Course directory 2018.2019

school of Biology (FBM-BIO) master

* your selection

> Biology > Master of Science (MSc) in Behaviour, Evolution and Conservation, Specialisation Behaviour, Economics and Evolution

UNIL | Université de Lausanne

SUMMARY

NOTICE

This course catalogue was produced using data from the *SylviaAcad* information system of the University of Lausanne. Its database contains all information about courses proposed by the different faculties and their times. This data can also be consulted online at the address :
https://applicationspub.unil.ch/interpub/noauth/php/Ud/index.php.

Web site of the faculty : **http://www.unil.ch/ecoledebiologie/**

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LEGEND

NAME OF THE COURSE

Teacher

Type of course	Status	Hours per week	Teaching language	Hours per year
Semester	Credits			

N: Levels

P: Programme requirements

O: Objective

C: Content

B: Bibliography

I: Additional information

ABBREVIATIONS

TYPE OF COURSE

Attest.	Attestation
C	Course
C/S	Course - seminar
Cp	Camp
E	Exercises
Exc	Excursion
Lg	Guided lecture
S	Seminar
T	Fieldwork
TP	Practical work

STATUS

Fac	Facultative
Obl	Compulsory
Opt	Optional
Fac/Comp/Opt	Facultative, compulsory or optional (according to the study programme)

SEMESTER

Sp	Spring
A	Autumn

UNIL | Université de Lausanne
Ecole de biologie

Master of Science in Behaviour, Evolution and Conservation
Specialisation Behaviour, Economics and Evolution
2018-2019

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

- 15 ECTS : Compulsory (10 ECTS) and Optional Courses (5 ECTS) (Module 1)
- 15 ECTS : First Step Project (Module 2)
- 30 ECTS : Compulsory (12 ECTS) and Optional Courses (18 ECTS) (Module 3)
- 30 ECTS : Personal Research Project (Master Thesis) (Module 4)

For specialisation Behaviour, Economics and Evolution (BEE) (30 ECTS), the student must obtain :
- 6 ECTS with Compulsory courses (marked in blue) in the Module 1
- 12 ECTS with Compulsory interdisciplinary subjects (marked in blue) in the Module 3
- 12 ECTS with at least 3 ECTS with Disciplinary optional subjects (marked in green) and at least 6 ECTS with Cross disciplinary optional subjects (marked in blue) in the Module 3
- Modules 2 and 4 have to be in behaviour, economics and evolution fields, validated by the head of BEE specialisation

Training objectives are available in its programme regulations.

Specific training objectives: At the end of the course the students will be able to:
• Interact with biologists and economists alike and thus foster and stimulate interactions between these two fields of study.
• Respond to a biological question of behaviour and / or conservation and resource management by mobilising relevant economic science concepts.

Autumn Semester (semester 1)

MODULE 1

Courses / Enseignement	Hours per semester C	E/S	PW	Teaching Staff	ECTS Credits	Limited nb of students
Compulsory / *Obligatoires*						
Advanced Data Analysis in Biology I *Analyse de données en biologie I : niveau avancé*	6	-	6	**Robinson M.** Malaspinas A.S.	2	
Introduction into Scientific Writing *Introduction à la rédaction scientifique*	7	9	-	**Waterhouse R.**	2	
Microeconomics and Game Theory (HEC) *Microéconomie et jeux théoriques*	56	-	-	**Thöni C.**	6	
Subtotal	69	9	6		**10**	
Optional / Optionnel *						
Advanced Data Analysis in Biology II *Analyse de données en biologie II : niveau avancé*	6	-	6	**Robinson M.** Malaspinas A.S.	2,5	
Molecular Methods in Ecology and Evolution *Méthodes moléculaires en écologie et évolution*	18	-	42	**Sanders I.**, Fumagalli L. N. Salamin	5	
Problem-based Learning in Biological Models *Apprentissage par problème : modèles biologiques*	7	35	-	**Franken P.**	3,5	
Scientific Research in all its Forms (for Biology) (Sciences2 - in French only) *La recherche dans tous ses états (pour biologie)*	14	-	-	**Preissmann D.**	1,5	
Spatial Analysis and GIS in Ecology *Analyses spatiales et SIG en écologie*	7	10	-	**Guisan A.**	1,5	
Introduction to R (optional support) *Introduction à R (mise à niveau optionnelle)*				**Schütz F.**	-	
Animal Experimentation and Wild Animals ** *Expérimentation animale et animaux sauvages*	20	-	20	**Rubin J.-F.**	1.5	
Animal Communication and Parasitism *Communication animale et parasitisme*	14	-	-	**Christe P.**, Roulin A.	1,5	
Phylogeography *Phylogéographie*	7	10	-	**Fumagalli L.**	1,5	
Population Genetics and Dynamics *Génétique et dynamique des populations*	7	10	-	**Goudet J.**	1,5	
The Major Transitions in Evolution *Les grandes étapes de l'évolution*	14	-	-	**Keller L.**	1,5	12
Total					**15**	

MODULE 2

Practical Project / *Travail pratique*						
First Step Project *Travail d'initiation à la recherche*	-	-	224	**Goudet J., Lehmann L.**	**15**	

*	Obtain at least 3 ECTS from disciplinary courses (marked in green)
**	Only students who choose a master project with animal experimentation are allowed to select this course

Abbreviations
C = Course
E/S = Exercise/Seminar
PW = Practical Work

BIOLOGICAL SECURITY

Patrick Michaux

C	Obl	English	2
A			

N: Master

P: A basic knowledge of microbiology and vegetal science

O: To familiarise future researchers with legislation concerning genetic engineering. In addition, possible biological risks associated to different applications of this technology will be discussed with the help of examples.
This teaching is a mandatory prerequisite for First-Step.

C: * Legislation: article 24 of the Federal Constitution; law concerning environmental protection; law concerning epidemics; ordnance on protection against major accidents; Swiss commissions on biological security: notification and registration of projects.
* Biological security in the laboratory: containment; security equipment; technical measures: laboratory construction; standard laboratory (microbiological) practice; classification of biological material: plasmids, microorganisms, cell lines, primary cells; security levels 1-4.
* Release of genetically modified bacteria in the environment: monitoring, survival and dissemination, ecological impact, transfer of genes, containment systems.
* Potential biological risks associated with the use of transgenic plants: dissemination, cross-pollination, gene transfer.
* The problem of recombinant vaccines: vectors, DNA vaccines.
* Somatic genetic therapy I: Illnesses accessible to treatment by somatic genetic therapy, gene transfer methods.
* Somatic genetic therapy II: Evaluation of the biological risk for the patient and his environment.

ADVANCED DATA ANALYSIS IN BIOLOGY I

Anna Sapfo Malaspinas, Matthew Robinson

C	Obl/Opt	English	6
A	2.00		

TP	Obl/Opt	English	6
A			

N: Master

INTRODUCTION INTO SCIENTIFIC WRITING

Robert Waterhouse

C	Obl	English	7
A	2.00		

E	Obl	English	9
A			

N: Master

P: Lecturing and paper writing are in English.

O: Synposis of the major course aims in English:
This short but intensive block course introduces students to the practice of scientific writing (and aspects related to getting published in peer-reviewed scientific journals).
We will discuss questions such as:
Why is it important to publish?
What is good/clear versus bad/unclear (scientific) writing?
How to learn how to write well?
How to structure and write a good scientific manuscript?
The submission, editorial and reviewing process.
How to review someone elses paper?
Publishing is of key importance in scientific research: your job as a scientist is not finished until you have published your results - science is to a very large extent about effectively communicating your results and insights, i.e. what you have learned about how nature works. The ultimate aim of this intensive course is thus to equip students with a solid understanding of how to effectively communicate their research in writing.

C: The course includes both lectures and practical exercises in class, distributed over four half-days. The lectures will give a broad and brief overview of different aspects of scientific writing and publishing; however, the major emphasis of the course is on practical work on part of the students. During the practical parts the students will learn, from scratch, the fundamental structure and essential components of scientific writing, how to write effective outlines/drafts and - most importantly - how to write complete, clear, well-structured papers. These practical exercises will thus require students to do reading and writing assignments, often under a bit of time pressure. At the beginning the exercises will be worked on by teams of 2-4; towards the end, each student will work individually. Finally, to get a grade for this class, students will have to complete 1 written report (homework assignment). For each exercise as well as for the written reports we will give detailed and individualized feedback.
Detailed Program
Day 1: Lecture 1: Writing papers: the basics of why and how. We will discuss the following: Overview of class and organizational things (incl. homework assignments). Why is it important to publish? What is good/clear versus bad/unclear (scientific) writing? How to learn how to write well? [We will also briefly touch upon issues of good scientific practice and conduct, and various ethical issues connected to publishing.] Approx. 1 hour.
Day 1: Practical work 1. How to think of an effective title and how to write a succinct abstract. In groups of 2-3. Read the assigned (stripped down and short) manuscript and come up with a title and with keywords. Then write a short abstract (< 200 words). We will then discuss the solutions you have come up with, and their potential pros and cons, together in class. Approx. 3 hours.
Day 2: Lecture 2: How to write a scientific paper. We will discuss the basics and essentials of writing a scientific paper (and also what not to do!). Specifically, I will explain how a paper should be structured and sub-structured, how to draft a paper (i.e., how to get started), how to build and complete a full manuscript, and then how to improve it by continuous and agressive revising and re-revising. I will also give you hints and tips for effective writing. Approx. 1 hour.
Day 2: Practical work 2. Writing your own paper in a nutshell. I will give you some data/results (e.g., data figures/ tables/legends/statistical outcomes) to choose from. Form a team of 2-3. Ask yourself: What do the results/tables/ figures/analyses show and mean? Then prepare a very short mini-paper (1 page max), including: Title, Abstract, Introduction, Materials and Methods, Results, Discussion and Conclusion (there are some other components in a paper that we will skip for the sake of this exercise). Each component should be between 1 and 3-4 sentences maximum. We will then discuss your solutions and their potential pros and cons together in class; I will then give you detailed feedback on your papers by e-mail within 1 week of the exercise. Approx. 3 hours.
Day 3: Lecture 3: How to write a scientific paper: recap. We will briefly recapitulate what we have discussed and learned so far. Approx. 30 min - 1 hour
Day 3: Practical work 3: Review a paper. What distinguishes a good from a bad
manuscript? Now you are the reviewer! Being a critical reviewer will help you to learn to distinguish between good and bad writing and thus help you to improve your own scientific writing. You will be given 2 short, stripped-down manuscripts. Team up in groups of 2-3. Read both manuscripts critically, then make pro and contra lists for both manuscripts. Briefly explain why you would accept/reject (or reach some other decision) the manuscript for publication (

MICROECONOMICS & GAME THEORY

Christian Thoeni

C	Obl	4	English
A	6.00		

N: Master

B: • Frank, R. H. & Cartwright, E. (2016). Microeconomics and Behavior. McGraw-Hill.
• Slides and problem sets
• Further readings will be announced in class

ADVANCED DATA ANALYSIS IN BIOLOGY II

Anna Sapfo Malaspinas, Matthew Robinson

C	Obl/Opt	English	6
A	2.50		

TP	Obl/Opt	English	6
A			

N: Master

MOLECULAR METHODS IN ECOLOGY AND EVOLUTION

Luca Fumagalli, Ian Sanders

C	Obl/Opt	English	18
A	3.50/5.00		

TP	Obl/Opt	English	42
A			

N: Master

O: The objective of this course is to learn the relevant molecular tools that are currently used in ecology, evolutionary and conservation biology research and understand why and when to apply them.

C: This course covers the reasons why molecular genetics is a necessary tool in many ecology, evolution and conservation biology projects. We study its uses and then look at at selection of techniques, particularly for looking at polymorphism, that are not traditionally taught in molecular cell biology courses. Man of the techniques can only be learnt in the classroom as there is not enough time in a week to practically learn all useful techniques. Therefore, the associated laboratory class cover some of the fast techniques that are useful for studying polymorphisms in populations.

B: The course is mostly based on publications in international journals rather than one specific book. The publications are made available in pdf format at the beginning of the course.

PROBLEM-BASED LEARNING IN BIOLOGICAL MODELS

Paul Franken

C	Opt	English	7
A	3.50		

E	Opt	English	35
A			

N: Master

SCIENTIFIC RESEARCH IN ALL ITS FORMS

Delphine Preissmann

C	Opt	2	French	14
A	1.50			

N: Master

P: * Bachelor degree
* Passive knowledge of French

O: - Integrate technics & scientific methods from different academic fields
- Synthesize information from different disciplines
- Transpose knowledge & results from one academic field to another

C: This course offers a multidisciplinary perspective on decision making. While addressing this topic, speakers from different faculties will shed light on their own way of practicing research.

I: http://www.unil.ch/sciencesaucarre/page86487.html

SPATIAL ANALYSIS AND GIS IN ECOLOGY

Antoine Guisan

E	Obl/Opt	English	10
A			

C	Obl/Opt	English	7
A	1.50		

N: Master

P: Basics in statistics and ecology

O: Teaching students the basics of GIS and remote sensing, as well as the main spatial methods available in spatial ecology.

C: 1. Introduction to GIS
2. Introduction to remote sensing
3. Raster analyses
4. Neighbourhood analyses
5. Spatial interpolation
6. Detection of spatial structures and patterns

B: Wadsworth, R. & Treweek, J. 1999. Geographical Information Systems for Ecology
Caloz, R. & Collet, C. 2002. Précis de télédetection, vol. 3. Presses Univ. du Québec
Turner, Gardner, O'Neill 2001. Landscape Ecology in Theory and Practice: Patterns and Process. Springer
Dale, Birks, Wiens 2000. Spatial Pattern Analysis in Plant Ecology. Cambridge University Press.
Klopatek, J.M. & Gardner, R.H. 1999. Landscape Ecological Analysis: isuues and applications. Springer.
Hunsaker, C.T., Goodchild, M.F., Friedl, M.A. and Case, T.J. (Eds). 2001. Spatial uncertainty in ecology. Springer.
Hansson, L., Fahrig, L. and Merriam, G. 1995. Mosaic Landscapes and Ecological Processes. Chapman & Hall.

I: http://www.unil.ch/ecospat

ANIMAL EXPERIMENTATION AND WILD ANIMALS

Jean-François Rubin

C	Opt	English	20
A	1.50		

TP	Opt	English	20
A			

N: Master

ANIMAL COMMUNICATION AND PARASITISM

Philippe Christe

C	Opt	English	14
A	1.50		

N: Master

P: None

O: Across the animal kingdom, individuals of the same species differ in their propensity to take risks, and explore new environments, and to be active, aggressive or sociable. Individual differences in behaviour that are consistent through time and across contexts are coined 'personalities', 'behavioural syndromes' or 'temperaments'. The terminology of personality is not a mere fashionable label of something usually studied by behavioural ecologists, but useful to conceptualize the common phenomenon that individuals differ markedly and consistently in their behavioural phenotypes across ecological and social contexts. The notion of personality implies that suites of behaviours are correlated within individuals and hence individuals are less flexible than would be expected under optimality models. In this course, I propose to study personality from an evolutionary point of view and also the evolution of language.

C: This lecture is interactive and illustrated by recent research articles.
7h will be given by A. Roulin and 7h by P. Christe

B: Réale, D., Reader, S.M., Sol, D., McDougall, P.T. & Dingemanse, N.J. (2007). Integrating animal temperament within ecology and evolution. Biol. Rev., 82, 291-318.
Sih, A., Bell, A.M., Johnson, J.C. & Ziemba, R.E. (2004). Behavioral syndromes: an integrative overview. Q. Rev. Biol., 79, 241-277.
Journaux scientifiques figurant à la bibliothèque du Biophore ou sur internet (http://perunil.unil.ch/perunil/periodiques/).

I: Aucune

PHYLOGEOGRAPHY

Luca Fumagalli

C	Opt	English	7
A	1.50		

E	Opt	English	10
A			

N: Master

O: 1) Course
Study of the historical processes (population expansions, bottlenecks, vicariance and migration) responsible for the current geographic distribution of genealogical lineages.
2) TPs
Analysis and interpretation of phylogeographic data with the help of several softwares.

C: 1) Phylogeography: definition and historical backgrounds
2) Animal and plant molecular markers
3) Distribution area
4) Gene tree/species tree
5) Molecular clocks
6) Coalescence
7) Mismatch distribution
8) Phylogenetic trees and networks
9) Phylogeographic patterns
10) Comparative phylogeography
11) Phylogeography and conservation
12) Phylogeography and genomics.

B: Avise JC. 2000. Phylogeography. Harvard University Press.

POPULATION GENETICS AND DYNAMICS

Jérôme Goudet

C	Obl/Opt	English	7
A	1.50		

E	Obl/Opt	English	10
A			

N: Master

P: A good grasp of the principles of population genetics and population dynamics (i.e. at least an introductory course in both)

O: Gain an understanding of how genetics and genomics interact with demographic and selective processes.
website:
http://www2.unil.ch/popgen/teaching/PGD18

C: In the first part of the course, selected papers from the recent literature are presented by students and discussed in a journal club format.
In the second part, in groups of 2-3 students you will use computer simulations and the quantiNemo program to investigate questions such as:
-efficacy of selection in the face of gene flow?
-effect of the number of loci encoding a trait on the speed of adaptation
-is neutral diversity a good proxy for adaptive diversity?

I: http://www2.unil.ch/popgen/teaching/PGD18/

THE MAJOR TRANSITIONS IN EVOLUTION

Laurent Keller

C	Opt	English	14
A	1.50		

N: Master

P: none

O: Understand how life has become increasingly more complex during the course of evolution on earth

C: We will addres the major transitions of life, including the evolution of multicelularity, evolution of sex and emergence of animal societies and language in humans

B: La bibliographie sera déterminée lors du cours

FIRST STEP PROJECT

Richard Benton, Marie-Christine Broillet, Jérôme Goudet, Antoine Guisan, Laurent Lehmann, Marc Robinson-Rechavi

TP	Obl	English	224
A	15.00		

TP	Obl	English	282
A	15.00		

TP	Obl	English	250
A	14.00		

TP	Obl	English	224
A	15.00		

TP	Obl	English	224
A	15.00		

TP	Obl	English	224
A	15.00		

N: Master

P: Practicals performed during the bachelor (molecular biology, genetics, biochemistry, bioinformatics)

O: - An initiation to the work of a scientist
- Conduct experimental work in research lab (wet bench or in silico)
- Interpretation of research results
- Implement basic principles in experimental design (e.g. include the appropriate controls, statistical significance of the results etc...)
- Present your experimental work in a written report which will be organized like a typical research article (intruduction, results, discussion, materials and methods)
- present your work orally (seminar style)

C: Perform laboratory work for about 12 weeks during the time when the student does not follow theoretical classes. This research project will typically be performed under the guidance of a PhD student or a post-doc from the host laboratory.

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Spring Semester (semester 2)

MODULE 3

Courses / Enseignement	Hours per semester C	E/S	PW	Teaching Staff	ECTS Credits	Limited nb of students
Compulsory interdisciplinary subjects ***Sujets interdisciplinaires obligatoires***						
Behaviour, Economics and Evolution Lecture Series *Séminaires BEE*	10	10	50	**Lehmann L.**, Santos-Pinto L.	6	
Environmental Economics *Economie environnementale*	28	-	-	**Di Falco S.**	3	
Social Evolution : from Genes to Culture *Evolution sociale : des gènes à la culture*	28	-	-	**Lehmann L.**	3	
Subtotal	56	10	50		**12**	
Disciplinary optional subjects ***Sujets disciplinaires optionnels***						
Advanced Quantitative Genetics *Génétique quantitative avancée*	10	7	-	**Robinson M.**	1,5	
Applied Ecology *Ecologie appliquée*	14	-	28	**Pellet J.**	3	
Biological Invasions *Invasions biologiques*	14	-	-	**Alexander J., Guisan A.**	1,5	
Co-evolution, Mutualism, Parasitism *Co-évolution, mutualisme, parasitisme*	14	-	-	**Sanders I.**	1,5	
Current Problems in Conservation Biology *Problèmes actuels en biologie de la conservation*	14	14	-	**Wedekind C.**	3	10
Ecology of the Fishes of Switzerland *Ecologie des poissons de Suisse*	7	-	10	**Rubin J.-F.**	1,5	
Evolution of Genome Architecture *Evolution de l'architecture du génome*	7	7	-	**Arguello R.**	1,5	
Evolutionary Consequences of Hybridization and whole Genome Duplication *Conséquences évolutives de l'hybridation et de la duplication de génome*	14	-	-	**Arrigo N.**	1,5	
Honeybee Ecology, Evolution and Conservation *Ecologie des abeilles, évolution et conservation*	14	-	-	**Dietemann V.**	1,5	
Integrated course Mountain Ecosystems - Ecology & Evolution *Cours intégré écosystèmes de montagne - écologie et évolution*	14	-	-	**Guisan A.**	1,5	
Integrated course Mountain Ecosystems - Geo-Environmental Sciences *Cours intégré écosystèmes de montagne - sciences géo-environnementales*	14	-	-	**Guisan A.**	1,5	
Introduction to Primate Behaviour, Cognition and Culture *Introduction au comportement, à la cognition et à la culture des primates*	10	6	-	**Van de Waal E.**	1,5	
Phylogeny and Comparative Methods *Phylogénie et méthodes comparatives*	7	14	-	**Salamin N.**	1,5	
Plant Population Genetics and Conservation *Génétique des populations végétales et biologie de la conservation*	7	-	10	**Felber F.**	1,5	
Plant Range Dynamics and Global Change *Dynamique des distributions géographiques de plantes et changements globaux*	7	-	10	**Randin C.**	1,5	
Predictive Models of Species' Distribution *Modèles de distribution d'espèces et de la biodiversité*	14	14	-	**Guisan A.**	3	
Scientific Mediation and Communication - Scientific Hands-on Workshop Module (in French only) *Communication et médiation scientifique - module atelier scientifique*	8	-	20	**Kaufmann A., Reymond P.,** Ducoulombier D., Trouilloud S.	3	8
Scientific Mediation and Communication - Museum Module *Communication et médiation scientifique - module musée*	6	-	22	**Sartori M.,** Glaizot O.	3	6
Social Genetics *Génétique sociale*	2	12	-	**Keller L.,** Kay T.	1,5	
Optional Field Courses (Financial participation by the student required) ***Etudes de terrain optionnel***						
Biological Conservation of the Mediterranean Region *Biologie de la conservation dans les régions méditerranéennes*	-	-	40	**Roulin A., Christe P., Fumagalli L.**	2	
Ecology and Faunistics of the Sea Shore, Roscoff *Ecologie et faunistique du bord de mer, Roscoff*	7	-	49	**Schwander T.**	3	20
Evolution and Biogeography of Semi-arid and Island Floras *Evolution et biogéographie des flores insulaires en zone semi-aride*	-	-	40	**Pannell J.**	2	
Integrated Practical Work Mountain Ecosystems in the Alps (*) *Travaux pratiques intégrés écosystèmes de montagne dans les Alpes*	-	-	44	**Guisan A.**	2	

* To follow Integrated Practical Work Mountain Ecosystems in the Alps : do the two courses Integrated course Mountain Ecosystems

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MODULE 3

Courses / Enseignement	Hours per semester C	E/S	PW	Teaching Staff	ECTS Credits	Limited nb of students
Cross disciplinary optional subjects ***Sujets optionnels cross disciplinaires***						
Leadership Development *Le développement du leadership*	28	-	-	**Bendahan S.**	3	
Data-Driven Business *Business piloté par les données*	56	-	-	**Marewski J.**	6	
Neuro Economie (in french) *Neuro économie*	56	-	-	**Villa A.**	6	
Organizational Behavior (in french) *Comportement organisationnel*	28	-	-	**Antonakis J., Bastardoz N., Dietz J.**	3	
Political and Institutional Economics *Economie politique et institutionnelle*	56	-	-	**Girsberger E., Saia A.**	6	
Behavioral Economics (autumn) *Comportement économique*	56	-	-	**Santos-Pinto L.-P.**	6	
Development Economics (autumn) *Economie de développement*	56	-	-	**Esposito E.**	6	
General Approach to Management (in french - autumn) *Approche générale du management*	28	-	-	**Palazzo G., Castaner X.**	3	
Heuristic Decision Making Strategy (autumn) *Stratégie heuristique de prise de décision*	56	-	-	**Marewski J.**	6	
Managerial Decision Making (autumn) *Prise de décision managériale*	56	-	-	**Hoffrage U.**	6	
Organizational Theory and Decision Making (autumn) *Théorie et prise de décision organisationnelle*	56	-	-	**Zehnder C.**	6	
Total					**30**	

MODULE 4

Course / Enseignement		ECTS Credits
Master Thesis BEE *Travail de Master BEE*	Thesis Director *Directeur du travail de Master*	30

BEHAVIOUR, ECONOMICS AND EVOLUTION LECTURE SERIES

Laurent Lehmann

C	Obl	English	10
S	6.00		
S	Obl	English	10
S			
TP	Obl	English	50
S			

N: Master

ENVIRONMENTAL ECONOMICS

Salvatore Di Falco

C	Obl		2	English
S	3.00			

N: Master

O: The syllabus is currently in update, please come back later.

SOCIAL EVOLUTION : FROM GENES TO CULTURE

Laurent Lehmann

C	Obl/Opt		English	28
S	3.00			

N: Master

O: What makes us such a unique species, able to cooperate in large-scale societies, organize social interactions, and dominate ecologically the Earth? The main goal of this course is to provide the foundations of social evolution, which consists of two main ingredients in humans: cooperation and cumulative cultural evolution. On one side, the course will thus focus on studying the main forces favoring and maintaining cooperation (mutually beneficial interactions, altruism) and conflict (cheating, malevolence, warfare) in group-structured populations. On the other side, we will study the forces behind cultural evolution, where behavior in interactions depends on genetic determinants, social learning, and individual learning ("gene-culture coevolution"). This will allow discussing the major steps in human social organization evolution, from primate autarky to division of labor in large-scale societies.

C: The course will be composed of five main parts and more focused on human behavior than the "Ecology and Evolution" class on which it builds:
(1) Cooperation and conflict in well-mixed populations. Here, we will study the evolution of cooperation (and cheating) in well-mixed population (no division into groups). We will study the standard one-shot social dilemmas illustrating the tension between self-interest and group-interest, like the prisoner's dilemma and the stag-hunt game. We will then investigate various settings of repeated interactions, where reputation dynamics between individuals are crucial to sustain long-term relationships.
(2) Cooperation and conflict in group-structured population. Here, we will study the forces shaping cooperation when interactions occur in group-structured populations (the rule in humans), and where the localization of the social interactions generates in the same time novel incentives to cooperate and novel incentives for spiteful behavior. We will also consider conflicts between groups and study warfare in small-scale hunter-gather societies.
(3) Social learning and gene-culture coevolutionary theory. Here, we will study the main modes of social learning ("cultural transmission"), which underlies cumulative cultural evolution that is the main determinant of the human lineage ecological success. We will also study gene-culture coevolution and how social learning impacts the dynamics of cooperation within groups.
(4) Individual learning and preferences. Here, we will discuss the main modes of individual learning that allow individuals to learn information about the relevant behavior to express on their own (e.g., trial-and error learning and related decision heuristics, maximizing behavior). We will investigate the conditions under which evolution may and may not lead individuals to become equipped with goal functions ("utility maximization behavior").
(5) Major transition from small to large-scale societies. Here, we will discuss the main evolutionary steps that took the human lineage in a 6 million year long co-evolutionary gene-culture ride from self reliant primate social organizations ("autarky") to large scale societies with extreme division of labor ("catallaxy"). This transition involved a zizag path from dominance, to egalitarianism, to inequality again.

ADVANCED QUANTITATIVE GENETICS

Matthew Robinson

C	Opt	English	10
S	1.50		

E	Opt	English	7
S			

N: Master

APPLIED ECOLOGY

Jérôme Pellet

C	Opt	English	14
S	3.00		

TP	Opt	English	28
S			

N: Master

P: BSc level in biology, including ecology

O: Applied ecology is a young crisis discipline undergoing a major effectiveness revolution. In most situations, urgent action is necessary, even in the absence of reliable information. How do we gather sound ecological information? How do we use it to plan natural communities conservation? In the process of answering these questions, wildlife ecologists often realize that research and practice are just two sides of the same coin.

C: The goal of the course is to teach students some of the skills they will need as evidence-based conservationists. Practical examples will be drawn from various ecosystems, communities and species. The course will revolve around the stages of adaptive management:
monitoring ecological resources, monitoring occupancy and abundance
research syntheses (systematic reviews and meta-analyses)
ecological triage (systematic conservation planning and red lists)
natural communities conservation planning and legislative context.
Field-based case studies will provide students an opportunity to apply and discuss some of the principles illustrated in the course. Practical work will include meeting with practitioners, discussing and analyzing their approach and methods through the prism of adaptive management.
« There is no such thing as a special category of science called applied science; there is science and its applications, which are related to one another as the fruit is related to the tree that has borne it. » Louis Pasteur

BIOLOGICAL INVASIONS

Jake Alexander, Antoine Guisan

C	Opt	English	14
S	1.50		

N: Master

O: 1. Explain core theory and concepts underlying the spread and impacts of non-native species.
2. Give key insights emerging from invasions as natural experiments in ecology and evolution.
3. Design an empirical study using non-native species as a model system.

C: Biological invasions are considered one of the most important global threats to biodiversity. Understanding the processes shaping the success of species outside of their native ranges is therefore a major goal of conservation research. However, the spread of invasive species can also be seen as natural experiments on a grand scale, giving important insights into the regulation and functioning of populations, communities and ecosystems. In this course, we elucidate the main hypotheses explaining the success and spread of invasive species, whilst emphasising the insights that biological invasions have given us into basic ecological and evolutionary processes.

B: See English pages of the course

CO-EVOLUTION, MUTUALISM AND PARASITISM

Ian Sanders

C	Opt	English	14
S	1.50		

N: Master

P: Must understand english and be prepared to give presentations

O: To understand the evolutionary consequences of organisms living together in mutualism or parasitism and how to investigate it experimentally

C: The course comprises some introductory talks given by me about concepts in co-evolution and theoretical frameworks for studying co-evolution. Afterwards, students give presentations on chosen key publications in this field and the group discusses these subjects after the presentations.

B: : All bibliography is made availble in pdf format before the course begins. For an example of the publications discussed you can find last years publications in my docunil public folder.

CURRENT PROBLEMS IN CONSERVATION BIOLOGY

Claus Wedekind

C	Opt	English	14
S	3.00		

E	Opt	English	14
S			

N: Master

P: Lectures, discussions, and proposal writing in English.

O: Introduction into
- some important problems of conservation biology
- funding opportunities for conservation projects
- the planning, writing, and reviewing of grant proposals in the context of the course

Own ideas shall be developed, presented and discussed in class.

C: Some current research topics within the field of conservation biology will be further introduced in lectures, guest lectures, and discussion in class. Each student then develops an own idea of a research project within these topics. After an introduction into funding agencies and the planning and writing of grant proposals, each student (or groups of two) write(s) up an own proposal and present(s) it to the class. The proposals of colleagues will then be peer-reviewed after an introduction into peer-reviewing of grant proposals.

ECOLOGY OF THE FISHES OF SWITZERLAND

Jean-François Rubin

C	Opt	English	7
S	1.50		

TP	Opt	English	10
S			

N: Master

P: none

O: Recognize the different habitats and species
Know the biology of the principal species
Identify the problems linked to the management of these habitats and species

C: Generalities on water
Lakes
Watercourses
Plankton and plants
Systematic of fish
Anatomy of fish
The fish of Switzerland

EVOLUTION OF GENOME ARCHITECTURE

Roman Arguello

C	Opt	English	7
S	1.50		

E	Opt	English	7
S			

N: Master

P: Evolutionary biology, some statistics that involve probabilistic reasoning, basic molecular biology

O: - To investigate several of the outstanding topics in genome/molecular evolution
- To develop familiarity with several of the current debates within the field
- To develop familiarity with quantitative/computation approaches to addressing questions within the field

C: Primary literature (reviews and reports), simulation software, computational approaches

EVOLUTIONARY CONSEQUENCES OF HYBRIDIZATION AND WHOLE GENOME DUPLICATION

Nils Arrigo

C	Opt	English	14
S	1.50		

N: Master

HONEYBEE ECOLOGY, EVOLUTION AND CONSERVATION

Vincent Dietemann

C	Opt	English	14
S	1.50		

N: Master

O: This series of lectures will show the complexity of insect societies, taking the honey bee as an example. It will give the opportunity to see how concepts learned elsewhere by the students can be placed within the context of a single species.

C: Since honeybees are economically important insects, they have been studied early in history and the knowledge we possess about them is greater than for any other social insect species. Our understanding of the honeybee reveals the complex organisation reached by insects when they form societies. This series of lectures will present some aspects of this complexity that will be replaced within its evolutionary context. Various aspects of honeybee ecology and evolution, including geophylogeny, biology, reproduction at individual and colony level, division of labour, communication, economical value, pathogens will be presented.
After a general introduction of this model species describing the diversity and biogeography of the taxon, we will dissect the communication abilities of European honeybees and compare it with related Asian species. We will see how this communication is used to organise foraging tasks sustaining colony growth. Honeybee health is a current concern and we will review the pathogens affecting them and comment the role of humans in their spread and control in an evolutionary context. Since honeybees are globally threatened, we will see what economical losses their decline could have and some conservation projects to invert the trend will be put in context.

B: Seeley T, 1985. Honeybee Ecology. Princeton University Press.
Seeley T, 1995. The wisdom of the hive. Harvard University Press.
Moritz RFA, Southwick EE, 1992. Bees are superorganisms. Spiringer Verlag
Oldroyd B, Wongsiri S, 2006. Asian Honey Bees. Harvard University Press.
Koeniger N, Koeniger G, Tingek S, 2010.Honey Bees of Borneo. Natural History Publications
Winston ML, 1987. The Biology of the honey bee. Harvard University press.

INTEGRATED COURSE MOUNTAIN ECOSYSTEMS - ECOLOGY & EVOLUTION

Antoine Guisan

C	Obl/Opt		English	14
S	1.50			

N: Master

INTEGRATED COURSE MOUNTAIN ECOSYSTEMS - GEO-ENVIRONMENTAL SCIENCES

Antoine Guisan

C	Obl/Opt	English	14
S	1.50		

N: Master

INTRODUCTION TO PRIMATE BEHAVIOUR, COGNITION AND CULTURE

Erica Van de Waal

C	Opt	English	10
S	1.50		

S	Opt	English	6
S			

N: Master

O: The first goal of this course is to give a general introduction into primate behaviour, with a special focus on primate cognition and culture. The topic will be developed in a comparative framework, with references to behaviours found in other animals as well as well highlighting behaviours shared between human and non-human primates and the ones unique to humans. This first part will give the general background to understand the articles that will be discussed in the seminar sessions. During the seminar, students will select articles to read and discuss together. This part aims at developing the critical thinking of students and the exchange between the students using concrete examples of research with conflicting findings. The course will train students to summarize, explain and discuss a paper during the final presentation in front of the class, as well as to develop ideas about potential future directions of the research on a specific topic.

C: This course will be composed of three main parts followed by seminar sessions.
1) Primate Behaviour. Here we will study briefly the bases of animal behaviour followed by a presentation of the diversity in the taxa Primates. Then we will study the specificities of Primate behaviour. We will investigates the topics of social structure, reproduction and life history. Later we will focus more on social relationships with lectures on competition and conflict management, communication and cooperation. All these topics will be discussed with a comparative approach to other animals and humans.
2) Primate Cognition. Here we will study the cognitive abilities of primates. We will investigate briefly the specificities of primate physical cognition and we will develop more on their social cognition. On this topic, we will study the abilities of primates to understand others' minds (theory of mind) and to exhibit strategic social behaviours like deception.
3) Primate Culture: Here we will study social learning mechanisms and strategies. We will investigate cases of conformity, traditions and culture in primates. This subject will highlight the specificities of human cultural behaviour as well as the shared roots with primates and other animals.
During the seminar, students will choose a scientific article to read (alone or in groups depending on the number of students following the course). The papers will be discuss in the class. At the end of the seminar, all the students will present the main finding of their paper and potential future directions of research on the topic.

B: van Schaik, C. P. (2016). The primate origins of human nature (Vol. 2). John Wiley & Sons.
Clutton-Brock, T. (2016). Mammal societies. John Wiley & Sons.
Boyd, R., & Silk, J. B. (2014). How humans evolved. WW Norton & Company.

PHYLOGENY AND COMPARATIVE METHODS

Nicolas Salamin

C	Opt	English	7
S	1.50		

E	Opt	English	14
S			

N: Master

P: none

O: Phylogenetic reconstruction methods and their application in evolutionary biology. To know and understand phylogenetic reconstruction methods in order to test the processes leading to genes and organisms evolution.

C: The subjects will be presented during lectures as well as practicals.
I. Reconstruction methods
- What is a phylogenetic tree and how to interpret it?
- Tree reconstruction:
a) optimisation criteria and models of evolution
b) search for the optimum tree
c) Bayesian methods
- Can we trust the inferred tree?
II. Uses for phylogenetic trees
- Detecting positive selection in a coding gene
- Testing coevolution and cospeciation
- Macroevolution:
a) dating evolutionary events
b) tempo and mode of evolution
c) testing for key innovations
- Phylogeny and conservation

B: Felsenstein, J. 2003. Inferring phylogenies. Sinauer Associates.
Page, R. 2003. Tangled trees: Phylogeny, cospeciation, and coevolution. University of Chicago Press.
Purvis, A., Gittleman, J.L. and Brooks, T. 2005. Phylogeny and conservation. Cambridge University Press.
Swofford, D.L., Olsen, G.K., Waddell, P.J. and Hillis, D.M. 1996. Phylogeny reconstruction. Pages 407-514 In Molecular Systematics (D.M. Hillis, C. Moritz, B.K. Mable, eds.). Sinauer Associates.
Yang, Z.H. 2006. Computational Molecular Evolution. Oxford University Press.

I: http://www.unil.ch/phylo/teaching/pmc.html

PLANT POPULATION GENETICS AND CONSERVATION

François Felber

C	Opt	English	7
S	1.50		

TP	Opt	English	10
S			

N: Master

PLANT RANGE DYNAMICS AND GLOBAL CHANGE

Christophe Randin

C	Opt	English	7
S	1.50		

TP	Opt	English	10
S			

N: Master

PREDICTIVE MODELS OF SPECIES' DISTRIBUTION

Antoine Guisan

C	Opt	English	14
S	3.00		

E	Opt	English	14
S			

N: Master

P: If possible, course 'Spatial Analyses & GIS' (ANSPAT) in 1st semester of the Master (not strictly required).

O: Species distribution models (SDMs) are increasingly important in ecology and conservation biology. This course proposes an introduction to these models and related concepts and methods. Overview of the main steps of model building. Advantages and limitations. Applications to various domains (climate change, invasions, rare species, ...).

C: Chap. 1. Introduction to species' niche & distributions, and related models. Theory and principles behind these models. Competition and disperal limitations. Types of response variables, main predictive modelling approaches, field sampling design, from predicting species distributions to predicting communities.
Chap. 2. Model calibration. Presence-only versus presence-absence data, statistical theory and methods for presence-only data, regressions and classifications for presence-absence, ensemble modelling and forecasting.
Chap. 3. Model evaluation. Internal versus external evaluation. Data and metrics for evaluation. Crossvalidation, jackknife, bootstrap, uncertainties.
Chap. 4. Assumptions behind these models. Pseudo-equilibrium, niche conservatism, niche completeness, realized niche, and other postulates.

B: Guisan, A. & Zimmermann, N.E. (2000). Predictive habitat distribution models in ecology. Ecological Modelling 135(2-3): 147-186.
Guisan A, Thuiller W (2005) Predicting species distribution: offering more than simple habitat models. Ecology Letters, 8, 993-1009.
Guisan et al. (2013) Predicting species distributions for conservation decisions. Ecology Letters 16: 1424-1435.

I: http://www.unil.ch/ecospat

SCIENTIFIC MEDIATION AND COMMUNICATION - SCIENTIFIC HANDS-ON WORKSHOP MODULE

Alain Kaufmann, Philippe Reymond

C	Opt	French	8
S	3.00		

TP	Opt	French	20
S			

N: Master

SCIENTIFIC MEDIATION AND COMMUNICATION - MUSEUM MODULE

Michel Sartori

C	Opt	English	6
S	3.00		

TP	Opt	English	22
S			

N: Master

P: None

O: This is a theoretical and practical course which will teach you how to write a text for an exhibition (scientific popularization). From original articles and textbooks to the exhibition content, several steps are required to make the exhibition attractive and accessible to a large audience. During this course, you will learn the basics of exhibition building, from content development to the elaboration of a mediation concept and a communication strategy.

C: After a 6 period's theoretical introduction, you will develop a personal project. No specific themes this year ; we will propose some ideas to be developed during the first lecture hours. You may also have the opportunity to propose your own subject of peculiar interest for you.

SOCIAL GENETICS

Laurent Keller

C	Opt	English	2
S	1.50		

E	Opt	English	12
S			

N: Master

BIOLOGICAL CONSERVATION OF THE MEDITERRANEAN REGION

Alexandre Roulin

T	Opt	English, French	40
A S	2.00		

N: Master

P: Financial participation required by the student.

O: Faunistic knowledge on birds, insects, crustaceans, mammals and reptiles with an emphasis on conservation issues. We will visit several places (Extermadura, Andalucia around the Doñana national parc, Tarifa and Brazo del Este) where the fauna is fundamentally different and habitats have suffered from human activities to different degrees.

C: Excursions and group field work. Discussion of scientific articles about conservation issues of Spanish endangered species. Additionnally, each student shall be responsible for the study of one endangered species. Discussion of projects that could be carried out in Spain to answer questions on evolutionary biology, behavioural ecology and conservation.

B: Polycopié distributé aux participants

ECOLOGY AND FAUNISTICS OF THE SEA SHORE, ROSCOFF

Tanja Schwander

T	Opt	English, French	49
S	3.00		

C	Opt	English, French	7
S	3.00		

N: Master

P: Financial participation required by the student.
!!! Please, contact the person in charge before your inscription !!!

O: To allow a first, integrated approach of the itertidal biotope, and to understand the role played by the tides, the substrate and other conditions on the faunistic composition of littoral communities and on the physical and behavioural adaptations of the species.

C: Lecture (6 h): Introduction to intertidal ecology.
Excursions and group field work: analysis of zonation and biodiversity in various habitats (sand beach, rock, estuaries and so on). Additionnally, each student shall be responsible for the study of one taxonomic group.
Lab experimentations: experimental design and realisation of an experiment in etho-ecology illustrating adaptative behaviour of an intertidal species.

EVOLUTION AND BIOGEOGRAPHY OF SEMI-ARID AND ISLAND FLORAS

John Pannell

T	Opt	French	40
S	2.00		

N: Master

P: Financial participation required by the student.

INTEGRATED PRACTICAL WORK MOUNTAIN ECOSYSTEMS IN THE ALPS

Antoine Guisan

T	Obl/Opt	English	44
S	2.00		

N: Master

P: Bachelor in environmental and/or biological sciences.

O: To offer an interdisciplinary vision of mountain environments and elevation gradients through the lens of different questions in ecology and evolution.

C: Two fields retreats of 2-days and 3-days, with courses and practical works and exercises, with 14C of lectures by different teachers in-between. Content of the lectures:
1. Adaptations to marginal environments
2. Reproductive systems along elevation
3. Patterns of micro-organisms along elevation
4. Biological invasions in mountains
5. Impact of climate change on mountain species and communities - field observations and experiments
6. Impact of climate change on mountain species and communities - spatial modelling
7. Human-wild fauna conflicts in mountain regions

B: See English pages of the course

I: See English pages of the course

LEADERSHIP DEVELOPMENT

Samuel Bendahan

C	Opt	2	English
S	3.00		

N: Master

B: Required text: Day, D. V., & Antonakis, J. (Eds.). (2012). The Nature of Leadership (2nd ed.). Thousand Oaks, CA: Sage Publications.

Articles (available for download on the course website in Moodle).

DATA-DRIVEN BUSINESS

Julian Marewski

C	Opt	4	English
S	6.00		

N: Master

P: Des connaissances préalables en statistiques descriptives de base (p. ex. moyens de calcul, écarts-types, etc.) sont utiles, mais non nécessaires. Une connaissance préalable de l'utilisation de Microsoft Excel est utile, mais n'est pas nécessaire. Aucune connaissance préalable de Matlab, R ou d'autres logiciels n'est requise.

O: Dans les sociétés digitalisées, les opportunités d’affaires orientées sur les données abondent. Pourtant, pour reconnaître et exploiter ces opportunités, il faut non seulement de la technologie, mais aussi une réflexion statistique et une compréhension des principes scientifiques, comme l'expérimentation. Par ailleurs, en plus de reconnaître et d'exploiter les opportunités commerciales basées sur les données, les gestionnaires doivent être conscients des risques et des pièges éthiques auxquels les activités basées sur les données peuvent se heurter. Par exemple, des algorithmes mal conçus peuvent non seulement faire passer à côté d'opportunités commerciales, mais aussi menacer l'existence même de l'entreprise et/ou créer de graves problèmes éthiques qui pourraient même prendre une ampleur sociétale. Enfin, qu'il s'agisse de la gestion des risques et de l'éthique des données ou de la stratégie, des relations publiques, de l'établissement de rapports et de la direction interne : les dirigeants doivent également être capables de communiquer clairement sur les données sur lesquelles repose leur entreprise.

Ce cours offre une introduction au monde des entreprises axées sur les données (data driven). Plus précisément, le cours initiera les participants (i) aux techniques quantitatives de base essentielles aux entreprises fondées sur les données, aux principes fondamentaux de (ii) la réflexion statistique et (iii) de l'expérimentation, et les invitera à réfléchir (iv) aux risques et aux problèmes éthiques auxquels les entreprises fondées sur les données peuvent être confrontées, ainsi qu'aux stratégies d’atténuation du risque. Enfin, en introduisant les techniques quantitatives de base, les participants feront un premier pas vers l'apprentissage (v) de la communication transparente et adéquate des analyses de données, qu'il s'agisse d'un PDG, d'un régulateur, d'un client ou d'autres parties prenantes.

Pour aider les participants à développer des compétences techniques et analytiques orientée sur la pratique, le cours s'appuie sur des cas réels du monde des affaires, incluant des bases de données, donnant ainsi un aperçu du fonctionnement de la Business Intelligence (BI). Ce cours est axé sur le monde réel et appliqué ; il est entièrement basé sur des cas et l'enseignement est similaire à celui des cours de EMBA (Executive Education). Ce faisant, ce cours est une introduction ; des connaissances préalables en analyse de données, en gestion des risques et en éthique des données ne sont pas nécessaire.

C: **Calendrier et exigences**

Aperçu du calendrier (provisoire) :

Les participants récapituleront d'abord les éléments de base de la boîte à outils d'analyse de données (p. ex., les méthodes statistiques de base) et, ce faisant, se concentreront sur la façon de communiquer au sujet des données. Ils exploreront ensuite plus en détail certains contenus avancés de la boîte à outils d'analyse des données, y compris les méthodes et les notions de domaines apparentés. Un accent particulier sera mis sur la construction et le test de classificateurs robustes. La construction de modèles personnalisés sera encouragée. Tout au long du cours, la réflexion statistique et la réflexion sur les méthodes scientifiques telles que l'expérimentation seront stimulées. De même, tout au long du cours, les risques et les problèmes éthiques que peuvent rencontrer les entreprises fondées sur des données ainsi que les stratégies de mitigation seront explorés. Les participants commenceront à développer un projet d'éthique des données vers le milieu du cours et finaliseront ce projet à la fin du cours en rédigeant un essai (devoir individuel ; voir ci-dessous). Cet essai leur permettra de mettre en pratique de manière créative les connaissances et les compétences acquises.

Méthode d'enseignement :

Comme mentionné ci-dessus, les sessions du cours sont basées sur de véritables business cases qui montrent comment les techniques et compétences couvertes peuvent être utilisées pour résoudre des problèmes dans la pratique (par exemple, prédire les meilleurs clients futurs, construire des classificateurs éthiquement défendables, etc.). En utilisant la méthode des études de cas, l'idée est que les participants acquièrent des connaissances par la pratique

Préparation et conditions de participation:

Les participants doivent contribuer oralement à la discussion en classe. Ils sont également tenus de faire des présentations de groupe.

Les participants sont tenus d'essayer de résoudre chaque étude de cas assignée avant la séance au cours de laquelle le cas correspondant sera couverte. Cette préparation pré-session est essentielle pour participer oralement à la discussion, suivre le contenu du cours et acquérir des compétences et des connaissances utilisables. Les participants sont également tenus de revenir sur les cas après chaque séance afin de récapituler la solution de cas élaborée au cours de la séance. Il est important de revenir au cas après chaque séance, car tous les cas s'appuient les uns sur les autres, et le fait de ne pas comprendre un cas précédent rendra difficile la résolution des cas suivants et le suivi du cours.

Pour aider les participants à préparer les cas, on leur demande de lire des articles et des chapitres de livres.

Afin de faciliter davantage le processus d'apprentissage et de compenser les niveaux potentiellement différents de connaissances techniques préalables, il sera possible de travailler en équipe pour préparer les séances.

B: *Required software:*

During the sessions, participants will solve real-world business problems. To each session, participants will have to bring their own laptop. On that laptop, Microsoft Excel should be installed. Access to further statistical software packages (e.g., Matlab, R) is useful, but not necessary.

Required business cases:

Solving business cases is required. References to these business cases and the associated data files will be given during the course.

Required book / chapters:

To stimulate reflection and discussion about data ethics, during the course participants are required to read chapters from the book “Weapons of math destruction: How big data increases inequality and threatens democracy”, by Cathy O’Neil.

Required journal articles:

Compulsory readings for this course are a few selected journal articles and/or book chapters. References to those articles will be given during the sessions.

I: http://hec.unil.ch/docs/index.php/jmarewski/cours/359/

NEURO ECONOMIE

Alessandro Villa

C	Opt	4	French
S	6.00		

N: Master

P: None

O: This course is for students who wish to acquire the principles of management of constraints and decision making from a perspective based on recent discoveries in neuroscience, cognitive science, biology and ecology.
The goal is to provide practical benchmarks to various stakeholders of the economy on resource management, information and waste in a neuroeconomics approach.

C: Contemporary society, as each individual, is set to change in a world with limited resources. The choices and decisions we are taking must necessarily consider the constraints imposed on producers and consumers through access to resources and their management. These same principles are found in brain function and behavior by one of its most characteristic behavior: decision-making with respect to whether investment, purchasing, risk taking, consumption are affordable. Where begins and ends the freedom of choice we make?
This course analyzes the information processing by the brain and especially the structures and the brain mechanisms that underlie the cognitive, motor and emotional behavior. Much of the course is devoted to the illustration of examples and experiences of neuroscience and to the methodological approach. Several chapters deal with the organization, allocation and management of resources for development and evolution of living systems in general.
Student participation will be encouraged during the development of exercises and classroom interactions. A working group will be assigned to students who must submit a written report which will be evaluated with consideration for the note.

IMPORTANT: the priority is given to those students who take this course as mandatory. In order to provide an adequate support during the course, the number of students choosing this course as optional, mainly those enrolled in the Master in Management, is limited. The group work is based on a maximum number of 12 groups, that is approximately 36-40 students maximum, including the students enrolled in the Master of Law (MLaw) in Legal Issues, Crime and Security of Information Technologies.

The reference list is indicative and goes well beyond the strict content of the course but serves to deepen the subject matter.

B: 1. Sacha Gironde - **La neuroéconomie : Comment le cerveau gère mes intérêts** – Plon Editeur, 2008.

2. Mickaël Mangot - **Psychologie de l'investisseur et des marchés financiers** – Dunod, 2008

3. Jason Zweig - **Your Money and Your Brain: Become a Smarter, More Successful Investor, the Neuroscience Way** - Souvenir Press Ltd, 2007,2008. Egalement traduit en français

4. Daniel Richard, Didier Orsal – **Neurophysiologie: Organisation et fonctionnement du système nerveux** – 3e édition, Dunod collection Science Sup., 2007.

5. Bruce Alberts, Dennis Bray, Karen Hopkin, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter – **Essential Cell Biology** - 2nd Edition, London, GB / Garland Science, 2004.

6. D.H. Meadows, Jorgen Randers, Dennis L. Meadows - **The Limits to Growth: The 30-year Update** – White River Jct., VT / Chelsea Green Pub Co, 2004.

7. Gordon M. Shepherd - **The Synaptic Organization of the Brain** – 5th edition, Oxford University Press, USA, 2003.

8. P.W. Glimcher - **Decisions, Uncertainty, and the Brain: the Science of Neuroeconomics** – Cambridge: The MIT Press, 2003.

9. Lester, R. Brown – **Eco-économie : Une autre croissance est possible, écologique et durable** – Paris / Ed. Seuil, 2003.

10. Stan Weinstein – **Secrets pour gagner en bourse à la hausse et à la baisse** – Hendaye / Editions Valor, 1998.

11. P. Bak – **How nature works** – New York, NY. / Springer Verlag, 1996.

12. Joël de Rosnay – **L'homme symbiotique** – Collection Points (P357), Paris/Editions du Seuil, 1995.

13. Armand Petitjean, Dennis L Meadows, Club de Rome, Georg Richt – **Quelles limites?** – Paris / Ed. Seuil, 1974.

14. D.L. Meadows, W.W. Behrens, D.H. Meadows, R.F. Naill, J. Randers, E.K.O. Zahn - **Dynamics of Growth in a Finite World** – Cambridge, MA / Wright-Allen, 1974.

COMPORTEMENT ORGANISATIONNEL

John Antonakis, Nicolas Bastardoz, Jörg Dietz

C	Opt	2	French
S	3.00		

N: Master

O: The syllabus is currently in update, please come back later.

B: Les slides et ressources complémentaires seront mis sur Moodle.

Lecture recommandée: Stephen Robbins & Timothy Judge (Adapté par Véronique Tran) (2014). Comportements organisationnels (16e édition). Pearson Education: France.

I: http://moodle.unil.ch/course/view.php?id=8451

POLITICAL AND INSTITUTIONAL ECONOMICS

Marc Sangnier, Philippe Tzaud

C	Opt	4	English
S	6.00		

C		2	English
A			

N: Master

B: The main handbooks that serve as references of this course are given below. The exhaustive list of references is available from the Moodle page of this course.

- Persson, Torsten, and Guido Tabellini, 2002, "Political Economics: Explaining Economic Policy," MIT Press
- Acemoglu, Daron and James A. Robinson, 2006, "Economic Origins of Dictatorship and Democracy," Cambridge University Press
- Besley, Timothy, 2006, "Principled Agents? The Political Economy of Good Government," Oxford University Press
- Besley, Timothy, and Torsten Persson, 2011, "Pillars of Prosperity," Princeton University Press
- North, Douglass, 1990, "Institutions, Institutional Change and Economics Performance," Cambridge University Press

I: http://moodle.unil.ch/course/view.php?id=15085

BEHAVIORAL ECONOMICS

Luis Pedro Santos Pinto

C	Opt	4	English
A	6.00		

N: Master

B: Most of the lectures will follow papers. However, there are three textbooks in Behavioral Economics that cover several topics of the course:

*Dhami, Sanjit, *The Foundations of Behavioral Economic Analysis*, Oxford University Press, 2016.

Wilkinson, Matthias Klaes, *An Introduction to Behavioral Economics*, Palgrave MacMillan, 2012.

Angner, Erik, *A Course in Behavioral Economics*, Palgrave MacMillan, 2012.

*Spiegler, Ran, *Bounded Rationality and Industrial Organization*, Oxford University Press, 2011.

*Wakker, Peter P., *Prospect Theory for Risk and Ambiguity*, Cambridge University Press, 2010.

Ariely, Dan, *The Upside of Irrationality: The Unexpected Benefits of Defying Logic at Work and at Home*, Harper Collins, 2010.

Ariely, Dan, *Predictably Irrational: The Hidden Forces that Shape our Decisions*, Harper Collins, 2008.

*Camerer, Colin, George Lowenstein and Mathew Rabin. *Advances in Behavioral Economics*, Russel Sage Foundation and Princeton University Press, 2004.

*Camerer, Colin, *Behavioral Game Theory: Experiments in Strategic Interaction*, Russell Sage Foundation and Princeton University Press, 2003.

*Kahneman, Daniel and Amos Tversky. *Choices, Values and Frames*, New York: Russell Sage Foundation; Cambridge, U.K.; New York: Cambridge University Press, 2000.

Thaler, Richard H. *The Winner’s Curse: Paradoxes and Anomalies of Economic Life*, Princeton University Press, 1994.

Elster, Jon and George Loewenstein. *Choice over Time*, Russell Sage Foundation, 1992.

Thaler, Richard. *Quasi Rational Economics*, New York, N.Y.: Russell Sage Foundation, 1991.

Kahneman, Daniel, Paul Slovic, and Amos Tversky, eds., *Judgment under Uncertainty: Heuristics and Biases*, Cambridge University Press, 1982.

I: http://moodle2.unil.ch/course/view.php?id=1741

DEVELOPMENT ECONOMICS

Johannes Buggle, Elena Esposito

C	Opt	4	English
A	6.00		

N: Master

B: MAIN REFRENCE:

Banerjee, A. and E. Duflo (2011), Poor Economics; Philadephia, PA: Public Affairs.

Reading List - assigned at the start of the course.

OPTIONAL:

Ray, D. (1998), Development Economics, Princeton University Press.

I: http://moodle.unil.ch/course/view.php?id=9091

APPROCHE GÉNÉRALE DU MANAGEMENT

Xavier Castaner, Annamaria Conti, Guido Palazzo

C	Opt	2	French
A	3.00		

N: Master

O: This course introduces students to the management of different organizations (e.g.: private companies, public organizations, NGOs) and familiarizes them with different modes of management. Students shall also become sensitized to the broader social environment in which organizations operate. At the end of the course, students should have acquired a solid knowledge of the historical and social context in which today’s corporations are embedded, and be knowledgeable of various concepts which shall give a better understanding of management.

C: The course is divided in several parts. First, we will define the notion of “management” and show that it is necessary to develop an adequate understanding of the environment (at various levels) in order to successfully manage an organization in a today’s globalized society. Then, we will turn our attention to the means by which a company can create value for its shareholders, clients, and employees, through some of its key functions: strategy, marketing, and human resource management.

Session 1, 20.09: Introduction: The organization in its environment (GP)

Session 2, 27.09: Globalization and societal transformations (GP)

Session 3, 04.10: Continuation (GP)

Session 4, 11.10: Corporate Social Responsibility (CSR) (GP)

Session 5, 18.10: Management of men and women (AC)

Session 6, 25.10: Governance (XC)

Session 7, 01.11: Strategic management: business policy & competitive/business strategy (XC)

Session 8, 08.11: Deepening session

Session 9, 15.11: strategic management: corporate strategy (XC)

Session 10, 22.11: Innovation (I) (AC)

Session 11, 29.11: Innovation (II) (AC)

Session 12, 06.12: Organizational design (XC)

Session 13, 13.12: Introduction to marketing (AC)

Session 14, 20.12: Introduction to operational management (AC)

I: http://moodle.unil.ch/course/view.php?id=14280

HEURISTIC DECISION MAKING STRATEGIES

Julian Marewski

C	Opt		4	English
A	6.00			

N: Master

P: Ce cours ne comporte pas d'exigences spécifiques en termes de connaissances et de compétences préalables. En fait, le cours est ouvert à la fois aux étudiants qui ne sont pas familiarisés avec les sciences cognitives et les sciences de la décision, et aux étudiants ayant déjà été immergés dans ce type de recherches.

O: Comment les humains et les autres animaux prennent-ils des décisions ? Comment devraient-ils faire pour prendre de meilleures décisions ? Qu'il s'agisse de management, de médecine ou d'autres tâches, dans le monde réel, les informations disponibles sont souvent, par nature, incertaines. En outre, les décideurs sont généralement confrontés à des contraintes de traitement de l’information, telles que la mémoire limitée, la puissance de calcul ou le temps.

Les stratégies pour prendre des décisions intelligentes dans des conditions d’incertitude sont des heuristiques rapides et simples (fast and frugal heuristics). Ces règles empiriques simples ne nécessitent que des connaissances et des capacités de traitement de l’information limitées. Contre intuitivement, le recours à l'heuristique ne nécessite pas de compromis entre la précision et l'effort ou autre attribut : en exploitant la structure statistique des environnements décisionnels, l'heuristique peut être à la fois précise et simple.

Ce cours offre une vue d'ensemble de la recherche interdisciplinaire sur les stratégies de prise de décision heuristiques, associant la psychologie humaine, l'intelligence artificielle, le machin learning, le business, l'économie, la biologie et d'autres domaines.

En plus de couvrir la recherche sur la prise de décision interdisciplinaire, le cours est conçu pour initier les étudiants aux activités de recherche - qu'elles soient menées dans le monde universitaire ou dans une entreprise.

Plus particulièrement, le cours aide les étudiants de Master à se préparer à la rédaction de leur thèse de Master. En outre, le cours s'adresse spécifiquement aux étudiants de doctorat ainsi qu'aux étudiants susceptibles d'être intéressés par des études de doctorat et une carrière universitaire par la suite.

Enfin, le cours offre des opportunités d’apprentissage à toute personne intéressée par la mise en pratique de compétences telles que la présentation devant un groupe, la conduite d’une discussion, la recherche de littérature académique ou les compétences rédactionnelles.

C: Les étudiants se familiariseront à la recherche sur la prise de décision, et plus particulièrement avec le programme de recherche en heuristique frugale. Développées à l'origine dans les sciences cognitives et les sciences de la décision, les heuristiques rapides et frugales ont des applications dans de nombreux domaines, notamment les affaires, l'économie, la médecine, la criminalité, l'aviation, la psychologie sociale et le sport, pour n'en citer que quelques-uns. Ce cours familiarisera les étudiants avec les fondements théoriques et méthodologiques de la recherche en heuristique, introduira différents domaines d’application et permettra aux étudiants de se concentrer sur un domaine qui les intéresse plus particulièrement - conseil en stratégie, management, marketing, business intelligence, investissement financier, des aspects de la cognition humaine (p. ex. la mémoire) ou d’autres domaines.

Comme le programme de recherche en heuristique rapide et frugale brise les frontières disciplinaires classiques et utilise diverses méthodes scientifiques (par exemple, modélisation informatique, analyses mathématiques, études sur le terrain, expériences en laboratoire), le cours initiera les étudiants à différents courants de pensée et recherches scientifique. Par exemple, en plus de couvrir la prise de décision dans le domaine des affaires et de l’économie, nous pourrons aborder les aspects décisionnels du diagnostic médical, nous concentrer sur la mémoire déclarative humaine en tant que déterminant majeur des processus de prise de décision ou encore en apprendre davantage sur les environnements sociaux des chimpanzés. En termes de sujets méthodologiques, les étudiants seront initiés aux notions statistiques telles que « l’overfitting » et le dilemme biais-variance. Ils découvriront des modèles linéaires inadéquats « improper models » (ex : poids unitaire) et des stratégies lexicographiques. Ils se familiariseront aux simulations réalisées à l’aide d’outils d'apprentissage automatique « machine learning » et aux analyses d'heuristiques en termes de théorie de la détection de signaux. Ils se familiariseront avec la notion de conception expérimentale représentative (« representative experimental design ») et d’autres approches comportementales permettant d’étudier la manière dont les processus de prise de décision peuvent s’immiscer dans la structure de l’environnement.

Approche :

La recherche en heuristiques se concentre sur quatre questions interconnectées. La question descriptive : Quelles heuristiques sont utilisées par les êtres humains et les animaux ? La question écologique : Dans quel environnement, une certaine heuristique mène-t-elle à une décision intelligente, et quand est-ce qu’elle échoue ? La question appliquée : Comment la prise de décision peut-elle être améliorée : en changeant les heuristiques utilisées ou en modifiant l’environnement ? La question méthodologique : Comment étudier l’usage et la performance des heuristiques, par exemple, lors d’expériences, avec des simulations sur ordinateur, ou via des analyses mathématiques ?

Après un aperçu de différentes théories sur la prise de décision, nous commencerons par chercher des réponses aux questions descriptives, écologiques et méthodologiques. Par la suite, nous couvrirons différents domaines de recherche appliquée. Enfin, les étudiants approfondiront un sujet de leur choix. Dans les domaines de spécialisation choisis, les étudiants développeront un projet de recherche. Le résultat concret de cette phase de développement de projet consiste à formuler une proposition de recherche détaillée, ou pour les étudiants avancés (par exemple doctorants), la possibilité de faire un travail empirique, d’écrire un rapport de projet (ex : une ébauche d’article).

La plupart des sessions de ce cours sont organisées en tant que séminaire de discussion académique. Avant chaque session, nous lirons des articles sélectionnés et des chapitres de livres, puis discuterons de ceux-ci en classe. L'idée est que les participants au cours acquièrent des connaissances non seulement en pensant par eux-mêmes, mais aussi en réfléchissant en groupe. Ces discussions seront accompagnées de présentations. Au fur et à mesure de la progression du cours, les sessions sont conçues pour inciter les étudiants à développer eux-mêmes un projet de recherche, les sessions ultérieures du cours permettant aux étudiants d’obtenir un retour constructif sur leurs projets.

Pour faciliter davantage les processus d'apprentissage, les participants formeront des équipes de travail pour la durée du cours. Les équipes sont censées se rencontrer afin de préparer ensemble les documents assignés. Les équipes travailleront également ensemble sur des tâches de groupe, telles que des présentations sur des sujets de cours ou des discussions en classe.

B: References to compulsory readings (scientific journal articles, book chapters) will be given in class by the instructor. Other “compulsory” readings will be chosen by the students themselves, namely in order to develop their research projects.

Students who wish to read up (e.g. already prior to the course) more on heuristics (e.g., in order to find out if they would be interested in taking the course), can find a general introduction here:

Gigerenzer, G., & Gaissmaier, W. (2011). Heuristic decision making. *Annual Review of Psychology, 62*, 451–482.

An overview of practical applications of fast-and-frugal heuristics is available here:

Hafenbrädl, S., Waeger, D., Marewski, J. N., & Gigerenzer, G. (2016). Applied decision making with fast-and-frugal heuristics. *Journal of Applied Research in Memory and Cognition*, *5*, 215-231.

Popular books on the fast-and-frugal heuristics research program include:

Gigerenzer, G. (2014). *Risk savvy: How to make good decisions*. New York: Viking.

Gigerenzer, G. (2007). *Gut feelings: The intelligence of the unconscious*. New York: Viking Press.

I: http://hec.unil.ch/docs/index.php/jmarewski/cours/615

MANAGERIAL DECISION MAKING

Ulrich Hoffrage

C	Opt	4	English
A	6.00		

N: Master

P: De l'intérêt pour le sujet du cours

O:
- Identifier les phases du processus de prise de décision
- Reconnaître les pièges dans chacune de ces phases
- Apprendre divers outils et techniques pour favoriser la prise de décisions rationnelles

- To learn about types of negotiations.
- To learn how to increase the chances for making a good deal in a negotiation.

C: Faire du business consiste à prendre des décisions, souvent risquées, généralement avec des informations incomplètes, et trop souvent en moins de temps qu'il n'en faudrait. La prise de décision est une compétence managériale souvent tenue pour acquise, mais faire de bonnes décisions n'est pas aussi facile que certains se plaisent à penser. Ce cours a pour but de familiariser les étudiants aux approches les plus importantes de la prise de décision, et de ce fait autant les théories descriptives que les outils prescriptifs seront abordés. De plus, divers sujets pertinents pour les manageurs en tant que preneurs de décisions seront discutés; par exemple, les émotions, les processus de groupe, l'impact du temps et de la pression des délais, l'expérience, la responsabilité, l'éthique, et bien d'autres. Plusieurs exemples, études de cas et exercises illustreront comment ces divers outils peuvent être appliqués pour améliorer la prise de décision managériale, et à quel point diverses approches théoriques sont utiles pour comprendre ce que les manageurs font en réalité.

A special focus will be on negotiations. A negotiation can be seen as the interaction of at least two parties whose interests are not the same and who have to make judgments and decisions when trying to find an agreement. We will look at different kinds of negotiations, and learn about negotiation tactics/strategies. In particular this part of the course will be quite practical, that is, include many actual negotiations and exercises i nthe classroom, but also real cases (which have been documented for teaching purposes).

B: The course is largely (but not exclusively) based on the following literature. Some parts are required, others are recommended, more detailed information will be provided in the class.

Russo, J. E. & Schoemaker, P. J. H. (2002). *Winning decisions: Getting it right the first time.* New York: Currency/ Doubleday.

Book review (of Russo & Shoemaker) by Patric Andersson (2003). Journal of Economic Psychology, 24, 795-797 (http://www.sciencedirect.com/science/article/B6V8H- 48V83GT-3/2/21062afe8a7aba5be6d3914e0955c2f7)

Bazerman, M. H. (2006). *Judgment in managerial decision making* (6th ed.). New York: Wiley.

Hammond, J. S., Keeney, R. L., & Raiffa, H. (1999). *Smart choices: A practical guide to making better decisions*. New York: Broadway Books.

Galotti, K. M. (2002). *Making decisions that matter: How people face important life choices.* Mahwah, NJ: Erlbaum.

Halpern, D. F. (2002). *Thought and Knowledge: An introduction to critical thinking.* Lawrence Erlbaum Assoc. Inc.

Hoffrage, U., & Marewski, J. (2015). Unveiling the Lady in Black: Modeling and aiding intuition. *Journal of Applied Research in Memory and Cognition*, 4, 145–163.

Klein, G. (2004). *The power of intuition: How to use your gut feelings to make better decisions at work*. New York: Currency/Doubleday.

Hogarth, R., (2001). *Educating Intuition*. Chicago: University of Chicago Press.

Gigerenzer, G. (2007). *Gut feelings*: The intelligence of the unconscious. New York: Viking Press. (Translated in 17 languages, so probably also in your native language).

Nutt, P.C. (1989) *Making tough decisions: tactics for improving managerial decision making*. San Francisco: Jossey-Bass Publishers.

Fisher, R., Ury, W. L., & Patton, B. (2011). *Getting to yes: Negotiating agreement without giving in*. Penguin.

Inside Risk. A documentary of a kidnapping case, with a focus on the negotiation with the kidnappers, (not publicly available).

I: http://moodle2.unil.ch/course/view.php?id=5140

ORGANIZATIONAL THEORY AND DECISION MAKING

Christian Zehnder

C	Opt	4	English
A	6.00		

N: Master