

The Master program has a normal duration of 3 semesters and comprises 90 ECTS :

Module 1 : 15 ECTS : Compulsory courses

Module 2 : 15 ECTS : First step project

Module 3 : 15 ECTS : Optional courses

Module 4 : 45 ECTS : Personal research project (Master thesis)

**For specialisation Computational Ecology and Evolution (CEE) (15.5 ECTS), the student must obtain :**

Module 1 : 9.5 ECTS with Compulsory computational courses (marked in blue)

Module 3 : 6.0 ECTS with Optional computational courses (marked in blue)

Modules 2 and 4 : have to be in computational ecology and evolution fields, validated by the head of CEE specialisation

**Training objectives** are available in its programme regulations.

**Specific training objectives:** At the end of the course the students will be able to:

- Model population processes.
- Make advanced use of computer and statistical methods in ecology and population biology.
- Use computer programming techniques.

### Autumn Semester (semester 1)

	Courses / Enseignement	Hours per semester			Teaching Staff	ECTS Credits	Limited nb of students
		C	E/S	PW			
MODULE 1	<b>Compulsory / Obligatoires</b>						
	Data Analysis <i>Analyses de données</i>	6	-	6	Bergmann S.	2	
	Advanced Data Analysis <i>Analyses de données : niveau avancé</i>	6	-	6	Ciriello G., Delaneau O.	2.5	
	Advanced Python Programming (MSc MLS) <i>Programmation avancée en Python</i>	7	14	-	Salamin N., Delaneau O.	2	
	Population Genetics and Dynamics <i>Génétique et dynamique des populations</i>	7	10	-	Goudet J.	1.5	
	Spatial Analysis and GIS in Ecology <i>Analyses spatiales et SIG en écologie</i>	7	10	-	Guisan A.	1.5	
	Introduction into Scientific Writing <i>Introduction à la rédaction scientifique</i>	7	9	-	Waterhouse R.	2	
	Molecular Methods in Ecology and Evolution <i>Méthodes moléculaires en écologie et évolution</i>	18	-	21	Sanders I., Fumagalli L., Salamin N.	3.5	
	Master BEC Retreat <i>Retraite Master BEC</i>	-	-	-	Kawecki T.	-	
	Seminars of the Dept. of Ecology and Evolution <i>Séminaires du Dept Ecologie et Evolution</i>	-	14	-	Kawecki T.	-	
	Introduction to R (optional support) <i>Introduction à R (mise à niveau optionnelle)</i>				Schütz F.	-	
		Subtotal	33	34	12		
	<b>Total</b>					<b>15</b>	
MODULE 2	<b>Practical Project / Travail pratique</b>						
	First Step Project <i>Travail d'initiation à la recherche</i>	-	-	224	Kawecki T., Goudet J.	15	

Computational courses marked in blue

#### Abbreviations

C = Course

E/S = Exercise/Seminar

PW = Practical Work

Spring Semester (semester 2)

Courses / Enseignement	Hours per semester			Teaching Staff	ECTS Credits	Limited nb of students
	C	E/S	PW			
<b>Computational optional courses *</b>						
<i>Enseignements computationnels optionnels</i>						
Advanced Population Genetics (MSc MLS) <i>Génomique des populations avancée (MSc MLS)</i>	14	6	-	Malaspinas A.-S.	3	20
Bioinformatic Algorithms (MSc MLS) <i>Algorithmes de bioinformatique (MSc MLS)</i>	15	15	-	Dessimoz C., Gfeller D.	3	
Comparative Genomics : from Thousands of Genomes to Single Cells <i>Génomique comparative : des milliers de génomes aux cellules individuelles</i>	7	7	-	Arguello R.	1,5	
Phylogeny and Comparative Methods <i>Phylogénie et méthodes comparatives</i>	14	14	-	Salamin N.	3	
Sex, Ageing and Foraging Theory <i>Théories et modèles de l'évolution de la reproduction sexuée, la sénescence et la consommation de ressources</i>	9	-	9	Mullon C.	1.5	
Spatial Modelling of Species and Biodiversity <i>Modélisation spatiale des espèces et de la biodiversité</i>	14	14	-	Guisan A.	3	
The Evolution of Cooperation : from Genes to Learning and Culture <i>L'évolution de la coopération : des gènes à l'apprentissage et la culture</i>	28	-	-	Lehmann L.	3	
<b>Optional courses *</b>						
<i>Enseignements optionnels</i>						
Applied Ecology <i>Ecologie appliquée</i>	14	-	28	Pellet J.	3	
Biological Invasions <i>Invasions biologiques</i>	14	-	-	Bertelsmeier C.	1.5	
Co-evolution, Mutualism, Parasitism <i>Co-évolution, mutualisme, parasitisme</i>	14	-	-	Sanders I.	1.5	
Current Problems in Conservation Biology <i>Problèmes actuels en biologie de la conservation</i>	14	14	-	Wedekind C.	3	10
Ecology of the Fishes of Switzerland <i>Ecologie des poissons de Suisse</i>	7	-	10	Rubin J.-F.	1.5	
Honeybee Ecology, Evolution and Conservation <i>Ecologie des abeilles, évolution et conservation</i>	14	-	-	Dietemann V.	1.5	
Integrated course Mountain Ecosystems - Ecology & Evolution <i>Cours intégré écosystèmes de montagne - écologie et évolution</i>	14	-	-	Guisan A.	1.5	
Integrated course Mountain Ecosystems - Geo-Environmental Sciences <i>Cours intégré écosystèmes de montagne - sciences géo-environnementales</i>	14	-	-	Guisan A.	1.5	
Scientific Communication - Scientific Hands-on Workshop Module (in French only) <i>Médiation scientifique - module atelier scientifique</i>	14	14	-	Kaufmann A., Reymond P., Ducoulombier D., Trouilloud S., Ythier M.	3	8
Scientific Mediation and Communication - Museum Module <i>Communication et médiation scientifique - module musée</i>	6	-	22	Glaizot O.	3	6
Social Genetics <i>Génétique sociale</i>	2	12	-	Keller L., Kay T.	1,5	
<b>Optional Field Courses (Financial participation by the student required)</b>						
<i>Etudes de terrain optionnelles</i>						
Biological Conservation of the Mediterranean Region <i>Biologie de la conservation dans les régions méditerranéennes</i>	-	-	40	Roulin A., Christe P., Fumagalli L.	2	
Drivers of Invertebrate Biodiversity along Ecological Gradients <i>Facteurs déterminant la biodiversité des invertébrés le long de gradients écologiques</i>	7	-	49	Schwander T.	3	20
Evolution and Biogeography of Semi-arid and Island Floras <i>Evolution et biogéographie des flores insulaires en zone semi-aride</i>	-	-	40	Pannell J.	2	14
Integrated Practical Work Mountain Ecosystems in the Alps ** <i>Travaux pratiques intégrés écosystèmes de montagne dans les Alpes</i>	-	-	52	Guisan A.	3	
<b>Total</b>					<b>15</b>	

Computational courses marked in blue

- \* - Before choosing an optional, please check the "programme requirement" (prerequisites for the course) in the course description  
- Students can choose optional courses independently from this study plan for a max. of 3 ECTS credits with the approval of the head of CEE specialisation
- \*\* To follow Integrated Practical Work Mountain Ecosystems in the Alps : do one of the two courses Integrated course Mountain Ecosystems

Spring semester (semester 2) and Autumn Semester (semester 3)

Course / Enseignement	ECTS Credits
Master Thesis CEE <i>Travail de Master CEE</i>	45

The pandemic has shown us that circumstances beyond our control may require us to make the following adjustments / adaptations to study plans during the semester:

- possibility to switch from one mode of teaching to another (face-to-face <-> distance, synchronous <-> asynchronous, switch to co-modal teaching where it was not initially planned).
- change / modification of evaluation modalities, without inducing derogations from the Study Regulations (oral <-> written, exam <-> validation, individual work <-> group work, practical work <-> theoretical work, face-to-face evaluation <-> online evaluation, etc.)
- alternative or time-shifted modalities for teachings, internships, practical work, fieldworks and camps that could not take place or teachings that could no longer take place in the form initially planned.

Students are invited to consult this document regularly (Study Plan & Evaluation Procedure)