Teaching Guide				
Identifying Data				2019/20
Subject (*)	Cytogenetics		Code	610G02022
Study programme	Grao en Bioloxía			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Fourth	Optional	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Bioloxía			
Coordinador	Mendez Felpeto, Josefina	E-mail	josefina.mendez@udc.es	
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Web	www.udc.es/grupos/xenomar			
General description	This is a course focusing on the study of eukaryotic chromosome from the structural, functional and evolutionary perspective. In this area seek to improve the knowledge acquired in the molecular genetics and genetic materials. Special emphasis on the organization of the genetic material and their implications in the evolution of genomes, their variation and handling will be done.			

Study programme competences	
Code	Study programme competences
A1	Recoñecer distintos niveis de organización nos sistemas vivos.
A2	Identificar organismos.
A11	Identificar e analizar material de orixe biolóxica e as súas anomalías.
A16	Realizar cultivos celulares e de tecidos.
A26	Deseñar experimentos, obter información e interpretar os resultados.
A29	Impartir coñecementos de Bioloxía.
A30	Manexar adecuadamente instrumentación científica.
A31	Desenvolverse con seguridade nun laboratorio.
B1	Aprender a aprender.
B2	Resolver problemas de forma efectiva.
B3	Aplicar un pensamento crítico, lóxico e creativo.
B5	Traballar en colaboración.
B6	Organizar e planificar o traballo.
B8	Sintetizar a información.
B9	Formarse unha opinión propia.
B10	Exercer a crítica científica.
B11	Debater en público.

Learning outcomes	
Learning outcomes	Study programme competences

Deepen your knowledge of the organization of hereditary material with an evolutionary approach through the study of chromosomes and their variations.	A1 A16 A26 A30 A31	B1 B2 B3 B5 B6 B8 B9 B10 B11	
To understand the fundamentals involve when learning about chromosome and familiar with the basic methodology employed for the study of chromosomes. Tools for cytogenetics.	A1 A2 A11 A16 A30 A31	B1 B2 B3 B5 B6 B11	
Search and use of different literature and databases that allow carrying out the scientific approach to a topic related to chromosomes sources, organization, function and evolution. Management information sources of interest in cytogenetics.	A29	B3 B8 B9 B10	

Contents	
Topic	**Sub-topic**
Block 1.- Structural and Organization Genomes	1.-Organization of genomes from viruses to eukaryotes. Evolutionary aspects. 2.-The chromosomes are chromatin 3.-Levels of organization 4 - Structure of metaphase chromosomes 5.-Induced chromosome structure: Bands vs isocoras. 6.-Linkage and mapping
Block 2.- Chromosomes, celular reproduction and function	1.-Control of the cell cycle. Cycle disorders 2 - Evolution of the mitotic mechanism 3.-replication and chromosomal regions 4.-Evolution of meiosis and its genetic consequences. Meaning of sexual reproduction. 5 - Different karyotypes and their use 6.-Chromosomes and gene function
Block 3.-Chromosome variation and evolution	1.-Chromosomal rearrangements and their significance in evolution. 2.-Genetic consequences of numerical and structural variations . 3.- Chromosomal polymorphisms: evolutionary aspects.

Planning				
Methodologies / tests	**Competencies**	**Ordinary class hours**	**Student?s personal work hours**	**Total hours**
Collaborative learning	A1 A2 A11 A16 A30 A31 B1 B2 B3 B5 B6 B11	28	56	84
Oral presentation	B5 B6 B8 B9 B10 B11	12	0	12
Objective test	A1 A16 B3 B8 B9 B10	2	25	27

Guest lecture / keynote speech	A26 A29 B1 B8 B11	8	0	8
Laboratory practice	A11 A16 A26 A29 A30 A31 B1 B5	15	0	15
Personalized attention		4	0	4
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	**Description**
Collaborative learning	Students work in groups of 2 or 3 and work collaboratively to effectively solve an assigned topic each block. They should learn to arrange and organize work among them. Perform appropriate to the subject under study literature searches . It is a mandatory activity
Oral presentation	The collaborative work by the group, will be presented orally at the end of each block. Throughout the course there will be at least three oral presentations for each student. It will consist of transmitting the rest of the seminar co-dossier prepared by the gruo (2-3 students) together. Each team member will present a part of the joint seminar, trying to fit it in coordination with their peers. It is a mandatory activity.
Objective test	Students will perform a final test consisting of different short questions that reflect different aspects learned throughout the course It is mandatory activity.
Guest lecture / keynote speech	The teacher explains the fundamental contents of each thematic block and identifies the associated activities. Attendance at these lectures and interactive sessions will be positively evaluated. The assitance will be assessed.
Laboratory practice	Laboratory practices related to the development of chromosomes and karyotypes were developed. It will be know the cell cultures, making the karyotype and develop some method of chromosome banding.

Personalized attention	
Methodologies	**Description**
Laboratory practice Collaborative learning	Throughout the course, the teacher will be available during the hours of interactive lectures, group tutorials / small group and individual tutoring for answering questions, guiding the development of seminars / group work and all matters related to the organization of matter.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Guest lecture / keynote speech	A26 A29 B1 B8 B11	In the keynote session, the teacher will explain the fundamental contents of each thematic block of matter. Attendance at these classes enables the treatment of questions and issues that may arise and further clarifies and organizes collaborative work group will be further developed and that will be lectures on oral presentations. Assisting them continuously is recommended.	10
Objective test	A1 A16 B3 B8 B9 B10	The final test will take place on the field marked by the Faculty. Consist of a few short questions about the novel contributions learned in the course ideas and reflection of learning as well as the realization in the responses, personal opinions and scientific literature specific answers to questions will be assessed.	40
Oral presentation	B5 B6 B8 B9 B10 B11	Clarity and precision in the presentation will be assessed. Suitable and current content. Synthesis capacity, motivation and debate. Both the submitted writen report and oral presentation will contribute to the assessment.	20

Laboratory practice	A11 A16 A26 A29 A30 A31 B1 B5	Take into account the interest to learn techniques on chromosomes, skill in the laboratory experiments ability to solve chromosomes and the attitude and ability to function in the laboratory.	10
Collaborative learning	A1 A2 A11 A16 A30 A31 B1 B2 B3 B5 B6 B11	Students will form working groups and the way teamwork is valued, how they solve the problems, the strategy when conducting literature searches to resolve the issue raised and its ability to incorporate new knowledge acquired in years above. Group work and coordination are essential in this regard. Their aptitude and attitude will be assessed throughout the course.	20

Assessment comments
The final test and practical clases are essential and mandatory activity. In the case of justified exceptional circumstances, additional measures may be taken so that the student can pass the subject, such as flexibility in the delivery date of supervised projects, flexibility in practice schedules or a global assessment test of the learning results.

Sources of information	
Basic	- Brown T.A. Genetics: A molecular approach (third edition). Chapman & Hall 1998-Brown, T.A. Genomas (Tercera edición). Editorial Médica Panamericana S.A. 2008-The evolution of te genomes. Edited by T.Ryan Gregory. Elsevier Academic Press. 2005-Lacadena, J.R. Citogenética Editorial Complutense S.A. 1996- Lewin, B. Genes IX. McGrawHill Education 2008-Lima de Faria, A. One hundred years of chromosome research and what remains to be learned. Kluwer Academic Publishers 2003- Lynch M. The origins of genome architecture Sinauer Associates, Inc Publishers. 2007-Macgregor, H.C. An Introduction to Animal Cytogenetics. Chapman & Hall 1993-Macgregor, H. & Varley, J. Working with Animal Chromosomes (second edition) John Wiley & Sons. Toronto 1988-Wagner R.P.; Maguire M.P. & Stalling R.L. Editorial Wiley-Liss 1993
Complementary	En primer lugar, los alumnos consultarán los libros recomendados en las materias de Genética y Genética Molecular para recordar los contenidos y conocimientos adquiridos previamente.A continuación realizarán una búsqueda bibliográfica específica en libros, artículos de revisión, publicaciones específicas que permitan incrementar el aprendizaje de la materia, teniendo como eje fundamental el cromosoma mitótico.La realización de una buena búsqueda bibliográfica estará presente en todas las valoraciones de las actividades propuestas.

Recommendations
Subjects that it is recommended to have taken before
Biology: Basic Levels of Organisation of Life I (Cells)/610G02007 Genetics/610G02019 Molecular Genetics/610G02020
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.