<table>
<thead>
<tr>
<th>MODULE</th>
<th>SUBJECT MATTER</th>
<th>YEAR</th>
<th>SEMESTER</th>
<th>CREDITS</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition, Dietetics and Health Sciences</td>
<td>Pathophysiology</td>
<td>2º</td>
<td>2º</td>
<td>6 ECTS (4,5 T + 1,5 P)</td>
<td>Required Mandatory</td>
</tr>
</tbody>
</table>

**TEACHING STAFF**(1)

**Department of Physiology**
- María López-Jurado Romero de la Cruz (T*)
- Virginia Aparicio García-Molina (T*; P*)
- Rosario Martínez Martínez (T*)
  (T*: Theory; P*: Practice)

**Department of Medicine**
- Francisco Martí Jiménez
- José González Zurita
- Antonia Horcajadas García

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

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**TIMETABLE FOR TUTORIALS OR LINK TO WEBSITE**

Department of Physiology:
http://www.ugr.es/~fisiougr/tutorias.php

Prof. Francisco Martí Jiménez:
Viernes de 10.00-12.00 h
Prof. José González Zurita:
Miércoles de 11.30-13.30 h

**BELONGS TO UNDERGRADUATE DEGREE PROGRAMME**

Degree in Human Nutrition and Dietetics

**AND ALSO TO OTHER UNDERGRADUATE DEGREE PROGRAMMES**

**PREREQUISITES OR RECOMMENDATIONS** (where applicable)

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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/)
• To have background knowledge of Chemistry, Human Anatomy and Histology, Structural and Metabolic Biochemistry, Human and Cell Physiology, Human Physiology.
• A good standard of English and computer skills are also required.

BRIEF DESCRIPTION OF CONTENT (ACCORDING TO OFFICIAL VALIDATION REPORT)


GENERAL AND SPECIFIC COMPETENCES

GENERAL ABILITIES

• CG1: To recognize the essential elements of the dietitian-nutritionist profession, including ethical principles, legal responsibilities and the exercise of the profession, applying the principle of social justice to professional practice and developing it with respect for people, their habits, beliefs and cultures.
• CG2: To develop the profession with respect to other health professionals, acquiring skills to work in a team.
• CG3: To recognize the need to maintain and update professional competence, paying special attention to the learning, independently and continuously, of new knowledge, products and techniques in nutrition and food, as well as the motivation for quality.
• CG4: To know the limits of the profession and its competences, identifying, when necessary, an interdisciplinary treatment or referral to another professional.
• CG5: To carry out communication effectively, both orally and in writing, with people, health professionals or industry and the media, knowing how to use information and communication technologies, especially those related to nutrition and life habits.
• CG29: To acquire basic training for the research activity, being able to formulate hypotheses, collect and interpret information for the resolution of problems following the scientific method, and understanding the importance and limitations of scientific thinking in health and nutrition.

SPECIFIC ABILITIES

• CE1: To know the chemical, biochemical and biological foundations of application in human nutrition and dietetics.
• CE2: To know the structure and function of the human body from the molecular level to the complete organism, in the different stages of life.
• CE26: To know the nutrients, their functions and their metabolic utilization. Know the bases of the nutritional balance and its regulation.
• CE32: To know the pathophysiological aspects of nutrition-related diseases.

OBJECTIVES (EXPRESSED AS EXPECTED LEARNING OUTCOMES)

At the completion of the course the student should be able to:

• Obtain information about the alterations in the function of the different systems that make up the organism, as well as the etiopathogenic mechanisms involved in the alteration and the symptoms of each disease.
• Understand the concepts of health and disease.
• Know the pathophysiological mechanism of the disease.
• Obtain a basis for the understanding of the nutritional implication of the different pathologies studied that
facilitates the later study of nutritional strategies involved in the prevention or treatment of those pathologies.

- Know the compensatory mechanisms to maintain the function of a system in pathological situations.
- Relate concepts with previous knowledge and acquire sufficient basis for subsequent.

### THEORETICAL CONTENTS

#### THEMATIC UNIT I: INTRODUCTION AND GENERAL PATHOPHYSIOLOGY
Module 1: Normal and pathologic function
Module 3: Cellular responses to stress and toxic insults. Alterations in cell physiology II: Necrosis and environmental diseases.
Module 4: Acute and chronic inflammation

#### THEMATIC UNIT II: BLOOD
Module 5: Pathophysiology of Erythrocytes.
Module 6: Pathophysiology of Leukocytes.
Module 7: Pathophysiology of hemostasis and thrombosis.

#### THEMATIC UNIT III: DIGESTIVE SYSTEM
Module 8: Disorders of gastrointestinal motility/transit.
Module 10. Symptomatology of digestive pathology.

#### THEMATIC UNIT IV: ENDOCRINE SYSTEM
Module 13: Pathophysiology of growth. Alterations of the hypothalamic-pituitary axis
Module 14: Pathophysiology of Thyroid gland. Goiter. Hyperfunction, hypofunction.
Module 15: Alterations in calcium and phosphate metabolism.
Module 16: Alterations of suprarrenal cortex function.
Module 17: Alterations of glucidic and lipidic metabolism.
Module 18: Alterations of protein and amino acid metabolism.

#### THEMATIC UNIT V: REPRODUCTIVE SYSTEM
Module 19. Alterations in sex differentiation and development.
Module 20: Disorders of testicular function.
Module 21: Disorders of ovary function.

#### THEMATIC UNIT VI: CARDIOVASCULAR SYSTEM
Module 23: Pathophysiology of heart bit rate and rhythm disorders. Cardiac arrhythmia
Module 24: Pathophysiology of coronary circulation.
Module 25: Pathophysiology of arterial blood pressure.
Module 26: Cardiac insufficiency. Pathophysiology of the pericardium.
Module 27: Acute circulatory failure.
Module 28: Pathophysiology of peripheral vascular system.
THEMATIC UNIT VII: RESPIRATORY SYSTEM
Module 30: Respiratory failure II. Restrictive lung disease.
Module 31: Pathophysiology of pulmonary circulation.
Module 32: Alterations of respiratory rhythm and pattern.

THEMATIC UNIT VIII: RENAL SYSTEM
Module 33: Alterations of glomerular and tubular functions.
Module 34: Acute and Chronic renal failure.
Module 35: Pathophysiology of the urinary tract.
Module 36: Acid-base metabolism disorders.

THEMATIC UNIT IX: MUSCULOSKELETAL SYSTEM
Module 37: Pathophysiology of muscle.
Module 38: Pathophysiology of bone.
Module 39: Pathophysiology of joints.

THEMATIC UNIT X: SYSTEMIC PATHOPHYSIOLOGY: THE NERVOUS SYSTEM
Module 40: Pathophysiology of sensory function
Module 41: Pathophysiology of peripheral, medular and brain stem alterations. Pathophysiology of the upper and lower motor neuron.
Module 42: Pathophysiology of motor coordination.
Module 43: Pathophysiology of basal ganglia.
Module 45: Pathophysiology of cerebral cortex.
Module 46: Alterations of consciousness, epilepsies, and sleeping disorders

PRACTICE PROGRAM
Meaningful construction of knowledge through interaction and student activity. Assistance is required.

The practical classes will be taught as follows:

- Practical session 1. Pathophysiology of the digestive system.
  - Carbohydrate malabsorption: lactose intolerance (case study).
  - Altered gastric secretion: peptic ulcer disease (case study).

- Practical session 2. Pathophysiology of the endocrine system: Altered metabolism of carbohydrates and lipids
  - Hyperglycemia: type I diabetes mellitus (case study).
  - Hyperglycemia: type II diabetes mellitus (case study).

- Practical sessions 3 and 4. Case studies and other activities related to part II of the theoretical syllabus (Dept. Medicine).

BIBLIOGRAPHY

BASIC READING LIST
We feature a program with a high degree of coherence and integration, which covers the needs of the student of the Degree in Food Science and Technology. The theoretical contents of the program will be developed through a combination of teaching techniques that we intend to be educational and innovative. In the first place, most of the theoretical topics will be presented in the classical way through master classes by the teacher himself, but taking advantage of information and communication technologies (ICTs) to facilitate the teaching-learning process. A small selection of the agenda will be presented by the students themselves, using for their preparation part of the autonomous work that they must carry out in person. This work will be supervised at all times by the teacher. During the course, face-to-face tutoring as well as interactivity through digital platforms will abound.

THEORETICAL CLASSES:
- Exposition of the subject in master classes by the professor, with introduction of the different sections that make up the subject, breakdown of the points to be dealt with in the development of the subject and its extension.
- Multimedia teaching material will be included in the exposition of the master classes, to facilitate the understanding of those more complex physiological phenomena for the students.
- Proposal for consultation sources (texts, published works, specialized magazines, web page addresses, etc.), in which to search for information for the various topics of the program.

Directed exhibitions and 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 teacher before the exhibition, during which the debate among the students will be encouraged, with the teacher of the subject acting as moderator.
- Study, commentary and discussion on practical cases related to the Physiology of specific systems and devices.
- Tutorials: periodic meetings in specific tutorials where to solve doubts or concerns raised by the students.
- Seminars, which are intended to deal with those topics not directly included in the program but that are of interest to the student.

PRACTICAL CLASSES:
The professor will explain and carry out the practice before a small group of students, then the student will carry out the practice individually supervised by the teacher and will complete the different activities proposed in the practice notebook. In these classes it is intended that the student acquire fluency in instrumental handling and learn to solve problems derived from working in the laboratory. At the end, he will deliver the notebook with the results obtained individually, in addition to collecting the different experimental observations. This notebook will be corrected by the professor and will be returned to the student with the corresponding qualification.

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

This is the default system. Continuous Assessment includes several theory exams which will take place on dates scheduled by the Faculty in coordination with the other subjects offered in the term. Prior to the exam, the lecturer will describe the structure and type of exam questions. Coursework performed by the students (essays, presentations, seminars...) as well as regular attendance and class participation will be also assessed.

The final mark will be calculated according to the following:

- Theory: 70%
- Laboratory practice: 10%
- Coursework (presentations, seminars, etc.): 10%
- Attendance to theoretical classes: 10%

A minimum mark of 5 (out of 10) in both the theory and laboratory practice sections must be obtained in order to pass the subject.

**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 deemed. 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.

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

- Theory: 90%
- Laboratory practice: 10%

**SCENARIO A (ON-CAMPUS AND REMOTE TEACHING AND LEARNING COMBINED)**

**TUTORIALS**

<table>
<thead>
<tr>
<th>TIMETABLE (According to Official Academic Organization Plan)</th>
<th>TOOLS FOR TUTORIALS (Indicate which digital tools will be used for tutorials)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Videoconference (Google Meet)</td>
</tr>
<tr>
<td></td>
<td>E-mail</td>
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</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)

Ordinary assessment session

This is the default system. Continuous Assessment includes several theory exams which will take place on dates scheduled by the Faculty in coordination with the other subjects offered in the term. Prior to the exam, the lecturer will describe the structure and type of exam questions. Coursework performed by the students (essays, presentations, seminars...) as well as regular attendance and class participation will be also assessed. The final mark will be calculated according to the following:
- Theory: 70%
- Laboratory practice: 10%
- Coursework (presentations, seminars, etc.): 10%
- Attendance to theoretical classes: 10%

A minimum mark of 5 (out of 10) in both the theory and laboratory practice sections must be obtained in order to pass the subject.

Extraordinary assessment session

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 that will appear will be obtained by applying the same criteria specified in the ordinary call.

Single final assessment

To benefit from the final single evaluation, the student will request it to the Director of the Department (who will transfer the corresponding teaching staff), citing and accrediting the reasons that assist him or her for not being able to follow the continuous evaluation system. The application period will be 2 weeks from the beginning of the teaching of the subject. If exceptional circumstances occur, the calculation of the term will be made from the date of enrollment (NCG78/9 regulation), in which case, the student must prove this last date when the application is made. If ten days have elapsed without the student having received an express written
response from the Director of the Department, the request will be deemed to have been considered. In case of refusal, the student may file, within a month, an appeal before the Rector, who may delegate to the Dean or Director of the Center, exhausting the administrative route.

The allocation of points in this evaluation system will be made according to the percentages:
- Theoretical classes: 90%
- Practical classes: 10%

### SCENARIO B (ONCAMPUS ACTIVITY SUSPENDED)

#### TUTORIALS

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

#### 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
- **Practical Teaching**: students are called through PRADO or teaching communication and a Google Meet link is created to teach these practices.
- 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)

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.