosen by the student: **Food microbiology** vs **Food physicochemistry.**

FOR ALL

Unit	Name of Unit	Contents to come	Hours (TBC)
Unit 1	Toolbox	Research project	35
		Communication	
		Statistical analysis	

Option MICROBIOLOGY

Unit	Name of Unit	Contents to come	Hours (TBC)
Unit 2A	Microbiology applied to food safety: pathogen and flora alterations	Microbial Risk Assessment in Modified Atmosphere Packaging (MAP) Technology	6
		Predictive microbiology (Sym'Previus, growth and death)	8
		Spoilage microbiologyin wine	3
		Development of a scientific approach to a elucidate a question related to pathogenicity	21
		Basics in virology and environmental virology	8
		New technologies in food virology (detection of viruses in foods)	4
Unit 3A	Interactions and adaptation of microorganisms to teir environment	Sequencing technologies to study the microbiota (in different environments)	6
		The human intestinal microbiota	4
		The human mycobiota	2
		Oral Microbiota	2
		Study of microbiota for environmental purposes	10
		Pesticide soil ecotoxicology / bioremediation	2
		Relevance of accelerated evolution approaches to adapt µo of interest	3
		Adaptation of *O. oeni* to low pH in wine context	2
Unit 4A	Food and wine design by the means of microbiology	Lactic acid bacteria metabolism (3h) + microbial sensorial impact on food (2h)	6
		Analysis of microbial physiology by the mean of the flow cytometry	2
		Biotechnology of microorganisms of interest	2
		Sequence alignment/KEGG approach + RTqPCR	4
		RNAseq analysis + 3D model of proteins	4
		Wine microbiology: processes of winemaking + yeasts and Lactic acid bacteria actors	6

		Influence of µo on wine properties (yeast interactions and metabolomic)	2
		Laffort: microbial selection in oenology	2
		Project (include 2h of oral presentation)	6
Unit 5A	Food processes and emerging technologies	Introduction to food microbiological processes	4
		A brief history of food decontamination processes	2
		Management of microbial risk by processes	2
		Spores and HHP / Biopreservation	4
		Novolyze	2
		Use of processes for beneficial microorganisms	6
		Hot-topics and outlook in food processes	20

Option
PHYSICOCHEMISTRY

Unit	Name of Unit	Contents to come	Hours (TBC)
Unit 2B	Chemical and Physical Food and Wine analysis	Food analysis: intro, sample preparation, GC-MS-olfactometry	12
		Food analysis	3
		LC-MS: metabolomics and spectroscopies	8
		Dielectric- RPE, DMTA, NMR	4
		Stat treatment	2
		Intro to wine analysis	2
		Debrifing practical	6
		Practical: physical characterizations	4
Unit 3B	Food and wine stability	Trends in food packaging, shelf life, case studies	12
		Wine stability, analysis, wine fining	11
		Encapsulation, control release	6
		Wine fining	5
		Packaging practical	4
		Packaging science	2
Unit 4B	Food and wine design by the means of Physical chemistry	Liquids, suspensions, solids: macromolecules, stability, glass transition, relaxation, phase stat diagrams	16
		Interface, proteins-polysacharide-fat-mixture, emulsions foams-proteins tensioactivity	12
		Wine physical chemistry	6
		Food structure and texture	2
		Soft matter	3
Unit 5B	Toxicology applied to food safety	Hazard identification, risk assessment and management, food allergen, food contact material, cases studies	16
		Biotest applied on acrylamide	7
		Analytical methods	11
		Risk specification: mycotoxins	4

Master 2 – Semester 4

The last semester of the MP2 Master's programme consists of an internship of 5-6 months in France or abroad, for 30 ECTS.