Universitat Autònoma de Barcelona

2021/2022

Analysis and Presentation of Scientific Data

Code: 42940
ECTS Credits: 6

Degree	Type	Year	Semester
4313782 Cytogenetics and Reproductive Biology	OB	0	1

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

Name: Josep Santaló Pedro

Email: Josep.Santalo@uab.cat

Use of Languages

Principal working language: catalan (cat)

Teachers

Anna Genescà Garrigosa

Teresa Anglada Pons

Joan Blanco Rodríguez

Oliver Valero Coppin

Prerequisites

There are no prerequisites for taking this course. In spite of this, in order to ensure the proper monitoring of the subject by the student and the achievement of the learning outcomes proposed, it is recommended that the student have some basic knowledge of statistical tools.
On the other hand, it is recommended that students have a minimum knowledge of English.

Objectives and Contextualisation

The objective of the course is:

Topic 1. Statistics:

Familiarize the student in the field of applied statistics in obtaining results from a study in the design of an investigation

That the student continued to describe and justify the statistical methodologies used in an investigation

That the student followed a critical reading and a good interpretation of the results presented in scientific articles on the subject of cytogenetics or the biology of reproduction.

Topic 2. Scientific communication:

Familiarize the student in the techniques and stratègies of scientific communication

Topic 3. Good Scientific Practices Guidlines:

That the student continued to identify the principies in the development of the research activity and to use the behavior ethically acceptable in the planning, development and dissemination of the results of the research.

Competences

- Apply the basic tools of statistical analysis in cytogenetics and reproductive biology.
- Apply the scientific method and critical reasoning to problem solving.
- Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
- Continue the learning process, to a large extent autonomously.
- Design experiments, analyse data and interpret findings.
- Identify the ethical dilemmas and apply current laws governing the area of knowledge of the master's degree.
- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
- Interpret, resolve and report on clinical cases or scientific findings in the area of the master's degree.
- Respect ethical principles in one's work.
- Show an ability to work in teams and interact with professionals from other specialist areas.
- 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.
- Use and manage bibliography or ICT resources in the master's programme, in one's first language and in English.

Learning Outcomes

1. Adopt an ethically acceptable approach when planning and conducting research and disseminating research findings.
2. Apply the scientific method and critical reasoning to problem solving.
3. Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
4. Continue the learning process, to a large extent autonomously.
5. Critically read and correctly interpret findings reported in scientific articles in the area of cytogenetics or reproductive biology.
6. Describe and justify the statistical methods used in research.
7. Design experiments, analyse data and interpret findings.
8. Identify ethical principles governing research activity.
9. Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
10. Respect ethical principles in one's work.
11. Revise the characteristics of scientific communication techniques.
12. Show an ability to work in teams and interact with professionals from other specialist areas.
13. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
14. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
15. Use and manage bibliography or ICT resources in the master's programme, in one's first language and in English.
16. Use applied statistics both to obtain findings in a study and to design a research project.

Content

Topic 1: Statistics

BLOC1. Basics

Introduction to DeduceR Software
Descriptive statistical univariate and bivariate
Inference for a population. Concepts and applications
Inference for two populations. Concepts and applications
Inference for k populations. Concepts and applications
BLOC2. Modeling

Regression model. General concepts of modeling
General Linear Model. Factors and covariates
Logistic regression model. Variable binary response
Poisson regression model. Variable count response
Topic 2: Scientific communication

The summary. The poster. The oral presentation. The articles. Master's degree work. The doctoral thesis
Topic 3: Code of good scientific practices

Description of a research ethic code: How to plan and develop the research. How to register and disseminate the results. How to disseminate, apply and exploit the knowledge derived from the investigation

*Unless the requirements enforced by the health authorities demand a prioritization or reduction of these contents.

Methodology

The subject consists of theoretical classes, analysis and commentary of cases proposed in a seminar format, and the analysis and resolution of problems and practices. The following describes the organization and the teaching methodology that will be followed in these three types of training activities.

Theory classes (Themes 1, 2 and 3):

The content of the theory program will be taught mainly by the teacher in the form of master classes with audiovisual support. Presentations used in class by the teacher will be previously available on the Virtual Campus of the subject. It is recommended that students print this material and take it to class, to use it as a support when taking notes.

Practical classes (Themes 1, 2):

In addition to the attendance to the theoretical classes the follow-up of the subject will also imply an active role of the student who by THEME 1, will consist of realizing a practice for each block described in the content of the subject, They will apply the concepts learned as well as the DeduceR software. For SUBJECT 2, you will have to complete a series of scientific content presentation (in text and poster format), as well as the preparation of an oral communication.

Seminars (Theme 3):

The students will analyze and comment on a proposed case, individually and outside the class schedule. This analysis will be reflected in a work that students will deliver within the established period, a work that will be evaluated by the teacher.

Subsequently, there will be a seminar session, which will be devoted to the analysis and comment of the case among all the students. The interventions of the different students will also be evaluated by the teacher while the discussion takes place, in the sense of highlighting the brightest and most passive students.

The subject proposal will be done by the teacher at the beginning of the course. The proposal will include the guidelines and points to deal with.

It is intended that all these activities serve to consolidate the contents previously worked in the theory classes and also for the student to develop the skills to solve problems related to the obtaining and interpretation of statistical data, in the presentation of scientific data and develop A critical spirit in the face of ethical and legal problems related to research in Biomedicine.

*The proposed teaching methodology may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Case study of statistics	15	0.6	2, 12, 6, 7, 13, 4, 5, 14, 15, 16
Code of good practices	2	0.08	10, 8, 9, 14, 1
Code of good practices Seminar	1	0.04	10, 8, 9, 14, 1
Practical case of bioethics	3	0.12	12, 10, 8, 9, 3, 14, 1
Practical sessions of statistics	14	0.56	12, 6, 7, 13, 4, 5, 14, 15, 16
Proposals for scientific communication	7	0.28	12, 6, 7, 13, 3, 4, 5, 11, 14, 15
Scientific communication	12	0.48	12, 7, 3, 5, 11, 15
Statistics	6	0.24	2, 12, 6, 7, 13, 4, 5, 14, 15, 16
Type: Autonomous			
Code of good practices	9.5	0.38	12, 10, 8, 9, 4, 14, 1
Scientific communication	25	1	12, 7, 13, 3, 4, 11, 14, 15
Statistics	35	1.4	2, 12, 6, 7, 13, 3, 5, 14, 15, 16

Assessment

The evaluation of the module will consist of the following activities:

1. Evaluation of the delivered practices (Theme 1): Both practices will be delivered and evaluated by the teacher.

2. Evaluation of the presented works (Theme 2): The student will present a work of scientific content in poster format and summary. This presentation must be original and not presented beforehand. The fulfillment of the delivery period will be considered. The student will also have to do an oral communication of scientific data on a topic previously agreed upon. The visual tools used to communicate the scientific data will be evaluated, as well as the structure of the contents of the talk and its exhibition.

3. Evaluation of the comments to the case proposed (Theme 3): The work presented by each student will be evaluated. The fulfillment of the delivery period will be taken into consideration, so that the work presented later to the discussion of the case in the seminar will not be valid.

4. Evaluation of the public discussion of the case. Seminar (Theme 3): The most brilliant interventions that take place during the public discussion of the case, as well as the passive attitudes of the students during this activity will be assessed individually.

Topic 1: Global weight of 40%

The weight in the note of this topic of each one of the evaluation activities will be:

Practice 1: 50%
Practice 2: 50%
Topic 2: Global weight of 40%

The relative weight of each of the assessment activities will be:

Evaluation of the poster: 33%
Summary evaluation: 33%
Assessment of oral communication: 34%
Topic 3: Global weight of 20%

The relative weight of each of the assessment activities will be:

Evaluation of the comments to the case: 80%
Evaluation of the public discussion of the case: 20% (This test is excluded from recovery).
The recovery:

There will be a recovery test similar to the one corresponding to each module topic, except those specifically indicated in each case.

To participate in the recovery the students must have been previously evaluated in a set of activities whose weight equals to a minimum of two thirds of the total grade of the subject or module.

Objective of the evaluation tests

The objective of these tests is to evaluate not only that students have acquired the conceptual knowledge of the module but, more importantly, that they have bought them and they know how to integrate and relate to each other. On the other hand, it will also be valued that students use the right terminology when dealing with the issues raised during the evaluation and to argue and discuss critically and rationally the topics covered.

In order to pass the subject, students must obtain a global grade equal to or greater than 5 points for the total evaluation test of the module.

The evaluation of the module will consist of the following activities:

1. Evaluation of the delivered practices (Theme 1): The first practice will be delivered and evaluated by the teacher. The second practice will be delivered and defended in front of the teacher, who will evaluate it and, if applicable, make suggestions.

2. Evaluation of the presented works (Theme 2): The student will present a work of scientific content in poster format and summary. This presentation must be original and not presented beforehand. The fulfillment of the delivery period will be considered. The student will also have to do an oral communication of scientific data on a topic previously agreed upon. The visual tools used to communicate the scientific data will be evaluated, as well as the structure of the contents of the talk and its exhibition.

3. Evaluation of the comments to the case proposed (Theme 3): The work presented by each student will be evaluated. The fulfillment of thedelivery period will be taken into consideration, so that the work presented later to the discussion of the case in the seminar will not bevalid.

4. Evaluation of the public discussion of the case. Seminar (Theme 3): The most brilliant interventions that take place during the public discussion of the case, as well as the passive attitudes of the students during this activity will be assessed individually.

Topic 1: Global weight of 40%

The weight in the note of this topic of each one of the evaluation activities will be:

Practice 1: 40%
Practice 2: 60%
Topic 2: Global weight of 40%

The relative weight of each of the assessment activities will be:

Evaluation of the poster: 33%
Summary evaluation: 33%
Assessment of oral communication: 34%
Topic 3: Global weight of 20%

The relative weight of each of the assessment activities will be:

Evaluation of the comments to the case: 80%
Evaluation of the public discussion of the case: 20%
The objective of these tests is to evaluate not only that students have acquired the conceptual knowledge of the module but, more importantly, that they have bought them and they know how to integrate and relate to each other. On the other hand, it will also be valued that students use the right terminology when dealing with the issues raised during the evaluation and to argue and discuss critically and rationally the topics covered.

In order to pass the subject, students must obtain a global grade equal to or greater than 5 points for the total evaluation test of the module.

*Student's assessment may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evaluation 1st practical session of statistics	16%	3.5	0.14	2, 12, 6, 7, 13, 3, 4, 5, 14, 15, 16
Evaluation and public defence of the 2nd practical session of statistics	24%	4	0.16	2, 12, 6, 7, 13, 3, 4, 5, 14, 15, 16
Evaluation of the comments on the case of bioethics	16%	3	0.12	2, 12, 10, 8, 9, 13, 3, 4, 11, 14, 1, 15
Evaluation of the public discussion of the case of bioethics	4%	1	0.04	2, 12, 10, 8, 9, 13, 3, 4, 11, 14, 1, 15
Evaluation oral communication	13,6%	3	0.12	12, 3, 4, 11, 14, 15
Evaluation summary	13,2%	3	0.12	12, 3, 4, 11, 14, 15
Poster evaluation	13,2%	3	0.12	12, 3, 4, 11, 14, 15

Bibliography

Basic bibliography Subject 1:

Moore, D. S. (2010). The basic practice of Statistics. 5th ed. Freeman and Co.

Vittinghoff, E .; Shiboski, S.C .; Glidden, D.V. and McCulloch, C.F. (2005). Regression Methods in Biostatistics. Linear, Logistic, Survival, and Repeated Measures Models. Springer e-books

Basic bibliography Subject 2:

Briscoe M.H. 1996. Preparing Scientific Illustrations. A guide to better posters, presentations and publications. 2nd Edition. New York. Springer.

Basic bibliography Subject 3:

Code of Good Practices in the Research of the UAB.

Software

- R: https://cloud.r-project.org/
- R-Studio: https://www.rstudio.com/products/rstudio/download/
- Jamovi: https://www.jamovi.org/download.html