Department of Epidemiology and Population Health

A/Chairperson:	Chaaya, Monique
Professors:	Chaaya, Monique; DeJong, Jocelyn; Sibai, Abla
Professor of Public Health Practice	Adib, Salim
Associate Professors:	Ghandour, Lilian; Jaffa, Miran
Associate Research Professor:	Ghattas, Hala
Assistant Professor:	El-Asmar, Khalil
Assistant Professors of Public Health Practice:	McCall, Stephan; Mohamed Fouad, Mohamed Fouad
Assistant Research Professor:	Mumtaz, Ghina
Adjunct Professors:	Hajjeh, Rana; Makhlouf-Obermeyer, Carla
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The Department of Epidemiology and Population Health offers courses in epidemiology, biostatistics, and population health to graduate students in the Faculty of Health Sciences and the Faculty of Medicine. The Department is committed to improving public health in Lebanon, the region, and beyond, by training students and public health professionals to become epidemiologists capable of undertaking independent quantitative research for advancing knowledge and informing policy and practice. Its academic programs, adapted to meet the needs of the region encourage learners to work on projects that address the public health needs of the region.

The course offerings to students in the Master of Public Health (MPH) program, the Master of Science (MS) in Epidemiology program, the Master of Science (MS) in Population Health program[1] and Doctor of Philosophy (PhD) in Epidemiology are given as core, required, and elective courses. In addition, members of the department offer courses in statistics and epidemiology to students in the Medical Degree program and coordinate and participate in teaching courses in preventive medicine and public health programs in the Faculty of Medicine.

EPHD 300[2] Principles of Epidemiology 1.5:0.5; 2 cr.
This course introduces graduate students to the basic principles and methods of epidemiology and the application of the epidemiological approach to public health research, policy and practice. The course consists of weekly lectures and practical application sessions. Students will learn about the rubrics of Epidemiology, dynamics of disease transmission, common sources of epidemiological data, measures of morbidity and mortality, observational study designs, measures of association, biases and confounding, and general principles of causation in epidemiology. The main concepts will be covered during the lecture. The application sessions (e.g., problem-solving exercises, case-studies, journal critiques, mapping…) will allow students to apply their acquired epidemiological knowledge and understand the role of epidemiological evidence in current practices of public health policy and practice.

1) *Currently frozen;*
2) EPHD 300 and EPHD 310 are equivalent to SHARP 300 and SHARP 310 respectively.

EPHD 310 Basic Biostatistics 2.2; 3 cr.
This course is an introduction for graduate students to statistical techniques applied to health and biomedical related data. The objectives are twofold: descriptive and inferential statistics. This course will provide theoretical and applied foundation that are needed to: 1) Carry out statistical analyses appropriate for the data and the study design, 2) Deduce accurate inferences and conclusions that concern the study population, 3) Disseminate and interpret biostatistical results and conclusions in a proficient manner. At the end of this course, students will be well rounded with the different analytical techniques that range from basic descriptive analysis, to mid-level analysis that distinguishes between the various distributions and applies the tests suitable for the outcome under examination, in addition to advanced modelling techniques using regression approaches linear, logistic and non-parametric methods.

EPHD 312 Analysis of Continuous Data 1.5-0.5; 2 cr.
In this course, students will learn to use regression analysis to address a research question. It covers basic exploratory data analysis for univariate (outcome) continuous observations with single or multiple covariates, followed by regression methods and diagnostics with a main focus on multiple regression. The emphasis of the course is on the application of statistical techniques that are carried out using the statistical package STATA and R. Lectures include lab sessions, article reading and appraisal as well as group discussions. *Prerequisite: EPHD 310 or consent of instructor.*

EPHD 313 Analysis of Categorical Data 2.2; 3 cr.
This course aims at introducing biostatistical approaches to analyze categorical and count data. In particular, students will learn about (1) probability distribution for binomial and multinomial data, (2) measures of association and test of association for nominal and ordinal data, (3) analysis for Two Way and Three Way contingency tables including interaction and confounding (4) generalized linear models (5) logistic regression for independent, matched case-control data, and data with small sample size and rare events (6) Poisson and Negative Binomial regressions for count and rates with and without over-dispersion, (7) Multi-category logit for nominal and ordinal data. The statistical package STATA will be used in this course. *Prerequisite: EPHD 310 or consent of instructor.*

EPHD 314 Data Management and Manipulation 1.2; 2 cr.
The data management course is an introduction to data manipulation and management using Stata, SPSS and Epi-data. The course covers data structure design including data checking as well as data manipulation, data imputation and basic statistical programming. The course is offered at the computer lab where students can have hands-on experience in dealing with real data sets. In case an enrolled student has a project specific data, she/he has the chance to directly apply the acquired course material on the dataset. Weekly assignments are given to allow the students to explore advanced and customized application of the material offered in the classroom. *Prerequisite: EPHD 310, undergraduate or graduate basic Biostatistics course, or consent of instructor.*

EPHD 315 Nonparametric Data Analysis 1.2; 2 cr.
Nonparametric tests are often used in place of their parametric counterparts when certain assumptions about the underlying population are questionable. This course introduces the students to the theory and applications of nonparametric statistics. Methods include estimation and testing of hypotheses for the one sample location problem, two sample location problem, multi-sample location problem, correlation, regression and tests for proportions. *Prerequisite: EPHD 310 or graduate basic Biostatistics course.*

EPHD 316 Epidemiology, Prevention and Control of Communicable Diseases 2.0; 2 cr.

The course explores the epidemiology, prevention and control of selected communicable diseases with major public health significance locally, regionally and globally. For each disease, the course will cover the morbidity, mortality, burden, associated risk factors, social and behavioral determinants, as well as public health strategies for prevention and control. *Prerequisite: EPHD 300 or consent of course instructor.*

EPHD 317 Epidemiology of Non Communicable Diseases and Mental Health Disorders 1.5-0.5; 2 cr.

The first part examines major non-communicable diseases (NCDs), (e.g., cardiovascular diseases, cancer, diabetes as well as chronic respiratory diseases) and their shared behavioural risk factors. The second part examines selected mental health disorders (MHDs) that are major sources of morbidity, mortality and disability worldwide and in the region. For all health outcomes covered in this course, students will study the epidemiological evidence focusing on the available estimates of morbidity, mortality and burden, as well as determinants. Students will also examine evidence-based and effective prevention strategies and interventions, as well as main methodological issues in the measurement, control/prevention of the selected health outcomes. *Prerequisite: EPHD 300 or consent of course instructor.*

EPHD 320 Epidemiology Beyond the Basics 1.5-0.5; 2 cr.

The course provides advanced knowledge of epidemiologic studies and covers in details methodological issues concerning the design and the analysis of observational studies (cross sectional, case control and cohort studies). It also introduces design and analysis of randomized clinical trials. The course addresses key validity issues related to selection of study subjects, accuracy of measures of measures, confounding bias, and discusses effect modification. The course is blended and relies on didactic teaching, applications on and class discussion of selected articles, online discussion sessions, and designing of two observational studies Ethical considerations in epidemiologic research are discussed throughout the course. *Prerequisites: EPHD 300 and EPHD 310, or consent of instructor.*

EPHD 321 Design and Analysis of Clinical Trials 1.2; 2 cr.

A course that focuses on issues in the design and organization of randomized controlled clinical trials: ethical and legal issues, patient selection, recruitment, masking and randomization, endpoint definition, protocol development, and statistical analysis. Designs such as cross-over designs, factorial-designs, and meta-analysis are discussed. *Prerequisites: EPHD 300 and EPHD 310, or consent of instructor.*

EPHD 322 Special Topics in Epidemiology 1-3 cr.
A course that covers selected topics of special interest to trainees in epidemiology. Examples include assessment of disease burden using epidemiological studies, occupational epidemiology, epidemiology of aging, epidemiology of maternal-child problems, or nutritional epidemiology. *Prerequisite: EPHD 300 or consent of instructor.*

EPHD 324 Special Topics in Biostatistics 1–3 cr.
A course that covers selected topics in biostatistics of special interest to researchers and trainees in epidemiology and population health. *Prerequisite: EPHD 310 or consent of instructor.*

EPHD 327 Field Epidemiology 0.2; 1 cr.
The field epidemiology course is an introduction to the concepts of epidemiology as it relates to applied field epidemiology. This course covers the key steps of an outbreak investigation and introduces main concepts of surveillance, its analysis and importance. This course focuses on problem-based, interactive methods: students can have a hands-on experience in dealing with basic outbreak investigation steps and surveillance data through real life case-studies which are discussed in group-work in class. *Prerequisite: EPHD 300 or any undergraduate or graduate basic epidemiology course.*

EPHD 328 Systematic Review and Meta-Analysis 2.2; 3 cr.
The course is structured around the steps of executing a systematic review of trials of interventions: specifying the Population Intervention Comparison Outcomes (PICO) question, searching for potentially relevant articles; selecting eligible studies; abstracting data; assessing risk of bias, conducting a meta-analysis; grading the quality of evidence; and interpreting results. PICO is an acronym referring to the components of the question forming the basis for a research study, a systematic review in this case: Population, Intervention, Comparison, Outcomes. Weekly assignments are designed to guide students in the production of a systematic review. The final paper consists of a report of the systematic review suitable for publishing in a peer-reviewed journal. This is a relatively intensive course and students need to allocate adequate time and effort. *Prerequisites: EPHD 310 and EPHD 300 or their equivalent courses, or consent of instructor.*

EPHD 331 Population Change and Health 3.0; 3 cr.
Population change is central to public health. This course provides a broad introduction to the field of population. It identifies core topics in population, discusses their relation to development and health, and emphasizes measurement issues. Topics covered include population size and growth as they relate to resources and to population health; components of population change including fertility and mortality, their links to development and consequences for health; population composition by age and gender and by socioeconomic status, and related inequalities; and population movements including forced, internal and international migration as factors of population change and health. Special focus is given to the Arab World and the Middle East Region.

EPHD 332 Population and Health Policy 3.0; 3 cr.
A course designed to explore the links between population, health, and development issues, with a focus on population policies and programs in the Middle East and North Africa. Topics include demographic trends and their implications for health policies; family planning programs and policies; the reproductive health paradigm; HIV/AIDS; gender and population policy; special health needs posed by the youth 'bulge' and population aging; political dimensions of population policies; and debates between the policy objectives of reducing population growth at the macro level and promoting individual well-being.

EPHD 333 Special Topics in Population Health 1- 3 cr.
An examination of specific topics in population health such as aging, burden of disease, reproductive health, fertility of adolescents, social determinants of population health, and the demography of refugee populations.

EPHD 334 Reproductive Health 3.0; 3 cr.
A course that examines selected issues in reproductive health with a focus on developing countries. Topics covered include pregnancy and childbirth, unintended pregnancy, maternal mortality, infertility, gynecological morbidity including sexually transmitted infections, sexuality, birth spacing and family planning, and reproductive rights. Particular emphasis is placed on conceptual issues and recent debates about reproductive health within the context of the international agenda on reproductive rights established at the 1994 Cairo Conference on Population and Development.

EPHD 336 Tutorial in Epidemiology 1–3 cr.

EPHD 337 Tutorial in Biostatistics 1–3 cr.

EPHD 338 Tutorial in Population Health 1–3 cr.

EPHD 365 Practicum in Epidemiology and Biostatistics 0.30; 2 cr.
The practicum offers students the opportunity to practice their obtained knowledge and gain research experience in epidemiology and biostatistics mainly through the design of epidemiological studies or data collection and analyses of various types of data. Students are advised internally by a faculty member and externally by an outside preceptor in the practicum site. Practicum sites may include the Ministry of Public Health, Ministry of Social Affairs, non-governmental agencies, UN agencies (UNICEF, ESCWA, UNFPA), and health services organizations. *Prerequisites: Completion of all, or all but one, of the core and/or concentration courses*.

EPHD 395 Comprehensive Exam 0 cr.

EPHD 399 Thesis 6 cr.

EPHD 403 Advanced Epidemiology Methods: Case Control and Cohort Studies 2.2; 3 cr.

The main objective of the course is to enhance students' ability to design and conduct unbiased and efficient research. It is specifically designed to expand students' understanding of the methods of sampling for case control and cohort studies, and train students on hybrid designs (case cross over designs, nested case controls and case-cohort). *Prerequisite: EPHD 320 or its equivalent.*

EPHD 404 Introduction to Causal Inference Methods 2.0; 2 cr.

This course provides an overview and understanding of key concepts and theoretical frameworks of causal inference without and with models. The course will cover causation in health research, Directed Acyclic Graphs (DAGs), and epidemiologic methods for causal inference such as inverse probability weighting and marginal structural models. Other topics such as mediation and instrumental variables will also be covered. The course will involve lectures and practical applications through journal club, lab sessions with data, homework, and class projects. *Prerequisite: EPHD 320 or SHARP 300/320 (or any equivalent intermediate level course in Epidemiology and Basic Biostatistics).*

EPHD 405 Social and Behavioral Factors in Epidemiology 2.0; 2 cr.

This course is about the influence of the social context on the distribution of disease and its consequences, and about conducting epidemiological and public health research that is mindful of social and behavioral factors. While social epidemiology has come to be identified with the study of social inequalities, understanding how society and culture influence health requires a broader view of social determinants than the statistical analysis of the effects of socioeconomic variables on health outcomes. The course situates itself at the intersection of epidemiology and the social sciences. It draws on a range of approaches to illustrate the ways that social forces affect health. *Prerequisites: PBHL 310, EPHD 300, and EPHD 310(or an equivalent basic epidemiology course).*

EPHD 406 Epidemiology in Action 2.2; 3 cr.

This course aims at exploring different public health modalities, strategies, interventions and approaches during man-made (conflict) and natural disasters. It also enables public health practitioners capable to select those most relevant to each situation's type, context and type of population affected. Skills needed in the management of disaster situation will be introduced as an integrated component, such as coordination and communication skills. In natural disasters, outbreak investigation methods will be included, using case studies of local, regional and global disease outbreaks. The response plan to natural and man-made disasters such as storms and earthquakes, injuries from armed conflicts will be developed. *Prerequisites: EPHD 300 (or its equivalent of basic epidemiology course) and EPHD 316 (or its equivalent in infectious epidemiology).*

EPHD 407 Global Health 2.0; 2 cr.

The course reviews the evidence on the distribution and determinants of major causes of death and ill-health in the world, the initiatives that have been launched to address them and the challenges to improving health in different parts of the world. It provides students with the knowledge and skills to examine how mortality and morbidity vary over time and across countries, the determinants of these changes, and the role of interventions to improve health. The course draws on epidemiology, economics, health policy and the social sciences to compare health across populations, assess the factors that account for variations, and review major policies and programs designed to improve health.

EPHD 410 Applied Multivariate and Longitudinal Methods in Health Sciences **2.2; 3 cr.**

Data are often complicated by high dimensionality and inter-observation correlations. This course aims at providing a solid grounding in the analysis of multivariate data, repeated measure data and correlated data. Specifically, students will learn to (1) distinguish between univariate and multivariate outcomes, (2) group comparison for multivariate outcomes using One-Way and Two-Way MANOVA, (3) multivariate analysis using General Linear Model, (4) analysis of longitudinal data and (5) analysis of correlated clustered data. SAS, STATA and SPSS will be used in this course as statistical packages. *Prerequisites: This is an advanced data analysis course that requires as prerequisites EPHD 310, EPHD 313, and EPHD 312.*

EPHD 411 Statistics for Psychosocial Research Psychometrics and Measurement of Latent Constructs **2.2; 3 cr.**

This course will introduce students to the principles of measurement, reliability and validity, as well as latent-variable based measurement models, including factor analysis. By the end of the course, students should be able to describe the basic principles of classical test theory and latent variables; conduct reliability and validity tests; conduct exploratory factor analysis; describe the basic steps and components of scale development, and critically appraise the process of validation of a scale. Students will be able to also read and evaluate scientific articles relevant to measurement in public health. The instructional method consists of lectures, in-class exercises, hands-on sessions in the computer lab, and assigned problem sets. Problem sets will require active manipulation of datasets provided by the instructor, using Stata and Mplus. *Prerequisites: EPHD 300 and EPHD 310.*

EPHD 412 Survival Analysis **1.2; 2 cr.**

The course introduces fundamental concepts in survival analysis. The emphasis is on statistical methods which are useful in medical follow-up studies and in general time-to-event studies. The following topics are included in this course: censoring, truncation, hazard and survival functions, Kaplan-Meier estimator, log-rank tests, and Cox proportional hazards model.

EPHD 440 Doctoral Seminar **0 cr.**

EPHD 445 Writing Research Grants **0 cr.**

Thesis Courses

EPHD 480 Qualifying Exam Part I: Comprehensive Exam **0 cr.**

Every term.

EPHD 481 Qualifying Exam Part II: Defense of Thesis Proposal **0 cr.**

Every term.

EPHD 482 PhD Thesis **3 cr.**

Every term.

EPHD 483 PhD Thesis **6 cr.**

Every term.

Listed as 483A when registered the second time.

EPHD 484 PhD Thesis 9 cr.
Every term.

EPHD 486 PhD Thesis 0 cr.
Every term. Taken after 24 credits of thesis are completed in case further thesis work is necessary.

EPHD 487 PhD Thesis Defense 0 cr.