



UNIVERSITÀ DI PAVIA

Anno Accademico 2019/2020

PHYSICS, STATISTICS AND EPIDEMIOLOGY

Enrollment year	2019/2020
Academic year	2019/2020
Regulations	DM270
Department	DEPARTMENT OF PUBLIC HEALTH, NEUROSCIENCE, EXPERIMENTAL AND FORENSIC MEDICINE
Course	ENVIRONMENT AND WORKPLACE PREVENTION TECHNIQUES
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	Annual (01/10/2019 - 12/06/2020)
ECTS	6
Language	Italian

The activity is split

501827 - **EPIDEMIOLOGY**

500396 - **PHYSICS**

500836 - **MEDICAL STATISTICS**



EPIDEMIOLOGY

Enrollment year	2019/2020
Academic year	2019/2020
Regulations	DM270
Academic discipline	MED/01 (MEDICAL STATISTICS)
Department	DEPARTMENT OF PUBLIC HEALTH, NEUROSCIENCE, EXPERIMENTAL AND FORENSIC MEDICINE
Course	ENVIRONMENT AND WORKPLACE PREVENTION TECHNIQUES
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	2nd semester (02/03/2020 - 12/06/2020)
ECTS	2
Lesson hours	16 lesson hours
Language	Italian
Activity type	WRITTEN TEST
Teacher	MONTI MARIA CRISTINA - 2 ECTS
Prerequisites	The course is part of the students' basic training, together with Physics and Medical Statistics, preparatory to the lessons and activities in the Prevention field. No particular prerequisites need to follow the course. On the contrary is mandatory for Prevention principles, Health Surveillance, Research Methodology.
Learning outcomes	<p>The course aims to provide the student with the tools necessary to:</p> <ul style="list-style-type: none">- know and understand the causal relationship between exposure and outcome- identify the study design useful to answer questions in the field of Prevention and apply it- calculate, understand and interpret the most important epidemiological measures of disease and association between exposure and disease. <p>At the end of the course the student will be able to autonomously carry out the planning of basic epidemiological research and communicate in</p>

	<p>a pertinent way as well as emerged, as well as understand the published evidence and be able to critically evaluate what exists in relation to their work context.</p>
Course contents	<ul style="list-style-type: none"> - Introduction to epidemiology: definition of epidemiology, historical outline. - The causation in epidemiology. - Types of studies: observational and experimental studies. - The main experimental studies design: randomized control trials, fields trials, community trials. - Observational studies: descriptive studies, Ecological studies, cross-sectional studies, , case-control studies, cohort studies: characteristics, advantages and disadvantages. - Confounding and effect modifier. - Main epidemiological measures of disease frequency: prevalence, cumulative risk or incidence, incidence rate, crude and standardized mortality rate, lethality rate. Odds of exposure and disease. - Association measures: absolute and relative measures. Absolute measures: Absolute risk, Risk attributable to exposure and Risk attributable to the population. Relative Measures: Prevalence Ratio, Relative Risk or Risk Ratio, Incidence Ratio Rates, Odds Ratio. Standardized Mortality Ratio or SMR. - Outlines on available information (health flows: death and birth records, notification of infectious diseases, hospital sources, pathology registries) as sources of data for epidemiological studies.
Teaching methods	<p>The course is organized in lectures and additional practical activities. Environmental and Occupational Epidemiology seminars can also be proposed to complete the lectures.</p>
Reccomended or required readings	<p>Basic Epidemiology. Robert Beaglehole, Ruth Bonita, Tord Kjellstrom A short presentation of academics lectures will be on Kiro platform.</p>
Assessment methods	<p>The examination will be written with a problem solving approach. The student will have to face some research questions, attesting to have acquired both the ability to manage the study design, to apply the epidemiological measures necessary to produce estimates of illness and epidemiological association (knowledge and skills) and to interpret the results obtained (competence).</p>
Further information	<p>The Professor takes appointments (Dept. of Public Health, Experimental and Forensic Medicine, U.O. of Biostatistics and Clinical Epidemiology, Via Forlanini 2, e-mail: svillani@unipv.it), usually on Tuesday.</p>
Sustainable development goals - Agenda 2030	<p>\$lbl_legenda_sviluppo_sostenibile</p>



PHYSICS	
Enrollment year	2019/2020
Academic year	2019/2020
Regulations	DM270
Academic discipline	FIS/07 (APPLIED PHYSICS (CULTURAL HERITAGE, ENVIRONMENT, BIOLOGY AND MEDICINE))
Department	DEPARTMENT OF PUBLIC HEALTH, NEUROSCIENCE, EXPERIMENTAL AND FORENSIC MEDICINE
Course	ENVIRONMENT AND WORKPLACE PREVENTION TECHNIQUES
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	1st semester (01/10/2019 - 17/01/2020)
ECTS	2
Lesson hours	16 lesson hours
Language	Italian
Activity type	WRITTEN TEST
Teacher	BELLANI VITTORIO - 2 ECTS
Prerequisites	Basic concepts of mathematics.
Learning outcomes	Learning of concepts and basic phenomena of physics, in particular with application to life sciences.
Course contents	Physical magnitudes, definition and measurement. Unit of measure. Vector and scalar magnitudes. Mechanics. Cinematic. Laws of motion. Force and fields of force. The gravitational field. Mass, weight and density. Work, energy and power. Kinetic energy and theorem of kinetic energy. Conservative fields. Potential energy and conservation of the mechanical energy. The fluid mechanics. Viscous and non viscous fluids. The Bernoulli law. Laminar and turbulent motion. Fluid pressure. Temperature and thermometric scales. Heat and specific heat. Perfect and real gases. The thermodynamics principles. Mechanisms of heat

	transmission. Interfaces and membranes. The diffusion. Electromagnetic phenomena. The waves: description and characteristics. The electromagnetic waves. Elements of optics. Matter and radiations.
Teaching methods	Lectures.
Reccomended or required readings	The book will be indicated during the course.
Assessment methods	Oral examination
Further information	
Sustainable development goals - Agenda 2030	\$lbl legenda sviluppo sostenibile



MEDICAL STATISTICS	
Enrollment year	2019/2020
Academic year	2019/2020
Regulations	DM270
Academic discipline	MED/01 (MEDICAL STATISTICS)
Department	DEPARTMENT OF PUBLIC HEALTH, NEUROSCIENCE, EXPERIMENTAL AND FORENSIC MEDICINE
Course	ENVIRONMENT AND WORKPLACE PREVENTION TECHNIQUES
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	1st semester (01/10/2019 - 17/01/2020)
ECTS	2
Lesson hours	23 lesson hours
Language	Italian
Activity type	WRITTEN TEST
Teacher	VILLANI SIMONA (titolare) - 2 ECTS
Prerequisites	<p>The course is part of the students' basic training, together with Physics and Epidemiology, preparatory to the lessons and activities in the Prevention field. To better follow the course, the student must have attended the tutorial courses and acquired the basic knowledge of mathematics, filling eventually gaps.</p>
Learning outcomes	<p>The course aims to provide the methodological principles for a scientific approach to the study of health and disease of a population. It is the first step in the knowledge that an operator in the field of prevention must have in order that the scientific research carried out is correctly set and evaluated.</p> <p>In detail, the course aims to develop the theoretical and practical knowledge of the most frequent basic statistical methodologies (knowledge and comprehension), as well as the ability to correctly apply this knowledge both to new experimental situations and to published</p>

	<p>research studies (ability to apply knowledge and comprehension). At the end of the course the student will be able to independently perform basic statistical analyses and communicate in an appropriate way the findings, as well as to understand and critically evaluate the published evidences in relation to their work context.</p>
Course contents	<p>Introduction to Statistic and research planning. Variability and chance. Population, sample and sampling methods: - non-probabilistic and probabilistic methods (simple random sampling; stratified random sampling; cluster sampling; multiple-stage sampling). - Sampling and sample size (touch on). - Sheet for data collection. Data organization: database and dataset. Tools for descriptive analysis and interpretation of data - Description of statistical unit and type of variables. Frequency distribution for qualitative and quantitative variables. Graphics. - Descriptive statistics: o mean, median, mode, centiles, o range variance, standard deviation, coefficient of variation o skewness and kurtosis - Correlation coefficient and simple linear regression - Normal distribution. - Inferential statistics: o Test of hypothesis o Parametric unpaired t-test. o Chi-squared test.</p>
Teaching methods	<p>The course is organised in lectures and practical exercises. With the problem solving approach, the fundamental elements of Medical Statistics will be addressed.</p>
Reccomended or required readings	<p>Any Biostatistics or Medical Statistics manual may be used. In particular: - Lantieri P, Risso D, Ravera G. Statistica medica per le professioni sanitarie. McGraw-Hill. - Triola, Triola. Fondamenti di Statistica per le discipline biomediche. Pearson, 2017. - Daniel, Cross. Biostatistica. Concetti di base per l'analisi statistica dell'area medico-sanitaria. III Edizione 2019 (Capitoli 1-3; 7). Useful material will be on Kiro platform.</p>
Assessment methods	<p>The examination will be written with a problem solving approach. The student must demonstrate not only to know and correctly apply the techniques of analysis (knowledge and skills), but to be able to interpret the results obtained and communicate in a scientifically correct way the evidences form the analyses (competence). Three closed questions on theory aspects are also provided.</p>
Further information	<p>The Professor takes appointments (Dept. of Public Health, Experimental and Forensic Medicine, U.O. of Biostatistics and Clinical Epidemiology, Via Forlanini 2, e-mail: svillani@unipv.it), usually on Tuesday.</p>
Sustainable development	

