Course Title	Principles of Epidemiology and Public Health				
Course Code	MPH-511				
Course Type	Required				
Level	2nd Cycle				
Year / Semester	1 / 1				
Teacher's Name	Dr Elena Critselis (Course Lead)				
ECTS	10	Lectures	26	Interactive learning activities	26
Course Purpose and Objectives	The main objectives of the course are to: • Apply measures of descriptive and analytic epidemiology used to assess the frequency, distribution, and determinants of disease in human populations. • Apply the different study designs in epidemiological research and be able to design their own epidemiological studies for answering research questions relevant to public health. • Differentiate between association and causation, as well as to critically evaluate the importance of their distinction in public health policy. • Critically evaluate concepts pertaining to internal study validity (i.e. random error, systematic bias, and confounding) and external study validity (i.e. generalizability of study findings). • Understand the importance of systematic reviews and meta-analyses in public health and be able to interpret these for answering research questions relevant to public health. • Apply the different levels of prevention and be able to design their own preventive measures for tackling current public health challenges. • Demonstrate deep understanding of the aims, objectives, and responsibilities of the World Health Organization and its leadership priorities, as well as the health-related UN Sustainable Development Goals.				
Learning Outcomes	After completion of the course students are expected to be able to: 1. Describe the importance of epidemiology and public health for ensuring disease prevention, well-being, and prosperity in populations. 2. Calculate, interpret, and apply appropriate major measures of disease frequency (e.g. prevalence, incidence, rate, and attack rate) in a relevant scenario. 3. Calculate, interpret, and apply appropriate major measures of mortality (e.g. crude, cause-specific, age-specific, perinatal, case-fatality rate, and standardized mortality ratio) in a relevant scenario. 4. Relate and apply the major concepts involved in analytic epidemiology, such as exposures/predictors, determinants, risk factors, protective factors, outcomes, and etiological associations of diseases.				

	5. Calculate, interpret, and apply appropriate measures of association pertaining to the analysis of binary and numeric outcomes (i.e. odds ratio, relative risk, regression coefficient and mean difference) in relevant epidemiologic and/or public health research scenarios. 6. Calculate, interpret, and apply appropriate measures of impact (i.e. Attributable Risk, Population Attributable Risk, and Population Attributable Risk Fraction) in relevant epidemiology and public health research scenarios. 7. Critically evaluate the major observational epidemiological study designs (e.g. ecological, cross-sectional, case-control, and cohort study designs) and design a suitable study for answering specific research questions of public health importance. 8. Critically evaluate the major interventional epidemiological study designs (e.g. Randomized Controlled Trials and other non-randomized trials) and design a suitable study for answering specific research questions of public health importance. 9. Critically evaluate concepts relating to sampling, estimation, and statistical inference, such as parameters vs. estimates, and statistical significance. 10. Critically appraise the different sampling methods used in epidemiological research and design their own sampling strategy for a given research scenario. 11. Critically appraise how different types of selection bias could affect the validity of different study designs and articulate strategies to avoid these. 12. Critically appraise how different types of information bias could affect the validity of different study designs and articulate strategies to avoid these. 13. Calculate, interpret and critically appraise results on sensitivity, specificity, positive and negative predictive values in the published literature. 14. Critically appraise how the multifactorial nature of disease and the concept of confounding could affect the validity of research findings, as well as to evaluate strategies to detect and deal with it in published research studies. 15. Differentiate the concepts of confounding, effect modification (interaction), and effect mediation, as well as to critically appraise such results arising from the published literature. 16. Compare, contrast and differentiate the concept of external study validity (generalizability) from internal study validity, critically evaluating, and explaining its importance in public health policy. 17. Perform and evaluate systematic reviews, as well as interpret the results from meta-analyses (i.e. forest plots) for answering specific research questions relevant to public health. 18. Distinguish and describe the differences between association and causation and critically appraise criteria for inferring causality for a given association.

	19. Critically evaluate how social and environmental determinants (e.g. poverty, food/water availability, climate change, armed conflict, etc) can impact health and health inequalities, to evaluate how social determinants can make individuals and communities more vulnerable to climate-related health threats, and to articulate the importance of the concept of environmental justice. 20. Evaluate and apply the different levels of disease prevention (i.e. primary, secondary, and tertiary prevention) for tackling current public health challenges. 21. Compare and contrast the different routine monitoring, notification, and registration systems for vital statistics and specific diseases, as well as to appreciate the importance of disease registries. 22. Analyze the structure, organization, responsibilities, and priorities of the World Health Organization (WHO), including its leadership priorities and the public health-related UN Millennium Development Goals and Sustainable Development Goals.		
Prerequisites	None	Required	None
Course Content	1. Introduction to epidemiology and public health 2. Measures of disease frequency and mortality in chronic and infectious disease epidemiology 3. Measures of association 4. Measures of impact 5. Observational study designs: Cross-sectional, retrospective and prospective study designs 6. Interventional study designs: Randomized Controlled Trials and other non-randomized trials 7. Sampling, random error, and statistical inference 8. Systematic error in research I: selection bias 9. Systematic error in research II: Information bias (measurement error) 10. Multi-factorial nature of disease: Confounding, effect modification, and effect mediation 11. External study validity and the importance of systematic reviews and meta-analyses 12. Association vs. causation 13. Social and environmental determinants of health 14. Principles of disease prevention 15. Global health monitoring and public health surveillance		
Teaching Methodology	This program is delivered via distance learning (online) and includes recorded lectures, interactive online tutorials (webinars) and discussion forums, as well as online exercises and other activities.		

Bibliography

Required Textbooks / Reading:

Title	Author(s)	Publisher	Year	ISBN
Gordis Epidemiology 6th Edition	de David D Celentano ScD MHS, Moyses Szklo MD	Elsevier	2018	0323552293
Modern Epidemiology (4th Edition)	Timothy L. Lash, Tyler J. VanderWeele, Sebastien Haneuse, Kenneth J. Rothman	LWW	2021	1451193289
Oxford Handbook of Public Health Practice (4th Edition)	Ichiro Kawachi (Editor), Iain Lang (Editor), Walter Ricciardi (Editor)	Oxford University Press	2020	0198800126

Recommended Textbooks / Reading:

Title	Author(s)	Publisher	Year	ISBN
Issues in Public Health (3rd ed.)	McKee M.	Open University Press	2022	0335249159

Assessment

Online quiz (formative)
Coursework (1 assignment): 15%
Coursework (1 oral presentation): 15%
Mandatory interactive activities and webinar session attendance/participation: 10%
Final exam: 60%

Language

English