ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

**Ε Θ . Α . Α . Ε .**

ΕΘΝΙΚΗ ΑΡΧΗ ΑΝΩΤΑΤΑΤΗΣ ΕΚΠΑΙΔΕΥΣΗΣ

HELLENIC REPUBLIC

**Η .Α .Η . Ε .**

HELLENIC AUTHORITY FOR HIGHER EDUCATION

## University of West Attica

**School of Health and Care Sciences**

**Department of Biomedical Sciences**

# Biomedical methods and Technology in diagnosis

Course Outline

**STANDARDS, AUTOMATION AND INFORMATION MANAGEMENT IN CLINICAL LABORATORY**

ATHENS 2023

# COURSE OUTLINE

## (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | of HEALTH and CARE SCIENCES | | |
| **ACADEMIC UNIT** | BIOMEDICAL SCIENCES | | |
| **LEVEL OF STUDIES** | POST GRADUATE | | |
| **COURSE CODE** | IA3 | **SEMESTER** | 2 |
| **COURSE TITLE** | Standards, Automation and Information Management in Clinical Laboratory | | |

| **INDEPENDENT TEACHING ACTIVITIES** *if credits are awarded for separate components of the course, e.g. lectures,laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits* | **WEEKLY TEACHING HOURS** | **CREDITS** |
|---|---|---|
| Theoretical and laboratory lessons | 4 | 8 |
| *Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at (d).* | | |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialized general knowledge, skills development* | Special background |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | - |
| **COURSE WEBSITE (URL)** | https://moodle.uniwa.gr |

## (2) LEARNING OUTCOMES

***Learning outcomes***

*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*

*Consult Appendix A*

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The aim of the course is to introduce biomedical scientists to the technologies and methods which manage information produced in the modern clinical laboratory. After the successful completion of the course, the students will:

- get critical knowledge and training in statistical analysis with emphasis on laboratory statistics (calculation of reference values, diagnostic and laboratory sensitivity, ROC curves, etc.) and statistical quality control (introduction to probability theory, distributions, statistical principles of quality control),
- get the necessary statistical knowledge for their own research activity,

- be aware of the trends of modern technology in the biochemical laboratory (modular analytical systems, technological trends, legal framework etc.).
- be familiar with the technology of modern automatic analyzers and acquire skills in Medical Informatics Laboratories (LIS) and (HIS).
- be able to use their knowledge and understanding, and their problem-solving skills to face usual or future problems in the clinical laboratory,
- be able to communicate their conclusions as well as their knowledge both to specialized and non-specialized audiences.
- get the necessary learning skills that allow them to continue their studies in a largely self-sufficient or even autonomous way.

***General Competences***

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

| | |
|---|---|
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |

- Search, analyze and synthesize data and information using the necessary technologies.
- Work in an interdisciplinary environment.
- Concentration and responsibility for performing laboratory exercises.
- Team work.

**(3) SYLLABUS**

1. Introduction to biomedical technology. History, current and future trends. Examples from biochemical/immunochemical analysts.
2. Modern medical diagnostic products (automatic pre-analytical systems and related examples). Visit to a relevant facility.
3. Introduction to probability theory.
4. Introduction to probability distributions.
5. Introduction to statistical quality control.
6. Statistical quality control in the clinical laboratory (analytical and other errors, methods of one or several criteria. Theory and exercises of laboratory statistics – introduction to SPSS – descriptive statistics.
7. External quality control schemes.
8. The use of biological variances in quality control goals.
9. The selection of laboratory methods with OPSpecs diagrams.

10. Informatics in the laboratory (LIS) and in the health team (HIS). Laboratory statistics theory and exercises – the quadrilateral table and its biomedical properties.
11. IT in the laboratory (LIS) and in the health team (HIS). Laboratory statistics theory and exercises – ROC curves (non-parametric statistics).
12. Theory and exercises of laboratory statistics – survival curves.
13. Laboratory statistics theory and exercises – introduction to reliability.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face teaching, Laboratory education |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching, laboratory education<br>Communication with students, Teaching through video and Kahoot tests |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS* | ***Activity*** — ***Semester workload***<br>Lectures with audiovisual media — 40<br>Laboratory practice — 40<br>Individual project — 40<br>Student's study hours — 80<br>Course total — 200 |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br>*Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open- ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Theory:<br>• Multiple choice questionnaires<br>• Short-answer questions<br><br>Laboratory:<br>• Laboratory work<br>• Short-answer questions<br>• Problem solving |

## (5) ATTACHED BIBLIOGRAPHY


1. Ehrmayer S The Poor Lab's Guide to the Regulations 2023-2024, Westgard QC Inc, 2023
2. Triola M Trila M, Jason R. Biostatistics of Biology and Health Sciences, Broken Hill Publishers, 2021
3. Marcello P, Kimbertee G. Biostatistics principles, Parisianos Edition, 2002
4. Westgard J. Six Sigma Risk Analysis, Westgard QC Inc, 2011