

3 core missions

Provide France with a leading higher education institution focused on the convergence of **Food, Agriculture** and the **Environment**

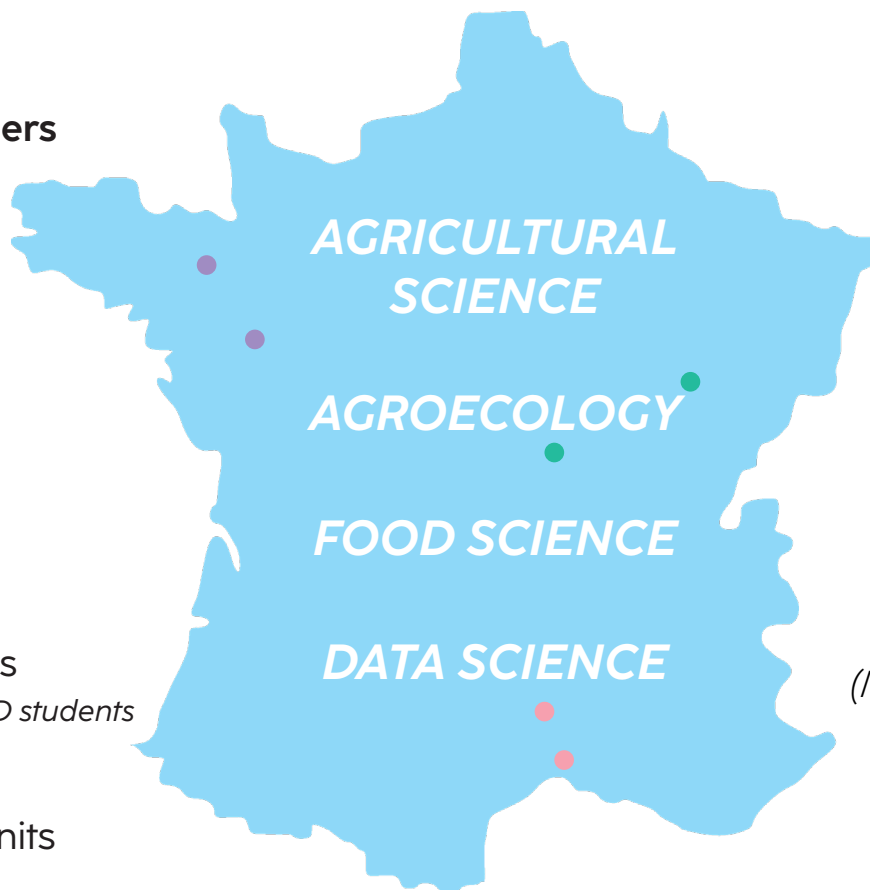
Foster **agroecological** and **digital transitions** of both production and food systems under climate change

Contribute to **education, research** and **innovation** as well as promote international **collaborations** and **intercultural dialogue**

1 Higher Education Institution, 6 campuses

Institut Agro
Rennes-Angers

Institut Agro Dijon
(Dijon / Clermont)



4700 students
including **400** PhD students

1300 staff

42 research units

Institut Agro
Montpellier
(Montpellier/Florac)






Erasmus code: F PARIS 487

Contact: partnership@institut-agro.fr

Full name in French: Institut national de l'enseignement supérieur pour l'agriculture, l'alimentation et l'environnement

Website: <https://www.institut-agro.fr/>

Exchange and course offer
(Master and PhD level)

-  <https://international.agrocampus-ouest.fr/>
-  <https://agrosupdijon.com/programs>
-  <https://en.institut-agro-montpellier.fr/admissions/come-academic-exchange-programme>

Institutional details

Name of the institution:

L'INSTITUT AGRO: National Institute of Higher Education for Agriculture, Food and Environment

Country: France

Erasmus Code: F PARIS 487

Address: 42 rue Scheffer, 75 016 PARIS

Campuses:
Institut Agro Dijon..... <https://institut-agro-dijon.com/>
Institut Agro Montpellier..... <https://en.institut-agro-montpellier.fr/>
Institut Agro Rennes-Angers..... <https://international.institut-agro-rennes-angers.fr/>
Websites:
<https://www.institut-agro.fr/fr>
Head of the institution: Ms Anne-Lucie WACK

Institutional contacts

Institutional Erasmus Coordinator:

 Ms Dominique LOUETTE
 dominique.louette@supagro.fr
 Tel. +33 (0)4 99 61 26 35

Inter Institutional Agreements:

partnership@institut-agro.fr

International office:
**INCOMING STUDENTS
(TO L'INSTITUT AGRO)**
Institut Agro Dijon laetitia.borsato@agrosupdijon.fr / international@agrosupdijon.fr

Institut Agro Montpellier..... santi.mallet@supagro.fr (Europe, North America)/ claudia.medina@supagro.fr (others)

Institut Agro Rennes-Angers student.mobility@agrocampus-ouest.fr

**OUTGOING STUDENTS
(FROM L'INSTITUT AGRO)**
Institut Agro Dijon amelie.jaillet@agrosupdijon.fr / international@agrosupdijon.fr

Institut Agro Montpellier..... santi.mallet@supagro.fr (Europe, North America)/ claudia.medina@supagro.fr (others)

Institut Agro Rennes-Angers
 outgoing-angers@agrocampus-ouest.fr
 outgoing-rennes@agrocampus-ouest.fr

Academic life

Fields of study:
CAMPUS:
DISCIPLINE:
Dijon
Montpellier
Rennes / Angers

Agricultural Science..... ● ● ●

Agricultural Socio-Economics..... ● ● ●

Food Science..... ● ● ●

Plant Science / Horticulture..... ● ● ●

Landscape Engineering..... ●

Rural development..... ●

Viticulture & Oneology..... ●

Courses available:

- <https://institut-agro-dijon.com/programs/international-exchange-students>
- <https://en.institut-agro-montpellier.fr/programs/academic-exchange-programs/course-offers>
- <https://international.institut-agro-rennes-angers.fr/exchange-students>

Programmes in English:

Autumn semester:

- **Sustainable Food Formulation** - Sept to March (30 ECTS)
- **Vinifera Euromaster** - Sept to Jan (27 ECTS) or Sept to Dec (20 ECTS)
- **Junior Research Lab for Agricultural Transition (JRL-AT)** - Sept to Dec (26 ECTS) or Sept to Jan (30 ECTS)
- **Agroecology** - Sept to Jan (30 ECTS) (Rennes)
- **Seeds and Plant Propagation** - Sept to Feb (30 ECTS) (Angers)
- **Microbiology and Physicochemistry for food and wine processes** - Sept to January (30 ECTS)
- **Physiological and Psychological Food Choice Determinants** - Sept to January (30 ECTS)
- **Transitions in Environmental and Agrifood Systems Management** - Sept to Feb (30 ECTS)

Spring semester:

- **Research Project** - Feb/March to July (30 ECTS)
- **Vinifera Euromaster** - Jan to May (30 ECTS) or Feb to May (28 ECTS)
- **Agroecology** - Feb to April (21 ECTS)
- **Plant Sciences** - Feb to April (21 ECTS)
- **Data Manager for Environmental Sciences** - Feb to April (21 ECTS)
- **Junior Research Lab - May and June** - 14 ECTS
- **Physiological and Psychological Food Choice Determinants** - Jan to June (30 ECTS)
- **Transitions: comprehend and act** - March (7 ECTS)

Language requirement:

French: B1/B2 level required (for courses in French)

English: B1/B2 level required (for courses in English)

Academic calendar:

	Autumn semester	Spring semester
Start >>	September	February
End >>	depends on the programme	depends on the programme

Accommodation:

- <https://institut-agro-dijon.com/life-agrosup-dijon/living-in-france/housing>
- <https://en.institut-agro-montpellier.fr/student-life/accommodation>
- <https://international.institut-agro-rennes-angers.fr/accommodation-and-catering>

Apply as an exchange student

Nomination / Application date:

Autumn semester: 30th April

Spring semester: 31st October

Email to:

- laetitia.borsato@agrosupdijon.fr
- santi.mallet@supagro.fr
- student.mobility@agrocampus-ouest.fr

Application process:

- <https://institut-agro-dijon.com/programs/international-exchange-students>
- <https://en.institut-agro-montpellier.fr/programs/academic-exchange-programme/how-to-apply>
- <https://international.institut-agro-rennes-angers.fr/exchange-students>

Requirements:

CV + Motivation letter in French or English

Academic requirement: 180 ECTS – EQF Level 7 (second cycle)

Other: ID Document, Higher Education Transcripts of records, French and/or English Language Certificate, Application Form

Websites



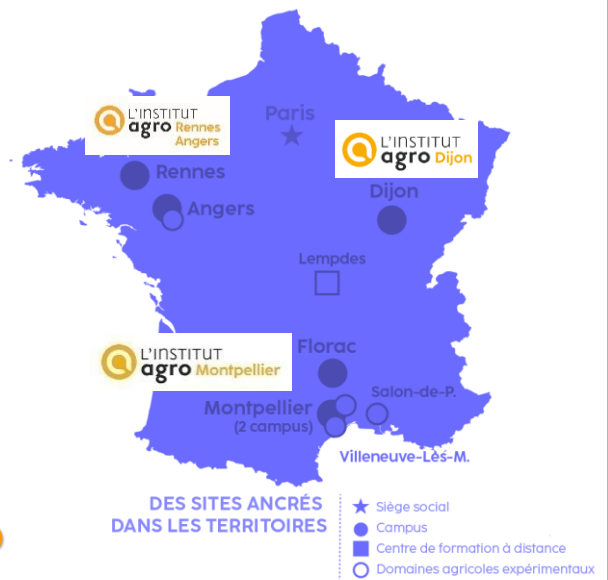
L'INSTITUT
agro Montpellier



FRANCE

EXCHANGE PROGRAMME

STUDIES AND INTERNSHIP



BSc to PhD

Research

International Cooperation

in

Agricultural Sciences

Biological Sciences

Agri-Food Science

Environment

Rural Development

Institut Agro Montpellier - France

ACADEMIC EXCHANGE 2023-2024

GENERAL INFORMATION AND PROCEDURES

English: <https://en.institut-agro-montpellier.fr/admissions/come-academic-exchange-programme>

French: <https://www.institut-agro-montpellier.fr/international/venir-etudier-montpellier-supagro/venir-en-echange-academique>

Institut Agro Montpellier, a Prestigious School

Since 2020, Institut Agro Montpellier (former Montpellier SupAgro F MONTPEL10) is part of l'Institut Agro (F PARIS487), a leading French higher education institution focused on the convergence of **Food, Agriculture and the Environment**. Its **mission is to contribute to education, research and innovation and promote international collaborations and intercultural dialog to foster agroecological and digital transitions** of both production and food systems under climate change. French National Institute dedicated to further education, research, international scientific and technical cooperation and sustainable development *in*

Institut Agro Montpellier offers courses in **Agriculture, Agri-Food Science, Environment and Rural Management and is specifically dedicated to innovation in Mediterranean, tropical and sub-tropical issues.**



Students benefit from **an outstanding scientific environment:**

- **MUSE, Montpellier University of Excellence:**

Institut Agro Montpellier is a member of MUSE, one of the world's most innovative scientific communities in three key fields: Agriculture, Environment and Health.

- **Agropolis International:**

Institut Agro Montpellier is a member of this Montpellier agronomic cluster, with 112 research units and 2,200 researchers in agriculture, food, environment and biodiversity.

- **The Consultative Group on International Agricultural Research (CGIAR) Headquarters** setting in Montpellier fortifies the leadership position of Montpellier's agronomic research at a worldwide level.

- **1,700** students (**29%** from foreign countries)
- **88** academic staff and **345** external lecturers

Contact for exchange programs

Address

Latin America and Asia

Ms. Claudia Medina

claudia.medina@supagro.fr - +33 (0)4 99 61 27 29

European Union and North America

Ms. Santi Mallet

santi.mallet@supagro.fr - +33 (0)4 99 61 23 27

Exchange programs

Ms. Dominique Louette

dominique.louette@supagro.fr - +33 (0)4 99 61 26 35

Institut Agro Montpellier
Service des Relations Internationales
et Langues (SRIL)
2 place Viala - Bâtiment 11
34 060 Montpellier cedex 2
France

More information on the websites:
<https://en.institut-agro-montpellier.fr/> (English)
<https://www.institut-agro-montpellier.fr/> (French)

Campuses

Most of the courses take place on the campus of La Gaillarde or La Valette in the city of **Montpellier**, few on the campus of the city of **Florac** and 3 of them take place, according to the periods, in different cities of France.



Academic Calendar

SCIENTIFIC COURSES

Jun	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
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AUTUMN semester

Scientific courses (Tracks)	Sept to Dec, Jan, Feb or Mar	Jun	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug

SPRING semester

Scientific courses (Tracks)	Jan or Feb to Apr	Jun	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Junior Research Lab	2 months														
FEAT/FLOW spring course	4 weeks														

INTERNSHIP

Internship	2 to 6 months	Jun	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug

EXAMS and RESIT

Exams	During and at the end of each course of a Track	Jun	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Resit exams	Can occur online														

LANGUAGE COURSES

Jun	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
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AUTUMN semester

French Summer Course	paying	Jun	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
French Intensive Course	2 weeks early Sept (or Oct)														
French weekly Course	2 h/week														
English, German, Spanish	1,5 h/week														

SPRING semester

French Intensive Course	2 weeks late Jan (or Feb)	Jun	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
French weekly Course	2 h/week														
English, German, Spanish	1,5 h/week														

- Each Track has its specific calendar. More information on Track Offer Charts from page 6.
- Internship can start at any time of the year and must last less than 6 months

Course Offers, Internship and Junior Research Lab (JRL and JRL-AT) for Exchange Students

From page 6, find information about the course offers in **French and English** for students in exchange, for **Autumn semester, Spring semester and Full year mobility**.

From page 14, find information about the JRL and Internship.

Or consult:

<https://en.institut-agro-montpellier.fr/admissions/come-academic-exchange-programme/> (English)

<https://www.institut-agro-montpellier.fr/international/venir-etudier-montpellier-supagro/mobilite-academique-stage/venir-en-echange/> (French)

Teaching Language

French or English according to the selected courses. For more information, see course offers attached.

EU ECTS credits system : 1 Semester = 30 ECTS

Exchange students can validate all or part of these credits. The number of scientific ECTS credits allocated to each course is indicated on the Course offers documents and on the application forms. These scientific credits can be completed, if necessary, by the ECTS credits allocated to the language courses.

Language Courses

<https://www.institut-agro-montpellier.fr/international/venir-etudier-montpellier-supagro/langues> (French)

<https://en.institut-agro-montpellier.fr/programs/languages> (English)

• Elective French Summer Courses

Please note, fees are due!

We offer a French Summer Programs in July and/or August:

• French Language Courses

Free of charge

Intensive French language courses, 2 weeks before the beginning of each semester, are followed by regular courses, the whole semester or year.

• Other Language Courses

Free of charge

Students can also choose to attend **free of charge** English, Spanish or German courses, subject to available places.



Requirements for academic exchange

• Bilateral Exchange Programs

Students are admitted through bilateral or multilateral exchange programs such as Erasmus+, Brafagri, Brafitec, Arfagri, Mexfitec and bilateral MoU.

• Academic Level

Depending on the chosen tracks, students should show official evidence of completion of a minimum of 4 to 6 semesters of graduate studies before the beginning of their academic exchange. Please consult the specific information on each Track. The academic level and the prerequisites required will be taken into account in the analysis of the application files.



• Language Level

Students must have a **B1/B2 level in French or in English**, depending on the selected courses (contact us). No language proficiency is required for an internship or for the Junior Research Lab.

Application for academic exchange or Junior Research Lab (JRL)

Students should be **nominated by their home university**. Each nominated student will receive an email with a login/password for the completion of the **application form ONLINE**: ID-photo, ID-document, Transcript of records of higher education, Language certificates in French and/or English, Cover letter and Application form.

Deadline for application	Full Year or Autumn Semester	April 30th
	Spring Semester	October 31th

Application for an Internship at Institut Agro Montpellier

Find specific information in the last session of this document about the **Joint Research Units (UMR)** where an internship can be done under certain conditions.

Exchange related information

Health Insurance

Students who do not have an European Health Insurance Card will benefit from the French health insurance cover for the duration of their stay.

<https://en.institut-agro-montpellier.fr/getting-settled/prepare-your-arrival-montpellier-supagro> (English)

<https://www.institut-agro-montpellier.fr/international/venir-etudier-montpellier-supagro/de-la-preparation-de-votre-arrivee-votre-accueil-1> (French)

Liability Insurance

A liability insurance is compulsory and can be taken at their arrival in France.

Visa for non-European Students

Visa VLSTS-Visa D allow student to benefit from French health insurance and housing allowance.

<https://en.institut-agro-montpellier.fr/getting-settled/prepare-your-arrival-montpellier-supagro> (English)

<https://www.institut-agro-montpellier.fr/international/venir-etudier-montpellier-supagro/votre-service/preparer-votre-arrivee-montpellier> (French)

Welcome Events and Administrative Tasks

The Students' Association provides services and **welcome activities** for incoming international students: Pick-up service at the airport or train station, Informal arrival celebration and other integration activities, ...

Each international student is matched with a local student (buddy) by a mentoring program managed by Institut Agro Montpellier students.

Students receive help with **administrative procedures** such as visas, insurance, housing, bank account, ...

Accommodation, Meals and Daily Life

Accommodation and Meals

Once accepted, students can book a room or a bedsit in one of Institut Agro Montpellier's **student residence halls**, which are situated near La Gaillarde campus. Students are free to choose another type of accommodation in town.

<https://en.institut-agro-montpellier.fr/student-life/accommodation> (English)

<https://www.institut-agro-montpellier.fr/vie-etudiante/lieu-de-vie/hebergement> (French)



Meals

Students can eat at the **campus restaurant** under the same conditions as the Institut Agro Montpellier students.

<https://en.montpellier-supagro.fr/student-life/living/dining> (English)

<https://www.montpellier-supagro.fr/vie-etudiante/restauration> (French)

Students with Special Needs

Montpellier SupAgro offers the infrastructure to welcome students and staff with disabilities.

<https://en.institut-agro-montpellier.fr/student-life/accessibility-and-disability> (English)

<https://www.institut-agro-montpellier.fr/vie-etudiante/campus-dynamiques/accessibilite-et-handicap> (French)

Student Guides

<https://en.institut-agro-montpellier.fr/getting-settled/prepare-your-arrival-montpellier-supagro> (English)

<https://www.institut-agro-montpellier.fr/international/venir-etudier-montpellier-supagro/de-la-preparation-de-votre-arrivee-votre-accueil-1> (French)

Extra-Curricular Activities

Exchange students have the opportunity to participate to a wide range of sports and extra-curricular activities offered by Institut Agro Montpellier and/or organized by the Student's Association.

<https://en.institut-agro-montpellier.fr/student-life/dynamic-campus/student-associations> (English)

<https://www.institut-agro-montpellier.fr/vie-etudiante/campus-dynamiques/vie-assocative>

(French)



Institut Agro Montpellier
Course Offer 2023-2024
for Incoming International Students

Institut Agro Montpellier 2023-2024

AUTUMN SEMESTER TRACK OFFER

Ctrl-Click on the link of the Track on which you would like more information

French

English

Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	
JRL-AT - Junior Research Lab for Agric. Transitions													Montpellier – 22 ECTS
JRL-AT - Junior Research Lab for Agric. Transitions													Montpellier – 28 ECTS
VINIFERA – Vinifera Euromaster													Montpellier – 23 ECTS
VINIFERA – Vinifera Euromaster													Montpellier – 30 ECTS
DOMINANTE 1 - Towards Sustainable Agriculture													Montpellier – 28 ECTS
DOMINANTE 1 - Towards Sustainable Agriculture													Montpellier – 24 ECTS
DOMINANTE 2 - Products, Processes and Companies													Montpellier – 28 ECTS
DOMINANTE 2 - Products, Processes and Companies													Montpellier – 24 ECTS
DOMINANTE 3 - Sustainable Management of Natural Resources													Montpellier – 28 ECTS
DOMINANTE 3 - Sustainable Management of Natural Resources													Montpellier – 24 ECTS
EAU et AGRICULTURE 1 - Water and Agriculture (cycle and management of water in agrosystems)													Montpellier – 30 ECTS
EAU et AGRICULTURE 2 - Water and Agriculture (advanced methods for water management in agrosystems)													Montpellier – 30 ECTS
EAU et SOCIETE 1 - Water and Society (economy-sociology-management)													Montpellier – 30 ECTS
EAU et SOCIETE 2 - Water and Society (political science, law, history, geography)													Montpellier – 30 ECTS
BEE - EcoSystèmeS –Biodiversity Ecology Evolution / Ecosystems													Montpellier – 32,5 ECTS
BESTE - Biodiversity, watEr, Soil, climaTe, Evaluation												Montpellier – 30 ECTS	
DATA SCIENCE - Data Science for Agronomy and Agri-food												Rennes/Montpellier – 30 ECTS	
AGROTIC - Agro-Technologies of Information and Communication												Montpellier/Bordeaux – 30 ECTS	
APIMET - Plant Breeding, Mediterranean and Tropical Crops Engineering												Montpellier – 29 ECTS	
SYSTEME D'ELEVAGE - Livestock Farming Systems												Montpellier – 30 ECTS	
CHIMIE VERTE - Chemistry and Bio-Processes for Sustainable Development												Montpellier – 28 ECTS	
PPE - Plant Protection and Environment												Montpellier/Rennes/Paris – 30 ECTS	
PVD - Sustainable Crop Production												Montpellier – 30 ECTS	
AGRO-MANAGERS - Agromanager												Montpellier – 28 ECTS	
TeRPPA - Rural development: land planning, natural resource management and public policies												Montpellier – 30 ECTS	
EEET - EcoDEVA - Economics of agricultural development, environment and food												Montpellier – 30 ECTS	
BIOAGRO - ICOA - Food eco-design engineering												Montpellier – 30 ECTS	
AAIM - Agri-Food and Agro-Industry												Montpellier – 28 ECTS	
IDEAL – Innovation, Development and Entrepreneurship in Food Processing for Mediterranean and Tropical Countries												Montpellier – 28 ECTS	
MOQUAS - Markets, Organization, Food Quality, Services in the Southern Agriculture												Montpellier – 28 ECTS	
RESAD - Resources and Agricultural Systems Development												Montpellier – 28 ECTS	

How to Choose from the Autumn Semester Track Offers?

Tracks and Teaching Units

- A Track corresponds to a line on the Track offers chart (previous page). Each Track is made up of several Teaching Units (UE).
- Each Track delivers 30 ECTS per semester.
- Students must choose one of the Tracks.
- Students can attend a Track if they have officially validated at least 6 semesters of study (180 ECTS).
- It is compulsory to attend all the Teaching Units of the chosen Track.

Foreign Languages

- In July and/or August, paying **French Summer Courses** are offered for non-French speaking students.
- Before the beginning and throughout the semester Montpellier offers **free of charge Language Courses**:

French	For all international students, except French speaking students	<u>Intensive Courses</u> Early September or eventually October 30 hrs (3 h/day) + <u>Regular Courses:</u> 2h/week throughout the semester	<i>Minimum admission level : B1</i>	1 ECTS + 1 ECTS
English Spanish German	For all students	1h30/week throughout the semester	<i>Admission level:</i> English: B1 to C1 Spanish / German : A1 to C1	1 ECTS

Institut Agro Montpellier 2023-2024 SPRING SEMESTER TRACK OFFER

Ctrl-Click on the link of the Track on which you would like more information



French



English



French and/or English

Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	July	Aug	Sept
				UE 5	DOMINANTE 1 - Towards Sustainable Agriculture				Montpellier – 4 ECTS			
				UE 4	DOMINANTE 2 - Products, Processes and Companies				Montpellier – 4 ECTS			
				UE 4	DOMINANTE 3 - Sustainable Management of Natural Resources				Montpellier – 4 ECTS			
				VINIFERA - Viticulture and Enology					Montpellier – 33 ECTS			
				VINIFERA - Viticulture and Enology					Montpellier – 26 ECTS			
				DATA MANAGER - Data Manager for environmental project					Montpellier - 21 ECTS			
				PLANT SCIENCES - Plant Sciences					Montpellier - 21 ECTS			
				AGROECOLOGY - Agroecology					Montpellier - 21 ECTS			
				Mixed Track (see next page)					Montpellier - 21 ECTS			
				AGROALIMENTAIRE - Agri-Food					Montpellier - 21 ECTS			
				DAAS Dev – Agric. and Food Systems in Southern Countries **					Montpellier - 21 ECTS			
				DAAS Agrifood – Agric. and Food Systems in Southern Countries					Montpellier - 21 ECTS			
				Mixed Track (see next page)					Montpellier - 21 ECTS			
				EAU et AGRICULTURE 1 - Water and Agriculture (cycle and management of water in agrosystems)					Montpellier - 22,5 ECTS			
				EAU et SOCIETE 1 - Water and Society (econ-social-management)					Montpellier - 22,5 ECTS			
								JRL Junior Research Lab		Montpellier – 14 ECTS		
								Internship		Montpellier – 7 ECTS		
								FEAT/FLOW		Montpellier – 6 ECTS		

How to Choose from the Spring Semester Track Offers?

Tracks and Teaching Units

- A Track corresponds to a line on the Track offers chart (previous page), or a combination of them when calendar permits (ex. Agroecology + JRL). Each Track is made up of several Teaching Units (UE). Each Track delivers 30 ECTS per semester.
- Students have two options:
 - 1) choose one track (1 line on the chart) and attend all the Teaching Units, or
 - 2) combine the Teaching Units (UE) (mixed track), selecting 1UE per period:

	Period 1 (23 Jan – 17 Feb 2023) 7 ECTS		Period 2 (27 Feb – 24 March 2023) 7 ECTS		Period 3 (27 March – 21 Apr 2023) 7 ECTS	
Data Manager for Environmental Projects	Collecting Environmental Data		Processing, Analysis and Presentation of Environmental Data		Mobile and Web Management of Environmental Data	
Plant Science	Designing New Crops for the Future		Training in AGROPOLIS Research Community		Evolutionary Applications in Agriculture: Evolutionary Concepts for the Management of Agro-Ecosystems	
Agroecology	What is Agroecology?		Agroecology in Depth Knowledge		The Agroecological Transition Implementation-	
Agri-Food and Agro-Industry	Analyser les filières agricoles et agroalimentaires + Traditions & Innovation en alimentaire : inventons les aliments traditionnels	 	Dynamique et outils de contrôle des procédés de transformation		Evolution cinétique des produits et qualité + Travaux Pratiques Intégrés	
DAAS Agrifood - Agricultural and Food Systems in Southern Countries	Analyser les filières agricoles et agroalimentaires + Comprendre les systèmes alimentaires et leurs enjeux	 	Dynamique et outils de contrôle des procédés de transformation		Evolution cinétique des produits et qualité + Travaux Pratiques Intégrés	
DAAS Development - Agricultural and Food Systems in Southern Countries	Analyser les filières agricoles et agroalimentaires + Comprendre les systèmes alimentaires et leurs enjeux	 	Gestion sociale des ressources		Milieus, Agricultures et Ressources	

Internship (7 ECTS) / Junior Research Lab (14 ECTS) / FLOW (6 ECTS)

At the end of the Tracks, students can do:

- A two-month **Internship** in a laboratory or a company (more information p.16)
or
- A **Junior Research Lab** for 2 months (more information p.15)
or
- The 3 weeks **FLOW** Spring course (more information p.

Foreign Languages

- Before the beginning and throughout the semester, Montpellier offers **free of charge Language Courses**:

French	For all international students, except French speaking students	<u>Intensive Courses</u> Late January or eventually February 30 hrs (3 h/day) + <u>Regular Courses:</u> 2h/week throughout the semester	<i>Admission level</i> : B1	1 ECTS + 1 ECTS
English Spanish German	For all students	1h30/week throughout the semester	<i>Admission level:</i> English: B1 to C1 Spanish / German : A1 to C1	1 ECTS

Ctrl-Click on the link of the Track on which you would like more information

 French

 English

Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	July	Aug	Sept
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COMBINE AUTUMN and SPRING SEMESTER TRACKS (see previous pages)
or
CHOOSE one of the following Tracks

VINIFERA – Vinifera Euromaster Montpellier – 56 ECTS	Internship 4 ECTS / month
CEEDDR - Coordination of Projects in Environmental Education and Sustainable Development - Florac - 40 ECTS	Internship 20 ECTS
GENA - Agricultural Management of Rural Natural Areas Florac - 40 ECTS	Internship 20 ECTS
EAU et AGRICULTURE 1 - Water and Agriculture (cycle and management of water in agrosystems) Montpellier - 52,5 ECTS	Internship 7,5 ECTS
EAU et AGRICULTURE 2 - Water and Agriculture (advanced methods for water management in agrosystems) Montpellier - 35 ECTS	Internship 25 ECTS
EAU et SOCIETE 1 - Water and Society (year 1 - economy-sociology-management) Montpellier - 52,5 ECTS	Internship 7,5 ECTS
BEE - EcoSystemS - Ecosystems Montpellier – 32,5 ECTS	Internship 27,5 ECTS
BESTE - Biodiversity, watEr, Soil, climaTe, Evaluation Montpellier - 30 ECTS	Internship 30 ECTS
DATA SCIENCE - Data science for Agronomy and Agri-Food Rennes/Montpellier - 30 ECTS	Internship 30 ECTS
AGROTIC - Agro-Technologies of Information and Communication Montpellier/Bordeaux - 30 ECTS	Internship 30 ECTS
APIMET - Plant Breeding, Mediterranean and Tropical Crops Engineering Montpellier - 30 ECTS	Internship 29 ECTS
SYSTEME D'ELEVAGE - Livestock Farming Systems Montpellier - 30 ECTS	Internship 30 ECTS
CHIMIE VERTE - Chemistry and Bio-Processes for Sustainable Development Montpellier - 28 ECTS	Internship 30 ECTS
PPE - Plant Protection and Environment Montpellier/Rennes/Paris - 30 ECTS	Internship 30 ECTS
PVD - Sustainable Crop Production Montpellier - 30 ECTS	Internship 30 ECTS
AGRO-MANAGERS - Agromanagers Montpellier - 30 ECTS	Internship 28 ECTS
TeRPPA - Rural development: land planning, natural resource management and public policies Montpellier - 30 ECTS	Internship 30 ECTS
EEET - EcoDEVA - Economics of agricultural development, environment and food Montpellier - 30 ECTS	Internship 30 ECTS
BIOAGRO - ICOA - Food eco-design engineering Montpellier - 30 ECTS	Internship 30 ECTS
AAIM - Agri-Food and Agro-Industry Montpellier - 30 ECTS	Internship 28 ECTS
IDEAL – Innovation, Development and Entrepreneurship in Food Processing for Mediterranean and Tropical Countries Montpellier - 30 ECTS	Internship 28 ECTS
MOQUAS - Markets, Organization, Food Quality, Services in the Southern Agriculture Montpellier - 30 ECTS	Internship 28 ECTS
RESAD - Resources and Agricultural Systems Development Montpellier - 30 ECTS	Internship 28 ECTS

How to Choose from the Full Year Track Offers?

Tracks and Teaching Units

- Students can:
 - combine tracks of the Autumn and Spring semester: choose one track (1 line on the chart) on Autumn semester chart (September-January) and one track on Spring semester chart (February-August).
 - Combine an internship during the Autumn semester with a track of the Spring semester
 - choose a specific Track for the full year on the chart above
- A Track corresponds to a line on the Track offers chart. Each Track is made up of several Teaching Units (UE). Each Track delivers 30 ECTS per semester. All the UE of the Track chosen must be attended.
- To attend the Tracks “Coordination of Projects in Environmental Education and Sustainable Development” and “Agricultural Management of Rural Natural Areas”, students must have officially validated 4 semesters of graduated studies (120 ECTS) as a minimum. To attend all others Tracks, 6 semesters of graduated studies are required.

Internship

After the courses, depending on the Track, students can do a 2 to 6-month Internship in a laboratory or company. See more at the end of the document, p. 16

Foreign Languages

- In July and/or August, paying **French Summer Courses** are offered for non-French speaking students.
- Before the beginning and throughout the year Montpellier offers **free of charge Language Courses**:

French	For all international students, except French speaking students	<u>Intensive Courses :</u> Early September or eventually October 30 h (3 h/day) + <u>Regular Courses:</u> 2h/week throughout the semester	<i>Minimum admission level :</i> B1	1 ECTS + 1 ECTS
English Spanish German	For students attending Tracks during the Spring semester	1h30/week throughout the semester	<i>Admission level:</i> English: B1 to C1 Spanish / German: A0 to C1	1 ECTS

Institut Agro Montpellier 2023-2024

Junior Research Lab – JRL

[More information](#)

Organization and credits

The course is a full time 8-week-long course (May and June). Successful completion of this course brings 14 ECTS credits.

Teaching language

English (B2 level)

Objectives

The module is based on a research project but is not an internship under the supervision of a senior scientist who has already framed the entire project.

It is a learning by researching and doing module. From seminal ideas of projects proposed by a team of experienced teachers, experts in several disciplines (plant biology, genetics and evolution, soil and water science, numeric agriculture or social sciences), small groups of 4-5 students are assembled on the basis of their complementary skills. They have to identify a scientific question from a literature review, design their own experiments, acquire and analyze data, write a scientific paper and realize a flash oral presentation. We aim to train them to work in a cooperative, open and sharing way respecting the principles of ethical, open and reproducible science.

The students are accompanied by a step-by-step process. Courses for project management, data management, data analysis, English writing, and literature management are given all along the 8 weeks consistently according to the increasing needs of the students.

Students are accompanied and taught in the different disciplines according to the needs of their project. They are asked to develop their engagement, self-learning, interculturality, curiosity, critical thinking and responsibility.

The module is hosted in a dedicated space to which they have a full-time access.

Course content

Students activities are split into a group project (50%) and transversal activities (50%).

The module is organized with three main activities:

- (i) active learning sessions providing in-depth knowledge and practical skills useful for research activities.
- (ii) seminars covering the diverse facets of open and reproducible research.
- (iii) scientific project: field visit, literature review, experimental design, data production, data management plan, data analysis, scientific writing and open peer review among groups. Students are mentored by teachers and expert scientists for their project.

Requirements

The course is open to Junior or Senior Students in agronomy, with at least attending a final year of bachelor in science. We expect some basics in statistics (also possibly taken at a previous module in Institut Agro Montpellier). No other specific prerequisites but English B2 level.

Grades

The final mark will be a weighted average between an individual exam (peer review of another group's project article and 180' flash oral presentation) and a group project (scientific article).

Partnership

Research Units: potentially all (120) research units from MUSE

FLOW

[More information](#)

Undergraduate Engineering Summer School

May 22nd - June 16th 2023

FLOW

Grand Industrial Challenges in France

Polytech Montpellier, South of France



Over a period of 4 weeks (*May 22th - June 16th 2022*), the Major Industrial Challenges in France will be studied in three major scientific fields:

- FEAT - Food, Wine and Water
- SEM - Sustainable Energy and Materials
- DIP - Data and Information Processing

In parallel to the scientific program, FLOW offers students a cultural immersion in the Occitanie region, with visits to its emblematic places, as well as learning the basics of French (gastronomy and culture).

Scientific courses

- lectures, labs + scientific visit
- 64h - 4 ECTS

Tutored cross-disciplinary project on sustainability project management

- 12h - 1 ECTS

French courses + social and intercultural programme

- 24h - 1 ECTS

Institut Agro Montpellier 2023-2024

INTERNSHIP

- International students can apply for a research internship in one of the 21 Institut Agro Montpellier **Joint Research Unit (UMR)**.
 - Students must personally take steps to find the internship. For that, they should consult the list of the UMR, at the end of this document and/or consult the UMR websites
<https://en.institut-agro-montpellier.fr/research/scientific-policy/research-units> (English)
<https://www.institut-agro-montpellier.fr/recherche/dispositifs-de-recherche> (French)
 - Students should send a message to the contact persons of the chosen UMRs of interest, and indicate the period they are interested in and the topics they would like to work on.
 - The application may be accepted if the project is compatible with the work in progress and the availability of the targeted research teams.
- Internship can begin **at any time of the year**.
 - Internships can last **from a few weeks to 6 months**. If the internship lasts more than 2 months, students are paid. This type of long internship is more difficult to obtain.
- Proficiency is required **in French or in English**. In some cases, other languages can be accepted.

Institut Agro Montpellier Joint Research Units (UMR)

[More information](#)

General Internship offers at CIRAD and INRAE

<https://www.cirad.fr/en/work-with-us/join-us/stages-partenaires-doctorats>
<https://jobs.inrae.fr/en/news/complete-internship>

Specific contacts at Joint Research Units

MPRS Department - Soils, Water, Crops and Livestock Systems Department

UMR Eco&Sols – Functional Ecology & Biogeochemistry of Soils

The aim of Eco&Sols is to use ecological engineering to propose scientifically-based practices to maintain and improve the agricultural and environmental functions of agro-ecosystems. The research undertaken by Eco&Sols seeks to describe and understand the ecological processes of primary production and the regulation of the carbon and nutrient fluxes in the agro-systems.

Information: <http://www.umr-ecosols.fr/en/>

Members: INRAE, CIRAD, IRD, l'Institut AGro

Contact: claire.marsden@supagro.fr

UMR LISAH - Laboratory for the Study of Interactions between Soil, Agro-Systems and Water Systems

LISAH focuses its work on hydrology, the transfer of contaminants and erosion of highly developed and cultivated soils. It also studies the spatial proprieties of these areas, and their evolution. These studies aim at analyzing the issues of water and soils in cultivated areas.

Information: <https://www.umr-lisah.fr/?q=en>

Members: INRAE, IRD, AgroParisTech, l'Institut Agro

Contact: Julien.fouche@supagro.fr

UMR LSTM – Tropical and Mediterranean Symbioses Laboratory

LSTM studies microbiology and biology of plants, based on a multidisciplinary and integrative approach. It aims at understanding the molecular mechanism influencing the establishing of symbioses, as well as their role in ecosystematic services. It also studies the biodiversity of symbiotic microorganisms.

Information: <https://umr-lstm.cirad.fr/>

Members: UM, CIRAD, IRD, INRAE, **L'Institut Agro**

Contact: brigitte.brunel@supagro.fr

UMR SELMET – Livestock Systems in Mediterranean and Tropical Regions

SELMET works on animal production agro-ecosystems in warm climates, in normal and harsh conditions. The extreme conditions under which some of these systems function challenge the limits of ecological intensification.

Information: <http://umr-selmet.cirad.fr/en>

Members: INRAE, CIRAD, **l'Institut AGro**

Contact: nathalie.agbagla@supagro.fr - charles-henri.moulin@supagro.inrae.fr

UMR ABSys - Biodiversified Agrosystems

ABSys supports the agroecological transition by producing knowledge and methods for the assessment and design of tree crop-based cropping systems, including agroforestry systems, in a wide range of Mediterranean and tropical environments.

Information: <https://umr-absys.cirad.fr/>

Members: CIRAD, INRAE, Ciheam-IAM, **l'Institut AGro**

Contact: aurelie.metay@supagro.fr

BE Department – Biology and Ecology

AGAP Institute – Genetic Improvement & Adaptation of Mediterranean and Tropical Plants

AGAP Institute produces, collates and shares knowledge, methods and technologies on genetics, physiology and evolution of cultivated plants, as well as innovative and collective management strategies. The objective is to create a diversity of crop varieties and to promote plants adapted to the diversity of Mediterranean and tropical agriculture. About 20 tropical and Mediterranean crops are studied, covering a very wide range of biological characteristics and uses. Considering the diversity of plants and their multiple uses as an opportunity, AGAP aims to impact the development of more efficient agroecosystems, through multidisciplinary approaches.

Information: <http://umr-agap.cirad.fr/en>

Members: CIRAD, INRAE, UM, **l'Institut AGro**

Contact: dominique.this@supagro.fr – nathalie.pivot@cirad.fr

UMR PHIM – Plant Health Institute Montpellier

PHIM studies the interactions between the plant and its biotic environment that have an impact on plant health, growth and productivity. Several of our researchers are located in Kenya, Ivory Coast, French Guyana and Costa Rica. We also have research platforms in Burkina-Faso, Cambodia and China.

Information: <https://umr-phim.cirad.fr/>

Members: INRAE, CIRAD, IRD, **l'Institut AGro**

Contact: claire.neema@supagro.fr - gerben-martijn.ten_hoopen@cirad.fr, - gilles.bena@ird.fr

UMR BPMP – Biochemistry and Molecular Physiology of Plants

B&PMP is defined as an Integrative Biology research department, focused on the mechanisms of plant responses and adaptation to variable abiotic environmental conditions.

Information: <https://www1.montpellier.inra.fr/wp-inra/bpmp/en/>

Members: INRAE, CNRS, UM, **l'Institut AGro**

Contact: pierre.berthomieu@supagro.fr - anna.medici@supagro.fr

UMR CBGP - Centre for Biology and Management of Populations

CBGP carries out research in the fields of systematics, genetics and ecology of natural populations and communities of animals (mainly arthropods and small mammals), for the purposes of agriculture, public health and biodiversity. It aims to characterize the diversity of these organisms, and to understand and predict their evolution in a context of global changes. The results of some of these research programs contribute to the development of decision support tools for pest and disease management or for the conservation of threatened species.

Information: <https://www.cirad.fr/nos-recherches/unites-de-recherche/cbpg>

Members: CIRAD, INRAE, IRD, **l'Institut AGro**

Contact: marie-stephane.tixier@supagro.fr - serge.kreiter@supagro.fr – jean-francois.martin@supagro.fr

UMR LEPSE – Ecophysiology Laboratory of Plants under Environmental Stress

LEPSE produces methods and knowledge to help maximizing crop production with less input, essentially water. This objective was initially assigned in the context of the necessity to limit water use by agriculture. Ongoing climate change, with global temperature elevation, increased probability of heat waves and drought episodes have led us to widen our domain of research.

Information: https://www6.montpellier.inrae.fr/lepse_eng/

Members: INRAE, l'Institut AGro

Contact: anne.pellegrino@supagro.fr

CEFE – Centre for Functional and Evolution Ecology

CEFE is currently the largest French research center in Ecology and Evolutionary Biology. Its mission is to perform independent, fundamental scientific research on the dynamics and evolution of biodiversity, planetary environmental change, and sustainable development. The CEFE works at a great variety of field sites around the world, but developed particular expertise in Mediterranean and tropical ecosystems. Its main objectives are to understand the dynamics and functioning of ecological systems, and to develop scenarios on their evolution as well as strategies for their conservation and their restoration

Information: <http://www.cefe.cnrs.fr/fr/>

Members: UMR, CNRS, UMR3, IRD, EPHE, INRAE, l'Institut AGro

Contact: elena.kazakou@supagro.fr

SABP Department - Department of Sciences for Agro-Bio-Processes

UMR G-EAU - Water Management, Actors, Uses

G-EAU conducts researches on hydrosystems, from physical description to integrated water management; it contributes to the design and evaluation of facilities to develop innovating solutions and policies for improved water management. The unit is strongly involved in the UNESCO water center ICIREWARD and hosts many students from the MSc programme Water Sciences ('Water and Agriculture' and 'Water and Society') for their research internships

Information: <http://www.g-eau.fr/index.php/en/>

Members: INRAE, CIRAD, IRD, AgroParisTech, BRGM, l'Institut AGro

Contact: gilles.belaud@supagro.fr, francois.colin@supagro.fr - armand.crabit@supagro.fr

UMR IATE – Agro-Polymer Engineering and Emerging Technologies

IATE is active in the field of agrifood and green chemistry. It comprises seven research teams who generate knowledge regarding the structural-functional properties of plant-based products upon transformation to food, biomaterials, biomolecules and bioenergy. Societal challenges, such as food security and a transition towards a bio-based society, serve as fuel for creativity and new research activities.

Information: <https://umr-iate.cirad.fr/en>

Members: INRAE, UMR, l'Institut AGro

Contact: maeva.subileau@supagro.fr – eric.dubreucq@supagro.fr

UMR ITAP – Technologies and methods for the agriculture of tomorrow

With the aim of developing equipment for a more sustainable agriculture and for services related to the environment, UMR ITAP develops the scientific and technical bases of the following topics: information and associated systems (optical measurements, decision support systems), eco-technologies for sustainable agricultural production (including equipment for crop protection and maintenance), environmental and social assessment based on life cycle assessments.

Information: <https://itap.inrae.fr/>

Members: INRAE, l'Institut AGro

Contact: bruno.tisseyre@supagro.fr

UMR MISTEA – Mathematic, Computing & Statistic for Environment and Agronomy

The activities of MISTEA concern the development of mathematical, statistical and computer science methods dedicated to analysis and decision support for Agronomy and Environment, with particular emphasis on the temporal dimension and complexity.

Information: https://www6.montpellier.inrae.fr/mistea_eng/

Members: INRAE, l'Institut AGro

Contact: benedicte.fontez@supagro.fr

UMR QUALISUD – Integrated Quality Food System

QUALISUD aims at developing an integrated approach for production and preservation of products and food with optimum organoleptic, health and nutritional optimal qualities.

Information: <http://umr-qualisud.cirad.fr/en/the-research-unit>

Members: CIRAD, UM, Avignon Université, IRD, Université de la Réunion, **l'Institut AGro**

Contact: manuel.dornier@cirad.fr - antoine.collignan@supagro.fr

UMR SPO – Sciences for Enology

SPO is one of the most important organizations involved in research in enology worldwide. It comprises 3 research teams: Adaptation, Diversity, Ecology of yeasts (ADEL), Alcoholic fermentation: Yeasts, Aromas, Metabolism (FLAM), Biomolecules of enological interest (BIO). Close interactions with the INRAE Experimental Unit of Pech Rouge-Narbonne (UE PR) allow the development of research projects up to pilot or pre-industrial scale and provide unique opportunities for innovation and transfer.

Information: https://www6.montpellier.inrae.fr/spo_eng/

Members: UM, INRAE, **l'Institut AGro**

Contact: bruno.blondin@supagro.fr

SESG Department - Economics, Management and Social Sciences

UMR INNOVATION – Innovation and Development in Agriculture and Agri-Food Sector

The mission of INNOVATION is to inform private and public actors' decision-making by producing knowledge on the processes of innovation and development in agricultural and food systems. Its research focuses on innovation processes, ranging from understanding the objectives of the actors wanting to innovate to analyzing innovations' impact on development. Its research also covers the methods required to support the actors who innovate.

Information: <https://umr-innovation.cirad.fr/en>

Members: CIRAD, INRAE, **l'Institut AGro**

Contact: stephane.de-tourdonnet@supagro.fr

UMR CEE-M – Center of Environmental Economics- Montpellier

CEE-M aims at developing a plurality of works through specific tools (Market Econometrics, behavioral economics, experimental economics, public economics, history of economics thought, micro economy, social economy, game theory). The targeted areas are as follow: Risks, Preferences and behaviors; Public decision, collective actions and social ethic; Competition, regulations and network industry and finally Environment, natural resources and biodiversity.

Information: <http://www.cee-m.fr/>

Members: INRAE, CNRS, UM, **l'Institut AGro**

Contact: pauline.lecole@supagro.fr

UMR MoISA – Montpellier Interdisciplinary center on Sustainable Agri-food systems (Social and nutritional sciences)

MoISA gathers researchers and lecturers in social sciences and nutrition from CIRAD, INRAE, IRD, Institut Agro Montpellier and Ciheam-IAMM, under Muse (Montpellier University of Excellence). We research stakeholders' strategies and behaviour in the agri-food systems of Mediterranean and tropical areas, and their results in terms of food security and sustainable development. The main disciplines of research are in social sciences: micro-economics, economics of organization, management, sociology, anthropology, political science); and public nutrition.

Information: <http://umr-moisa.cirad.fr/>

Members: CIRAD, INRAE, IRD, CIHEIAM-IAMM, **l'Institut AGro**

Contact: lucie.sirieix@supagro.fr

UMR SENS – Knowledge, Environment, Societies

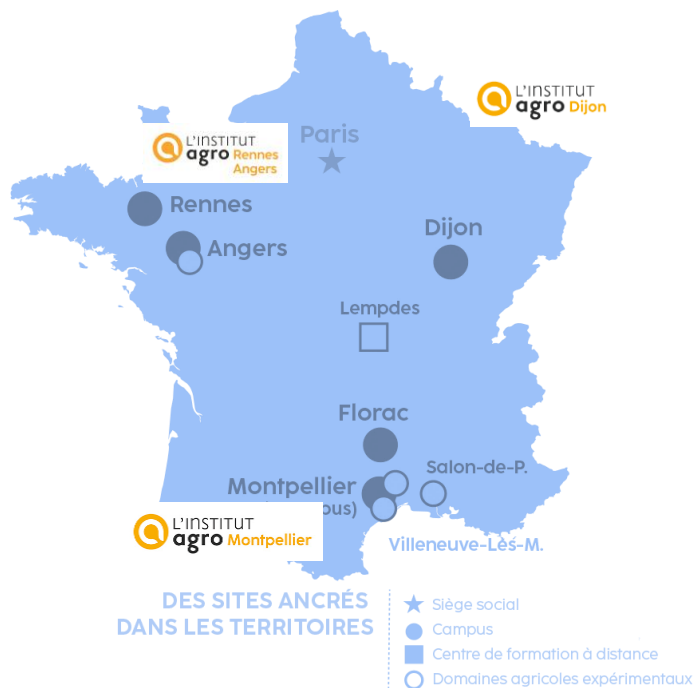
SENS is structured around the following objectives: 1) to produce knowledge on the mechanisms underlying the relations and tensions that make up the society-environment nexus; 2) to accompany social and institutional initiatives and innovations aimed at sustainably influencing, at different scales, the trajectories of ecological and social systems; 3) to consolidate reflexive approaches to our role as scientists with regard to the complexity of the phenomena studied, their ethical and political dimensions, and the necessary co-construction of knowledge and practices oriented towards sustainability.

Information: <https://umr-sens.fr/>

Members: IRD, UM3, **l'Institut AGro**

Contact: pascale.maizi@supagro.fr - marie-jeanne.valony@supagro.fr





L'INSTITUT AGRO France

Institut Agro Montpellier

TRAINING OFFER IN ENGLISH

FOR INTERNATIONAL
INCOMING STUDENTS

Academic year 2022/2023

Autumn / Fall semester

Junior Research Lab for Agricultural transitions (JRL-AT) – full semester

Complete 26 ECTS from September to December or 30 ECTS from September to January in a module that trains junior researchers for sustainability transitions - [link](#)

VINIFERA Master – full semester

Complete 30 ECTS attending the courses of the Vinifera euromaster about vine&wine - [link](#)

Spring semester

PARCOURS - February, March and April

Choose one Teaching Unit per period. This will be equivalent to full time study.

	Period 1 January 23 -February 17 7 ECTS	Period 2 March 1 – March 24 7 ECTS	Period 3 March 27 – April 21 7 ECTS
Agroecology	What is Agroecology? link	Agroecology in Depth Knowledge - link	The Agroecological Transition: Implementation - link
Plant Science	Designing New Crops for the Future - link	Training in AGROPOLIS Research Community: special topics in advanced Plant Sciences - link	Evolutionary applications in agriculture: Evolutionary Concepts for the Management of Agro-Ecosystems - link
Data Manager for Environmental Projects	Collecting Environmental Data - link	Processing, Analysis and Presentation of Environmental Data - link	Mobile and Web Management of Environmental Data - link

Junior Research Lab (JRL) or Internship - May and June

During 2 months, join the Junior Research Lab – JRL (14 ECTS) ([link](#)) or do an internship (7 ECTS) ([link](#)). in one of our Research Units.

FLOW Spring Course - end of May to early June

Join the free FLOW Spring Course (6 ECTS), held this year from 22th of May to 16th of June 2023, entirely online - [link](#).

VINIFERA Euromaster - full semester

Complete 30 ECTS attending the courses of the Vinifera euromaster about vine&wine - [link](#)

COMBINE - Full semester

When possible, you can combine modules from the PARCOURS, modules of VINIFERA Master, JRL and/or internship.

INTERNSHIP in a RESEARCH LAB

Find information about the Internship at Institut Agro Montpellier - [link](#)

Final note

- 1 ECTS = 20-25 hours of workload completed by the student (lectures, labs, projects, personal work...)
- 2 European Credits (ECTS) are equivalent to 1 American Credit

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 in a timely way.

JRL-AT - Junior Research Lab for Agricultural Transition

AUTUMN / FALL

September 5 – December 16, 2022 (or January 19, 2023)

Reference of the course: JRL-AT		Credits: 26 ECTS (September-December) – 30 ECTS (September-January)
Teaching language: English (min B2 level)	Level: 500-600	Europe – 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Research skills development, learning by researching, international collaboration, project development and management, sustainability transition in agriculture, active learning

Requirements

Solid foundations in biology, mathematics, physics and chemistry.

Although it is not mandatory, having a laptop is useful so the student can work with as much flexibility as possible as the projects require using multiple workspaces in the campus.

Persons in charge

Pr. Jacques DAVID (jacques.david@supagro.fr), Pr. Pierre BERTOMIEU (pierre.bertomieu@supagro.fr), Dr. Jean-François MARTIN (jean-francois.martin@supagro.fr)

General theme of the course

The context of the course is deliberately oriented towards sustainability transitions, preserving climate, energy, natural resources, biodiversity and the environment. The module is based on the acquisition of transversal research skills and disciplinary knowledge, and their deployment on a 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 common 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 and International students, to develop their critical sense, 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 will be 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 (MUSE) communities will be offered (25% of the schedule). The offer will span the field of expertise of Institut Agro Montpellier on a catalog available online in the spring 2021. Advanced Ecology, Advanced and Applied Evolution, Sociology, Water management will be offered on a regular basis. Supplementary offers may complement those courses on a year-to-year basis.
- Four masterclasses will be organized by the students and led by external experts on the theme of sustainability transitions.
- Scientific skills and further disciplinary knowledge will then be deepened on a case-by-case basis during a group-based research project where it is necessary.

A research project (for 55% of the schedule) will be 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 will 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 construction 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 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 at the Spring previous to the next enrollment period.

Transversal skills for managing a real scientific project will also be acquired through active learning sessions (20% of the schedule). The set of transversal objectives of this course to enable students to develop their ability to conduct a research project is provided in the “research skills” section at the end of this syllabus). Organization and credits

The course is an autumn semester course (September to December) for 26 ECTS. It is organized into three main types of activities:

Item i) Disciplinary courses provided through Problem-based Learning (6 ECTS). Three courses (2 ECTS each) will be chosen among a catalog of modules covering Ecology, Evolution, Water science, Economy, Biochemistry and year-to-year offers of the Institut Agro Montpellier and the large number of associated research units of the Agropolis and Montpellier University MUSE communities. Each course schedule will be organized on a four weeks basis. Preparing, organizing and participating in masterclasses led by expert scientists is also part of the exercise (1 ECTS)

Item ii) Full and autonomous scientific small-group research projects for more than 50% of the schedule (14 ECTS) from the acquisition of the scientific literature, definition of a tractable research question, experimental or modelization design, data acquisition / in silico programming, data analysis, writing and oral communication. When not in labs or in the field, students are located in a dedicated room on campus, the HIVE (the Highly Innovative and Versatile Environment), where they get courses but also realize their group and personal work. When necessary, research activities will be performed either in campus facilities or in research laboratories according to the themes and needs defined by the students and supervisors.

Item iii) Active learning sessions to acquire in-depth knowledge and practical skills for research (5 ECTS), including data management and analysis, in particular in R, literature management, good reproducibility practices, scientific writing and oral presentations, ethics and integrity in science and social network communication

An optional course in January, Evaluation of Environmental sustainability, brings 4 additional ECTS.

Research skills and disciplinary content

Disciplinary content (Item i)	Nb of scheduled hours	Disciplines
Plenary masterclasses	12h (4x3h)	
Three elective courses throughout the semester (item i) taken among the following list	75h (3x25h)	
Nature Based Solution and Ecosystem functioning	25h	Ecology
Molecular Evolution	25h	Evolutionary genetics
Agricultural economic policies for the transition	25h	Economy
Structure and functionality of raw materials and bioproducts	25 h	Biochemistry
Gene cloning in plants	25 h	Molecular Physiology
Water cycle and management	25h	Water science
Total Compulsory Disciplinary Content	87h (25%)	
Optional January course		
Evaluation of Environmental sustainability	54h	Life cycle assessment
Research skills (Item ii)	Scheduled hours	
Agile Project management (within project)	12h	
Literature survey and management	3h	
Data analysis and visualization (R Tidyverse) (within project)	18h	
Basic programming (R and bash script)	9h	
Research Data Management	6h	
Reproducible research through code versioning and sharing	6h	
Scientific writing	6h	
Oral presentation skills	3h	
Scientific networking	3h	
Research Integrity	3h	
Total Research Skills	69h (20%)	
Research Project (Item iii)	200h (55%)	
General Compulsory total	356h	

Grades

The evaluation of Grades is based on (i) the evaluation of the acquisition of disciplinary knowledge on the basis of problem solving (23%), (ii) evaluation of the student implication and preparation of masterclasses (4%) (iii) good scientific practices as evaluated throughout the research project (literature survey, data management, analysis reproducibility, scientific networking etc..) (19%), (iv) an individual oral communication (16%) (v) the collaborative writing of a scientific article 26%) (vi) an individual peer-review exercise (12%).

VINIFERA EUROMASTER

<https://en.montpellier-supagro.fr/training/vinifera-euromaster>

Vinifera EuroMaster is a master's degree awarded by EMaVE, a European consortium of six major institutions that includes Institut Agro Montpellier (in charge of coordination), Hochschule Geisenheim University (Germany), Universidad Politécnica de Madrid (Spain), and the Universities of Lisbon (Portugal), Turin (Italy) and Udine (Italy).

This international master's degree responds to a demand for the training of high level international executives able to accompany the development and modernization of the vine and wine industry in many producing countries. It offers multidisciplinary scientific and technical knowledge to adapt to developments in the world wine sector and its markets.

Vinifera courses of the M.Sc 1 level can be taken throughout the year, over a full semester or combined with other courses, the JRL and/or an internship during the spring semester when calendars allow it.

Important note:

the follow-up of courses throughout the year as an exchange student does not lead to the validation of the first year of the master's degree and therefore to access to the 2nd year.

SPRING / AUTUMN or FULL YEAR

19 September 2022 – 9 June 2023

beginning	end	Course	ECTS
19/09/2022	23/09/2022	Vinifera 1 - Terroir and company auditing	2 ECTS
26/09/2022	14/10/2022	Vinifera 2 - Vine Biology	5 ECTS
17/10/2022	18/11/2022	Vinifera 3 - Economics for the wine industry	6 ECTS
21/11/2022	16/12/2022	Vinifera 4 - Enology	7 ECTS
02/01/2023	06/01/2023	exams	
09/01/2023	20/01/2023	Vinifera 5 - Project management in science	6 ECTS
23/01/2023	24/02/2023	Vinifera 6 - Wine processing	7 ECTS
13/02/2023	07/02/2023	Vinifera 7 – Sensorial analysis	
06/03/2023	17/03/2023	Vinifera 8 - Wine analysis	5 ECTS
20/03/2023	14/04/2023	Vinifera 9 - Vine ecology and physiology	8 ECTS
17/04/2023	21/04/2023	Study trip (optional)	1 ECTS
01/05/2023	05/05/2023	exams + retakes	
08/05/2023	02/06/2023	Vinifera 10 - Viticulture	7 ECTS
05/06/2023	09/06/2023	exams + retakes	
June-July		Internship (optional - max 2 months)	4 ECTS/month

Reference of the course: Vinifera 1		Credits: 2 ECTS
Teaching language: English (min B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Languedoc vineyard, wine sector, orientation week, basics in vine and wine sciences

Teaching language

English

Requirements

Basic knowledge in chemistry, physic, biochemistry, botany and plant biology usually obtained in former Bachelor studies in plant production or food Sciences, knowledge of the economics module

Persons in charge

Patrice Lallemand – Institut Agro Montpellier – patrice.lallemand@supagro.fr

Organization

Offered during the 2-week long Immersion period at Institut Agro Montpellier and Pech Rouge (experimental field station/winery in Gruissan, Aude):

The aim of the Immersion Period is: 1) to organize all necessary administrative matters and to introduce the international dimension into the new study environment (local and regional), 2) to introduce the students to the structure and organization of the Vinifera EuroMaster degree programme.

Lectures (55 h): viticulture 15 h; oenology 15 h; inter cultural workshops 5 h; auditing 20h

Practical exercises: 10 h (tasting and wine-making) 10h (auditing)

Study trip: 1 day

Personal studies including literature studies to bridge existing gaps and project 40 hours

Targeted learning outcomes

Students

- have a first overview concerning worldwide viticulture
- know the history of viticulture and grape production-know the basic technologies for the cultivation of grapevine and the production of grapes for wine making-are aware of the main characteristics and challenges of the Wine Sector
- understand the on-going activities in vineyards and cellars around Montpellier and know the special professional features of this region-have the chemical, biochemical and physical bases necessary to follow the enological courses. These bases are common to food science and processing in general and also in beverage and wine production.
- know the basic technologies and equipment for winemaking-know about the diversity of the skills needed by oenologists -have experience in intercultural communication and in working in multicultural groups-have first experience in Sensory Analysis of wines-know about the financial aspects of wine company management
- understand the interactions between vineyard, wine production and commercial aspects (systematic approach)-can apply practical methods in company auditing

Course content

Introduction to viticulture and enology: • worldwide Viticulture • technologies and approaches in grapevine cultivation and grape production-history of viticulture and grape production • special features of the agriculture, viticulture and enology of the Languedoc-Roussillon region (including study trip) • workshops on harvest and wine-making at PechRouge research station-fundamentals in biochemistry and their application in wine making-fundamentals in chemistry in relation to wine making • laboratory analyses techniques • fundamentals in physics in relation to the application in wine making • extraction and separation techniques-biological transformations-temperature control • hygiene measures and materials • Intercultural learning-workshops on intercultural communication-workshops on intercultural experience

Company Auditing: • Methodology of company auditing (wine making aspects and economic aspects) • Audit coaching -Study visit

Grades

Auditing: Written examination (group and individual evaluation Powerpoint presentation on company audit 50 %) - 4 ECTS
Group Project (1 ECTS)

Reference of the course: Vinifera 2		Credits: 5 ECTS
Teaching language: English (min B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Plant biology, vine anatomy and physiology

Teaching language

English

Requirements

None

Persons in charge

Enrico Peterlunger, Prof. (Università degli studi di Udine, Italy)

Organization

PU Vine Anatomy and Genetics: Face to face lectures: 24 h; Directed exercises (laboratory course with stereo microscope): 4 h; Field visit: 2 h

PU Ampelography: Face to face lectures: 9 h; Directed exercises 8 h; Field visit 4 h

Student's personal study time in the module: 70 h.

Targeted learning outcomes:

PU Vine Anatomy and Genetics:

- students have acquired basic knowledge of higher plant internal and external anatomy, at a whole plant level, as well as organ and tissue level.
- they understand the principles of grapevine development and adaptation mechanisms that determine usual practices of grapevine management (pruning, hedging, yield control...)
- they are introduced to the principles of Mendelian, quantitative and molecular genetics and to the genetic peculiarities of the grapevine genome
- they learn strategies for genetic improvement of a perennial heterozygous crop and how molecular/biotechnological approaches are applied to speed up breeding programmes

PU Ampelography:

- Students can apply the methods used in ampelography
- know the systematics of species and rootstocks and main grapevine cultivars-can determine the main cultivars in the field

Course content

PU Vine Anatomy and Genetics:

- Morphology and anatomy of the grapevine organs. • Root, trunk, shoot, cane, leaf, bud, leaf, flower, berry, seed. • Systematics of the genus Vitis (basic knowledge). • Cultivated species and their use. • Annual cycle of the grapevine, vegetational phases.
- Qualitative and quantitative aspects of the annual cycle: description of the modification of organs and evaluation of biomass involved. • Evolution of storage substances along the annual cycle. • Foundations of classical genetics. • General features of the grapevine genome. • Origin and genetic diversity in domesticated grapevines. • Conventional breeding and genetic engineering.
- Genetic control and improvement of agronomic traits.

PU Ampelography:

- Ampelographic methods, •Systematics and species, Rootstocks, Wine varieties and clonal selection

Grades

Written examination

Reference of the course: Vinifera 3		Credits: 6 ECTS
Teaching language: English (min B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Wine business and marketing

Teaching language

English

Requirements

None

Persons in charge

Luigi Galletto, Prof. PhD (University of Padova)

Organization

PU Wine economics: Face to face lectures: 48 h; Case Studies 3 h; Study trips 9 h

Student's personal study time in the module: 70 h

Targeted learning outcomes:

- students have a macro and meso economic view of the wine markets, its structures and regulatory systems (OIV, CMO...)
- they will understand the production and consumption situation, international trade, bulk wine markets, and the economics of international firms who operate in the wine sector.
- Students have a managerial view of the wine market, with a special emphasis on international business strategies of wine companies, and marketing, both at strategic and operational level.
- They know about the market planning, business positioning, marketing mix management,

Course content

- Introduction to economic analytical approaches and theoretical backgrounds: macro, meso and micro economics. • Description and analysis of the wine production system, consumption, and international trade. • Relevant drivers in these systems, including coordination and institutional devices at global or local levels. • Global and local factors that influence wine prices, with a special insight into the bulk market.
- Performance drivers in different types of businesses (private and cooperative, large and family business). • Introduction to marketing with a particular focus on marketing-mix techniques. • Product launch, quality management, branding, communication, packaging, distribution and pricing in the wine sector. • Wine tourism economics.

Grades

Written examination and presentation

Reference of the course: Vinifera 4		Credits: 7 ECTS
Teaching language: English (min B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Wine and juice composition, biochemistry

Teaching language

English

Requirements

Basic knowledge in Enology as delivered in the module "Immersion" during the immersion period.

Persons in charge

Jorge M. Ricardo-da-Silva, PhD HDR (Universidade de Lisboa)

Organization

PU Grape & Wine Composition: Face to face lectures: 40h

PU Microbiology & Fermentation: Face to face lectures: 31h

Student's personal study time in the module: 91 h

Targeted learning outcomes:

PU Grape & Wine Composition:

- Students know the major and minor components in musts and wines
- technical repercussion of must components
- sensorial repercussion of musts and wine components
- nutritional repercussion of musts and wine components

PU Microbiology & Fermentation:

Students gain knowledge about the metabolism of yeast and bacteria relevant for wine making (alcoholic & malolactic fermentations),

- populations dynamics from vineyard to the fermentation processes (AF & MLF), also comparing spontaneous fermentation with usage of microbial starter cultures
- impact of yeast and bacteria nutrients on course of fermentation and formation of positive and negative aroma compounds
- selection procedures for yeast and bacteria
- impact factors on fermentations
- construction of genetically engineered wine yeasts and their properties
- microbial spoilage of grapes, musts and wine,
- lagging and stuck fermentations and problem solving operations
- Biochemistry of yeast autolysis and impact on wine aroma

Course content

PU Grape and Wine composition: • Nitrogen compounds: Proteins. Peptides. Enzymes. Aminoacids. • Phenolic compounds I –Anthocyanins: Chemistry, Grape contents, Anthocyanins during fermentation and aging. • Organic acids: From grape and must. Formation during yeast fermentation. Formation during MAF. • Glucid compounds: Sugars, Polyalcohol, Polysaccharides. • Phenolic compounds II: Flavanols, flavanols, phenolic acids, stilbens, • Varietal aroma and other volatile aroma compounds, Mineral compounds.

PU Microbiology and Fermentation: • Yeast cell biology and taxonomy; special carbon metabolism and by-products of fermentations, fermentation cycle. • Yeast physiology, nutrition and stress factors. • Nitrogen and sulphur metabolism; sulfite production and sulfite management. • Role and effects of fermentation additives on fermentation performance. • Nutritional demands of yeasts and strain differences. • Genetic improvement of wine yeast and risk assessment.

- Lactic acid bacteria: taxonomy, metabolism, nitrogen and oxygen management. • Wine spoilage by yeast and bacteria.
- Targeted impact of yeast and bacteria on wine flavour (de novo synthesis of compounds and hydrolysis of bound aroma substances from precursors.
- Spontaneous fermentations versus usage of starter cultures; selection scheme for starters. • Mixed yeast cultures and simultaneous usage of yeast and bacteria starter cultures. • Control of fermentation. • Biochemical post-fermentation processes during yeast autolysis: formation of sensorially relevant compounds.

Grades

Written examination

Reference of the course: Vinifera 6		Credits: 6 ECTS
Teaching language: English (min B1 level)	Level: 300-400-500 ou 600	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Statistics, research project, experimentation

Teaching language

English

Requirements

Basic statistics and data organisation and basic worksheet skills

Persons in charge

Bénédicte Fontez, PdD - Institut Agro Montpellier – benedicte.fontez@supagro.fr

Organization

PU Experimental methodology and statistics: Face to face teaching 20h; tutored application of statistic programmes 25 h

PU Research project organization: Workshop on project definition and organisation 4 h; intermediate and final workshops with project presentation and discussion 14h

Student's personal study time in the module: 80 h

Targeted learning outcomes:

PU Experimental methodology and statistics:

- Students can design simple experiments
 - know how to avoid observation errors and prejudice
 - know and can apply the statistical methods commonly used in viticulture, enology and wine economics-are able to interpret the results obtained by using statistics
 - they have knowledge in less common statistical methods (e.g. principal component analysis, cluster analysis, discriminant analysis)
- They can use statistical programmes for data analysis

PU Research project organisation:

- Students can identify the technical and scientific questions and problems-make a bibliography to know the current state of art on a specific topic-are able to propose experimental designs (factors analysed, measurements, replicates required)
- can handle, analyse and discuss data
- can present research results to a public-can write and summarise scientific reports-are able to work in research teams (coordination and structure, milestones)

Course content

PU Experimental methodology and statistics:

- Methodology of scientific research • The scientific method and the experimental design • Hypothesis testing • Samples and populations, confidence limits • Analysis of Variance (ANOVA) • Linear and nonlinear regressions • Modelling and optimisation (e.g. Response surface methodology) • Data Analysis (e.g. Principal components analysis, Cluster analysis, Discriminant analysis) • Applications of statistical programmes in case studies in viticulture, enology or wine economics.

PU Research project organisation:

- Methodology of project organization • Scientific working methods (literature research, report writing) • Presentation techniques

Grades

Written examination on statistics experimental methodology and statistics (50 %)

Project presentation and written report (50 %)

Reference of the course: Vinifera 5		Credits: 7 ECTS
Teaching language: English (min B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Wine making, fermentation, microbiology

Teaching language

English

Requirements

Basic knowledge in Enology as delivered in the module "Immersion" during the immersion period.

Persons in charge

Aude Vernhet, Prof. PhD HDR - Institut Agro Montpellier – anne.vernhet@supagro.fr

Organization

PU Wine making: Face to face lectures: 43h

PU Post-vinification: Face to face lectures: 27h; directed exercises 4 h; study visit 8 h
Student's personal study time in the module: 100 h

Targeted learning outcomes:

PU Wine Making:

- students know wine making process in white and rosé wines
- they know wine making process in red wines
- they understand ageing of white and red wines (vat/barrel)
- and know other kinds of wines: Sparkling, fortified, sweet wines

PU Post-vinification:

- students know about the main physico-chemical changes and alterations liable to occur in wines;
- they know the methods used to assess the risks and the stabilization methods (unit operations, fining, additives...) implemented to prevent them and ensure product conservation;
- students have acquired theoretical and applied basis for the implementation and control of the unit operations used for wine (must) clarification and microbiological stabilization;
- they know basics about wine packaging technologies.

Course content

PU Wine Making: • Engineering of pre-fermentative processes White and rosé wines: Preparation of must and juice (Destem, Crush, Pressing, SO₂ addition.). • Fermentation. Red Wines: Preparation of must and juice (Destem, Crush, SO₂ addition). Maceration/Fermentation. • Maceration techniques-increasing the extraction, Pressing. MLF. Barrel Aging of white and red wines. Special wines/Special techniques-Thermovinification-Flash expansion-Carbonic maceration-Special vinifications-Sparkling wines-Fortified wines-Botrytis spoiled wines

PU Post-vinification: • Wine clarification and stabilization: necessity and objectives • Main colloidal instabilities in wines –risk assessment and stabilization methods. • Theoretical and practical aspects of wine fining. • Wine (must) clarification: principle of the different unit operations and their control in enology (centrifugation/floatation, dead-end filtrations, cross-flow microfiltration) • Crystallization of tartaric salts in wines: origin and stabilization methods (nucleation and crystal growth, impact of wine constituents, TID, T_{sat} and ISTC 50 tests, cold stabilization, electro dialysis, additives). • Microbiological stabilization (membrane filtration, flash pasteurization, pasteurization, hotfilling, tunnel pasteurization). • SO₂ and other additives. • Glass bottle production, PET bottle production, bottle inspection, bottling of glass bottles, PET bottles, Tetra Pak, Bag in Box and kegs, flash pasteurization, pasteurization, hot filling, membrane filtration, corks, crown corks, screw closures, Vino Lok, level adjustment and control, labelling.

Grades

PU Wine Analysis: Evaluation of the written reports of the laboratory sessions and personal participation in the lab sessions.
PU Wine Sensory Analysis: Continuous assessment of knowledge during tasting sessions

Wine Analysis

SPRING

06 March – 17 March 2023

Reference of the course: Vinifera 7		Credits: 5 ECTS
Teaching language: English (min B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Wine analysis, practical lab analysis, sensory analysis, wine tasting, chemistry

Teaching language

English

Requirements

None

Persons in charge

Sofia Catarino, Prof. PhD HDR - Universidade de Lisboa

Organization

PU Wine analysis: Face to face lectures 10 h; directed exercises 15 h

PU Wine sensory analysis: Montpellier: Face to face lectures 6 h; practical sensory analysis 28 h; Bordeaux: 10h (3h lectures + 7h TD)

Student's personal study time in the module: 56 h

Targeted learning outcomes:

PU Wine Analysis:

- students understand the role of analytical chemistry on grape and wine quality control
- are able to interpret the wine analyses results in order to decide and to control the wine treatments as well as the assessment of legal and commercial wine specifications.

PU Wine Sensory Analysis:-

- students know the theoretical back ground of sensory analysis
- they know the main principles and techniques applied in sensory analysis
- they are aware of the flavor development and can distinguish the differences between varieties and the influence of the terroir and regions
- with these principles and techniques they are able to carry out quality control from the harvest to the final product ready for the customer
- they know how Descriptive Sensory Analysis permits product traceability
- students know a vast field of application implying varied techniques covering comparative and descriptive tests
- students will have indispensable skills in Sensory Analysis extremely useful in any field of vine.

Course content

PU Wine Analysis: • Grape vine ripeness control: analytical control of sugars and acidity; concepts and analyses of technological and phenolic maturity indexes • Wines, quality and quality control: quality characteristics; critical control points in wine processing; legal and commercial wine specifications. Classical and modern wine analysis; regulatory requirements. • Wine contaminants: ochratoxin A, biogenic amines and ethyl carbamate; occurrence and oenological strategies to reduce the risk of contamination.

PU Wine Sensory Analysis: • Introduction to Sensory Analysis in general and specially of wine; • Data analysis Selection and training of judges called for Sensory Analysis; • Make up of homogeneous jury adapted to the different test; • Different tests applied in Sensory Analysis (parametric or not) and statistical analysis of results; • Different steps of practical descriptive tastings; Semantics of descriptive Sensory Analysis and its various techniques of application in tastings, use of vocabulary (free or pre-established). • Tasting grids. • Descriptive Sensory Analysis versus the influence of quality factors (terroir, grape varieties)

Grades

PU Wine Analysis: Evaluation of the written reports of the laboratory sessions and personal participation in the lab sessions.
PU Wine Sensory Analysis: Continuous assessment of knowledge during tasting sessions

Reference of the course: Vinifera 8		Credits: 8 ECTS
Teaching language: English (min B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Plant physiology, abiotic factors, water management, vine ecology,

Teaching language

English

Requirements

Basic knowledge in Viticulture as delivered in the module "Immersion", basics in soil sciences, module "Vine Biology"

Persons in charge

Anne Pellegrino, PhD - Institut Agro Montpellier – anne.pellegrino@supagro.fr

Organization

PU Vine Ecology: Face to face lectures 32h; directed exercises (practices) 4 h

PU Vine Physiology: Face to face lectures 25h; directed exercises 19h, Student's personal study time in the module: 28h

Student's personal study time in the module: 28h

Targeted learning outcomes:

PU Vine Physiology:

- To get theoretical knowledge on basic grapevine physiology, growth and development,
- To learn about the interaction between abiotic factors, vine physiology, development, fruit growth and composition,
- To learn about the eco-physiological differences across various grapevine varieties,
- To understand specific aspects of nutrient acquisition,
- To be able to apply research methods for physiological studies
- To be able to use specific decision making tools to measure vine and fruit physiological parameters
- To get a first insight in remote sensing approaches

PU Vine Ecology:

- To know how the sites characteristics (soil and climate) interact with viticultural practices (irrigation, soil preparation, cover crops; nutrient supply),
- To learn how to evaluate/measure the soil and climate parameters,
- To be able to assess and to correct soil problems: soil acidity, pH, erosion, poor organic matter content, salinity,
- To understand the potential impact of climate factors –temperature (including winter and spring frosts), light, rainfall, hail, and wind – on vine and vineyard performances
- To be able to characterize current or new sites/terroir from a soil and climate perspectives.

Course content

PU Vine Physiology: • Vegetative growth, Fruitfulness • Water Relations, Source-sink Relations (carbohydrates, nitrogen) • Root to shoot chemical communication • Nutrition-minerals: analytical methods and data interpretation • Berry development & composition/biochemistry • Remote and proxy sensing of physiological parameters • Phenology modelling, applications for the prediction of abiotic and biotic risks • Canopy light interception and water use efficiency under abiotic constraints and stresses
Practices: • Phenology modelling • Light interception modelling • Experimental project: initiation to ecophysiological methods • Sequential harvest and wine profiles

PU Vine Ecology: • Vineyard soils: basic concepts • Soil Ecology • Water balance model (field, site) • Copper and vineyard soil • Climate factors affecting vine growth and yield: temperature (including frosts), hail, rain, wind • Climate index & soils classifications • Climate change and Viticulture
Practicals: • Climate and soil indexes

PU Vine Physiology & PU Vine Ecology: General discussion: Have you noticed controversies across the Physiology and Ecology lectures? Great, then let's talk about it!

Grades

PU Vine Physiology: Oral presentation and written report or poster per group (50%)

PU Vine Ecology: Individual written report (50%)

Reference of the course: Vinifera 9		Credits: 7 ECTS
Teaching language: English (min B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

vineyard management, pest and disease, viticulture

Teaching language

English

Requirements

Basic knowledge in Viticulture as delivered in the module Terroir and Company Auditing and during the Vine Biology, Ecology & Physiology modules.

Persons in charge

Pilar Baeza Trujillo, Prof. PhD (Universidad Politécnica de Madrid); Manfred Stoll, PhD (Hochschule Geisenheim University)

Organization

PU Vineyard Management (3.5 ECTS): Face to face teaching: 24 h of lectures + 3 h of field visits (partly together with PU Vine pest control) + 3 half-day seminars; Personal study: 30 hours minimum

PU Vine Pest Control (3.5 ECTS): Face to face teaching: 27 h of lectures + 3 h of directed exercises, Personal study: 30 hours minimum

Targeted learning outcomes:

- know about the choice of cultivation practices in relation to the ecophysiology of the vine and the environment
- know innovative techniques closely linked to research
- know about adaptation of the vineyard management to either the valuation of terroir in the context of sustainable viticulture, or to an industrial approach of wine productions and derivatives
- know about global aspects of technical approaches for temperate, warm/dry and tropical viticulture
- know about the biology and epidemiology of the main pests, diseases and weeds of vines in the world, how they interact and to understand integrated and organic strategies of control
- know tools for the diagnosis of pests and diseases

Course content

- Techniques needed to set up a vineyard
- Soil management strategies
- Irrigation equipment and monitoring
- Canopy management, trellising
- Cool/dry/warm viticulture
- Steep slope and tropical viticulture
- Mites in vineyards
- Cicadellids and transmitted pathogens
- Grape moths and other insects
- Viruses of vines
- Coccoids and transmitted pathogens
- Nematodes and transmitted pathogens
- Grapevine wood diseases
- Vine fungi and bacteria
- Pedology and Soil zoning
- Methodology of soil mapping
- Study visits

Grades

Evaluation of practical work and written examination

SPRING SEMESTER

What is Agroecology?

SPRING

January 23 - February 17, 2022

Reference of the course: Agrecology UE1		Credits: 7 ECTS
Teaching language: English (min B1 level)	Level: 300	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Agroecology, pluridisciplinarity, controversy, human x nature relationship, agroecosystem, agricultural practices, complexity, critical sense

Requirements

Basic knowledge of plant and animal biology, ecology and agronomy (in the broad sense).

Persons in charge

Dr. Aurélie Javelle (aurelie.javelle@supagro.fr), Prof. Magali Jouven (magali.jouven@supagro.fr) and Prof. Stéphane de Tourdonnet (stephane.de-tourdonnet@supagro.fr).

[Department of Soil, Water, Crops and Livestock Systems, Department of Biology and Ecology, Department of Economics, Management and Social Sciences](#)

Organization

Full time 4-week-long course with lectures, tutorials, seminars, debates, field trips.

Objectives

The general aim of the course is to apprehend agroecology through an interdisciplinary approach combining agronomy, ecology, social and economic sciences. In this objective, the players and the different dimensions of agroecology (scientific disciplines / social and political movements / sets of practices) are presented and the reference framework on which they are based is analyzed. The objective is not to give a single definition of agroecology but rather to help the students to understand the multiple facets of this concept, to identify how it complies or contrasts with other conceptions of agriculture and to discuss its implications in terms of human x nature relationships and agricultural development.

Course content

The teaching is organized around two main themes:

- (i) an historical and scientific approach to understand how agroecology has emerged, has shifted the lines within various disciplines and at their interfaces, and has generated controversies
- (ii) an analysis of the diversity of actors and of experiences of agroecology, based on field trips and direct interactions with a variety of stakeholders.

A large importance is given to reflective analysis, comparative analysis and discussion to allow the students to understand the diversity of the agroecology approaches, identify their conceptual and ethical positioning and the modalities for their practical implementation in the field. The students contribute to the MOOC Agroecology which takes place annually.

The course will combine lectures-seminars, tutorials, analyses of case studies, interviews and on-site visits. Students are required to: (1) attend all classes, tutorials and seminars, (2) participate actively to group work and discussions, (3) develop self-learning, (4) prepare and perform interviews and (5) take a final examination.

Interdisciplinary Content	nb of hours	Disciplines involved
Lectures	19	Ecology
Conferences by professionals and field trips	12-20h	Anthropology
Tutorials and seminars	20h	Sociology
Self training	25-30h	Economy
Facilitation of interactions between participants in the MOOC Agroecology	8h	Agronomy
Final exam	3h	Animal science
		Soil science
		Communication and IT

Grades

The final mark will be a weighted average between the individual examination and the evaluation of seminars and presentations carried out in groups during the course.

Partnership

Research Units: Innovation, Cefe, Eco&Sols, System, Selmet, Agap, HortSys et Aida

Associations: Terre & humanisme, semeurs de jardins Civam etc.

Agroecology in depth knowledge

SPRING

March 1 - March 24, 2023

Reference of the course: Agroecology UE2		Credits: 7 ECTS
Teaching language: English (min B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Functional ecology, biological / ecological / technical / social processes, management practices, sociotechnical networks

Requirements

Sequence 1 of the Mooc Agroecology and/or course "What is agroecology ?"

Persons in charge

Ass. Prof. Florian Fort (florian.fort@supagro.fr), Ass. Prof. Aurélie Metay (aurelie.metay@supagro.fr), Ass. Prof. Muriel Tavaud (muriel.tavaud@supagro.fr), Prof. Stéphane de Tourdonnet (stephane.de-tourdonnet@supagro.fr).

[Department of Soil, Water, Crops and Livestock Systems; Department of Biology and Ecology](#)

Organization and credits

The course is a full time 4-week-long course.

Objectives

The general objective of the course is to present the processes underpinning agroecology to mobilize ecological functionality in agro-ecosystems. Students are expected to analyze, evaluate and integrate these processes through a systemic approach conducted at different levels: plot, ecosystem, production system, socio-ecosystem. Teaching is focused on a functional analysis of the agro-ecosystem in order to highlight the key processes of agroecology with their associated concepts and methods and evaluate the ecosystem services provided.

At the end of the module the students will be able to (1) name and describe the biological, ecological and social processes going on in agroecosystems; (2) identify and analyze agronomic practices complying with agroecological principles, at various levels (from the community to the farm level) and their impact on the components of the agroecosystem.

Course content

The teaching will address the following topics: Ecological, Biological, Technical and Social Processes in agroecology, biodiversity and diversity of practices in agro-ecosystems, construction of agroecological knowledge and learning. Students will develop an integrated analysis based on case studies and a field camp.

The course will make extensive use of a digital learning resource developed by the teaching team (MOOC agroecology). During the MOOC session, the students will tutor the participants through forums, act as community managers, facilitate the live events of the MOOC. A dedicated training will enable them to acquire and practice the necessary skills.

The course will combine lectures-seminars, tutorials, and on-site visits. Students are required to: (1) attend all classes, tutorials, e-learning activities (2) participate actively to group work and discussions, (3) develop self-learning, (4) work on a project during the field camp, and (5) take a final examination.

Disciplinary Content	nb of hours
Biology and genetic	6
General and soil ecology	14
Agronomy	10
Pest and diseases management	4
Livestock systems	6
Water and soil management	3
Sociology	3
Field activities, measurement, data analysis	14
Self learning and group work	40

Grades

The final mark will be a weighted average between an individual exam (40%), continuous assessment (20%) and a group project on field camp results (40%).

Partnership

Research Units: Innovation, Cefe, Eco&Sols, System, Selmet, Agap, HortSys et Aida

The Agroecological Transition: implementation

SPRING

March 27 – April 21, 2023

Reference of the course: Agroecology UE3		Credits: 7 ECTS
Teaching language: English (min B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Agroecological transition, innovation, ecological engineering, design and evaluation of agroecosystems, public policies, short food supply chains, certification

Requirements

Prerequisites: sequences 1 to 4 of the MOOC Agroecology and/or course "What is agroecology?" and "Fundamentals of agroecology"

Persons in charge

Prof. Ronan Le Velly (ronan.le-velly@supagro.fr), Prof. Stéphane de Tourdonnet (stephane.de-tourdonnet@supagro.fr).
[Department of Soil, Water, Crops and Livestock Systems](#), [Department of Biology and Ecology](#), [Department of Economics, Management and Social Sciences](#)

Organization and credits

The course is a full time 4-week-long course.

Objectives

The general objective of the course is to analyze the evolution of practices and systems, as well as the innovation and transition processes towards agroecology. The course will present the levers (public and research policies, devices to co-design technical systems, support systems and socio-technical networks ...) to guide the agroecological transition and address issues such as adaptation to climate change, reduction of inputs, development of sustainable food systems.

The concepts, approaches and instruments of the agroecological transition are presented in order to strengthen the students' ability to drive change and to assess the corresponding impacts at the economic, social, agricultural and ecological levels. Most of the course consists in a project where the students will work in groups to address the various aspects of the design of a "real" sustainable agroecosystem complying with the principles of agroecology.

Course content

The teaching will address the following topics: Innovation and agro-ecological transition, Greening of public policy, Technical, organizational and economic lock-ins and levers for agroecology, Evaluation methods and (co) design of agro-ecological systems, Ecological Engineering.

Small groups of students will have to work on a project in relation with external partners (community, association, cooperative etc.) to conceive and evaluate ex-ante the agroecological transition within a farm or small territory.

The course will combine lectures-seminars, tutorials, and project-based learning through the analysis of a real-world case study. Students are required to: (1) attend all classes, tutorials and discussion, (2) develop self-learning, (3) work in groups on a project, and (4) take a final examination.

Disciplinary Content	nb of hours
Economics, Sociology	20%
Agronomy, Zootechnics, Soil Sciences, Ecology	30%
Project	50%

Grades

The final mark will be a weighted average between an individual exam and a group project.

Partnership

Research Units: Innovation, Cefe, Eco&Sols, System, Selmet, Agap, HortSys et Aida
Every year changing professional partner for the project)

Designing new crops for the future

SPRING

January 23 - February 17, 2023

Reference of the course: Plant Sciences UE1		Credits: 7 ECTS
Teaching language: English (min B1 level)	Level: 300	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students/ MSc students

Keywords

Climate change, societal expectations, crop pests, food security, diversification of agricultural production, ideotype, biocontrol, tolerance to biotic and abiotic constraints, genotype/environment interaction, genetic innovation, biotic interaction, genotype, phenotype, multi trait combination, genetic recombination, perception towards innovation, public acceptability, production processes, genome editing, participatory plant breeding, legal issues

Requirements

Basic knowledge in biology of organisms, plant protection, genetics and breeding.

Persons in charge

Dr. Dominique THIS (dominique.this@supagro.fr), Dr. Florian FORT (florian.fort@supagro.fr)

[Department of Biology and Ecology](#)

Organization and credits

The course is a full time 4-week-long course, with one item per week and a four-weeks applied transversal project.

General theme of the course

Changes affecting agriculture at the world level (environmental and societal changes) bring questions about paradigm shift in crop breeding and health. This course aims at guessing and designing the upcoming crop varieties and plant protection strategies to be developed in future production chains.

This course will bring scientific bases and methods to reflect on evolutions of plant breeding and plant protection at the global level. Students will learn how to design new plant ideotypes and plant protection systems in line with natural resources preservation, and integrate them into either innovative or traditional farming systems. Finally, this course aims at making students acquire additional operational skills and discover careers in plant breeding and crop protection sectors.

Course content

The course will combine lectures-seminars, laboratory, field and/or company on-site visits and project-based learning.

- First week theme:** To analyze and predict the impacts of climate and societal changes on cropping systems
- Second week theme:** To define suitable crop ideotypes well adapted to environmental constraints and new-coming agricultural systems
- Third week theme:** Available methods to be developed to go towards the engineering of the desired crop ideotypes
- Fourth week theme:** Technical, societal and legal challenges

Students are required to: (1) attend all classes, discussion and on-site visit sections, (2) informally and formally participate in class and all exercises, (3) prepare an essay on a synthesis case study, and (4) take a final oral examination.

Disciplinary Content	nb of hours
Sociology and economy	3
Agro-ecology	5
Eco-physiology	7
Phytopathology and pest management	7
Environmental sciences	3
Genetics	10
Breeding	6
Legislation	4
English	4,5
Multidisciplinary Project	10,5 (+40h group work)

Grades

Grades are based on (i) evaluation of individual participation to classes and to the different exercises; (ii) evaluation of a written report (10 pages max) and (iii) final oral examination (15 minutes)

Reference of the course: Plant Science UE2		Credits: 7 ECTS
Teaching language: English (min B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students/ MSc students

Keywords

scientific approach, communication, team-work, experimentation, research, plant biology, plant breeding, crop protection, ecology

Requirements

Basic knowledge in biology of organisms, plant protection, genetics and breeding.

Persons in charge

Dr. Anna Medici (anna.medici@supagro.fr), Dr. Jean-Jacques Kelner (jean-jacques.kelner@supagro.fr), Dr. Véronique Marie-Jeanne (veronique.marie-jeanne@supagro.fr) .

[Department of Biology and Ecology](#)

Organization and credits

The course is a full time 4-week-long course.

General theme of the course

The attractiveness of the Montpellier Research Campus in the field of plant science is mainly due to the excellence of the scientific research and higher education network of Agropolis (www.agropolis.fr). However, this community is not well known by students. Also, some of the research units do not know the potential of the students coming to Institut Agro Montpellier as future trainees or staff. This course aims at filling this gap by introducing the students to the richness of the Montpellier scientific network in plant sciences, ecology and crop protection. Students will participate to a scientific project conducted within an Agropolis research unit and supervised by our research partners. They thus will learn the different steps of the scientific approach: to carry out a state-of-the-art, to formulate scientific hypotheses, to implement an experimental process and to discuss the results. This will contribute to develop scientific rigor, scientific communication, ability to work in a team, and more generally the adaptation to a professional environment.

Course content

The course will be based on project-based learning as well as practical exercises. The students will work in small groups. Students will also attend scientific seminars and develop self-learning.

1. **First week:** Presentation of the scientific environment and analysis of the state-of-the-art relative to the research project (bibliography)
2. **Second week:** Establishment of the methodology and start of the experiments
3. **Third week:** Development of the experiments and collection of results
4. **Fourth week:** Analysis of the results and presentation of the work

The week-to-week progress of the work will depend on the subject the student will work on.

Students are required to: (1) attend all classes, discussion and practical exercises, (2) report on their work on a weekly basis, and (3) make a final oral presentation of their work. The course requires a full time investment in the projects

Disciplinary Content	nb of hours
Experimental Sciences (biology / biotechnology / plant breeding / plant protection / ecology depending on groups)	30 (+60h personal work)
Scientific communication	5
English	5

Grades

Grades are based on (i) evaluation of individual participation to classes and to the different exercises; (ii) evaluation of a written report (10 pages max) and (iii) final oral examination (15 minutes)

Evolutionary applications in agriculture: evolutionary concepts for the Management of Agro-Ecosystems

SPRING

March 27 – April 21, 2023

Reference of the course: Plant Science UE3		Credits: 7 ECTS
Teaching language: English (min B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students/ MSc students

Keywords

molecular diversity, evolutionary and selection footprint, co-evolution, barcoding, microbiome.

Requirements

Basic knowledge in Mendelian genetics, General concepts of molecular Biology (meiosis, recombination), Probability (mean, variance, binomial distribution) and Statistics and R (p-value, PCA).

Persons in charge

Pr. Vincent Ranwez (vincent.ranwez@supagro.fr) and Dr. Jean-François Martin (jean-francois.martin@supagro.fr)

[Department of Biology and Ecology](#)

Organization and credits

The course is a full time 4-week-long course.

General theme of the course

Modern agro-ecosystem management must resolve the potentially conflicting objectives of short-term, intensive production and long-term sustainability whilst simultaneously reducing negative environmental impacts. This course aims at providing students with the key theoretical background elements needed to comprehend and assess the agro-ecosystem within an evolutionary framework.

Relevant evolutionary concepts will be used to shed light on processes such as: domestication and its impact on cultivated plants; adaptive potential to biotic or abiotic stresses; identification of candidate genes for adaptation; community dynamics influencing host/pathogen, plant/microbiome or arthropod-related interactions; the spread of invasive species. To achieve this goal, students will be introduced to the essential theoretical background from population genetics, molecular evolution and phylogeny, as well as community dynamics and interactions.

Course content

The course will combine lectures-seminars, tutorials, analyses of real-world case studies and project based learning. Students are required to: attend all classes, tutorials and discussion, develop self-learning, work on a project, and take a final examination.

Tutorials will aim at mastering F-statistics, sequence alignments, advance queries on Ensembl and NCBI databases, molecular phylogeny, taxonomic identification as well as understanding the fundamentals of tests used to detect selection/adaptation or to characterize microbiomes.

Students are expected to develop their ability to read scientific article and question methodological choices, to apprehend agronomic question in a broader evolutionary framework, to propose biological interpretation based on molecular data analysis and to suggest further analysis to validate those hypotheses, to work with others: being able to emit/accept constructive criticism, being open-minded and inquisitive, being respectful of other point of view, being diligent and punctual.

- 1. First week:** Genetic resources in agriculture and conservation biology (molecular diversity): Characterizing genetic/genomic diversity via high-throughput molecular methods, Understanding evolutionary processes shaping allelic distribution, Quantifying molecular diversity, Conducting taxon identification and phylogenetics analyses for diagnostics and classification
- 2. Second week:** Molecular breeding, dynamics of adaptation, candidate gene identification (footprints of selection): Establishing a null hypothesis to detect selection for adaptation to biotic and abiotic conditions, Detecting selection at the genome level for adaptation to biotic and abiotic conditions
- 3. Third week:** Domestication history, epidemiology, emergence of resistances and geographical expansion (spreading): Understanding how molecular diversity is shaped by organism reproductive traits, Deciphering the history of populations at different time and space scales, Retracing phylogeography and geographical expansion to understand the past and predict the future
- 4. Fourth week:** Community evolutionary dynamics (interactions): Understanding co-evolution and how it can be tested, Knowing the importance of soil microbiome and how metagenomics allows to characterize it, Understanding that the plant level is not the sole relevant level

Disciplinary content	nb of hours
Genetics	31
Molecular ecology	9
Evolution and Phylogenetics	9
Multidisciplinary project (data analysis)	20 (+24h personal work)
English	7

Grades

The final mark will be a weighted average between an individual exam and a group project.

Collecting Environmental data

SPRING

January 23 - February 17, 2023

Reference of the course: Data Manager for environmental projects UE1		Credits: 7 ECTS
Teaching language: English (B1 level)	Level: 300	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Sensors and Metrology, Wireless Sensors Networks (WSN), Arduino platform, Networks, Metadata and Data formats

Requirements

Very basic skills in programming (any language) may be useful.

Persons in charge

Ass. Prof Hazaël JONES (hazael.jones@supagro.fr)

[Department of Sciences for Agro-Bio-Processes](#)

Organization and credits

The course is a full time 4-week-long course.

Objectives

Measurement is one of the major components of environmental monitoring, whether for water quality, atmospheric conditions. It forms the basis on which hazard management strategies or policies related to the protection and management of the natural environment can be implemented. The objective of this teaching unit is to provide with students the physical and organizational principles for collecting information to describe the natural environment. This module will introduce the first steps of geo-referenced data project management with the application of sensors and their connection to a communication network. The sampling, data validation and representation of information issues will also be considered

Course content

The course will combine lectures-seminars, tutorials, interviews and on-site visits and project-based learning.

The goal for the students is to be able to perform an effective environmental data collection in order to carry out an agri-environmental project. To achieve this goal, the following program will be done:

- First week: Sensors and Arduino, Data Format: this week is about how to concretely manage sensors with basic knowledge of sensors and their characteristics for agro-environmental applications. Development of measuring system based on Arduino open-source platform within the framework of agro-environmental project is done. An introduction about data for agronomy and agriculture is also given.
- Second Week: Wireless Sensor Network (WSN) and Arduino, Computer networks, Metadata: this week will give theoretical knowledge about how computer networks work and how wireless sensor network are managed with Arduino. An introduction about what are metadata and why they are useful for environmental data projects is given.
- Third Week: Statistics and Sampling, In-field data acquisition: this week will give the basics on how to perform a good sampling for data acquisition; it will then be concretely achieved in the field on a concrete application.
- Fourth Week: Data processing, Geomatics and Geographic Information System (GIS) basics, Global navigation satellite system (GNSS). This week will be about the first steps of data processing once the data have been gathered. As many data are of spatial nature, geomatics, GIS and GNSS notions will be investigated.

Disciplinary Content	nb of hours
Sensor and Metrology	2
Prototyping with Arduino platform	15
Networks and IoT	3
Data Format, Semantic Networks, Ontologies and Metadata	5
Statistic and Sampling	6
In field data acquisition and Data processing	15
Geomatics and Geographic Information System (GIS) basics, Global navigation satellite system (GNSS)	2

Grades

Grades are based on evaluation of individual participation to classes and a group project.

Partnership

Research Units: UMR MISTEA (Institut Agro Montpellier / INRAE) and UMR ITAP (Institut Agro Montpellier / INRAE)

Processing, Analysis and Presentation of Environmental Data

SPRING

March 1 - March 24, 2023

Reference of the course: Data Manager for environmental projects UE2		Credits: 7 ECTS
Teaching language: English (B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Spatial Data, Data Science

Requirements

Basic knowledge in: Statistics (sampling, estimation, principle of statistical tests), Databases (tables and simple SQL queries) and statistical free software R.

Persons in charge

Ass. Prof. Bénédicte Fontez (benedicte.fontez@supagro.fr)

[Department of Sciences for Agro-Bio-Processes](#)

Organization and credits

The course is a full time 4-week-long course.

Objectives:

To propose a set of methods and tools to study complex data (georeferencing, temporal data and so on) in order to predict a variable of interest or identify consistent sub-sets and to represent these results in the form of maps and charts.

Course content

The course will combine lectures-seminars, tutorials, interviews and on-site visits and project-based learning.

Disciplinary Content	nb of hours
Applications : project (tutorials with R, QGIS) and advanced level in R	8
Distributed spatial data extraction and management, Databases, Big data, Semantic Networks	20
Statistics (Spatial autocorrelation and regression)	18
Variogram – Kriging	5
Geomatics	6

Grades

Grades are based on evaluation of individual participation to classes and a group project.

Partnership

Research Units: UMR MISTEA (Institut Agro Montpellier / INRAE) and UMR ITAP (Institut Agro Montpellier / IRSTEA)

Reference of the course: Data Manager for environmental projects UE3		Credits: 7 ECTS
Teaching language: English (B1 level)	Level: 400	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

GIS, Mobile and web applications, spatial data analysis

Requirements

Very basic skills in: Web design (basic knowledge of HTML tags and CSS), Programming (any language), GIS

Persons in charge

Pr Bruno Tisseyre (bruno.tisseyre@supagro.fr) and Pr Philippe Vismara (philippe.vismara@supagro.fr)
[Department of Sciences for Agro-Bio-Processes](#)

Organization and credits

The course is a full time 4-week-long course.

Objectives:

To provide decision support at different level (local, national, regional and international) environmental data and land use information must be available for many different activities and stakeholders. Sharing and dissemination of environmental data is therefore a challenging issue which largely relies on web and mobile technologies. The first goal of this teaching unit is to provide with the student an overview as well as a description of the main technologies available to tackle the issue of dissemination of environmental data. The second goal is to involve the student in a project management aiming at applying these technologies to real environmental project with collecting platforms (crowd-sourcing, sensor networks, and so on) and dissemination of information. Spatial data like maps and remote sensing image will be the core of the project.

Course content

This module is mainly based on project-based training with a few lectures-seminars and tutorials.

- First fortnight theme: Designing a mobile web application for on-site collecting data
- Second fortnight theme: Project in precision agriculture

Students are required to: (1) attend all classes, tutorials and discussion, (2) develop self-learning, (3) work on a project and contribute to the restitution seminar.

Disciplinary Content	nb of hours
mobile and web applications (HTML, CSS, PHP, JavaScript), web services	30
GIS and spatial data analysis	10
Remote sensing	5
Collective Project management	15 + (40 personal project)

Grades

Grades are based on evaluation of individual participation to classes and a group project.

Partnership

Research Units: UMR MISTEA (Institut Agro Montpellier / INRAE) and UMR ITAP (Institut Agro Montpellier / IRSTEA)

Junior Research Lab – JRL

SPRING

April 28 – June 28, 2023

Reference of the course: JRL		Credits: 14 ECTS
Teaching language: English (B2 level)	Level: 500 - 600	Europe - 3d year of Bachelor's degree/ 1st year of Master's degree USA - Bachelor Junior students/ Bachelor senior students

Keywords

Research skills development, Learning by researching, international collaboration, project development and

Requirements

Good basis in biology, mathematics, physics, chemistry as well as the B2 English capacity are required and will be evaluated.

Persons in charge

Pr. François Colin (francois.colin@supagro.fr), Pr. Jacques David (jacques.david@supagro.fr), Dr. Jean-François Martin (jean-francois.martin@supagro.fr)

Organization

The course is a full time 8-week-long course. It is organized into three main types of activities:

- (i) learning sessions to acquire in-depth knowledge and practical skills for data management and analysis, in particular in R, literature management, data management, good replication practices, scientific writing and oral presentations;
- (ii) weekly seminars led by expert scientists organized by the students themselves;
- (iii) autonomous scientific small-group projects for at least 50% of the time. This is not an internship. The students are not located in the research units, but in the heart of the Gaillarde campus in a room dedicated to the JRL.

Research skills and disciplinary content

The Junior Research Lab (JRL) is a teaching unit dedicated to learning through research. Students can choose their research theme, benefit from the support of senior researchers and are encouraged to develop co-training. It is a bridge between academic input and research activity, an opportunity for students to exchange with students from other disciplines, other countries and to prepare a long-term personal research project. It puts students in the position of managing a research project from the construction of working hypotheses, the acquisition of data, their analysis and the sharing of their research in written and oral form. The scientific and transversal objective of this module is therefore to enable students to develop their ability to:

0. Improve autonomously their academic knowledge through the reading of scientific literature and the development of their critical thinking skills
1. Conduct a research activity,
2. Manage a scientific project using the AGILE methodology,
3. Plan the phases of acquisition, analysis and sharing of the products of their research,
4. Use analytical tools,
5. Organize their approach with a view to reproducibility and quality of results.
6. Work in a small (4/5) multicultural group, both face-to-face and at a distance,
7. Write a scientific article that is a product of their research,
8. Present a scientific project orally in English in 180'.

Scientific disciplines: The scientific topics of the research project are addressed through the field of expertise of Institut Agro Montpellier, i.e, mainly in biology, ecology, soil sciences, agronomy, rural economics. Every year, a team of academics is volunteering for mentoring the students during their project. Available discipline varies accordingly.

Research skills & Disciplinary content	Nb of hours
Agile Project management	12h
Literature survey and management (Zotero)	3h
Data analysis and visualization (R Tidyverse)	18h
Basic programming (R and bash script)	9h
Research Data Management	6h
Reproducible research through code versioning and sharing	6h
Scientific writing	6h
Oral presentation skills	3h
All disciplinary content is addressed within the research projects where it is relevant	

Grades

The evaluation of Grades is based on (i) the project-group scientific article (50%), (ii) the individual peer-review of another article (20%), (iii) the individual 180 seconds flash presentation (20%) and (iv) the ongoing scientific network exercise.

Undergraduate Engineering Summer School

May 22nd – June 16th 2023

FLOW

Grand Industrial Challenges in France

Polytech Montpellier, South of France



FLOW Grand Industrial Challenges in France



FEAT: Food, WinE, wATER
 Wine and Beer
 Food Engineering and Food Safety
 Urban Flood and Risk Mitigation
 Assuring Clean Water
 Sustainable Aquatic Ecosystems



SEM: Sustainable Energy & Materials
 From Nuclear to Solar Energy
 Materials for Sustainable Development
 Nanomaterials and Nanotechnologies
 Welding Technologies



DIP: Data & Information Processing
 Data Science
 Agility for Management
 Interfacing Computers and Sensors
 Internet of Things

Who can apply ?

Undergraduate students
 with a major in Engineering
 who have completed
 their first or second year of study
 and plan to major
 in one of the three topics of *FLOW*

Tuition and fees

Regular fees: 3600€
 Students from partner universities: 1800€
 including:
 Accommodation and meals (family home)
 Transfers and local transportation pass
 Scientific lectures and activities (64h, 4 ECTS*)
 Cross-disciplinary project on sustainability
 (12h, 1 ECTS*)
 French courses and sociocultural activities
 (24h, 1 ECTS*)

* 2 European Credits (ECTS) are equivalent to 1 American Credit

How to apply ?

Contact:
polytech-flow@umontpellier.fr
 Testimonials: [Youtube](#)
[Visit our website](#)

Application deadline:
 February 15th 2023



CONTENT

- Scientific courses (lectures, labs + scientific visit) – (64h, 4 ECTS):
 - FEAT - Food, Wine, Water
 - SEM - Sustainable Energy and Materials
 - DIP - Data and Information processing
- Tutored cross-disciplinary project on Sustainability (12h, 1 ECTS*)
- French language courses and sociocultural activities (24h, 1 ECTS*)

For Information about **Data and information processing** and **Sustainable Energy and Materials**, please consult : <https://www.polytech.umontpellier.fr/international/summer-school>

*1 ECTS = 15 - 20 hours of workload completed by the student (lectures, labs, projects, personal work...)
2 European Credits (ECTS) are equivalent to 1 American Credit

SCIENTIFIC COURSES: FOOD - WINE – WATER

45h (lecture, labs, project...) + 45h (personal work) – 4 ECTS

This track offers about 64 hours of lectures and projects related to some challenges in the fields of food and water sciences. First sessions will present the major unit operation in food processing systems and how to master them to improve sustainability. The second sessions will give a synthetic presentation of one of the most fermented beverage iconic of the South of France: wine, from harvest to winemaking and aroma. The last sessions will focus on conventional and innovative technologies for water treatment, waste management and on ecological systems and biodiversity preservation. During these 4 weeks you will be interacting with researchers experts in various fields of food and water and discovering the activities developed in the South of France. Lecturers are members of two major engineering schools of Montpellier: Polytech Montpellier and Institut Agro Montpellier. The provisional syllabus of the track is detailed below. It includes some references that might support you during the school or guide your way for a more thorough exploration of the covered material.

INTRODUCTION TO FOOD ENGINEERING (15h)

Dr. Kurt ROSENTRATER - Iowa State University

Analyzing and designing major unit operations in food processing systems

- Introduction to food industry, food engineering, engineering basics
- Impacts on chemistry,
- Energy sources, energy balances
- Psychrometrics, thermodynamics
- Heat transfer
- Preservation
- Drying, dehydration
- Thermal processing
- Fluid flow
- Extrusion processing
- Examples, exercises

Assessment: Written exam, multiple-choice questions, calculation questions, short questions

WINE TECHNOLOGY (8h + 6-9h MOOC + virtual visit)

Dr. Patrice LALLEMAND (patrice.lallemant@supagro.fr), Dr. Aurélie ROLAND (aurelie.roland@supagro.fr)
Institut Agro Montpellier

A synthetic presentation of two most consumed fermented beverages

- Wine 1 (4h): Lecture: Understanding wine technology from harvest to winemaking. Selection of grape variety, “terroir”, vineyard management and quality of wine. Process of white, red, sweet and sparkling wine-making, fermentations, aging.
- Wine 2 (4h): Lecture: Aroma compounds in wines (how they are formed during winemaking and wine aging) and sensory evaluation of wines (methodology and explanation of wine sensory attributes). Presentation of the Mediterranean wines (category, food matching, history, market).
- Free access to the MOOC Vine and Wine (Mandatory)
(<https://www.fun-mooc.fr/courses/course-v1:supagro+120002+session02/about>)

Assessment: Multiple-choice questions

WATER SCIENCE AND TECHNOLOGY (15h + visit)

Dr. François ZAVISKA, Pr. Catherine ALIAUME - Université de Montpellier, Polytech MONTPELLIER

ASSURING CLEAR WATER (4h with students + 3.5h work at home)

Lectures + small projects: Conventional and innovative technologies for water treatment and waste water management. Water contamination can be very diverse and can be harmful for both environment and human health. The content of this course will be divided into three main parts. The first part will be dedicated to the presentation of the different type of water contaminants/pollution (anthropogenic or natural pollution) and how it can affect the ecosystem and human health. In a second part, the different water treatment techniques will be presented for both wastewater management and drinking water production. Finally, a presentation of innovative water technology based on membrane processes for specific applications will be details in the last part of this lecture.

SUSTAINABLE AQUATIC ECOSYSTEMS (4h with students + 3.5h work at home)

Lectures and small projects on the ecosystem ecological status and biodiversity preservation. This course aims at introducing ecological basic knowledge of a river system and aquatic organisms, and providing tools to evaluate the ecological status of rivers. Human impacts (such as dam construction) jeopardize ecosystem functioning and biological resources sustainability, and solutions for the ecological continuity restoration are presented.

Assessment: multiple-choice questions, small-project

FRENCH LANGUAGE AND SOCIOCULTURAL ACTIVITIES

19h face-to-face + 5h of independent work - 1 ECTS

- Presentation of France and immersion in the Occitanie Region (Regional economy, Art of living in Occitanie)
- Basic French vocabulary (gastronomy and culture)
- Introduction to interculturality and to the cultural specificities of France

This track of about 20 hours offers a presentation of France et an immersion in the Occitanie Region (Regional economy, Art of living in the South of France).

In small working groups you will learn the basic french vocabulary (gastronomy and culture). During these 3 weeks you will also benefit from an introduction to interculturality and the cultural specificities of France.

Assessment: production of a personal video integrating the linguistic and cultural concepts presented and discussed.

TUTORED CROSS-DISCIPLINARY PROJECT ON SUSTAINABILITY

15h - 1 ECTS

This course consists of a tutored project on sustainable development in an international context. During the 3 weeks, you will work in small teams supervised by a professor. The objective of the project is to work in groups from different cultures and scientific disciplines in order to write the specifications of an innovative product/service responding to one of the 17 sustainable development issues established by the United Nations. During the 3 weeks, the projects will be conducted by alternating face-to-face learning sessions and non-face group work sessions. This project also covers an initiation to project management.

Assessment: Oral defence of the project

IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT :

polytech-flow@umontpellier.fr

<https://www.polytech.umontpellier.fr/international/summer-school>

INTERNSHIP

- International students can apply for a research internship in one of the 21 Institut Agro Montpellier **Joint Research Unit (UMR)**.
 - Students must personally take steps to find the internship. For that, they should consult the list of the UMR, at the end of this document and/or consult the UMR websites
<https://en.institut-agro-montpellier.fr/research/scientific-policy/research-units> (English)
<https://www.institut-agro-montpellier.fr/recherche/dispositifs-de-recherche> (French)
 - Students should send a message to the contact persons of the chosen UMRs of interest, and indicate the period they are interested in and the topics they would like to work on.
 - The application may be accepted if the project is compatible with the work in progress and the availability of the targeted research teams.
- Internship can begin **at any time of the year**.
- Internships can last **from a few weeks to 6 months**. If the internship lasts more than 2 months, students are paid. This type of long internship is more difficult to obtain.
- Proficiency is required **in French or in English**. In some cases, other languages can be accepted.

BE Department – Biology and Ecology

AGAP Institute – Genetic Improvement & Adaptation of Mediterranean and Tropical Plants

Contact: dominique.this@supagro.fr - nathalie.pivot@cirad.fr -- laurent.torregrosa@supagro.fr

UMR PHIM – Plant Health Institute Montpellier

Contact: claire.neema@supagro.fr - gerben-martijn.ten_hoopen@cirad.fr - gilles.bena@ird.fr

UMR BPMP – Biochemistry and Molecular Physiology of Plants

Contact: pierre.berthomieu@supagro.fr - anna.medici@supagro.fr

UMR CBGP - Centre for Biology and Management of Populations

Contact: marie-stephane.tixier@supagro.fr - serge.kreiter@supagro.fr - jean-francois.martin@supagro.fr

UMR LEPSE – Ecophysiology Laboratory of Plants under Environmental Stress

Contact: anne.pellegrino@supagro.fr

CEFE – Centre for Functional and Evolution Ecology

Contact: elena.kazakou@supagro.fr

MPRS Department - Soils, Water, Crops and Livestock Systems Department

UMR Eco&Soils – Functional Ecology & Biogeochemistry of Soils

Contact: claire.marsden@supagro.fr

UMR LISAH - Laboratory for the Study of Interactions between Soil, Agro-Systems and Water Systems

Contact: Julien.fouche@supagro.fr

UMR LSTM – Tropical and Mediterranean Symbioses Laboratory

Contact: brigitte.brunel@supagro.fr

UMR SELMET – Livestock Systems in Mediterranean and Tropical Regions

Contact: nathalie.agbagla@supagro.fr - charles-henri.moulin@supagro.fr

UMR ABSys - Crop Systems Tropical and Mediterranean Cropping Systems functioning and management

Contact: aurelie.metay@supagro.fr

SABP Department - Department of Sciences for Agro-Bio-Processes

UMR G-EAU - Water Management, Actors, Uses

Contact: gilles.belaud@supagro.fr - francois.colin@supagro.fr - armand.crabit@supagro.fr

UMR IATE – Agro-Polymer Engineering and Emerging Technologies

Contact: maeva.subileau@supagro.fr - eric.dubreucq@supagro.fr

UMR ITAP – Information – Technologies – Environmental Analysis – Agricultural Processes

Contact: bruno.tisseyre@supagro.fr

UMR MISTEA – Mathematic, Computing & Statistic for Environment and Agronomy

Contact: benedicte.fontez@supagro.fr

UMR QUALISUD – Integrated Quality Food System

Contact: manuel.dornier@cirad.fr - antoine.collignan@supagro.fr

UMR SPO – Sciences for Enology

Contact: bruno.blondin@supagro.fr

SESG Department - Sciences Economiques, Sociales et de Gestion

UMR INNOVATION – Innovation and Development in Agriculture and Agri-Food Sector

Contact: stephane.de-tourdonnet@supagro.fr

UMR CEE-M – Center of Environmental Economics- Montpellier

Contact: pauline.lecole@supagro.fr

UMR MoiSA – Knowledge, Environment, Societies

Contact: pascal.maizi@supagro.fr - marie-jeanne.valony@supagro.fr