



DEPARTMENT OF ELECTRICAL  
& COMPUTER ENGINEERING



**Department of Midwifery**  
University of Western Macedonia

## **COURSE OUTLINES**

### **INTERDEPARTMENTAL POSTGRADUATE PROGRAM**

### **“Digital Health & Health Services Management”**

(MSc in Digital Health and Health Management)

#### **COLLABORATING DEPARTMENTS**

##### **Department of Electrical and Computer Engineering**

School of Engineering

University of Western Macedonia

##### **Department of Midwifery**

School of Health Sciences

University of Western Macedonia

Kozani, May 2025

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To be conferred a Master’s Degree in Digital Health and Health Services Management, students must successfully complete eight (8) courses during the first and second semesters. The third semester concerns thesis preparation, if students have fulfilled both their academic and financial obligations from the previous semesters. The Master’s Thesis and the 1<sup>st</sup> and 2<sup>nd</sup> semester courses are graded on a 10-point scale, with 10 being the highest grade. All postgraduate courses carry 7.5 ECTS credits, corresponding to a total of 30 ECTS per semester. The Master’s Thesis also carries 30 ECTS credits. A Master’s Degree (MSc) is conferred upon the successful completion of 90 ECTS credits in total.

The structure of the Program is as follows:

<b>1<sup>st</sup> Semester</b>			
S/N	Course Title	ECTS credits	Hours/Week
1	Digital Health – Principles of Health Information Systems	7,5	3
2	Fundamental Principles of Management in Health Services	7,5	3
3	Management of Personal Health Data – Bioethics in Healthcare	7,5	3
4	Health Data Processing Algorithms	7,5	3
	Total	30	12
<b>2<sup>nd</sup> Semester</b>			
S/N	Course Title	ECTS credits	Hours/Week

1	Elective Course A'	7,5	3
2	Elective Course B'	7,5	3
3	Elective Course C'	7,5	3
4	Elective Course D'	7,5	3
	Total	30	12
<b>3<sup>rd</sup> Semester</b>			
1	Master's Thesis	30	-

In the 2<sup>nd</sup> semester, students are required to select a total of four (4) elective courses as follows:

- ✓ **Option 1: Three (3) courses from Group A and one course (1) from Group B.**
- ✓ **Option 2: Three (3) courses from Group B and one course (1) from Group A.**
- ✓ **Option 3: Two (2) courses from Group A and two (2) courses from Group B.**

Students must choose one of the above combinations to ensure a balanced distribution between the subject areas of the two groups.

S/N	Elective Courses – Group A'
1	Diagnostic, Sensory, and Imaging Technologies
2	Introduction to Artificial Intelligence
3	UX in Digital Health: Methodologies and Applications
S/N	Elective Courses – Group B'
1	Evaluation of Economic Efficiency of Health Services and Technologies

2	Fundamental Principles of Data Collection and Evaluation of Epidemiological Studies
3	Bioethics and Health Law in Public Health Policies
4	Administration and Quality Management in Healthcare Services

## 1<sup>st</sup> Semester Courses

### 1. DIGITAL HEALTH – PRINCIPLES OF HEALTH INFORMATION SYSTEMS

<b>FACULTY/SCHOOL</b>	School of Engineering		
<b>DEPARTMENT(S)</b>	Electrical and Computer Engineering (Kozani) and Midwifery (Ptolemaida)		
<b>LEVEL OF STUDY</b>	POSTGRADUATE		
<b>COURSE UNIT CODE</b>	-	<b>SEMESTER OF STUDY</b>	A'
<b>COURSE TITLE</b>	Digital Health – Principles of Health Information Systems		
<b>INDEPENDENT TEACHING ACTIVITIES</b>	<b>TEACHING WEEKLY HOURS</b>	<b>ECTS CREDITS</b>	
	3	7,5	
<b>COURSE UNIT TYPE</b>	General Background		
<b>PREREQUISITES:</b>	-		
<b>LANGUAGE OF INSTRUCTION / EXAMS:</b>	Greek		
<b>COURSE DELIVERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	Moodle		

#### Learning Outcomes

The aim of the course is to familiarize students with the rapidly evolving and interdisciplinary field of Digital Health which is the application of the principles of information technology and telecommunications to provide solutions to problems and address the challenges of Prevention, Treatment and Quality of Health. Due to the interdisciplinary nature of the course, students explore different scientific fields, such as biology, medicine as well as the use of appropriate devices and software for the study and analysis of their problems. The course covers all modern trends, such as ewellness, independent living, Health 2.0, MedSocApps

Upon successful completion of the course, students will be able to:

- Understand the basic concepts, role, and functions of Health Information Systems (HIS).
- Identify the basic elements of Digital Health and its applications in the prevention, diagnosis, treatment and health monitoring.
- Understand the importance of interoperability, HL7/FHIR standards, and the fundamentals of medical informatics.
- Describe the architecture, operation and specific requirements of a health information system (HIS, EHR, LIS, RIS, PACS).
- Analyze the challenges related to the adoption of ICT in the health sector, including privacy, security, ethics and data management issues.
- Implement basic tools and techniques for the management and utilization of health data.
- Compare and evaluate digital solutions and health technologies based on the needs of health service delivery systems.
- Design digital intervention scenarios in prevention, wellness, and remote patient monitoring contexts.

#### General Competences

- Familiarization with e-Health and the application of cutting-edge technologies in healthcare and Primary Health Care.
- Collection, analysis, and synthesis of data and information using appropriate technological tools.
- Support evidence-based decision-making in healthcare contexts.
- Ability to work and collaborate effectively within interdisciplinary contexts.
- Generation of innovative research ideas in the field of Digital Health.
- Capacity to work independently and responsibly.
- 

#### COURSE CONTENT

Week	Unit Title
1	Introduction to Digital Health
2	Digital Health
3	Technological Framework of Electronic Services in Primary Health Care
4	Management of Chronic Patients through Telematics Systems
5	Basic Principles of Internet of Things (IoT)
6	Man: the oldest IoT system in operation

7	Biosignals
8	Mobile Health (mHealth)
9	Mobile Health (mHealth)
10	Standards, Standardization, Organizations
11	Hospital Digitization
12	Telemedicine

#### TEACHING / LEARNING METHODS - ASSESSMENT

<b>MODE OF DELIVERY</b> <i>Face-to Face, Distance Learning etc.</i>	Synchronous distance learning (zoom) and asynchronous distance learning (electronic platform Moodle)	
<b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)</b>	Lectures will incorporate audiovisual media and the projection of digital course materials using the classroom projector. Internet resources will be employed during instruction to demonstrate methods for locating scientific literature and accessing digital libraries. In the case of distance learning, the Zoom platform will be utilized to support online teaching.	
<b>TEACHING METHODS</b>	<b><i>Method Description</i></b>	<b><i>Semester Workload</i></b>
	Lectures	52
	Lab Exercises	52
	Self-study	121
	Total	225
<b>ASSESSMENT METHODS</b>	Final Exam: 30% Lab Exam: 30% Writing Assignment: 40%	

#### RESOURCES- RECOMMENDED BOOK RESOURCES

[1] Παντελης Αγγελιδης, Ιατρική Πληροφορική τόμος Α, "σοφία", 2011.

[2] Αθηνά Λαζακίδου, Προηγμένα Συστήματα και Υπηρεσίες Πληροφορικής στο Χώρο της Υγείας, Αθηνά Λαζακίδου, 2009.

## 2. FUNDAMENTAL PRINCIPLES OF MANAGEMENT IN HEALTH SERVICES

<b>FACULTY/SCHOOL</b>	SCHOOL OF ENGINEERING		
<b>DEPARTMENT(S)</b>	Electrical and Computer Engineering (Kozani) and Midwifery (Ptolemaida)		
<b>LEVEL OF STUDY</b>	POSTGRADUATE		
<b>COURSE UNIT CODE</b>	-	<b>SEMESTER OF STUDY</b>	A'
<b>COURSE TITLE</b>	Fundamental Principles of Management in Health Services		
<b>INDEPENDENT TEACHING ACTIVITIES</b>	<b>TEACHING WEEKLY HOURS</b>	<b>ECTS CREDITS</b>	
	3	7,5	
<b>COURSE UNIT TYPE</b>	General Background		
<b>PREREQUISITES:</b>	-		
<b>LANGUAGE OF INSTRUCTION / EXAMS:</b>	Greek		
<b>COURSE DELIVERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	Moodle		

Learning Outcomes
<p><b>Purpose</b></p> <p>The purpose of the course "Basic Principles of Management in Health Services" is to familiarize students with the basic principles of management sciences and to provide specialized knowledge on how to exercise the management of Health Service Units as well as the management of their health resources. It also aims to equip students with the appropriate background for the evaluation of health programs and services.</p> <p>Through the course students will acquire knowledge concerning:</p> <ul style="list-style-type: none"> <li>• the factors determining Health Units Management</li> </ul>

- the factors determining the most effective organization and management of Health Services using information technologies
- the planning, organization and management of their human resources

Upon successful completion of the course, students will be able to:

- Understand the distinctive nature of management in healthcare settings, in which professionals not only produce but also deliver services.
- Comprehend the institutional and regulatory framework governing health service administration.
- Recognize the necessity of public intervention in the provision and governance of healthcare services.
- Understand the principles of social and health policy.
- Describe the historical development of the National Health System, identifying its weaknesses and potential for improvement in relation to social and economic conditions.
- Analyze how health outcomes are shaped by both the organization of the health system and broader social and economic determinants.
- Apply methods and techniques of economic evaluation and resource allocation to maximize healthcare effectiveness.
- Examine behavioral models of healthcare utilization and the dynamics of the doctor–patient relationship.
- Understand models of preventive health behavior and their application to public health strategies.
- Recognize the importance of interventions aimed at reducing occupational burnout among healthcare professionals.
- Appreciate the significance of diversity and inclusion in healthcare teams.
- Understand the lived experience of chronic illness and its psychosocial impacts.
- Identify and evaluate frameworks for interventions designed to improve healthcare quality and enhance patient satisfaction.
- Apply basic principles of research methodology and select appropriate research designs based on study objectives.

#### **General Competences**

- Search, analysis and synthesis of data and information, using the necessary technologies
- Adapting to new situations

- Decision-making
- Independent work
- Teamwork
- Working in an international environment
- Working in an interdisciplinary environment
- Generating new research ideas
- Promoting free, creative and inductive thinking

## COURSE CONTENT

Week	Unit Title
<b>Course Structure – Units</b>	
<b>Unit 1: The Health Sector</b>	
1.1: Health Systems. Features and International Trends	
1.2: Healthcare	
1.3: Health Services	
1.4: The Health sector in Greece. Institutional Framework: Public and Private Health	
1.5: The Social Security System	
1.6: Trends and Prospects in the Healthcare Sector in Greece	
<b>Unit 2. Management &amp; Leadership in Health Services</b>	
2.1: Basic Management Theories. The Management of an Organization	
2.2: Health Services Management	
2.3: Modern Models of Health Service Management	
2.4: Leadership and Management in the Health Sector	
<b>Unit 3. Decision-Making Process</b>	
3.1: Decision Making and Management	
3.2: The Healthcare Decision-Making Process	
3.3: Operational Planning of Health Services	
3.4: Quantitative Analysis in Decision Making	
3.5: Linear Planning and Management	
<b>Unit 4. Human Resource Management</b>	
4.1: Human Resources in Health Services	
4.2: The Management of Culture and Change in Health Services	
4.3: Organizational Behavior and Communication.	
4.4: Motivation and Performance. The Role of Leadership.	
4.5: Training, Education and Specialization.	
4.6: Health and Safety of Health Services Workers	

**Unit 5. Total Quality Management in Health Services**

- 5.1: The concept of Quality in Health Services  
 5.2: Quality Management in Health Services  
 5.3: Systems and Quality Assessment. Quality Awards  
 5.4: Statistical Testing and Reliability Analysis  
 5.5: Trends in Total Quality Management. Internal Service Quality.

**TEACHING/LEARNING METHODS - ASSESSMENT**

<b>MODE OF DELIVERY</b> <i>Face-to Face, Distance Learning etc.</i>	Synchronous distance learning (zoom) and asynchronous distance learning (electronic platform Moodle)	
<b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)</b>	Lectures will incorporate audiovisual media and the projection of digital course materials using the classroom projector. Internet resources will be employed during instruction to demonstrate methods for locating scientific literature and accessing digital libraries. In the case of distance learning, the Zoom platform will be utilized to support online teaching.	
<b>TEACHING METHODS</b>	<b><i>Method Description</i></b>	<b><i>Semester Workload</i></b>
	Lectures	52
	Lab Exercises	52
	Self-study	121
	Total	225
<b>ASSESSMENT METHODS</b>	I. End Semester Final Exam (70%) including: - Multiple Choice Questions - Comparison/Evaluation Questions  II. Writing and presentation of group work assignment (30%)	

**RESOURCES- RECOMMENDED BOOK RESOURCES**

- Διοίκηση και οργάνωση υπηρεσιών υγείας. Νίκος Πολύζος, Εκδόσεις Παπαζήση , 2014 Αθήνα.
- Υπηρεσίες Υγείας: Συστήματα και Πολιτικές. Σαράφης και συν., Εκδόσεις Βασιλειάδης, 2020

- Οργανωσιακή κουλτούρα υπηρεσιών υγείας. Γούλα, Εκδόσεις Παπαζήση , 2014 Αθήνα.
- Εισαγωγή στη Νοσηλευτική Διοίκηση και Ηγεσία. Russell C. Swansburg, Richard J. Swansburg. Επιμέλεια Αποστόλου Ελένη. Εκδόσεις ΛΑΓΟΣ, 1999, Αθήνα.
- Διοίκηση Ανθρωπίνων Πόρων. Ξηροτύρη – Κουφίδου Σ. Εκδόσεις Ανίκουλα, 1997, Θεσ/νίκη..
- Wolper L.( 2001), Διοίκηση Υπηρεσιών Υγείας, Το Νοσοκομείο στα Πλαίσια ενός Συστήματος Οργανωμένης Παροχής Φροντίδας, Τόμος Β΄, εκδ. Mediforce, Αθήνα.
- Κυριόπουλος Γ, Οικονόμου Χ., Σουλιώτης Κ, (2003): Υγεία και Υπηρεσίες Υγείας στα Βαλκάνια, εκδ. Παπαζήσης Αθήνα.
- Κυριόπουλος Γ., Γκρέγκορ Σ., Οικονόμου Χ., (2003): Υγεία και Υπηρεσίες Υγείας στον Ελληνικό Πληθυσμό, εκδ. Παπαζήση, Αθήνα.
- Σουλιώτης Κ., (2000): Ο ρόλος του Ιδιωτικού Τομέα στο Ελληνικό Σύστημα Υγείας, εκδ. Παπαζήση, Αθήνα.
- Γ. Δημολιάτης κ.ά (2002): Η δημόσια υγεία στην Ελλάδα, εκδ. Θεμέλιο / Κοινωνία και Υγεία, Αθήνα.
- Διοίκηση Ολικής Ποιότητας. Τσιότρας. 2016 Εκδόσεις Broken Hill.2016
- Reddy, S., & Tavares, A. I. (Eds.). (2020). Evaluation of Health Services. BoD–Books on Demand.
- Schulz, Rockwell, and Alton Cornelius Johnson. Management of hospitals and health services: strategic issues and performance. Beard Books, 2003.
- Soulis S., and others (2003), Health Economics and Health Management, Proceedings of the First International Conference, εκδ. Παπαζήσης, Αθήνα.
- Wilkinson R., Marmot M., (2003): Social Determinants of Health: The Solid Facts, ed.W.H.O. EURO Nonserial Publication.
- Dumolin J., Kaddar M., Velásquez G., (2003) : Guide d’analyse économique du circuit du médicament, W.H.O. Documents et autres références.
- Martin Mckee and Judith Healy (2001): Hospitals in a changing Europe (ed.), Open University Press.
- Peter M. Ginter, Linda E. Swayne, W. Jack Duncan, (2002): Strategic Management of Health Care Organizations, Blackwell Publishers, 8th edition.
- John R. Griffith, Kenneth R. White (2002): The Well-Managed Healthcare Organization, Health Administration Press/Ache, 9th edition.
- Charles J. Austin, Stuart B. Boxerman (2002): Information Systems for Healthcare Management, 8th Edition, Health Administration Press, 6th edition.
- Reinhardt, U. & Cheng, T. (2000). The world health report 2000 – Health systems: improving performance.. Bulletin of the World Health Organization, 78 (8), 1064. World Health Organization. <https://apps.who.int/iris/handle/10665/268209>
- OECD (2021), Health at a Glance 2021: OECD Indicators, OECD Publishing, Paris, <https://doi.org/10.1787/ae3016b9-en>.
- World health statistics 2021: monitoring health for the SDGs, sustainable development goals. Geneva: World Health Organization; 2021.

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### 3. MANAGEMENT OF PERSONAL HEALTH DATA – BIOETHICS IN HEALTHCARE

<b>FACULTY/SCHOOL</b>	SCHOOL OF ENGINEERING		
<b>DEPARTMENT(S)</b>	Electrical and Computer Engineering (Kozani) and Midwifery (Ptolemaida)		
<b>LEVEL OF STUDY</b>	POSTGRADUATE		
<b>COURSE UNIT CODE</b>	-	<b>SEMESTER OF STUDY</b>	A'
<b>COURSE TITLE</b>	Management of Personal Health Data – Bioethics In Healthcare		
<b>INDEPENDENT TEACHING ACTIVITIES</b>		<b>TEACHING WEEKLY HOURS</b>	<b>ECTS CREDITS</b>
		3	7,5
<b>COURSE UNIT TYPE</b>	General Background		
<b>PREREQUISITES:</b>	-		
<b>LANGUAGE OF INSTRUCTION / EXAMS:</b>	Greek		
<b>COURSE DELIVERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	Moodle		

<b>Learning Outcomes</b>
<p>This course concerns the relationship between law, ethics and technological development in the field of health, and its purpose is to explore basic concepts of Health Law as well as developing the ability to critically analyze and approach the ethical dilemmas created by the progress of biomedical science and technology and its application in Public Health. The critical ethical, social and legal issues emerging in this regard, in areas such as transplantation, assisted reproduction, stem cell banks, clinical drug trials, genetic testing, patents in biotechnology, render bioethics a field that must be constantly updated and monitored by modern developments.</p> <p>Upon successful completion of the course, students will be able to:</p>

1. Recognize the basic concepts of Health Law and the fundamental issues of Bioethics.
2. Understand the legal and ethical framework that governs the management of personal data in the health sector.
3. Analyze critical issues arising from advances in technology and biomedical science, such as genetics, clinical trials, and the use of big data.
4. Distinguish the conflicts between individual rights and the general interest in Public Health by applying the principle of proportionality.
5. Apply basic principles of ethics and privacy protection when analyzing and managing sensitive health data.
6. Develop critical thinking skills regarding ethical dilemmas and complex cases in the field of health.

**General Competences**

- Data and information search, analysis, and synthesis, using the necessary technologies
- Adapting to new situations
- Decision-making
- Independent work
- Working in an interdisciplinary environment
- Project planning and management
- Demonstration of social, professional and moral responsibility
- Exercise of criticism and self-criticism
- Promoting free, creative and inductive thinking

**COURSE CONTENT**

Week	Unit Title
Course Units	
-INTRODUCTION TO BIOETHICS	
-THE CONCEPT OF HEALTH LAW – THE RELATIONSHIP BETWEEN ETHICS LAW AND TECHNOLOGY	
- HEALTH PROFESSIONALS’ RESPONSIBILITY – RESPONSIBILITY IN PUBLIC HEALTH	
-SCIENTIFIC RESEARCH AND BIOETHICS	
-ARTIFICIAL ASSISTED REPRODUCTION AND PUBLIC HEALTH-BIOETHICAL DILEMMAS	

<p>-TISSUE AND ORGAN TRANSPLANTS</p> <p>-EUTHANASIA</p> <p>-ARTIFICIAL INTELLIGENCE: CHALLENGES AND CONSIDERATIONS</p> <p>-PRENATAL SCREENING</p> <p>-FROM CONCEPTION TO DELIVERY</p> <p>-BIOETHICS IN NEONATOLOGY</p>
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**TEACHING METHODS - ASSESSMENT**

<b>MODE OF DELIVERY</b> <i>Face-to Face, Distance Learning etc..</i>	Synchronous distance learning (zoom) and asynchronous distance learning (electronic platform Moodle)	
<b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)</b>	Lectures will incorporate audiovisual media and the projection of digital course materials using the classroom projector. Internet resources will be employed during instruction to demonstrate methods for locating scientific literature and accessing digital libraries. In the case of distance learning, the Zoom platform will be utilized to support online teaching.	
<b>TEACHING METHODS</b>	<b><i>Method Description</i></b>	<b><i>Semester Workload</i></b>
	Lectures	52
	Lab Exercises	52
	Self-study	121
	Total	225
<b>ASSESSMENT METHODS</b>	<p>I. End Semester Final Exam (70%) including:</p> <ul style="list-style-type: none"> <li>- Multiple Choice Questions</li> <li>- Comparison/Evaluation Questions</li> </ul> <p>II. Writing and presentation of group work assignment (30%)</p>	

**RESOURCES- RECOMMENDED BOOK RESOURCES**

1. Κριάρη-Κατράνη Ισμήνη (1994): Βιοϊατρικές Εξελίξεις και Συνταγματικό Δίκαιο, Εκδόσεις Σάκκουλα, Θεσσαλονίκη
  2. Αλεξιάδης Α.Δ.(1996): Εισαγωγή στο ιατρικό Δίκαιο. Εκδοτικός Οίκος Μ.Δημόπουλου. Θεσσαλονίκη.
  3. RS Downie, KC Calman (1997): Υγιής Σεβασμός: Η ηθική στη φροντίδα υγείας, Ιατρικές Εκδόσεις Λίτσας, Αθήνα
  4. S.Reith: ENCYCLOPAEDIA OF BIOETHICS, Volume 3
  5. The Data Protection Directive and Medical Research across Europe (2004). Eds: D.Beylveid, D.Townend, S.Rouille-Mirza, J.Wright. Ashgate Publishing, Aldershot.
  6. Philosophy and Practice of Medical Ethics. British Medical Association 1988.
  7. Health, Ethics and Human Rights: The Council of Europe meeting the challenge Eds: H.Roscam-Abbing, K-F.Bopp. Council of Europe 2004.
  7. Beauchamp T., (2007). Ευθανασία, Αρχιπέλαγος
  8. McEwan I. (2014).The children act: a novel. New York : Nan A. Talese/Doubleday.
  9. Garasic, Mirko Daniel (2011) Freedom, Consent and Autonomy in Bioethics: justifications for Enforced Medical Treatment and its Refusal (Thesis)
  10. Ο'Neil O., (2011). Αυτονομία και εμπιστοσύνη στη βιοηθική, Αρσενίδης 5. Stuart J. Youngner, Gerrit K. Kimsma (ed). Physician-assisted death in perspective : assessing the Dutch experience, New York : Cambridge University Press, 2012
  11. Βιδάλης Τ., (2007 ). Βιοδίκαιο, Σακούλας ΑΕ. 7. Καϊάφα-Γκμπάντι, Κουνουγέρη-Μανωλεδάκη Ε., Συμεωνίδου-Καστανίδα (2013). Ιατρική Υποβοήθηση στην Ανθρώπινη Αναπαραγωγή, Σάκκουλας 8. Μάλλιος Ε. (2004). Γενετικές εξετάσεις και δίκαιο, Σάκκουλας ΑΕ
  12. Mitrossili M., Dinou A., Gkioka V. and Stavropoulos-Gioka C., Regulation across the Globe (2014) in Catherine Stavropoulos-Giokas, Dominique Charron, Cristina Navarrete (ed). Cord Blood Stem Cells Medicine, Elsevier.
  13. Μητροσύλη Μ., (2009), Δίκαιο της Υγείας, Παπαζήσης
  14. Μητροσύλη Μ., (2008), Από τη βιοηθική στο βιοδίκαιο, Επιστήμη και κοινωνία, Σάκκουλας 16. Παπαδημητρίου Ι., Δρακοπούλου Μ., (2010). Βιοηθική και Ανθρώπινα Δικαιώματα, Αντ. Ν. Σάκκουλα
  15. Σαρειδάκης Ε., (2008). Βιοηθική, Ηθικά προβλήματα των νέων βιοϊατρικών τεχνολογιών, Παπαζήσης
- Συναφή επιστημονικά περιοδικά:
- Bioethics
  - Journal of Medical Ethics
  - The American Journal of Law and Medicine
  - Ιατρικό Δίκαιο και Βιοηθική (Δελτίο)
  - Επιθεώρηση Βιοηθικής

#### 4. HEALTH DATA PROCESSING ALGORITHMS

<b>FACULTY/SCHOOL</b>	School of Engineering		
<b>DEPARTMENT(S)</b>	Electrical and Computer Engineering (Kozani) and Midwifery (Ptolemaida)		
<b>LEVEL OF STUDY</b>	POSTGRADUATE		
<b>COURSE UNIT CODE</b>	-	<b>SEMESTER OF STUDY</b>	A'
<b>COURSE TITLE</b>	Health Data Processing Algorithms		
<b>INDEPENDENT TEACHING ACTIVITIES</b>	<b>TEACHING WEEKLY HOURS</b>	<b>ECTS CREDITS</b>	
	3	7,5	
<b>COURSE UNIT TYPE</b>	General Background		
<b>PREREQUISITES:</b>	-		
<b>LANGUAGE OF INSTRUCTION / EXAMS:</b>	Greek		
<b>COURSE DELIVERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	Moodle		

#### LEARNING OUTCOMES

The course studies Health Data Analysis and Management as an important aspect of the Postgraduate Curriculum.

Upon successful completion of the course, students will be able to:

- Describe the basic concepts of health data
- Explain the different aspects of health data representation
- Organize, store and retrieve health data and information
- Describe the health data management process, its components and systems
- Understand Big Data and its use in health
- Recognize Machine Learning applications in Medicine
- Design Smart Environments in Health Implementation Scenarios

## GENERAL COMPETENCES

- Search, analysis and synthesis of health data and information, using the necessary technologies
- Comparison and evaluation of techniques and decision-making support
- Independent work
- Healthcare project planning and management

## COURSE SYLLABUS

Basic and Advanced Topics in Health Data Acquisition, Analysis, and Management. Big Data in Health: Data Collection, Processing, Storage, Interoperability and Analysis. Machine Learning Applications and Data Management in Healthcare. Case Study in Health Services.

## COURSE CONTENTS

WEEK	UNIT TITLE
1	Course Overview-Introduction
2	Medical Data & Standards
3	Databases in Medicine
4	Data Preprocessing
5	Data Processing Algorithms
6	Biomedical Signals & Analysis (Electrocardiogram)
7	Biomedical Signals & Analysis (Electroencephalogram)
8	Data Mining & Machine Learning
9	Neural Networks & Deep Learning
10	Predictive Modeling & Predictive Models
11	Big Data Tools in Healthcare
12	Intelligent Applications and Healthcare Services

## TEACHING/LEARNING METHODS - ASSESSMENT

<b>MODE OF DELIVERY</b> <i>Face-to Face, Distance Learning etc.</i>	Synchronous distance learning (zoom) and asynchronous distance learning (electronic platform Moodle)
<b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)</b>	Lectures will incorporate audiovisual media and the projection of digital course materials using the classroom projector. Internet resources will be employed during instruction to demonstrate methods for locating scientific literature and accessing digital libraries. In the case of distance learning, the Zoom platform will be utilized to support online teaching.

<b>TEACHING METHODS</b>	<b><i>Method Description</i></b>	<b><i>Semester Workload</i></b>
	Lectures	36
	Writing Assignments (2)	97
	Self-study	92
	Total	<b>225</b>
<b>ASSESSMENT METHODS</b>	<ul style="list-style-type: none"> <li>• Writing Assignments (50%)</li> <li>• Oral Examination (50%)</li> </ul>	

#### RESOURCES- RECOMMENDED BOOK RESOURCES

[1] Τσιπούρας, Μ., Γιαννακέας, Ν., Καρβούνης, Ε., & Τζάλλας, Α. (2015). Ιατρική πληροφορική. Κάλλιπος, Ανοικτές Ακαδημαϊκές Εκδόσεις. <http://dx.doi.org/10.57713/kallipos-733>

[2] Hwaiyu, G., & McKeeth, J. (2016). Internet of things and data analytics handbook. Wiley Online Library.

## 2<sup>nd</sup> Semester Courses

### Elective courses- Group A'

#### 1. DIAGNOSTIC, SENSORY, AND IMAGING TECHNOLOGIES

<b>FACULTY/SCHOOL</b>	School of Engineering		
<b>DEPARTMENT(S)</b>	Electrical and Computer Engineering (Kozani) and Midwifery (Ptolemaida)		
<b>LEVEL OF STUDY</b>	POSTGRADUATE		
<b>COURSE UNIT CODE</b>	-	<b>SEMESTER OF STUDY</b>	B'
<b>COURSE TITLE</b>	Diagnostic, Sensory, and Imaging Technologies		
<b>INDEPENDENT TEACHING ACTIVITIES</b>	<b>TEACHING WEEKLY HOURS</b>	<b>ECTS CREDITS</b>	
	3	7,5	
<b>COURSE UNIT TYPE</b>	General Background		
<b>PREREQUISITES:</b>	-		
<b>LANGUAGE OF INSTRUCTION / EXAMS:</b>	Greek		
<b>COURSE DELIVERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	Moodle		

#### LEARNING OUTCOMES

<b>Learning Outcomes</b>
The course aims to familiarize students with the modern diagnostic methods employed by the diagnostic approach of pathologies in the sensory organs and the processing of signals and images with automated procedures. The learning objectives of the course are summarized as follows:

- Definition, analysis and processing of biosignals
- Familiarization with the representation and nature of the grayscale image of the multi-channel color image.
- Understanding image as a multidimensional signal and the assignment of the concepts of signal theory to the multidimensional spaces of image.
- Learning image enhancement techniques, filtering and spatial transformations.
- Familiarization with techniques of segmentation and locating objects (from conventional to cutting-edge ones used nowadays)
- Application of enhancement and segmentation techniques to images of various fields.
- Presentation of the new trends in the field of image processing. Machine Learning and Medical Image Processing
- Calculation of quantified values from classified objects and the extraction of local and holistic characteristics.

#### **General Competences**

- Search, analysis and synthesis of health data and information, using the required technologies
- Comparison and evaluation of techniques and decision-making support
- Independent work
- Teamwork
- Working in an interdisciplinary environment
- Generating new research ideas

#### **COURSE CONTENTS**

The course specializes in signal processing techniques in the field of images and addresses a wide range of research questions. The applications of image processing extend across multiple domains, from microscopy and medical imaging to astrophysics.

The basic stages of image processing concern:

a) Image enhancement, performed either as an end or with the aim of the image transformation into a form that can be easily utilized in subsequent processing and analysis b) Segmentation, during which the pixels of the image with similar characteristics are grouped together, forming distinct findings and objects c) Extraction of quantitative values from the results of segmentation. The aim of the course is to familiarize students with the fundamental concepts of image processing and analysis, as well as to introduce them to relevant techniques and algorithms. It addresses specific enhancement techniques using filters and geometric transformations, as well as various types of segmentation methods. Computers advancement, access to computational resources, and the spread of parallel processing systems have given significant dynamics to the field in recent years, through the direct application of machine learning methods at the pixel level. Nowadays, the

semantic approach to object detection using advanced classification techniques is steadily evolving. The structure of the course places particular emphasis on the chronological development of the field and concludes with the emerging trends recently shaping imaging diagnostics.

Week	Unit Title
1	<b>Introduction to Image:</b> Basic image concepts, optical and electromagnetic spectrum, the image as a multidimensional concept, signal theory and systems.
2	<b>Digital image:</b> Image digitization, pixels, neighborhood and coherence, depth of brightness, dimensions, image resolution. Binary image, gray layer image and multichannel image, key features, color, frequency, texture.
3	<b>Color spaces:</b> Different color spaces and representations of a multi-channel image. Color spaces RGB, CMYK, YSV and YUV, features and conversions.
4	<b>Image Frequency:</b> Discrete Fourier Transform (DFT), Discrete Cosine Transform (DCT), Lossless and Lossy Image Compression.
5	<b>Enhancement via Image Filters:</b> Image Noise, Mean Filter, Median Filter, Variance Filter. Convolution in an image and convolutional filters, smoothing filters, edge enhancement filters, wiener filters, multi-channel filters. Evaluation Measures.
6	<b>Image Enhancement with Geometric Transformations:</b> Scaling, translation, transfer, rotation, reflection, Affine transformation. Hough transform and distance transform. Radon transform.
7	<b>Histogram-Based Segmentation:</b> Brightness frequency, Image histogram, brightness threshold, histogram equalization, Otsu's method, multi-threshold methods.
8	<b>Morphology-Based Segmentation:</b> Mathematical morphology, morphological erosion and dilation, morphological opening and closing, template matching technique, watershed transform.
9	<b>Edge-Based Segmentation:</b> Image differentiation, Sobel filters, Laplacian filters, edge detection with morphological operations, active contours and snakes, region-growing methods.
10	<b>Feature Extraction:</b> Pixel-level and neighborhood features, Color features, Statistical features and interpretation, Texture features, Geometric features, Feature selection
11	<b>Clustering-Based Segmentation:</b> Pixel clustering based on features, K-means and Fuzzy K-means algorithms, cluster-to-class matching.

12	<b>Classification-Based Segmentation:</b> Object labeling, classification methods, semantic segmentation, Deep learning, Convolutional Neural Networks (CNNs), evaluation measures.
13	<b>Applications and Quantification:</b> Processing and object detection across different imaging domains using various segmentation techniques, extraction of quantitative values.

#### TEACHING AND LEARNING METHODS - ASSESSMENT

<b>MODE OF DELIVERY</b> <i>Face-to Face, Distance Learning etc..</i>	Synchronous distance learning (zoom) and asynchronous distance learning (electronic platform Moodle)		
<b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)</b>	Lectures will incorporate audiovisual media and the projection of digital course materials using the classroom projector. Internet resources will be employed during instruction to demonstrate methods for locating scientific literature and accessing digital libraries. In the case of distance learning, the Zoom platform will be utilized to support online teaching.		
<b>TEACHING METHODS</b>	<b>Method Description</b>	<b>Semester Workload</b>	
	Lectures	39 hours	
	Tutorials	26 hours	
	Lab Exercises	13 hours	
	Writing Assignments	60 hours	
	Self-study	87 hours	
	<b>Total</b>	<b>225 hours</b>	
<b>ASSESSMENT METHODS</b>	<p>Course assessment will be based on a combination of the students' performance in the following components:</p> <ul style="list-style-type: none"> <li>• <b>Two midterm exams</b> conducted during the semester, including multiple-choice questions as well as problem-solving exercises — <b>20/100</b>.</li> <li>• <b>Written assignments</b>, including the analysis of the laboratory exercises performed — <b>20/100</b>.</li> <li>• <b>End semester final examination</b>, consisting of problem-solving exercises — <b>60/100</b>.</li> </ul> <p>In the problem-solving section, assessment will be based on correct problem-solving methodology (50/100), understanding of operations and concepts (30/100), accuracy of numerical results and conclusions (20/100)</p>		

	All relevant material will be available on the course website, including many exercises of equivalent difficulty for each learning unit, as well as sample written assignments and laboratory reports.
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## RESOURCES

### - *Recommended Book Resources:*

1. R. Gonzalez and R. Woods. Ψηφική Επεξεργασία Εικόνας, Εκδόσεις Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε., 2010, ISBN: 978-960-418-2.
2. Ν. Παπαμάρκος, Ψηφιακή επεξεργασία και ανάλυση εικόνας. Β. Γκιούρδας Εκδοτική. 2010, ISBN: 978-960-92731.

### - *Relevant Scientific Journals:*

1. IEEE transactions on Image Processing, IEEE.
2. International Journal of Computer Vision, Springer.
3. Image and Vision Computing
4. Computer Vision and Image Understanding

Eurasip Journal on Image and Video Processing

## 2. INTRODUCTION TO ARTIFICIAL INTELLIGENCE

<b>FACULTY/SCHOOL</b>	School of Engineering		
<b>DEPARTMENT</b>	Electrical and Computer Engineering (Kozani) and Midwifery (Ptolemaida)		
<b>LEVEL OF STUDY</b>	POSTGRADUATE		
<b>COURSE UNIT CODE</b>	-	<b>SEMESTER OF STUDY</b>	A'
<b>COURSE TITLE</b>	Introduction to Artificial Intelligence		
<b>INDEPENDENT TEACHING ACTIVITIES</b>	<b>TEACHING WEEKLY HOURS</b>	<b>ECTS CREDITS</b>	
	3	7,5	
<b>COURSE UNIT TYPE</b>	Specific Background		
<b>PREREQUISITES:</b>	-		
<b>LANGUAGE OF INSTRUCTION / EXAMS:</b>	Greek		
<b>COURSE DELIVERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	Moodle		

### LEARNING OUTCOMES

This course introduces students to the fundamental concepts and techniques of Artificial Intelligence (AI), with a focus on applications in healthcare.

Upon successful completion of the course, students will be able to:

- Understand the core concepts of intelligent systems
- Explain fundamental principles of Artificial Intelligence
- Apply AI techniques to address healthcare-related problems
- Understand the basics of machine learning and its role in medical applications
- Identify practical applications of machine learning in medicine
- Comprehend the fundamentals of data mining and knowledge discovery in health data

### GENERAL COMPETENCIES

- Search, analysis and synthesis of health data and information, using the required technologies
- Adapting to new situations
- Decision-making
- Independent work
- Generating new research ideas

## COURSE CURRICULUM

Introduction to Artificial Intelligence. Intelligent agents. Blind Search, Heuristic Search, Local Search, Propositional Logic, Predicate Logic, Machine Learning, Data Mining, Decision Trees, Support Vector Engines, Neural Networks, Clustering Algorithms, Rule Mining Algorithms, and Applications in Health.

## COURSE CONTENTS

WEEK	UNIT TITLE
1	Introduction & Overview
2	Introduction to Artificial Intelligence
3	Artificial Intelligence Algorithms
4	Applications of Artificial Intelligence in Healthcare
5	Machine Learning
6	Data Mining Algorithms
7	Classification Algorithms
8	Regression Techniques
9	Health Repositories & Databases
10	Health Data Mining
11	Artificial Neural Networks
12	Deep Learning

## TEACHING/LEARNING METHODS - ASSESSMENT

<b>MODE OF DELIVERY</b> <i>Face-to Face,</i> <i>Distance Learning</i> <i>etc.</i>	Synchronous distance learning (zoom) and asynchronous distance learning (electronic platform Moodle)
<b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)</b>	Lectures will incorporate audiovisual media and the projection of digital course materials using the classroom projector. Internet resources will be employed during instruction to demonstrate methods for locating scientific literature and accessing digital libraries. In the case of distance learning, the

	Zoom platform will be utilized to support online teaching.	
<b>TEACHING METHODS</b>	<b><i>Method Description</i></b>	<b><i>Semester Workload (hours)</i></b>
	Lectures	36
	Writing Assignments (2)	97
	Self-Study	92
	<i>Total</i>	225
<b>ΑΞΙΟΛΟΓΗΣΗ ΦΟΙΤΗΤΩΝ</b>	<ul style="list-style-type: none"> <li>• Writing Assignments (50%)</li> <li>• Oral Examination (50%)</li> </ul>	

#### RESOURCES- RECOMMENDED BOOK RESOURCES

[1] Russell & Norvig (2004). Τεχνητή Νοημοσύνη: Μια Σύγχρονη Προσέγγιση, Κλειδάριθμος.

[2] Βλαχάβας, Κεφαλάς, Βασιλειάδης, Κόκκορας, Σακελλαρίου (2005). Τεχνητή Νοημοσύνη, Εκδόσεις Γαρταγάνης.

### 3. UX IN DIGITAL HEALTH: METHODOLOGIES AND APPLICATIONS

<b>FACULTY/SCHOOL</b>	School of Engineering		
<b>DEPARTMENT</b>	Electrical and Computer Engineering (Kozani) and Midwifery (Ptolemaida)		
<b>LEVEL OF STUDY</b>	POSTGRADUATE		
<b>COURSE UNIT CODE</b>	-	<b>SEMESTER OF STUDY</b>	B'
<b>COURSE TITLE</b>	UX in Digital Health: Methodologies and Applications		
<b>INDEPENDENT TEACHING ACTIVITIES</b>	<b>TEACHING WEEKLY HOURS</b>	<b>ECTS CREDITS</b>	
	3	7,5	
<b>COURSE UNIT TYPE</b>	Specific Background		
<b>PREREQUISITES:</b>	-		
<b>LANGUAGE OF INSTRUCTION / EXAMS:</b>	Greek		
<b>COURSE DELIVERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	Moodle		

<b>Learning Outcomes</b>
<p>The course focuses on usability and user experience (UX) in health technologies, highlighting the importance of human-centered design (UCD). Students will learn to evaluate usability through methods such as Think-Aloud and heuristic evaluation, analyzing and reporting their findings. The goal is to improve the effectiveness and user satisfaction of digital health technologies.</p> <p>Upon completion of the course, students will be able to:</p> <ul style="list-style-type: none"> <li>• Understand the importance of the design and evaluation of Health Information Technologies (HIT) and Digital Health Technologies (DHT).</li> <li>• Explain the fundamental concepts of Human Factors Engineering, Human-Computer Interaction (HCI), and User Experience (UX).</li> <li>• Describe the role of User-Centered Design (UCD) in the development of health technologies.</li> <li>• Explain the concept of usability and identify the main categories of usability issues.</li> <li>• Understand how to conduct usability evaluations through:</li> </ul>

- Heuristic evaluation
- User testing using the Think-Aloud protocol.
- Evaluate the usability of health technologies using the Think-Aloud method.
- Apply appropriate analytical methods for processing and interpreting data from usability tests.
- Compose and present their findings in clear and concise reports.

### General Competencies

The course aims to develop the following general competences:

- Search, analysis, and synthesis of data and information, with emphasis on the use of usability and UX evaluation methods.
- Adaptation to new situations, enhancing the ability to assess and improve digital health technologies.
- Decision-making, based on evidence from usability data and user feedback.
- Independent work, through individual analyses and usability evaluation reports.
- Teamwork, as students collaborate in conducting UX tests and analyzing results.
- Working in an interdisciplinary environment, fostering collaboration between healthcare professionals and software developers.
- Generation of new research ideas, promoting innovative approaches to improving user experience in health technologies.
- Project design and management, through the execution and evaluation of research activities in the field of usability.
- Critical and self-critical thinking, aimed at improving design decisions and continuously refining UX methods.
- Promotion of free, creative, and inductive thinking, enhancing problem-solving and innovation skills in UX design.

### COURSE CONTENTS

This course focuses on the principles of User-Centered Design (UCD) and usability in health technologies. Students will explore key concepts such as Human-Computer Interaction (HCI), User Experience (UX), and Human Factors Engineering, while gaining practical experience in usability evaluation methods, including Think-Aloud testing and heuristic evaluation. Combining theoretical instruction, workshops, and hands-on exercises, the course aims to equip students with the skills to analyze and enhance user experience in digital health technologies.

Week	Unit Title
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1	Introduction to UX and Usability in Health Technologies
2	Human-Centered Design (UCD) and Human Factors in Healthcare
3	Basic Principles of Usability and UX in Digital Health
4	Usability Evaluation Methods: Heuristic Evaluation
5	Usability Evaluation Methods: User Testing (Think-Aloud Protocol)
6	Analysis and Interpretation of UX Data from Think-Aloud Tests
7	Laboratory Session: Conducting and Observing UX Tests in Practice
8	Development and Use of UX Tools for the Evaluation of Health Technologies
9	Design and Adaptation of UX in Specific Healthcare Contexts
10	Presentation and Documentation of UX Findings: Report Writing
11	Case Studies: Successful and Unsuccessful UX Examples in Healthcare
12	Conclusions and Final Evaluation: Challenges and Future Trends in Healthcare

#### TEACHING AND LEARNING METHODS - ASSESSMENT

<b>MODE OF DELIVERY</b> <i>Face-to Face, Distance Learning etc.</i>	Synchronous distance learning (zoom) and asynchronous distance learning (electronic platform Moodle)	
<b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)</b>	Lectures will incorporate audiovisual media and the projection of digital course materials using the classroom projector. Internet resources will be employed during instruction to demonstrate methods for locating scientific literature and accessing digital libraries. In the case of distance learning, the Zoom platform will be utilized to support online teaching.	
<b>TEACHING METHODS</b>	<b><i>Method Description</i></b>	<b><i>Semester Workload</i></b>
	Lectures	39
	Lab Exercises	126
	Self-study	60
	Total	225
<b>ASSESSMENT METHODS</b>	30% from the Public Presentation of the semester project. 20% from Weekly Reports (related to the progress of each deliverable of the semester project). 40% from the Semester Project itself.	



## RESOURCES- RECOMMENDED BOOK RESOURCES

- [1] "The Design of Everyday Things" by Don Norman
- [2] "Don't make me think" by Steve Krug.
- [3] "Sprint" by Jacob Knapp
- [4] "Meet my HUBBI: he's an expert on eHealth usability" by Marijke Broekhuis
- [5] "Introducing User-Centred Design: a Longitudinal Study of a Healthcare Informatics Organisation" by Jessica Wardlaw
- [6] "Usability for the masses" by Jacob Nielsen

## Elective Courses – Group B'

### 1. EVALUATION OF ECONOMIC EFFICIENCY OF HEALTH SERVICES AND TECHNOLOGIES

<b>FACULTY/SCHOOL</b>	School of Engineering		
<b>DEPARTMENT(S)</b>	Electrical and Computer Engineering (Kozani) and Midwifery (Ptolemaida)		
<b>LEVEL OF STUDY</b>	POSTGRADUATE		
<b>COURSE UNIT CODE</b>	-	<b>SEMESTER OF STUDY</b>	B'
<b>COURSE TITLE</b>	Evaluation of Economic Efficiency of Health Services and Technologies		
<b>INDEPENDENT TEACHING ACTIVITIES</b>		<b>TEACHING WEEKLY HOURS</b>	<b>ECTS CREDITS</b>
		3	7,5
<b>COURSE UNIT TYPE</b>	Specific Background		
<b>PREREQUISITES:</b>	-		
<b>LANGUAGE OF INSTRUCTION / EXAMS:</b>	Greek		
<b>COURSE DELIVERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	Moodle		

#### Learning Outcomes

The course “Health Services Quality Management & Administration” aims to equip students with knowledge particularly useful in organizing, managing, and coordinating quality assurance activities in healthcare units, ensuring their effective, efficient, and high-quality operation. Upon completing the course, students will have a comprehensive understanding of designing, organizing, and evaluating the quality of healthcare services.

Students will acquire knowledge upon:

- the factors determining the object of Productivity and Efficiency of Health Units
- the necessity of studying the Health Economics and the Evaluation of modern Technologies
- the identification and evaluation of the factors determining the most effective organization of Health Services by utilizing information technologies,
- the planning, organization, and management of the resources and the services produced
- understanding the results of reports, studies and surveys on the economic evaluation of health services and technologies

This course aims to equip students with specialized knowledge in the organization, management, and coordination of healthcare services, ensuring their effective and efficient operation. Upon completion, students will have a comprehensive understanding of the design, organization, and evaluation of inputs and outputs within a healthcare service unit.

Upon successful completion, students will be able to:

- Understand the unique characteristics of healthcare as a commodity and the challenges of applying market rules to service demand and delivery.
- Comprehend the principles of Health Economics and methods for assessing the efficiency of healthcare services and technologies.
- Identify funding methods for healthcare services and the factors influencing the financial sustainability of health systems.
- Apply methods and techniques for economic evaluation and resource allocation aimed at maximizing healthcare outcomes
- Understand the use of tools for measuring the efficiency and productivity of services
- Integrate relevant medical, economic, social, and ethical information related to the use of health technologies.
- Analyze the properties, effects, and implications of health technologies on service delivery and adopt strategies to ensure economic efficiency.
- Know the basic principles of research methodology and be able to choose the appropriate one depending on the subject.

### **General Competences**

- Data and information search, analysis, and synthesis, using the necessary technologies
- Adapting to new situations
- Decision-making
- Independent work
- Teamwork
- Working in an international environment
- Working in an interdisciplinary environment
- Generating new research Knowledge
- Promoting free, creative and inductive thinking

## COURSE CONTENT

1. INTRODUCTION TO HEALTH ECONOMICS
2. BASIC TYPES OF ECONOMIC EVALUATION
3. SOURCES AND TYPES OF COSTS
4. ASSESSMENT OF EFFECTIVENESS AND BENEFIT
5. DISCOUNTING AND TIME HORIZONS IN EVALUATION
6. SENSITIVITY AND UNCERTAINTY ANALYSIS
7. INTERPRETATION AND PRESENTATION OF RESULTS
8. HEALTH POLICIES AND PRACTICAL APPLICATIONS

## TEACHING / LEARNING METHODS - ASSESSMENT

<b>MODE OF DELIVERY</b> <i>Face-to Face, Distance Learning etc.</i>	Synchronous distance learning (zoom) and asynchronous distance learning (electronic platform Moodle)	
<b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)</b>	Lectures will incorporate audiovisual media and the projection of digital course materials using the classroom projector. Internet resources will be employed during instruction to demonstrate methods for locating scientific literature and accessing digital libraries. In the case of distance learning, the Zoom platform will be utilized to support online teaching.	
<b>TEACHING METHODS</b>	<b><i>Method Description</i></b>	<b><i>Semester Workload</i></b>
	Lectures	52

	Lab Exercises	52
	Self-study	121
	Total	225
<b>ASSESSMENT METHODS</b>	I. End Semester Final Exam (70%) including: <ul style="list-style-type: none"> <li>- Multiple Choice Questions</li> <li>- Comparison/Evaluation Questions</li> </ul> II. Writing and presentation of group work assignment (30%)	

#### RESOURCES- RECOMMENDED BOOK RESOURCES

- Rice Tomas. Τα Οικονομικά της Υγείας. Εκδόσεις Κριτική, 2006, Αθήνα
- Οικονομική της Υγείας. Σούλης Σ. Εκδόσεις Παπαζήση, 1999, Αθήνα.
- Συλλογικό. Επιμέλεια Κυριόπουλος Γ., Σουλιώτης Κ. Οι Δαπάνες Υγείας στην Ελλάδα, Μεθοδολογικά προβλήματα στη μέτρηση και συνέπειες για τις πολιτικές υγείας, Παπαζήση, 2002, Αθήνα.
- Οικονομικά της Υγείας. Χλέτσος . Εκδόσεις Παπαζήση ,2011
- Ποσοτική Ανάλυση στην Άσκηση της Διοίκησης. Καθαρακή, Εκδόσεις Σταμούλη, 2007
- Research Methodology on Data Envelopment Analysis (DEA), Jibendu Kumar Mantri. Universal Publisher ,2008
- Dumolin J., Kaddar M., Velásquez G. : Guide d'analyse économique du circuit du médicament, W.H.O. Documents et autres references, 2003
- Sachs J.D. Macroéconomie et santé :investir dans la santé poy de dével économique, 2002
- Penner J S.Introduction to Health Care Economics and Financial Management., ed. Lippincott Williams and Wilkins, Philadelphia, 2003.
- Nord E., .Ανάλυση Κόστους-Αξίας στη Φροντίδα Υγείας, εκ. Mediforce, Cambridge, (Μετάφραση, 2003
- Green A, Bennett S, eds. Sound choices: enhancing capacity for evidence- informed health policy. Geneva, World Health Organization, 2007
- HTA glossary. International Network of Agencies for Health Technology Assessment and Health Technology Assessment international (<http://www.htaglossary.net/>, accessed November 2010).
- Velasco-Garrido M, Busse R. Health technology assessment: an introduction to objectives, role of evidence, and structure in Europe. Copenhagen, World Health Organization Regional Office for Europe, on behalf of the European Observatory on Health Systems and Policies, 2005.

- Health technologies and decision making. Paris, Organisation for Economic Co-operation and Development (OECD), 2005.
- Børllum Kristensen F, Sigmund H, eds. Health technology assessment handbook. Copenhagen, National Board of Health, 2008 ([http://www.sst.dk/publ/Publ2008/MTV/Metode/HTA\\_Handbook\\_net\\_final.pdf](http://www.sst.dk/publ/Publ2008/MTV/Metode/HTA_Handbook_net_final.pdf), accessed November 2010)
- Resolution WHA60.29. Health technologies. In: Sixtieth World Health Assembly. Resolutions and decisions. Geneva, World Health Organization, 2007.
- Juzwishin D, Schneider W. Screening procedure for use when considering the implementation of health technology. Edmonton, Alberta Heritage Foundation for Medical Research, 2002
- Eucomed HTA Position Paper. Brussels, Eucomed, 2008.
- Frost L, Reich MR. Access: how do good health technologies get to poor people in poor countries? Harvard Center for Population and Development Studies, 2008
- Lewis M, Pettersson G, Bank W. Governance in health care delivery: raising performance. Washington, World Bank, 2009.
- EUnetHTA Joint Action 2010–12, EUnetHTA ([http://www.eunetha.net/Public/Work\\_Packages/EUnetHTA-Joint-Action-2010-12](http://www.eunetha.net/Public/Work_Packages/EUnetHTA-Joint-Action-2010-12))
- Health research: essential link to health equity. Cambridge, Commission on Health Research for Development, 1990.
- Hailey D. Elements of effectiveness for health technology assessment programs. Edmonton, Alberta Heritage Foundation for Medical Research, 2003.

## 2. FUNDAMENTAL PRINCIPLES OF DATA COLLECTION AND EVALUATION OF EPIDEMIOLOGICAL STUDIES

<b>FACULTY/SCHOOL</b>	School of Engineering		
<b>DEPARTMENT(S)</b>	Electrical and Computer Engineering (Kozani) and Midwifery (Ptolemaida)		
<b>LEVEL OF STUDY</b>	POSTGRADUATE		
<b>COURSE UNIT CODE</b>	-	<b>SEMESTER OF STUDY</b>	B'
<b>COURSE TITLE</b>	Fundamental Principles of Data Collection and Evaluation of Epidemiological Studies		
<b>INDEPENDENT TEACHING ACTIVITIES</b>		<b>TEACHING WEEKLY HOURS</b>	<b>ECTS CREDITS</b>
		3	7,5
<b>COURSE UNIT TYPE</b>	Specific Background		
<b>PREREQUISITES:</b>	-		
<b>LANGUAGE OF INSTRUCTION / EXAMS:</b>	Greek		
<b>COURSE DELIVERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	Moodle		

### Learning Outcomes

The aim of this course is to develop an understanding of the principles and methods of Epidemiology, as well as the interpretation of epidemiological data in Public Health, Primary Health Care, and healthcare services in general. The course combines theoretical lectures with practical exercises conducted after each session, helping students translate theoretical knowledge into clinical practice. These exercises may include problem-solving, article discussions, or hands-on activities related to study design. The course also introduces students to the fundamental concepts of preventive medicine and evidence-based practice, with a focus on population health, disease surveillance, and data interpretation for health policy and planning.

Upon successful completion of the course, students will be able to:

- Understand the fundamental concepts and terminology used in Epidemiology and Public Health, including the concept of risk.
- Become familiar with the main methods of epidemiological research and describe the advantages and limitations of different study designs.
- Identify major sources of bias in epidemiological studies and apply basic methods to prevent or correct them.
- Define and use key epidemiological indicators such as morbidity, mortality, and association measures across population groups.
- Evaluate the quality of epidemiological data and studies, and apply findings to population and community health contexts.
- Interpret epidemiological data in clinical practice and research settings.
- Connect core concepts of Primary Health Care (PHC) and Public Health (as an extension of the course Society and Health and as an introduction to clinical PHC practice) with prevalence and incidence measures.
- Use diagnostic tests effectively, understanding their utility and necessity for evidence-based clinical decision-making (in connection with the course Evidence-Based Medicine and Clinical Decision-Making).
- Recognize population health needs and design intervention programs aimed at reducing disease burden and improving health outcomes.

#### **Course objectives**

The course aims to train students in the basic principles of Public Health and Epidemiology so that they can address issues of medical prevention and health promotion, as well as manage public health problems effectively. Students will consolidate their knowledge in Hygiene and Epidemiology, understand the core principles of data collection and evaluation, and develop skills in the design of studies and research protocols.

By the end of the course, students will have:

- Consolidated knowledge in the fields of Hygiene and Preventive Medicine.
- Understood the key concepts of descriptive epidemiology.
- Learned the general principles of Preventive Medicine.
- Gained insight into the principles and application of Evidence-Based Medicine in clinical and public health practice.
- Become familiar with basic prognostic systems.

- Understood the fundamental principles of data collection and evaluation.
- Gained experience in designing studies and surveys, developing questionnaires, identifying biological markers, and applying surveillance methods.

### General Competences

- Independent work
- Teamwork
- Working in an international environment
- Working in an interdisciplinary environment

## COURSE CONTENT

- Definitions and concepts of Health and Disease, Prevention, and Protection
- Factors influencing Health, Disease Outcomes, and Consequences
- Measurement of health status. Sources and origins of causal factors
- Mechanisms of transmission of infectious agents. Analysis of disease characteristics
- General measures for the prevention of infectious diseases: limitation of pathogen spread, implementation of disinfection practices
- Control and restriction of pathogen hosts, isolation of infectious individuals.
- Basic principles of immunity and immunoprophylaxis — natural, acquired, and herd immunity
- Basic concepts of descriptive epidemiology. General principles of preventive medicine. Causality
- Evidence and indications in medical practice
- Measures of effect and association. Prognostic systems
- Characteristics and evaluation of diagnostic tests
- Evaluation of therapeutic interventions, measures of treatment effectiveness, and assessment of side effects
- Epidemics. Nutrition and physical activity. Counseling interventions
- Behaviors with significant public health impact (e.g., smoking, alcohol consumption, driving)
- Occupational hygiene. Recommended preventive measures by age group
- Vaccination and chemoprophylaxis. Recommended preventive measures for specific population groups
- Statistical concepts in epidemiology and clinical practice — hypotheses and probabilities

- Random errors, selection bias, confounding, and information bias
- Meta-analysis: principles, design, evaluation, and common errors
- Decision analysis. Quality-of-life assessments. Cost-effectiveness studies
- Health status and health services
- Disease burden. Global health forecasts and future trends

#### TEACHING / LEARNING METHODS - ASSESSMENT

<b>MODE OF DELIVERY</b> <i>Face-to Face, Distance Learning etc.</i>	Synchronous distance learning (zoom) and asynchronous distance learning (electronic platform Moodle)	
<b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)</b>	Lectures will incorporate audiovisual media and the projection of digital course materials using the classroom projector. Internet resources will be employed during instruction to demonstrate methods for locating scientific literature and accessing digital libraries. In the case of distance learning, the Zoom platform will be utilized to support online teaching.	
<b>TEACHING METHODS</b>	<b><i>Method Description</i></b>	<b><i>Semester Workload</i></b>
	Lectures	52
	Lab Exercises	52
	Self-study	121
	Total	225
<b>ASSESSMENT METHODS</b>	I. End Semester Final Exam (70%) including: <ul style="list-style-type: none"> <li>- Multiple Choice Questions</li> <li>- Comparison/Evaluation Questions</li> </ul> II. Writing and presentation of group work assignment (30%)	

#### RESOURCES- RECOMMENDED BOOK RESOURCES

- Χαριζάνη Φ.Θ.(2004) Λοιμώξεις και προληπτικά μέτρα, Εκδ. Παπαζήση, Αθήνα.
- Δαρβίρη Χ. (2007) Προαγωγή Υγείας, Εκδ. Πασχαλίδης, Αθήνα.
- Παπαευαγγέλου Γ., Φαρμάκη Γ. (1998) Πρόληψη και έλεγχος λοιμωδών νοσημάτων, Εκδ. Ζήτα, Αθήνα.

- Τριχόπουλος Δ. (2002) Επιδημιολογία, αρχές, μέθοδοι, εφαρμογές, Εκδ. Παρισιάνος, Αθήνα.
- Τούντας Γ. (2001) Κοινωνία και Υγεία, Εκδ. Οδυσσεάς/Νέα Υγεία, Αθήνα.
- Αρχές Αποδεικτικής Ιατρικής: Επιδημιολογία, Δημόσια Υγιεινή, Μέθοδοι Έρευνας, Ι. Ιωαννίδης. Εκδόσεις Λίτσας, Αθήνα 2000
- Εισαγωγή στη Σύγχρονη Επιδημιολογία, Ahlbom, S Norel, Εκδόσεις Λίτσας, Αθήνα 1992
- Epidemiology: An Introduction, Kenneth J. Rothman Oxford University Press, 2012
- Epidemiology: Beyond the Basics, Moyses Szklo, F. Javier Nieto Jones & Bartlett Publishers, 2012
- Applied Epidemiology: Theory to Practice, Ross C. Brownson, Diana B. Petitti Oxford University Press, 2006
- Basic Statistics and Epidemiology: A Practical Guide, Antony Stewart
- Τίτλος: iGenetics - μια Μεντελική Προσέγγιση, Συγγραφέας: Peter J. Russell, Εκδοτικός Οίκος: Ακαδημαϊκές Εκδόσεις, Τόπος & Χρόνος Έκδοσης: 2009, ISBN: 978-960-88412-7-7, Κωδικός ΕΥΔΟΞΟΣ: 2626
- Τίτλος: Thompson & Thompson ιατρική γενετική, Συγγραφείς: NUSSBAUM R., McINNES R.R., WILLARD H.F., Εκδοτικός Οίκος: BROKEN HILL PUBLISHERS LTD, Τόπος & Χρόνος Έκδοσης: 8η εκδ./2011, ISBN: 9789604890620, Κωδικός ΕΥΔΟΞΟΣ: 13256587
- Τίτλος: Εισαγωγή στη Γενετική, Δ' Έκδοση, Συγγραφέας: Σταμάτης Αλαχιώτης, Εκδοτικός Οίκος: Λιβάνη, Τόπος & Χρόνος Έκδοσης: 2011, ISBN: 978-960-442-024-7, Κωδικός ΕΥΔΟΞΟΣ: 12469325
- Αλαχιώτης, Σταμάτης Ν. Εισαγωγή στην εξέλιξη, Εκδοτικός Οίκος Α. Α. Λιβάνη, 2007
- Κορνάρου Ε., Ρουμελιώτη Α. (2007) Η Δημόσια Υγεία στην Πρωτοβάθμια φροντίδα Υγείας. Θέματα Επιδημιολογίας Μεθοδολογίας της Έρευνας και Στατιστικής. Ενότητα: Μεθοδολογία Επιδημιολογικής Έρευνας, Εκδόσεις Παπαζήσης
- Μπάγκος Παντελής. Βιοπληροφορική. Πανεπιστήμιο Θεσσαλίας, 2015 7. Τριχόπουλος, Δ. (2002) Προοπτικές Έρευνες, Αναδρομικές Έρευνες. Στο: Τριχόπουλος Δ. Επιδημιολογία, Αρχές, Μέθοδοι και Εφαρμογές, Γρ. Παρισιάνος, Αθήνα, 176-195, 196-233 8. Borenstein Michael, Larry V. Hedges, Julian P. T. Higgins, Hannah R. Rothstein. Introduction to Meta-Analysis. Wiley, 2009
- Dorman Janice S., Massimo Trucco, Ronald E. LaPorte, and Lewis H. Kuller . Family Studies: The Key to Understanding the Genetic and Environmental Etiology of Chronic Diseases In Genetic Epidemiology 5:305-310 (1988
- Duncan C. Thomas,. Statistical Methods in Genetic Epidemiology. Oxford University Press, USA, 2004 11. Gelehrter T. Αρχές Ιατρικής Γενετικής. Εκδόσεις: Πασχαλίδης 2003
- Συναφή επιστημονικά περιοδικά:
  1. <https://www.journals.elsevier.com/cell/>
  2. <http://emboj.embopress.org/>
  3. <https://www.nature.com/ng/> 4. <http://journals.plos.org/plosgenetics/>

### 3. BIOETHICS AND HEALTH LAW IN PUBLIC HEALTH POLICIES

<b>FACULTY/SCHOOL</b>	School of Engineering		
<b>DEPARTMENT(S)</b>	Electrical and Computer Engineering (Kozani) and Midwifery (Ptolemaida)		
<b>LEVEL OF STUDY</b>	POSTGRADUATE		
<b>COURSE UNIT CODE</b>	-	<b>SEMESTER OF STUDY</b>	B'
<b>COURSE TITLE</b>	Bioethics in Public Health Policies		
<b>INDEPENDENT TEACHING ACTIVITIES</b>	<b>TEACHING WEEKLY HOURS</b>	<b>ECTS CREDITS</b>	
	3	7,5	
<b>COURSE UNIT TYPE</b>	Specific Background		
<b>PREREQUISITES:</b>	-		
<b>LANGUAGE OF INSTRUCTION / EXAMS:</b>	Greek		
<b>LANGUAGE OF INSTRUCTION / EXAMS:</b>	Greek		
<b>COURSE WEBSITE (URL)</b>	Moodle		

<b>Learning Outcomes</b>
<p>Upon successful completion of the course, students will be able to:</p> <ul style="list-style-type: none"> <li>• Demonstrate knowledge of the main legal framework governing contemporary health issues.</li> <li>• Understand the ethical and deontological foundations of modern Public Health and the bioethical dimensions of healthcare delivery.</li> <li>• Identify and analyze bioethical dilemmas inherent in Public Health.</li> </ul>

## General Competences

- Data and information search, analysis, and synthesis, using the necessary technologies
- Adapting to new situations
- Decision-making
- Independent work
- Working in an interdisciplinary environment
- Demonstrating social, professional, and ethical responsibility
- Exercising critical thinking and self-assessment
- Promoting free, creative, and inductive thinking
- Showing respect for diversity and multiculturalism
- Demonstrating respect for the natural environment (where related to public health)

## COURSE CONTENT

1. Introduction to the basic concepts of Health Law. The relationship between Law, Ethics, and Technology
2. Theories and Principles of Bioethics
3. Public Health and Human Rights: individual benefit and community health
4. Public Health, personal data, and issues of power. The concept of individual autonomy in the field of Health
5. The Precautionary Principle in Health
6. Bioethical issues and pandemic preparedness
7. Bioethical issues in Epidemiology
8. Scientific research ethics
9. Genetics and Public Health
10. End-of-life as a Public Health issue
11. Special bioethical issues in Public Health
12. "Big Data" and Public Health
13. Mental Health and Bioethical concerns

## TEACHING / LEARNING METHODS - ASSESSMENT

<b>MODE OF DELIVERY</b> <i>Face-to Face, Distance Learning etc.</i>	Synchronous distance learning (zoom) and asynchronous distance learning (electronic platform Moodle)										
<b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)</b>	Lectures will incorporate audiovisual media and the projection of digital course materials using the classroom projector. Internet resources will be employed during instruction to demonstrate methods for locating scientific literature and accessing digital libraries. In the case of distance learning, the Zoom platform will be utilized to support online teaching.										
<b>TEACHING METHODS</b>	<table border="1"> <thead> <tr> <th><i>Method Description</i></th> <th><i>Semester Workload</i></th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>39</td> </tr> <tr> <td>Lab Exercises</td> <td>90</td> </tr> <tr> <td>Self-study</td> <td>96</td> </tr> <tr> <td>Total</td> <td><b>225</b></td> </tr> </tbody> </table>	<i>Method Description</i>	<i>Semester Workload</i>	Lectures	39	Lab Exercises	90	Self-study	96	Total	<b>225</b>
<i>Method Description</i>	<i>Semester Workload</i>										
Lectures	39										
Lab Exercises	90										
Self-study	96										
Total	<b>225</b>										
<b>ASSESSMENT METHODS</b>	End semester final exam										

#### RESOURCES- RECOMMENDED BOOK RESOURCES

<ol style="list-style-type: none"> <li>1. Κριάρη-Κατράνη Ισμήνη (1994): Βιοϊατρικές Εξελίξεις και Συνταγματικό Δίκαιο, Εκδόσεις Σάκκουλα, Θεσσαλονίκη</li> <li>2. Κριάρη-Κατράνη Ισμήνη (1999): Γενετική Τεχνολογία και Θεμελιώδη Δικαιώματα, Η συνταγματική προστασία των γενετικών δικαιωμάτων. Εκδόσεις Σάκκουλα , Αθήνα – Θεσσαλονίκη.</li> <li>3. Γκαράνη-Παπαδάτου Τ, Ι.Κριάρη-Κατράνη (2012): Το Πρόσθετο Πρωτόκολλο στη Σύμβαση Βιοϊατρικής σχετικά με γενετικές εξετάσεις για σκοπούς υγείας. Δικαιώματα Του Ανθρώπου 53;53-79.</li> </ol>
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4. Laine Friedman Ross et al: Technical report: ethical and policy issues in genetic testing and screening of children. *Genet Med* 2013;15(3):234–245.
5. Βιδάλης Τ.Κ (2016): Βιοδίκαιο: Από τη βιοποικιλότητα στις έξυπνες μηχανές, Εκδόσεις: Σάκκουλα Α.Ε.
6. Schwartz JL & Caplan AL, editors (2018): Vaccination Ethics and Policy. An introduction with readings. The MIT Press,
7. Κανελλοπούλου-Μπότη Μ, Πρωτοπαπαδάκης Ευ., Παναγοπούλου-Κουτνατζή Φ. (επιμ): Βιοηθικοί προβληματισμοί ΙΙ: Το παιδί. Εκδόσεις Παπαζήση, Αθήνα 2018
8. Χωριανοπούλου Μ.Κ. (2018): Βιοηθική και Δικαιώματα. Εκδόσεις Παπαζήση 2018.
9. Henk ten Have (2004): Ethical Perspectives on Health Technology Assessment. *International Journal of Technology Assessment in Health Care*, 20:1;1-6
10. How to Engage Men in Preconception Health?: A Scoping Review.
11. Agustina SA, Prabandari YS, Hakimi M, Hayati EN. *Iran J Nurs Midwifery Res.* 2024 Nov 20;29(6):660-668. doi: 10.4103/ijnmr.ijnmr\_27\_23. eCollection 2024 Nov-Dec. PMID: 39759910
12. Adolescent and parental proxy online record access: analysis of the empirical evidence based on four bioethical principles.
13. Hagström J, Hägglund M, Blease C. *BMC Med Ethics.* 2025 Feb 20;26(1):27. doi: 10.1186/s12910-025-01182-9. PMID: 39979965

#### Ηλεκτρονικές διευθύνσεις:

- [Εθνική Επιτροπή Βιοηθικής](#)
- [Συμβούλιο της Ευρώπης](#)
- [Αρχή Προστασίας Δεδομένων](#)
- [European Network of Research Ethics and Integrity](#)

#### 4. ADMINISTRATION AND QUALITY MANAGEMENT IN HEALTHCARE SERVICES

<b>FACULTY/SCHOOL</b>	School of Engineering		
<b>DEPARTMENT(S)</b>	Electrical and Computer Engineering (Kozani) and Midwifery (Ptolemaida)		
<b>LEVEL OF STUDY</b>	POSTGRADUATE		
<b>COURSE UNIT CODE</b>	-	<b>SEMESTER OF STUDY</b>	B'
<b>COURSE TITLE</b>	Administration and Quality Management in Healthcare Services		
<b>INDEPENDENT TEACHING ACTIVITIES</b>	<b>TEACHING WEEKLY HOURS</b>	<b>ECTS CREDITS</b>	
	3	7,5	
<b>COURSE UNIT TYPE</b>	Specific Background		
<b>PREREQUISITES:</b>	-		
<b>LANGUAGE OF INSTRUCTION / EXAMS:</b>	Greek		
<b>COURSE DELIVERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	Moodle		

##### Learning Outcomes

This course introduces postgraduate students to the critical role of quality in healthcare services, both for service users and providers (e.g., physicians, nurses and administrative staff). Students will develop practical skills in measuring, evaluating, and managing healthcare service quality, with an emphasis on effective and efficient service delivery.

The course "Quality Management in Health Services" aims to equip students with essential knowledge and competencies in organizing, managing, and coordinating quality assurance activities within healthcare institutions. By the end of the course, students will have a

comprehensive understanding of the principles and methods used in the design, implementation, and evaluation of quality systems in healthcare organizations. Students will also be able to effectively use quality measurement and assessment tools to ensure continuous improvement in service performance and patient satisfaction.

### **Learning Outcomes**

Upon successful completion of the course, students will be able to:

- Understand the fundamental concepts of quality in healthcare delivery and recognize its impact on service performance and patient outcomes.
- Analyze quality systems in healthcare settings and evaluate their structure, processes, and results.
- Apply quality tools and techniques to improve healthcare services and organizational performance.
- Manage the satisfaction of internal and external clients, understanding the needs of both healthcare professionals and patients, and designing strategies to enhance satisfaction through quality improvement.
- Develop strategic and leadership skills in quality management, recognizing key approaches to fostering a culture of quality within healthcare organizations.
- Evaluate and ensure quality, using internal and external audits, certifications, and continuous improvement mechanisms.
- Identify, assess, and manage risks associated with quality in healthcare delivery.
- Design and implement quality policies and procedures that promote ongoing improvement and compliance with national and international standards.
- Evaluate and improve organizational processes, analyzing healthcare workflows and proposing targeted improvements for sustainable quality enhancement.

### **General Competences**

- Data and information search, analysis, and synthesis, using the necessary technologies
- Adapting to new situations
- Decision-making
- Independent work
- Teamwork
- Working in an international environment

- Working in an interdisciplinary environment
- Generating new research knowledge
- Promoting free, creative and inductive thinking

## COURSE CONTENT

### Course Units – Unit Title

1. Quality of Services
2. Quality in Health Services
3. Quality Assessment Tools
4. Internal Service Quality
5. Total Quality Management (TQM)
6. Quality Standards and Tools in Healthcare

## TEACHING / LEARNING METHODS - ASSESSMENT

<b>MODE OF DELIVERY</b> <i>Face-to Face, Distance Learning etc.</i>	Synchronous distance learning (zoom) and asynchronous distance learning (electronic platform Moodle)
<b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)</b>	Lectures will incorporate audiovisual media and the projection of digital course materials using the classroom projector. Internet resources will be employed during instruction to demonstrate methods for locating scientific literature and accessing digital libraries. In the case of distance learning, the Zoom platform will be utilized to support online teaching.
<b>ASSESSMENT METHODS</b>	I. End Semester Final Exam (70%) including: <ul style="list-style-type: none"> <li>- Multiple Choice Questions</li> <li>- Comparison/Evaluation Questions</li> </ul> II. Writing and presentation of group work assignment (30%)

## RESOURCES- RECOMMENDED BOOK RESOURCES

### Προτεινόμενη Βιβλιογραφία :

- Διοίκηση και οργάνωση υπηρεσιών υγείας. Νίκος Πολύζος, Εκδόσεις Παπαζήση , 2014 Αθήνα.
- Υπηρεσίες Υγείας: Συστήματα και Πολιτικές. Σαράφης και συν., Εκδόσεις Βασιλειάδης, 2020

- Οργανωσιακή κουλτούρα υπηρεσιών υγείας. Γούλα, Εκδόσεις Παπαζήση , 2014 Αθήνα.
- Εισαγωγή στη Νοσηλευτική Διοίκηση και Ηγεσία. Russell C. Swansburg, Richard J. Swansburg. Επιμέλεια Αποστόλου Ελένη. Εκδόσεις ΛΑΓΟΣ, 1999, Αθήνα.
- Διοίκηση Ανθρωπίνων Πόρων. Ξηροτύρη – Κουφίδου Σ. Εκδόσεις Ανίκουλα, 1997, Θεσ/νίκη..
- Wolper L.( 2001), Διοίκηση Υπηρεσιών Υγείας, Το Νοσοκομείο στα Πλαίσια ενός Συστήματος Οργανωμένης Παροχής Φροντίδας, Τόμος Β΄, εκδ. Mediforce, Αθήνα.
- Κυριόπουλος Γ, Οικονόμου Χ., Σουλιώτης Κ, (2003): Υγεία και Υπηρεσίες Υγείας στα Βαλκάνια, εκδ. Παπαζήσης Αθήνα.
- Κυριόπουλος Γ., Γκρέγκορ Σ., Οικονόμου Χ., (2003): Υγεία και Υπηρεσίες Υγείας στον Ελληνικό Πληθυσμό, εκδ. Παπαζήση, Αθήνα.
- Σουλιώτης Κ., (2000): Ο ρόλος του Ιδιωτικού Τομέα στο Ελληνικό Σύστημα Υγείας, εκδ. Παπαζήση, Αθήνα.
- Γ. Δημολιάτης κ.ά (2002): Η δημόσια υγεία στην Ελλάδα, εκδ. Θεμέλιο / Κοινωνία και Υγεία, Αθήνα.
- Διοίκηση Ολικής Ποιότητας. Τσιότρας. 2016 Εκδόσεις Broken Hill.2016
- Reddy, S., & Tavares, A. I. (Eds.). (2020). Evaluation of Health Services. BoD–Books on Demand.
- Schulz, Rockwell, and Alton Cornelius Johnson. Management of hospitals and health services: strategic issues and performance. Beard Books, 2003.
- Soulis S., and others (2003), Health Economics and Health Management, Proceedings of the First International Conference, εκδ. Παπαζήσης, Αθήνα.
- Wilkinson R., Marmot M., (2003): Social Determinants of Health: The Solid Facts, ed.W.H.O. EURO Nonserial Publication.
- Dumolin J., Kaddar M., Velásquez G., (2003) : Guide d’analyse économique du circuit du médicament, W.H.O. Documents et autres références.
- Martin Mckee and Judith Healy (2001): Hospitals in a changing Europe (ed.), Open University Press.
- Peter M. Ginter, Linda E. Swayne, W. Jack Duncan, (2002): Strategic Management of Health Care Organizations, Blackwell Publishers, 8th edition.
- John R. Griffith, Kenneth R. White (2002): The Well-Managed Healthcare Organization, Health Administration Press/Ache, 9th edition.
- Charles J. Austin, Stuart B. Boxerman (2002): Information Systems for Healthcare Management, 8th Edition, Health Administration Press, 6th edition.
- Reinhardt, U. & Cheng, T. (2000). The world health report 2000 – Health systems: improving performance.. Bulletin of the World Health Organization, 78 (8), 1064. World Health Organization. <https://apps.who.int/iris/handle/10665/268209>
- OECD (2021), Health at a Glance 2021: OECD Indicators, OECD Publishing, Paris, <https://doi.org/10.1787/ae3016b9-en>.
- world health statistics 2021: monitoring health for the SDGs, sustainable development goals. Geneva: World Health Organization; 2021. Licence: CC BY-NC-SA 3.0 IGO

## 3<sup>rd</sup> Semester Courses

### Master's Thesis

<b>1. GENERAL INFORMATION</b>			
<b>FACULTY/SCHOOL</b>	School of Engineering		
<b>DEPARTMENT</b>	Electrical and Computer Engineering (Kozani) and Midwifery (Ptolemaida)		
<b>LEVEL OF STUDY</b>	POSTGRADUATE		
<b>COURSE UNIT CODE</b>	-	<b>SEMESTER OF STUDY</b>	3 <sup>rd</sup>
<b>COURSE TITLE</b>	Master's Thesis		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits</i>	<b>TOTAL TEACHING HOURS</b>	<b>ECTS CREDITS</b>	
		30	
<b>COURSE UNIT TYPE</b> <i>General background, Specific Background, Specialization, General Knowledge</i>	SPECIALIZATION		
<b>PREREQUISITES:</b>	1 <sup>st</sup> and 2 <sup>nd</sup> Semester Courses		
<b>LANGUAGE OF INSTRUCTION / EXAMS:</b>	GREEK/ENGLISH		
<b>COURSE DELIVERED TO ERASMUS STUDENTS:</b>	-		
<b>COURSE WEBSITE (URL)</b>	-		
<b>2. LEARNING OUTCOMES</b>			
<p><b>Learning Outcomes</b>  <i>The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail.</i></p> <p><b>Refer to Appendix A:</b></p> <ul style="list-style-type: none"> <li>• Description of the level of Learning Outcomes for each study cycle, in accordance with the European Higher Education Area (EHEA) Qualifications Framework.</li> <li>• Level descriptors for Levels 6, 7, and 8 of the European Qualifications Framework for Lifelong Learning (EQF) and Appendix B.</li> <li>• Concise guide for drafting Learning Outcomes.</li> </ul>			
<p>The purpose of the Master's Thesis is to integrate and synthesize knowledge on a specific topic relevant to the subject areas of the Master's Program, through a scientific and systematic approach.</p>			

Throughout the thesis preparation process, postgraduate students further develop their critical thinking skills by conducting in-depth study of a specific issue and by applying acquired knowledge in practice.

Specifically, the objectives of the Master’s Thesis are to:

- (i) Enable students specialize in selected academic and professional fields.
- (ii) Deepen their understanding of research thinking and methodology through the comprehensive and in-depth investigation of a distinct topic.
- (iii) Apply the knowledge and skills acquired during the coursework of previous semesters.

Upon successful completion of the Master’s Thesis, students will be able to:

- Demonstrate in-depth understanding of a scientific topic.
- Clearly define the scope and boundaries of their study subject and identify its key aspects.
- Describe and substantiate the knowledge related to their chosen topic.
- Exhibit critical and original thinking.
- Identify, select, and utilize relevant academic literature.
- Design and implement an appropriate theoretical and research framework.
- Apply methodological practices and analytical tools effectively.
- Draw scientifically sound conclusions.
- Summarize existing knowledge and synthesize it with their own research findings.
- Demonstrate learning skills that enable them to pursue further academic or professional study.

**General Competencies**

*Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?*

*Search for, analysis and synthesis of data and information by the use of appropriate technologies, Adapting to new situations, Decision-making, Individual/Independent work, Group/Team work, Working in an international environment, Working in an interdisciplinary environment, Introduction of innovative research*

*Project planning and management  
Respect for diversity and multiculturalism, Environmental awareness, Social, professional and ethical responsibility and sensitivity to gender issues, Critical thinking, Development of free, creative and inductive thinking .....  
(Other.....citizenship, spiritual freedom, social awareness, altruism etc.)*

Students are expected to develop competencies such as:

- Searching, analyzing, and synthesizing data and information using appropriate technologies.
- Adapting to new situations.
- Making informed and evidence-based decisions.
- Working independently and responsibly.
- Generating innovative research ideas.
- Designing and managing projects effectively.
- Fostering free, creative, and inductive thinking.

### 3. COURSE CONTENTS

The Master's Thesis (MT) aims to address and resolve, at both theoretical and applied levels, issues related to the core subject areas of the program, synthesizing and utilizing the knowledge gained during the previous two semesters. Through the thesis process, students are expected to develop the capacity to manage complex problems within the field of Digital Game Development and Multimedia Applications, and/or to implement an original idea in this domain. The thesis constitutes a substantial and integral component of the Master's Program, comprising several distinct stages. Students are required to present their study, research, or implementation clearly, both in an extensive written scientific report and through a comprehensive oral presentation.

The Master's Thesis may fall into one of the following categories:

- **Research/Theoretical Thesis:** focuses on the exploration and extension of theoretical phenomena with potential applications.
- **Applied Thesis:** focuses on the development of a new application within a specific area of interest, using one or more software packages or tools.

The Master's Thesis represents a major academic undertaking of high significance. Students are encouraged to select topics that are at the forefront of scientific inquiry, demonstrating originality and research innovation.

The preparation of the Master's Thesis generally includes the following stages:

1. Topic description and analysis.
2. Review and critical analysis of the current state of research (literature review).
3. Definition of the research field — research questions or hypotheses, objectives, and expected outcomes.
4. Description of the adopted methodology and research tools.
5. Data collection and/or application development.
6. Analysis of results (e.g., statistical, content, or applied analysis).
7. Drawing conclusions based on research findings and existing theoretical frameworks.
8. Writing the thesis document.
9. Preparation and delivery of the final presentation.