L'INSTITUT agro Montpellier

Booklet Major 4

« Junior Research Lab for Agricultural Transitions »

2026-2027

Table of contents

General presentation of JRLAT

Pedagogical supervisors Jean-François MARTIN – jean-francois.martin@supagro.fr Jacques DAVID – jacques.david@supagro.fr Karine GAUCHE – karine.gauche@supagro.fr
Administrative Manager Zélie HACHET – zelie.hachet@supagro.fr
Course Assistant Florence MARCHAL – florence.marchal@supagro.fr
Dates of course: from September 4, 2026 **to either** December 18, 2026 Or January 20, 2026 (including UE4 - Strategic foresight) Or June 30, 2026 (including UE4 and UE6M - Research Internship)
Key words Agriculture-related themes: Sustainable agriculture, Precision farming, Digital agriculture, Agroecology, Climate-smart agriculture, Food security, Crop diversification, Genetic engineering, Organic farming, Soil health, Irrigation management, Rural development, Agricultural policy, Food waste reduction, Agri-food value chain, Agricultural automation, Agroforestry, Sustainable intensification, Agricultural biotechnology, Data analytics, Precision livestock farming, Climate change resilience, Conservation agriculture, Agrochemical reduction, Remote sensing, Post-harvest technologies, Agricultural finance, Livestock genetics, Renewable energy in agriculture, Integrated pest management and many others Research skills related themes: Subject knowledge, Information retrieval, Critical thinking, Problem solving, Inquiring mind, Enthusiasm, Self-confidence, Self-reflection, Preparation and prioritization, Time management, Continuous professional development, Health and safety, Ethics, principles and sustainability, Project planning and execution, Teamwork, Communication methods, Society and culture, Artificial Intelligence

General theme of the major

The context of the course is deliberately oriented towards sustainability transitions, preserving climate, energy, natural resources, biodiversity and the environment. In JRLAT, agricultural transitions are not understood as linear or purely technological shifts, but as systemic reconfigurations involving ecological limits, socio-economic trade-offs, scientific uncertainties and long-term viability conditions. The fall semester is based on the acquisition of transversal research skills and disciplinary knowledges, and their deployment on a collaborative research project since we deeply believe that providing students with the practices of a proper and ethical scientific approach will help them to think, explore, test and validate ways for the transitions needed to mitigating and adapting to the global change, whether they have the project to become professional scientists or not.

The goal is to find a balanced experience including the learning of strong disciplinary fundamentals through Problem-based learning, while promoting the interaction and interculturality among students, learning activities dedicated to the practice of research and regular masterclasses.

The semester aims to strengthen the scientific background of the students, to get them trained through real and collaborative research activities within a cohort of French (60-70%) and international students (30-40%), to develop their critical mindset, their scientific rigor, their creativity and their taste for innovation and research while developing the systemic and multidisciplinary vision that characterizes engineers in the French Grande Ecole assertion (equivalent to MsC).

The disciplinary scientific knowledge is obtained as follows:

- Disciplinary courses based on a problem-based learning delivered by academics from Institut Agro Montpellier and associated with professional scientists of the large Agropolis and Montpellier University communities is offered (25% of the schedule). The offer spans the field of expertise of l'Institut Agro

Montpellier on a catalog available online in the preceding spring. Advanced Ecology, Genetics, Advanced and Applied Evolution, Sociology, Environmental Economics, Water management, Agro resources processing, Plant modeling and deep learning are offered on a regular basis. Supplementary offers may complement those courses on a year-to-year basis.

- Four masterclasses are organized by the students and led by external experts on the theme of sustainability transitions
- Scientific skills and further disciplinary knowledge is deepened on a case-by-case basis during a group-based research project where it is necessary.

A research project is carried out from start to finish in a highly autonomous manner by a small group of students under the mentoring of academics and scientific experts.

In contrast with a traditional internship in a lab, the attendees choose their research theme in a context previously defined by an academic staff, benefit from the support of senior researchers to think and design their own project and are encouraged to develop co-training. It is a bridge between academic input and research activity, an opportunity for developing international interculturality. It puts the students in the position of managing a research project from the building of working hypotheses, the acquisition of data, their analysis and the sharing of their research in written and oral form.

The research projects are addressed through the field of expertise of l'Institut Agro Montpellier and fit questions related to sustainability transitions. Every year, a team of academics is volunteering to provide expert mentoring of the students during their project. Available themes vary accordingly and their expertise and are made available online during the Spring previous to the next enrollment period.

Transversal skills for managing a real scientific project are also acquired through active learning sessions. The set of transversal objectives of this course enables students to develop their ability to conduct a research project.

Finally, **a research internship is offered to International mobility students for the Spring semester.**
Following the Fall semester, the Research Internship (UE6M) offers a five-to-six-month, full-time immersion in a research laboratory of Institut Agro Montpellier or an associated partner. Conceived as a direct pedagogical continuation of the Fall semester, this internship shifts students from a collaborative, school-based research project to an individual, lab-embedded research experience. Students actively contribute to an ongoing research program by addressing a clearly identified scientific question related to agricultural, agronomy environmental sustainability. The internship consolidates research skills developed during the Fall semester —scientific rigor, autonomy, reflexivity, ethical practice, and critical analysis—while confronting students with the realities of long-term scientific work, including uncertainty management, data analysis, and scientific communication. It prepares students for advanced academic pathways as well as for professional contexts requiring strong research and analytical competencies.

Organisation of the major

The semester is organized with 5 UE:
UE1 aims at acquiring the scientific skills required to develop a research project (2 ECTS)
UE2 is built from the 6 available problem-based disciplinary modules (3x2 ECTS)
UE3 is the main collaborative research project (7 ECTS)
UE4 is an introduction to strategic foresight (4 ECTS)
UE5M (only for international students) aims at disseminating research outputs (6 ECTS)
UE6M (only for international students) is a 5-6 months spring research internship (30 ECTS)

SEQUENTIAL MANDATORY UE		IN CHARGE	HOURS	ECTS
UE1	**Scientific skills development**	MARTIN Jean-François	**63** *(+5h self work)*	**2**
UE2	**Disciplinary concepts for transitions (choose 3 from 6)**	LE VELLY Gwenolé	**37,5** *(+37,5h self work)*	**6**
ECUE 2.1a	*Mediterranean Ecology*	Marie-Laure Navas		
ECUE 2.1b	*Plant Molecular Physiology and Mineral Nutrition*	Anna Medici & Pierre Berthomieu		
ECUE 2.2a	*Molecular Evolution*	Vincent Ranwez		
ECUE 2.2b	*Water Management*	Gilles Belaud		
ECUE 2.2c	*Plant Modeling*	Benoît Pallas		
ECUE 2.3a	*Relationships between intrinsic properties of agro-resources, processing, and end products quality and functionality*	Maeva Subileau		
ECUE 2.3b	*Environmental Economics for Agricultural Transitions*	Gwenolé Le Velly & Alexandre Sauquet		
ECUE 2.3c	*Deep Learning*	Bénédicte Fontez & Philippe Vismara		
UE3	**Collaborative research project**	DAVID Jacques	**47** *(+175h self work)*	**7**
UE4	**Strategic Foresight**	HANNIN Hervé	**39** *(+25h self work)*	**4**
UE Stats	**Statistics & Data analysis**	FONTEZ Bénédicte	**4,5**	**1**
UE LV1	**English**	ZECCHINO Fabien FABRE Céline	**22**	**1**
UE5M	**Disseminating research outputs**	MARTIN Jean-François DENIAU Anne-Hélène	**79**	**(6)**
UE6M	**Research Internship**	MARTIN Jean-François DAVID Jacques	**770**	**(30)**
	Sub-total sequential UE		**259(1039)**	**21(57)**
CONTINUOUS MANDATORY ENGINEERS UE		**IN CHARGE**	**HOURS**	**ECTS**
Développement professionnel (only engineers)		DUPPI Mélanie	**27** *(+50h self work)*	**8**
ECUE Stage	*Stage 1ère année*	DUPPI Mélanie BOURGEOIS Patrick	*During 1st year*	*4*
ECUE PEI	*Projet d'étudiants ingénieurs*	AUMASSON Géraldine	*8*	*3*
ECUE PPP	*Projet professionnel et personnel*	DUPPI Mélanie	*19*	*1*
UE LV2	**Second language**	ELANIOU Nafissa	**16,5**	**1**
FLE-Intensif	**French as a foreign Language intensive course**	BARLET Benjamin	**30**	**1**
FLE-Hebdo	**French as a foreign language weekly course**	BARLET Benjamin	**30**	**1**
	Sub-total Continuous engineers UE		**70**	**9(3)**
TOTAL Engineers			**341,75**	**30**

Links between JRLAT and 3rd year options and M2s

This training is highly recommended for entry into 3rd year options where Scientific Research is the envisioned path for the student. It is also recommended, but not mandatory, for any option of the Institut Agro Montpellier.

Sequential teaching units

UE 1 Scientific skills development

Key words

Subject knowledge, Information retrieval, Critical thinking, Problem solving, Inquiring mind, Enthusiasm, Self-confidence, Self-reflection, Preparation and prioritization, Time management, Continuous professional development, Health and safety, Ethics, principles and sustainability, Project planning and execution, Teamwork, Communication methods, Society and culture

Objectives

1- Develop an Understanding of Research Methodology:

- Familiarize students with the fundamental concepts, principles, and techniques of research methodology.
- Enable students to critically evaluate different research methodologies and select appropriate approaches for their research projects.
- Enhance students' ability to design research studies that align with academic and ethical standards.

2- Enhance Critical Thinking and Analytical Skills:

- Foster critical thinking skills by encouraging students to analyze and evaluate research literature from various fields.
- Train students to identify research gaps, formulate research questions, and develop hypotheses or research objectives.
- Promote the ability to apply logical and analytical thinking to complex research problems and draw evidence-based conclusions

3- Foster Literature Review and Information Retrieval Skills:

- Develop students' ability to conduct comprehensive literature reviews using appropriate databases, search engines, and research tools.
- Enhance skills in critically evaluating and synthesizing existing research findings to identify research gaps and build a strong theoretical foundation.
- Teach effective strategies for citation management, referencing, and avoiding plagiarism.

4- Promote Ethical Conduct in Research:

- Raise awareness of ethical issues in research, including informed consent, confidentiality, integrity, and conflicts of interest.
- Enable students to navigate ethical review processes and adhere to ethical guidelines in conducting research.
- Foster an understanding of the responsible and respectful treatment of human subjects and the appropriate use of animals in research.

5- Develop Proficiency in Research Data Collection and Analysis:

- Familiarize students with various data collection methods, such as surveys, interviews, observations, and experiments.
- Provide training in data management, organization, and analysis using appropriate statistical or qualitative analysis software.

- Enhance students' ability to interpret and present research findings effectively through appropriate visualization techniques.

6- Cultivate Effective Research Presentation and Communication Skills:

- Develop students' oral and written communication skills for presenting research findings to diverse audiences.
- Enhance proficiency in designing and delivering effective research presentations, including visual aids and interactive elements.
- Encourage students to prepare concise and coherent research reports, articles, and manuscripts suitable for publication in academic journals or conferences.

7- Foster Collaborative Research Skills:

- Encourage teamwork and collaboration in research projects, fostering an environment of shared learning and interdisciplinary approaches.
- Promote effective communication and conflict resolution skills within research teams.
- Develop an understanding of intellectual property rights and collaborative authorship practices.

Skills assessed

The Research Skills Training course assesses a range of skills essential for conducting effective research. Students will be evaluated on their understanding of research methodology, critical thinking abilities, and analytical skills. Assessment also includes their proficiency in conducting literature reviews, and retrieving information. Ethical conduct in research, data collection and analysis, as well as research presentation and communication skills, will be assessed. Additionally, collaborative research skills, such as teamwork and communication within research teams, are evaluated. Various assessment methods will be employed, mainly through the collaborative research project.

Content and organization of the course

Several research skills are explicitly taught in dedicated session:

- Literature discovery and management s a group
- Agile project management
- Research Data management
- Publishing as academics
- Research Integrity in the everyday practice
- R data management and visualization
- Sharing and versioning your code
- Writing a scientific article
- Giving a pitch presentation

Most of the content is delivered through active learning sessions where the students acquire a skill by using it directly within their research group. Each session takes place when the corresponding proficiency is required in the project so it is useful immediately and transposed to real case-study that promote engagement for the matter and full comprehension. The active learning sessions are therefore spread out during the whole semester from the very first day to the last week of the research project in December.

Lecture	TD	TP	Project	Autonomous work	Evaluation
24	**22**	**12**	**4**	**5**	**1**

Assessment procedures

Each skill addressed during this UE is used within the research project. Its mastery will be addressed during and at the end of the research project in a group-base evaluation
The UE is passed if the mark obtained is equal to or higher than 10/20.

UE 2 Disciplinary concepts for transitions (choose 3 from 6)

The Teaching Unit contains 6 different modules:

- ECUE 1a: Mediterranean Ecology
- ECUE 1b: Plant Molecular Physiology and Nutrition
- ECUE 2a: Molecular Evolution
- ECUE 2b: Water Management
- ECUE 3a: Environmental Economics
- ECUE 3b: Agroresources transformation

Each student must take 3 of them, one for each period from 1 to 3.

Cours	TD	TP	Projet	Travail en autonomie	Evaluation
24	**12.5**			**37.5**	**3**

ECUE 1a: Mediterranean Ecology

Persons in charge

Marie-Laure Navas

Objectives

This course is based on the hypothesis that understanding the functioning of ecosystems shaped over centuries by fluctuating and unpredictable environment, in part due to human activities, can contribute to manage other ecosystems to get them adapted to climate change. The model chosen is the circum-Mediterranean zone, subject to great annual and inter-annual climatic fluctuations (with a forecast of drought exacerbation in the years to come) but also in terms of human occupation (ancient agriculture, transit zones, urbanization...).

Aims of the course

The interventions of CEFE (Centre d'Ecologie Fonctionnelle et Evolutive) researchers specializing in these ecosystems will aim to characterize local biodiversity, its constitution and evolution, in response to environmental constraints (climate, fire, agricultural inputs, etc.) and their recent changes, its impact on the functioning of ecosystems and its various contributions to the populations.

Disciplinary content and organization

- Conservation ecology
- Functional ecology
- Community ecology
- Fire ecology
- Agro-ecology
- Trait-based approaches

The module is planned on a period of four weeks. It encompasses 25 hours scheduled on the week time and students are expected to add 15 hours of additional homework. Academics are present with the students for half of the scheduled time for lectures, skills consolidation and other activities supporting the learning experience. Students spend the second half of the scheduled time in the dedicated learning Lab (the HIVE) to work on their own or in co-working with other students.

Evaluation is performed during the period.

Assessment procedures

Acquisition of skills will be realized at individual and/or group levels.

A grade of 10/20 is necessary to get the credits

A retake exam will be proposed in case of a failed exam.

ECUE 1b: Plant Molecular Physiology and Mineral Nutrition

Persons in charge

Anna Medici & Pierre Berthomieu

Objectives

In the era of transitions towards sustainable agriculture, the study of organisms, ecotypes or varieties with best performances is linked to the identification of key genes and characterization of their function. In the context of the semester, the course aims at teaching the strategies and tools used to identify the function(s) of a plant gene. It is based on the analysis of scientific papers published in the fields of plant mineral nutrition and adaptation to climate change. As such, the students will gain knowledge in these thematic fields. The approaches and methods developed in the papers are analyzed in depth and the students are expected to be able to propose on their own research programs to decipher the function of a gene in a specified context.

Aims of the course

- Acquisition of academic knowledge in plant molecular physiology and plant mineral nutrition
- Self-learning capacity and development of lifelong learning
- Critical thinking in the analysis of the scientific literature
- Development of group working capacities
- Oral and writing scientific communication skills

Disciplinary content and organization

Key concepts and tools of plant molecular physiology and of plant mineral nutrition:

- origin, making of and use of mutants
- identification, cloning and functional analysis of genes of interest
- in situ and ex situ gene expression analyses
- analysis of gene regulatory networks
- ion transport measurements at both the cell and whole plant levels
- regulation of mineral nutrition in response to environmental cues

The module is planned within a four-week-long period. 25 hours are scheduled on the week time and students are expected to add 15 hours of additional homework. Academics are present with the students for half of the scheduled time for lectures, skills consolidation and other activities supporting the learning experience. Students spend the second half of the scheduled time in the dedicated learning Lab (the HIVE) to work on their own or in co-working with other students.

Evaluation is performed all along the course as well as at the end of the period.

Assessment procedures

Acquisition of skills will be realized at individual and/or group levels.

A grade of 10/20 is necessary to get the credits

A retake exam will be proposed in case of a failed exam.

ECUE 2a: Molecular Evolution

Persons in charge

Jacques David & Vincent Ranwez

Objectives

Genetic diversity is essential for adaptation to climatic transitions, in crop and wild species as well. Preservation and use of the biodiversity of wild relatives can be reevaluated through DNA sequence analysis and theoretical concepts.

The course is thus an introduction to molecular evolution, it will provide students with knowledge and skills in population genetics and phylogenetic analysis. In this module, examples and case studies will be presented and students will have to seek out a deeper understanding of molecular evolution concepts and their use on real DNA data for the final aims to bring solutions to conservation and management of genetic diversity. Breeding (Plant, animal and any organisms) and conservation biology are the applied outputs of the course.

Aims of the course

- Acquisition of academic knowledges in molecular evolution
- Molecular sequence manipulation skills
- Self-learning capacity and development of lifelong learning
- Critical thinking in the use of DNA information
- Problem solving abilities in breeding and conservation biology
- Development of group working capacities
- Oral and writing scientific communication skills

Disciplinary content and organization

Key concepts and tools of population genetics and molecular evolution:

- Data acquisition: principle of sequencing/genotyping techniques
- Identification and alignment of homologous/orthologous sequences
- Dynamics of genes in population (population genetics, coalescent theory)
- Molecular diversity indicators (theta, He, Ne, phylogenetic diversity etc.)
- Selection footprints: Synonymous/ non synonymous polymorphism, neutrality test including Mc Donald Kreitman test, codon model (PAML)
- Evolutionary scenario inference
    - non equilibrium population dynamics: coalescence based evolutionary scenario (drift, selection and migration), in silico simulation and test of fit of real data (Approximate Bayesian Computation)
    - among species: Phylogeny inference

The module is planned on a period of four weeks. It encompasses 25 hours scheduled on the week time and students are expected to add 15 hours of additional homework. Academics are present with the students for half of the scheduled time for lectures, skills consolidation and other activities supporting the learning experience. Students spend the second half of the scheduled time in the dedicated learning Lab (the HIVE) to work on their own or in co-working with other students.

Evaluation is realized during the period.

Assessment procedures

Acquisition of skills will be realized at individual and/or group levels.
A grade of 10/20 is necessary to get the credits
A retake exam will be proposed in case of a failed exam.

ECUE 2b: Water Management

Persons in charge

Gilles Belaud

Objectives

Water resources are largely affected by climate change and anthropogenic drivers. Among them, agriculture has a huge impact on water resources, due to the withdrawals for irrigation, land management, release of contaminants… At the same time, reduced water availability is at the origin of crises and forces to develop new models for agricultural water uses.

The objectives of this course is to introduce major issues of water management for agricultural transitions, to illustrate the need for interdisciplinary approaches to address them (from biophysical sciences to social sciences), and to show how solutions can be designed and evaluated.

Aims of the course

- Acquisition of academic knowledge in water sciences
- Development of capacity for interdisciplinary analysis
- Self-learning capacity and development of lifelong learning
- Critical thinking in the use of field data and reports
- Development of group working capacities
- Oral and writing scientific communication skills

Disciplinary content and organization

- Challenges for water management in agricultural transitions: agroecology and water, water quality, groundwater (over-)exploitation, basin closure
- Water cycle and agricultural systems: agro-hydrology, transfer of contaminants, irrigation strategies, anthropogenic and climatic drivers
- Interdisciplinary analyses of solutions to address water crises (waste water reuse, storage, water harvesting, collective versus individual solutions); environmental impact assessment, modelling

The module is planned on a period of four weeks. It encompasses 25 hours scheduled on the week time and students are expected to add 15 hours of additional homework. Academics are present with the students for half of the scheduled time for lectures, skills consolidation and other activities supporting the learning experience. Students spend the second half of the scheduled time in the dedicated learning Lab (the HIVE) to work on their own or in co-working with other students.

Evaluation is realized during the period.

Assessment procedures

Acquisition of skills will be realized at group levels.
A grade of 10/20 is necessary to get the credits
A retake exam will be proposed in case of a failed exam.

ECUE 2c: Plant Modeling: a scientific tool to evaluate the impact of agricultural practices and genotypic variability on plant performance

Persons in charge

Benoît Pallas Frédéric Boudon
Benoit.pallas@supagro.fr frederic.boudon@cirad.fr

Plant modelling is used in many agronomic contexts to analyse and predict the behaviour of plants under changing and constraining environmental conditions. Nowadays, we need to evaluate the benefit of the different agricultural practices that could mitigate the impact of climate change. In that context, plant models appear as relevant tools for the scientific community. Two main types of approaches are usually used, namely crop and functional structural plant models (FSPM). Crop models are relevant when dealing with crop functioning at the stand scale but cannot

be used to assess the impact of practices that modify plant architecture (pruning, thinning, or crop mixture in agroecology). However, modifying plant architecture using different genotypes or management practices are one of the solutions that could limit the rise in organ temperature and reduce the impact of water deficit. To simulate the impact of such kinds of practices FSPMs are needed.

The first objective of this course is to introduce the main formalisms used in FSPMs: simulation of architectural development, between plants and organs competition for light and water. The second objective is to use these approaches to evaluate the impact of genotypic variability and cultural practices on plant performances in the context of climate change.

Teaching language

English (minimum TOEIC-B2 level – 785 pts)

Organization and credits

The module is planned on a period of three weeks. It encompasses 25 hours scheduled on the week time and students are expected to add 15 hours of additional homework. Academics are present with the students for half of the scheduled time for lectures, skills consolidation, and other activities supporting the learning experience. Students spend the second half of the scheduled time in the dedicated learning Lab (the HIVE) to work on their own or co-working with other students.

Evaluation is performed during the period.

Aims of the course

- Acquisition of general knowledge of plant modelling
- Acquisition of specific skills in computer programming
- Critical thinking on modelling approaches
- Use of models to answer specific scientific questions
- Self-learning capacity
- Development of group working capacity
- Oral and writing scientific communication skills

Disciplinary content

Key concepts in functional structural plant modeling:

- Architectural description of plants and associated formalisms
- Simulation of plant architectural development in response to abiotic stresses.
- Simulation of light interception and photosynthesis under constraining environments.
- Sensitivity analysis of the models.

Pedagogy

This course is based on problem-based learning. Students will have to propose modeling formalisms, implement them in a programming language and run simulations to answer specific questions (plant productivity, crop water use, within plant microclimate variation, fruit production stability…).

This course will rely on both short lectures and practical courses and available tutorials to favor self-learning. The course will also favor interactions between students and researchers/teachers in order to improve the understanding of the issues at stake.

This course will extensively rely on available material to favor self-learning.

- co-working and sharing between students
- self-learning: resources provided by the teaching team
- interaction with academics: lectures, concepts consolidation,

- Autonomous Group Practical Work during group sessions followed by academic discussion and consolidation: co working helping to solve complex questions

Books and other reading materials

Students will access to scientific literature servers of INRAE and l'Institut Agro. A list of the most relevant scientific articles (around 5-10) will be provided at the beginning of the module.

Will also be provided:

- Videos from different courses
- Tutorial on the use of modeling platform

Requirements

Basic concept/vocabulary in:

- Botany: main concepts to describe plant architecture
- Ecophysiology: knowledge of the main processes involved in plant response to abiotic stresses
- Modeling: mathematical formalization of biological processes.
- Programming: basic knowledge of one of the following programming software (R, Python, C++, Java)

Grades

Acquisition of skills will be realized at the individual (short writing report) and group level (flash presentation)
A grade of 10/20 is necessary to get the credits
A retake exam will be proposed in case of a failed exam.

Final note

We hold the right to make modifications [additions, deletions, etc.] to the syllabus, assignments, requirements, and expectations for this course; any such modifications will be clearly communicated and communicated in a timely way.

ECUE 3a: Relationships between intrinsic properties of agro-resources, processing, and end products quality and functionality

Persons in charge

Maeva Subileau

Objectives

To move forward with agro-ecological transition, the entire production and value chain of agro-resources must be reconsidered, including the transformation processes. Low-energy and low-water consuming processes, use of alternative bio-based materials, adaptability to variable agro-resources, are examples of such a transition in the process design. Through problem-solving exercises and case studies, the course will focus on the relationships between the agro-resources composition and structure, the effect of processing, and the resulting properties that can be obtained. The aim is to understand how, beyond composition, the products properties (nutritional, sensory, sanitary…) rely on the raw matter structural organization, and how rational processing can be designed and improved toward targeted functional properties, product durability and added value (applications can be food and non-food). Depending on fundamental comprehension objectives and/or environmental/industrial challenges, compromise between different processing steps or between different qualities will be addressed.

Aims of the course

- Acquisition of general knowledge regarding agro-resources (raw materials) structures and functions, focusing on cereal grains.

- Ability to identify and characterize properties and quality of materials (including technical methodology for analysis)
- Critical thinking on the effect of processing on material functionalities (e.g. nutritional quality, bioavailability, mechanical or sensory properties, sanitary quality, hydration properties...)
- Abilities in the management of functional properties
- Identification of the demands/challenges/constraints (regarding product, process, environment, transfer…) in relation with the need to rethink global *vs* local production by means of alternative low-processing solutions
- Ability to establish a benefit-risk analysis on product and process quality, adopting a multicriteria and multifactor view and seeking compromises
- Self-learning capacity and development of lifelong learning
- Development of group working capacities
- Oral and writing scientific communication skills

Disciplinary content and organization

Biochemical composition of the agro-sourced raw materials will be addressed in relation with concepts of quality and functionality. Based on the example of wheat, the course will demonstrate how, beyond composition, the physical chemistry of constituents (their structure and interactions, but also contaminants possibly present in the matrix) play key roles in the final properties of the intermediate and end products depending on the processing itineraries chosen.
The choices of raw materials (e.g., variety), and process itineraries (through first and second transformation: from farm to fork) will be studied in relation with their effects on the management of quality, energy, and customized properties. Physical and chemical processes, fractionation, but also physiological (e.g., germination) or microbial ones will be explored.
Examples of analytical tools at different study scales for mechanistic understanding of processes and fine characterization of biomarkers will be made available. Knowledge engineering tools could be used to address benefit-risk and compromise issues.
The module is planned on a period of four weeks. It encompasses 25 hours scheduled on the week time and students are expected to add 15 hours of additional homework. Academics are present with the students for half of the scheduled time for lectures, skills consolidation and other activities supporting the learning experience. Students spend the second half of the scheduled time in the dedicated learning Lab (the HIVE) to work on their own or in co-working with other students.

Evaluation is realized during the period.

Assessment procedures

Acquisition of skills will be realized at individual and/or group levels.
A grade of 10/20 is necessary to get the credits
A retake exam will be proposed in case of a failed exam

ECUE 3b: Environmental Economics for Agricultural Transitions

Persons in charge

Gwenolé Le Velly & Alexandre Sauquet

Objectives

The objectives of this course is to understand how environmental economists looks at the agricultural transitions by answering the following questions:

- How can the basic concepts of microeconomics (rivalry and excludability, externalities, etc.) and the insights of behavioral economics (dependence on norms, risk perception, etc.) explain the obstacles to changing agricultural practices.
- How can public policies remove some of these constraints?
- How can experimental and quasi-experimental evaluation methods help to analyze and improve those policies?

Aims of the course

In this module, you will learn to characterize a situation of overpollution, or insufficient provision of an ecological service using the basic theoretical frameworks of microeconomics in the presence of externalities. You will then think about the various policy instruments that can be used to resolve this situation. In this course, you will also analyze how behavioral factors, linked to risk or social norms, can impact the behavior of the farmers. Finally, you will get acquainted with the evaluation of public policies using experimental and quasi-experimental methods.

Disciplinary content and organization

Key concepts and tools of Economics:

- Supply and demand, economic surpluses
- Market failures, externalities, rivalry and excludability
- Economic and regulatory instruments
- Behavioral economics
- Impact evaluation

The module is planned on a period of four weeks. It encompasses 25 hours scheduled on the week time and students are expected to add 15 hours of additional homework. Academics are present with the students for half of the scheduled time for lectures, skills consolidation and other activities supporting the learning experience. Students spend the second half of the scheduled time in the dedicated learning Lab (the HIVE) to work on their own or in co-working with other students.

Evaluation is realized during the period.

Assessment procedures

Acquisition of skills will be realized at individual and group levels.
A grade of 10/20 is necessary to get the credits
A retake exam will be proposed in case of a failed exam

ECUE 3c: Artificial Intelligence: interests and limits of machine / deep learning

Persons in charge

Philippe Vismara philippe.vismara@supagro.fr
Bénédicte Fontez benedicte.fontez@supagro.fr

Artificial intelligence (AI) holds significant promise and offers numerous benefits in the field of agronomy, contributing to the advancement of agriculture in various ways by optimizing resource utilization or improving crop management to reduce environmental impact, and to enhance overall productivity and sustainability. It addresses critical challenges facing agriculture while offering opportunities for innovation and growth in the sector. Among the general areas of interest and application of AI in agronomy, pest and disease detection as part of crop monitoring and management offer some challenging issues and a real-world agronomic challenge.
This course focuses on the potential of artificial intelligence (AI), and more specifically machine learning, and deep learning to address a real-world agronomic challenge through supervised classification. Participants will explore the fundamental concepts of machine learning and delve into practical applications of supervised classification algorithms to solve a current issue in agriculture. By the end of the course, students will have the knowledge and skills necessary to understand or develop basic AI-based solutions for agronomic problems.

Teaching language

English (minimum TOEIC-B2 level – 785 pts)

Organization and credits

The module is planned on a period of three weeks. It encompasses 25 hours scheduled on the week time and students are expected to add 15 hours of additional homework. Academics are present with the students for 12 hours of the scheduled time for lectures, skills consolidation, and other activities supporting the learning experience. Students spend the second half of the scheduled time in the dedicated learning Lab (the HIVE) to work on their own or co-working with other students.

Evaluation is performed during the period.

Aims of the course

- Acquisition of general knowledge of AI.
- Acquisition of specific skills in computer programming.
- Critical thinking on machine/deep learning approaches.
- Initiation to the versioning.
- Self-learning capacity.
- Development of group working capacity.
- Oral and writing scientific communication skills.

Disciplinary content

Key concepts in AI:

- Quality of the prediction: Training/test/validation sets and objective function.
- Popular classification algorithms.
- Implementation and evaluation of theses algorithms using R or Python.
- Building, training, and optimizing simple deep neural networks.

Pedagogy

This course is based on problem-based learning. Students will have to propose an analysis plan, implement them in a programming language (R or Python) to answer specific questions of supervised classification for an agronomic issue. The work will be done using research collaborative tools like Git and Gitlab (first step to a student e-portfolio of its machine learning skills).

This course will rely on both short lectures and practical sessions and available tutorials to favor self-learning. The course will also favor interactions between students and researchers/teachers in order to improve the understanding of the issues at stake.

This course will extensively rely on available material to favor self-learning.

- co-working and sharing between students
- self-learning: resources provided by the teaching team, data and problematic issue from Inrae (MISTEA-ITAP)
- interaction with academics: lectures, concepts consolidation,
- Autonomous Group Practical Work during group sessions followed by academic discussion and consolidation: co working helping to solve complex questions

Books and other reading materials

Students will access to scientific literature servers of INRAE and l'Institut Agro. A list of the most relevant scientific articles (around 5-10) will be provided at the beginning of the module.

Will also be provided:

- Videos from different courses
- Tutorial on the use of modeling platform

Requirements

Basic concept/vocabulary in:

- Statistics: main concepts in linear models (anova, regression) and inference (test, estimation)
- Programming with R or Python
- Modeling: mathematical formalization of biological issue.

Grades

Acquisition of skills will be realized at the individual (versioning of a Rmarkdown or Jupyter working document) and group level (oral presentations)
A grade of 10/20 is necessary to get the credits
A retake exam will be proposed in case of a failed exam.

Final note

We hold the right to make modifications [additions, deletions, etc.] to the syllabus, assignments, requirements, and expectations for this course; any such modifications will be clearly communicated and communicated in a timely way.

UE 3 Collaborative research project

Key words

Sustainable agriculture, Precision farming, Digital agriculture, Agroecology, Climate-smart agriculture, Food security, Crop diversification, Genetic engineering, Organic farming, Soil health, Irrigation management, Rural development, Agricultural policy, Food waste reduction, Agri-food value chain, Agricultural automation, Agroforestry, Sustainable intensification, Agricultural biotechnology, Data analytics, Precision livestock farming, Climate change resilience, Conservation agriculture, Agrochemical reduction, Remote sensing, Post-harvest technologies, Agricultural finance, Livestock genetics, Renewable energy in agriculture, Integrated pest management, Subject knowledge, Information retrieval, Critical thinking, Problem solving, Inquiring mind, Enthusiasm, Self-confidence, Self-reflection, Preparation and prioritization, Time management, Continuous professional development, Health and safety, Ethics, principles and sustainability, Project planning and execution, Teamwork, Communication methods, Society and culture

Objectives

Students will learn the main methods of the scientific process and apply it to a self-defined question.

They will develop their critical mindset, their scientific rigor, their creativity and their taste for innovation and research while developing the systemic and multidisciplinary vision that characterizes engineers in the French Grande Ecole (equivalent to MsC)

They develop their ability to work in groups in order to develop a collective intelligence by learning to listen in a multicultural and international environment while respecting appropriate ethical rules.

They develop their autonomy, their capacity for self-learning to be applied to any field in the future. They learn to generate ideas and defend them before a scientific authority while accepting to examine them critically.

They learn to step back and analyze scientific work, to rigorously source their arguments, and to combine them to discuss the relevance of their results.

They accumulate domain oriented scientific knowledge necessary for the realization of their project.

They strengthen their capacity in data analysis, R programming and scientific writing and communication

Skills assessed

Students will be evaluated

- as a group for the written report and the application of the good practices learned in other modules: the scientific mastering of the subject, the rigor, the conciseness, the relevance of the experiments and the quality of the analyses and discussions in relation to the state of the art are the main evaluation criteria
- individual peer-review: the relevance and depth of commentary on another group's work are evaluated
- individual oral presentation: a 3 min presentation without support will permit to evaluate the communication skills of the students towards a non-specialist although scientific audience.

A grade of 10/20 is necessary to get the credits
A retake exam will be proposed in case of a failed exam.

Content and organization of the course

The research projects are addressed through the field of expertise of l'Institut Agro Montpellier and its associated large scientific community in agriculture and fit questions related to sustainability transitions. Every year, teams of academics are volunteering to provide expert mentoring of the students during their project. Available themes vary

accordingly and their expertise. Projects are made available online during the Spring previous to the next enrollment period and the final list is obtained after the vote and self-organization of the whole class.

The Project's fair takes place mid-June. Once chosen, students acquire disciplinary scientific knowledge according to the project in which they are involved. They also benefit from the regular presentation of the other groups. They thus are made aware of the multi-disciplinary aspects of transitions.

In contrast with a traditional internship in a lab, the attendees choose their research theme in a context previously defined by an academic staff, benefit from the support of senior researchers to think and design their own project and will be encouraged to develop co-training. It is a bridge between academic input and research activity, an opportunity for developing international interculturality. It puts the students in the position of managing a research project from the building of working hypotheses, the acquisition of data, their analysis and the sharing of their research in written and oral form.

Cours	TD	TP	Projet	Travail en autonomie	Evaluation
			35	**175**	**12**

Assessment procedures

The research project is evaluated through three activities:

- the quality and compliance to the provided rules of the scientific article written by each group of students
- the relevance and depth of the individual peer review that each student write at the end of the semester to comment the scientific article from another group
- a short individual oral presentation in front of the class

A grade of 10/20 is necessary to get the credits
A retake exam will be proposed in case of a failed exam.

UE4 – Strategic Foresight

Instructors: Hervé HANNIN – herve.hannin@supagro.fr Jean-François MARTIN – jean-francois.martin@supagro.fr	
Number of hours: 72h	**4 ECTS**
Keywords: Strategic Foresight, Agriculture, Sustainability, Project-Based Learning, Scenario Analysis, Data Analysis, Generative AI, Climate Change.	

Learning objectives

Strategic foresight serves as a crucial tool for anticipating and planning transitions by providing insights into climate change impacts, resource management, technological innovations, societal shifts, and economic models. This module equips students with foundational skills in conducting foresight analysis with a focus on sustainability and transitions in agriculture, food industry, and environment. Students will gain the ability to critically assess complex challenges and opportunities within such systems, integrating both qualitative and quantitative approaches. They will enhance their data literacy by working with extensive datasets such as Eurostat and FAOstat, applying systemic methodologies to analyze variables, and exploring their interconnections. Furthermore, students will develop robust scenario-building frameworks, enabling them to simulate future agricultural conditions and identify potential recommendations to face emerging issues. Through this process, they will learn to align foresight analysis with stakeholder needs, bridging the gap between technical findings and practical applications. Effective communication of their insights will be emphasized, ensuring that findings are accessible and actionable for diverse audiences. They will also provide specific recommendations in the field of scientific research to work on the connection between science and global challenges. Lastly, students will cultivate teamwork and collaborative problem-solving skills, enabling them to engage with multidisciplinary teams and contribute meaningfully to innovative, sustainable solutions for real-world challenges.

General organization

The course is developed through interactive lessons, practical sessions, and project-based learning.

1. Research and Analysis:

Students begin by exploring foresight methodologies and systemic approaches through lectures, gaining foundational knowledge to understand and define agronomy-based challenges. They will analyze variables and datasets relevant to foresight projects, fostering critical thinking and analytical skills.

2. Scenario Development:

In workshops and group sessions, students apply their analytical insights to build foresight scenarios. This includes practical application of systemic methodologies to structure, prioritize, and develop multiple scenarios addressing agricultural transitions.

3. Project Synthesis and Reporting:

In the final stage, students consolidate their work into comprehensive foresight analyses. This involves drafting synthetic reports, presenting their findings and recommendations to peers and stakeholders, and refining their approaches based on feedback to ensure clarity, relevance, and actionable outcomes.

Educational Components:

- Theoretical Learning: Lectures, readings and discussions provide the foundational concepts of foresight and multidisciplinary approaches, introducing students to the frameworks and methodologies they will apply.

- Practical Sessions: Hands-on workshops and group activities focus on applying theoretical knowledge to real-world scenarios, emphasizing data analysis, scenario building, and reporting.

- Project-Based Learning: Students engage in collaborative projects, integrating research, analysis, problem solving and reporting to address complex challenges, ensuring practical application of learned skills.

The course culminates in the production of a synthetic foresight report and a team presentation, which synthesize the analysis of variables, scenarios developed by students and recommendations. Those deliverables are designed to be accessible to both academic and non-specialist audiences, providing actionable insights and recommendations for sustainable transitions. Students will mainly work at the HIVE learning lab for self-directed and group work. Half of the scheduled hours involve direct interaction with instructors, while the other half is dedicated to project development.

Educational activities

1. Research and Variable Analysis

***Objective*:** Enable students to explore and understand the principles of foresight and multidisciplinary methodologies while identifying key variables influencing transitions toward sustainability.
Activities: Lectures to introduce foresight frameworks, guided exercises in variable identification and dataset exploration, and case studies to demonstrate real-world applications.
Deliverable: Annotated review summarizing the variable analysis.

2. Scenario Development

Objective: Equip students with the skills to create and evaluate multiple foresight scenarios addressing a given challenge.
Activities: Interactive workshops on scenario-building methodologies, group exercises to design multidisciplinary frameworks, and iterative feedback sessions to refine scenarios.
Deliverable: Scenario analysis report and team presentation detailing the developed foresight scenarios and associated recommendations.

3. Project Execution and Reporting

Objective: Foster practical application of foresight skills through comprehensive project management and reporting.
Activities: Group projects focusing on sustainable transitions, structured project timelines with task delegation, and instructor-led guidance for producing synthetic reports.
Deliverable: Final synthetic report and presentation presenting actionable insights.

4. Collaboration and Reflection

Objective: Develop students' collaborative problem-solving abilities and encourage reflective practices for continuous learning.
Activities: Regular team discussions to exchange ideas, structured reflection exercises to assess individual and group learning, and collaborative synthesis of findings.
Deliverable: Reflective group presentation highlighting collective progress and insights.
Interactive Sessions and Collaborative Learning

Throughout the course, students engage in a blend of lectures, discussions, tutorials, and practical sessions to develop their diagnostic, advisory, and project management skills. These sessions introduce core concepts, provide hands-on support, and focus on delivering a first-hand experience with foresight analysis. These educational

activities aim to provide practical experience in developing critical thinking, communicating scientific research, and enhancing project management skills.

Skills acquired

1. Diagnostic Skills

Students develop the ability to:

- Leverage public databases for variable analysis:

Students will learn to identify and extract relevant data from public resources like Eurostat and FAOstat, ensuring accuracy and comprehensiveness in their analysis.

- Conduct a systematic evaluation of transitions in a given system:

Students will develop the ability to assess complex systems by examining variable interdependencies and modeling potential impacts of identified changes.

2. Advisory Skills

Students develop the ability to:

- Contextualize findings to address stakeholder needs:

Students will be trained to frame their insights within the context of specific stakeholder priorities, ensuring their analyses are actionable and relevant.

- Craft strategic recommendations for sustainable transitions:

Students will learn to synthesize their analyses into clear, practical strategies that promote resilience and sustainability in a given system.

3. Project Management Skills

Students develop the ability to:

- Plan effectively, allocate resources, and manage timeline:

Students will gain hands-on experience in creating project roadmaps, optimizing resource use, and adhering to deadlines to ensure efficient execution.

- Adaptive project execution and refinement based on feedback:

They will develop skills to monitor project progress, integrate stakeholder or peer feedback, and make necessary adjustments to enhance outcomes.

4. Collaborative and Communication Skills

Students develop the ability to:

- Work as a team in scenario development:

Students will engage in collaborative exercises to design and refine scenarios, providing recommendations to stakeholders, leveraging diverse perspectives to create more robust analyses.

- Clear communication of findings through structured reports:

They will learn to produce coherent, well-structured reports and presentations tailored to both specialist and non-specialist audiences, ensuring accessibility and impact.

Evaluation methods

The evaluation framework for this module is designed to assess students' ability to integrate theoretical knowledge with practical application, fostering critical thinking and effective communication.

1. Variable Analysis Repport (25% of final grade):

Objective: evaluate the student's ability to critically analyze and synthesize information from relevant datasets and literature sources.
Criteria:
- Quality and relevance of data sources: demonstrates comprehensive and accurate selection of materials.
- Depth of analysis and systemic understanding: reflects a nuanced approach to identifying and evaluating variables and associated criteria.
- Clear documentation and citation practices: ensures academic rigor and clarity in presenting findings.

Method: students submit their Variable Analysis Report early in the module for evaluation against a detailed rubric. Constructive feedback is provided to guide improvements in analytical and documentation skills.

2. Scenario Analysis Report (35% of final grade):

Objective: assess the logical structuring and feasibility of foresight scenarios, emphasizing sustainability and systemic impacts.
Criteria:
- Robustness of scenario frameworks: exhibits detailed and well-structured foresight models.
- Relevance to identified challenges: directly addresses the key agricultural transitions and their implications.
- Integration of sustainability and ethical considerations: includes multidimensional perspectives for actionable foresight.
- Adequate recommendations to stakeholders.

Method: students work in groups to develop scenario frameworks. Feedback is provided during iterative review sessions to refine scenarios and address identified gaps.

4. Final Presentation and The Elevator (20% of final grade):

Objective: Evaluate the ability of team members to present scenarios and recommendations effectively, showcasing clear communication and collaboration.
Criteria:
- Individual Clarity: Assess each member's ability to clearly explain their assigned scenario and associated recommendations.
- Logical Structuring: Evaluate the overall logic in how scenarios and recommendations are presented, ensuring they align with the team's foresight analysis.
- Team Coherence: Measure how well the team collaborates to deliver a consistent and unified presentation, reflecting shared understanding.
- Engagement and Adaptability: Review the team's ability to adapt content to the audience's needs, including responses to questions and stakeholder feedback (the elevator).
- Visual and Verbal Communication: Assess the use of visual aids, clarity of speech, and effectiveness in capturing and maintaining the audience's attention.

Method: Presentations are conducted in a formal setting, with each member responsible for a specific part. Peers and instructors' feedback will be used to refine presentation skills and ensure robust team dynamics.

Cours	TD	TP	Projet	Travail en autonomie	Evaluation
6	**16**	**14**	**25**	**9**	**2**

UE5M– Disseminating research for global challenges

Instructors: Jean-François MARTIN – jean-francois.martin@supagro.fr Anne-Hélène DENIAU – anne-helene.deniau@supagro.fr	
Number of hours: 79h	**3 ECTS**
Keywords: Research Communication, Podcast Production, Scientific Communication, Societal Challenges, Audience Engagement, Project Management, Information literacy, Sustainability, Interview Preparation, scientific mediation, Global Challenges.	

Learning objectives

The UE5M course is designed to develop a comprehensive set of skills necessary for effectively communicating complex scientific research through the medium of podcasting. Students will apply research and analytical methods to deepen their understanding of complex scientific topics and analyze how these topics connect with broader societal challenges. They will identify key issues and factors influencing the evolution of research and master the skills necessary for data collection, processing, and analysis in support of effective research communication. Additionally, students will learn to contextualize research in relation to stakeholder needs and global challenges, highlight the contributions of research to resolving societal issues, and adapt communication strategies to engage a diverse audience. The management and execution skills taught include managing a podcast production project from inception to completion, ensuring effective coordination of tasks, adherence to deadlines, and sustainable resource management. These skills will empower students to produce high-quality podcasts that communicate scientific research to a broad audience while effectively managing project resources and adapting content to meet diverse needs.

General organization

The course is developed through interactive lessons, practical sessions, and project-based learning. The goal is to enable students to transform complex scientific research into engaging podcast content for a specific audience.

1. Research and Analysis:
Students select a globally relevant research topic, identify a researcher, and perform an in-depth literature review to understand the societal impact of the research.
2. Communication and Engagement:
Students develop communication strategies, draft interview questions, create a podcast script, and learn to adapt content for their audience, focusing on simplifying complex topics and connecting them to global challenges.
3. Project Management and Production:
In this final phase, students oversee the full production of a podcast episode, managing resources, coordinating interviews, recording, and participating in editing. They monitor their progress, make necessary adjustments, and ensure timely project completion.
Educational Components:

- Theoretical Learning: Lectures and discussions with experts introduce research communication, audience engagement, and interviewing skills.
- Practical Application: Tutorials and shared sessions develop skills in podcast production and data analysis.
- Project-Based Learning: Students produce podcast episodes to demonstrate their mastery of the material.

The course concludes with the delivery of a final podcast episode, evaluated for research quality, audience relevance, and production value. This approach ensures students gain both theoretical insight and practical experience, focusing on the connection between research and public engagement.

Educational activities

1. Research and Analytical Methods

Objective*:* Enable students to deeply explore a research topic, conduct a literature review, and analyze its societal impact to understand how the research addresses global challenges.

Activities*:*

Literature Review: Students collect and analyze scientific publications to identify key milestones and societal implications of their topic.

Bibliographic Report: Students compile their research findings into a report that informs their podcast script and interview questions.

Deliverable: Bibliographic Report.

2. Communication Strategies and Audience Engagement

Objective: Train students to adapt complex scientific content for specific audiences, focusing on specialized language and the research's societal relevance.

Activities*:*

Drafting Interview Questions: Students draft questions that probe the societal challenges addressed by the research and encourage insightful discussions.

Developing a Podcast Script: Students use their bibliographic findings to create a clear, engaging script for their podcast episode, in agreement with the other students to ensure coherence of the podcast.

Deliverables: Interview Draft, Podcast Script.

3. Project Management and Podcast Production

Objective*:*

Equip students with the skills to manage a podcast episode's production from planning to post-production, emphasizing teamwork and effective use of digital tools.

Activities*:*

Project Planning: Students develop a project timeline, assign tasks, and ensure resource availability.

Podcast Production: Students conduct interviews, record, and participate in the editing of their podcast episode, adjusting plans as needed to stay on schedule.

Deliverable: Podcast Episode.

Interactive Sessions and Collaborative Learning

Throughout the course, students engage in a blend of lectures, discussions, tutorials, and practical sessions to develop their diagnostic, advisory, and project management skills. These sessions introduce core concepts, provide hands-on support, and focus on podcast production. Students also work in groups to foster collaboration and share responsibilities in research, scriptwriting, and production.

These educational activities aim to provide practical experience in developing critical thinking, communicating scientific research, and enhancing project management skills.

Skills acquired

1. Diagnostic Skills

Students develop the ability to:

- ***Conduct Research and Analyze Scientific Topics***:

Students learn how to perform in-depth research, synthesize information from multiple sources, and analyze the societal relevance of scientific topics. This involves critically assessing research findings and identifying their impact on global challenges such as climate change, food security, or biodiversity.

- ***Use Diagnostic Methods***:

Students gain proficiency in using analytical methods to evaluate scientific research and its evolution over time. This includes mastering the ability to diagnose how research interacts with societal issues and contributes to their resolution.

- ***Process and Analyze Data***:

Students acquire skills in data collection and analysis, ensuring that they can organize, interpret, and present relevant information in a coherent and structured manner.

2. Advisory Skills

Students develop the ability to:

- ***Contextualize Scientific Research***:

Students learn how to align research with stakeholder needs and societal challenges. They can assess the broader implications of scientific discoveries and explain how these discoveries contribute to solving real-world problems.

- ***Adapt Communication for a given Audience***:

One of the core skills acquired is the ability to adapt complex scientific concepts into accessible, understandable language for a non-specialist audience. Students learn how to simplify content without losing its core meaning, making it relevant to the needs of the intended audience.

- ***Highlight the Societal Relevance of Research***:

Students gain the ability to clearly articulate how scientific research addresses pressing global challenges, such as sustainability or public health, and how it contributes to potential solutions.

3. Project Management and Execution Skills

Students develop the ability to:

- ***Plan and Manage a Communication Project***:

Students acquire practical experience in managing all aspects of a communication project, from planning and task delegation to timeline management and resource allocation. They learn how to organize and execute tasks efficiently, ensuring deadlines are met and deliverables are of high quality.

- **Monitor and Evaluate Project Progress**:

Throughout the module, students track project milestones, assess progress, and adjust their plans as necessary to keep the project on track. This helps them develop skills in self-evaluation and project assessment, ensuring they can navigate challenges and delays effectively.

4. Collaborative and Communication Skills

Students develop the ability to:

- ***Engage with the audience***:

Through the production of podcasts and interviews with researchers, students practice engaging with various stakeholders (researchers and the public). They learn how to prepare for and conduct interviews, frame research in a way that is relevant to the audience, and communicate the research impact clearly.

Evaluation methods

The evaluation for this course is continuous and project-based, centered around three core outputs: the Bibliographic Report, Interview Draft, Podcast Script. These components collectively assess students' mastery of diagnostic, advisory, and project management skills, focusing on their individual contributions.

1. Bibliographic Report (30% of final grade)

Objective: Assess students' ability to conduct a literature review and analyze the connection between research and societal challenges.

Criteria:

- Research Depth: Quality and relevance of sources, coverage of the research topic.

- Historical Context: Understanding of key research milestones.

- Societal Relevance: Linking research to global challenges and societal impact.

- Clarity and Structure: Report organization and coherence, including referencing.

Method: Evaluated early in the module using a detailed rubric, with feedback provided to enhance diagnostic skills.

2. Interview Draft (30% of final grade)

Objective: Evaluate preparation of interview questions that probe the societal impact of the research.

Criteria:

- Question Relevance: Alignment with research topic and societal issues.

- Depth of Insight: Encouraging a deep understanding of research impact.

- Structure and Flow: Logical question progression for a coherent interview.

- Audience Focus: Reflection about audience needs.

Method: Pre-interview submission evaluated via rubric, focusing on question relevance and engagement potential.

3. Podcast Script (40% of final grade)

Objective: Assess the ability to create a podcast script that makes complex research accessible and societally relevant.

Criteria:

- Content Simplification: Simplification of scientific concepts without losing key information.

- Engagement and Clarity: Storytelling, clear language, and logical flow.

- Global Challenge Focus: Highlighting the research's contribution to addressing global challenges.

- Accuracy and Coherence: Overall script accuracy and coherence.

Method: Post-interview submission evaluated for communication effectiveness and audience engagement. Feedback focuses on clarity and societal alignment.

UE6M– Research Internship

Instructors: Jacques DAVID – jacques.david@supagro.fr Jean-François MARTIN – jean-francois.martin@supagro.fr **Hosting structures** Research units and laboratories of Institut Agro Montpellier and associated research partners (UMR, UMR-associated units, research platforms).	
Number of hours: 770h – February to June	**30 ECTS**
Keywords: Research internship, scientific practice, research immersion, autonomy, experimentation, data analysis, scientific writing, ethics, sustainability transitions, reflexivity, research communication.	

Course Summary

UE6M – Research Internship is a long-duration, full-time research immersion that follows the Junior Research Lab (JRL) semester. It is designed as a direct pedagogical continuation of the JRL experience, shifting students from a collaborative, school-based research project to an individual, lab-embedded research situation. During this internship, students are fully integrated into a research laboratory of Institut Agro Montpellier (or an associated partner). They actively participate in ongoing research activities and contribute to a clearly identified scientific question aligned with the laboratory's research agenda and the broader challenges of agricultural and environmental sustainability.

The internship aims to consolidate the research posture developed during the JRL by confronting students with the realities of scientific work over an extended period: formulation and refinement of research questions, experimental or analytical work, data management, interpretation of results, uncertainty management, ethical considerations, and scientific communication. Emphasis is placed on autonomy, rigor, reflexivity, and responsibility within a real research environment.

UE6M prepares students either for advanced academic pathways (PhD, research-oriented master's programs) or for professional trajectories where strong research competencies, analytical thinking, and evidence-based decision-making are required.

Learning objectives

1. Scientific and diagnostic skills

Students develop the ability to:

- Formulate and refine a research question within an existing scientific framework and research program.
- Design and implement a research approach consistent with scientific standards (experimental, observational, modeling, or analytical).
- Collect, manage, and analyze data using appropriate quantitative and/or qualitative methods.
- Interpret results critically, identify limitations, and articulate uncertainties.

2. Research autonomy and reflexivity

Students develop the ability to:

- Work autonomously while interacting constructively with supervisors, researchers, engineers, and technical staff.
- Organize their work over a long-time frame, manage priorities, and adapt to unforeseen constraints.
- Reflect on their own research practices, choices, and learning processes.
- Integrate feedback and progressively improve their scientific reasoning and methods.

3. Ethical and responsible research practice

Students develop the ability to:

- Apply ethical principles in research (data integrity, reproducibility, authorship, confidentiality, responsible use of AI and digital tools).
- Respect health, safety, and regulatory constraints of the host laboratory.
- Situate their research within the broader context of sustainability transitions and societal challenges.

4. Scientific communication

Students develop the ability to:

- Communicate research objectives, methods, and results in written and oral scientific formats.
- Produce a structured scientific report consistent with academic standards.
- Present and discuss their work clearly to a scientific audience, while demonstrating critical distance.

General organization

UE6M is a full-time research internship carried out over approximately five months. Students are hosted in a research laboratory and placed under the joint supervision of a laboratory supervisor and the pedagogical academic tutor of the JRL.

The internship is structured around four main phases, which may overlap:

1. **Integration and problem refinement**
   Familiarization with the research environment, tools, and protocols; clarification and refinement of the research question.

2. **Research implementation**
   Experimental work, data collection, modeling, surveys, or analytical tasks, depending on the discipline and project.

3. **Analysis and interpretation**
   Data processing, interpretation of results, iterative discussions with supervisors, and positioning with respect to the state of the art.

4. **Synthesis and dissemination**
   Writing of the internship report and preparation of the oral defense.

The internship builds explicitly on competencies acquired during the JRL, while deepening individual responsibility and immersion in professional research practices.

Educational activities

1. Research activities in the host laboratory

Objective:

Enable students to experience real scientific work within a research team and contribute meaningfully to an ongoing research program.

Activities:

- Participation in laboratory activities (meetings, seminars, experiments, data analysis).
- Implementation of a defined research task under supervision.
- Use of laboratory-specific tools, methods, and data.

Deliverable:

Contribution to the laboratory's research activities and production of internship outputs.

2. Scientific analysis and synthesis

Objective:

Develop students' capacity to analyze results, position them within the scientific literature, and produce a coherent synthesis.

Activities:

- Literature review related to the internship topic.
- Data analysis and interpretation.
- Drafting and revision of the internship report.

Deliverables:

Written internship report.

3. Communication and defense

Objective:

Train students to communicate their research work clearly and rigorously.

Activities:

- Preparation of an oral presentation.
- Oral defense in front of an academic jury.

Deliverable:

Oral presentation and defense.

Evaluation methods

Evaluation is based on the student's individual work and assesses scientific competencies, autonomy, rigor, and reflexivity.

1. Internship report (60%)

Objective
Assess the student's ability to conduct, analyze, and synthesize a research project.

Criteria

- Clarity and relevance of the research question.
- Scientific rigor of methods and analyses.
- Critical interpretation of results and discussion of limitations.
- Structure, clarity, and quality of scientific writing.
- Proper referencing and ethical research conduct.

2. Oral defense (30%)

Objective
Evaluate the student's ability to present and discuss their research work.

Criteria

- Clarity and structure of the presentation.
- Scientific accuracy and depth.
- Ability to answer questions and demonstrate critical thinking.

3. Supervisor's assessment (10%)

Objective
Evaluate professional behavior and research posture during the internship.

Criteria

- Autonomy and initiative.

- Integration within the research team.
- Work organization and reliability.
- Ethical and professional conduct.

The UE is validated if the final grade is equal to or higher than 10/20. A retake procedure may be proposed in accordance with institutional regulations.

Les Unités d'Enseignement continues Ingénieur

UE Développement professionnel

Responsable pédagogique Mélanie DUPPI - 04.99.61.30.15 - melanie.duppi@supagro.fr	
Assistante de formation Marie BONNAGUE - 04.99.61.28.28 – marie.bonnague@supagro.fr	
Nombre d'heures : 27 (+ 50h en autonomie)	**8 ECTS**
Mots clés : Gestion de projet, compétences, milieu professionnel, communication, travail en équipe, interdisciplinarité	
UE et ECUE (élément constitutifs d'UE)	L'UE DP en S7 contient 3 Ecue : **ECUE PEI** : • Responsable pédagogique : Géraldine Aumasson – 04.99.61.29.84 – geraldine.aumasson@supagro.fr **ECUE Stage en entreprise agricole :** • Responsables pédagogiques : Mélanie Duppi (IA) – 04.99.61.30.15 - melanie.duppi@supagro.fr Patrick Bourgeois (SAADS) – 04.67.61.70.09 – patrick.bourgeois@supagro.fr • Assistantes : Katty Fernandez (IA) – 04.99.61.26.43 – katty.fernandez@supagro.fr Cécile Verdeille (SAADS) – 04.99.61.70.60 – cecile.verdeille@supagro **ECUE Projet personnel et professionnel (PPP) et communication :** • Responsable pédagogique : Mélanie DUPPI - 04.99.61.30.15 - melanie.duppi@supagro.fr

Objectifs

Objectif général :
L'objectif de cette UE est de préparer les étudiants au milieu professionnel : par la mise en situations professionnelles, l'acquisition de compétences transversales, la préparation au projet professionnel et la préparation à l'emploi.
Les expériences professionnelles associées à cette UE (stage et projet étudiant) visent le développement de compétences professionnelles, disciplinaires et transversales (gestion de projet, communication, analyse, expression écrite et orale...), et contribuent à la construction du projet professionnel des étudiants.
Les enseignements proposés permettent aux étudiants de valoriser ces expériences dans la construction de leur projet professionnel et visent le développement de compétences en communication, la préparation à la recherche de stage et plus globalement la préparation à l'insertion professionnelle.

***Sous-objectifs* :**
ECUE stage :
En dominante, cette ECUE fait suite aux stages réalisés dans le cadre de l'UE/ECUE « stage en entreprise agricole », en tronc commun des cursus IA et SAADS. Cette ECUE vise à développer sa connaissance de la réalité agricole (ou agroalimentaire) de son pays ou d'un autre pays, et mettre en œuvre des pratiques agricoles ou agroalimentaires, adaptées à la structure professionnelle de stage.

Les étudiants rédigent un rapport de stage dont les objectifs sont les suivants : analyser le fonctionnement d'une entreprise agricole sur les plans économiques, sociaux et techniques ; analyser un projet d'évolution ou une problématique de l'entreprise (cursus IA).
Les étudiants entrants directement en 2ème année ingénieur, n'ayant pas vécu l'UE/ECUE « stage en entreprise agricole » du tronc commun, réalisent quant à eux un exercice de présentation orale, dont les objectifs sont les suivants : présenter la structure professionnelle ainsi que les objectifs de la mission et résultats obtenus, apporter une analyse critique sur cette expérience.

ECUE PEI :
L'ECUE PEI en dominante a des objectifs qui sont dans la continuité de ceux de l'ECUE PEI en tronc commun. Les étudiants vont ainsi poursuivre l'acquisition de compétences en gestion de projet à savoir : utiliser des outils de gestion de suivi de projet, travailler en équipe pour répondre à la commande d'un commanditaire extérieur à l'école, récolter puis analyser des données, émettre des préconisations, fournir des livrables en adéquation avec la commande et construire des supports de communication afin de présenter à l'oral les résultats de leur travail.

ECUE PPP et communication :
L'ECUE « projet personnel le professionnel et communication » a pour objectif de préparer les étudiants à la recherche de stage (ou d'emploi) : savoir identifier et mobiliser son réseau professionnel, savoir organiser sa recherche de stage ou d'emploi, savoir candidater. Les étudiants sont notamment accompagnés pour identifier et valoriser leurs compétences et élaborer leurs outils de candidature : Cv, lettres de motivation, pitchs de présentation personnelle. Chaque étudiant bénéficie d'une correction personnalisée de ses outils de candidature, apportée par des professionnels du recrutement et positionnée avant le Forum des métiers (novembre).
Au-delà des rencontres proposées dans le cadre du Forum des métiers de l'Institut Agro Montpellier, les étudiants ont l'opportunité, dans cette ECUE, d'échanger avec des recruteurs sur les techniques de recrutement pratiquées. Ils sont par ailleurs sensibilisés au droit du travail, afin d'acquérir les connaissances de base liées à la négociation de leurs futurs contrats.
Enfin, cette ECUE a pour objectif d'apporter aux étudiants des bases en communication leur permettant, en situation professionnelle, d'identifier, prévenir et sortir des conflits.

Organisation générale et positionnement de l'UE dans l'année

ECUE PEI : Les étudiants poursuivent le projet démarré au cours du semestre 6. Le travail personnel se fait principalement pendant les journées PEI ciblées, ainsi que les demi-journées libérées à l'emploi du temps. L'ECUE prend fin en décembre, lors de la soutenance finale.
ECUE stage : La période de stage est réalisée en première année du cursus, et rattachée à l'UE/ECUE « stage en entreprise agricole » du tronc commun IA et SAADS. Le rapport de stage est rendu au cours du S7.
ECUE PPP et communication : Les TD ont lieu en continu, tout au long du semestre.

Capacités évaluées

Concepts-clés à mobiliser
- ECUE stage : systèmes de cultures et d'élevage, autonomie
- ECUE PEI : conduite de projet, notion d'interculturalité, travail collaboratif
- ECUE PPP et communication : techniques de recherche de stage et de construction du projet professionnel, droit du travail,

Outils et méthodes à maîtriser
- Rédaction de supports (rapports, notes de synthèse, CV et lettres, profils réseaux sociaux) en tenant compte des consignes transmises et des attentes des destinataires
- Présentation à l'oral du travail réalisé, des compétences développées en s'adaptant au public (jury, tuteur, étudiants) en s'appuyant sur des supports adaptés (diaporamas par exemple)
- Mobilisation des connaissances disciplinaires spécifiques à l'étude, au projet, à la compréhension de l'organisation de la structure professionnelle
- Analyse du fonctionnement d'une entreprise agricole, analyse économique, analyse d'un projet multicritère, en repositionnant l'entreprise dans son environnement (ECUE stage)
- Conduite de projet : organisation du travail en équipe, gestion d'un budget, d'un planning, adoption d'une démarche interdisciplinaire (ECUE PEI)

- Analyse d'expériences, valorisation à l'écrit et à l'oral, explicitation de sa trajectoire et de ses choix de formation (ECUE PPP et communication)

Comportements

- Adopter une posture professionnelle
- S'adapter et s'intégrer dans une équipe et/ou un milieu professionnel nouveau (ouverture d'esprit, capacité d'écoute, intégration des différences culturelles)
- Développer une attitude collaborative lors des travaux de groupe ou d'équipe

Contenu de l'UE et programme

Discipline	cours	TD/TP	Autres activités pédagogiques en autonomie	Examen	Total
ECUE PEI	1	6	50	1	58
ECUE Stage	0	0			0
ECUE PPP/com	1	18			19
TOTAL UE	2	24	50	1	77

ECUE PEI

COURS (1 h)	Remise en route des PEI après la période estivale
TD (6 h dont 2h pendant journée PEI)	Gestion de la multiculturalité dans un projet et accueil de nouveaux entrants dans les groupes Préparation à la soutenance orale (pendant journée PEI) Co-développement : Faire émerger des solutions face à des difficultés professionnelles
Travail en autonomie (50h)	Temps libéré à l'emploi du temps « journées PEI »

ECUE PPP COM

COURS (1 h)	Introduction de l'UE Développement Professionnel : organisation, modalités, évaluation
TD (18 h)	Analyser ses expériences et identifier ses compétences Organiser sa recherche de stage (ou d'emploi) Préparation de candidatures : les attendus du CV et de la lettre de motivation Atelier corrections CV/lettres de motivation Pitch de présentation personnelle et simulations d'entretien de recrutement Négocier son salaire, connaître les techniques de recrutement Le réseau professionnel : l'identifier, le créer, l'utiliser, l'entretenir Travailler en intelligence collective et gérer les tensions Sensibilisation au droit du travail

Modalités d'évaluation

ECUE stage (50%) : rapport de stage, rendu écrit réalisé en tronc commun (étudiants ingénieurs agronomes)
ECUE PEI (37,5%) : rapport écrit, soutenance orale 1h
ECUE PPP/communication (12,5%) : rendu écrit

Structures de recherche et professionnels associés

Commanditaires PEI, organismes de stage
Interventions de professionnels en TD (PPP).

UE LV1 – Communication en langue anglaise

Responsables pédagogiques Celine FABRE - 04 99 61 28 53 - celine.fabre@supagro.fr Fabien Zecchino - 04 67 61 70 62 - fabien.zecchino@supagro.fr	
Assistantes de formation : Olga COLLIN - 04 99 61 27 14 - olga.collin@supagro.fr	
Nombre d'heures : 22h	**1 ECTS**
Mots clés : compétences linguistiques, interculturel, communication professionnelle, champ lexical/grammatical, évaluation	
UE et ECUE (élément constitutifs d'UE)	Pas d'ECUE dans l'UE

Objectifs

Objectif 1 : Affirmer son projet professionnel
- Se doter d'outils personnels et élaborer des stratégies en vue de son intégration dans le monde du travail dans un contexte international : CV, lettre de motivation, entretien d'embauche…

Objectif 2 : Communiquer, échanger et argumenter
- Renforcer les acquis des semestres précédents dans les domaines de la communication, de la prise de parole, de l'argumentation, de l'animation de débats et du travail d'équipe
- Identifier les stratégies de communication en lien avec son domaine de spécialité
- Savoir présenter et valoriser son activité professionnelle à destination du grand public

Objectif 3 : Renforcer sa maitrise linguistique et développer ses connaissances lexicales
- Renforcement du vocabulaire général et agronomique
- Acquisition et renforcement du vocabulaire du champ de spécialisation (suivant la dominante choisie)
- Consolidation des acquis grammaticaux des cycles précédents
- Développement de la maitrise phonétique (prononciation, prosodie, rythme, accentuation…)

Organisation générale et positionnement de l'UE dans l'année

UE transversale sur le semestre 7, l'anglais est enseigné de septembre à fin décembre à raison de 11 séances de 2h hebdomadaires.
La présence est obligatoire. A chaque absence non justifiée, il sera attribué un « 0 » comptant pour la moyenne.
Des groupes de niveaux sont constitués pour un meilleur apprentissage.

Contenu de l'UE et programme

1 : La recherche d'emploi
- Savoir rédiger un CV et une lettre de motivation en anglais
- Réaliser un entretien d'embauche

2 : Le compte-rendu écrit
- Savoir rédiger un écrit à caractère professionnel (compte-rendu, résumé scientifique, email…) de manière appropriée et efficace

3 : La communication à caractère professionnel
- Savoir présenter et promouvoir son activité en anglais
- Se familiariser avec les outils de communication en lien avec son domaine de spécialité

4 : Le management interculturel
- Appréhender l'influence et les effets de la dimension culturelle dans un cadre de travail international

Capacités évaluées

Concepts-clés à mobiliser
Etre capable de comprendre et de s'exprimer couramment en langue étrangère
Maitriser les stratégies de communication en langue étrangère

Outils et méthodes à maîtriser
Savoir présenter et valoriser ses compétences professionnelles

Comportements
Savoir communiquer et interagir dans un contexte interculturel

Modalités d'évaluation

Contrôle continu : 100 %. On cherchera à évaluer au moins trois des cinq compétences linguistiques (compréhension orale, compréhension écrite, expression orale, expression écrite, interaction orale).
Niveau visé (selon le cadre européen pour l'enseignement des langues) : C1, niveau minimal attendu : B2 (785pts au TOEIC / 160pts au Cambridge)

UE LV2 – Communication en langue vivante (Allemand – Espagnol – Portugais)

Responsables pédagogiques Nafissa ELANIOU - 04.99.61.22.27 – nafissa.elaniou@supagro.fr	
Assistante de formation : Olga COLLIN - 04 99 61 27 14 - olga.collin@supagro.fr	
Nombre d'heures : 16,5h	**1 ECTS**
Mots clés : compétences linguistiques, interculturel, communication professionnelle, champ lexical/grammatical, évaluation	
UE et ECUE (élément constitutifs d'UE)	Pas d'ECUE dans l'UE

Objectifs de l'UE

L'UE LV2 a pour objectif de répondre aux compétences linguistiques, communicationnelles et interculturels d'un(e) ingénieur(e) à l'international.

Afin d'atteindre cet objectif général, 2 axes majeurs seront privilégiés au cours de la formation et la primauté sera donné à la communication orale.

- Compréhension et mobilisation d'éléments de cultures étrangères pour développer des compétences interculturelles et inter-linguistiques dans des situation socio-professionnelles de référence.
- Développement et approfondissement des éléments de la langue scientifique et technique en lien avec le domaine d'étude.

Organisation générale et positionnement de l'UE dans l'année

Les enseignements se déroulent à hauteur d'1,5 heure par semaine selon un calendrier établi en début de semestre.
Un test de positionnement peut être proposé aux étudiant(e)s.
Les cours de LV2 du tronc commun s'articulent autour de thématiques ou objectifs précis en fonction des niveaux de langue :

➔ Pré A1 à A2 : Comprendre, parler, lire et écrire une langue étrangère au plus proche de l'authenticité pour communiquer de façon efficace dans des situations sociales de référence

➔ A2 à C1 : Comprendre, parler, lire et écrire une langue étrangère au plus proche de l'authenticité pour communiquer de façon efficace dans des situations socio-professionnelles de référence.

Contenu de l'UE et programme

Le contenu de l'UE varie selon le niveau de LV2

Les niveaux A2 à C1 pourront développer les compétences suivantes :

1 : Affirmer son projet professionnel

- Savoir rédiger un CV et une lettre de motivation.
- Réussir un entretien de recrutement en valorisant son parcours.
- Se projeter dans son avenir professionnel.

2 : Echanger, convaincre et argumenter dans des situations sociales ou professionnelles :

- Conduire un débat.
- Rédiger un écrit argumentatif pour valoriser un projet, une idée.
- Savoir prendre la parole pour défendre un point de vue et argumenter.
- Renforcer les techniques de présentation pour communiquer efficacement ses idées.

- Comprendre, créer, et mettre en œuvre des stratégies de communication efficaces pour convaincre un auditoire.
- Concevoir un support de présentation visuel impactant et s'en saisir pour valoriser ses idées et son propos.

3 : Communiquer avec des locuteurs de différentes cultures :

- Connaître et se saisir des différences culturelles propre aux différents pays de référence.
- Comprendre ou communiquer en tenant compte de la diversité diatopique (variation d'une même langue d'un espace géographique à un autre).
- Connaître la phonétique et les subtilités linguistiques favorisant l'intégration.

Exemples de compétences transversales évaluées

- Organiser son travail pour participer à un projet.
- Mobiliser des stratégies adaptées à une intention de communication.
- Concevoir des supports de communication efficaces.
- Mobiliser des éléments culturels, interculturels dans le cadre d'un projet ou d'une tâche.
- S'exprimer à l'oral ou à l'écrit de façon claire et organisée dans un contexte social ou professionnel de référence.

Modalités d'évaluation

Contrôle continu :

- Pour chaque semestre, un minimum de 3 compétences langagières est évalué (coefficients identiques).

Absentéisme et retards :

- Présence en cours de langue obligatoire, quel que soit le niveau de l'étudiant.
- En cas d'absence justifiée, les étudiant(e)s font passer leur justificatif (rendez-vous médical, administratif, décès d'un proche, convocation…) au service de la scolarité et en adresse une copie au coordinateur/à la coordinatrice dès leur retour et au plus tard sous 8 jours.

L'absence est alors excusée et n'entraine aucune sanction.

Pour chaque absence non justifiée, un zéro sera ajouté à la moyenne du semestre

En cas de retard de plus de 5mn, l'enseignant(e) est en droit de ne pas accepter l'étudiant(e) en cours et le retard est donc assimilé à une absence.