**COURSE OUTLINE**

1. **GENERAL**

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| **SCHOOL** | Human Sciences |
| **ACADEMIC UNIT** | Department of Mediterranean Studies |
| **LEVEL OF STUDIES** | Undergraduate |
| **COURSE CODE** | **ΑY-27** | **SEMESTER** | **5th**  |
| **COURSE TITLE** | INSTRUMENTATION (LABORATORY) OF ARCHAEOMETRY |
| **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** |
|  | 3 | 5 |
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| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* |  |  |
| **COURSE TYPE***general background, special background, specialised general knowledge, skills development* | Specialised general knowledge |
| **PREREQUISITE COURSES:** | None |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek  |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** |  |
| **COURSE WEBSITE (URL)** |  |

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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| With the successful completion of the mandatory laboratory course students should be able to:- to perform specific measurements with instruments of the laboratory and report on workbook exercises that write up, including an evaluation of the measurements and their errors, rejection of some of them and why, appropriate figures and tables, interpretation of the results- to discuss the results of measurements obtained in the laboratory or the countryside (eg Archaeomaterials characterization, analysis and dating of them, identification of buried monuments, archaeoastronomical orientation, recognition of surface relief and subsurface topography and geology, weight and density measurements of various materials, radioactivity measurements etc.)- To calculate the age by luminescence, and obsidian hydration, radiocarbon and interpret errors and determine whether they are caused by the measurement mode, methodology or instrument, or the human factor,- To distinguish in some experiments the appropriate protocol of measurement, the methodology and demonstrate the correct and wrong answers - To make an experiment for a measurement of a sample (eg XRF for chemical elements in ceramics), to know operation of some apparatus and the taking of readings.- And to calibrate a number of equipments and evaluate and implement appropriate method for the correct answer to the questions that often arise in archeology. |
| **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, with the use of the necessary technology
* Decision-making
* Working in an interdisciplinary environment
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1. **SYLLABUS**

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| The course includes familiarization of students in theoretical and, where possible, on a practical level with the:1. Basic lab equipment and chemical Solvents-Reactants2. arcaheomaterial collection of the lab, physical properties etc3. X-Ray Fluorescence (Familirazion with the taking of measurements, sample preparation, data processing and results)4. Alpha Counting System ZnS. (Basics on natural radioactivity and luminescence dating)5. Archaeogeophysical Prospection. (Magnetometer & Electrical resistivity meters). Measurements outdoors and statistical evaluation of the results.6. Archaeoastronomy (GPS, Magnetic Compass, Clisiometer, Softwares. Orientation exercises on ancient & modern Temples, data retrieved from literature sources referred to celestial phenomena) 7. Sensitive weight balance. Measurements of density of various archaeomaterials8. Polarised Optical Microscope. Thin section images observations.9. Geological reconnaissance on chart. |

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* | **PowerPoint presentations** |
| **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*** | ***Semester workload*** |
| Lectures |  |
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| Course total  |  |

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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.* | Written or oral exams at the end of the semester |

1. **ATTACHED BIBLIOGRAPHY**

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| *- Suggested bibliography:**a) Basic Textbooks:**Liritzis, I. (2007) Natural Sciences in Archaeology. Tipothito – G. Dardanos publ., Athens, 2nd ed.**Liritzis Ioannis (2005) Archaeology and environment, Kardamitsa publ., Athens**b) Additional References:**Liritzis, I. and Vafiadou, A. (2012) Calibration aspects of thick source alpha counter ZnS system, Measurement, 45, 1966–1980**Liritzis, I., Sideris, C., Vafiadou, A., Mitsis, J. (2008),Mineralogical, petrological and radioactivity aspects of some building material from Egyptian Old Kingdom monuments, Journal of Cultural Heritage, 9, 1-13**Liritzis.I and Vassiliou.H (2006) Does sunrise day correlate with eastern orientation of Byzantine Churches during significant solar dates and Saint’s day name? A preliminary study. Byzantinische Zeitscrift (K.G.Saur Munchen, Leipzig) 99, 2, 523-534.**Tsokas G. and Liritzis Y. (1990) Resistivity prospecting in the centre of Athens for the detection of buried antiquities. Prospezioni Archaeologishe. Quaderni 1 133-143.* *Liritzis.I and Polychroniadou.E (2007) Optical and analytical techniques applied to the Amfissa Cathedral mural paintings made by the Greek artist Spyros Papaloukas (1892-1957). Revue d’ Archaeometrie (Archaeosciences), 31, 97-112**Liritzis, I (2011) Surface dating by luminescence: An Overview Geochronometria, 38(3) 292-302**- Related academic journals:* |