UAB
Universitat Autònoma de Barcelona

Genetics and Reproduction

2026/2027

Code: 101891
Credits: 3

Degree programme	Type	Course
Biomedical Sciences	OP	4

Contact lecturer

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Group languages

You can consult this information at the end of the document.

Prerequisites

To facilitate successful participation in the course and support the achievement of the intended learning outcomes, students are recommended to:

1. Have a solid knowledge and understanding of the fundamental concepts covered in the first-year courses Cell Biology and Histology and Genetics.
2. Be familiar with and understand the basic concepts of the second-year course Cytogenetics.
3. Be familiar with the main techniques used in these disciplines, as many of them will be referred to throughout the course and prior knowledge of these techniques is assumed.

Objectives

Sexual reproduction is governed by genetic mechanisms that regulate sex determination, sexual differentiation, and gamete formation. Alterations in these processes can impair fertility and lead to genetically based infertility, embryonic developmental abnormalities, or pregnancy loss.

This course examines the genetic basis of human reproduction, the molecular mechanisms involved in gametogenesis and sexual differentiation, and the major genetic causes of infertility. It also covers the genetic techniques used to analyse gametes and preimplantation embryos, as well as the principles of genetic counselling in reproductive medicine.

The course objectives are to:

1. Identify the main genetic causes affecting human reproduction.
2. Understand the genetic basis of sex determination, sexual differentiation, and gametogenesis.
3. Analyse the genetic techniques applied to the study of gametes and preimplantation embryos.
4. Assess the risk of transmission of genetic alterations associated with infertility.
5. Understand the basic principles of genetic counselling in reproductive medicine.

Learning outcomes

1. Describe and understand the genetic bases of sex determination and differentiation in humans.
2. Describe and understand the genetic bases and control of human gametogenesis.
3. Understand and describe the structure, morphology and dynamics of eukaryote chromosomes in the different stages of the cell cycle.

4. Recognise genetic anomalies in spermatogenesis and ovogenesis related to a phenotype of sterility.
5. Evaluate the involvement of genetic anomalies as a cause of infertility.
6. Describe the genetic techniques for the study and prevention of sterility and infertility.
7. Provide pre-conceptional genetic counselling, taking ethical and legal factors into account.
8. Interpret scientific publications and solve problems and typical cases in the area of cytogenetics.
9. Correctly use the terminology of genetics and its text and reference books

Contents

SECTION I: GENETIC BASIS OF HUMAN REPRODUCTION

Topic 1. Sex Determination and Sexual Differentiation in Humans

Topic 2. Genetic Basis and Molecular Control of Human Gametogenesis

SECTION II: GENETIC BASIS OF INFERTILITY

Topic 3. Genetic Basis of Male Infertility

Topic 4. Genetic Basis of Female Infertility

SECTION III: GENETIC TESTING IN ASSISTED HUMAN REPRODUCTION

Topic 5. Fundamentals of Assisted Human Reproduction

Topic 6. Genetic Evaluation of the Infertile Couple

Topic 7. Preimplantation Genetic Testing

Topic 8. Preconception Genetic Carrier Screening in Gamete Donors and Couples Planning a Pregnancy

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Study and self learning concepts	27	1.08	1, 2, 3, 4, 5, 6, 7, 8, 9
Problem sessions	4	0.16	1, 2, 4, 5, 6, 7, 8, 9
Lectures	22	0.88	1, 2, 3, 4, 5, 6, 7, 9
Problem ressolution	16	0.64	4, 5, 7, 8, 9

Theory classes

The theoretical content of the course programme will be delivered by the teaching staff in 50-minute classes supported by audiovisual materials and encouraging active student participation. The tables, figures, and graphs used during the sessions will be available in PDF format through the course Moodle classroom. Students will also have access, through this platform, to recommended videos, animations, and websites, and will receive detailed references for each topic that they should consult to consolidate the contents covered in the lectures and for their individual study.

Problem-solving classes

The sessions will be carried out in two groups. Students must check which group they belong to and attend the corresponding sessions. Each group will complete 4 sessions of 50 minutes throughout the course. Within each group, students will be organised into teams of four.

For each session, students will have access to a problem set (available through the course Moodle classroom), which they must solve outside class as part of their working group. During each session, 2-3 problems will be addressed, and students will prepare a written solution dossier that must be printed and brought to class. This dossier must be submitted to the teaching staff at the end of the session.

In class, the problems will be discussed and corrected with active student participation. The teaching staff will randomly select one member from the different groups to present the solution to one of the problems and explain it to the rest of the class. During these presentations, the teaching staff may ask additional questions to encourage deeper reasoning and understanding of the concepts addressed. During presentations and additional questions, the use of mobile phones, computers, or any electronic device with access to artificial intelligence tools will not be allowed, in order to ensure reflection and understanding of the course content.

The activity grade will be based on students' participation and contributions during class, with individual assessment within the context of group work. The problem dossier will not contribute to the final grade. The final mark obtained will correspond to the average of all individual contributions made by the members of the group, meaning that all members of the same group will receive the same grade.

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.

Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Problem ressolution	20	2	0.08	1, 2, 4, 5, 6, 7, 8, 9
Written examination I	40	2	0.08	1, 2, 3, 4, 8, 9
Written examination II	40	2	0.08	4, 5, 6, 7, 9

Assessment system

To pass the course, students must obtain a final grade equal to or higher than 5 out of 10, calculated according to the weighting of the different assessment activities. In addition, students must obtain a minimum grade of 4 out of 10 in the arithmetic mean of the two written examinations.

Students who do not meet these requirements may take a resit examination. The characteristics of this examination will be equivalent to those established for the partial examinations.

Students who have already passed the course may also take the resit examination in order to improve their theoretical component grade. In this case, the grade obtained in the resit examination will replace the previous grade, whether it is higher or lower.

To be eligible for the resit examination, students must have participated in assessment activities representing at least 67% of the total course grade; otherwise, they will be classified as Not assessable.

Assessment activities

1. Throughout the semester, two written examinations will be carried out (see the course schedule)

covering the theoretical contents of the course. Students must complete these examinations individually. The examinations will consist of multiple-choice questions aimed at assessing students' understanding of the concepts covered in class, as well as their ability to apply and correctly relate them. Each examination (Written examination I and Written examination II) will represent 40% of the final course grade.

2. Problem solving (group assessment): The grade for this activity will be obtained from the arithmetic mean of the grades obtained by the group in the different contributions made throughout the course. The problem sets will only serve as learning support and will not be directly assessed. However, a missing or incomplete problem set will receive a grade of zero when calculating the group grade. The assessment will consider the correctness of the answers, the reasoning followed in solving the problems, the interpretation of results, and the ability to adequately answer questions posed by the teaching staff. The final grade will be shared by all group members and will represent 20% of the final course grade.

Single assessment

Students may be assessed on the theoretical contents of the course through a single written examination (individual assessment), which will account for 80% of the final grade. The remaining 20% will be based on problem solving, which will be assessed continuously throughout the course (see previous section). This examination will have the same format as the two examinations scheduled for the continuous assessment of theoretical contents. It will take place on the same date scheduled in the calendar for Written examination II, and the same resit system as for continuous assessment will apply. Students choosing this assessment modality must inform the course coordinator before the first working day of October.

Irregularities in assessment activities

Any irregularity in an assessment activity (academic misconduct, plagiarism, or improper use of artificial intelligence tools, except when such use is expressly authorised by the teaching staff) that may significantly affect the evaluation of the activity will result in a grade of 0 for that activity.

In this course, the use of electronic devices with access to artificial intelligence tools is not permitted during written examinations or during presentations and questions in problem-solving classes. Any breach of this rule will be considered an assessment irregularity.

If multiple irregularities are detected in different assessment activities, the final course grade will be 0. Without prejudice to this, the teaching staff may initiate the corresponding disciplinary procedure in accordance with current regulations.

Bibliography

Bajo JM, B. Coroleu B. (Eds.) Fundamentos de Reproducción. Editorial Panamericana. Madrid. 2009.

Elder K., Dale B. In vitro fertilization. (3rd edition). Cambridge University Press. New York. 2011.

Fauser B.C.J.M. (Ed.). Molecular Biology in Reproductive Medicine. The Parthenon Publishing Group. New York. 1999

Gardner D.K. et al. (Eds.). Textbook of Assisted Reproductive Techniques. Martin Dunitz Pub. Hampshire. 2001.

Harper J. (Ed.) Preimplantation Genetic Diagnosis. (2nd Edition). Cambridge University Press. New York (USA).2009.

Johnson M.H. and Everitt B.J. (Eds.) Essential Reproduction. 5th Edition. Blackwell Science. Oxford. 2005.

Matorras R, Hernández J. (Eds.). Estudio y tratamiento de la pareja estéril. Adalia. Madrid. 2007.

Specific review articles will be recommended during the course.

Software

Not applicable

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this link. To access the information, you will need to enter the course CODE