

PHYSIOLOGY AND PATHOPHYSIOLOGY OF NUTRITION

(approved by the Department Council on 26th April, 2018)

| MODULE | CONTENT | YEAR | TERM | CREDITS | TYPE |
|---|---|---------------|--|---------------------------|----------|
| Training Complements | Physiology and Pathophysiology of nutrition | from 3rd year | 2nd | 6 ECTS (4,5 T + 1,5 P) | Optional |
| LECTURER(S) | | | Postal address, telephone n^o, e-mail address | | |
| <ul style="list-style-type: none"> Magdalena López Frías (T*; P*) M^a Teresa Nestares Pleguezuelo (T*) <p>(T*: Theory; P*: Practice)</p> | | | Dpt. Physiology, 1st floor, Faculty of Pharmacy, Cartuja Campus. Office 142. 958243879 maglopez@ugr.es ; nestares@ugr.es | | |
| DEGREE WITHIN WHICH THE SUBJECT IS TAUGHT | | | TUTORING | | |
| Degree in Food Science and Technology | | | http://www.ugr.es/~fisiougr/tutorias.php | | |
| PREREQUISITES and/or RECOMMENDATIONS (if necessary) | | | | | |
| <p>Prerequisites: The prerequisites for access to the degree related to the level of training that the student must acquire to access university studies.</p> <p>Recommendations:</p> <ul style="list-style-type: none"> To have background knowledge of: Chemistry, Biochemistry, Human Physiology, Nutrition and Dietetics. A good standard of English and computer skills are also required. | | | | | |
| BRIEF ACCOUNT OF THE SUBJECT PROGRAMME | | | | | |
| <p>The contents of Physiology and Physiopathology of Nutrition are important for the future professionals of the "Science and Technology of the Foods", since they will allow them to apply the acquired basic knowledge on Physiology and Nutrition in the field of the Nutrition for the health, through the prevention and treatment of various pathologies whose development and evolution is linked to nutrition.</p> <p>The subject is taught in 2 thematic blocks:</p> | | | | | |



I. Physiology of Nutrition
II. Pathophysiology of Nutrition

GENERAL AND PARTICULAR ABILITIES

BASIC ABILITIES:

- BC1. That the students demonstrate to possess and to understand knowledge in an area of study that departs from the base of the secondary general education, and includes also some aspects that imply knowledge proceeding from the forefront of their field of study.
- BC2. That the students can apply their knowledge to their work or vocation in a professional manner and possess the skills which are demonstrated through devising and sustaining arguments and solving problems within their field of study.
- BC3. That the students have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include a reflection on relevant social, scientific or ethical topics.
- BC4. That the students can communicate information, ideas, problems and solutions to both specialist and nonspecialist.
- BC5. Students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.

TRANSVERSAL ABILITIES:

- TC2. Problem solving.
- TC3. Teamwork.

GENERAL ABILITIES:

- CG1. Aptitude to express correctly in spanish language in the area of knowledge.
- CG2. Resolution of problems.
- CG3. Teamwork.
- CG4. Aptitude to apply the theoretical knowledge to the practice.
- CG5. Decisions.
- CG6. Capacity of ethical commitment.
- CG7. Capacity of analysis and synthesis.
- CG8. Critical reasoning.
- CG9. Motivation for the quality.
- CG10. Capacity of organization and planning.
- CG11. Capacity of management of the information.
- CG12. Aptitude to adapt to new situations.
- CG13. Capacity of awareness towards environmental topics.

SPECIFIC ABILITIES:

- EC1. To recognize and to apply the physical, chemical, biochemical, biological, physiological, mathematical foundations and statisticians necessary for the comprehension and development of the food science and technology.
- EC7. To analyze the biological, physical and chemical dangers of the food chain with the purpose of protecting the public health.



- EC11. To understand and to value that the food is one of the basic props of the cultural identity of a society.
- EC13. To understand and to be able to apply actions to promote the food education, the systems of health and the food policies.
- EC14. To evaluate, to control and to manage the strategies and plans of prevention and control of diseases originated by the food consumption.
- EC15. To report, to qualify and to advise legally, scientifically and technically to the public administration, to the food processing industry and to the consumers, to design strategies of intervention and training in the area of the food science and technology.
- EC16. Put into practice the principles and methodologies that define the professional profile of the scientist and food technologist, demonstrating of integrated form the acquisition of the skills and competences of the degree.

OBJECTIVES (EXPRESSED IN TERMS OF EXPECTED RESULTS OF THE TEACHING PROGRAMME)

The **general objective** pursued is aimed at the student acquires knowledge about nutritional adaptation for different physiological states, as well as those pathologies related to nutrition.

The **specific objectives** are aimed at:

- To identify the physiological and pathological factors that influence nutrition.
- To know how to recognize specific nutritional adaptations in different physiological situations, as well as in some pathologies.
- To prepare for the education of the population in terms of nutrition for health.

DETAILED SUBJECT SYLLABUS

THEORETICAL SYLLABUS

BLOCK I. NUTRITION PHYSIOLOGY

Unit 1.-GESTATION- Influence of physiological and gestational on fertility, maternal and fetal development situation. Nutritional physiological adaptations to pregnancy. Importance of the placenta at a maternal fetal level throughout gestation. Influence of the maternal nutritional status.

Unit 2.-LACTATION- Growth and development of the mammary gland. Physiological characteristics of lactation. The importance of the lactation in the development of the neonate. Influence of the maternal nutritional status in the process of lactation.

Unit 3.- INFANCIA- differential physiological and metabolic aspects of the infant. The importance of breastfeeding on infant growth and development. Evolving nutritional requirements in terms of growth and maturation of effector physiological and regulatory systems.

Unit 4.- CHILDHOOD- Growth and development in childhood. Establishing eating habits, physical activity and other standards of conduct as the basis for achieving health. Situations of children against the collective alimentation.

Unit 5.- ADOLESCENCE- Physiological characteristics of adolescence. Nutritional requirements of the adolescent growth spurt. Adolescent behavior against the alimentation. Problem of teenage pregnancy and its physiological and nutritional implications.

Unit 6.- ADULT- fundamental physiological mechanisms in maintaining structures. Physical activity versus inactivity. Physiological and pathophysiological stress repercussions. Justification of adult nutritional requirements.

Unit 7.- PERIMENOPAUSE- endocrine and functional changes in perimenopause. Physiological evaluation systems of menopausal women. Justification of nutritional changes and the introduction of models of



physical activity in menopause.

Unit 8.- ELD.- social, economic and health problems in the old age. Physiology and pathophysiology of the elderly. Justification of the nutritional requirements in old age.

Unit 9.- PHYSICAL ACTIVITY- Physical activity and physiological benefits in the functionalism of organs and systems. Adaptation of the physical activity according to the physiological situation. Requirements and nutritional and nourishment benefits of the physical activity.

Unit 10.- DIGESTIVE SYSTEM- physiological bases of the digestive system. Pathophysiological reminder of the most prevalent diseases. Malabsorption syndromes of diverse etiology, diverticulosis and diverticulitis, gastrointestinal cancers.

BLOCK II. PATHOPHYSIOLOGY OF NUTRITION

Unit 11.- HEMATOPOIETIL SYSTEM AND BLOOD- haematopoietic and physiological bases of the hematopoietic system and blood. Pathophysiological reminder of nutritional anemia. Justification of nutritional requirements.

Unit 12.- CARDIOVASCULAR SYSTEM- physiological bases of the cardiovascular system.

Pathophysiological reminder of the most prevalent diseases: ischemic heart disease, cerebrovascular disease, hypertension. Justification of nutritional goals.

Unit 13.- HEPATOBILIAR SYSTEM- physiological bases of the hepatobiliary system. Pathophysiological reminder of the most prevalent diseases: liver cirrhosis, colediolitosis. Justification of the requirements and nutritional recommendations.

Unit 14.- RESPIRATORY SYSTEM-Physiological bases of the respiratory system. Pathophysiological reminder of the most prevalent chronic diseases: chronic bronchitis and emphysema. Justification of nutritional requirements.

Unit 15.- RENAL SYSTEM- Physiological basis of the renal system. Pathophysiological reminder of chronic renal failure. Justification of nutritional requirements.

Unit 16.- OSTEOMUSCULAR SYSTEM- Physiological bases of bone formation and destruction.

Pathophysiological memory of osteoporosis and osteomalacia. Justification of nutritional requirements.

Unit 17.- ENDOCRINE SYSTEM- Pathophysiological bases of most prevalent diseases: growth failure, goiter and diabetes. Justification of nutritional requirements.

Unit 18.- GENERAL METABOLISM- Pathophysiological bases of diseases caused by micronutrient deficiencies Bases. Hyperuricemia and congenital errors of metabolism. Justification of nutritional requirements.

PROGRAM OF LABORATORY PRACTICES AND THEORETICAL-PRACTICAL SEMINARS

- **Practice 1.** Physiology of the renal system. Glomerular filtration.
- **Practice 2.** Pathophysiology of the reproductive system: determination of fertility through an ovulation test.
- **Practice 3.** Measurement of body composition by bioimpedance.
- **Practice 4.** Pathophysiology of the digestive system. Practical cases.
- **Practice 5.** Physiology of taste and smell. Types of gustatory and olfactory receptors. Modalities of flavors and smells.
- **Practice 6.** Pulsoximetry.
- **Practice 7.** Indirect calorimetry for the determination of basal metabolic expenditure (fitmateMed).

Each academic year the practices that will be taught will be selected from the list.

READING

- TORTORA, G.J. and DERRICKSON, B. Principios de Anatomía y Fisiología. 13ª edición. Méjico: Ed.



- Médica Panamericana. 2013
- LASO F.J .Introducción a la Medicina Clínica. Fisiopatología y semiología 3ª edición .ElsevierMasson .Barcelona 2015.
 - FOOD AND NUTRITION BOARD/INSTITUTE OF MEDICINE. Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein and amino acids. Institute of Medicine of the National Academies. Washington: National Academy Press; 2002-2005.
 - GIL A. Bases Fisiológicas y Bioquímicas de la Nutrición. 3ª edición. Editorial Panamericana. Madrid, 2017.
 - SALAS-SALVADÓ J. Nutrición y dietética clínica, 3ª edición. Elsevier.Barcelona. 2014
 - S.ESCOTT-STUMP .Nutrición, diagnóstico y tratamiento. 8ª edición.Barcelona 2016
 - MATAIX VERDÚ J. Nutrición y Alimentación Humana. 2ª rev. edición. Editorial: ERGON. Madrid 2015
 - MATAIX VERDÚ J. Nutrición para educadores.2ª edición. Editorial: Díaz de Santos . Madrid. 2013.
 - SHILS, ME, OLSON, JA, SHIKE, M. ROSS, AC "Nutrición en Salud y Enfermedad" Editorial: McGrawHill Interamericana Méjico. Novena edición. 2002.
 - L.KATHLEEN MAHAN, SYLVIA ESCOTT-STUMP, JANICE L. RAYMOND. Krause Dietoterapia 13ª edición. Editorial Elsevier Barcelona 2013

Dictionaries and atlases:

- Diccionario médico. Editorial Marban, 2005.
- Diccionario médico de bolsillo. Editorial Marban, 2005.

FURTHER READING:

- BALLABRIGA A, CARRASCOSA A. Nutrición en la infancia y la adolescencia. 3ª edición. Editorial ERGON. Madrid, 2006
- PONCE J. Tratamiento de las enfermedades gastrointestinales. Editorial DOYMA y Asociación Española de gastroenterología. Madrid, 2001.
- RUIZ M, SÁNCHEZ VALVERDE F, DALMAU J. Tratamiento nutricional de los errores innatos del metabolismo. Editorial ERGON. Madrid, 2004
- TOJO R. Tratado de nutrición pediátrica. Editorial DOYMA. Barcelona, 2001

LAB MANUALS:

- Cuaderno de Prácticas de Fisiología y Fisiopatología de la Nutrición. Departamento de Fisiología. Facultad de Farmacia. Universidad de Granada. 2010.

COMPUTER SIMULATIONS:

- Stabler T, Peterson G, Smith L, Gibson MC y Zanetti N. PhysioEx 6.0 para fisiología humana. Simulaciones de laboratorio de fisiología. Pearson. Addison Wesley, 2006
- Mataix J y García Diz, 2006. Software Nutriber, S.A.

RECOMMENDED INTERNET LINKS

www.ciberobn.es

www.ciberesp.es

<http://medicapanamericana.com/fisiologia>

Sociedades científicas con webs educativas y webs generalistas

www.senpe.com Sociedad Española de Nutrición Parenteral y Enteral

<http://www.the-aps.org/> The American Physiological Society



www.seen.es Sociedad Española de Endocrinología y Nutrición
<http://physoc.org/> The Physiological Society
<http://www.seccff.org/> Sociedad Española de Ciencias Fisiológicas
<http://www.feps.org/> Federación Europea de Sociedades de Fisiología
<http://www.sennutricion.org/> Sociedad Española de Nutrición
<http://www.nutricioncomunitaria.org/> Sociedad Española de Nutrición Comunitaria

