BSc in Nursing

INTEGRATED TEACHING: HYGIENE, EPIDEMIOLOGY, HEALTH STATISTICS
NUMBER OF CFU: 7
SSD: MEDS-24/A; MEDS-24/B; MEDS-24/C; INFO-01/A
RESPONSIBLE PROFESSOR: FABIO D'AGOSTINO
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MODULE: MEDICAL STATISTICS
NUMBER OF CFU: 1
SSD: MEDS-24/A
PROFESSOR: ANNE W.S. RUTJES
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MODULE: GENERAL APPLIED HYGIENE EPIDEMIOLOGY
NUMBER OF CFU: 2
SSD: MEDS-24/B
PROFESSOR: VALERIO MOGINI
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MODULE: NURSING SCIENCE – CLINICAL NURSING METHODOLOGY OF RESEARCH
NUMBER OF CFU: 2
SSD: MEDS-24/C
PROFESSOR: FABIO D'AGOSTINO
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MODULE: NURSING SCIENCE – CLINICAL NURSING PUBLIC HEALTH
NUMBER OF CFU: 1
SSD: MEDS-24/C
PROFESSOR: ANDREA MASTRIA
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MODULE: INFORMATION TECHNOLOGY
NUMBER OF CFU: 1
SSD: INFO-01/A

PROFESSOR: DOMENICO ROCCO
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PREREQUISITES

Basic concepts of organization of health services and rudiments of microbiology are needed and basic mathematical knowledge.

LEARNING OBJECTIVES

Aim of the integrated module is to:

- provide students with knowledge about the mechanisms of infection and transmission of infectious diseases; systems of disinfection, sterilization, and prophylaxis; and the fundamentals of general, descriptive, analytical, and investigative epidemiology.
- provide students with knowledge on the professional practice of the nurse and raise awareness that knowledge gained through research is safest for the patient, allows the advancement of the nursing discipline and allows more appropriate use of health resources.
- provide knowledge on the process of nursing research and enhancing the ability to critically read a research article.
- provide students with both theoretical knowledge and practical skills in some of the most common basic statistical methods;
- develop students' ability to understand, select, and correctly apply statistical principles and analysis techniques essential for conducting and interpreting research in clinical nursing;
- foster the ability to critically read and interpret statistical results;
- communicate clinical evidence in scientifically accurate language;
- provide students with knowledge on the basic knowledge to understand the essential role of Information Technology (IT) in our society, and specifically in the context of health-related technical professions.
- provide students with knowledge on acquire the fundamental concept of the state of health of a population and the essential role of public health in its maintenance and promotion.
- provide knowledge on the objectives of public health with its main systems and services.
- provide knowledge on specific nursing activities and responsibilities in the public health field
- foster basic ethical concepts that guide professional practice in this context and planning an educational intervention plan for the general population.
- provide knowledge on the importance of self-care in chronic diseases management and to raise awareness about the risks related to the knowledge deficit diagnosis.
- Provide students with knowledge on acquire the fundamental concept of global health and of international cooperation health programs. Know the 2030 health goals promoted by WHO.

LEARNING OUTCOMES

Knowledge and Understanding

At the end of this teaching the student must:

- Know the hygiene of physical, biological and social environments
- Describe the hygiene of the patient and the hospital environment
- Know the main methods of prophylaxis of infectious diseases
- Know the basics of epidemiology and epidemiological methodology
- Have basic knowledge of demography and health statistics
- Describe the basics of the epidemiology of infectious and non-infectious diseases
- Know the issues related to global health and health determinants
- Know what a research problem is
- Know the different research designs
- Know what a sample is and how to select a sample
- Know the validity and reliability of measuring instruments
- Know and be able to understand both quantitative and qualitative research
- Having acquired basic knowledge of research methodology
- Have understood the importance of statistics for biomedical disciplines
- Know what a well phrased research objective is
- Know main areas of clinical research (etiology, diagnosis, therapy, prognosis)
- Know what is meant with population, study sample and other basic terms in biostatistics and epidemiology
- Know how and when to use specific measures of tendency and dispersion
- Understand main methods available to visualize data, and when to use them
- Being able to use characteristics of the normal distribution to solve simple probability questions
- Know how to perform a simple data analysis
- Have acquired sufficient descriptive and inferential statistical knowledge to interpret study findings of a scientific study correctly
- Master IT terminology and get a basic knowledge of the characteristics of both modern IT systems and their main applications
- Know the concept of health and its determinants.
- Know international documents on which public health is based on.
- Know the definition of public health.
- Know and describe a public health system.
- Know the ten essential public health services.
- Know the characteristics of essential public health functions.
- Know the concepts of disease prevention and health promotion.
- Know the role of ethics in public health.
- Know the role of nursing and of nurse in public health.
- Know the role of family nurse.
- Know the importance of self-care in chronic diseases management: the concept of self-empowerment and knowledge deficit.
- Know and understand the planning process and implementation of public health interventions.
- Know the concept of public health education.
- Know the Prochaska's e Di Clemente's (1972) model for changing dysfunctional behaviors.
- Know how to design an educational plan in public health field.

Applying knowledge and understanding

At the end of the course the student will be able to:

- evaluate the information provided by epidemiology in order to have an evidence-based approach to the profession.
- Know how to apply knowledge to correctly formulate a research problem
- Know how to apply knowledge to correctly formulate a hypothesis or research question
- Know how to apply knowledge to select a research design and select a sample
- Know how to use his/her skills to measure variables of interest
- Know how to apply knowledge to interpret the results of studies
- Being able to apply statistical knowledge to the comprehension of scientific studies
- Get the elements that contribute to defining the architecture of an IT system in terms of the relevant hardware and software components
- Be able to recognize and evaluate artificial intelligence tools in clinical contexts, assessing their limitations, accuracy, bias, and ethical and privacy implications.
- Use the gained knowledge for an autonomous learning related to the specific professional field, especially with attention to the design of health education plans.

Communication skills

At the end of the teaching the student should be able to:

- Know how to communicate using correct scientific terminology to describe the process of nursing research and be able to read a research article critically and express the basic concepts of public health and information technology adequately.

Making judgements

At the end of the teaching the student should be able to:

- carry out general assessments on the topics covered.
- Understand the topics covered in the course and apply this knowledge in simple experimental studies.
- Distinguish between what is relevant to public health and what is not.
- Recognize the specific area of nursing action in the public health field.
- Evaluate the adequacy of a health education program.

Learning skills

The student will have acquired skills and methods of learning suitable for deepening and improving their competencies in the field of hygiene, epidemiology, medical statistics, information technology, also through consulting scientific literature.

COURSE SYLLABUS

Syllabus MEDICAL STATISTICS

- Introduction to biostatistics in nursing and medicine
- From observation to research question and hypothesis formulation
- Sources of data
- Measurand, measurement and measurement scales
- Quantitative and qualitative variables
- Concept of descriptive statistics and inferential statistics
- Absolute, relative and cumulative frequencies
- Data visualization with tables, diagrams and graphs
- Statistical indices: measures of central tendency and dispersion, percentiles and quartiles
- Central limit theorem
- The normal curve (Gaussian) and its properties
- Statistical inference: null hypothesis and alternative hypothesis, P-value, statistical significance
- Association and causality
- Hypothesis testing and introduction to statistical significance tests
- Correlation

Syllabus GENERAL APPLIED HYGIENE EPIDEMIOLOGY

- environmental health;
- food safety and nutrition;
- the social environment: urbanization, housing;
- patient and hospital hygiene: asepsis, antisepsis, disinfection, disinfestation, sterilization, hospital waste, hospital infections, occupational risks;
- prophylaxis of infectious diseases: notification, diagnostic assessment, isolation, vaccination and sero-prophylaxis.
- definition and purpose of epidemiology;
- notes on demography and health statistics;
- epidemiological methodology: rates, mortality and morbidity measures, prevalence and incidence, association measures;
- descriptive, analytical and investigative epidemiology, transversal, retrospective and prospective investigations;
- experimental and general epidemiology of infectious diseases and non-infectious diseases;
- global health and health determinants.
- Antimicrobial resistance;
- Healthcare systems.

Syllabus NURSING SCIENCE – CLINICAL NURSING METHODOLOGY OF RESEARCH

- identification and definition of the research problem
- ethical problems in research;
- formulation of research hypotheses and questions;
- theory and research;
- selection of the research design: quantitative and qualitative;

- sample selection;
- measurement principles;
- validity and reliability of measuring instruments
- methods of data collection;
- data analysis;
- interpretation and dissemination of results;
- criticism of quantitative and qualitative research;
- phenomenological research;
- use of research in practice.
- EBN evidence-based nursing, protocol and procedure processing

Syllabus NURSING SCIENCE – CLINICAL NURSING PUBLIC HEALTH

- The concept of health and its determinants.
- International documents on which public health is based on: declaration of Alma-Ata (1978) and Ottawa Charter for Health Promotion (1986).
- Definition of public health.
- Definition and identification of public health systems.
- The ten essential public health services.
- The definitions and characteristics of essential public health functions, with a special focus on the prevention function of diseases in general population and promotion health function.
- The role of ethics in public health: WHO ethical guidelines in the context of public health surveillance and ethical decision-making.
- The role of nursing and of nurse in public health: objectives, public health nursing model.
- The role of family nurse.
- The role of selfcare in chronic diseases management: self – empowerment and Knowledge deficit.
- Planning process and implementation of public health interventions: identification of needs, risk factors and interventions with public health nursing interventions model.
- The concept of public health education: purpose according to WHO and characteristics.
- The concept of global health.
- The role of nursing and nurse in international cooperation programs.
- Prochaska e Di Clemente (1972) model for changing dysfunctional behaviors.
- Design of an educational plan: objectives, strategies, methods and tools.

Syllabus INFORMATION TECHNOLOGY

- Binary system and information codification, input and output, boolean operators.
- Computer architecture, CPU, memories;
- Software: operating systems, application software;
- Word processor (Microsoft Word), including bibliography, citations and references;
- Spreadsheet (Microsoft excel);
- Computer networks, Internet, e-mail, World Wide Web;
- Academic databases and search engines;

- Artificial Intelligence in Healthcare:
    - Basic concepts of AI and Machine Learning: definitions, main applications.
    - AI tools in clinical practice: decision support systems, predictive analytics, chatbots, image recognition.
    - Opportunities and limitations: accuracy, bias, interpretability.
    - Ethical and privacy considerations in AI applications for healthcare (GDPR, data protection).

COURSE STRUCTURE

The course includes frontal lectures and seminars of case studies. The language in all modules is English.

The module of General Applied Hygiene Epidemiology 2 is structured in 28 hours of frontal teaching structured in lessons lasting between 2 and 4 hours based on the academic calendar. Practical exercises are planned for students, both during and after the lectures. Some exercises are designed to be completed individually, while others will require students to form working groups, to collaborate on a joint exercise. Team-based exercises will be presented by students during one of the lectures.

The module of Methodology of Research is structured in 28 hours of frontal teaching, divided into lessons of 2 or 4 hours according to the academic calendar. Part of the lectures is reserved for discussions, student presentations, audiovisuals, completion and discussion of written assignments and assigned readings (texts, journals, electronic).

The module of Medical Statistics is scheduled for a total of 14 hours of frontal lectures, according to the academic calendar. Lectures typically have a duration of 2 hours and include exercises that need to be solved both during the lecture and at home. Lectures are set up as introductions to the topics listed in the syllabus. Students need to foster their knowledge and understanding by also studying of the textbook chapters recommended at the end of each lecture and by completion of the assigned exercises.

The module of Information Technology is structured around a set of topics illustrated during classes for a total of 14 hours of frontal lessons, which deal with both theory and application, with reference to concrete case studies. Lectures will last between 2 and 4 hours based on the academic calendar.

The module of Clinical Nursing Public Health consists of 14 hours: 8 hours will be carried out with a frontal approach, 3 hours with group works to design an educational plan (the students will be able to use other additional hours for the project by working from home) and 3 hours with oral presentations of the group works. For the oral presentation, the students will be able to use slides, diagrams and anything else they deem appropriate. Each group member must present a part of the work.

COURSE GRADE DETERMINATION

The exam of the integrated module Hygiene, Epidemiology, Health Statistics is comprised of a written exam of the modules of GENERAL APPLIED HYGIENE EPIDEMIOLOGY 2, METODOLOGY OF RESEARCH, MEDICAL STATISTICS, INFORMATION TECHNOLOGY, PUBLIC HEALTH and has a duration of maximally 120 minutes. The exam will cover the main topics of the teaching modules and will be considered passed if the student scores a final mark of 18/30.

Knowledge and understanding, the ability to apply knowledge and understanding, independence of judgment and written communication skills will weigh in the final score as follows 30%, 30%, 30% and 10%, respectively.

The assessment criteria will include: acquired knowledge, independence of judgment, communication skills (assessed through the understanding and correct use of terminology and the interpretation of written texts), and learning capacity. The examinations will be evaluated according to the following criteria:

< 18 **insufficient**	The candidate possesses an inadequate knowledge of the topic, makes significant errors in applying theoretical concepts, and unclear and/or incomplete answers, inaccurate use of technical language.
18 - 20	The candidate possesses a barely adequate and only superficial knowledge of topic, unclear or incomplete answers, inaccurate use of technical language, and only an inconsistent ability to apply theoretical concepts.
21 – 23	The candidate possesses an adequate, but not in-depth, knowledge of the topic, a partial ability to apply theoretical concepts, and generally correct answers, with appropriate use of technical terms and acceptable clarity.
24 – 26	The candidate possesses a fair knowledge of the topic, a reasonable ability to apply theoretical concepts correctly and correct answers, with appropriate use of technical terms and more than acceptable clarity.
27 - 29	The candidate possesses an in-depth knowledge of the topic, a sound ability to apply theoretical concepts, good analytical skills, clear, complete, and precise answers, with correct use of technical language.
30 - 30L	The candidate possesses an in-depth knowledge of the topic, an outstanding ability to apply theoretical concepts, a clear, complete, and precise answers, with correct use of technical language, as well as excellent analytical skills, and a well-developed ability to synthesize and establish interdisciplinary connections.

OPTIONAL ACTIVITIES

In addition to the theoretical teaching activity, some themes and case studies will be discussed with monographic insights. If necessary, students can ask for an appointment with the module's professor or one of the available tutors, to increase and deepen their understanding of specific topics included in the teaching program. Moreover, full text of the articles listed in the reading materials will be available from the course dedicated app.

READING MATERIALS

Reading materials for MEDICAL STATISTICS

- Lecture slides provided during class sessions
- Daniel WW, Cross CL. Biostatistics: A Foundation for Analysis in the Health Sciences: Wiley; 11th edition (2018), Wiley. ISBN: 978-1-119-28237-2 (PBK) / ISBN: 978-1-119-49668-7 (EVALC).
- W. W. Daniel, C. L. Cross: Concetti di base per l'analisi statistica delle scienze dell'area medico-sanitaria. Edizione 3 (2019), ISBN: 8833190412

Supplementary reading materials and exercises will be provided through the designated course app. These resources are designed to reinforce key concepts and support independent learning.

The listed textbooks are merely a suggestion. Students are free to use the textbook(s) of their choice. The Italian edition is the translation of the 11th edition in English.

Reading materials for GENERAL APPLIED HYGIENE EPIDEMIOLOGY

- Kawachi, I., Lang, I., & Ricciardi, W. (Eds.). (2020). *Oxford handbook of public health practice 4e*. Oxford University Press.
- Rothman, K. J. (2012). *Epidemiology: an introduction.* Oxford university press.

Reading materials for NURSING SCIENCE – CLINICAL NURSING METHODOLOGY OF RESEARCH

- Polit, D. F., & Beck, C. T. (2017). *Essentials of nursing research: Appraising evidence for nursing practice*. Lippincott Williams & Wilkins

Reading materials for NURSING SCIENCE – CLINICAL NURSING PUBLIC HEALTH

- Bettcher, D. W., Sapirie, S. A., & Goon, E. H. (1998). Essential public health functions: results of the international Delphi study. World health statistics quarterly (Rapport trimestriel de statistiques sanitaires mondiales 1998; 51 (1): 44-54)
- Centers of Disease Control and Prevention. (2018). The Public Health System & the 10 Essential Public Health Services. Retrieved 17/09/2019, 2019, from https://www.cdc.gov/publichealthgateway/publichealthservices/essentialhealthservices.html
- Keller, L. O., Strohschein, S., Lia-Hoagberg, B., & Schaffer, M. (1998). Population-based public health nursing interventions: a model from practice. Public Health Nurs, 15(3), 207-215
- Kuss, T., Proulx-Girouard, L., Lovitt, S., Katz, C. B., & Kennelly, P. (1997). A public health nursing model. Public Health Nurs, 14(2), 81-91.
- Martin-Moreno, J. M., Harris, M., Jakubowski, E., & Kluge, H. (2016). Defining and Assessing Public Health Functions: A Global Analysis. Annu Rev Public Health, 37, 335-355. doi: 10.1146/annurev-publhealth-032315-021429
- Merrick, J. (2013). Public health in a global context. Frontiers in public health, 1, 9.
- Stanhope, M., & Lancaster, J. (2015). Public health nursing-e-book: Population-centered health care in the community: Elsevier Health Sciences.

Reading materials for INFORMATION TECHNOLOGY

- Joos, I., Wolf, D., & Nelson, R. (2019). Introduction to computers for healthcare professionals. Jones & Bartlett Learning