# Quantitative Archaeology 2015/2016

Code: 100715
ECTS Credits: 6

| Degree | Type | Year | Semester |
|---|---|---|---|
| 2500241 Archaeology | OB | 3 | 1 |

## Contact

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## Use of languages

Principal working language: catalan (cat)

## Prerequisites

Standard Knowledof of basic arithmetic

## Objectives and Contextualisation

Although the majority of archaeologists still do not believe it, archeology is a mathematical discipline (as it was asserted by David Clarke) equally with chemistry, physics, etc.. That is, we have to solve archaeological problems using reasoning methods developed in mathematical language. The difficulty is that most students from Humanities do not know their maths. Although there are many computer programs that would help us to apply these mathematical, the truth is that its use seems to be too complicated for those without the necessary skills. So this course has been scheduled, following step by step easy to follow examples of all techniques used in archeology, documenting a schematic, intuitive, simple and direct of all statistical functions that may become useful for archaeologists. The introduction to statistical techniques will not be based on formulas, but the explanation of the underlying logics. Calculations will performed by a computer program. The course is specially designed for students of archeology that wish to become future professionals in our discipline that not only have no idea of mathematics, and they learnt to hate them in their school years . Numbers appear in large numbers, but operations (arithmetic, algebraic, etc.) will be obviated and replaced by intuitive explanations of what is intended with these techniques.

Thematically, the course is an introduction to classical statistics, initially discussing the quantitative data and archaeological measurements, the most common presenting descriptive statistics and introducing students to the procedures of statistical inference, such as qualitative tests for contingency tables, analysis of variance, the study of correlations between variables, etc.. The course presents the foundations of studies of classification and multidimensional analysis, leaving aside a brief examination geostatistics and statistical analysis of time series.

## Skills

- Carrying out and managing archaeology fieldwork: excavation and survey.
- Managing the main methods, techniques and analytic tools in archaeology.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethic relevant issues.

## Learning outcomes

1. Applying both knowledge and analytical skills to the resolution of problems related to their area of study.

2. Applying proper techniques and analytical tools in case studies.
3. Autonomously searching, selecting and processing information both from structured sources (databases, bibliographies, specialized magazines) and from across the network.
4. Interpreting the archaeological fieldwork results by placing them into their historical context.
5. Using computing tools, both basics (word processor or databases, for example) and specialised software needed in the professional practice of archaeology.
6. Using the specific interpretational and technical vocabulary of the discipline.

## Content

UNIT 1. TO SOLVE A PROBLEM YOU SHOULD KNOW ITS SOLUTION BEFOREHAND. Is this a contradiction?

Going blind is not a convenient method for doing any task. At best, we get a nice black eye when we our nose kicks against the wall. The same goes for social science and other scientific disciplines: we always know where we are going if we want to get somewhere. Unfortunately there is no magic switch that illuminates our tireless search for simple solutions.

UNIT 2. The Execrable world of numbers

The day I finished high school I closed the Mathematics book with joy. I hoped to see them never again, but the numbers keep coming up in the soup. I propose a delicious soup of numbers recipe (with some other letter).

UNIT 3. THE MAGIC OF DATA OR ... the more, the better.
Historians have passion for big numbers. Not just a reference, or a document. No, they want to have thousands, millions of data. Too bad nobody knows what to do after that. In this lesson we will learn how to invoke a goddess so elusive and difficult as the statistics, especially when we are in danger of being drowned with such data.

UNIT 4. THINGS ARE ALL DIFFERENT EACH OTHER?
To our surprise, the first thing you notice is that all these tons of data are not equal. We have two options, thinking about how and why certain events or facts are different, while others resemble a lot, or leave the outset and dedicate ourselves to other more rewarding activities.

UNIT 5. The EASIEST ARCHAELOGICAL PROBLEMS WE CAN SOLVE

Although you can fear numbers, the truth is that they are convenient to used to solve problems as trivial as the classic: How much of this is here? Are historical objects found at this place similar? What did they eat in the past? Where do they sleep? How they made fun by nights? How many were killed?

UNIT 6. SPACEFLIGHT

Those that are mad about philosophy and have read Kant know that space is not there where stars fall, but under our feet. This short trip to the surface of Earth attempts to summarize and explore how historical data and archaeological trash is scattered on the soil surface, and if this makes any sense or not dispersion. Spatial analysis is fashionable ....

UNIT 7. RANDOMNESS AS A MEASURE OF ALL THINGS.
People used to say that "... in the beginning it was the Word." No, it turns out that in the beginning was chaos (as the Greeks said), this is chance or whim of crazy neutrons and electrons. The same happening in the micro-universe happens to human beings (those men and women who seem human): the basis of behavior and social action is no more than whim and the lack of rationality. What it has to do with statistics we will discover soon (if Chance does not decide otherwise.)

UNIT 8. HOW WE CAN DO SOCIAL COMPARISONS?
This is like this other thing ... That is unlike anything else ... These expressions are part of everyday speech.

And yet, we can hardly imagine greater nonsense. In this lesson we will learn not to commit follies and to know when common sense" deceives us.

UNIT 9. A MAGIC WORD "ASSOCIATION".
Suppose the computer has accepted to understand what we asked. Unfortunately it insists to show that it is different from us, so instead of answering with a simple yes or no, it swears with a mysterious 0.000. What does it mean?

UNIT 10. MORE ASSOCIATIONS
If You do not have enough, double portion of maths. Only a bit harder, with more numbers and greater incomprehensibility. Let us put it very difficult for anyone to understand it and thus bluffing our way to high Science.

UNIT 11. ANOTHER MAGIC WORD "RELATIONSHIP".
Beginnings are always difficult. Now we can go deeper and explore what is actually beyond the mere association of something else.

UNIT 12. ORACLES AND PREDICTING THE FUTURE
We have already said too much poetry and other mathematical inutilities. Now we can deal with what really matters: predicting the future and leaving a discipline (history) that after two thousand years of published books and filling the head of readers with insufferable explanations, has failed to predict how we will live within a few years.

UNIT 13. NOTHING IS AS SIMPLE AS IT SEEMS
What a disappointment when we discover that the goal, the objective we had since the beginning is a mathematical discourse which becomes almost incomprehensible outside the computer that generated. But if we look good, we will see that what we were looking for where causes and effects, and how these causes had produced these effects and not others.

UNIT 14. FROM SIMPLICITY TO COMPLEXITY
The study of human societies is not simple, since the dynamics and causal actions of men and women can not be summarized in four general principles. Fortunately, mathematics come to our aid.
UNIT 15. MODELS AND CAUSES.
We are already running out. The story is essentially a mathematical discipline, and the purpose of this lesson is to prove it and discovering the uses of formulae and equations that seem to describe social processes.

## Methodology

Check the cataln version of this Guide

## Activities

| Title | Hours | ECTS | Learning outcomes |
|---|---|---|---|
| **Type: Directed** | | | |
| Practical Homework | 15 | 0.6 | 1, 6 |
| Practical work at class | 20 | 0.8 | 1, 6 |
| Theoretical content | 5 | 0.2 | 4 |
| **Type: Supervised** | | | |
| Tutorials | 20 | 0.8 | 2, 1, 5 |
| **Type: Autonomous** | | | |

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|---|---|---|---|
| Student Work | 90 | 3.6 | 2, 1, 3, 5 |

## Evaluation

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## Evaluation activities

| Title | Weighting | Hours | ECTS | Learning outcomes |
|---|---|---|---|---|
| Continuous evaluation (Week activities) | 30 | 0 | 0 | 2, 1, 3, 4, 6, 5 |
| Written essay | 70 | 0 | 0 | 2, 1, 6, 5 |

## Bibliography

Check the catalan version of this Guide