



Philosophie des sciences de la vie

/ Philosophy of life sciences

L'année académique / Academic year 2024-2025

Semestre d'automne / Autumn term (HUM-429)

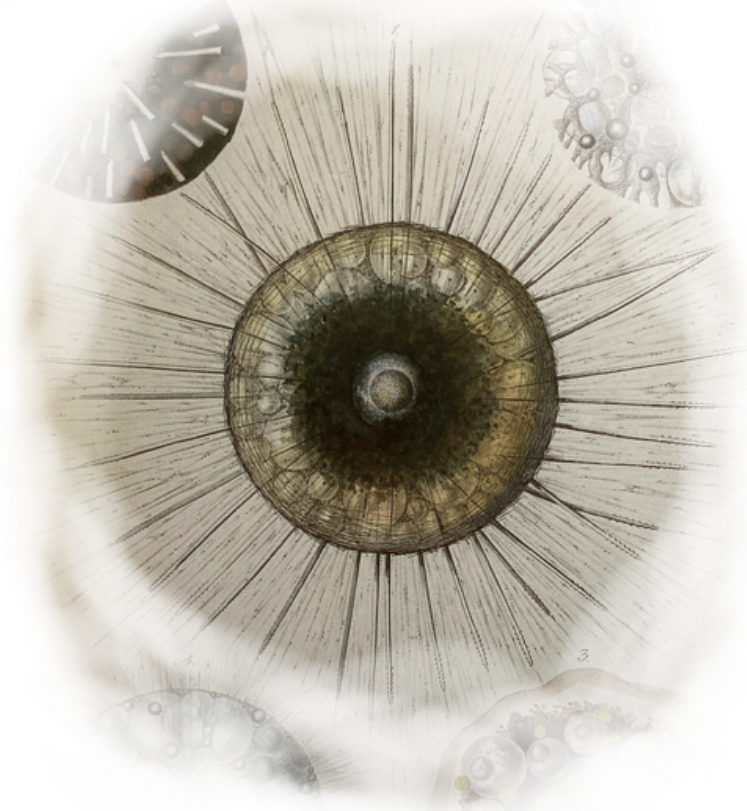
Semestre de printemps / Spring term (HUM-430)

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I. Introduction

L'objectif de ce programme de master est de réfléchir et de discuter – d'abord **ensemble en classe** et ensuite dans **votre groupe de travail** – des questions philosophiquement centrales et stimulantes des sciences de la vie. Plus précisément, après le premier cours d'introduction, il y aura **6 cours** (en français) sur différents débats philosophiques, très probablement sur :

- Réduction, réalisation multiple, et 'other tricky things'
- Fonctions biologiques, dysfonctions & troubles mentaux
- Paradoxe d'altruisme & émergence de coopération
- Sélection disruptive et spéciation
- Déterminisme & libre arbitre
- **Alban Ridet** : « Ethique animale » & « Le néodarwinisme et le réalisme moral »

The aim of this master programme is to reflect on and to discuss – first **together in class** and later **in your working group** – philosophically central and challenging issues of the life sciences. More precisely, after the first introductory session, there will be **6 lectures** (in French) on different philosophical debates, most likely on:

- Reduction, multiple realization, and 'other tricky things'
- Biological functions, dysfunctions & mental disorders
- Paradox of altruism & emergence of cooperation
- Disruptive selection and speciation
- Determinism & free will
- **Alban Ridet** : « Animal ethics » & « Neodarwinism and moral realism »

Un livre complémentaire au cours

Partie I :

- 1) Peut-on saisir la particularité de l'évolution biologique en observant les étoiles ?
- 2) Quelles sont les idées et les découvertes qui ont influencé Darwin, et dans quelle mesure a-t-il révolutionné les règles du jeu ?
- 3) Quels sont les arguments les plus convaincants de la théorie de l'évolution ?
- 4) Est-ce que la sélection naturelle explique l'essentiel de l'évolution ?
Comme « un seul anneau pour nous gouverner tous » ?
- 5) Peut-on voir des fossiles, mais ne pas voir l'évolution ?
- 6) Quels sont les enjeux de la fameuse explosion cambrienne ?
- 7) Comment faire mieux que simplement inférer des ancêtres communs ?
- 8) Peut-on répondre à la question du « pourquoi » en biologie ?

Partie II :

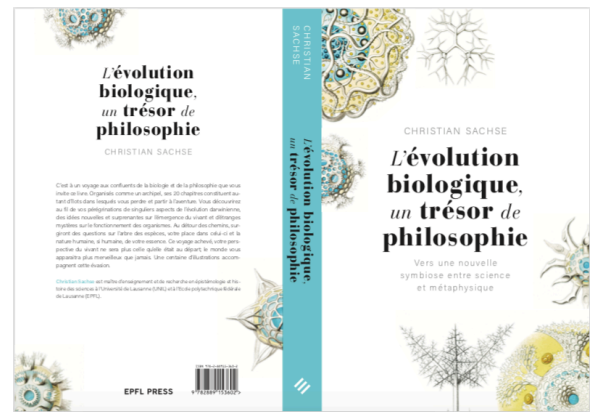
- 9) Le passé évolutif détermine-t-il la fonction biologique de vos organes ?
- 10) « L'ADN poubelle », ou dans quelle mesure la pratique scientifique détermine-t-elle la fonction biologique ?
- 11) Quel rôle joue l'organisation dans votre fonctionnalité ?

Partie III :

- 12) Pourquoi est-il aussi difficile d'identifier des conditions nécessaires et suffisantes du vivant ?
- 13) Quel est le lien entre l'origine chimique du vivant et sa définition ?
- 14) Comment mettre fin à cette guerre de tranchées dans le débat qui divise la définition du vivant ?

Partie IV :

- 15) Que veut dire « espèces naturelles » ? Et pourquoi ces espèces sont-elles rarement complexes ?
- 16) Quelles espèces chimiques se laissent comprendre de manière microstructuraliste ?
- 17) Pourquoi est-ce qu'il y a autant de discontinuités entre les espèces bactériennes ?
- 18) Est-ce que l'arbre de la vie est une image expressionniste abstraite de l'évolution ?
- 19) En quoi l'isolement reproductif est-il une bonne nouvelle ?
- 20) Pourquoi ne considère-t-on pas les espèces comme de véritables individus adultes ?



Notes importantes / Important notes:

Il est nécessaire de **préparer chaque cours en lisant au moins un** des articles d'introduction suggérés qui sont liés au sujet du cours (vous trouverez tous les articles sur Moodle).

Chacune des 6 cours dure environ **2h** (16h15-18h ; pour tout le monde) + **1h** (jusqu'à 19h ; pour celles et ceux qui sont intéressé-e-s par une discussion plus approfondie et informelle, juste pour le plaisir et/ou pour identifier un sujet possible, lié à votre futur travail de groupe / plan de projet).

La deuxième partie du semestre ne comporte pas de cours, mais concerne **votre travail de groupe / plan de projet** qui est **supervisé** par moi (ou par Alban Ridet alban.ridet@unil.ch) (réunion à l'EPFL dans la salle de cours habituelle si pas convenu autre chose). Plus précisément, au plus tard à la fin du dernier cours, **vous devez former un groupe (de 3 à 5 personnes) sur la base d'intérêts partagés/recouverts et travailler sur un sujet/débat/question particulier**. En d'autres termes, l'idée est de commencer en novembre et – en tant que petit groupe – de soumettre un plan de projet avant la fin du semestre d'automne. En tant que perspective – à moins que vous ne restiez seulement jusqu'à la fin du semestre d'automne – vous continuez à travailler avec votre groupe au semestre de printemps (première moitié du semestre de printemps, à nouveau avec une réunion de supervision) et présentez votre travail en classe (dans la deuxième moitié du semestre de printemps) ; c'est un peu comme si vous donniez les cours à ce moment-là.

It is required to **prepare each lecture by reading at least one** of the suggested introductory articles that are linked to the topic of the lecture (you will find all articles on Moodle).

Each of the 6 lectures is about **2h** (16h15-18h; for everybody) + **1h** (till 19h; for those interested in a further, deeper & informal discussion just for fun

and/or for identifying a possible, related topic for your future group work / project plan).

The second part of the semester has no lectures, but is about your **group work / project plan** that is **supervised** by me (or by Alban Ridet alban.ridet@unil.ch) (meeting at EPFL in the usual lecture room if not otherwise indicated). More precisely, at latest at the end of the last lecture, **you have to form a group (of 3-5 people) based on shared/overlapping interests and work on a particular topic/debate/question**. Put differently, the idea is to get started in November and – as a small group – to submit a project plan by the end of the autumn term. As an outlook – unless you just stay only till the end of autumn term – you continue to work with your group in spring term (first half of spring term, again with a supervision meeting) and present your work in class (in the second half of spring term); it's somehow like you are then giving the lectures.

2. Semestre d'automne – crédits / Autumn term – credits

Méthode d'évaluation pour les 3 ECTS (note) :

50% : Qualité d'une dissertation individuelle de 5 pages (sur un cours/sujet).

Choisissez un cours/sujet qui vous intéresse le plus (qui se rapproche de votre intérêt propre), **ceci soit du cours soit du livre présenté**, rédigez un résumé du contenu/débat essentiel (~3 pages), mettez en évidence ce qui vous a le plus intéressé et/ou ce que vous critiquez le plus (~1½ page), et développez une question que vous aimeriez traiter, qui vous intéresserait comme partie possible d'un plan de projet de groupe (~½ page). Soumission par e-mail à christian.sachse@unil.ch ou à christian.sachse@epfl.ch avant le mercredi soir **6 novembre**.

50% : Qualité du plan du projet de groupe.

Les groupes sont formés au plus tard à la fin du dernier cours ; les détails sont expliqués pendant les cours et la supervision. Présentation par e-mail à christian.sachse@unil.ch ou à christian.sachse@epfl.ch avant le dimanche soir **23 décembre**.

Assessment method for the 3 ECTS (mark):

50%: Quality of an individual 5-pages essay (about one lecture/topic).

Pick one lecture/topic that interests/interested you most (that comes close to your proper interest), of the course or the preselected book, write a summary of the essential content/debate (~3 pages), highlight what interested you most and/or what you criticises most (~1½ page), and develop a question that you would like to address, that would interest you as a possible part of a group project plan (~½ page). Submission by e-mail to christian.sachse@unil.ch or to christian.sachse@epfl.ch by Wednesday night **November 6**.

50%: Quality of the group project plan.

Groups are formed at latest at the end of the last lecture; detailed are explained during the lectures and supervision. Submission by e-mail to christian.sachse@unil.ch or to christian.sachse@epfl.ch by Sunday night **December 23**.

Programme / Schedule:

Cours / Lectures	11.09.	Introduction	(EPFL, CHB 330)
	18.09.	<i>Réduction, émergence & systèmes complexes</i>	(EPFL, CHB 330)
	25.09.	<i>Fonctions biologiques, dysfonctions & troubles mentaux</i>	(EPFL, CHB 330)
	02.10.	<i>Individus biologiques, paradoxe d'altruisme & émergence de coopération</i>	(EPFL, CHB 330)
	09.10.	<i>Sélection disruptive et spéciation</i>	(EPFL, CHB 330)
	16.10.	<i>Déterminisme & libre arbitre</i>	(EPFL, CHB 330)
	23.10.	-- Pas de cours à l'EPFL --	
	30.10.	<i>Alban Ridet : Questions métaéthiques, le néodarwinisme et le réalisme moral</i>	(EPFL, CHB 330)
Supervision	06.11	Soumission de la dissertation individuelle (par e-mail) [50% de la note finale]	
	06.11.	Submission of individual essay (by e-mail) [50% of final grade]	
	06.11.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB 330)
	13.11.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB 330)
	20.11.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB 330)
	27.11.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB 330)
	04.12.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB 330)
	11.12.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB 330)
	18.12.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB 330)
	23.12.	Soumission du plan du projet de groupe (par e-mail) [50% de la note finale]	
	23.12.	Submission of group project plan (by e-mail) [50% of final grade]	

Semestre d'automne – guide pour le plan du projet / **Autumn term – guideline for the project plan**

Objectif principal : rédiger jusqu'au **23 décembre** un court projet, **en anglais, en français ou en allemand, en groupes de 3 à 5 étudiants**, sur un débat particulier lié aux conférences du trimestre d'automne (voir également la liste des sujets à la fin de cette brochure).

Longueur minimale du plan du projet :

Titre provisoire & table des matières + 2 pages/personne du groupe

Contenu minimal du plan de projet :

- a) **Titre provisoire** et table des matières.
- b) Une **introduction** dans laquelle vous exposez votre question de recherche principale, dites à la lectrice / au lecteur pourquoi cette question est intéressante, placez-la dans un cadre général (par exemple, une introduction historique, un aperçu de l'évolution récente du débat ou un bref aperçu de ce qui vient dans la section suivante – dans quelle mesure les articles/chapitres de livres résumés reflètent la richesse du débat).
- c) De **courts résumés** des articles/chapitres de livres lus (par exemple, un résumé d'une page d'un article sur les espèces par David Hull, une autre page sur la position développée par Ernst Mayr, ... peut-être que chaque participant d'un groupe fait un résumé).
- d) **Liens et perspectives.** Montrez comment vous êtes capable d'aller au-delà des articles résumés. Prenez au moins une question particulière que vous commencez à analyser plus en profondeur et pour le reste du projet prévu, décrivez comment vous procédez dans votre travail (au semestre de printemps). Par exemple, vous pourriez discuter de la manière dont les positions de David Hull et d'Ernst Mayr sont liées ou différentes.
- e) **Bibliographie** utilisée (+ mentionner les lectures prévues au semestre de printemps)

Main aim: Write until **December 23** a short **project plan**, in **English**, in **French** or in **German**, in **groups of 3-5 students**, on a particular debate linked to the autumn term lectures (see also a list of topics at the end of this booklet).

Minimal length of the project plan:

Provisional title & table of content + 2 pages/person of group

Minimal content of the project plan:

- f) **Provisional title** and table of content pages
- g) An **introduction** in which you spell out your guiding research question, tell the reader why this question is interesting, put it into a general framework (e.g. a historical introduction, an overview of the recent development of the debate or a short overview what comes in the next section – to what extent the summarized papers/book chapters reflect the richness of the debate).
- h) **Short summaries** of the read papers/book chapters (e.g. 1 page summary of some paper on species by David Hull, another 1 page on the position developed by Ernst Mayr, ... maybe each participant of a group makes one summary)
- i) **Linkages & perspectives.** Show how you're able to go beyond the summarized papers. Take at least one particular question that you start to analyse more profoundly and for the planned rest of the project, outline how you proceed in your work (in spring term). One example might be a discussion of how the position of David Hull and Ernst Mayr are connected or differ.
- j) **Used bibliography (+ mention planned reading in spring term)**

3. Semestre de printemps / Spring term

Méthode d'évaluation pour les 3 ECTS (note) :

50%: Qualité de la présentation du projet.

50%: Qualité du projet de groupe (= dissertation).

La version finale doit être soumise jusqu'au 4 juin à christian.sachse@unil.ch ou à christian.sachse@epfl.ch.

Points bonus pour des feedback des autres presentations!*

Assessment method for the 3 ECTS (mark):

50%: Quality of the project presentation.

50%: Quality of the group project (= essay).

Final version has to be submitted by June 5 to christian.sachse@unil.ch or christian.sachse@epfl.ch.

Extra points for feedbacking other presentations!*

Programme / Schedule:

Supervision	19.02	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB ?)
	26.02.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB ?)
	05.03.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB ?)
	12.03.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB ?)
	19.03.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB ?)
	26.03.	pas de supervision (conference en Allemagne)	
	02.04.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB ?)
	09.04.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB ?)
	16.04.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB ?)
	<i>Vacances de Pâques / Easter Break</i>		
Presentations	30.04.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB ?)
	07.05.	Supervision (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB ?)
		[50% de la note finale / 50% of final grade]	
	14.05.	Presentations (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB ?)
	21.05.	Presentations (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB ?)
	28.05.	Presentations (16h15-17h; 17h15-18h; 18h15-19h)	(EPFL, CHB ?)
		[50% de la note finale / 50% of final grade]	
	04.06.	Soumission de la dissertation du groupe (par e-mail)	
	04.06.	Submission of group essay (by e-mail)	

Semestre de printemps – lignes directrices pour la dissertation / Spring term – guideline for the essay

Développez votre plan de projet du semestre d'automne en un projet complet (= dissertation de groupe) et bien écrit. Des changements concernant les groupes et des réorientations concernant les sujets sont encore possibles au début du semestre de printemps (veuillez discuter de ces changements avec moi !).

Notez que chaque membre du groupe peut poursuivre sa “propre orientation” dans une partie/chapitre de votre dissertation.

Longueur approximative de la dissertation du groupe :

Dissertation écrite par **3 étudiant-e-s** : environ **20 pages**

Dissertation écrite par **4 étudiant-e-s** : environ **25 pages**

Dissertation écrite par **5 étudiant-e-s** : environ **30 pages**

Develop your project plan of the autumn term into a complete and well-written project (= group essay). Changes as concerns groups and re-orientations as concerns topics are still possible at the beginning of the spring term (please discuss such changes with me!).

Note that each group member can pursue his or her "own direction" in a part/chapter of your group essay.

Approximate length of the essay:

Essay written by **3 students**: about **20 pages**



Essay written by **4 students**: about **25 pages**

Essay written by **5 students**: about **30 pages**

Semestre de printemps – lignes directrices pour la dissertation / Spring term – guideline for the essay

The **title page** must be as follows:

La **page de garde** doit être comme suit :

Top of page Title of essay or report First name, surname and section of authors Middle of page <i>Project SHS 1st year master</i> <i>Professor: Christian Sachse</i> <i>Philosophy of life sciences</i> <i>Submission date xxx (dd.mm.yyyy)</i> Bottom of page Lausanne, academic year 2024-2025 Symbol EPFL 	Haut de page Titre du rapport ou du projet Nom, prénom et section des auteurs Milieu de page <i>Projet SHS de 1^{ère} année master</i> <i>Professor: Christian Sachse</i> <i>Philosophy des sciences de la vie</i> <i>Date de soumission xxx (jj.mm.aaaa)</i> Bas de page Lausanne, année académique 2024-2025 Logo EPFL 
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For instance (in English):

Titel

Name, first name (EPFL affiliation, e.g. SV), Name, first name ...

Project of SHS, 1st year of Master
Supervisor: Christian Sachse
Philosophy of life sciences
Submission date X.Y.2023

Lausanne, academic year 2024 - 2025



Semestre de printemps – lignes directrices pour la dissertation / Spring term – guideline for the essay

Suggestions formelles / Formal suggestions :

- Police / Type size: 12
- Interligne / Line spacing: 1,5
- Marges (haut/bas/gauche/droite) / Margin (top, bottom, left, right): 2,5 - 3 cm
- Numéros de page (utile pour mon feedback) / Page numbers (helpful for my feedback)

Structure de la dissertation / Structure of the essay :

- Table des matières / Table of content
- Introduction (contextualisation, motivation, question & hypothèse) / Introduction (contextualisation, motivation, question & hypothesis)
- Développement (analyse dans les chapitres/sections) / Development (analysis in the chapters/sections)
- Conclusion (récapitulation des points importants + touche personnelle (si voulu) + ouvertures) / Conclusion (sum up of the essential points + personal point of view (if wanted) + perspectives)
- Bibliographie / Bibliography

Il faut citer vos sources ! Comment citer et indiquer les références / You have to cite your sources! How to cite and indicate the references :

- Mettez les citations entre guillemets / Put citations in quotation marks
- Toute citation doit être accompagnée de références précises (Nom, année, page/s) / Any citation has to be followed by a precise reference (Name, year, page/s)
 - Exemple / Example : « bli blabla bla » (Sober, 2000, pp. 23-24).
→ Cette parenthèse renvoie à la référence complète dans votre bibliographie à la fin de votre travail / This bracket refers to the complete reference in your bibliography at the end of your essay.
- Si vous discutez ou présentez quelque chose de quelqu'un, vous devez indiquer la référence comme si vous la/le citiez ! / If you discuss or present something from someone else, you have to indicate the reference as if you were citing her/him!
 - Exemple / Example : Bli blabla bla et c'est pourquoi bli bla bli est problématique (voir Sober, 2000, pp. 23-24) / Bli blabla bla and therefore bli bla bli is problematic (see Sober, 2000, pp. 23-24).
→ Cette parenthèse renvoie à la référence complète dans votre bibliographie à la fin de votre travail / This bracket refers to the complete reference in your bibliography at the end of your essay.

Modèle de bibliographie scientifique / Model of the scientific bibliography

Toute référence bibliographique doit contenir : Nom, prénom, année de publication, titre, lieu de publication. Any reference has to contain: Name, surname, year of publication, title, "place" of publication. Par exemple / For instance:

Ouvrage / Book :

- Nom, Prénom, Année (Année 1^{ère} édition), *Titre du Livre : Sous-titre*, Lieu d'édition : Maison d'édition (Nom de la collection).

Richardson, Charles, 1982 (1904), *Une théorie de l'esprit : La perspective du neurone*, Paris : Gallimard (Les domaines de la philosophie).

Article de revue / Article of a scientific journal :

- Nom, Prénom, Année, « Titre de l'article », *Titre de la revue*, Numéro de la revue/numéro du fascicule, pages.

Woelfli, Patrick, 1993, « La Métaéthique de Charlie's », *Journal de Philosophie*, 8/1, p. 32-57.

Article en ligne / Online article :

- Nom, Prénom, Année, « Titre de l'article », *Titre de la revue* (en ligne), Numéro de la revue/numéro du fascicule, pages. < www://... > (réf. date de consultation)

Saribluck, Michèle, 2003, « Mythes et transmission culturelle », *Anthropologies* (en ligne), 75/2, p. 32-57. < www://anthropologie.fr > (réf. 24.12.2023)

Site internet institutionnel / Institutional Web site :

- *Titre du site* (site en ligne), < www://... > (réf. date de consultation)

Organisation mondiale de la santé (site en ligne), < www.who.int/fr/ > (réf. 24.12.2023)

Attention : Wikipédia, pages de blogs, sites web individuels, présentations Power Point etc. ne sont pas de sources citables ! Vous pouvez les utiliser comme point de départ, afin d'obtenir un survol personnel du débat ou de la position, mais pas pour la version finale du travail et votre argumentation.

Attention : Wikipedia, Internet blogs, personal web pages, Power Point presentations etc. are not citable scientific sources! You may use them as a starting point, to get a personal overview on some debate or position, but not for your final essay and argumentation.

4. Code of Ethics concerning the Citing

See: https://www.epfl.ch/about/overview/wp-content/uploads/2019/09/1.3.3_dir_plagiat_etudiant_an.pdf

Directive concerning the citing and referencing of sources of information in written work submitted by students

LEX 1.3.3

1 January 2013, status as at 1 January 2017

The Direction of the Ecole polytechnique fédérale de Lausanne,
based on Article 3, par. 1, point a, of the *Ordonnance sur l'EPFL et l'EPFZ* of 13 November 2003 (RS 414.110.37),
hereby adopts the following :

Preamble

Embarking on a field of study involves gathering information by consulting the scientific works available concerning the subject. The quality of the student's work very often depends on the quality of the information collected. It is important to start from the scientific state of the art. In fact, it is normal that a large part of a written work should be based on what others have already created or discovered. The resulting written work, whatever its nature, must however comply with the following rules in order to avoid any form of plagiarism.

Section 1 General provisions

Article 1 Field of application

This directive applies to all written work (including computer programs) that students, PhD students or participants in continuing education programmes (hereinafter: the student) submit for evaluation or divulge, in one way or another, to a restricted or wider audience.

Article 2 Definitions

The terms used in the present directive correspond to the following definitions:

Source: any information from which the author has drawn inspiration for the writing of their work;

Citation: word-for-word repetition of certain passages from a source;

Copying of the substance from a source: copying all or part of the content (notions, concepts, ideas, methods, results, experiments, discoveries presented in existing works) of a source, but described according to a personal structure and wording;

Borrowed material: any citation or copying of the substance from a source;

Source reference: indication in a written work of the source of all borrowed material, by a reference to the contact details of the source.

Article 3 Responsibility

As author of a written work, the student is considered responsible for its content and form.

Section 2 Rules

Article 4 Borrowed material and personal contribution

¹ All written work must make a clear distinction between:

- a. material originating from other works (Art. 5) and
- b. the student's personal and original contribution.

² All material originating from elsewhere must be recognisable as such in the written work thanks to a reference to the source.

³ If the material originating from elsewhere is not clearly indicated in the work, the student allows the reader to think that it is their personal and original contribution. This amounts to cheating (plagiarism Art. 8).

Article 5 Forms of borrowed material

¹ All written work must then clearly distinguish concerning the borrowed material (Art. 4 par. 1a) between:

- a. citations (Art. 6) and
- b. substance borrowed from a source (Art. 7).

² If a copied passage is not mentioned as being a citation (Art. 6 par. 1 c), the student allows the reader to think that he has retranscribed borrowed material in his own words. This amounts to cheating (plagiarism Art. 8).

Article 6 Rules concerning citation

¹ The copying of a passage from an existing work, as such or translated, is authorised under the following conditions:

- a. the copied passage serves as a comment, reference or demonstration;
- b. the use of the copied passage justifies its length;
- c. the quoted passage is clearly indicated (e.g. in brackets, italics or by a separate paragraph);
- d. the source is referenced (before or just after the quotation, or by a footnote)¹. This source reference is necessary even if the passage is taken from a previous personal work.

² It is forbidden, even if the rules stated in par. 1 are respected, to :

- a. use a quotation altering the original text or making editorial adaptations;
- b. cite a complete work - only extracts may be copied;
- c. copy an illustration (figure, picture, video, graph, data graphics) without the authorisation of its author (or publisher) in cases where this illustration constitutes an original work in itself (protected work);
- d. copy all or part of a computer source code:
 - unless the software user licence permits it, or if
 - the legal exception applies (Art. 21 of the Loi sur le droit d'auteur)².

Article 7 Rules concerning substance copied from a source

¹ Copying the substance from a source is authorised on condition that the written work makes reference to the source.

² The reference must allow the reader to clearly identify the source. This rule also applies if the copied elements are taken from previous personal works.

¹ The student can obtain information concerning the rules applicable from the EPFL <http://library.epfl.ch/info/>

² http://www.admin.ch/ch/f/rs/231_1/a21.html

Article 8 Plagiarism

¹ Plagiarism consists of representing oneself as the author of all or part of the work or results in fact originating from one or several other person(s), by failing to respect the rules concerning the citing and referencing of sources as defined under Articles 6 and 7.

² The act commonly referred to as « self-plagiarism » consists of copying all or part of a previous personal work without citing it or referencing the source, and consequently presenting this work as a new contribution.

³ Plagiarism or self-plagiarism, whether committed intentionally or by omission, is a form of cheating, which gives rise to the launching of an internal disciplinary procedure³.

Section 3 Coming into force**Article 9 Coming into force**

The present directive nullifies and replaces the Code of Ethics of 6 June 2007 and comes into force on 1st January 2013, status as at 1 January 2017.

On behalf of the EPFL Direction:

President:
Patrick Aebischer

General Counsel:
Susan Killias

Comment: this Directive has been reviewed as part of the 2017 reorganisation. No modifications were made to this directive as a result of the review.

³ https://www.epfl.ch/about/overview/wp-content/uploads/2019/09/2.4.0.2Disciplinary_Rules_Regulations_ang.pdf

5. Ressources bibliographiques et numériques / Bibliographic and digital resources

General guidelines for writing an essay in philosophy (English):

<http://www.jimpryor.net/teaching/guidelines/writing.html>

Excellentes introductions d'un débat ou d'un problème philosophique (encyclopédie rédigées par des expert-e-s dans le domaine en question /

Excellent introductions into a philosophical debate or problem (encyclopedia written by experts in the domain):

Encyclopedie philosophique: <https://encyclo-phil.fr/> (French)

Stanford Encyclopedia of Philosophy: <http://plato.stanford.edu> (English)

The Internet Encyclopedia of Philosophy: <http://www.iep.utm.edu/> (English)

Page de ressources bibliographiques et numériques du département de philosophie de l'université de Lausanne / Bibliographic and digital resources page of the philosophy department of the University of Lausanne:

<https://www.unil.ch/phil/home/menuinst/etudiants/ressources.html>

Outils Internet pour la recherche et la citation d'articles et de livres /

Internet tools for searching and citing articles and books:

<http://scholar.google.ch/>

<http://books.google.ch/>

<http://gen.lib.rus.ec/> (download of books might not be legal!)

Philosophie de la biologie / des sciences (French):

Barberousse, A., Bonnay, D. & Cozic, M. (éds.) (2011): *Précis de philosophie des sciences*, Vuibert.

Barberousse, A., Kistler, M. & Ludwig, P. (2000) : *La philosophie des sciences au XXème siècle*. Flammarion.

Esfeld, M. (2017): *Philosophie des sciences. Une introduction*. 3ème édition, PPUR.

Merlin, F. & Hoquet, T. (éds.) (2014): *Précis de philosophie de la biologie*, Vuibert.

Sachse, C. (2011): *Philosophie de la biologie. Enjeux et perspectives*, PPUR.

Sachse, C. (2021): *L'évolution biologique, un trésor de philosophie*, PPUR.

Philosophy of biology / sciences (English):

Ayala, F. & Arp, R. (eds.) (2009): *Contemporary debates in philosophy of biology*, Wiley Blackwell.

Balashov, Y. & Rosenberg, A. (eds.) (2002): *Philosophy of science. Contemporary readings*, Routledge.

Barberousse, A., Morange, M. & Pradeu, T. (eds.) (2009): *Mapping the future of biology. Evolving concepts and theories*, Springer.

Garvey, B. (2007): *Philosophy of biology*, Acumen.

Hull, D. & Ruse, M. (eds.) (2007): *The Cambridge companion to the philosophy of biology*, Cambridge University Press.

Matthen, M. & Stephens, C. (eds.) (2007): *Handbook of the philosophy of science: Philosophy of biology*, Elsevier.

Newton-Smith, W. H. (ed.) (2000): *A companion to the philosophy of science*, Blackwell.

Rosenberg, A. & McShea, D. (2008): *Philosophy of biology. A contemporary introduction*, Routledge.

Sarkar, S. & Plutynski, A. (eds.) (2008): *A companion to the philosophy of biology*, Wiley-Blackwell.

Sober, E. (2006): *Philosophy of biology*. 3rd edition, MIT Press.

Sober, E. (ed.) (2006): *Conceptual issues in evolutionary theory*. 3rd edition, MIT Press.

6. Suggestions de projects / Project suggestions

Propositions par Alban Ridet (responsable d'encadrement); rédigées ici seulement en français (mais projet également possible en anglais!) / Proposals by Alban Ridet (supervisor); written here in French (but project also possible in English!):

- A) Les grandes questions métaéthiques**
- B) Le néodarwinisme et le réalisme moral**

Propositions par Christian Sachse (responsable d'encadrement) rédigées ici en anglais (mais projet également possible en français!) / Proposals by Christian Sachse (supervisor); written here in English (but project also possible in French!):

- 1) Creationism vs. Evolutionary theory**
- 2) Biological fitness – more than a story telling metaphor?**
- 3) The role of chance and adaptations in evolution**
- 4) The unit of selection problem – altruism vs. egoism**
- 5) The emergence and definition of life**
- 6) What is a biological individual / organism?**
- 7) The tree of life and the species problem**
- 8) Disruptive selection and other ‘funny things’**
- 9) The notion of functions in biology**
- 10) Scientific explanations in neuroscience and biology**
- 11) DSM and mental disorders from a biological point of view**
- 12) Natural laws in the life sciences**
- 13) Reductionism vs. antireductionism**
- 14) Free will, chance and determination**

A) Les grandes questions métaéthiques

Description :

Alors que l'éthique normative se questionne sur ce qui rend une action bonne ou mauvaise, juste ou injuste et que l'éthique appliquée se cantonne à évaluer ce qu'il faut faire dans des situations spécifiques (assistance au suicide, problèmes environnementaux, souffrance animale...), la métaéthique a pour ambition de décrire la nature de l'éthique ou de la morale. Ainsi, elle tente de répondre à des questions comme : Les faits moraux existent-ils ? Sont-ils de la même nature que les faits physiques ? Qu'expriment les jugements moraux ? Des croyances ou des attitudes non-cognitives ? La connaissance morale est-elle possible ? Existe-t-il des vérités morales ? Si oui, comment pouvons-nous en prendre connaissance ? Comment pouvons-nous justifier nos croyances morales ?

Article introductif :

Sayre-McCord, G. (2012). Metaethics. Dans E. N. Zalta (dir.), The Stanford Encyclopedia of Philosophy. <https://plato.stanford.edu/entries/metaethics/>

Quelques suggestions bibliographiques :

- Ayer, A. J. (1952). Language, truth and logic (1^{ère} éd.). Dover Publications.
- Desmons, O., Lemaire, S. et Turmel, P. (dir.). (2019). Manuel de métaéthique. Hermann.
- Jackson, F. (1998). From metaphysics to ethics. A defence of conceptual analysis. Oxford University Press.
- Joyce, R. (2015). Moral anti-realism. Dans E. N. Zalta (dir.), The Stanford Encyclopedia of Philosophy.
- Lutz, M. (2018). Moral Naturalism. Dans E. N. Zalta (dir.), The Stanford Encyclopedia of Philosophy.
- Mackie, J. L. (1977). Ethics : inventing right and wrong. Penguin.
- McPherson, T. et Plunkett, D. (dir.). (2017). The Routledge handbook of metaethics. Routledge.
- Moore, G. E. (1903). Principia ethica. Cambridge University Press.
- Ridge, M. (2019). Moral Non-Naturalism. Dans E. N. Zalta (dir.), The Stanford Encyclopedia of Philosophy.
- Sayre-McCord, G. (2015). Moral realism. Dans E. N. Zalta (dir.), The Stanford Encyclopedia of Philosophy.
- Shafer-Landau, R. (2003). Moral realism: a defence. Oxford University Press.
- van Roojen, M. (2008). Moral cognitivism vs. non-cognitivism. Dans E. N. Zalta (dir.), The Stanford Encyclopedia of Philosophy.

Orientations possibles :

- Apporter des éléments de réponse à l'une ou plusieurs des questions ci-dessus en s'appuyant sur une ou plusieurs positions en métaéthique.
- Exposer une position métaéthique et s'appuyer sur la littérature pour la critiquer, la défendre ou argumenter en sa faveur.
- Exposer plusieurs positions métaéthiques et s'appuyer sur la littérature pour en défendre une et critiquer l'autre.

B) Le néodarwinisme et le réalisme moral

Description :

Afin de réfuter ou d'appuyer certaines positions en métaéthique, des philosophes font appel à des recherches en psychologie évolutionniste. Depuis plusieurs années déjà, un débat important s'est cristallisé autour du réalisme moral, position d'après laquelle il existe indépendamment de nous des vérités ou des faits moraux. La théorie de l'évolution réfute-t-elle le réalisme moral ?

Article introductif :

FitzPatrick, W. (2020). Morality and Evolutionary Biology. Dans E. N. Zalta (dir.), The Stanford Encyclopedia of Philosophy. <https://plato.stanford.edu/entries/morality-biology/>

➔ Lire surtout la section 4.I.

Quelques suggestions bibliographiques :

FitzPatrick, W. (2014). Why There is No Darwinian Dilemma for Ethical Realism. Dans M. Bergmann et P. Kain (dir.), Challenges to Moral and Religious Belief: Disagreement and Evolution (p. 237-255). Oxford University Press.

FitzPatrick, W. (2015). Debunking Evolutionary Debunking of Ethical Realism. Philosophical Studies, 172(4), 883-904.

Ruse, M. et Richards, R. J. (dir.). (2017). The Cambridge Handbook of Evolutionary Ethics. Cambridge University Press.

Street, S. (2006). A Darwinian Dilemma for Realist Theories of Value. Philosophical Studies, 127(1), 109-166.

Orientations possibles :

-Présenter le débat et prendre position en s'appuyant sur la littérature.

I) Creationism vs. Evolutionary theory

Get started with the Stanford Encyclopedia overview article:

Ruse, Michael (2018): "Creationism", *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/creationism/>

Propositions for bibliography:

- Baird, Robert M. & Rosenbaum, Stuart E. (eds.) (2007): *Intelligent Design. Science of religion? Critical perspectives*. Amherst (NY): Prometheus Books.
- Behe, Michael (1998): *Darwin's Black Box: The biochemical challenge to evolution*. New York: Free Press.
- Berlinsky, David (2009): *The Devil's delusion. Atheism and its scientific pretensions*. New York: Basic Books.
- Dawkins, Richard (1987): *The blind watchmaker*. New York: Norton.
- Dawkins, Richard (2006): *The God delusion*. London: Transworld Publishers
- Demsky, William A, and Ruse, Michael (2004): *Debating design. From Darwin to DNA*. Cambridge: Cambridge University Press.
- Dennett, Daniel (2006): *Breaking the spell*. London: Penguin Books.
- Dennett, Daniel (2009): "Darwin's "strange inversions of reasoning"", *Proceedings of the National Academy of Science*, 106, pp. 10061-10065.
- Dennett, Daniel, and Plantinga, Alvin (2011): *Science and religion: are they compatible?* New York: Oxford University Press.
- Forrest, Barbara, and Gross, Paul R. (2004): *Creationism's Trojan horse. The wedge of intelligent design*, Oxford: Oxford University Press.
- Gould, Stephen Jay (1999): *Rocks of Ages*. Ballantine Books.
- Lennox, John C. (2011): *Gunning for God. Why the new atheists are missing the target*. Oxford: Lion Hudson.
- Pallen, Mark J., and Matzke, Nicholas J. (2006): "From *The Origin of Species* to the origin of bacterial flagella", *Nature Reviews Microbiology* 4(1), pp. 784-790.
- Phy-Olsen, Allene (2010): *Evolution, creationism, and intelligent design (Historical guides to controversial issues in America)*, Santa Barbara: Greenwood.
- Plantinga, Alvin (2011): *Where the conflict really lies: Science, religion, & naturalism*. Oxford: Oxford University Press.
- Poole, Verla (2012): *A comprehensive introduction to intelligent design*, Delhi: White Word Publication.
- Ruse, Michael (2003): *Darwin and Design: Does Evolution have a Purpose?*, Cambridge, Mass.: Harvard University Press.
- Ruse, Michael (2005): *The Evolution-Creation Struggle*. Cambridge, Mass.: Harvard University Press.
- Scott, Eugenie C. (2004): *Evolution vs. creationism*. Los Angeles: University of California Press.
- Scott, Eugenie C., and Branch, Glenn (2006): *Not in our classrooms. Why intelligent design is wrong for our schools*, Boston: Beacon Press.
- Shanks, Niall (2004): *God, the Devil, and Darwin. A critique of intelligent design theory*, Oxford: Oxford University Press.
- Sober, Elliot (2007): "What's wrong with intelligent design?", *The Quarterly Review of Biology* 82, pp. 3-8. www.creation.com for some input and possible criticism of evolutionary theory.

Possible guiding questions:

- History of science: Characterization of the history of the debate (especially since Darwin's publication).*
- Philosophy of science: How can one argue in favour of creationism, and, thus, against the theory of evolution (or against science in general)?*
- Philosophy of science: What are the arguments against creationism / arguments in favour of the theory of evolution?*
- Philosophy of science: Can recent creationist (or ID) approaches be called scientific? Under what conditions diverse perspectives (e.g. creationism and evolutionary theory) may be reconciled?*

2) Biological fitness – more than a story telling metaphor?

Get started with the Stanford Encyclopedia overview article:

Rosenberg, Alexander and Bouchard, Frédéric (2015): “Fitness”, *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/fitness/>

Propositions for bibliography:

Ariew, André and Lewontin, Richard, C. (2004): “Confusions of fitness”, *The British Journal for the Philosophy of Science* 55, pp. 347-363.

Ariew, André and Ernst, Zachary (2009): “What fitness can’t be”, *Erkenntnis* 71, pp. 289-301.

Drouet, Isabelle and Merlin, Francesca (2015): “The propensity interpretation of fitness and the propensity interpretation of probability”, *Erkenntnis* 80, pp. 457-468.

Krimbas, Costas B. (2004): “On fitness”, *Biology & Philosophy* 19, pp. 185-203.

Mills, Susan K. and Beatty, John H. (1979): “The propensity interpretation of fitness”, *Philosophy of Science* 46, pp. 263-286.

Pigliucci, Massimo and Kaplan, Jonathan (2006): *Making sense of evolution. The conceptual foundations of evolutionary biology*, Chicago: University of Chicago Press, chapter 1.

Rosenberg, Alexander (1978): “The supervenience of biological concepts”, *Philosophy of Science* 45, pp. 368-386.

Sober, Elliott (2000): *Philosophy of biology. Second edition*. Boulder: Westview Press, chapters 1 & 3.

Weber, Marcel (1996): “Fitness made physical: the supervenience of biological concepts revisited”, *Philosophy of Science* 63, pp. 411-431.

Possible guiding questions:

- a) *History of science: Characterization of the principle of natural selection and the concept of fitness in the context Darwin’s theory of evolution.*
- b) *Philosophy of science: What is the dilemma with the notion of fitness?*
- c) *Philosophy of science: What are the possible characterization of the concept of fitness (e.g. as a supervenient property)?*
- d) *Philosophy of science: Is there any solution to the dilemma if one rather follows one interpretation than another? Is there a drawback for any solution (e.g. is it still possible to use the notion of fitness in order to explain evolutionary change)?*

3) The role of chance and adaptations in evolution

Get started with the Stanford Encyclopedia overview article:

Orzack, Steven Hecht and Forber, Patrick (2010): "Adaptationism", *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/adaptationism/>

Propositions for bibliography:

- Abrams, Marshall (2007): "How do natural selection and random drift interact?" *Philosophy of Science* 74(5), pp. 666-679.
- Beatty, John and Desjardins, Eric Cyr (2009): "Natural selection and history", *Biology & Philosophy* 24, pp. 231-246.
- Forber, Patrick (2009): "Spandrels and a pervasive problem of evidence", *Biology & Philosophy* 24, pp. 247-266.
- Gould, Stephen Jay and Lewontin, Richard C. (1978): "The spandrels of San Marco and the panglossian paradigm: a critique of the adaptionist programme", *Proceedings of the Royal Society of London B* 205, pp. 581-598.
- Houston, Alasdair I. (2009): "San Marco and evolutionary biology", *Biology & Philosophy* 24, pp. 215-230.
- Lewens, Tim (2009): "Seven types of adaptationism", *Biology & Philosophy* 24, pp. 161-182.
- Malaterre, Christophe and Merlin, Francesca (2014): „The (in)determinism of biological evolution: where does the stochastic character of evolutionary theory come from?“, in T. Heams et al (eds.): *Handbook of evolutionary thinking in the sciences*, Springer.
- Nei, Masatoshi (2005): "Selectionism and neutralism in molecular evolution", *Molecular Biology and Evolution* 22, pp. 2318-2342.
- Potochnik, Angela (2009): "Optimality in a suboptimal world", *Biology & Philosophy* 24, pp. 183-197.
- Sober, Elliott (2000): *Philosophy of biology. Second edition*. Boulder: Westview Press, chapter 5.
- Sober, Elliott and Orzack, Steven Hecht (2003): "Common ancestry and natural selection", *The British Journal for the Philosophy of Science* 54, pp. 423-437.
- Turner, Derek (2011) : « Gould's replay revisited », *Biology & Philosophy* 26, pp. 65-79.
- van Valen, Leigh (2009) : « How ubiquitous is adaptation ? A critique of the epiphenomenist program », *Biology & Philosophy* 24, pp. 267-280.
- Wilkins, Jon F. and Godfrey-Smith, Peter (2009): "Adaptationism and the adaptive landscape", *Biology & Philosophy* 24, pp. 199-214.

Possible guiding questions:

- a) *History of science: Characterization of the history of the debate (especially 20th century).*
- b) *Philosophy of science: Define the notions of "adaptation", "adaptationism", "random drift" and "chance".*
- c) *Philosophy of science: What are the arguments for and against adaptationism?*
- d) *Philosophy of science: What are the broader implications of one or both of the positions?*

4) The unit of selection problem – altruism vs egoism

Get started with the Stanford Encyclopedia overview article:

Lloyd, Elisabeth A. (2017): “Units and levels of selection”, *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/selection-units/>

Note: if you’re interested in evolutionary transitions (mentioned at several points in the lectures) **have a look at section 3.5 of the cited article or look also at:** <https://plato.stanford.edu/entries/macroevolution/#MajoEvolTran>

Propositions for bibliography:

- Axelrod, R. and Hamilton, W. (1981): “The evolution of cooperation”, *Science* 211, pp. 1390-1396.
- Axelrod, Robert (1984): *The evolution of cooperation*, New York: Basic Books.
- Brandon, Robert (1982): “The levels of selection”, *Proceedings of the Philosophy of Science Association* Vol. 1982 Vol. 1, pp. 315-323.
- Dawkins, Richard (1976): *The selfish gene*, Oxford: Oxford University Press.
- Garvey, Brian (2007): *Philosophy of biology*, Stocksfield: Acumen, chapter 3.
- Grafen, Alan (2007): “An inclusive fitness analysis of altruism on a cyclical network”, *Journal of Evolutionary Biology* 20, pp. 2278-2283.
- Hamilton, William D. (1963): “The evolution of altruistic behavior”, *The American Naturalist* 97, pp. 354-356.
- Hamilton, William D. (1964): “The genetical evolution of social behaviour I (II)”, *Journal of Theoretical Biology* 7, pp. 1-16 (pp. 17-52).
- Kitcher, Philip, Sterelny, Kim and Waters, C. Kenneth (1990): “The illusory riches of Sober’s monism”, *The Journal of Philosophy* 87, pp. 158-161.
- Maynard Smith, John and Price, George R. (1973): “The logic of animal conflict”, *Nature* 246, pp. 15-18.
- Maynard Smith, John (1974): “The theory of games and the evolution of animal conflicts”, *Journal of Theoretical Biology* 47, pp. 209-221.
- Okasha, Samir (2008): “The units and levels of selection”, in: S. Sarkar and A. Plutynski, (eds.) (2008): *A companion to the philosophy of biology*, Malden: Blackwell Publishing, pp. 138-156
- Sober, Elliott (1990): “The poverty of pluralism: A reply to Sterelny and Kitcher”, *The Journal of Philosophy* 87, pp. 151-158.
- Sterelny, Kim and Kitcher, Philip (1988): “The return of the gene”, *Journal of Philosophy* 85, pp. 339-361.
- Taylor, Peter D., Day, Troy and Wild, Geoff (2007): “From inclusive fitness to fixation probabilities in homogenous structured population”, *Journal of Theoretical Biology* 249, pp. 101-110.
- Trivers, Robert L. (1971): “The evolution of reciprocal altruism”, *The Quarterly Review of Biology* 46, pp. 35-57.
- West, Stuart A., Griffin, Ashleigh S. and Gardner, Andy (2007): “Evolutionary explanations for cooperation”, *Current Biology* 17, pp. R661-R672.
- Wilson, David Sloan and Sober, Elliot (1994): “A critical review of philosophical work on the units of selection problem”, *Philosophy of Science* 61, pp. 534-555.

Possible guiding questions:

- History of science: Provide a short sum up of the origin and history of the debate.
- Philosophy of science: Characterize the different positions in the debate.
- Philosophy of science: What are the strongest arguments in favour and against each position?
- Philosophy of science: Is it possible to combine the different approaches in order to provide a solution (e.g. multi-level selectionist approaches)?

5) The emergence and definition of life

Get started with the Stanford Encyclopedia overview article:

Weber, Bruce (2021): "Life", *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/life/>

For the important concept of "replication", look also at the recently updated article: Hull, David and Wilkins, John S. (2018): "Replication", *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/replication/>

Propositions for bibliography:

Dawkins, Richard (1986): *The blind watchmaker. Why the evidence of evolution reveals a universe without design*, New York: Norton.

Eigen, Manfred and Schuster, Peter (1978): "The hypercycle. A principle of natural self-organization", *Naturwissenschaften* 65, pp. 7-41.

Lazcano, Antonio and Bada, Jeffrey L. (2003): "The 1953 Stanley L. Miller experiment: fifty years of prebiotic organic chemistry", *Origins of Life and Evolution of the Biosphere* 33, pp. 235-242.

Mayr, Ernst (2002): *What evolution is*, London: Phoenix, chapter 3.

Maynard Smith, John and Szathmáry, Eörs (1999): *The origins of life*. Oxford: Oxford University Press; French translation (2000): *Les origines de la vie*. Paris: Editions Dunod.

Miller, Stanley L. (1953): "Production of amino acids under possible primitive earth conditions", *Science* 117, p. 528.

Oparin, Alexander Ivanovich (1961): *Life: its nature, origin and development*, New York: Academic Press.

Ruiz-Mirazo, Kepa, Peretó, Juli, and Alvaro, Moreno (2010): "A universal definition of life: autonomy and open-ended evolution", in: M. A. Bedau and C. E. Cleland (eds): *The nature of life*, Cambridge: Cambridge University Press, pp. 310-325.

Sterelny, Kim and Griffiths, Paul E. (1999): *Sex and death. An introduction to philosophy of biology*, Chicago: University of Chicago Press, chapter 15.

Szathmáry, Eörs (2006): "The origin of replicators and reproducers", *Philosophical Transactions of the Royal Society Biological Sciences* 361, pp. 1761-1776.

Wächtershäuser, Günther (1990): "Evolution of the first metabolic cycles", *Proceedings of the National Academy of Science* 87, pp. 200-204.

Wächtershäuser, Günther (2000): "Life as we don't know it", *Science* 289, pp. 1307-1308.

Possible guiding questions:

- a) *History of science: Sum up essential points of the history of the debate, the progress in empirical research.*
- b) *Philosophy of science: Spell out the main positions / hypotheses in the recent debate on what life is and how to define it.*
- c) *Philosophy of science: What are the strongest arguments in favour and against each position / hypothesis / definition?*
- d) *Philosophy of science: Are there any problems left if some position X turns out to be the correct one? What does it mean for us if life emerged according to position / hypothesis X?*

6) What is a biological individual / organism?

Get started with the Stanford Encyclopedia overview article:

Wilson, Robert A. & Barker, Matthew J. (2019): "The biological notion of individual", *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/biology-individual/>

Look also at the **special issues** edited by Pradeu, Thomas. Introduction article: Pradeu, Thomas (2016): "The many faces of biological individuality", *Biol Philos* 31, pp. 761-773. Link for overview an all included articles: <https://link.springer.com/journal/10539/31/6/page/1>

Propositions for bibliography:

- Bouchard, Frédéric & Huneman, Philippe (eds.)(2013): *From groups to individuals. Evolution and emerging individuality*. Cambridge (Mass.): MIT Press.
- Clarke, Ellen (2011): "The problem of biological individuality", *Biological Theory* 5, pp. 312-325.
- Clarke, Ellen (2012): "Plant individuality: a solution to the demographer's dilemma", *Biol Philos*
- Hull, David L. (1986): "On human nature", *PSA Proceedings of the Biennale Meeting of the Philosophy of Science*, 2, pp. 3-13.
- Hull, David L. (1992): "Individual", in: Keller, E. & Lloyd E. (eds.): *Keywords in evolutionary biology*, Cambridge: Harvard University Press, pp. 180-187.
- Garvey, Brian (2007): *Philosophy of Biology*, Stocksfield: Acumen, chapter 9.
- Mishler, Brent D. and Brandon, Robert N. (1987): "Individuality, pluralism, and the phylogenetic species concept", *Biology and Philosophy* 2, pp. 397-414.
- Pradeu, Thomas (2010): "What is an organism? An immunological answer", *Hist. Phil. Life Sci.*, 32, pp. 247-268.
- Sober, Elliott (2000): *Philosophy of biology. Second Edition*, Boulder: Westview Press, chapter 6.2.
- Sterelny, Kim and Griffiths, Paul E. (1999): *Sex and death. An introduction to philosophy of biology*, Chicago: University of Chicago Press, chapter 9.
- Wilson, Robert A. (2005): "What is an organism", in his book *Genes and the agents of Life*, New York: Cambridge University Press, chapter 3.

Possible guiding questions:

- History of science: Give a short overview on the recent debate with some examples that represent the problem/debate.*
- Philosophy of science: Explain why a notion of biological individuality is important.*
- Philosophy of science: Present the common sense view on biological organisms/individuals and its problems.*
- Philosophy of science: Explain the evolutionary approach and make a contrast to alternatives, e.g. physiological approaches or organizational ones.*
- Philosophy of science: Discuss the arguments and problems of a pluralistic perspective.*

7) The tree of life and the species problem

Get started with the Stanford Encyclopedia overview articles:

Ereshefsky, Marc (2022): "Species", *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/species/>
Bird, Alexander and Tobin, Emma (2022): "Natural kinds", *The Stanford Encyclopedia of Philosophy*. <https://plato.stanford.edu/entries/natural-kinds/>

Propositions for bibliography:

Andam, Cheryl P., Williams, David and Gogarten, J. Peter (2010): "Natural taxonomy in light of horizontal gene transfer", *Biology & Philosophy* 25, pp. 589-602.
Bapteste, Eric and Burian, Richard M. (2010): "On the need for the integrative phylogenomics, and some steps toward its creation", *Biology & Philosophy* 25, pp. 711-736.
Boto, Luis (2010): "Horizontal gene transfer in evolution: facts and challenges", *Proceedings of the Royal Society B* 277, pp. 819-827.
Bouchard, Frédéric (2010): "Symbiosis, lateral function transfer and the (many) saplings of life", *Biology & Philosophy* 25, pp. 623-641.
Brigandt, Ingo (2009): "Natural kinds in evolution and systematics: Metaphysical and epistemological considerations", *Acta Biotheoretica* 57, pp. 77-97.
Charlebois, Robert L. and Doolittle, W. Ford (2004): "Computing prokaryotic gene ubiquity: rescuing the core from extinction", *Genome Research* 14, pp. 2469-2477.
Doolittle, W. Ford (2010): "The attempt on the life of the Tree of Life: science, philosophy and politics", *Biology & Philosophy* 25, pp. 455-473.
Dupré, John (1981): "Natural kinds and biological taxa", *The Philosophical Review* 90, pp. 66-90.
Franklin-Hall, L. R. (2010): "Trashing life's tree", *Biology & Philosophy* 25, pp. 689-709.
Gogarten, Peter J. and Townsend, Jeffrey P. (2005): "Horizontal gene transfer, genome innovation and evolution", *Nature Reviews Microbiology* 3, pp. 679-687.
Hull, David (1965): "The effect of essentialism on taxonomy – two thousand years of stasis", *The British Journal for the Philosophy of Science* 60, pp. 314-326.
LaPorte, Joseph (2004): *Natural kinds and conceptual change*, Cambridge: Cambridge University Press.
Lawrence, Jeffrey G. and Retchless, Adam C. (2010): "The myth of bacterial species and speciation", *Biology & Philosophy* 25, pp. 569-588.
Malaterre, Christophe (2010): "Lifeness signatures and the roots of the tree of life", *Biology & Philosophy* 25, pp. 643-658.
Mallet, James (2010): "Why was Darwin's view of species rejected by twentieth century biologists?" *Biology & Philosophy* 25, pp. 497-527.
Mayr, Ernst (2002): *What evolution is*, London: Phoenix, chapter 3 and 8-9.
O'Malley, Maureen A. (2010): "Ernst Mayr, the tree of life, and philosophy of biology", *Biology & Philosophy* 25, pp. 529-552.
Pigliucci, Massimo and Kaplan, Jonathan (2006): *Making sense of evolution. The conceptual foundations of evolutionary biology*, Chicago: University of Chicago Press, chapter 9.
Plutynski, Anya (2008): "Speciation and macroevolution", in: S. Sarkar and A. Plutynski (eds.): *A companion to the philosophy of biology*, Malden: Blackwell Publishing, pp. 169-185.
Richards, Richard A. (2008): "Species and taxonomy", in: M. Ruse (ed.) (2008): *The Oxford handbook of philosophy of biology*, Oxford: Oxford University Press, pp. 161-188.
Rieppel, Olivier (2010): "The series, the network, and the tree: changing metaphors of order in nature", *Biology & Philosophy* 25, pp. 475-496.
Sober, Elliott (2000): *Philosophy of biology. Second Edition*, Boulder: Westview Press, chapter 6.
Sterelny, Kim and Griffiths, Paul E. (1999): *Sex and death. An introduction to philosophy of biology*, Chicago: University of Chicago Press, chapter 9.

Possible guiding questions:

- History of science: Give a short overview on the debate – from Darwin until today.
- Philosophy of science: Explain the tree of life / species and its role for the theory of evolution.
- Philosophy of science: What are the arguments against the tree of life?
- Philosophy of science: Is it possible to give a definition of species as types (natural kinds)?

8) Disruptive selection and other ‘funny things’

This is a new and very much work in progress project (see lecture)

Get started with a biological overview article:

Rueffler et al. (2006): “Disruptive selection and then what?”, *Trends in Ecology and Evolution* 21.

Propositions for bibliography:

Bolnick, Daniel, and Doebeli, Michael (2003): “Sexual dimorphism and adaptive speciation: two sides of the same ecological coin”, *Evolution* 58, pp. 2433-2449.

Maynard Smith (1966): “Sympatric speciation”, *The American Naturalist* 100(916), pp. 637-650.

Slatkin, Montgomery (1984): “Ecological causes of sexual dimorphism”, *Evolution* 38(3), pp. 622-630.

Very good books:

Ah-King, Malin (2023): *The female turn. How evolutionary science shifted perceptions about females*. Palgrave Macmillan.

Arnqvist, Göran & Rowe, Locke (2011): *Sexual conflict*. Princeton University Press.

Burt, Austin & Trivers, Robert (2006): *Genes in conflict. The biology of selfish genetic elements*. Harvard University Press.

Possible guiding questions:

- a) *History of science: Summary of the recent change in perspective on the importance and particularities of natural selection.*
- b) *Philosophy of science: Distinction between natural selection and sexual selection (+history: what has changed since Darwin?).*
- c) *Philosophy of science: How does disruptive selection works, what are case studies?*
- d) *Philosophy of science: Is it possible to better understand speciation through disruptive selection, what are the implications for understanding sexual dimorphism?*

9) The notion of functions in biology

Get started with the Stanford Encyclopedia overview articles:

Allan, Colin & Neal, Jacob (2020): "Teleological notions in biology", *Stanford Encyclopedia of Philosophy* <https://plato.stanford.edu/entries/teleology-biology/>

Propositions for bibliography:

- Ariew, André (2007): "Teleology", in: Hull, D. et Ruse, M. (eds.): *The Cambridge companion to the philosophy of biology*, Cambridge University Press, ch. 9 (pp. 160-181).
- Ariew, André, Cummins, Robert, and Perlman, Mark (eds.) (2002/2009): *Functions. New Essays in the philosophy of psychology and biology*, Oxford: Oxford University Press.
- Arp, Robert (2007): "Evolution and two popular proposals for the definition of function", *Journal for General Philosophy of Science* 38, pp. 19-30.
- Amundson, Ron and Lauder, George V. (1994): "Function without purpose", *Biology & Philosophy* 9, pp. 443-469.
- Bigelow, John and Pargetter, Robert (1987): "Functions", *Journal of Philosophy* 84, pp. 181-196.
- Christensen, Wayne D. and Bickhard, Mark H. (2002): "The Process Dynamics of Normative Function", *The Monist* 85(1), pp. 3-28.
- Craver, Carl (2001): "Role functions, mechanisms, and hierarchy", *Synthese* 153, pp. 355-376.
- Cummins, Robert (1975): "Functional analysis", *Journal of Philosophy* 72, pp. 741-764.
- Garvey, B. (2007): *Philosophy of biology*. Acumen, chapter 7.
- Godfrey-Smith, Peter (1993): "Functions: consensus without unity", *Pacific Philosophical Quarterly* 74, pp. 196-208.
- Godfrey-Smith, Peter (1994): "A modern history theory of functions", *Noûs* 28, pp. 344-362.
- Griffiths, Paul E. (1993): "Functional analysis and proper functions", *The British Journal for the Philosophy of Science* 44, pp. 409-422.
- Hull, David L. and Ruse, Michael (eds.) (1998): *Oxford Readings in Biology. The philosophy of biology*. Oxford University Press, notably part IV (introduction by Hull and then the articles by Amundson & Lauder, Kitcher and Godfrey-Smith that are also individually listed in this bibliography).
- Kitcher, Philip (1993): "Function and design", in P. A. French, T. E. Uehling et H. K. Wettstein (eds): *Midwest Studies in Philosophy XVIII*, Minneapolis: University of Minnesota Press, pp. 379-397.
- Manning, Richard N. (1997): "Biological function, selection, and reduction", *The British Journal for the Philosophy of Science* 48, pp. 69-82.
- McLaughlin, Peter (2001): *What functions explain. Functional explanation and self-reproducing systems*, Cambridge: Cambridge University Press.
- Millikan, Ruth Garrett (1989): "In defense of proper functions", *Philosophy of Science* 56, pp. 288-302.
- Mitchell, Sandra D. (1993): "Dispositions or etiologies? A comment on Bigelow and Pargetter", *The Journal of Philosophy* 90, pp. 249-259.
- Mossio, Matteo, Saborido, Cristian and Moreno, Alvaro (2009): "An organizational account of biological functions", *The British Journal of the Philosophy of Science* 60, pp. 813-841.
- Neander, Karen (1991): "Function as selected effects: the conceptual analyst's defense", *Philosophy of Science* 58, pp. 168-184.
- Lewens, Tim (2007): "Functions", in: Matthen, M. et Stephens, C. (eds.) (2007): *Handbook of the philosophy of science: Philosophy of biology*, Elsevier, pp. 525-547.
- Saborido, Cristian, Mossio, Matteo, and Moreno, Alvaro (2011): "Biological organization and cross-generation functions", *The British Journal of the Philosophy of Science* 62, pp. 583-606.
- Schwartz, Peter H. (1999): "Proper function and recent selection", *Philosophy of Science* 66, pp. S210-S222.
- Walsh, D. M. (1996): "Fitness and function", *The British Journal for the Philosophy of Science* 47, pp. 553-574.
- Wouters, Arno G. (2003): "Four notions of biological function", *Studies in History and Philosophy of Biological and Biomedical Sciences* 34, pp. 633-668.
- Wouters, Arno G. (2005): "The function debate in philosophy", *Acta Biotheoretica* 53, pp. 123-151.
- Wright, Larry (1973): "Functions", *Philosophical Review* 82, pp. 139-168.

Possible guiding questions:

- History of science: Characterization of the development from teleological to functional explanations.
- Philosophy of science: Comparison between the two main rival conceptions of a biological function – historical development (e.g. Wright 1973) vs. causal role / systemic account (non-historical approach) (e.g. Cummins 1975).
- Philosophy of science: What are the new approaches in contemporary philosophy of biology (e.g. the organizational approach; e.g. Mossio et al. 2009 or Saborido et al. 2011)?
- Philosophy of science: Is it possible to combine and unify the different approaches, is it possible to provide a clear notion of dysfunction?

10) Scientific explanations in neuroscience and biology

Get started with the Stanford Encyclopedia overview articles:

Woodward, James (2021): "Scientific explanation", *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/scientific-explanation/>

Propositions for bibliography:

- Craver, Carl (2001): "Role functions, mechanisms, and hierarchy", *Philosophy of science* 68, pp. 53-74.
- Craver, Carl (2006): "When mechanistic models explain", *Synthese* 153, pp. 355-376.
- Craver, Carl (2007): "Explaining the brain: mechanisms and the mosaic unity of neuroscience", Oxford: Oxford University Press.
- Darden, Lindley (2002): "Strategies for discovering mechanisms: schema instantiation, modular subassembly, forward/backward chaining", *Philosophy of Science* 69, pp. S354-S365.
- Friedman, Michael (1974): "Explanation and scientific understanding", *Journal of Philosophy* 71, pp. 5-19.
- Glennan, Stuart (2002): "Rethinking mechanistic explanation", *Philosophy of science* 69, pp. S342-S353.
- Hempel, Carl Gustav (1942): "The function of general laws in history", *Journal of Philosophy* 39, pp. 35-48.
- Hempel, Carl Gustav and Oppenheim, Paul (1948): "Studies in the logic of explanation", *Philosophy of Science* 15, p. 135-175.
- Hempel, Carl Gustav (1962): "Two models of scientific explanation", in: R. G. Colodny (ed.): *Frontiers of Science and philosophy*, Pittsburgh: The University of Pittsburgh Press, pp. 9-19.
- Kitcher, Philip (1976): "Explanation, conjunction, and unification", *The Journal of Philosophy* 73, pp. 207-212.
- Kitcher, Philip (1981): "Explanatory unification", *Philosophy of Science* 48, pp. 507-531.
- Machamer, Peter, Darden, Lindley and Craver, Carl (2000): "Thinking about mechanisms", *Philosophy of science* 67, pp. 1-25.
- Oppenheim, Paul and Putnam, Hilary (1958): "The unity of science as a working hypothesis", in: H. Feigl, G. Maxwell and M. Scriven (eds.): *Minnesota Studies in the Philosophy of Science, II*, Minneapolis: The University of Minnesota Press, pp. 3-36.
- Psillos, Stathis (2002): *Causation & Explanation*, Chesham: Acumen, chapter 3.
- Psillos, Stathis (2007): "Causal explanation and manipulation", in: J. Persson and P. Ylikoski (eds.): *Rethinking explanation*, Dordrecht: Springer, pp. 93-107.
- Salmon, Wesley C. (1965): "The status of prior probabilities in statistical explanation", *Philosophy of Science* 32, pp. 137-146.
- Salmon, Wesley C. (1971): "Statistical explanation", in: W. C. Salmon (ed.): *Statistical explanation and statistical relevance*, Pittsburgh: University of Pittsburgh Press, pp. 29-87.
- Salmon, Wesley, C. (1977): "Hempel's conception of inductive inference in inductive-statistical explanation", *Philosophy of Science* 44, pp. 180-185.
- Salmon, Wesley, C. (1977): "Why ask 'Why?' – an inquiry concerning scientific explanation", *Proceedings and Addresses of the American Philosophical Association* 51, pp. 683-705.
- Salmon, Wesley C. (1998): *Causality and explanation*, Oxford: Oxford University Press.
- Woodward, James (1996): "Explanation, invariance, and intervention", *Philosophy of science* 64, pp. S26-S41.
- Woodward, James (2003): *Making things happen. A theory of causal explanation*, Oxford: Oxford University Press.
- Woodward, James (2010): "Causation in biology: stability, specificity, and the choice of levels of explanation", *Biology & Philosophy* 25, pp. 287-318.

Possible guiding questions:

- History of science: Sum up of the development of the debate about the models of scientific explanations.
- Philosophy of science: What is the model with the strongest arguments?
- Philosophy of science: What model represents at best the current research in neuroscience and biology?
- Philosophy of science: Is it possible to combine different models of scientific explanations?

11) DSM and mental disorders from a biological point of view

Get started with the Stanford Encyclopedia overview articles:

Radden, Jennifer (2019): "Mental disorder (Illness)", *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/mental-disorder/>

Have also a look at the recent, new approach (RDoC): <https://www.nimh.nih.gov/research/research-funded-by-nimh/rdoc/index.shtml>

Propositions for bibliography:

- Fulford, K. W. M. (2000): "Teleology without tears: Naturalism, new-naturalism, and evaluationism in the analysis of function statements in biology (and a bet on the twenty-first century)", *Philosophy, Psychiatry, & Psychology* 7(1), pp. 77-94.
- Kendler, K. S., Zachar, P., and Craver, C. (2011): "What kind of things are psychiatric disorders?", *Psychological Medicine* 41, pp. 1143-1150.
- Mayes, Rick and Horwitz, Allan V. (2005): "DSM-III and the revolution in the classification of mental illness", *Journal of the History of Behavioral Sciences*, Vol. 41(3), pp. 249-267.
- Megone, Christopher (2000): "Mental illness, human function, and values", *Philosophy, Psychiatry, & Psychology* 7(1), pp. 45-65.
- Sarag, Michael, and Stiefer, Friedrich (2011): "Psychiatry and the scientific fallacy", *Acta Psychiatry Scand* 214, pp. 70-72; Comment on this paper by: Parikh, S. V. (2011): "Does psychiatry suffer from a scientific fallacy?", *Acta Psychiatry Scand* 214, p. 73.
- Smoller, Jordan W. et al. (2013): "Identification of risk loci with shared effects on five major psychiatric disorders: a genome-wide analysis", *Lancet* 381(9875), pp. 1371-1379.
- Stein, Dan J., Phillips, Katharine, A., Bolton, Derek, Fulford, K.W. M., Sadler, John Z., and Kendler, Kenneth S. (2010): "What is a mental /psychiatric disorder? From DSM-IV to DSM-V", *Psycho Med* 40(11), pp. 1759-1765.
- Szasz, Thomas Stepen (2000). "Second commentary on "Aristotle's function argument"", *Philosophy, Psychiatry, & Psychology* 7(1), pp. 3-16.
- Thornton, Tim (2000): "Mental illness and reductionism: Can functions be naturalized?", *Philosophy, Psychiatry, & Psychology* 7(1), pp. 67-76.
- Wakefield, Jerome C. (1992): "The concept of mental disorder", *American Psychologist*, Vol. 47, pp. 373-388.
- Wakefield, Jerome C. (2000): "Aristotle as sociobiologist: The "Function of a human being" Argument, black box essentialism, and the concept of mental disorder", *Philosophy, Psychiatry, & Psychology* 7(1), pp. 17-44.
- Wakefield, Jerome C. (2007): "The concept of mental disorder: diagnostic implications of the harmful dysfunction analysis", *World Psychiatry*, Vol. 6, pp. 149-156.
- Switzerland (French):
- Kiefer, Bertrand (2010): "Le DSM-V, à la gloire d'une époque qui craint la déviance", *Revue Médical Suisse* 17 février 2010, p. 368.
- Saraga, Michael (2010): "A propos du DSM-V", *Revue Médical Suisse* 14 avril 2010, p. 782-783.

Possible guiding questions:

- History of science: What are the arguments for the change to DSM-III (cf. notably the introduction by Wakefield 1992 or 2007).*
- Philosophy of science: What are the problems to define mental disorders?*
- Philosophy of science: Despite all the obstacles, risks etc. concerning DSM, why does it still persist? What would be the alternative?*
- Philosophy of science: What is the connection with the debate on the notion of biological function?*

12) Natural laws in the life sciences

Get started with the Stanford Encyclopedia overview articles:

Carroll, John W. (2020): "Laws of nature", *Stanford Encyclopedia of Philosophy*, <https://plato.stanford.edu/entries/laws-of-nature/>

Or (in French):

Sachse, Christian (2018): "Lois de la nature", *L'encyclopédie philosophique*, <https://encyclo-philo.fr/item/185>

Propositions for bibliography:

Beatty, John (1980): "What's wrong with the received view of evolutionary theory?", *Proceedings of the Biennial Meeting of the Philosophy of Science Association*, Vol. 1980, Volume Two: Symposia and invited Papers, pp. 397-426.

Beatty, John (1995): "The evolutionary contingency thesis", in: G. Wolters and J. Lennox (eds.): *Concepts, theories and rationality in the biological sciences. The second Pittsburgh-Konstanz Colloquium in the philosophy of science*, Pittsburgh: University of Pittsburgh Press, pp. 45-81.

Beatty, John and Desjardins, Eric Cyr (2009): "Natural selection and history", *Biology & Philosophy* 24, pp. 231-246.

Dorato, Mauro (2005): *Software of the universe. An introduction to the history and philosophy of laws of nature*, Aldershot: Ashgate.

Dorato, Mauro (2011): "Mathematical Biology and the Existence of Biological Laws", in: D. Dieks, W. Gonzales, S. Hartmann, M. Stöltzner and M. Weber (eds.): *Probabilities, laws and structures*, Dordrecht: Springer, pp. 119-132.

Kistler, Max (1999): *Causalité et lois de la nature*, Paris: Vrin, Collection Mathesis; English translation under the title: *Causation and laws of nature*, London: Routledge (2006).

Lange, Marc (1999): "Laws, counterfactuals, stability, and degrees of lawhood", *Philosophy of Science* 66, pp. 243-267.

Lange, Marc (2009): *Laws & lawmakers*, Oxford: Oxford University Press.

Psillos, Stathis (2002): *Causation & Explanation*, Chesham: Acumen, chapter 2.

Rosenberg, Alexander (1994): *Instrumental biology or the disunity of science*, Chicago: Chicago University Press.

Rosenberg, Alexander (2006): *Darwinian reductionism. Or, how to stop worrying and love molecular biology*, Chicago: University of Chicago Press, chapter 6.

Sober, Elliott (1997): "The outbreakness of lawlessness in recent philosophy of biology", *Philosophy of Science* 64, pp. S458-S467.

Possible guiding questions:

- a) History of science: Characterization of the debate (20th century until today).
- b) Philosophy of science: Discussion of the different conception of laws.
- c) Philosophy of science: What are the arguments against the existence of laws in the life sciences? What are the problems for the existence of laws in the life sciences that do not exist in physics?
- d) Philosophy of science: How is it possible to argue in favour of the existence of laws in the life sciences? What are implications if there are not laws in the life sciences?

13) Reductionism vs. antireductionism

Get started with the Stanford Encyclopedia overview articles:

Brigandt, Ingo and Love, Alan (2017): "Reduction in biology", *Stanford Encyclopedia of Philosophy*, <http://plato.stanford.edu/entries/reduction-biology/>

Propositions for bibliography:

- Bickle, John (1998): *Psychoneural reduction. The New Wave*. Cambridge, MA: MIT Press.
- Bickle, John (2003): *Philosophy and neuroscience. A ruthlessly reductive account*, Dordrecht: Kluwer.
- Esfeld, Michael & Sachse, Christian (2007): "Theory reduction by means of functional subtypes", *International Studies in the Philosophy of Science*, 21(1): pp. 1–17.
- Esfeld, Michael & Sachse, Christian (2011): *Conservative reduction*, London/New York: Routledge.
- Fodor, Jerry A. (1974): "Special sciences (or: The disunity of science as a working hypothesis)". *Synthese* 28, pp. 97–115.
- Hohwy, Jakob and Kallesrup, Jesper (eds.) (2008): *Being reduced*, Oxford: Oxford University Press.
- Hooker Clifford (1981): "Towards a general theory of reduction. Part I: Historical and scientific setting. Part II: Identity in reduction. Part III: Cross-categorical reduction", *Dialogue* 20, pp. 38-60, pp. 201-236 and pp. 496-529.
- Kim, Jaegwon (1999): "Making sense of emergence". *Philosophical Studies* 95: pp. 3-36.
- Kim, Jaegwon (2005): *Physicalism, or something near enough*. Princeton: Princeton University Press, chapter 4.
- Kitcher, Philip (1984): "1953 and all that. A tale of two sciences", *Philosophical Review* 93, pp. 335–373. Reprinted in Philip Kitcher (2003): *In Mendel's mirror. Philosophical reflections on biology*. Oxford: Oxford University Press. Pp. 3–30.
- Marras, Ausonio (2007): "Kim's supervenience argument and nonreductive physicalism", *Erkenntnis* 66, pp. 305-327.
- Nagel, Ernest (1961): *The structure of science: problems in the logic of scientific explanation*. London: Routledge and Kegan Paul: pp. 336-366.
- Sachse, Christian (2007): *Reductionism in the philosophy of science*. Frankfurt (Main): Ontos.
- Sachse, Christian (2010-11): "Conservative reduction of biology", *Philosophia Naturalis* 47-48 (1), pp. 33-65
- Schaffner, Kenneth F. (1967): "Approaches to reduction", *Philosophy of Science* 34, pp. 137-147.
- Schaffner, Kenneth F. (1969): "The Watson-Crick model and reductionism", *The British Journal for the Philosophy of Science* 20, pp. 325-348.
- Soom, Patrice, Sachse, Christian and Esfeld, Michael (2010): "Psycho-neural reduction through functional subtypes", *Journal of Consciousness Studies* 17, pp. 7-26.
- Waters, C. Kenneth (1994): "Genes made molecular", *Philosophy of Science* 61, pp. 163-185.
- Waters, C. Kenneth (2000): "Molecules made molecular", *Revue internationale de Philosophie* 4, pp. 539-564.

Possible guiding questions:

- a) History of science: Characterization of the scientific progress from classical genetics to molecular genetics (of molecular biology and reductive explanations in general).
- b) Philosophy of science: What are the arguments against reductionist approaches?
- c) Philosophy of science: What are the main models of reductions and to what extent they can be applied in genetics (biology / neuroscience)?
- d) Philosophy of science: Is there any danger in the scientific progress, in reductionist approaches, etc.? Is the anti-reductionist argument an ultimate argument or may it be possible one day to decode us in terms of molecular genetics (biology)?

14) Free Will, chance and determination

Get started with the Stanford Encyclopedia overview articles:

O'Connor, Timothy & Franklin, Christopher (2018): "Free Will", *Stanford Encyclopedia of Philosophy*, <http://plato.stanford.edu/entries/freewill/>

Propositions for bibliography:

Dilman, Ilham (1999): *Free Will: An Historical and Philosophical Introduction*. London: Routledge.

Ekstrom, Laura (2000): *Free Will: A Philosophical Study*. Boulder, CO: Westview Press.

Ekstrom, Laura (2003): "Free Will, Chance, and Mystery," *Philosophical Studies*, 113, 153–180.

Frankfurt, Harry (1982): "Freedom of the Will and the Concept of a Person," in Watson (1982), ed., 81–95.

Kane, Robert (ed.) (2002; 2nd edition 2010): *Oxford Handbook on Free Will*. New York: Oxford University Press.

Kane, Robert (2005): *A Contemporary Introduction to Free Will*. New York: Oxford University Press.

Lowe, E.J. (2008). *Personal Agency: The Metaphysics of Mind and Action*. Oxford: Oxford University Press.

O'Connor, Timothy (ed.) (1995): *Agents, Causes, and Events: Essays on Indeterminism and Free Will*. New York: Oxford University Press.

O'Connor, Timothy (2000): *Persons and Causes: The Metaphysics of Free Will*. New York: Oxford University Press.

O'Connor, Timothy (2008): "Agent-Causal Power," in Toby Handfield (ed.), *Dispositions and Causes*, Oxford: Clarendon Press, 189-214.

O'Connor, Timothy (2009): "Conscious Willing and the Emerging Sciences of Brain and Behavior," in George F. R. Ellis, Nancey Murphy, and Timothy O'Connor (eds.): *Downward Causation And The Neurobiology Of Free Will*. 2009, New York: Springer Publications, 173- 186.

Pink, Thomas (2004): *Free Will: A Very Short Introduction*. Oxford: Oxford University Press.

Watson, Gary (1987): "Free Action and Free Will," *Mind* 96, 145–72.

Watson, Gary (ed.) (2003b): *Free Will*. 2nd edition. Oxford: Oxford University Press.

Wegner, Daniel (2002): *The Illusion of Conscious Will*. Cambridge, MA: MIT Press.

Possible guiding questions:

- a) History of science: Explore the history of the discussion of Free Will in the life sciences (20th century until today).
- b) Philosophy of science: What is the role of free will as seen from an evolutionary perspective?
- c) Philosophy of science: Is there space for free will in the world described by the life sciences today?
- d) Philosophy of science: Can the life sciences support the view that free will exist? How so?