Digital Archaeology

Code: 44063
ECTS Credits: 6

Degree	Type	Year	Semester
4313137 Prehistory, Antiquity and the Middle Ages	OT	0	1

Contact

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Use of languages

Principal working language: catalan (cat)

Other comments on languages

Language can be adapted to the special needs of students

Teachers

Ermengol Gassiot Ballbé

Prerequisites

Knowledge characteristic of a university degree (Bachelor level) in Archaeology, History, Humanities or Anthropology. It can be also acceptable a degree in any Human or Social Sciences. The course is also appropriated to students with a degree in computer science and wishing to apply digital technology in archaeological or historical fields. Some degree of familiarity with computers and basic office software. Although it is not compulsory, it is recommended some knowledge, at a very basic level, in databases, computer assisted cartography, digital photography and statistics.

Knowledge of English at a specialized reading level is also necessary.

Objectives and Contextualisation

The course pretends to introduce students to the use of advanced information technologies for archaeological research. Throughout the course different techniques and information technologies for data analysis are presented. Topics such as advanced database design, data mining and automatic learning techniques (neural networks, induction), and various computer simulation approaches (agent-based models) are discussed. Emphasis is also put on advanced spatial analusis (Topography, GIS, geostatistics) and temporal series analysis of radiometric dates. Various aspects of 3D computer graphics are discussed, such as the use of 3D scanners and computer visualization and virtual reality techniques.

Skills

- Analyse and summarise information from a critical perspective.
- Correctly present historical research results orally or in writing.
- Critically analyse the theoretical and methodological standpoints that have guided research in prehistory, ancient history and medieval history.

- Define, design, plan and draw up an original unpublished research project on history or archaeology, following the established academic and scientific parameters.
- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
- Work in interdisciplinary teams.

Learning outcomes

1. Analyse and summarise information from a critical perspective.
2. Carry out a research project on a particular topic, addressing the state of historical and/or archaeological theory in that area.
3. Critically analyse the relation between historico-archaeological sources and their interpretation.
4. Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
5. Present archaeological research results and conclusions clearly, orally or in writing, to both specialists and non-specialists.
6. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
7. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
8. Work in interdisciplinary teams.

Content

1. Introduction. Digital or Quantitative Archaeology? Debating the need of formalize reasoning and discourse in the human and social sciences, and the objective need of quantifying data about past social behavior.
2. Data Acquisition in Archaeology. Image Analysis: From computer assisted microscopy to 3D scanning. Photogrammetry. Shape analysis and Geometry
3. Image Analysis Practical Session. Quantitative Archaeology Lab and Digital Humanities Lab at the UAB. 3D scanning presentation from Faro Gmbh, CreaForm and Leica.
4. Spatial Analysis. Data Acquisition. Topography and Teledetection
5. Optional field trip for practicing with topographic equipment at an archaeological site
6. Data Processing (i): Databases in Archaeology
7. Data Processing (ii) Advanced uses of databases in archaeology
8. Data Processing (III): Geographical Information Systems
9. Data Processing (iv): Radiocarbon data and Temporal databases
10. Practical session using Radiocarbon calibration software: OxCal, Chronomodel and R.
11. Data Analysis (i): statistical hypothesis testing
12. Data Analysis (ii): Classification, Typology and Artificial Intelligence
13. Spatial Analysis at the intra-site scale. Geostatistics
14. Spatial Analysis at the regional level. Landscape and territory.
15. Practical session on: Spatial Analysis at the regional level. Landscape and territory.
16. Virtual Reality in Archaeology. Reconstructing the Past
17. Virtual Reality in Archaeology. Artificial Societies and Simulating the Past.

Methodology

Directed activities: standard class and explanation of digital technologies and its theoretical and methodological background. Discussion seminars about specialized texts (37.5 hours)

Supervised activities: Presentationh of digital equipment. Practical sessions with technology. Tutor work and attendance for preparing the writing essay to bge presented at the end of this module. (37.5 hours)

Autonomous activity: search for documentation, creation and operation of databases, technical exercises, text reading, essay writing. (75 hours)

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Explanation of digital technologies	30	1.2	7
discusssion seminars	7.5	0.3	3, 4, 6
Type: Supervised			
Practical sessions	30	1.2	6, 8
Tutorial work	7.5	0.3	6, 2, 5
Type: Autonomous			
text reading	35	1.4	3, 1, 4, 7

Evaluation

A written essay about any of the subjectes presented and studied during the course. It can be a prospective essay about the need to aply a particular technique to a particular database at a particular case, or a bibliographic essay where the student discvuss in a critical and innovative way the advantages and negative aspects opf a partiocular famility of techniques and technologies. It is also acceptable the analysis of the student own data. (40 % of final result).

Written comments of practical sessions, indicating in a critical way, advantages and disadvantages. (35% final result)

Text commentaries about specialized readings. (25% final result).

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Practical Exercises	35	5	0.2	6, 8
Written Essay	40	30	1.2	1, 4, 6, 2, 7, 5
text comentaries	25	5	0.2	3, 1

Bibliography

Main literature

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