Syllabus Advanced Core Epidemiology

N°203	**Advanced Core Epidemiology**
Coordinator	Dr. Judith Mueller Department of Quantitative methods in Public Health (METIS) Ecole des Hautes Etudes en Santé Publique (EHESP, French School of Public Health) judith.mueller@ehesp.fr
Dates	3 September - 1 October 2024
Credits/ECTS	3 ECTS
Duration	30 hours
Location	EHESP campus at MSH-Paris Nord, 20 avenue George Sand, 93210 LA PLAINE ST DENIS.
Description	This module aims at providing students with working knowledge of epidemiology, which will allow them applying epidemiological concepts in a general public health work setting. This includes understanding epidemiological measures, study designs, biases and study validity, diagnostic testing as it relates to screening and use of epidemiological data in decision making and simple models for prediction and evaluation of intervention strategies (decision analysis). The module also aims at consolidating pre-existing knowledge to prepare students for the epidemiology track.
Prerequisites	Introduction to epidemiology (M1 level) Previous reading of K.J. Rothman: Epidemiology – an introduction . 2nd edition. (few copies available in the library) or other similar epidemiology book at introductory level.
Course learning objectives	Students who successfully complete this course should be able to: 1. Explain and apply principal concepts of epidemiological reasoning (validity, causality, power, attributable risk…) 2. Interpret and discuss epidemiological studies, their design and their contribution to public health 3. Perform simple epidemiological analyses (measures of frequency and association; standardization and Mantel-Haenszel; test performance; combining probabilities)
Structure (details of sessions title/speaker/date /duration)	Each course day will include two sessions. Sessions will typically be structured by 1.5h of lecture, 1h of lab assignment with presence of a teaching assistant, and 1h of discussion of the previous homework. See the schedule for details of each session.
Resources	Recommended book for the class: Charles H. Hennekens and Julie Buring: Epidemiology in Medicine [a few copies in the library] Students may also choose to read other appropriate epidemiology books to prepare for the classes (see in the library). Example of alternatives: K.J. Rothman: Epidemiology – an Introduction . 2nd edition. [copies in the library] K.J. Rothman: Modern Epidemiology [copy in the library; not recommended for students who are not in the epidemiology track] All other readings and materials will be posted on REAL. Lecture slides will be posted on REAL at least one week before the class.
Course requirement	Students are expected to attend all lectures and lab sessions. Class attendance will be checked accordingly. Validation of the module may be refused if attendance is judged insufficient

	Students must hand in homework assignments at the given deadlines. Students must read and analyse the lecture slides, corresponding book chapters and reading material before the courses. Asking questions and active contribution to discussions during lectures – as invited by the lecturer – is encouraged.
Grading and assessment	Final exam: 80% of grade Details on the exam conditions (on site, in distance, online or on paper) will be communicated later (at the latest during the exam preparation session). Submission of weekly homeworks is mandatory and will be graded (accounting for 20% of the course grade). Homeworks will be posted and must be submitted via Campus.
Course policy	Attendance & punctuality Regular and punctual class attendance is a prerequisite for receiving credit in a course. Students are expected to attend each class. Attendance will be taken at each class. The obligations of attendance and punctuality cover every aspect of the course: - lectures, conferences, group projects, assessments, examinations, as described in EHESP Academic Regulations http://mph.ehesp.fr EHESP Academic Regulation Article. 3). If students are not able to make it to class, they are required to send an email to the instructor and to the MPH program coordinating team explaining their absence prior to the scheduled class date. All supporting documents are provided to the end-of-year panel. . Students who miss class are responsible for content. Any student who misses a class has the responsibility for obtaining copies of notes, handouts and assignments. If additional assistance is still necessary, an appointment should be scheduled with the instructor. Class time is not to be used to go over material with students who have missed class. Lateness: Students who are more than 10 minutes late may be denied access to a class. Repeated late arrivals may be counted as absences (See http://mph.ehesp.fr EHESP Academic Regulation Article. 3 Attendance & Punctuality) Maximum absences authorized & penalty otherwise Above 20% of absences will be designated a fail for a given class. The students will be entitled to be reassessed in any failed component(s). If they undertake a reassessment or they retake a module this means that they cannot normally obtain more than the minimum pass mark (i.e. 10 out of 20) Exceptional circumstances Absence from any examination or test, or late submission of assignments due to illness, psychological problems, or exceptional personal reasons must be justified; otherwise, students will be penalized, as above mentioned. Students must directly notify their professor or the MPH academic secretariat before the exam or before the assignment deadline. Before accepting the student's justification, the professor or the MPH academic secretariat has the right to request either a certificate from the attending physician or from a psychologist, or from any other relevant person (See http://mph.ehesp.fr EHESP Academic Regulation Article 4 Examinations). Courtesy: All cell phones/pagers MUST be turned off during class time. Students are required to conduct themselves according to professional standards, eating during class time is not permitted during class time, such as course or group work.
Valuing diversity	Diversity enriches learning. It requires an atmosphere of inclusion and tolerance, which oftentimes challenges our own closely-held ideas, as well as our personal comfort zones. The results, however, create a sense of community and promote excellence in the learning environment. This class will follow principles of inclusion, respect, tolerance, and acceptance that support the values of diversity. Diversity includes consideration of: (1) life experiences, including type, variety, uniqueness, duration, personal values, political viewpoints, and intensity; and (2) factors related to "diversity of presence," including,

	among others, age, economic circumstances, ethnic identification, family educational attainment, disability, gender, geographic origin, maturity, race, religion, sexual orientation and social position.
Course evaluation	EHESP requests that you complete a course evaluation at the end of the school year. Your responses will be anonymous, with feedback provided in the aggregate. Open-ended comments will be shared with instructors, but not identified with individual students. Your participation in course evaluation is an expectation, since providing constructive feedback is a professional obligation. Feedback is critical, moreover, to improving the quality of our courses, as well as for instructor assessment.

Attention: the order of the sessions may be changed if required by organisational issues! Please refer to the schedule posted on CAMPUS.
The presented session plan corresponds to onsite teaching, it may differ in case of online teaching.

Session 1	Module introduction
Speakers	Judith Mueller
Session Outline	Lecture (2h) and Lab (1h)
Learning Objectives	- Understand the organisation of the module, - Measures of frequency and association - Interpretation of statistical significance
Duration	3 hours
Training methods	Lecture and Lab
Readings	Required Reading: lecture slides and corresponding book chapter

Session 2	Study design and biases
Speakers	J. Mueller
Session Outline	Lecture (1.5h) and Lab (1h)
Learning Objectives	- Recall study designs and their risk for bias - Categories of biases, ways to avoid them during the study development
Duration	3 hours
Training methods	Lecture and lab
Readings	Required reading: corresponding book chapter

Session 3	Validity and strategies to control confounding
Speakers	Judith Mueller
Session Outline	Lecture (1.5h) and Lab (1h)
Learning Objectives	- Internal and external study validity - Confounding

	- Methods to control confounding, including standardisation
Duration	3 hours
Training methods	Lecture and lab
Readings	Required reading: corresponding book chapter

Session 4	Causal inference
Speakers	E. Counil
Session Outline	Lecture (1.5h) and Lab (1h)
Learning Objectives	- Understand and apply arguments for causality based on results of epidemiological studies
Duration	3 hours
Training methods	Lecture and case study
Readings	Required reading: corresponding book chapter

Session 5	Diagnostic testing
Speakers	J. Mueller
Session Outline	Lecture (1.5h) and Lab (1h)
Learning Objectives	- Understand concepts of test performance and their application to screening - Calculate sensitivity, specificity, predictive values - Understand and estimate consequences from limited test performance for the validity of epidemiological studies
Duration	3 hours
Training methods	Lecture and lab
Readings	Required reading: corresponding book chapter

Session 6	Introduction to decision analysis
Speakers	J. Mueller
Session Outline	Individual study of the lecture videos (before class); discussion with the lecturer (1h) and Lab (1h)
Learning Objectives	- Understand the principal idea of decision analysis - Conduct a simple combination of probabilities
Duration	3 hours
Training methods	Lecture and lab

Readings	Required reading: Paper to be announced

Session 7	Clinical Trials
Speakers	Jean-Philippe Régnaux
Session Outline	Lecture (1.5h) and Lab (1h)
Learning Objectives	- Understand how to conduct and interpret clinical trial - Discuss types and limitations in clinical trials
Duration	3 hours
Training methods	Lecture and lab
Readings	Required reading: corresponding book chapter ; paper to be announced

Session 8	Ecological studies
Speakers	C. Padilla
Session Outline	Lecture (1.5h) and Lab (1h)
Learning Objectives	- Understand how to conduct and interpret an ecological study - Discuss validity and level of evidence in ecological studies
Duration	3 hours
Training methods	Lecture and lab
Readings	Required reading: corresponding book chapter; paper to be announced

Session 9	Metaanalyses
Speakers	JP Regnaux
Session Outline	Lecture (1.5h) and Lab (1h)
Learning Objectives	- Understand how to conduct and interpret a metaanalysis - Discuss limitations of metaanalyses
Duration	3 hours
Training methods	Lecture and lab
Readings	Required reading: corresponding book chapter ; paper to be announced

Session 10	Outlook on Advanced Topics

Speakers	Judith Mueller
Session Outline	Lecture (3h)
Learning Objectives	- Acquire initial understanding of advanced topics, such as regression modelling, sampling
Duration	3 hours
Training methods	Lecture and discussion
Readings	Required reading: to be announced, if any