MODULE | SUBJECT MATTER | YEAR | SEMESTER | CREDITS | TYPE
--- | --- | --- | --- | --- | ---
Basic common knowledge | Physiology | 2nd | 1st | 6 ECTS (4,5 T + 1,5 P) | Basic

**TEACHING STAFF**

- Alfonso Varela López (T*; P*)
- Elena María Planells del Pozo (T*)
- María Dolores Yago Torregrosa (T*; C*)
- Marta de la Flor Alemany (T*)
- Lourdes María Herrera Quintana (P*)
- María Dolores Navarro Hortal (P*)
- Iryna Rusanova (P*)

(T*: Theory; P*: Practice; C*: Subject coordinator)

**ADDRESS, TELEPHONE NUMBER, EMAIL, ETC.**

Dpt. Physiology, 1st floor, Faculty of Pharmacy, Cartuja Campus. 958243879
alvarela@ugr.es, elenamp@ugr.es, mdyago@ugr.es, floralemany@ugr.es, lourdesherrera@ugr.es, mdnavarro@ugr.es, irusanova@ugr.es

**TIMETABLE FOR TUTORIALS OR LINK TO WEBSITE**

Prof. Varela López
1st T: M 9.30-11.30 h; W 9.30-13.30 h
2nd T: W and F 10.30-13.30 h

Prof. Planells del Pozo
1st T: M and Tu 9.30-11.30 h; W 10.30-11.30 h
2nd T: M 9.00-10.00 h; Tu 13.00-14.00 h; W 11.00-14.00 h

Prof. Yago Torregrosa
M, W and F 9.30-11.30 h

Prof. de la Flor Alemany
Tu and Th 17.00-20.00 h

Prof. Herrera Quintana
1st T: Tu and Th 9.30-12.30 h
2nd T: M, Tu and Th 17.00-19.00 h

Prof. Navarro Hortal
Tu and Th 9.30-11.30 and 12.30-13.30 h; W 10.30-11.30 h

Prof. Rusanova
1st T: Tu and Th 14.00-16.00 h; W 15.00-17.00 h
2nd T: Tu and Th 14.00-16.00 h; W 11.00-13.00 h

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1 Consult any updates in Acceso Identificado > Aplicaciones > Ordenación Docente

(-) This course guide should be filled in according to UGR regulations on assessment of student learning: [http://secretariageneral.ugr.es/pages/normativa/fichasugr/ncg7121/](http://secretariageneral.ugr.es/pages/normativa/fichasugr/ncg7121/)
**Prerequisites or Recommendations (where applicable)**

To have background knowledge of Chemistry, Human Anatomy and Histology, Structural Biochemistry, Metabolic Biochemistry, Human and Cell Physiology.

A good standard of:
- English
- Computer skills are also required.

**Brief Description of Content (According to official validation report)**


**General and Specific Competences**

**General Abilities**

- CG2. To develop the profession as for other professionals of the health, acquiring skills to be employed at team
- CG3. To recognize the need to support and update the professional competence, giving special importance to the learning, of an autonomous and continued way, of new knowledge, products and skills in nutrition and food, as well as to the motivation for the quality
- CG4. To know the limits of the profession and their competences, identifying, when a treatment is necessary to interdiscipline or the derivation to another professional
- CG5. To realize the communication of an effective way, so much of oral such as written form, with the persons, the professionals of the health or the industry and the mass media, being able to use the technologies of the information and the communication specially the related ones to nutrition and habits of life
- CG29. To acquire the basic training for the investigative activity, being capable of formulating hypothesis, gathering and interpreting the information for the resolution of problems following the scientific method, and understanding the importance and the limitations of the scientific thought in sanitary and nutritional matter.

**Specific Abilities**
• CE1. To know the chemical, biochemical and biological foundations of application in human and dietetic nutrition
• CE2. To know the structure and function of the human body from the molecular level to the complete organism, in the different stages of the life
• CE26. To know the nutrients, their functions and their metabolic utilization. To know the bases of the nutritional balance and their regulation.

OBJECTIVES (EXPRESSED AS EXPECTED LEARNING OUTCOMES)

• To gain knowledge about the functioning of the human organism with the aim of relating nutrition to maintenance of body functions.
• To understand the physiological processes, analyzing their biological significance, description, regulation and integration at the different levels of organization, in health.
• To establish the bases to comprehend the modifications of physiological processes as a form of adaptation to a changing environment.
• To relate concepts to previous knowledge and acquire sufficient basis for subsequent learning.

DETAILED SYLLABUS

THEORY:

• **Thematic unit 1. Body Fluids. The blood.**
  - Describe the compartments that distributes water from the body
  - Give an overview of the components of blood
  - Give an estimate of volume percentages and formed elements
  - Describe the formed elements of the blood and their functions
  - Describe the functions of the blood
  - Understand what the hematocrit value and its clinical utility
  - Describe the main plasma components and their functions
  - Describe the different types of plasma proteins and their functions

• **Thematic unit 2. Physiology of the erythrocyte and leukocyte.**
  - Describe erythropoiesis and its regulation
  - Explain the production and degradation of hemoglobin
  - Describe the role of iron and its main metabolic aspects
  - Know the current theories of the stem cells
  - Explain how to determine the ABO blood groups and Rh factor
  - Describe leucopoiesis
  - List the functions of neutrophils, eosinophils and basophils

• **Thematic unit 3. Platelet physiology and hemostasis.**
  - Explain the formation of the platelet clot
  - Describe the mechanisms that contribute to hemostasis
  - Identify the stages of blood coagulation and explain the various factors that stimulate and inhibit it.
  - List the hemostatic regulatory mechanisms

• **Thematic unit 4. Functional anatomy of the heart. Myocardial properties. Electrocardiogram.**
  - Describe the function of the heart chambers and valves
  - Explain the functional characteristics of the myocardium.
- List the properties of the myocardium.
- Explain the functional characteristics of the cardiac conduction system.
- Explain the significance of the electrocardiogram (ECG) and its diagnostic significance.

**Thematic unit 5. Cardiac cycle and output.**
- Explain the temporal sequence of contraction-relaxation in the cardiac cycle.
- Explain and relate the pressure changes that occur in the cardiac chambers with valves dynamics and blood movements during the cardiac cycle.
- Explain the origin and components that produce heart sounds.
- Define cardiac output and describe the factors that affect it: stroke volume and heart rate.
- List the factors controlling stroke volume and heart rate.

**Thematic unit 6. Arterial and venous circulation.**
- Describe and differentiate the function of arteries and veins.
- Schematize the general circulation.
- Explain the factors that regulate the rate and blood flow.
- Define the concepts of systolic, diastolic, and mean differential blood pressure.
- Describe the mechanisms that are implemented in the short, medium and long-term blood pressure control.
- Explain the main determinants of the venous circulation.

**Thematic unit 7. Capillary and lymphatic circulation.**
- Differentiate the function of arterioles, capillaries and venules.
- Describe the organization of the microcirculatory unit.
- Analyze the pressures associated with the movement of fluids and substances between capillaries and interstitial spaces.
- Describe the circulation of the lymphatic vessels.
- Describe the formation and flow of lymph.
- Understand the functions of lymph.

**Thematic unit 8. Cardiovascular regulation.**
- Explain the heart self-regulation.
- Explain the role of baro and chemoreceptors in the control of the cardiovascular activity.
- Know the functioning of the nerve centers in the cardiocirculatory activity control.

**Thematic unit 9. Functional morphology of the respiratory system. Mechanical ventilation.**
- Describe the function of the respiratory tract.
- Describe the processes causing inspiration and expiration.
- Explain what is meant by surface tension and the role of the alveolar surfactant.
- Describe and differentiate anatomic dead space and physiologic dead space.
- Define and quantify lung volumes and capacities.
- Describe the unique characteristics of the pulmonary circulation.

**Thematic unit 10. Exchange and transport of respiratory gases.**
- Know the partial pressures of oxygen and carbon dioxide in the atmosphere, alveoli, blood and tissues, and based on that describe the diffusion of gases.
- Describe the different ways in which oxygen and carbon dioxide are transported in the blood.
- Explain the role of hemoglobin in the transport of CO2.
• **Thematic unit 11. Regulation of respiration.**
  - Describe the areas of the central nervous system and the mechanisms involved in the nervous control of respiration.
  - Explain peripheral mechanisms that contribute to the maintenance of normal breathing patterns.
  - Describe the role of central and peripheral chemoreceptors on breathing control.

• **Thematic unit 12. Functional morphology of the urinary system. The nephron.**
  - Make a list of kidney functions.
  - Describe the functional anatomy of the nephron.
  - Know the structure and function of the juxtaglomerular apparatus.

• **Thematic unit 13. Mechanisms of urine formation.**
  - Define glomerular filtration explaining the mechanisms that produce it.
  - Explain the basic mechanisms of tubular reabsorption and secretion.
  - Explain the countercurrent mechanism.
  - Explain the mechanisms and factors involved in the concentration and dilution of urine.
  - Explain the concept of urine clearance and usefulness.
  - Explain the mechanisms and stages that occur in urination.

• **Thematic unit 14. Regulation of urinary function.**
  - Know the self- and endocrine regulation of the glomerular filtration.
  - Describe the role of the renin-angiotensin-aldosterone system in the reabsorption and secretion of electrolytes.
  - Understand the role of antidiuretic hormone on water reabsorption in the renal tubules.

• **Thematic unit 15. Regulation of the acid-base balance.**
  - Relate hydrogen ion secretion by the kidney in the maintenance of the acid-base balance.
  - Explain the importance of buffer systems for the acid-base balance.
  - Define the concepts of acidosis and alkalosis.
  - Describe the importance of the respiratory system in the regulation of the acid-base balance.

• **Thematic unit 16. Functions and hormonal regulation of the male reproductive system.**
  - Know the physiology of male sexual organs
  - Describe the stages of spermatogenesis and functions of Sertoli’s cells in this process
  - Function of seminal vesicles and prostate gland
  - Describe the role of the hypothalamus-hypophysis-testicle axis in the control of testosterone secretion
  - Puberty and regulation of its beginning

• **Thematic unit 17. Female physiology before pregnancy and female hormones.**
  - Know the physiology of the female sexual organs
  - Describe the different stages of ovarian and menstrual cycles
  - Explain hormonal interactions involved in the control of ovulation
  - Describe the biological actions of testosterone, estrogen and progesterone
  - Describe the role of the hypothalamus-hypophysis-ovary axis in the control the secretion of estrogen and progesterone
  - Compare the various types of methods of birth control and its effectiveness

• **Thematic unit 18. Physiology of fecundation, pregnancy, childbirth and lactation.**
Describe the structure and functions of the placenta
Know what hormones the placenta secretes and describe their actions
Describe the evolution of the plasma levels of estrogen, progesterone and chorionic gonadotropin throughout gestation
List the functional changes in the endocrine glands of women during pregnancy
Explain the hormonal mechanisms triggering birth
Describe the interactions of various hormones in the initiation and maintenance of breastfeeding

Thematic unit 19. Skeletal muscle physiology.
Describe the functional organization of muscle fiber.
Describe the motor neuron-muscle relationship.
List the sequence of electrical and ionic events from the production of an action potential in the motor nerve to the contraction of a muscle.
Describe how cross bridge cycle and sarcomere shortening is carried out.
Know the role of calcium ions in contraction-relaxation.
Explain contraction summation and the length-tension and force-speed relationships.

Thematic unit 20. Control of motor activity I. Motor functions of the spinal cord and brainstem.
Describe the function of the neural structures responsible for movement
Explain the spinal circuits and motor control
Describe topographic relations: neural-skeletal muscle
Explain the importance and function of alpha and gamma motor neuron
Describe the following spinal reflexes: the stretch reflex and the flexor reflex
Describe the function of the brainstem motor: vestibular nucleus and reticular formation in the maintenance of balance and posture

Thematic unit 21. Control of motor activity II. Motor functions of the cerebellum, basal ganglia and cortex.
List the motor areas of the cerebral cortex and its relative contribution to the organization of the motor act
Report the differences between the pyramidal and extrapyramidal motor systems
Explain the role of the cerebellum in voluntary movements
Describe the afferent and efferent projections of the cerebellum
Explain the role of the basal ganglia
Describe the afferent and efferent projections of the basal ganglia
Make a diagram integrating the functions of the various structures involved in the regulation and control of the motor act

Thematic unit 22. Regulation of body temperature.
Remember homeotherm and poikilotherm concepts
Study the importance of maintaining body temperature
Studying the role of the hypothalamus in regulation system of the body temperature
Consider what happens in situations of abnormal body temperature regulation

Thematic unit 23. Integumentary system. Physiology of the skin and related structures.
Functionally describe the various layers of the epidermis and dermis and their component cells
Describe the various functions of the skin
Compare the structure and functions of the skin adnexal structures
Know the role in regulating skin perspiration
• **Thematic unit 24. General adaptation syndrome.**
  - Explain afferent pathways that mediate the endocrine response to stress
  - Study the activation of the autonomic nervous system and the adrenal medulla
  - Understand the response of the various systems of the body in relation to adaptation to stress

**PRACTICE:**

**Laboratory work**

- Practice 1. Microscopic study of blood cellular components (functional description).
- Practice 4. Electrocardiogram at rest.
- Practice 5. The acid-base balance (computer simulation).

**BIBLIOGRAPHY**

**BASIC READING LIST**

**Textbooks**

- Martín Cuencia E. "Fundamentos de Fisiología". Thompson, 2006.
- Tresguerres JAF, López-Calderón Á, Villanúa MA. "Anatomía y Fisiología del cuerpo humano". 1ª ed.
**COMPLEMENTARY READING**

**Textbooks (specific literature)**

**Dictionaries and medical atlases**

**Periodic publications (journals)**
- Annual Review of Physiology
- Current Advances in Physiology
- News in Physiological Sciences
- Physiological Reviews

**Lab manuals**

**Computer simulations**

**RECOMMENDED LINKS**

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### INTERNET RESOURCES

- [http://muscle.ucsd.edu/musintro/Jump.shtml](http://muscle.ucsd.edu/musintro/Jump.shtml) Fisiología del músculo esquelético
- [https://www.hhmi.org/biointeractive/cardiology-virtual-lab](https://www.hhmi.org/biointeractive/cardiology-virtual-lab) Cardiology virtual lab
- [http://www.mhhe.com/biosci/ap/vander8e/student_index.mhtml](http://www.mhhe.com/biosci/ap/vander8e/student_index.mhtml) Get Body Smart: An online examination of human anatomy & physiology

### SCIENTIFIC SOCIETIES WITH EDUCATIONAL WEBSITES

- [http://www.secf.es/](http://www.secf.es/) Sociedad Española de Ciencias Fisiológicas
- [http://www.feps.org/](http://www.feps.org/) Federación Europea de Sociedades de Fisiología

### TEACHING METHODOLOGY

#### THEORETICAL CONTENTS

The theoretical contents of the program will be developed through a combination of teaching and learning methods. First of all, most of the theoretical topics will be presented by the lecturer in the classical and formal way through lectures. The rest of the agenda will be presented by the students themselves, using for their preparation part of the autonomous work that they must do. This work will be supervised by the lecturer.

**Theory**
- Presentation of the subject in lectures, with introduction of the different sections that make up the subject
- Proposal for literature sources (texts, published scientific articles, specialized journals, web sites, etc.) to search for information on the various topics of the program.

**Seminars**
- Classroom presentation of the topics prepared by the students. The topics will be distributed among the students with enough time in advance for them to prepare and be supervised by the lecturer before the presentation, during which the debate among the students will be encouraged, with the lecturer acting as moderator.
- Study, commentary and discussion of case studies related to the Physiology of specific systems.
- Other activities

**Tutorials**
- Periodic meetings to support for lectures and resolve questions/queries raised by students.

### PRACTICAL CONTENTS (LABORATORY SESSIONS)
- The lecturer will explain and carry out the practice in front of a reduced group of students, then the student will carry out the practice individually supervised by the lecturer and will complete the different activities proposed in the practice notebook. At the end, the student will deliver the notebook which will include the results obtained individually and his/her observations.

**ASSESSMENT (ASSESSMENT INSTRUMENTS, CRITERIA AND PERCENTAGE VALUE OF FINAL OVERALL MARK, ETC.)**

The assessment of the academic performance of the students will be preferably continuous and will cover the theoretical and practical contents, the autonomous work carried out and presented by the students in class, as well as regular attendance and participation in the face-to-face activities scheduled throughout the course.

In order to pass the course, it will be essential to have passed (≥ 5 points / 10) the theory and laboratory practice.

Final mark in the continuous evaluation system will be calculated according to the following percentages:

- Theory: 70%
- Coursework (essays and presentations, and participation in seminars): 10%
- Attendance and in-class participation: 10%
- Laboratory practices: 10%

**ASSESSMENT CRITERIA**

**Assessment of theoretical contents**

A mid-term exam may be carried out on the date scheduled by the Faculty in coordination with the rest of the 2nd course subjects. This exam may allow passing the thematic units included. If this were the case, a mark ≥ 5 points / 10 will have to be obtained, and the mark will only be kept until the ordinary call. Before the date of each exam, the lecturer will inform about its structure and type of questions. The theory mark will account for 70% of the final mark.

**Assessment of coursework done and presented by the students**

At the beginning of the term, a number of topics will be distributed among the students and the approximate date for the presentation in class will be set. Coursework will be assessed in terms of contents, presentation and defence of the topic. Students will have to prepare a summary that will serve their classmates to study the topic (questions about these topics might be included in the final theory exam). Some topics may be covered by all students, being discussed later in class. Coursework mark will account for 10% of the final mark.

**Assessment of regular attendance to face-to-face activities and in-class participation**

Attendance and in-class participation will account for 10% to the final mark

**Laboratory practice assessment**
Students must take a theoretical-practical exam and deliver the notebook with results and observations. The exam will consist of the completion of one of the practices carried out, together with a written exam with questions about what was done in the practice sessions or about their theoretical bases. Both the exam and the notebook mark will be taken into account. The practice mark will account for 10% of the final mark. Students who do not pass the practices will be able to take a new practice exam that will be held before or coinciding with the theoretical exam of the official calls (ordinary / extraordinary).

**DESCRIPTION OF THE EXERCISES WHICH WILL CONSTITUTE SINGLE FINAL ASSESSMENT AS ESTABLISHED IN UGR REGULATIONS**

According to the Students Assessment and Qualification Policy of the University of Granada (adopted by the Governing Council on Oct 26, 2016), those students who cannot follow the continuous assessment system due to working, health or disability issues (or any other reason appropriately justified) can apply for a Single Final Assessment. For this purpose, the student will submit a formal request to the Director (Head) of the Department, arguing and proving (with documented evidence) the reason for not being able to follow the continuous system. The submission deadline will be 2 weeks after the beginning of the lectures. In extraordinary circumstances, the starting date for counting the 2-week period will be the enrolment date (policy NCG78/9) and, in this case, the student will have to include the proof of enrolment date when making the request. After ten days without the student receiving a written reply from the Director of the Department, it will be understood that the request has been accepted. In case of denial, the student may file, within one month, an appeal to the Rector, who may delegate this task to the Dean or Director of the Centre, exhausting the administrative proceedings.

**ASSESSMENT CRITERIA**

For students in the Single Final Assessment system, the mark will be calculated according to the following:

- Theory: 90%
- Laboratory practice: 10%

In order to pass the course, it will be essential to have passed (≥ 5 points / 10) both the theory and laboratory practice.

**Assessment of theoretical contents**

Students will be assessed by taking a final exam. The final exam will be scored out of 10 and will be passed with a mark of 5 points or higher. This will account for 90% of the final mark.

**Laboratory practice assessment**

Students must pass a theoretical-practical exam that will consist of completing one of the practices included in the Department practice notebook (randomly chosen) and answering questions asked by the lecturer about the different practices that make up the aforementioned notebook. The practice mark will account for 10% of the final mark.
SCENARIO A (ON-CAMPUS AND REMOTE TEACHING AND LEARNING COMBINED)

TUTORIALS

<table>
<thead>
<tr>
<th>TIMETABLE</th>
<th>TOOLS FOR TUTORIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(According to Official Academic Organization Plan)</td>
<td>(Indicate which digital tools will be used for tutorials)</td>
</tr>
<tr>
<td>If circumstances allow, tutorials will be face-to-face, the address and</td>
<td>• Videoconference (Google Meet)</td>
</tr>
<tr>
<td>timetable being those listed on page 1 of this Guide.</td>
<td>• E-mail</td>
</tr>
<tr>
<td>If face-to-face attention is not feasible, the tutorials would be</td>
<td>• PRADO forums</td>
</tr>
<tr>
<td>delivered telematically using the tools included in the adjacent table</td>
<td>• Teaching</td>
</tr>
<tr>
<td>and according to the timetables described for scenario B.</td>
<td>communications</td>
</tr>
</tbody>
</table>

MEASURES TAKEN TO ADAPT TEACHING METHODOLOGY

- Royal Decree-Law 21/2020, of June 9, on urgent measures of prevention, containment and coordination to face the health crisis caused by COVID-19, establishes in its article 9 that in educational centers, including University students must guarantee the adoption of organizational measures, avoid crowds and ensure that a safety distance is maintained, maintaining on campus teaching.
- When it is not possible to maintain this safety distance, adequate hygiene measures will be observed to prevent the risks of contagion. If it is not possible to maintain social distance in the classrooms, each theory group will be divided in two and on campus teaching will be given in alternate weeks to each subgroup while the other subgroup receives teaching via streaming.
- For practical teaching, the explanation of the theoretical foundations may be taught online, while the practical part will subdivide the groups to do it in person in the laboratory, keeping the distance of safety and hygiene measures.

MEASURES TAKEN TO ADAPT ASSESSMENT (Instruments, criteria and percentage of final overall mark)

The assessment instruments, assessment criteria and percentages of the final mark would be the same as those listed on pages 9–11 of this Guide.

SCENARIO B (ONCAMPUS ACTIVITY SUSPENDED)

TUTORIALS

<table>
<thead>
<tr>
<th>TIMETABLE</th>
<th>TOOLS FOR TUTORIALS</th>
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<tbody>
<tr>
<td>(According to Official Academic Organization Plan)</td>
<td>(Indicate which digital tools will be used for tutorials)</td>
</tr>
<tr>
<td>The tutorials are given at the same times that it was done in person.</td>
<td>• Videoconference (Google Meet)</td>
</tr>
<tr>
<td>Exceptionally, when this is not possible, the students will have</td>
<td>• E-mail</td>
</tr>
<tr>
<td>meetings in a new schedule from 2:30 p.m. or 7:00 p.m. In addition,</td>
<td>• PRADO forums</td>
</tr>
<tr>
<td>• Teaching communications</td>
<td></td>
</tr>
</tbody>
</table>
emails are attended to students at any time, for specific questions.

**MEASURES TAKEN TO ADAPT TEACHING METHODOLOGY**

- **Theoretical Teaching:** classes are held on-line synchronous videoconference through the Google Meet platform at the same times that they had been taught in person or by means of video recordings made with the software recommended by the University of Granada, in which case the discussion and resolution of doubts/queries can be done in videoconference sessions during the tutoring hours and/or through forums that will be created for each topic in PRADO.

- **Practical Teaching:** students are called through PRADO or teaching communication and a Google Meet link is created to teach these practices. Some practices, such as those based on study cases or computer simulations (among others), can also be provided to students in the form of video recordings, in which case the discussion and resolution of doubts/queries can be done in videoconference sessions during the tutoring hours and/or through forums that will be created for each practice in PRADO.

- Use of the PRADO platform with support material for theory and practices and activities for monitoring continuous assessment.

**MEASURES TAKEN TO ADAPT ASSESSMENT** (Instruments, criteria and percentage of final overall mark)

### Ordinary assessment session

- **Theoretical Teaching:**
  Online questionnaires through the PRADO-EXAMEN platform.
  Online questions according to the PRADO-EXAMEN exam modality. The questions are ordered sequentially without being able to go back. The questions are elaborated and carried out through PRADO-EXAMEN. The allocation of points in the evaluation system will be made according to the percentages: 70% of the final grade will be the theoretical exam, 10% the practices and 20% continuous evaluation activities + seminars.

- **Practical Teaching:**
  Online questionnaires through the PRADO-EXAMEN platform.
  It will consist of a test (60% of the grade with a structure similar to the theory exam) and the questions from the practical notebook adapted to the new teaching methodology (40% of the grade) that is sent to students in a single file, through PRADO or teaching communication.

- Students who have not completed or have not passed the practices will be called for a practice exam on the day of the theory exam.

- To evaluate both theoretical and practical teaching in the event of a connection failure, another time will be agreed on the same day. In case it fails again, another day will be agreed in the form of individualized online oral test.

### Extraordinary assessment session

- Online questionnaires through the PRADO-EXAMEN platform
  Online questions according to the PRADO-EXAMEN exam modality. The questions are ordered sequentially without being able to go back. The questions are elaborated and carried out through PRADO-EXAMEN.

- To evaluate both theoretical and practical teaching in the event of a connection failure, another time will be agreed on the same day. In case it fails again, another day will be agreed in the form of
**individualized online oral test**

- Students who have not completed or have not passed the practices will be called for a practice exam on the day of the theory exam.
- Students will always take a theory test that will be evaluated over 70%. In the rest of the sections, the students will be able to keep their mark or waive the mark of all the sections (practices, seminar and continuous evaluation questions) and be re-evaluated of all of them if they so request. The qualification will be obtained by applying the same criteria specified in the ordinary call.

**Single final assessment**

- Online questionnaires through the PRADO-EXAMEN platform
  
  Online questions according to the PRADO-EXAMEN exam modality (70% of the final grade). The questions are ordered sequentially without being able to go back. The questions are elaborated and carried out through PRADO-EXAMEN.

- Students will be called for a practical exam on the day of the theoretical exam (10% of the final grade).

- The allocation of points in the evaluation system will be made according to the percentages: 90% of the final grade will be the theoretical exam (those who pass the test must also pass an oral exam the same day through Google Meet to complete the grade up to 90%) and 10% corresponds to the practices.

- Both to evaluate the theoretical teaching as well as the practical teaching in the event of a connection failure, another time will be agreed on the same day. In case it fails again, another day will be agreed in the form of individualized online oral test.

**ADDITIONAL INFORMATION** (if necessary)

It will be an indispensable condition to pass the subject, both in the continuous and in the single final assessment systems, to have a minimum mark of 5 points out of 10 in both theory and practice. In no case will the marks obtained in the continuous system for the coursework or assistance components (or any other evaluable component that appears in this Guide), will serve to pass the subject and will only contribute to the final mark once the theoretical and practical parts have been passed.

The teaching methodology and the assessment methods will be adapted to students with specific needs (NEAE), in accordance with Article 11 of the Regulations for the Evaluation and Qualification of students of the University of Granada, published in the Official Gazette of the University of Granada of November 9, 2016.

In the event of suspension of on campus teaching, the students of the single final evaluation may request to join virtual teaching, since the difficulties they claimed to not follow the continuous evaluation will have disappeared.