

## Global Risks for a Living Planet: Climate, Biodiversity, Pandemics

Course title – Intitulé du cours	Global Risks for a Living Planet: Climate, Biodiversity, Pandemics
Level / Semester – Niveau /semestre	M2 / S3
School – Composante	Ecole d'Economie de Toulouse
Teacher – Enseignant responsable	Marion Desquilbet, Anouch Missirian, Ulrich Hege (coordinators)
Other teacher(s) – Autre(s) enseignant(s)	Serge Morand
Other teacher(s) – Autre(s) enseignant(s)	Christophe Cassou
Other teacher(s) – Autre(s) enseignant(s)	NN
Other teacher(s) – Autre(s) enseignant(s)	NN
Other teacher(s) – Autre(s) enseignant(s)	
Lecture Hours – Volume Horaire CM	15
TA Hours – Volume horaire TD	
TP Hours – Volume horaire TP	
Course Language – Langue du cours	English / Anglais
TA and/or TP Language – Langue des TD et/ou TP	

### Teaching staff contacts – Coordonnées de l'équipe pédagogique :

Email and office:

### Course Objectives – Objectifs du cours :

This course offers an introduction to three long-term threats to modern economies and societies, life and ecosystems: climate change, biodiversity loss, and the risk of pandemics. The objective is to provide an introduction to the scientific bases behind each of these long-term risks, to understand how they are related to human activity, and how risks pertaining to them can be assessed and addressed. Concerning climate change, the course will cover questions including: what is the carbon cycle? Why is the prediction of the impact of greenhouse gas emissions subject to so much uncertainty? What are the major climate scenarios, and how are they related to predictions of GHG emissions? What are the major anticipated climate risks today, and how predictable is the impact in terms of geographical concentration? Concerning biodiversity, questions that the course addresses include: What is biodiversity loss, and how can it be measured? Why and where does it matter for societies and life on the planet? What are the measures of the impact of human activity on biodiversity loss? Concerning epidemics, questions include: what are zoonoses? What are major threats of new epidemics that may emerge, and to what extent can epidemic risks be predicted or anticipated? What are lessons from Covid-19 and from past pandemics?

This is a multidisciplinary course that goes beyond economics and connects to other disciplines in the life and geosciences, in particular climatology, ecology, and epidemiology. The teaching will largely rely on specialists from outside TSE.

**Prerequisites – Pré requis :**

There are no prerequisite other than introductory economics and high-school knowledge of natural sciences.

**Practical information about the sessions – Modalités pratiques de gestion du cours :**

Students are expected to attend and actively participate in all lectures.

**Grading system – Modalités d'évaluation :**

The final grade consists of a final exam at semester end.

**Bibliography/references – Bibliographie/références :**

Readings will include selected reports from the intergovernmental panels (IPCC and IPBES) as well other materials selected by the speakers. Detailed readings will be indicated in due course.

**Session planning – Planification des séances :**

- I. Climate change
  - a. The physical science basis: Earth's radiative balance, the carbon cycle and sources of uncertainty about the climate impact of GHG emissions
  - b. Impacts, adaptation, vulnerabilities: major anticipated climate risks, and predicting geographical risk exposure
  - c. Mitigation: major climate scenarios and the role of GHG emission scenarios and budgets with mitigation
- II. Biodiversity
  - a. Biodiversity: nature, measurement, trends and drivers of biodiversity loss
  - b. Consequences of biodiversity loss
  - c. Scenarios for biodiversity and mitigation policies
- III. Epidemics
  - a. Viruses, with a focus on zoonotic diseases, and lessons learned from Covid-19
  - b. Bacteria, bacterial pandemics, and other pathogens

The course will dedicate about 6 hours to climate change, 6 hours to Biodiversity, and 3 hours to epidemics. The teaching will largely rely on specialists from outside TSE that will offer mini-courses on specific questions related to each of the three long-term threats. Marion Desquilbet, Anouch Missirian, Ulrich Hege will act as joint course coordinators.

**Distance learning – Enseignement à distance :**

Distance learning can be provided when necessary by implementing, for example: / En cas de nécessité, un enseignement à distance sera assuré en mobilisant, par exemple :

- Interactive virtual classrooms / Classe en ligne interactive
- Recorded lectures (videos) / Vidéo enregistrée de la présentation du matériel pédagogique
- MCQ tests and other online exercises and assignments / QCM et exercices en ligne
- Remote (online) tutorials (classes) / TP/TD à distance
- Chatrooms / Forums