In addition to the general offer of courses taught in English, some Centers also offer for incoming students English Friendly Courses (EFC): subjects taught in Spanish, in which the syllabus summary, lecturer tutoring, examinations and/or papers are available in English.

<table>
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<tr>
<th>FACULTY OF MEDICINE AND NURSING (327)</th>
<th>SEMESTER</th>
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2 SCHEDULE: Morning (M)/ Afternoon (A): begins at 13.30.
By clicking the subject’s name, its Syllabus will appear.
26711. Cell Biology (Odontology). School of Medicine and Nursing

**DESCRIPTIÓN Y CONTEXTUALIZACIÓN DE LA ASIGNATURA (INGLÉS)**

This subject delves into aspects of Cell Biology that students should know in their general aspects. Together with other subjects of the first course of dentistry complete the training of the basic subjects of these students. As far as possible, the subjects are taught taking as examples aspects related to Dentistry.

**COMPETENCIAS / RESULTADOS DE APRENDIZAJE DE LA ASIGNATURA (INGLÉS)**

1. Autonomous learning.
2. Capacity for organization and planning.
3. Team work.
4. Information management capacity.
5. Capacity for oral and written expression.
6. Decision making.
7. Mastery of the current means of electronic communication and information technology.

**CONTENIDOS TEÓRICO-PRACTICOS (INGLÉS)**

1. Brief historical and conceptual introduction of the cell

1.1 Visualizing cells. Microscopic sizes, cellular function and differentiated cells. The cell through the history of Biology (classroom practices).

2. Cell organization

2.1 Membrane systems.
- Endoplasmic reticulum, Golgi apparatus, lysosomes and vesicular traffic: composition, structure and functions.
- Energy organelles: peroxisomes and mitochondria. Composition, structure and functions.

2.3 Cytoskeleton.

-Microfilaments, intermediate filaments and microtubules.

3. Cellular contacts, cellular communication and extracellular matrix
3.1 Adhesion and cellular communication

-Intercellular junctions.

3.2 Intercellular space: extracellular matrix. Extracellular dental matrix.

4. Cell nucleus and cell life cycle

4.1 Cell nucleus: flow of genetic information, nuclear envelope, nucleus-cytoplasm transport, chromatin (structure and functions), nucleolus and ribosomes.

4.2 Cell cycle: stages, regulatory mechanisms.

4.3 Cell division: mitosis and cytokinesis. Cell death

4.4 Stem cells and cancer
**Laboratory practices**

- Use of the optical microscope, preparation of biological samples and most used stains (4 hours)

- Electron microscope: use and preparation of samples under the transmission and scanning electron microscope (2 hours)

- Study of cellular and extracellular components by transmission and scanning electron microscopy (6 hours)

- Study of odontogenesis: sections of cellular structures in development of the first molar and the incisor: stages of onset, morphogenesis and cell differentiation. Dentin and enamel formation (dentinogenesis and amelogenesis) (6 hours)

In the classroom practices, problems related to the topics of the subject will be made, individually or in groups, as they are explained in the lectures using the knowledge, reasoning and skills of each student.

In the seminars will be carried out classes of presentation of current topics of interest in Cell Biology and Dentistry and review of the thematic blocks presented in the theoretical classes.

**METODOLOGIA (INGLÉS)**

The methodology is based on the master classes using the blackboard and PowerPoints on the part of the teacher where the students also participate through questions that are asked during the course of the classes.

The practical laboratory classes are developed with the use of microscopes where each student individually studies the corresponding histological preparations under the supervision of the teacher.
In the seminars, groups of 4-5 students are organized and they prepare and expose a topic of Cell Biology related to dentistry and present the work in class. In the classroom practices, cases and problems are presented by the teacher, and solve by the students in groups of 4-5 people, and expose the solutions in public.

**CONVOCATORIA ORDINARIA: ORIENTACIONES Y RENUNCIA (INGLÉS)**

**ASSESSMENT SYSTEMS**

- Final Evaluation System
- Tools and qualification percentages:
  - Written test to develop (%): 90
  - Internship (exercises, cases or problems) (%): 10

**ORDINARY CALL: ORIENTATIONS AND RESIGNATION:**

Partial exam with short questions (20%), practical exam (10%) and final exam with short questions (70%)

**EXTRAORDINARY CALL: ORIENTATIONS AND RESIGNATION**

Exam of short questions (100%)

**CONVOCATORIA EXTRAORDINARIA: ORIENTACIONES (INGLÉS)**

EXTRAORDINARY CALL: ORIENTATIONS AND RESIGNATION

Exam of short questions (100%)

**BIBLIOGRAFIA (INGLÉS)**

- In Spanish:


General and Clinical Pharmacology is a core subject in the 3rd year of the Undergraduate Course in Dentistry. The main objective of this subject is that the students learn to use drugs rationally in their future dental practice. The subject is divided into three main blocks:

I. In the first, general aspects of pharmacology, pharmacokinetics and pharmacodynamics are covered. These concepts will be used in the next two blocks in the subject.

II. In the second block, the most commonly used and prescribed drugs in dental clinical practice will be studied in depth.

III. In the third, drugs that although not currently prescribed in dental practice that can have an influence in the clinical practice or patient management will be studied.

1. Content of the subject

4.1. Theoretical content

Block I

Topic 1. Introduction to Pharmacology
Topic 2. Absorption of drugs
Topic 3. Distribution of drugs in the body
Topic 4. Metabolism of drug excretion
Topic 5. Pharmacodynamics. Drug action mechanism
Topic 6. Adverse reactions to drugs. Pharmacological interactions

Block II

Topic 9. Local anesthetics
Topic 10. Benzodiazepines. Other anxiolytic and sedating-hypnotic drugs. Central action muscle relaxants
Topic 11. Nitrous oxide
Topic 12. Nonsteroidal anti-inflammatory drugs (NAIDs). Other analgesics
Topic 14. General features of anti-infective chemotherapy
Topic 15. Beta-lactam antibiotics
Topic 16. Macrolide antibiotics. Clindamycin
Topic 17. Nitroimidazoles
Topic 18. Tetracycline
Topic 19. Other antibacterial pharmacological groups
Topic 20. Antifungal drugs
Topic 21. Antiviral drugs
Topic 22. Antiseptics. Fluorides

Block III
Topic 23. Opiate analgesics
Topic 24. Antidepressant drugs Antipsychotic drugs
Topic 25. Antiparkinsonian and antiepileptic drugs. General anesthetic
Topic 26. Pharmacology of the cardiovascular system I
Topic 27. Pharmacology of the cardiovascular system II
Topic 28. Pharmacology of the respiratory tract
Topic 29. Antihistamine H drugs
Topic 30. Pharmacology of the digestive tract
Topic 31. Hormonal pharmacology I
Topic 32. Hormonal pharmacology II
Topic 33. Antineoplastic drugs. Immunostimulant and immunosuppressive drugs

4.2. Practical content

The practical content in the subject is spread over 10 practical sessions in the classroom, 1 computer practical session and 7 seminars

2. Assessment

Ordinary call

The assessment system is mixed:

Written theoretical assessment
Instrument: final written exam combining 2-3 multiple choice questions, 1-2 problems, 2-3 clinical cases and 10-12 questions with short answers. 
Assessment criteria: information provided, reasoning, ability to summarize and precision in the use of language. Each of the three blocks in the subject must be passed. 
Percentage of the final grade: **70%**

**Practical assessment**

Instrument: final practical work report (classroom and computer) and active participation in classroom practical work sessions.
Assessment criteria: identification of the objectives proposed, information contained, ability to analyze and solve the issues presented correctly. 
Percentage of the final grade: **15%**

**Continuous assessment of face-to-face activities and independent work**

Instrument: participation in seminars and 3 mid-course assessments (30-35 multiple-choice questions, 5 possible answers and just one right) 
Assessment criteria: adaptation of the content, information provided, reasoning and ability to communicate the information (assessment templates designed for the purpose will be used). Results of the mid-course assessments. 
Percentage of the final grade: **15%**

**Extraordinary call**

The extraordinary call is governed by the same criteria as the ordinary call. Students may request that the grade they achieve in the practical work assessment and the continuous assessment of face-to-face activities and independent work should be maintained.
COURSE GUIDE 2019/20

Faculty 327 - Faculty of Medicine and Nursing

Degree GODONT30 - Bachelor’s Degree in Dentistry

Course Implantology

COURSE DESCRIPTION

Implantology (UNESCO code 329900) is a subject belonging to the m06 optional module taught during the second quarter of year 5 in the Dentistry Master Degree.

This subject is worth 6 ECTS and is divided into: teaching, in and outside class modalities as summarised in the table.

This subject aims for the student to become competent in: establishing a diagnosis, prognosis and execution of a correct therapeutic plan in cases of partially or totally edentulous via dental implants. To establish diagnosis and treatment plan, a student must be capable of taking and interpreting X-rays and other imaging procedures relevant to dentistry. The student must also be skilled in determining and identifying the patient’s aesthetic requirements likewise the possibilities of satisfying his/her curiosity.

The specific subject skills are detailed in the ‘contents description’ section of M06 optional module.

COMPETENCIES/LEARNING RESULTS FOR THE SUBJECT

Specific Implantology skills

<table>
<thead>
<tr>
<th>Skills</th>
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<tbody>
<tr>
<td><strong>IP1</strong></td>
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<td><strong>IP3</strong></td>
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<td><strong>IP4</strong></td>
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<td><strong>IP5</strong></td>
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<tr>
<td><strong>IP6</strong></td>
</tr>
</tbody>
</table>
IP7 Analyse, discuss, summarise and express scientific information corresponding to implantology.

IP8 Team work in co-operative implantology tasks, i.e. Help with assistance tasks, discuss diagnoses and co-operate with treatments.

IP9 Show a favourable attitude towards self-learning in implantology, being active and participative in resolving problems and continuous updating.

COURSE CONTENTS, THEORETICAL & APPLIED

Subject syllabus
The syllabus is divided into 6 blocks:
1. Osseointegration, implant design and its implications.
2. Diagnosis and therapeutic planning.
3. Totally edentulous.
4. Partially edentulous.
5. Increased bone availability.
6. Implant complications, results and maintenance.

Each block is subdivided into the following topics:

a) Osseointegration, implant design and its implications.
   Topic 1: Bone healing and osseointegration.
   Topic 2: Implant designs and surfaces.

b) Diagnosis and therapeutic planning.
   Topic 3: Clinical history, examination and diagnosis via imaging.
   Topic 4: Treatment plan.

c) Totally edentulous.
   Topic 5: Surgical aspects.
   Topic 6: Restorative aspects and options.

d) Partially edentulous.
   Topic 7: Surgical aspects.
   Topic 8: Prosthetic aspects.

e) Increased bone availability.
   Topic 9: Guided bone regeneration.
   Topic 10: Monocortical bone grafts.
   Topic 11: Elevation of maxillary sinus floor and alveolar distraction.

f) Implant complications, results and maintenance.
   Topic 12: Failures and complications.
   Topic 14: Implant survival and success rate.
   Topic 15: Maintenance in implant therapy.

TEACHING METHODS

TOPIC AREA CHOSEN FOR: MASTERCLASSES, SEMINARS & CLINICAL PRACTICE

The IMPLANTOLOGY syllabus can be subdivided into 2 large blocks:

I/ Partially edentulous refers to treatment via prosthetic implant in patients lacking only one or a few teeth.
II/ Totally edentulous refers to treatment via prosthetic implant in edentulous patients. Teaching will be different in each case.

I/ Partially edentulous. In the second quarter of year 5 in the Dentistry Degree, when the optional subject Implantology is first taught, there are only 4 months left to complete degree studies; and students have already acquired vast theoretical knowledge on surgery and prostheses, so they will be skilled in performing rehabilitations via removable partial/complete and permanent prostheses. They know the basic principles of occlusion and have studied the associated pathology. Furthermore, they have developed clinical and surgical skills during the last 3 years performing multidiscipline treatments at the University of the Basque Country UPV/EHU Dental Clinic. All the foregoing, enables students under strict supervision and after training through the implantology subject to rehabilitate straightforward cases of patients missing single teeth or partially edentulous via implants at the Dental Clinical. 84 out of the 150 hours of the subject would be used for this, i.e. 56% of the entire subject and 40% of the topics tackled. The topics tackled are:

**TOPIC AREA CHOSEN FOR PBL APPLICATION.**

**JUSTIFICATION**

II/ Totally edentulous. There are situations where rehabilitation with prosthetic implant is highly complex requiring specific training in advanced diagnostic, surgical and prosthodontic techniques. For this reason the study of these complex scenarios is best via an active methodology like PBL.

To correctly tackle these complex situations, students must: ¹ have exhaustive critical knowledge of different implant surfaces and designs; ²understand the importance of planning; ³be able to handle new imaging analysis and prosthetic design technologies; and ⁴know bone availability increase techniques. Therefore, they will attend 7 hours of masterclasses, 3 hours of seminars and 18 hours of class practice. Thus 44% of the total hours for the subject will be imparted via PBL methodology, tackling 60% of the syllabus:

a) Osseointegration, implant design and its implications.
   Topic 1: Bone healing and osseointegration.
   Topic 2: Implant designs and surfaces.

b) Diagnosis and therapeutic planning (for totally edentulous).
   Topic 3: Clinical history, imaging diagnosis and examination.
   Topic 4: Treatment plan.

c) Totally edentulous.
   Topic 5: Surgical aspects.
   Topic 6: Restorative aspects and options.

e) Bone availability increase (for totally edentulous).
   Topic 9: Guided bone regeneration.
   Topic 10: Monocortical bone grafts.
   Topic 11: Elevation of maxillary sinus floor and alveolar distraction.

f) Implant complications, results and maintenance (for totally edentulous).
   Topic 12: Failures and complications.
   Topic 14: Implant survival and success rate.
   Topic 15: Implant therapy maintenance.
TYPES OF TEACHING

ECTS, teaching modalities, in and outside class hours

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<tr>
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Evaluation methods

- End-of-course evaluation

Evaluation tools and percentages of final mark

50% of the mark corresponds to assessment of the subject using PBL methodology and the other 50% for the rest of the subject.

ORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

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<td>Clinical practice attitude and participation</td>
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EXTRAORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

The same

MANDATORY MATERIALS


13. ITI Treatment Guide: Implant Therapy in the Aesthetic Zone for Single-tooth Replacements U. Belser, W. Martin, R. Jung, C. Hammerle, B. Schmid, Daniel Buser (Editor), Urs Belser (Editor), Daniel Wismeijer (Editor) Published by Quintessenz Verlag (2007)


SUMMARY OF THE STUDENT'S GUIDE

PHARMACOLOGY IN PHYSIOTHERAPY
1. Data on the subject

<table>
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<th>Center</th>
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<tr>
<td>Prof.</td>
<td>María Torrecilla (Coordinator)</td>
</tr>
<tr>
<td>e-mail</td>
<td>marí<a href="mailto:a.torrecilla@ehu.eus">a.torrecilla@ehu.eus</a></td>
</tr>
<tr>
<td>Tutorial consult</td>
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2. Competencies in the Subject

The general competencies worked on in the subject, in line with the study program approved by the Ministry of Education, are (order CIN2135/2008):

G003. Learn and understand the methods, procedures and actions of physiotherapy, aimed both at the therapy to be applied in clinical practice for functional re-education or recovery and for the performance of activities to promote and maintain health.

G012. Intervene in the areas of promotion, prevention, protection and recovery of health.

G017. Understanding the importance of updating the knowledge, skills and attitudes that make up the professional skills of a physiotherapist.

The learning outcomes to be achieved by the students are:

RA1. Understanding the basics of pharmacokinetics and pharmacodynamics and the factors that intervene in drug responses.

RA2. Identify the basic aspects of drugs that act on the vegetative and neuromuscular nervous system, other systems and tracts, and of chemotherapy drugs. Differentiate the main routes of drug administration through the skin and drugs for topical application in physiotherapy and sports medicine.

RA3. Evaluate the effect of drug therapy in the effectiveness of the physical and physiotherapeutic treatments and the possible effects of the pharmacological agents in the prevention of increase of risk of lesions.

RA4. Analyze the influence of certain rehabilitation procedures on the effects of drugs.

RA5. Defend the importance of therapy with drugs being safe and effective, contributing to the correct use of medication in relation to patients, families and the community in general.
### 3. Program

<table>
<thead>
<tr>
<th>Syllabus Theoretical (CM)</th>
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<td>Part II. Pharmacology of the vegetative and peripheral nervous system</td>
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<td>Part III. Pharmacology of systems and tracts</td>
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<td>B.- Other tracts and systems</td>
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<td>C.- Hormones. Vitamins</td>
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<td>(S1) Pharmacokinetics - the effect of physical activity on pharmacokinetics.</td>
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<tr>
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<td>(S2) Doping in sport and the abuse of medication and drugs.</td>
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**PRACTICAL CLASSROOM WORK (PA)**

<table>
<thead>
<tr>
<th>(PA1 &amp; 3) Pharmacological targets and pharmacodynamic parameters.</th>
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<tbody>
<tr>
<td>(PA2) Pharmacokinetics - the effect of physical activity on pharmacokinetics.</td>
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<td>(PA4) Non-steroid anti-inflammatory drugs. Topical application of drugs.</td>
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<tr>
<td>(PA5) CNS pharmacology.</td>
</tr>
<tr>
<td>(PA6) Pharmacological treatment of asthma.</td>
</tr>
<tr>
<td>(PA7) Cardiovascular and blood pharmacology.</td>
</tr>
<tr>
<td>(PA8) Problem-solving in interactions between drugs and other physiotherapy treatments.</td>
</tr>
<tr>
<td>(PA9) Antibiotics and antiviral drugs.</td>
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**LABORATORY PRACTICAL WORK (PL)**

<table>
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<th>(PL1) Elimination of salicylates.</th>
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<td>(PL2) Pharmacology of pain.</td>
</tr>
<tr>
<td>(PL3) Pharmacology of motor disorders - Parkinson's disease.</td>
</tr>
<tr>
<td>(PL4) Pharmacology of diabetes: simulation of blood sugar regulation through the administration of insulin and adjusting carbohydrate intake.</td>
</tr>
</tbody>
</table>

**COMPUTER PRACTICAL WORK.** Attendance is compulsory.

- (PO1). Sources of information and learning in Pharmacology: handling pharmacopoeia, Forms and Catalogues of specialties.

### 4. Assessment
Continuous assessment system.
The continuous assessment system consists of a final written exam and tasks performed by the student that are assessed during the practical classroom sessions with computers, laboratory work and seminars, as well as during non-face-to-face hours of the subject.
### 27272 Basic Medical Histology

| HMG-1. | Understand microscopic structure and the function of the elements of the human body in the state of health. Analyze the principles on which current scientific methodology applied to this discipline is based and analyze scientific texts from a critical perspective on their content. |
| HMG-2. | Learn about the concept and classification of human tissues and their embryological origin. Identify the different elements of each of the tissues, both in their theoretical aspect and through the use of the microscope. |
| HMG-3. | List the supramolecular organization and the functional activity of tissues, as well as the molecular and physiological basis that makes this organization possible. Apply the bio pathological principles that govern tissue lesions. |
| HMG-4. | Understand the structure and function of the elements of the human body in terms of state of health. Analyze the principles on which the current scientific methodology is based for this discipline and analyze scientific texts, reflecting on their content in a critical way. |
| HMG-5. | Learn about the characteristics and the embryological elements of the cellular and tissue elements of the organs, systems and tracts, both in their theoretical aspect and identifying them using the microscope. |
| HMG-6. | List the tissue organization and the functional activity of organs, tracts and systems, as well as the cellular molecular and physiological bases of their activity. |
1. Learn about the microscopic structure of tissues and organs of the nervous, cardiovascular and immune systems, and of the basic characteristics of embryo development and the organogenesis of these organs; be able to relate the structure to the function and its importance in the bases of a pathology, integrated this knowledge with that of other biomedical disciplines; be able to make a critical analysis and provide answers to questions or problems with a histological basis, using the correct scientific terminology.

2. Make a critical analysis, identify tissues and tissue structures and answer questions or problems on issues related to the morphology, structure and function of basic tissues in the body and of the nervous, cardiovascular and immune systems.

3. Be able to recognize, in microscope images, the characteristic structures of the different tissues and organs that make up the nervous, cardiovascular and immune systems.
5.- ASSESSMENT SYSTEM

<table>
<thead>
<tr>
<th>Assessment method</th>
<th>% of final mark</th>
<th>Learning objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.- Written theoretical assessment (2)</td>
<td></td>
<td>1</td>
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<tr>
<td>• 1 multiple-choice test, only one correct answer, penalty of (-0.33) for a wrong answer.</td>
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<tr>
<td>• A minimum grade of 4.75/10 must be obtained in the assessment.</td>
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<tr>
<td>2.- Oral and/or practical assessment</td>
<td></td>
<td>2, 3</td>
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<tr>
<td>(one or more specific tests)</td>
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<td></td>
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<tr>
<td>• Microscope image recognition test (minimum grade = 6/10)</td>
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<tr>
<td>3.- Continuous assessment of face-to-face activities and independent work</td>
<td>20</td>
<td>2, 3</td>
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<tr>
<td>• Assessment of activities in Practical Classroom Work (15%). Minimum grade: 4/10</td>
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<tr>
<td>• Continuous assessment of face-to-face activities (20%): practical work reports (5%) + one-off assessments (5%) + classroom practical work (10%).</td>
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</table>

Remarks:
* Assessments may be made at any time during the course.
* The minimum mark in each assessment is used for the calculation of the overall grade and for passing the subject.
* Although theoretical and practical exercises may be done on the same day, the practical ones will be corrected first. If the minimum mark is not reached, the theoretical exercise will not be corrected.
* The practical work grade will not be carried over to the extraordinary exam call.
* To withdraw from continuous assessment, the student must request it 9 weeks before the official date of the ordinary assessment, by filling in and handing in the form for this purpose. For these students, the assessment system will be the same as in the Extraordinary Call.
The subject "Clinical Microbiology and Infection" sets out to give an overall vision of infectious diseases from the etiological point of view. The etiology and the pathogenicity mechanisms of the main infectious processes, the correct steps and clinical samples to make a laboratory diagnosis, and an analysis of the microbiological factors that determine antibacterial treatments. The main aim is to acquire the necessary knowledge to establish a strategy and a diagnostic opinion on microbial diseases, indicate a safe and efficient course of treatment and propose the most suitable preventive measures.

SYLLABUS

Infection and infectious disease
Immune response to an infection
Anti-infectious immunotherapy
Microbiological basis for a diagnosis of infections
Criteria for the rational use of antibiotics
Etiopathogenic, diagnosis and antibiotic treatment of infections
Respiratory infections
Urinary tract infections
Cutaneous, subcutaneous, osteoarticular and muscular infections
Central nervous system infections
Sexual transmission infections
Obstetric, congenital and perinatal infections
Infections in an immunodepressed patient. Infections related to healthcare
Digestive tract infections

NEW INFECTIOUS CHALLENGES

The major infectious threats. Emerging infections
Infections in a globalized world
Travelers' infections

Old and new challenges of resistance to antibiotics

- Seminars
  Emerging/re-emerging pathogens (Middle East Respiratory Syndrome (MERS), Crimean–Congo hemorrhagic fever (CCHF))
- Laboratory practical work
  Indication and interpretation of complementary diagnosis studies on infections. Taking and processing of clinical samples for microbiological study. Evaluation, monitoring and follow-up of antibiotic therapy. Immunodiagnostics

ORDINARY EXAM CALL
Theoretical assessment: exam of 60 multiple-choice with one correct answer. Each correct answer = 1 point, and each wrong answer means that 0.3 points will be subtracted. Unanswered questions will not be penalized. Of the 60 questions, 48 are related to the subject taught in lectures, and they may include notions worked on in practical laboratory sessions. Twelve questions will be about clinical problems worked on and solved in the practical classroom sessions. This exam must be passed to pass the subject as a whole. The marks of the other assessments will not be added if this part of the assessment is no passed.

Practical assessment: questions based on images or tests with an overall weight of 15 points. For each incorrect answer one point is subtracted. This mark will be added to the total grade (only if the test is passed). Attendance is compulsory, and this percentage will not be added to the final mark if the student's absence is not sufficiently justified.

Furthermore, attendance, active participation, and the presentation and level of correctness of projects all contribute to the final mark. Practical classroom work accounts for 50% of this section, clinical laboratory practical work 25% and seminars 25%. Presentations (posters or oral) of both kinds of activity will be graded with a maximum 10 points to calculate the overall grade.

Attendance at all programmed activities is compulsory. A lack of active participation of non-compliance of rules will be penalized by subtracting 0.5 points per day of practical work.

If the student does not show up for assessments this will be considered as a withdrawal from the call and will appear as "Not presented".

Students may be assessed under the final assessment (exam) system, regardless of whether they have participated in the continuous assessment system or not. To do this, they should apply in writing to withdraw from continuous assessment within 9 weeks of the start of the term. In this case, they must sit a multiple-choice exam (only one answer correct) and a practical exam.
Medical practice is increasingly oriented towards personalized medicine, in which the genetic characteristics of each patient are key. Therefore, a sound knowledge of Genetics is essential for future professionals of Medicine. The subject of "Medical Genetics" aims to increase student’s understanding of how genes contribute to human pathophysiology.

In this subject, we address the mechanisms that contribute to the development of diseases directly caused by genetic alterations (monogenic or chromosomal) and the transmission of these diseases. Other complex diseases such as cancer, in which genetics plays an important role are also addressed. Throughout the course we made reference to the different medical specialties where the knowledge of Genetics is applied, and the genetic aspects of clinical cases are discussed. Genetics may facilitate the integration of other knowledge from different areas. Thus, the subject of "Medical Genetics" is directly related to other subjects of the Degree in Medicine. For example, 3rd year students would already have acquired in their 1st and 2nd years (subjects of "Cell Biology", "Genetics" and "Biochemistry") a series of basic notions (patterns of inheritance, gene structure and function, regulation of gene expression). This knowledge will be strengthened, extended and contextualized by taking the subject of "Medical Genetics". Moreover, "Medical Genetics" relates to other 3rd year subjects, such as "Pharmacology" (through pharmacogenetics), and later year subjects, such as "Pathology" and "Pediatrics" (the genetic basis of many diseases affecting children is studied).

COMPETENCIES/LEARNING RESULTS FOR THE SUBJECT

COMPETENCIES (MODULE)
To draw and interpret pedigrees; to calculate the risk of recurrence and to recognize human phenotypical features: to understand the structure and regulation of the human genome; to understand the molecular basis of human genetic diseases, as well as the origin and consequences of chromosomal alterations; to set up the experimental approaches required for the analysis or genetic diagnosis of a pathology; to know how to use the tools for the analysis of human genetic variability

COMPETENCIES (TRANSVERSAL)
CT1. Instrumental. Analysis and synthesis capability; organization and planning capability; oral communication; problem solving.
CT2. Personal. Self learning. Use of databases with information relevant in the field of Medical Genetics.

LEARNING OUTCOMES (LO)
LO1. To adequately solve complex problems related to the inheritance of diseases as represented in pedigrees.
LO2. To establish the relationships between human genome alterations and human pathologies, in order to use such alterations as markers for diagnosis, prognosis and targeted treatment.
LO3. To select, in a well-argued manner, the cytogenetic or molecular techniques best suited for the diagnosis of different genetic pathologies.
LO4. To explain the features and consequences of a genetic disease, in a manner that is both correct and understandable for either health professionals or patients,

THEORETICAL/PRACTICAL CONTENT

Topic 1: Medical Genetics in the context of health: medical dimension of the advances in Human Genetics.

Topic 2: Use of molecular tools and techniques in the clinical diagnosis of genetic diseases.

Theoretical-practical content:
General organization of the human nuclear and mitochondrial genome.
Genes: structure, expression and regulation. Protein-coding genes and non-coding RNA.
Repetitive DNA. Alu Sequences, microsatellites.
Epigenetics: Histone modifications and DNA methylation. Methods to study DNA methylation.
Importance of the family history in medicine. The pedigree as a fundamental tool for the study of family history. Inheritance patterns of monogenic diseases. Rules, tools and procedures to calculate the risk of recurrence. Limitations and problems.

Models of molecular alterations that cause disease. Genotype-phenotype correlation
Theoretical-practical content:
Specific nomenclature in Molecular pathology and Cytogenetics.

Topic 5: Applications of Genetics in Clinical Practice: Genetic counselling. Fundamentals and applications of Pharmacogenetics and Gene Therapy.
Theoretical-practical content:
Criteria for requesting a genetic test, interpretation of results and communication to the patient. The process of Genetic counseling.
Pharmacogenetics: genetic variability and drug metabolism.
Gene therapy, History, objectives and challenges. Methodological basis: vectors and procedures in vivo or ex vivo. Achievements and problems

METHODS

Topic 1: Medical Genetics in the context of health: medical dimension of the advances in Human Genetics.
Methodology and teaching modalities:
Master class (Lecture). (1 hour)
Conferences by professionals of Genetics in the health field. (2h)

Topic 2: Use of molecular tools and techniques in the clinical diagnosis of genetic diseases.
Methodology and teaching modalities:
Master classes (Lectures). (6h)
Laboratory Practice: DNA extraction and PCR amplification. (4h)
Computer Practices: Practical exercise: design of PCR primers. (4h)
Genomic databases: genes and diseases (4h)
Classroom Practices (Problem solving): Diagnosis by Molecular Techniques (6h)
Problem-based learning: Seminars: (1h) Management of a family with a genetic disease - i) search for information

Methodology and teaching modalities:
Master Class (Lecture), (1 hour)
Classroom Practices (Problem solving): Pedigree Analysis and Disease Inheritance (6h)
Problem-based learning: Seminars: (1h)
Management of a family with a genetic disease - ii) pedigree analysis and risk calculation

Models of molecular alterations that cause disease. Genotype-phenotype correlation
Methodology and teaching modalities:
Master Classes (Lectures). (6h)
Classroom practices: Use of nomenclature (2h)
Guided discussion of clinical cases (2h)
Classroom practices (Problem solving): Results of molecular and cytogenetic techniques (6h)
Laboratory practice: Preparation and observation of human karyotype. (4h)
Problem-based learning: Seminars: (1h)
Management of a family with a genetic disease - iii) relationship between the genetic alteration and the clinical consequences

Topic 5: Applications of Genetics in Clinical Practice: Genetic counselling. Fundamentals and applications of
Pharmacogenetics and Gene Therapy.
Methodology and teaching modalities:
Master Classes (Lectures). (6h)
Classroom Practice: Ethics and Genetics -Reading and discussion of articles (2h)
Preparation and presentation of seminars
Problem-based learning: Seminars: (2h)
Management of a family with a genetic disease - iv) presentation of the case to the group and communication to the family (therapeutic options and genetic counseling)

TYPES OF TEACHING

<table>
<thead>
<tr>
<th>Type of teaching</th>
<th>M</th>
<th>S</th>
<th>GA</th>
<th>GL</th>
<th>GO</th>
<th>GCL</th>
<th>TA</th>
<th>TI</th>
<th>GCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom hours</td>
<td>28</td>
<td>5</td>
<td>20</td>
<td>7</td>
<td>8</td>
<td></td>
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</tr>
<tr>
<td>Hours of study outside the classroom</td>
<td>54</td>
<td>10</td>
<td>9</td>
<td>5</td>
<td>4</td>
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</tbody>
</table>

Legend:
M: Lecture
S: Seminario
GA: Pract.Class.Work
GL: Pract.Lab work
GO: Pract.computer wo
GCL: Clinical Practice
TA: Workshop
TI: Ind. workshop
GCA: Field workshop

ASSESSMENT SYSTEMS

- Continuous assessment system
- Final assessment system

TOOLS USED & GRADING PERCENTAGES

- Extended written exam 45%
- Practical work (exercises, case studies & problems set) 15%
- Team work (problem solving, project design) 30%
- Exposition of work, readings, etc. 10%

ORDINARY EXAM CALL: GUIDELINES & DECLINING TO SIT

It is mandatory to perform all the tests, and obtain a mark of at least 50% in each one of them.

1. - Theoretical evaluation (written test)
Criteria: The student correctly answers theoretical questions and adequately solves practical problems (pedigree analysis, interpretation of genetic diagnostic techniques and chromosomal analyses). He/she properly uses professional terminology (including nomenclatures for mutations and chromosomal alterations).
Tools: written test: Three theory questions and two problems / practical exercises.

2. - Practical evaluation (Realization of practices - exercises, case studies or problems)
Criteria: The student correctly performs laboratory practices, properly manages experimental equipment and materials, and is capable of interpreting the results. He/she is able to extract relevant information using computer tools and Genetics databases.

3. - Continual assessment (teamwork, problem solving and project design, presentation of works, paper discussion...)
Criteria: The student attends to classes and participates actively. He/she works autonomously, and addresses the problems raised in previous classes. He/she makes contributions to during teamwork exercises (seminars and group exercises). He/she asks questions and makes interesting comments in the classroom. He/she collaborates in the learning of his/her classmates.
The seminar presentation (both preliminary rehearsals and the final presentation) contains all the relevant information and it is presented in a correct and interesting manner. The slides are well designed. In his/her presentation, the student integrates and contextualizes correctly the concepts explained in theoretical sessions, and he/she respond correctly to questions posed by the teacher or his/her classmates. The student uses the terminology appropriate to each situation (colleagues and patients).
Tools: Observation of the student’s attitude in the classroom and the dynamics of work during the preparation of the seminar and in tutorial sessions. Deliverables: seminar summaries, solved exercises and problems raised in class to evaluate autonomous work.
Tutorial sessions (at least 3), report and public presentation (10 min) of a seminar on a genetic disease prepared during the course.

Students who wish to be evaluated through a final evaluation system must communicate their renounce to continual assessment by writing to the lecturer responsible for the subject. This communication should be made within 9 weeks after the beginning of the semester, in accordance with the official calendar of the Center.
The final evaluation will consist on a written test in which all the learning outcomes of the subject will be evaluated.
Students wishing to resign from an examination call must notify teachers in writing (email) at least 10 days before the
beginning of the official examination period.

**EXTRAORDINARY EXAM CALL: GUIDELINES & DECLINING TO SIT**

The extraordinary examination call will be carried out through a final evaluation system. It will consist on a written test in which all the learning outcomes of the subject will be evaluated. The mark in the test will determine 100% of the final mark.

**COMPULSORY MATERIALS**

**BIBLIOGRAPHY**

**Basic bibliography**

**In-depth bibliography**

**Journals**
- Nature Reviews in Genetics
- Current Opinión in Genetics

**Useful websites**
- Specific for cytogenetics and chromosomal abnormalities: http://www.slh.wisc.edu/cytogenetics/index.php

**REMARKS**
STUDENT'S GUIDE

DEVELOPMENTAL GENETICS BIOLOGY
Undergraduate Degree Course in Medicine
1st year, 2nd term
Module 1
Core subject
Coordinator: Laura Gomez Santos

Summary of the theoretical content taught in lectures (1h face-to-face/lecture):
O. PRESENTATION OF THE SUBJECT
1. GENOMA, GENES AND GENE EXPRESSION
2. CELL REPRODUCTION
3. FERTILISATION AND HEREDITY
4. DEVELOPMENTAL BIOLOGY

26 hours of class attendance
Independent hours worked: 39 individual work

Other training activities:
Seminar: 20-25 students, group work.
Practical work in the classroom
Practical work in the laboratory

ASSESSMENT SYSTEM

FINAL ASSESSMENT

- INTEGRATION OF CONCEPTS EXAM:
  75% of the final grade.
  Theoretical questions, problems of application, interpretation of graphics, description of micro photos or tables, performance of drawings or outlines of cellular processes, summary of figure captions, etc. The accuracy of the theoretical concepts applied will be graded, together with the ability to summarize and expression in the correct scientific language, and the correct nature of the conclusion reached following an analysis of the data provided. Correct spelling and grammar will also be considered. The theoretical content given in lectures and the work done in seminars and practical session will also be evaluated.

-PRACTICAL EXAM:
  10% of the final grade.
  Identification and description of biological structures and processes, both seen in optical and electronic microscope micro photos and in histological sections. This exam must be passed (5 points out of 10) to take the Written Exam on Integration of Concepts later. The pass mark will be held for two academic years, regardless of whether the student sits the written exams or not.

CONTINUOUS ASSESSMENT
- MID-COURSE EXAM:
15% of the final grade.
The first two thematic blocks will be assessed, following the same criterion as the written exam on integration of concepts. The mark obtained will be added to the final grade, regardless of whether it is a pass or not. Passing does not eliminate a subject. Taking the exam will not be considered if the student does not show up for the Concept Integration exam (ordinary call) and will appear in the ordinary call as "Not Presented". The mark obtained is not maintained for the Extraordinary Call.

- DELIVERABLES AND QUESTIONNAIRES FILLED IN DURING CLASSROOM PRACTICE/SEMINARS:
These will consist of responding to questions posed during the performance of the practical session or seminar, either individually or in groups. The following will be assessed in the allocation of the final grade of the subject: accuracy and precision in the answers, writing and graphic expression. The reading/visualization of the themes to be worked on can be requested at any time through the e-Gela platform.

- REPORT ON PRACTICAL LABORATORY WORK:
This must be handed in. To allocate the final grade of the subject, weight will be given to the correct identification and description of the objectives observed in the form of drawings or short answers, using correct scientific language.

WITHDRAWAL FROM CONTINUOUS ASSESSMENT

This only means not taking the Mid-Course Exam. It does not affect attendance and other usual formative activities.
Deadline for presentation: 28 March 2020 at 12:00.
Form: Document available in e-Gela. It must be signed and handed to the coordinator.
Withdrawal means that the Concept Integration Exam (Ordinary Call) represents 90% of the final grade.
Not taking the Mid-Course Exam without having presented the withdrawal beforehand will give the Mid-Course Exam a mark of 0 points, maintaining the 15% in the calculation of the final grade.

To arrange a tutorial with the teaching staff, either make contact personally or by email.
## Competencies/learning outcomes of the subjects

<table>
<thead>
<tr>
<th>Competencies</th>
<th>Learning outcomes</th>
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</table>
| **1.** Understand microscopic structure and the function of the components of the human body in a state of health. Learn about the principles on which current applied scientific methodology in this discipline is based, and analyze scientific texts, reflecting critically on their content. | ✓ Understand microscopic structure and the function of the components of the human body in a state of health.  
✓ Relate the structure to the function and its importance in the bases of pathology, integrating this knowledge with that of other biomedical disciplines.  
✓ Analyze the principles on which the scientific methodology applied to this discipline is based.  
✓ Make a critical analysis and respond to questions or solve problems of a histological basis, using the correct scientific terminology. |
| **2.** Learn about the characteristics and the embryological origin of cellular and tissue components of the organs, systems and tracts. Identify each of their components, both from the theoretical angle and through identification by microscope. | ✓ Learn the concept, the classification of the tissue components of the organs, systems and tracts of the human body and their embryological origin.  
✓ Learn the characteristics and identify, using the microscope, the cellular and tissular components of the endocrine, respiratory, digestive, urinary, reproductive and integumentary systems of organs, systems and tracts. |
| **3.** List the supratissular and functional activity of organs, tracts and systems, as well the molecular, cellular and physiological bases for their activity. Apply bio-pathological principles that govern lesions to the organs, tracts and systems. | ✓ Link knowledge of supratissular organization and the functional activity of organs and systems with the molecular and physiological bases that make this organization possible.  
✓ Learn the bio-pathological principles that constitute the basis of illnesses in which alterations occur to the normal structure of organs, tracts and systems. |
### Assessment system

<table>
<thead>
<tr>
<th>Assessment Evaluation</th>
<th>% final grade</th>
<th>Learning objective assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.- Written theoretical assessment (2)</strong></td>
<td></td>
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<tr>
<td>(one or more specific exams)</td>
<td>Final exercise</td>
<td>65%</td>
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<tr>
<td>• 1 Multiple-choice test, only one correct answer, penalty of -0.33 points for each wrong answer.</td>
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<tr>
<td>• Minimum grade of 4.75/10 in the assessment required</td>
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<tr>
<td><strong>2.- Oral and/or practical assessment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(one or more specific exams)</td>
<td>Test: recognition of microscope images + identification test of organs in histological preparations</td>
<td>20%</td>
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<tr>
<td>• Test: recognition of microscope images (minimum grade = 6/10)</td>
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<tr>
<td>• Test: identification of organs in microscopic preparations (minimum grade to pass the subject = 6/10)</td>
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<tr>
<td><strong>3.- Continuous assessment of face-to-face and independent work activities</strong></td>
<td>Practical work in class</td>
<td>10%</td>
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<tr>
<td>(direct assessment of the training process)</td>
<td>Portfolio of practical work</td>
<td>5%</td>
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<tr>
<td>• Assessment of activities in Practical Classwork (10%). A minimum grade of 4/10 is required</td>
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<tr>
<td>• Assessment of practical work reports (5%)</td>
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**Remarks:**
* No additional assessment tests may be taken at any time in the teaching calendar.
* The grade for the practical work will NOT be maintained for the extraordinary exam call.

In the case of the Extraordinary Call the following will be done: 1. **Theoretical written exam** (multiple-choice test) accounting for 80% of the final grade, and 2. **Practical assessment** (exam of recognition of histological preparations and images), accounting for 20% of the final grade.
1. Description

The main objective of the subject is that the students should acquire the scientific basis to promote individual and collective health through the treatment of the most common illness in our setting. It is necessary to have passed “Basis of Medical Pharmacology” to take the subject.

2. Learning outcomes

The specific learning outcomes of the subject are:

RA1. Evaluate when the patient needs drug treatment and select the most suitable from those available, weighing up the therapeutic value against the toxicity risk.

RA2. Be able to find the right information to solve a drug therapy problem, as well as critically analyze the bibliography of the sector and apply bioethical principles to drug research.

RA3. Use and prescribe drugs correctly in the most common illnesses.

RA4. Learn about Pharmacovigilance and how to fill in a notification of adverse reaction and collaborate with or receive information from the National Pharmacovigilance System.

RA5. Teamwork

3. Content

Theoretical Content: Lectures

General Applied Pharmacology

T0. Introduction


T2. Reasoned pharmacotherapy, prescription and regulation.

T3. Applied pharmacokinetics and pharmacodynamics.

T4-5. Studies on the use of medication


Special groups


Reasoned prescription in illnesses

T10. Basic principles for the prescription of antibiotics.

T11. Selection and use of antibiotics in highly prevalent infections.

T12. Selection and use of drugs in respiratory illnesses.

T13. Selection and use of drugs in digestive illnesses.

T14. Selection and use of hormonal contraceptive therapy.


T16. Selection and use of drugs in inflammatory illnesses and headaches.

T17-18. Selection and use of drugs in metabolic illnesses and cardiovascular risk: Osteoporosis, Diabetes, Dyslipidemias


T25-26. Selection and use of drugs in neurological illnesses I: Parkinson's, Alzheimer's, Epilepsy and Headaches.

Practical content:

Practical work in the classroom

   PA1. Prescriptions issued in a reasoned way
   PA2. Critical reading
   PA3. Adverse reactions and Pharmacovigilance
   PA4. Criticisms of advertising

Practical computer work

   PO1. Sources of information on medication

Seminars

   S1. Ethics of research
   S2. Pharmacoepidemiology and Pharmacoeconomics.
   S3. Placebo effect
   S4. Biological medication
   S5-S6. Applied clinical cases

Assessment
The assessment of the subject will be continuous, as described below:

1. Final exam (70% of the final grade). It will consist of 25-30 multiple-choice questions and 3-4 questions to be answered in writing. To pass this part, the student must score at least 4 (out of 10) in each part.

2. Attendance (4% of the final grade).

3. Individual and group practical activities (26% of the final grade). To pass the subject, this part must be passed too.

If a student wishes, he/she may be assessed through the final assessment system (final exam). This must be requested within 9 weeks of starting the term. The theoretical content will be assessed (70% of the grade, written exam) and practical content (30% of the grade, oral exam). Both parts must be passed separately.

Non-attendance at the final exam will mean automatic withdrawal from the call.

The extraordinary call will consist of a single final exam similar to that of the ordinary call.