

# **MÁSTER INTERUNIVERSITARIO EN SALUD PÚBLICA**

## **Guía docente de la asignatura: Epidemiología III**

**Departamento de Medicina y Ciencias de la vida  
UNIVERSITAT POMPEU FABRA - UNIVERSITAT AUTÒNOMA DE  
BARCELONA**



## DESCRIPTION

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**Academic course:** 2023-2024

**Subject name:** Epidemiology III

**Kind of subject:** Elective

**Number of credits:** 3 ECTS

**Coordination:** Xavier Basagaña

**Language:** English

## PROFESSORS

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Judith Garcia-Aymerich (Doctor in Public Health and Biomedical Research Methodology UAB, 2002). Research Professor at the Institut de Salut Global de Barcelona (ISGlobal). Assistant professor of the Dept. of Experimental Sciences and Health of the UPF. [judith.garcia@isglobal.org](mailto:judith.garcia@isglobal.org)

Jordi Sunyer (Doctor in Medicine UB, 1989). Permanent Professor of the Dept. of Experimental Sciences and Health of the UPF. Full professor at the Institut de Salut Global de Barcelona (ISGlobal). [jordi.sunyer@isglobal.org](mailto:jordi.sunyer@isglobal.org)

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## PRESENTATION

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The purpose of this course is to cover fundamental aspects in the practice of Epidemiology not covered in the two previous epidemiological courses in order to allow a minimum set of knowledge for the practice of Epidemiology in any of the Public Health fields. Particularly, the course is going to cover mixt designs, the causal diagrams that allow a proper development of an epidemiological research, and two key aspects such as handling missing data and measurement error correction.

## ORGANIZATION AND METHODOLOGY OF COURSE

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• **Course credits: 3 ECTS (75 hours).**

• **The work schedule is as follows:**

- Theory: 12 hours.
- Seminars and Discussions: 6 hours.
- Practical work in class with professor: 4 hours.
- Group work outside class: 8 hours.
- Individual reading: 15 hours.
- Individual study: 15 hours.
- Individual writing: 15 hours.

**Theory:** lectures developing theoretical concepts with the use of examples.

**Seminars:** The work is to be done in groups, fixed throughout the course. Presentation and discussion of each exercise involves presenting and defending results in front of the class by each one of the groups.

**Practical work in class:** to work in the computer room with tutorial from the professor.

**Group work outside class:** Completing exercises. Discussion among classmates in order to answer the exercises is the basis for learning EPI-III

**Readings:** of theoretical material to be able to follow the classes and fulfill the exercises.

• **Participation and group work:**

The active participation of students in all the sections (theoretical classes, seminars and group work) is an essential part of the concept of this course.

## SKILLS

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### • GENERAL SKILLS

#### • Instrumental skills:

- Basic understanding of the design of epidemiological studies.
- Basic understanding of the analysis and interpretation of epidemiological research in public health.
- Ability to solve problems and compare and contrast epidemiological hypotheses.
- Computer and basic statistical skills.

#### • Personal skills:

- Ability to work in a team.
- Ability to collate results, write their description and interpretation and orally defend them.
- Communication skills.

#### • Methodological skills:

- Promote the ability to design studies following straightforward procedures.
- Promote the ability to analyse data from the epidemiological perspective as well as using statistical criteria.
- Encourage critical reading of epidemiological literature.
- Encourage self motivation in work.

### • SPECIFIC SKILLS (EXAMPLES, SPECIFIED IN SUMMARY OF EACH SESSION)

- Design of mixt studies.
- Ability to analyse and interpret causal pathways and diagrams.
- Ability to properly analyze data with missing values.
- Ability to interpret and correct the effect of measurement error.
- Working in teams to solve practical exercises.
- Public presentation of work.

## EVALUATION

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Attendance to class is compulsory. Absences need to be justified (disease or job-related). Continuous evaluation will be performed along the seminars, corrections and final presentation.

### What is to be evaluated?

The understanding of the problem, the application of adequate methods, the correct interpretation of results, the writing up of the work and the level of communicative ability demonstrated therein. Also the active participation in group work discussion and class.

These are the items that will be evaluated:

	Percent of the final grade
Exercise modelling**	20%
Exercise missing data*	20%
Exercise DAGs I**	10%
Exercise DAGs II**	10%
Final exercise*** – content	20%
Final exercise*** – presentation	20%

\* To be done and corrected in class. However, each groups needs to hand in the exercise, up to one week later.

\*\* To be done and corrected during class hours

\*\*\* To be done outside class and corrected in class on the last day.

### Notes on evaluation:

- All exercises will be done in group (groups will be created the first day) and all members of the group will have the same grade.

- Students who missed a class in which an exercise was done will be either (i) scored a 0, or (ii) allowed to present the exercise (and scored it individually) the day after, if the absence is justified.

## PROGRAMME

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- **Theoretical sessions**

- Mixed models (JS) (2h)
- Imputation of missing values (XB) (2h)
- Correction of measurement error (XB) (2h)
- Graphical representation of causal effects: Directed Acyclic Graphs (DAGs) (JG) (2h)
- Graphical representation of confounding and bias using DAGs (JG) (2h)

- **Practical sessions**

- **Seminars:**

- Multivariate modelling (JS) (2h)
- Identification of DAGs (JG) (2h)
- DAGs in longitudinal studies with repeated measures (JG) (2h)

- **Practical work in class**

- R session on missing data imputation (XB) (4h)

- **Work group**

- Preparation of seminars (6h)
- Preparation of final work (4h)

- **Final exercise**

## READINGS, MATERIALS AND CONTENTS

Date	Session	Content	Readings
8/4, 9:00-11:00	Seminar (JS)	Discussion on multivariate modelling	<i>Reading previous to class:</i> Shapiro M, N Engl J Med. 1982;307(27):1661-6
8/4, 11:30-13:30	Theory (JS)	Mixed designs: nested case-control, case-cohort	Szklo & Nieto 2 <sup>nd</sup> edition: 19-31; 95-99; 270-273.
15/4, 9:00-11:00	Theory (XB)	Imputation of missing values	<i>Readings after class:</i> <a href="#">Donders ART. J Clin Epidemiol 2006; 59:1087-91.</a> <a href="#">Bhaskaran K, Smeeth L. Int J Epidemiol. 2014;43(4):1336-9.</a>
15/4, 11:30-13:30	Work in class (XB)	R session on missing data imputation (1)	
29/4, 9:00-11:00	Theory (XB)	Correction of measurement error	<i>Readings after class:</i> <a href="#">van Smeden. Int J Epidemiol 2020; 49(1): 338-347.</a> <a href="#">Cole SR. Int J Epidemiol 2006; 35:1074–1081.</a>
29/4, 11:30-13:30	Work in class (XB)	R session on missing data imputation (2)	
6/5, 9:00-11:00	Theory (JG)	Graphical representation of causal effects: Directed Acyclic Graphs (DAGs)	<i>Reading previous to class:</i> <a href="#">Hernán MA, et al. Ann Neurol 2001;50:780-786.</a>
6/5, 11:30-13:30	Seminar (JG)	Identification of DAGs	
13/5, 9:00-11:00	Theory (JG)	Graphical representation of confounding and bias using DAGs	<i>Readings after class:</i> <a href="#">Hernán MA, et al. Am J Epidemiol 2002;155:176-84.</a> <a href="#">Hernán MA, et al. Epidemiology 2004;15:615-625.</a>
13/5, 11:30-13:30	Seminar (JG)	DAGs in longitudinal studies with repeated measures	
27/5 11:30-13:30	Presentation and discussion of final exercise		