UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Public Health, Occupational Medicine and Medical Statistics

2526-1-I0102D003

Aims

Knowledge and understanding

Upon completion of the course, students will have acquired:

- Fundamental knowledge of public health and prevention, with application to general population health and maternal-infant health.
- Basic concepts of occupational medicine, with specific focus on healthcare sector occupational risks and the obligations related to worker training and information.
- Core knowledge in descriptive statistics and probability, including statistical indices and graphical data representation.
- Principles of radiation physics, modes of exposure, associated biological risks, and radiation protection, especially in hospital settings.
- Basic understanding of medical imaging techniques, their clinical applications, related radiation risks, and radiation protection measures.

Applying knowledge and understanding
Students will be able to:

- Apply public health principles to midwifery practice, with attention to health promotion and disease prevention.
- Recognize major occupational risk factors and propose preventive and protective measures for themselves and their colleagues.
- Use descriptive statistical tools to analyze simple datasets, create graphs, calculate means, medians, standard deviations, interpret percentiles, and apply Gaussian distribution principles.
- Understand the clinical indications and limitations of commonly used diagnostic imaging techniques, with awareness of safety and radiation protection.

**Making judgements **

Students will develop the ability to:

- Critically evaluate information related to health and occupational risks, including epidemiological evidence.
- Correctly interpret statistical data found in scientific literature and professional documents.
- Identify clinical or professional situations where enhanced attention to radiation safety is required.

Communication skills
Students will be able to:

- Communicate clearly and effectively, using appropriate terminology, concepts of public health, prevention, and basic statistics to both professional and non-professional audiences.
- Contribute to the dissemination of essential information regarding occupational risks and safety measures to colleagues and patients in a responsible and understandable manner.

Learning skills
Students will develop:

- The methodological foundations needed to independently deepen their understanding of public health, occupational medicine, and applied statistics throughout their professional development.
- The ability to read and comprehend scientific literature in epidemiology and to stay up-to-date with new diagnostic technologies and regulations concerning workplace safety.

Contents

Introduction to public health; the evolution of the concept of health; demographic and epidemiological evolution; principles and concepts of public health; primary prevention of infectious and chronic diseases.
Reasoned analysis of Italian safety regulations with regard to aspects of interest for the future health professional.
Main knowledge of descriptive statistics.
Topics related to the main diagnostic methods used in clinical radiology and nuclear medicine will be covered, the general principles of radiation physics, the concept of biological risk from radiation, the modalities and effects of radiation exposure, the principles of radiation protection and the fundamental aspects of radiation protection legislation for workers will be illustrated, with particular regard to the working areas of radiology, nuclear medicine and radiotherapy.
Radiation physics, imaging modalities in conventional radiodiagnostics and CT, conventional nuclear medicine, SPET and PET, magnetic resonance imaging and ultrasonography.

Detailed program

General and applied hygiene: Introduction to public health; the evolution of the concept of health; demographic and epidemiological evolution
demographic and epidemiological; principles and concepts of public health; primary, secondary, tertiary prevention for infectious and chronic diseases. Public health within health systems.

Occupational Medicine: Elements of the history of Occupational Medicine; The Legislative Decree 81/08: generalities; Protective Devices / Personal
Protection / Individual; Pathology from manual handling of loads (Title VI Legislative Decree 8108); Pathology from video terminals/personal computers (Title VII Lgs.D. 8108); Pathology from noise and vibrations (Title VIII Lgs. 8108; Chemical risk (Title IX Legislative Decree 81/08); Carcinogenic risk (Title IX Legislative Decree 81/08); Biological risk

(Title X Lgs.D. 81/08); First Aid in the workplace (DM 388/03); Pregnancy and work (Lgs. 151/01); Radio-protection legislation (Legislative Decree 230/95)

Medical statistics: Quantitative-qualitative variables. Statistical series and seriations. Graphical representation of a distribution. Position indices of a distribution. Dispersion indices of a distribution. Scatter diagrams.
dispersion diagrams. Indices of association between two quantitative characters. Reliability of a measurement, random and systematic errors.
systematic errors. Indices of accuracy and precision. Definition of Gaussian density. Approximation of a histogram using the Gaussian distribution. The definition of standardised Gaussian density and its use.

Diagnostic Imaging and Radiation Protection: Introduction to Diagnostic Imaging and Radiation Protection. Overview of equipment used in diagnostic imaging. Main imaging techniques and their most common clinical applications in radiology (planar radiography, angiography, CT, MRI, ultrasound) and nuclear medicine (scintigraphy, single photon emission tomography (SPET) positron emission tomography (PET)).
General overview of ionising radiation and its radiobiological effect. Classification of irradiation damage. Radiation exposure in Radiodiagnostics and Nuclear Medicine. General principles of radiation protection.

Electronic and computer bioengineering: Hints of radiation physics. Conventional radiology with X-rays.
Computed Tomography (CT) with X-rays. Conventional Nuclear Medicine. Single Photon Emission Tomography
Single Photon Emission Tomography (SPECT). Positron Emission Tomography (PET). Magnetic Resonance Imaging. Ultrasound scanning.

Prerequisites

None

Teaching form

In the integrated course there will be 12 2-hour lessons delivered in face-to-face mode for the Monza site and in teledidactic mode for the Bergamo Lecco site;
the teledidactic mode envisages the "Direct" lesson in progress and the lessons uploaded onto the platform for consultation.
The 4 lessons of 2 hours of the Applied General Hygiene module are delivered in face-to-face mode at each location.
The 8 2-hour lectures of the Medical Statistics module will be conducted in alternating presence between the two sites (with remote connection for the other location).
The 8 lectures of the Medical Statistics module include an exercise part which is aimed at engaging students interactively in the final part of each lecture.

Textbook and teaching resource

Slides of the lessons .
-Signorelli C (editor). Igiene e Sanità Pubblica. SEU, Roma, 2017
D.lgs. 9 aprile 2008, n. 81, Dm 388/03
-Marc M. Triola, Mario F. Triola, Jason Roy. Fondamenti di statistica Per le discipline biomediche. Pearson,

seconda edizione 2022
-F.Giovagnorio. Manuale di diagnostica per immagini nella pratica medica. Esculapio Ed. 2017

Semester

first year- first semester

Assessment method

Final written test including:
-2 exercises to test the ability of the student in the application of statistics
-28 questions with closed answer to evaluate the preparation on the overall program

Office hours

on request by email

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY