

**Short description of Minors & Majors of Environmental and Occupational Health Sciences track (EOHS)**

Module #	Module title	Coordinator	Contents	ECTS #	Teaching Week/year
216	<b>Minor A of the Environmental and occupational health sciences track "The Control of Environmental Infectious Diseases"</b>	Michèle Legeas	<p><b>Minor A « The Control of Environmental Infectious Diseases »</b></p> <p>This course is designed to introduce students to major issues related to global health and epidemics. The course is recommended for students of whom interest consists of getting knowledge and tools of the global prevention and the control of wide epidemics/pandemics and of their two complementary approaches 1) epidemiology and dynamic of transmission of agents modeling and 2) definition of policies adapted to the prevention and control. The course will introduce students to some basis about the different plans, organizations and policies internationally adopted. This course will also provide students the opportunity to analyze the potential contribution of research to support decision makers in such issues. This minor is designed in relationship to the Major A of ISB track (modeling of infectious diseases) and to the Major B of EHOS track (Advanced planetary health)</p> <p><b>Learning objectives: at the end of the module, the students should be able to:</b></p> <ul style="list-style-type: none"> <li>- Understand the importance of fighting against epidemics and the differences between all infectious diseases and those having wide potential to spread inside a population and coming from human or animal or vegetal reservoirs;</li> <li>- Describe international bodies involved against epidemics: WHO, FAO, OIE, ECDC, CDC etc., and their interactions, plans, programs, directives, guidelines ...</li> <li>- Explain the different models used to fight against epidemics: defining vaccine programs, predicting the spread of cases, understanding links between environmental factors and the epidemic dynamics etc.</li> </ul> <p>Discuss country preparedness to tackle epidemics, accounting their level of risks and the state of their health system.</p> <p><b>Prerequisite</b> Core curriculum in Environmental and Occupational Health Sciences of MPH1</p>	3	46, 2019
217	<b>Minor B of the Environmental and occupational health sciences track: « Impact Assessment in environmental Health »</b>	Séverine Deguen	<p><b>Minor B « Impact Assessment in environmental Health »</b></p> <p>This course is designed to introduce students to the major 234 "Critical windows of exposures and vulnerability". This course deals with impact assessment approaches and methods in the domain of environmental health. This course focuses on the application of quantitative techniques for impact evaluation. It is recommended for students who have an interest in better understanding certain biostatistics and epidemiological notions in an environmental health issue. The main goal of the module is to give an overview of the different approaches and methods aiming to assess the health impact of exposure to environmental stressors; these include epidemiological, economical and deliberative territorial methods which provide different metrics to give an appreciation of the health impact of a given environmental situation for use by decision makers and different stakeholders to inform their choices for action.</p> <p>Presentation of different approaches of environmental health impact assessment with an overall view of advantages and limitations with regard to a specific question. Each approach will be presented so that we will learn when, why, and how these methods are applied.</p> <p><b>Learning objectives: at the end of the module, the students should be able to:</b></p> <ul style="list-style-type: none"> <li>- To be familiar with the most common methods aiming to assess the health impact of exposure to environmental stressors.</li> <li>- To interpret the results obtained from a health impact assessment study</li> <li>- To select and list appropriate information in order to realize a health impact assessment, to answer to the study objective, to design the outlines of an intervention to improve the situation.</li> </ul> <p><b>Prerequisite:</b> Core curriculum in Environmental and occupational health sciences, in biostatistics and epidemiology</p>	3	47, 2019

232	Major A of the Environmental and occupational health sciences track : « Advanced Planetary Health»	Jean-François GUEGAN	<p><b>Major A « Advanced Planetary Health »</b></p> <p>There is growing understanding around the ways human-mediated environmental changes (e.g. land use change, wildlife trade, deforestation, climate change, human migration) significantly affect the health of wild and domestic animals, plants, and humans, resulting in both infectious and non-communicable diseases.</p> <p>Using a systems approach, we explore in this module the relationships between infectious diseases, biodiversity and ecosystems, the economics of disease and disease drivers, and the impacts of climate change and demography on health. Through this module, we seek to understand the health implications of current and anticipated global environmental change to identify policy and practical solutions to promote human health, ecosystem integrity, and sustainable development, i.e. Planetary health.</p> <p>We will see using different illustrations how too-narrowly focused vertical programs in medicine and public health cannot address the overlap that exists between animal and human health and even plant health, nor incorporate the necessary social, economic and ecosystem expertise.</p> <p>The adoption of more integrated approaches to human health is central in planetary health, and we need to implement a major shift in public health to better address the pressing global health challenges and achieve policy implementations by the UN's sustainable development goals.</p> <p>The course covers interdisciplinary scientific issues such as environmental systems, ecology, epidemiology, population dynamics, biomathematics and biostatistics, biodiversity changes, ecosystem modifications, climate change, agriculture development and intensive farming, transcontinental air transport and international trade, established and emerging diseases. The instructors are renowned international specialists in medical sciences, ecology/evolutionary biology and biomathematics affiliated to the most famous universities and research institutes in the world.</p> <p><b>Learning objectives:</b> at the end of the module, the students should be able to:</p> <ol style="list-style-type: none"> <li>1. Identify the main determinants of (new) infectious disease risks in a changing world</li> <li>2. Critically assess the quality and opportunity of national and international public health policies when facing these new disease risks</li> <li>3. Specify environmental risk assessment methods that are applied for microbial agents</li> <li>4. Put new emerging infectious disease risks into perspective with other (agriculture, demography, pollution, international travel and trade,...) dimension of globalization</li> </ol> <p><b>Prerequisite:</b> Good training, or research interest, in biology, international public health, science of complexity are requested. Course #217.</p>	3	49, 2019
233	Major B of the Environmental and occupational health sciences track : « Geographic Information System and Environmental Health »	Bertrand Lefebvre	<p><b>Major B « Geographic Information System and Environmental Health »</b></p> <p>Geographic Information Systems (GIS) have been absolutely fundamental in revealing patterns of inequalities in environmental exposures and mapping them. Many advances (GPS, remote sensing, open geographic data...) that have occurred in the past 20 years have helped us to better understand the spatial and temporal dimensions of exposures that are either harmful or beneficial for people's health.</p> <p>Students will learn how to apply GIS principles and tools to create maps and conduct basic spatial analysis investigations in environmental health. Using GoogleMaps, QGIS and a range of online geographic and environmental databases, students will learn how to create and manage spatial information. The module will introduce the best practices regarding cartographic principles and manipulation of vector and raster layers to create powerful maps and visualizations. Students will learn how to interpret and communicate results based on maps. Finally, basic spatial analysis tools (buffers, kriging, distance and density measures) will be introduced to the audience. While course's materials will be based on environmental health cases (i.e. planetary health), the methods and tools covered can be applied to other areas (i.e. health services research).</p> <p>This module, while being open to any student, is a required introduction to the module 231 on Spatial Statistical Analysis (ISB Track).</p> <p><b>Learning objectives:</b> at the end of the module, the students should be able to:</p> <ol style="list-style-type: none"> <li>1. Investigate a public health issue using geographic information and spatial analysis</li> <li>2. Create and manage geographic information</li> <li>3. Design, create and interpret maps as well as basic spatial analysis results</li> </ol> <p><b>Prerequisite</b></p>	3	2, 2020

			Advanced Core modules in environmental and occupational health sciences, in information sciences and biostatistics, in social & behavioral sciences in public health and in management & policy sciences		
234	<b>Major C of the Environmental and occupational health sciences track : «Critical windows of exposures and vulnerability»</b>	<b>Aurore Gely-Pernot</b>  <b>Robert Barouki</b>	<p><b>Major C «Critical windows of exposures and vulnerability»</b></p> <p>The toxicity of chemicals or of other environmental stressors is highly dependent on exposure conditions and on the particular vulnerability of the individual or group of persons. The module will address these issues with some emphasis on vulnerability during development and growth and on occupational exposures. The module is multidisciplinary with epidemiological, toxicological and social sciences perspectives. The following items will be discussed: importance of windows of exposure to carcinogens or reprotoxic agents during pregnancy, in early life and at the workplace; vulnerability of children to physical agents; transgenerational epigenetic effects both in experimental animals and in humans; examples of gene-environment interaction and mechanistic basis of vulnerability, notably during development.</p> <p><b>Learning objectives:</b> <i>at the end of the module, the students should be able to:</i></p> <ol style="list-style-type: none"> <li>1. Describe the hypothesis of the developmental origin of adult health and disease (DOHaD)</li> <li>2. Identify the role of parental exposure at work or in the general environment in developmental toxicity</li> <li>3. Describe gene-environment interactions in fetal development and disease</li> </ol> <p><b>Prerequisite:</b> Basic knowledge on biological mechanisms of disease and molecular biology. Such background is provided in the M1 EOHS modules (for example module 118).</p>	3	49, 2019