**COURSE OUTLINE**

1. **GENERAL**

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| **SCHOOL** | School of Health Sciences |
| **ACADEMIC UNIT** | Faculty of Medicine |
| **LEVEL OF STUDIES** | PREGRADUATE |
| **COURSE CODE** | **ΙΑΕ501** | **SEMESTER** | **6th** |
| **COURSE TITLE** | PHARMACOGENOMICS |
| **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** |
| **LECTURES – GROUP DISCUSSIONS – STUDENT PRESENTATIONS** | **2** | **2** |
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| *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* | SPECIAL BACKGROUND |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO  |
| **COURSE WEBSITE (URL)** | http://ecourse.uoi.gr/course/view.php?id=1784 |

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*
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| Pharmacogenetics is an optional course for the medical student. It is directly linked to courses such as Pharmacology I and II and specializes the theoretical knowledge and experimental approaches / advanced technologies needed to understand the impact of the genetic background on drug effects. In addition, it highlights the need for diagnostic molecular techniques that are used or can be used in the clinical practice for optimizing pharmacotherapy in order to achieve the maximum therapeutic effect by minimizing toxicities. Students acquire understanding of the theoretical background of Pharmacogenetics and Pharmacogenomics as well as of the mechanisms that modify the effects of drugs with emphasis on drug metabolism and receptors. They are acquainted with the concept of personalized pharmacotherapy. They acquire basic knowledge of advanced technologies and design / assessment of pharmacogenomics clinical trials. Theyunderstand and familiarize with the concept of cost-effectiveness in the practical application of pharmacogenomics assays and diagnostics in health systems and standard clinical practice.Students are able to identify individual drugs/ drug groups that bear specific labeling for pharmacogenomic evaluation, and the group of patients. Finally, students understand the use of algorithms for dose adjustment according to the genetic background of each patient. |
| **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…**…….* |
| -Search for, analysis and synthesis of data and information, using the necessary technologies-Independent work-Teamwork- Promoting free, creative and inductive thinking- Respect for diversity-Production of new research ideas |

1. **SYLLABUS**

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| **Lectures**- Introduction to Pharmacogenetics-Pharmacogenomics- Methodological Approaches to PharmacogenomicsGenetic polymorphisms. Linkage, association and GWASstudies.- Pharmacogenomics in clinical practice todayPharmGKB presentation. Markers and Drug Labeling (FDA List). Clinical Tools - Dose-Adjustment Algorithms. Ethical Dilemmas. Advantages and disadvantages/problems in clinical application.-Basic principles. Preclinical and clinical trials in Pharmacogenomics-Pharmacogenomics of drug metabolism**Student GroupDiscussions**- Discussion with students about projects/presentations, structure and work process, related research/clinical literature, databases and internet resources**Student Projects/Presentations**(1-2 students / project)(indicative titles/fields)Opioid analgesics (Codeine); Statins; Anaesthetics (succinylcholine/inhaled); Coumarin anticoagulants; Antidepressants (SSRIs, TCAs); Risperidone-Clozapine; Anticancer drugs (tyrosine kinase inhibitors/antibodies/hormones/thiopurines); Pharmacogenomics and polypharmacy; Pharmacogenomics of GPCRs; Cost-effectiveness of pharmacogenomically-guided treatment (examples) |

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

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| **DELIVERY***Face-to-face, Distance learning, etc.* | Lectures in the classroom / group discussions with students / presentation of all student projects at a special 1-day-workshop |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY** *Use of ICT in teaching, laboratory education, communication with students* | - Teaching using PowerPoint- Posting information/teaching material to the e-course e-learning platform- Announcements on the course website- ShowEducationalVideos / Tutorials / Databases for Pharmacogenomics / Software programs/Algorithms for dose adjustments- Direct communication with the faculty by e-mail |
| **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* |

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| ***Activity*** | ***Workload of each students group (two groups per semester)*** |
| Lectures | 10 |
| Student Group Discussions | 16 |
| Workshop | 6 |
| Preparation of presentations / non-directed study | 28 |
| Total  | ***60*** |
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| **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.* | **Language of evaluation**: Greek**Public presentation of projects at a special 1-day-workshop with the participation of all students**: duration of presentation is 30 minutes and 10 minutes of questions-discussion with participation of all students.**Evaluation criteria**: oral presentation quality, organization of the material, presentation slides (Powerpoint), answers to questions related to the project, general participation in the questions/discussions of all projects for each student. (Criteria are specified at the first lecture of the course and repeated during the course if necessary) |

1. **ATTACHED BIBLIOGRAPHY**

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| *Teaching - study material:*- «Pharmacogenomics and Proteomics» Eudoxus Code: 89223St. Wong, M.Linder, R.Valdes, Jr. ISBN: 978-960-394-721-9- «Pharmacogenomics» Eudoxus Code: 41690M. Rochstein. ISBN: 978-960-394-524-6-PharmGKB database. https://www.pharmgkb.org/; http://pharmgkb.blogspot.gr/ -Markers and Drug Labeling (FDA list)http://www.fda.gov/Drugs/ScienceResearch/ResearchAreas/Pharmacogenetics/ucm083378.htm- Clinical Tools – Dose Adjustment Algorithms, e.g.http://www.warfarindosing.org |