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Microbial ecology (3BL2238)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en biologie	**Cours: 30 pg**	**Voir ci-dessous**	3

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

Période d'enseignement:

- Semestre Printemps

Equipe enseignante

Diego Gonzalez

Contenu

This course will cover topics linking microbial ecology to sustainable agriculture. It focuses on plant-microbe associations and aims at:
1. Briefly introducing root and leave microbiomes as well as the physiological basis of plant-microbe interactions.
2. Illustrating how agriculture can impact microbiota and how microbiota manipulation can impact agriculture.
3. Presenting traditional as well as cutting-edge approaches to microbe-driven agricultural practices (aiming at biocontrol, improvement of stress-tolerance, optimization of nutrient use).
4. Clarifying concepts and techniques used to investigate and manipulate plant-associated microbiota (including shortcomings of past and current approaches).
The students are expected to contribute to the common reflection with a short assay on one key concept around microbiome studies (microbiome, holobiont, biocontrol, etc.), a short research proposal highlighting a gap of knowledge and proposing an experimental system and a research plan to fill it, and a critical presentation of a review, an opinion, or a research article relevant to the course content.

Forme de l'évaluation

The evaluation of this teaching is based on a graded continuous assessment, consisting of the following elements:
1. Oral presentation of articles during the course 30%
2. Assay on a key concept in the microbiome field 20%
3. Short research proposal 40%
4. Active participation to the discussions in the course 10%

1. Oral presentations
- An outline of the course, including a list of review and research articles which will be presented and discussed at each session, will be provided the first week.
- Presentations are done individually.
- Presentations include 15 minutes of research summary and 15 minutes of critical discussion moderated (or rather stimulated) by the presenting students.
2. Conceptual assay
- A list of key problematic concepts will be provided the first week.
- The assay is done individually.
- The assay should include most of the following elements: origin of the concept, evolution of the concept, current usage, key distinctions and connections in the conceptual field, theoretical and practical significance for microbiome studies; an emphasis on the evolution of the concept over time or on the contradictions and tensions within the concept (between fields or authors) is expected. The text should be clearly written and well organized; bullet-point or telegraphic styles are not welcome. Min. 5 references. Max. 2 pages (11pt).
- Deadline: April 25th, 2022.
3. Short research proposal
- Any topic covered during the course can be chosen; more excentric topics can be proposed, but should be validated with the teacher.
- The research proposal is written individually.
- The sections that should appear in the report are: introduction, including gap of knowledge and question; experimental system and experimental plan; expected results; reference list. An emphasis on the identification of the gap of knowledge and the justification of the chosen experimental system (and plan) is expected. Min. 8 references. Max. 3 pages (11pt).
- Deadline: May 30th, 2022.

Documents should be sent per e-mail as a pdf file to diego.gonzalez@unine.ch.

In case of an insufficient evaluation, an updated version of the report will be required together with a 30 minutes oral presentation (15 minutes presentation and 15 minutes questions) that will allow assessing the extent of the candidate's knowledge on the topics developed in the entire course. After the publication of results, the student has the responsibility to contact the teacher in advance in order to define a date to hand out

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the report as well as a date for the oral presentation. The oral presentation should take place within one week after the date by which the report has been handed out. The oral evaluation does not necessarily need to take place within an exam session, but it should be organized at the latest 5 days before the end of the following exam session.

Documentation

Review articles will be provided to the students and specific scientific articles will be discussed during the lectures.

Pré-requis

Basic concepts in microbiology of a Bachelor level

Forme de l'enseignement

Lectures, seminars, practical work, and discussion of scientific articles

Objectifs d'apprentissage

Au terme de la formation l'étudiant-e doit être capable de :

- Interpret recent scientific information in the field
- Illustrate methods discussed in the theoretical lectures for the accomplishment of a scientific project.
- Discuss current topics in microbial ecology in the context of sustainable agriculture
- Identify a scientific goal
- Develop a research project
- Provide critical feedback in the projects of peers
- Establish a scientific hypothesis
- Outline a research question on the topic

Compétences transférables

- Explain a scientific question
- Translate theoretical knowledge into practice
- Review scientific literature
- Invent a novel idea