

## Nutrition and Food science

MODULE	CONTENT	YEAR	TERM	CREDITS	TYPE
MEDICINE AND PHARMACOLOGY	NUTRITION AND FOOD SCIENCE	4th	2nd	6	Mandatory
<b>LECTURER(S)</b>			<b>Postal address, telephone nº, e-mail address</b>		
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<b>DEGREE WITHIN WHICH THE SUBJECT IS TAUGHT</b>					
PHARMACY					
<b>PREREQUISITES and/or RECOMMENDATIONS (if necessary)</b>					
Having studied the subjects of Biochemistry and Physiology					
<b>BRIEF ACCOUNT OF THE SUBJECT PROGRAMME (ACCORDING TO THE DEGREE c??)</b>					
Human nutrition and dietetics. Analytical criteria and health of food.					
<b>GENERAL AND PARTICULAR ABILITIES</b>					
<b>GENERAL ABILITIES</b> <ul style="list-style-type: none"> <li>Providing advice in drug and diet therapy as well as at the nutritional and food area level food in the area in the establishments in which they render service.</li> <li>To participate in the activities of health promotion and disease prevention, at the individual, family and community level, with a comprehensive and multidisciplinary view of the health-disease process.</li> </ul>					



- To develop hygienic-sanitary analysis, especially those related to food and the environment.
- To recognize own limitations and the need to maintain and update professional skills, giving special importance to the self-learning of new knowledge based on available scientific evidence.

## PARTICULAR ABILITIES

- To develop health and hygiene analysis (biochemical, food science, microbiological and parasitological analyses) related to general health and food and the environment in particular.
- To acquire the necessary skills to provide therapeutic counseling on drug and diet therapy and nutritional and dietary advice to users of the establishments in which they serve.
- To understand the relationship between food and health, and the importance of diet in the treatment and prevention of disease.
- To learn the techniques related to analytical laboratory, diagnosis, toxic, food and environment.

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

At the end of the course the student is expected to be able to be able:

- To know the nutrients, namely their functions, health implications and food sources.
- To know the composition and nutritional value of food, nutritional requirements and recommendations.
- To know the characteristics of a balanced diet, the nutritional guidelines in the life cycle and dietary recommendations in diseases of the consumer society.
- To demonstrate the understanding of the hygienic aspects and analytical control of food

## DETAILED SUBJECT SYLLABUS

### THEORETICAL PROGRAM

#### THEMATIC UNIT I: INTRODUCTION

**Item 1.** Presentation of the subject. Concept of Nutrition, Food Science, Dietetics, Food Technology and Food Security. Role of the pharmacist in the field of Nutrition and Food Science.

#### THEMATIC UNIT II: NUTRITION

##### CHAPTER I: Energy requirements and nutritional

**Item 2.** Energy requirements of the human body. Components of energy metabolism: basal metabolism, thermogenesis and physical activity. Measuring methods.

**Item 3.** Food: source of energy, nutrients and other bioactive components. Energy value of nutrients. Tables of food composition and nutritional databases. Labelling.

**Item 4.** Requirements and nutritional recommendations. Nutritional goals. Dietary Guidelines. Concept and criteria for establishing them. Applications and limitations. Balanced diet: standards and characteristics governing nutritional balance.

##### CHAPTER II: Nutrients

**Item 5.** Macronutrients: Carbohydrates, lipids and proteins. Functions and sources. Role in health. Dietary recommendations.

**Item 6.** Macroelements and microelements. Current importance. Functions and sources. Dietary



recommendations.

**Item 7.** Water: nutritional significance. Water balance. Needs and source.

### THEMATIC UNIT III: OVERVIEW OF FOOD

#### CHAPTER III. Food law

**Item 8.** Food law. Spanish legislation on food: technical and sanitary regulations, general quality standards and official methods of analysis. Food law in the European Union. International organizations: FAO / WHO (Codex Alimentarius mundi)

#### CHAPTER IV: Food additives

**Item 9.** Concept of food additive. Aids. Safety criteria. Classification and functions.

#### CHAPTER V. Food hygiene

**Item 10.** Alterations of food. Concept of alteration, life and shelf life. Alterations in chemical and biochemical type. Microbiological changes. Factors that regulate them. Impact on quality and food safety.

**Item 11.** Disorders of food. Alterations of chemical and biochemical type. Regulatory factors. Prevention. Impact on quality and food safety.

**Item 12.** Food preservation: General principles. Physical methods of preservation: Asepsis, filtration, protective atmospheres, high and low temperatures. Drying and freeze drying. Ionizing radiation. Applications.

**Item 13.** Food preservation: Methods affecting sensory properties: salting, smoking, pickling, sugar and alcohol addition. Additives (chemical preservatives)

**Item 14.** Concept of hazard and health risks: Classification of the hazards associated with food consumption. Biological, chemical and physical hazards. Sanitary control: General Hygiene Plans (PGH). Hazard analysis and critical control points (HACCP).

### THEMATIC UNIT IV: FOOD GROUPS

#### CHAPTER VI: Protein foods

**Item 15.** Meat and meat products. Chemical composition and nutritional importance. Effects of processing on the nutritional value.

**Item 16.** Fish and seafood. Chemical composition and nutritional importance. Effect of processing on the nutritional value.

**Item 17.** Eggs and egg products. Structure. Chemical composition and nutritional importance.

**Item 18.** Milk and dairy products. Classification. Chemical composition and nutritional importance.

#### CHAPTER VII: Lipid foods

**Item 19.** Animal fats. Cream, butter and other animal fats. Chemical composition and nutritional importance.

**Item 20.** Vegetable fats. Olive oil and seed oils. Modified fats: margarine. Chemical composition and



nutritional importance.

## CHAPTER VIII: Food hydrocarbon

**Item 21.** Cereals. Structure, composition and nutritive value. Derivatives of the flours. Bread and pasta. Chemical composition and nutritional importance. Nutritional implications of other cereal products.

**Item 22.** Legumes: classification, chemical composition and nutritional importance.

**Item 23.** Vegetables and fruits. Classification. Commercial preparations. Chemical composition and nutritional importance.

**Item 24.** Nuts. Chemical composition and nutritional importance.

## CHAPTER IX: Other foods

**Item 25.** Non-alcoholic beverages and stimulating foods. Classification. Chemical composition and nutritional importance.

**Item 26.** Alcoholic beverages. Wine: definition, composition and classification. Beer: definition, types and composition. Other alcoholic beverages: cider, spirits and liqueurs. Nutritional implications of drinking

## THEMATIC UNIT V: DIETETICS

**Item 27.** Diet concept. Human nutrition in the life cycle periods: nutrition during pregnancy and lactation. Nutrition in the first year of life. Physiological changes and nutritional needs. Energy and nutrient needs. Recommended food groups.

**Item 28.** Nutrition in childhood and adolescence. Physiological changes and nutritional needs of young children (preschool), school children and adolescents. Recommended foods.

**Item 29.** Nutrition in older people. Concept of aging. Physiological changes related to nutrition. Nutritional needs. Recommended foods.

**Item 30.** Diet and chronic disease prevention. The diet as a cause of protection: overweight and obesity, diabetes, cardiovascular disease, cancer. Food and osteoporosis. Guidelines and dietary advice.

## SEMINARS

**First seminar:** Labelling. Nutrition and health claims in food

**Second seminar:** Diseases of the consumer society. The diet as a protective factor: overweight and obesity, diabetes, cardiovascular disease, and cancer. Food and osteoporosis. Guidelines and dietary advice.

## PRACTICAL PROGRAM

### NUTRITION and DIET

**Practice 1.** Calculation of basal metabolism and total energy requirements



**Practice 2.** Calculating the energy profile of a diet and quality indexes

**Practice 3.** Use of food composition tables and alcoholic energy drinks.

**Practice 4.** Nutritional labeling of foods. Food ration concept.

**Practice 5.** Pyramid. Reference intakes. Nutritional goals.

**Practice 6.** Registration and evaluation of a 5-day diet. Assessment of nutritional status.

## FOOD SCIENCE

**Practice 1.** - Introduction. Food analysis. Brief classification and utilities.

**Practice 2.** Drinks: Determination of Brix of juices

**Practice 3.** Oils: refractive index, peroxide value and acidity.

**Practice 4.** Milk density, acidity and enzymes (peroxidase, alkaline phosphatase).

**Practice 5.** Flours: moisture and gluten

**Practice 6.** Edible fats: fat in food extraction and determination of fatty acids by GC.

**Practice 7.** Alcoholic beverages: Alcohol. Preservatives: sulfites

## READING

### KEY LITERATURE:

#### - NUTRITION AND DIETETICS

- ASTIASARAN I, LACERAS B, ARIÑO A, MARTINEZ A (2003). Alimentos y nutrición en la práctica sanitaria. Díaz de Santos. Madrid.
- BELLIDO GUERRERO D, DE LUÍS ROMÁN DA (2006). Manual de nutrición y metabolismo. Ed. Díaz de Santos, Madrid.
- CERVERA P, CLAPÉS J, RIGOLFAS R (2004). Alimentación y dietoterapia (Nutrición aplicada en la salud y la enfermedad). 4ª edición, Ed. Interamericana McGraw-Hill. México.
- CESNID (2008). Tablas de composición de alimentos por medidas caseras de consumo habitual en España. Ed McGraw-Hill, Madrid.
- GIBNEY MJ, KOK FRANS J, VOSTER HESTER H (2005). Introducción a la nutrición humana. Ed. Acribia, Madrid.
- GIL A (2010). Tratado de Nutrición (4 tomos). Ed. Panamericana. Madrid.
- MAHAN LK, ESCOTT-STUMP S (2009). 12ª ed. Krause Dietoterapia, Ed. Elsevier, SL Barcelona.
- MATAIX VERDU J (2009). Nutrición y alimentación humana (2 tomos). Ed. Ergon. Madrid.

#### - FOOD SCIENCE

- ASTIASARAN I, MARTÍNEZ J (2000). Alimentos: Composición y propiedades. Ed. McGraw-Hill. Interamericana. Madrid.
- BARROS C (Recopilador) (1997). Legislación Alimentaria. Alimentaria. Madrid. 1976- Actualizado con CD.
- BELITZ HD, GROSCH W (1997). Química de los Alimentos. 2ª Edición. Ed. Acribia. Zaragoza. (la 3ª edición en lengua inglesa está publicada en 2004).
- BELLO J (2000). Ciencia bromatológica. Principios generales de los alimentos. Ed. Díaz de Santos. Madrid.



- LEGISLACIÓN ALIMENTARIA. Código alimentario español y disposiciones complementarias (2006). Ed Tecnos. Madrid.
- FENNEMA OR (2000). Química de los alimentos. 2ª ed. Ed. Acribia. Zaragoza.
- FORSYTHE SJ, HAYES PR (2002) Higiene de los Alimentos, Microbiología y HACCP. 2ª Ed. Acribia, Zaragoza.
- GIL A, RUIZ MD (2010). Tratado de Nutrición. TOMO II. Composición y Calidad Nutritiva. Ed. Panamericana. Madrid.
- BADÍ DERGAL S (2006). Química de los alimentos, 4ª ed. Ed. Pearson, México.
- BALTES W (2007). Química de los alimentos, 5ª ed. Ed. Acribia S.A. Zaragoza.
- BELITZ HD, GROSCH W, SCHIEBERLE P (2012). Química de los alimentos, 4th ed. Ed. Springer-Verlag, Leipzig.
- RODRÍGUEZ RIVER VM, SIMÓN MAGRO E (2008). Bases de la alimentación humana. Ed. Netbiblo, S.L. La Coruña.
- QUÍMICA DE LOS ALIMENTOS, 3ª Edición. DAMODARAN S., PARKIN K. L., FENNEMA, O. R. Editorial Acribia, S. A. Zaragoza 2008.

#### ADDITIONAL LITERATURE:

##### - NUTRITION AND DIETETICS

- MARTINEZ JA (2004). Fundamentos teórico-prácticos de Nutrición y Dietética. Ed. Interamericana McGraw-Hill, Madrid.
- MINISTERIO DE SANIDAD Y CONSUMO (1995). Tablas de composición de alimentos españoles. Ed. Ministerio de Sanidad y Consumo. Secretaría General Técnica. Centro de Publicaciones, Madrid.
- MUÑOZ M, ARANCETA J, GARCIA-JALON I (2004). Nutrición aplicada y dietoterapia, 2ª ed. Ed. Eunsa. Pamplona.
- REQUEJO A, ORTEGA RM (2000). Nutriguia. Manual de Nutrición clínica en atención primaria. Ed. Complutense. Madrid.
- SALAS-SALVADO J, BONADA A, TRALLERO R, SALÓME, BURGOS R (2008). Nutrición y Dietética Clínica. 2ª ed. Ed. Masson. Barcelona.
- SENC (2004). Guías de la alimentación saludable. Edita Sociedad Española de Nutrición Comunitaria. Madrid.
- SERRA MAJEN L, ARANCETA J (2006). Nutrición y salud pública: métodos, bases científicas y aplicaciones, 2ª ed. Ed. Masson, Madrid
- SHILS ME, OLSON JA, SHIKE M (2002). Nutrición en Salud y Enfermedad. 9ª ed. (2 tomos). McGraw-Hill. México.
- SORIANO DEL CASTILLO JM (2006). Nutrición básica humana. Ed Universidad de Valencia.
- VAZQUEZ C, DE COS AI, LOPEZ NOMDEDEU C (2005). Alimentación y nutrición. Manual Teórico-Práctico, 2ª ed. Díaz de Santos, Madrid.
- WARDLAW GM (2008). Perspectivas sobre Nutrición, Ed. Paidotribo, Badalona.

##### - FOOD SCIENCE

- FEHLEBER K (1998). Higiene Veterinaria De Los Alimentos. Ed. Acribia. Zaragoza.XXXX.
- ORDOÑEZ JA (ed) (1998). Tecnología de los alimentos (2 tomos). Ed. Síntesis. Madrid.
- POTTER NN, HOTCHKISS JH (1999). Ciencia de los Alimentos. Ed. Acribia. Zaragoza.
- PRIMO YUFERA E (1998). Química de los Alimentos. Ed. Síntesis. Madrid.
- ROBINSON DS (1991). Bioquímica y valor nutritivo de los alimentos. Ed. Acribia. Zaragoza.
- VOLLMER G, JOOS G, SCHENKER D, STURM W, VREDEN N. (1999). Elementos de Bromatología descriptiva. Ed. Acribia. Zaragoza.
- WONG DWS (1994). Química de los alimentos. Mecanismos y teoría. Ed. Acribia. Zaragoza.
- CAMEAN AM, REPETTO M (2006). Toxicología alimentaria. Ed. Díaz de Santos. Madrid.

#### RECOMMENDED INTERNET LINKS

- Dietary Reference Intakes (DRIs): [http://fnic.nal.usda.gov/nal\\_display/index.php?info\\_center=4&tax\\_level=1](http://fnic.nal.usda.gov/nal_display/index.php?info_center=4&tax_level=1)
- United Nations Organization for Agriculture and Food. [http://www.fao.org/index\\_es.htm](http://www.fao.org/index_es.htm)
- Spanish Agency for Food Safety and Nutrition: [www.aesan.msc.es](http://www.aesan.msc.es)



- Spanish Federation of Societies of nutrition, food and dietary. <http://www.fesnad.org/>
- Ministry of Environment and Rural and Marine Area: <http://www.marm.es/>

