**COURSE OUTLINE**

1. **GENERAL**

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| **SCHOOL** | School of Health Sciences | | | | |
| **ACADEMIC UNIT** | Faculty of Medicine | | | | |
| **LEVEL OF STUDIES** | Undergraduate | | | | |
| **COURSE CODE** | **ΙΑΕ201** | **SEMESTER** | | **1st** | |
| **COURSE TITLE** | **Medical Informatics** | | | | |
| **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** |
|  | | | 5 | | 5 |
|  | | |  | |  |
|  | | |  | |  |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (4).* | | |  | |  |
| **COURSE TYPE**  *general background,  special background, specialised general knowledge, skills development* | General background, specialized general knowledge, skill developments | | | | |
| **PREREQUISITE COURSES:** | none | | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | | | |
| **COURSE WEBSITE (URL)** | https://sites.google.com/uoi.gr/themedinfo | | | | |

1. **LEARNING OUTCOMES**

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| **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 course material aims to introduce students to fundamental concepts related to the electronic management of medical data, information, and knowledge with the following objectives:   * To promote medical care and healthcare * To enhance medical education and research * To empower, activate, and involve patients in maintaining and improving their health   Upon completing the course, students should have acquired the appropriate theoretical background:   * The nature of medical data. * The challenges arising in the electronic management of medical information. * The role of coding and classification systems for medical terms. * Applications of medical term coding and classification systems such as SNOMED-CT, ICD, MeSH, and UMLS. * The concept of an information system. * The operation of basic hospital information subsystems. * The term "integrated hospital information system." * Interoperability among information subsystems. * The advantages and applications of databases and knowledge bases. * The requirements, benefits, and challenges of implementing standardized electronic health records. * The OpenEHR standard. * The contribution of computational systems to medical imaging. * Medical image analysis systems. * Expert systems and machine learning systems in clinical decision support.   Upon completing the laboratory exercises, students should have developed skills in:   * Evaluating international medical and health services websites. * Identifying certifications for the safeguarding and validity of medical and health data. * Conducting effective literature searches on PubMed/MedLine using MeSH terms. * Using online applications for document sharing and commenting. * Processing data sheets with Excel. * Conducting simple statistical tests. * Calculating basic descriptive statistical indicators. | |
| **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*  *Adapting to new situations*  *Decision-making*  *Working independently*  *Team work*  *Working in an international environment*  *Working in an interdisciplinary environment*  *Production of new research ideas* | *Project planning and management*  *Respect for difference and multiculturalism*  *Respect for the natural environment*  *Showing social, professional and ethical responsibility and sensitivity to gender issues*  *Criticism and self-criticism*  *Production of free, creative and inductive thinking*  *……*  *Others…*  *…….* |
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1. **SYLLABUS**

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| COURSE OUTLINE Introduction to Medical Informatics  * Evolution stages and new directions in the healthcare model: Personalization, Participation, Precision, Predictability, Prevention. * Data, information, and knowledge in healthcare decision-making.The challenge of BigData in Health sector. * Nature of medical data: Synonymy, polysemy, ambiguity.  International Classification Systems  * ICD-11 (International Classification of Diseases). * SNOMED-CT (Systematized Nomenclature of Medicine - Clinical Terms). * MeSH (Medical Subject Headings). * UMLS (Unified Medical Language System).  Hospital Information Systems (HIS)  * Introduction to HIS: Information management needs, development objectives, and main medical information subsystems. * Conditions required to successfully implement HIS * The challenge of functional and semantic interoperability * HL7 standard and interoperability between subsystems.  From Electronic Medical Records (EMR) to Electronic Health Records (EHR)  * Coding systems and information models. * OpenEHR standard and implementation examples. * OpenEHR and e-Health services.  Computers in Medical Imaging  * Basic concepts of image generation * Introduction to digital image processing: Pre-processing, segmentation, analysis, and interpretation. * Radiomics, imaging biomarkers, and Computer-Aided Diagnosis (CAD) systems.  Clinical Decision Support Systems (CDSS)  * Introduction to CDSS * Expert systems, probabilistic systems (Bayes' theorem), and decision trees. * Machine learning and current application examples.  Laboratory Exercises in Medical Informatics:Web and Health Information: Key Aspects of Health Information QualityWeb technology and e-Health services, e-patientWeb in medical research, access to medical knowledge bases, education and continuous learningUse of Online Tools for Document Sharing and CommentingSpreadsheet processing: Data input, formatting, tables, charts, scatter plots, and basic linear regression models.Data Processing and Statistical AnalysisDescriptive statistics and statistical tests (T-test, chi-square).PubMed/MedLine Literature Searches Using MeSH terms for efficient searches. |

1. **TEACHING and LEARNING METHODS - EVALUATION**

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| **DELIVERY** *Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY** *Use of ICT in teaching, laboratory education, communication with students* | The use of information and communications technology is inherent to the nature of the course. |
| **TEACHING METHODS**  *The manner and methods of teaching are described in detail.*  *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.*  *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*** | ***Workload of each students group*** | | Lectures | 40 | | Laboratory practice | 18 | | study | 20 | | Exam | 2 | | Total | 80 | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |
| **STUDENT PERFORMANCE EVALUATION**  *Description of the evaluation procedure*  *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.* | Skill development in computer lab: 20%  Written examination of theoretical background: 80% |

1. **ATTACHED BIBLIOGRAPHY**

*Teaching - study material*

* Biomedical Informatics. Computer Applications in Health Care and Biomedicine. Fourth Edition. Edward H. Shortliffe, James J. Cimino *Editors.*
* Η ΠΛΗΡΟΦΟΡΙΚΗ ΣΤΗΝ ΙΑΤΡΙΚΗ-eHealth-ΒΑΣΙΚΕΣ ΑΡΧΕΣ ΚΑΙ ΕΦΑΡΜΟΓΕΣ

Κωδικός Βιβλίου στον Εύδοξο: 86056112

Συγγραφείς: Venot Alain, Burgun Anita, Quantin Catherine

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Διαθέτης (Εκδότης): BROKEN HILL PUBLISHERS LTD

* ΟΙ ΤΕΧΝΟΛΟΓΙΕΣ ΠΛΗΡΟΦΟΡΙΑΣ ΚΑΙ ΕΠΙΚΟΙΝΩΝΙΩΝ ΣΤΗΝ ΥΓΕΙΑ

Κωδικός Βιβλίου στον Εύδοξο: 320017

Συγγραφείς: ΚΟΥΜΠΟΥΡΟΣ ΙΩΑΝΝΗΣ

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Διαθέτης (Εκδότης): Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα - Αποθετήριο "Κάλλιπος"

* ΗΛΕΚΤΡΟΝΙΚΗ ΥΓΕΙΑ

Κωδικός Βιβλίου στον Εύδοξο: 59303593

Συγγραφείς: ΠΑΝΤΕΛΗΣ ΑΓΓΕΛΙΔΗΣ

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