DEMOCRATIC PEOPLE'S REPUBLIC OF ALGERIA

MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH

Training offer
Master's Degree: Academic

Etablissement	Faculty / Institute	Departement
Hassiba Benbouali of CHLEF University	**Nature and Life sciences faculty**	**Nutrition and food sciences**

field	sactor	Speciality
Nature and Life sciences faculty	**Food sciences**	**Nutrition and Pathology**

Master's Degree Identity Card

Title: **Nutrition and Pathology**

Page Type : training.
Language ; French / English
Translation :التغذية وأمراض
Status
Published.
Program Overview
The specific objective of this master's degree is to give the student a high-level education aimed at training senior managers in the field of Nutrition, Food Sciences and Health. Students will also be familiar with the environment of research and development in the agri-food sector, public health, pharmaceutical, biotechnology; in the fields of food and health, food supplements and herbal products.
The acquired knowledge: The Master Nutrition and Pathology is developed to allow the acquisition of fundamental and technical bases through in-depth teaching in Human Nutrition, Metabolism and physiology of regulation, nutritional physiopathologies, nutrition and immunity, nutrigenomics, cellular pharmacology, molecular biology, the role of nutraceuticals in health and nutritional and therapeutic value of phytomicronutrients in the prevention of current frequent chronic pathologies.
The course of this master's degree allows students to acquire solid knowledge in nutrition that enables them to critically approach research topics related to nutrition and pathology , to advise a preventive or specific health food for a given pathology and to develop a targeted food for a given physiological situation. This course also allows a continuation in specialized doctoral thesis to integrate research organizations.

Curriculum Highlights
The program integrates knowledge in physiology and nutrition, nutrition and pathology, nutraceuticals and functional foods to provide an overview of the relationship between diet and health.
This approach enables students to understand the mechanisms by which diet influences disease development, and to develop skills to intervene in the prevention and management of these diseases.
This training really meets many needs both at the level of local public authorities (A.P.C., Daira or Wilaya) or private: quality control laboratories or medical analysis hospitals or private where it will be able to participate effectively in the various control activities, the development of new functional foods and the exploitation of natural biomolecules in the formulation of food products.
It will also be very useful in the pharmaceutical field to control locally produced or imported drugs (SAIDAL,...), with EPEAL for water analysis, supervision in local communities at the level of health and safety services, in the fraud departments, in the agri-food sector (yeast, canneries, beverages, ERIAD, milk and derivatives, meat and derivatives, confectionery, ice cream,...).

Admissions Information
Offers: Bachelor's Degrees in Biology or other equivalent degree

Core Courses

Core courses are designed to provide students with the fundamentals. They generally cover the essential concepts needed to understand the basic principles of the discipline. Here are some examples of topics covered in core courses:

1. **Nutrition, metabolism and physiology**: Know the nutritional needs and intakes in physiological and pathological cases.
2. **Food behaviour**: Understanding the organoleptic characteristics of foods that are one of the major determinants of food choices and behaviours.
3. **Nutraceuticals and Health**: The teaching aims to give students knowledge about new healthy foods such as nutraceuticals, functional foods and their role in preventing chronic diseases.
4. **Nutritional Toxicology**: Nutritional Toxicology studies the toxic molecule-food couple for food safety.
5. **Nutritional epidemiology**: Introduce the basic notions of nutrition necessary for the conduct of epidemiological surveys (food, nutrients, energy need and intake, anthropometric measures, biomarkers) and the assessment of the impact of nutritional supplements or complex nutritional interventions on health.
6. **Nutritional status assessment techniques**: To know the characteristics of screening patients at nutritional risk for early detection of malnutrition. Know the pros and cons of different tools used for nutritional assessment. Know the techniques of anthropometric measurements allowing the measurement of body composition in clinical practice.

Advanced Topics

Advanced topics delve deeper into the concepts and techniques presented in core courses and introduce more specialized areas. Here are some examples of advanced topics:

- **Metabolism and physiology of regulation**: study of metabolic processes and the regulation of metabolic flows that ensure the homeostasis of carbohydrates, lipids, proteins, hydromineral and vitaminic according to the different physiological conditions in which the organism may be found.
- **Bioinformatics**: provide basic training to students in the field of research in genomic and proteomics bioinformatics using computer tools in biology for the analysis of biomolecular sequences.
- **Nutritional and metabolic physiopathology**: The teaching aims to give students preparing for research theoretical knowledge on the causes of chronic diseases related to diet and therapeutic diets.
- **Neurodigestive physiopathology**: Knowledge of energy and nutritional requirements, intestinal physiology, neuroendocrine regulation, and the pathophysiology of chronic bowel disease.
- **Renal Pathophysiology and Nutrition**: Acquisition of knowledge on renal pathophysiology and different diets.
- **Biostatistics**: Allow the student to learn about methods of statistical analysis of biological data.

Tuition Fees
Free of charge.
Teaching Language
French/English.
Full Curriculum

II – Semi-annual Learning Organization Sheet

Semester 1

Teaching units	SSH*	Hours weekly				Coeff.	Credits	Mode of teaching		Mode of evaluation	
	15 weeks	Course	Tutorials	Practical Work	Other			On line	In presential	CM*	Exam
Fundamental TU											
FTU1 (O/P) Nutrition, Metabolism and Physiology						**9**	**18**				
Humain Nutrition	67h30	1h30	1h30	1h30	82h30	03	06		x	40%	60%
Metabolism and physiology of regulation	67h30	1h30	1h30	1h30	82h30	03	06		x	40%	60%
FTU12(O/P)											
Food behavior	67h30	3h	1h30		82h30	03	06		x	40%	60%
Methodology TU											
MTU1(O/P)						**05**	**09**				
Technics of evaluation of the nutritional status	60h	1h30		2h30	65h	03	05		x	40%	60%
Bioinformatic	45h	1h30		1h30	55h	02	04		x	40%	60%
Discovery TU											
DTU1(O/P)						**02**	**02**				
Nutritional epidemiology	45h	1h30	1h30		5h	02	02	x	x	40%	60%
Transversal TU											
UET1(O/P)						**01**	**01**				
Communication	22h30	1h30			2h30	01	01	x	x		100%
Total Semestr 1	**375h**	**12h**	**7h**	**7h**	**375**	**17**	**30**				

SSH* = Semester scheduled hours Other*= Additional work in semi-annual consultation; CM*= Continuous monitoring.

Semester 2

Teaching units	SSH*	Hours weekly				Coeff.	Credits	Mode of teaching		Mode of evaluation	
	15 weeks	Course	Tutorials	Practical Work	Other			On line	In presential	CM*	Exam
Fundamental TU											
FTU 1(O/P) Physiopathologie						**09**	**18**				
Nutritional and metabolic physiology	67h30	1h30	1h30	1h30	82h30	03	06		x	40%	60%
neurodigestive physiology	45h	1h30		1h30	55h	02	04		x	40%	60%
renal et nutrition physiology	45h	1h30		1h30	55h	02	04				
FTU 2(O/P)											
Nutritional Toxicology	45h	1h30		1h30	55h	02	04		x	40%	60%
Methodology TU											
MTU 1(O/P)						**05**	**09**				
Biostastics	60h	1h30	1h30	1h	65h	03	05		x	40%	60%
Food Formulation and structuration	45h	1h30		1h30	55h	02	04		x	40%	60%
Discovery TU											
DTU1(O/P)						**02**	**02**				
Food consuption in the world and public health	45h	1h30	1h30		5h	02	02	x	x	40%	60%
Transversal TU											
TTU1(O/P)						**01**	**01**				
Legislation	22h30	1h30			2h30	01	01	x	x		100%
Total Semestr 2	**375**	**13h30**	**4h30**	**8h30**	**375**	**17**	**30**				

SSH* = Semester scheduled hours Other*= Additional work in semi-annual consultation; CM*= Continuous monitoring.

Semester 3

Teaching units	SSH*	Hours weekly				Coeff.	Credits	Mode of teaching		Mode of evaluation	
	15 weeks	Course	Tutorials	Practical Work	Other			On line	In presential	CM*	Exam
Fundamental TU											
FTU 1(O/P) Diet, immunity and dietetics						**09**	**18**				
Food, nutrition and immunity	67h30	1h30	1h30	1h30	82h30	03	06		x	40%	60%
Dietetic	67h30	3h	1h30		82h30	03	06		x	40%	60%
FTU 2(O/P)											
Nutraceuticals and health	67h30	1h30	1h30	1h30	82h30	03	06		x	40%	60%
Methodology TU											
MTU1(O/P) Enquêtes Anthropometry and Nutritional Genomics						**05**	**09**				
Food surveys and nutritional anthropometry	60h	1h30	1h30	1h	65h	03	05		x	40%	60%
Genomics and nutrition	45h	1h30		1h30	55h	02	04		x	40%	60%
Discovery TU											
DTU1(O/P)						**02**	**02**				
Phytomicronutrients, nutritional and therapeutic interest	45	1h30		1h30	5h	02	02	x	x	40%	60%
Transversal TU											
TTU1(O/P)						**01**	**01**				
Entrepreneurship	22h30	1h30			2h30	01	01	x	x		100%
Total Semestr 3	**375h**	**13h30**	**6h**	**7h0**	**375h**	**17h**	**30**				

SSH* = Semester scheduled hours Other*= Additional work in semi-annual consultation; CM*= Continuous monitoring.

Semestr 4

Internship in a company, followed by a brief and a presential presentation.

	SSH	Coeff	Credits
Work Personal	500	09	18
In-company internship	200	05	09
Seminars	50	03	03
Other (please specify)	-	-	-
Total Semester 4Total	750	17	30

Overall training summary:

TU / SH	Fundamental Teaching Units	Methodological Teaching Units	Discovery Teaching Units	Transversal Teaching Units	**Total**
Course	270	154.5	58.5	58.5	580.5
Tutorials	148.5	84	39	00	316.5
Practical Work	167.5	78	19.5	00	162
Personal Work	740	360	15	7	1122
Other	500	200	50	00	750
Total	1826.5	857	182	65.5	3000h
Credits	72	36	9	03	**120**
Percentage of Credits per teaching unit	60	30	7.5	2.5	100

Detailed syllabus of the S1, S2 and S3 subjects

Master's degree title: Nutrition and Pathology
Semester: 1
UEF1 title:**Nutrition, Metabolism and Physiology Subject title:**
Human Nutrition
Credits: 6
Coefficients: 3
Teaching method: face-to-face

Teaching objectives:know the nutritional needs and contributions in physiological and pathological cases.

Recommended prior knowledge: Biochemistry and physiology.

Content of the subject:

I. /Physiological needs and energy intake in healthy subjects
1. /Physiological needs
2. /Energy intake
II. /Changes in nutritional intake
1. /Nutrition and physical activity
2. /Nutrition and physiological states
III. /Malnutrition diseases
1. /Doldrums
2. /Kwashiorkor
3. /Avitaminosis
IV. / Metabolic diseases
1. /Obesity
2. /Type 2 diabetes
3. /Hypercholesterolemia
Practical work:
Anatomy of the digestive tract In
vitro digestion
Colorimetric enzymatic assays Lowry protein
assay

Practical work:
The different macro and micronutrients and their nutritional value The basics for providing a balanced diet
The different food groups and their nutritional value Food manufacturing processes
Personal work: Analysis and synthesis of recent articles dealing with human nutrition and various pathologies.

Assessment method:practical work control, manipulation, questions.
Weighting: Exam: 60% Continuous assessment: 40%

Bibliographic references:
Apfelbaum M., Romon M., Dubus M., 2009. Dietetics and nutrition. Ed: 7th Elsevier Masson, Paris, PP: 512
Battu C., 2013. Nutritional management of an adult with hypercholesterolemia. Pharmaceutical News, 531:55-58
Chevalier L., 2009. Nutrition: principles and advice. Ed: 3ème Masson, Paris, PP: 256 David C. and Boinet T., 2018. Unbalanced type 2 diabetes and high cardiovascular risk. Pharmaceutical news, 573: 14-17
Labarde S. AndSicard J., 2018. THEsporty, of the needs individuals. Newspharmaceuticals, 575:20-24
Maughan RJ, 1999. Role of micronutrients in sport and physical activity. British Medical Bulletin, 55:683-690
Polikandrioti M. and Stefanou E., 2009. Obesity disease. Health Science Journal, 3:132-138 Richard R., 2014. Sports nutrition, macronutrient intakes according to disciplines. Clinical Nutrition and Metabolism, 28:272-278

Master's degree title: Nutrition and Pathology
Semester: 1
UEF1 title:**Nutrition, Metabolism and Physiology**
Subject title: Metabolism and physiology of regulation Credits: 6
Coefficients: 3
Teaching method: face-to-face

Teaching objectives: Study of metabolic processes and the regulation of metabolic flows which ensure carbohydrate, lipid, protein, hydromineral and vitamin homeostasis depending on the different physiological conditions in which the organism may find itself.

Recommended prior knowledge: Biochemistry, Physiology.

Content of the material:
- Hormones involved in the regulation of carbohydrate homeostasis
- Digestion and intestinal absorption of fats
- Lipid transport by lipoproteins
- Triglyceride metabolism
- Fatty acid metabolism
- Consequences of ß-oxidation on glucose metabolism
- Physiological and pathological ketogenesis
- Cholesterol metabolism
- Metabolic regulation: protein catabolism
- Amino acid metabolism
- Movement of water and electrolytes across biological membranes
- Regulatory mechanisms
- Regulation of kidney function
- Regulation of water intake
- Regulation of salt intake
- Phosphocalcic metabolism
- The metabolism of other minerals
- Physiological role of vitamins
- Vitamin interrelationships

Practical work:
Oral glucose tolerance test Glycemic index
Study of blood sugar regulation Lipoprotein
dosage
Dosage of mineral elements

Practical work:

Digestive physiology
Metabolism of proteins, carbohydrates and lipids Metabolism of fibers, vitamins and minerals.

Personal work: Analysis and synthesis of recent articles dealing with different metabolisms and their regulation.

Assessment method:practical work control, manipulations, presentations.**Weighting: Exam: 60% Continuous assessment: 40% References:**

René Cacan 2008, Metabolic regulation: genes, hormones and nutrients. Ellipses Marketing 356p.
Voet and Voet "Biochemistry" 2nd edition 2007, translation of the 3rd American edition by Guy Rousseau and Lionel Domenjou/d.

Master's degree title: Nutrition and Pathology
Semester: 1
Title of UEF2: Eating Behavior Subject title: Eating
Behavior Credits: 6
Coefficients: 3
Teaching method: face-to-face

Teaching objectives:The organoleptic characteristics of foods are one of the major determinants of food choices and behaviors.

Knowledge prerequisites recommended: Biology And physiology animal, biochemistry

Content of the material:

- The organoleptic characteristics of foods
- Eating behavior
- Food choices
- Physiology of the Perception of Food Flavor and Texture
- Sensory properties of food
- Knowledge of food and the food chain,
- Nutritional and epidemiological recommendations
- Nutritional transition

TD Content:
Food diversification through improved availability
Nutritional products for the prevention of malnutrition and micronutrient deficiencies.
Specific nutrition programs for nutritional and food security Education for nutrition
Personal work: Analysis and synthesis of recent articles dealing with eating behavior and its impact on health.

Assessment method: Presentations, questions, reports

Weighting: Exam: 60% Continuous assessment: 40%

References:

Dupin H. (1999). Human nutrition and diet. ESF publisher, Paris, 1530 p. Basdevant A., Laville M., Lerebours E. (2001). Treatise on clinical nutrition for adults. Flammarion, 699 p.

Chapelot D, Louis-Sylvestre J. (2004). Eating behaviors. Tec-Doc Lavoisier. Agri-food science and technology. 470 p.

Master's degree title: Nutrition and Pathology
Semester: 1
Title of UEM1: Nutritional status assessment techniques and bioinformatics
Subject title: Techniques nutritional status assessment Credits: 5
Coefficients: 3
Teaching method: face-to-face

Teaching objectives:
To understand the characteristics of screening patients at nutritional risk for the purpose of early detection of malnutrition.
Know the advantages and disadvantages of the different tools used for nutritional assessment.
Know the anthropometric measurement techniques allowing the measurement of body composition in the clinic.

Knowledge prerequisites recommended: Biochemistry, physiology, nutritional needs.

Content of the subject:
-Malnutrition
-Evaluation of nutritional status
-Biological and anthropometric data
-Albuminemia: the most widely used biological marker for assessing nutritional status
-Body composition analysis
-Bioelectric impedance
-Nutritional indexes
-Use of nitrogen balance for therapeutic monitoring of nutritional assistance
-Integration into a nutritional care plan

Practical work:
Assess nutritional status by analyzing anthropometric parameters.
Measurement of weight, height, hip circumference, skinfolds, body mass index (BMI). Evaluate biological parameters

Practical work:
Methods for assessing energy expenditure
Comparison of two methods for assessing daily energy expenditure Impedancemetry techniques

Personal work: Analysis and synthesis of articles concerning new methods of assessing nutritional status.

Assessment method:practical work control, handling, presentations
Weighting: Exam: 60% Continuous assessment: 40%

References:

- Assessment of infant growth: use and interpretation of anthropometry.(http://www.who.int/childgrowth/publications/evaluation_bul/fr/)
- Sphere Project Manual.(http://www.sphereproject.org/french/handbook/index.htm)
- Practical anthropometry 101 and 102, International Food Policy and Research Institute.(http://www.ifad.org/gender/tools/hfs/anthropometry/ant_toc.htm)
- Use and interpretation of anthropometry. Report of a WHO expert committee. Technical Report Series 854. 1995(http://whqlibdoc.who.int/trs/WHO_TRS_854_fre.pdf)
- Anthropometric indicators measurement guide, 2003.

Master's degree title: Nutrition and Pathology
Semester:1
Title of UEM1: Nutritional Status Assessment Techniques and Bioinformatics
Subject title:

BioinformaticsCr

edits: 4
Coefficients: 2
Teaching method: face-to-face

Teaching objectives*:*to provide basic training to students in the field of research in genomic and proteomic bioinformatics using computer tools in biology for the analysis of biomolecule sequences.

Recommended prior knowledge: General Biology, Mathematics and Computer Science.
Content of the subject:

- Introduction
- Basics of molecular biology
- Genes and their functions
- Search in Biomolecules banks and databases
- Analysis of biomolecule sequences
- Phylogeny
- Analysis of Biomolecule Structures
- Multiple sequence alignment.
- Molecular modeling

Practical work:
- Use of databases
- Methods and tools for sequence manipulation and analysis.
- Pairwise alignment
- BLAST

Personal work:concerning genomic and proteomic bioinformatics using computational tools in biology for the analysis of biomolecule sequences.
Assessment method:questions, presentations,
reports.**Weighting:**Exam: 60% Continuous assessment:
40%**References:**
-KRAWETZ S A., WOMBLE D. (2003) Introduction to bioinformatics: a theoretical & practical approach. Edition Tec et Doc, 728 p.

-KRAWETZ SA.,WOMBLE D.**(**2003). Introduction to bioinformatics (Paper). Edition Tec et Doc, 728p.
-BOURNE PE, WEISSIG H. (2003). Structural bioinformatics (Paper). Edition Tec et Doc, 650p.
-WANG Jason TL - WU Cathy H. - WANG Paul P. (2003). Computational biology & genome informatics. Edition Tec et Doc, 268p

Master's degree title: Nutrition and Pathology
Semester: 1
Title of UED1: Nutritional epidemiology Title of subject:
Nutritional epidemiology Credits: 2
Coefficients: 2
Teaching method: face-to-face and distance learning
Teaching objectives:
Introduce the basic concepts of nutrition necessary for carrying out nutritional epidemiological surveys (foods, nutrients, energy needs and intake, anthropometric measurements, biomarkers) and for evaluating the impact of nutritional supplements or complex nutritional interventions on health.
Recommended prior knowledge: Basic concepts of nutrition, biostatistics**. Content of the material:**

- Introduction, food and nutrient reminders
- Food surveys in epidemiology
- Anthropometric and biological measurements
- Description of nutritional variables
- Analytical epidemiology: relationships between foods/nutrients and health status, methods of adjustment on ingested energy
- Development of consumer profiles
- Evaluation of the impact of nutritional interventions
- Example of an analytical epidemiological study in nutrition
- Nutrition and cancer

Practical work:series of exercises Measures in
descriptive epidemiology
Interpretation of descriptive epidemiological measures Incidence
calculations
Calculation of an incidence density
Epidemiological surveys.

Personal work:outings at hospital level to carry out epidemiological surveys of nutritional pathologies.

Assessment method:outing reports, questions, presentations
Weighting: Exam: 60% Continuous assessment: 40%

References

Alain-Jacques Valleron, 2006. Human epidemiology, EDP Sciences
B. Maire, F. Delpeuch, 1992. Analysis strategies and risks in nutritional epidemiology Bingham SA: Biomarkers in nutritional epidemiology. Public Health Nutr., 2002, 5, 821-827.
Biró G., Hulshof KFAM, Ovesen L., Amorim Cruz JA: Selection of methodology to assess food intake. Eur. J. Clin. Nutr., 2002, 56 Suppl 2, S25-S32. Cade J., Thompson R., Burley V., Warm D.: Development, validation and use of food-frequency questionnaires – a review. Public Health Nutr., 2002, 5, 567-587. Dodd KW, Guenther PM, Freedman LS, et al. : Statistical methods for estimating usual intake of nutrients and foods: a review of the theory. J. Am. Diet. Assoc., 2006, 106, 1640-1650.
Freudenheim JL: A review of study designs and methods of dietary assessment in nutritional epidemiology of chronic disease. J. Nutr., 1993, 123, 401-405.

Master's degree title: Nutrition and Pathology
Semester: 1
Title of UET1: Communication Title of subject: Communication Credits: 1
Coefficients: 1
Teaching method: Distance learning

Teaching objectives: Master the methodology of experimental research in biology. Know how to write a scientific article, format a presentation, a thesis, a dissertation.

Recommended prior knowledge:

Content of the subject:

- General information on the scientific approach
- Pre-scientific methods
- Objective of the scientific method
- Basic postulate of the scientific approach
- The main stages of the scientific approach
- Analysis of scientific texts
- Demonstration of a problem
- The defense of a point of view on an issue.
- Bibliographic review, databases
- Implementation of the protocol
- Ethics: main points
- Example of a scientific approach
- Dissemination of results (scientific publication, oral communication, dissertation).

Assessment method:01 exam at the end of the semester
Weighting: Exam: 100%

Master's degree title: Nutrition and Pathology
Semester: 2
Title of UEF1: Pathophysiology
Subject title: Nutritional and metabolic pathophysiology Credits: 6
Coefficients: 3
Teaching method: face-to-face

Teaching objectives. : The teaching aims to give students preparing for research theoretical knowledge on the causes of chronic diseases linked to diet and therapeutic diets.
Recommended prior knowledge: Fundamental bases in nutrition and pathology.

Content of the subject:

The causes of diet-related diseases The epidemic of chronic diseases
The nutritional transition Evolution of diets
Evolution of fat consumption Evolution of protein consumption Evolution of fruit and vegetable consumption Chronic diseases:
Cancers
Diabetes Obesity
Cardiovascular diseases Food allergies
Eating disorders Bulimia
Anorexia nervosa
Diets
The concept of diet Weight loss diets
The Cretan and Mediterranean diets

Dissociated diets
High-protein diets Therapeutic diets
Vegetarian and vegan diets

Practical work:
Determination of serum total cholesterol, HDL cholesterol (HDL-C) and LDL cholesterol (LDL-C) levels
Biochemical tests of carbohydrates
Biochemical tests for proteins, iron and other minerals Tests for food allergens

Practical work:
Summary of recent articles on various food-related pathologies.
Summary of recent articles on different diets for the prevention of nutritional pathology.

Personal work:outings at hospital level to carry out surveys on metabolic pathologies.

Assessment method:TP control, handling, output reports
Weighting: Exam: 60% Continuous assessment: 40%

References:
AFSSA, 2005, Nutrition and food risks, AFSSA notebooks, Textuels editions, Paris
Darmon M., 2003, Becoming anorexic, a sociological approach, La Découverte, Paris.INSERM, 2008, Inserm website:http://www.inserm.fr/
Nonjon A., 2012, Geopolitics of Food, Ellipses, Paris. WHO, 2003, Diet, Nutrition and Prevention of Chronic Diseases: Report of a WHO/FAO Expert Consultation, Technical Report Series 916, Geneva.
Plumey L, 2014. The big book of food, Eyrolles

Master's degree title: Nutrition and Pathology
Semester: 2
Title of UEF1: Pathophysiology
Subject title: Neurodigestive pathophysiology Credits: 4
Coefficients: 2
Teaching method: face-to-face

Goals
Acquisition of knowledge on energy and nutritional needs, on intestinal physiology, neuroendocrine regulation, and the pathophysiology of chronic intestinal diseases.

Recommended prior knowledge: Biochemistry, Physiology, Genetics.

Content of the subject:
1. Energy and nutritional needs
2. Intestine and associated pathologies:
- Intestinal barrier and neuroendocrine functions of the intestine
- Intestinal microbiota: bacterial ecology and metabolites
- Gut-brain axis
- Chronic bowel diseases
3. Metabolic regulation: energy balance, pathologies, treatment and prevention
- Regulation of food intake: leptin, gut-brain axis, Nutrigenetics
- Gene expression and nutritional status
- Energy balance dysregulation: overweight and obesity and metabolic complications
- Dyslipidemia and atherosclerosis: treatment and prevention
- Oxidative stress: complexes involved, their polymorphisms and disruption of energy metabolism

Practical work: The organization of
the digestive system Digestion
Study of intestinal flora in healthy subjects

Study of intestinal flora in patients with metabolic pathologies Study of therapeutic diets.
Personal work: visits to hospitals to carry out surveys on digestive pathologies.

Assessment method:TP control, handling, output reports.
Weighting: Exam: 60% Control continuous: 40%

References:
Cristian Carip. Pathophysiology: Pathophysiological Basis of Dietetics, The Manual. 3rd edition Lavoisier, Tec et Doc, 2014
Stefan Silbernagl, Florian Lang. Pocket Atlas of Pathophysiology. 3rd edition Lavoisier, 2015

Master's degree title: Nutrition and Pathology
Semester: 2
Title of UEF1: Pathophysiology
Subject title: Renal pathophysiology and nutrition Credits: 4
Coefficients: 2
Teaching method: face-to-face

Goals

Acquisition of knowledge on renal pathophysiology and different diets.**Recommended prior knowledge:**Biochemistry, Physiology, Pathophysiology.**Content of the subject:**

INTRODUCTION

I/Acute renal failure

1. Different types of acute kidney failure
2. Symptoms and Signs of Acute Kidney Failure
3. Diagnosis of acute renal failure II/chronic renal failure
    1. Stages of chronic kidney disease
    2. Epidemiology of chronic renal failure
    3. Symptoms of chronic kidney failure
    4. Etiology of chronic renal failure
5. Complications of chronic renal failure III/Assessment of nutritional status
    1. Anthropometry
2. Biological methods

IV/Treatments

1. Hemodialysis
2. Peritoneal dialysis
3. Kidney transplant

V / Nutrition and renal failure

1. Nutritional needs in chronic renal failure
2. Nutritional needs of chronic dialysis patients
3. Nutritional needs in diabetics with chronic renal failure

4. Nutritional needs in children with chronic renal failure
5. Nutritional needs of kidney transplant recipients

VI/Nutritional recommendations for chronic renal failure VII/Role of the dietitian in renal failure

Practical work:
Biological analyses of potassium, phosphorus, sodium in hemodialysis patients. Analyses of lipids and proteins in hemodialysis patients.
Carbohydrate analyses in hemodialysis patients.
Calcium and vitamin D analyses in hemodialysis patients.

Personal work: hospital outings in hemodialysis departments to conduct surveys on nutritional status in hemodialysis patients.

Assessment method:TP control, handling, output reports.
Weighting: Exam: 60% Continuous assessment: 40%

References:
Cristian Carip. Pathophysiology: Pathophysiological Basis of Dietetics, The Manual. 3rd edition Lavoisier, Tec et Doc, 2014
Stefan Silbernagl, Florian Lang. Pocket Atlas of Pathophysiology. 3rd edition Lavoisier, 2015
BETO J., RAMIREZ W. and BANSAL V., (2014). Medical nutrition therapy in adults with chronic kidney disease - Integrating. Evidence into practice for the Generalist Registered dietitian nutrisionist.
BROYER M., FOLIO D. and MOSSER F., (2004). Dietetics and childhood nephropathy. EMC Pediatrics, 1:281-295.
CHUMLA WC., (2004).Anthropometric and body composition assessment in dialysis patients. Semin Dial., 17: 466-70.
CHOLETTE-DALLON E., STOERMANN-CHOPAR D and MARTIN P., (2006).Could cystatin c replaces creatinine as a market of glomerular filtration rate? Swiss Rev Med, 2(55): 582-5.
FADLI N., KENNAB A., GOUINI K., KHELFAT M., BOULGHITI N. and AYAD N.,(2019).Evaluation of the nutritional status of chronic hemodialysis patients.Clinical Nutrition and Metabolism, 33: 62-63
LIN J., CURHAN G., (2010). Associations of diet with albuminuria and kidney function decline. Clin J Am Soc Nephrol. , 5: 836-43.

Master's degree title: Nutrition and Pathology
Semester: 2

Title of UEF2: Nutritional Toxicology Subject title:
Nutritional Toxicology Credits: 4
Coefficients: 2
Teaching method: face-to-face

Teaching objectives: Nutritional toxicology studies the toxic molecule-food pair for food safety.

Recommended prior knowledge: Biology, Biochemistry, Chemistry, Microbiology.

Content of the subject:

I. Metabolism and Transport of Toxins from Food The Different
Enzymes of Toxin Metabolism
Toxic carriers
II. Regulation of the expression of enzymes and transporters
III. Free radicals and their importance in toxicology
Interrelationships between endogenous substrates and exogenous
substrates Organ toxicology
Methods of toxicology studies
IV. Influence of foods and contaminants on enzyme expression Dietary supplements
Mycotoxins and phytotoxins PCBs
and Dioxins
Agrochemical and medicinal residues
Products newly formed during food processing processes

Practical work:
Experimental toxicology:
- Single and repeated dose toxicity

- Immunotoxicology
- In vitro toxicology
- Anatomopathology
- Carrying out an experimental protocol: quality control
- Writing a toxicological report and conclusion

Personal work: Analysis and synthesis of recent articles dealing with nutritional toxicology in order to understand the food molecules that are toxic for food safety.
Assessment method:reports, presentations, questions.
Weighting: Exam: 60% Continuous assessment: 40%

References:

Henri Chavéron, 1999. Introduction to nutritional toxicology. Tec & Doc, 214 pages. Bai, Y., Zhou, L., Li, J., (2006). Organochlorine pesticide (HCH and DDT) residues in dietary products from Shaanxi Province, People's Republic of China. Bulletin of environmental contamination and toxicology 76: 422-428. Battu, RS,
Singh, B., Kang, B.K., (2004). Contamination of liquid milk and butter with pesticide residues in the Ludhiana district of Punjab state, India. Ecotoxicology and environmental safety 59(3): 324-331
Zohair, A., Salim, A.-B., Soyibo, AA, Beck, AJ, (2006). Residues of polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and organochlorine pesticides.

Master's degree title: Nutrition and Pathology
Semester: 2
Title of UEM1: Biostatistics and food formulation Title of subject:
Biostatistics
Credits: 5
Coefficients: 3

Teaching method: face-to-face

Teaching objectives: To enable the student to learn about statistical analysis methods for biological data.

Recommended prior knowledge: Mathematics, Statistics, General Biology.

Content :
Reminders of descriptive statistics
General notions of probability
Conditional probabilities Bayes'
theorem
Real random variables Probability
distributions
Usual discrete probability laws, Bernoulli, binomial, Poisson Usual probability
laws
Normal distribution, Pearson distribution (X2), Student distribution, Fisher distribution,
Snedecor, use of tables
Statistical estimation
Point and confidence interval estimation of different parameters Test theory
General information

Hypothesis testing
Risks of error of the 1st and 2nd type Homogeneity
test
Comparison of an observed parameter to a theoretical parameter Comparison
of two means, of 2 percentages, of 2 variances Goodness-of-fit tests
Comparison of an observed distribution to a theoretical distribution
Application to the normal law.

Practical work:
Series of exercises with direct applications of the course.

Personal work:introduction to statistical analysis methods for biological data.

Assessment method:questions, report, presentations
Weighting: Exam: 60% Continuous assessment: 40%

References:

TL Chap., 2003. Introductory Biostatistics. Ed. Wiley & Sons, Hoboken, New Jersey, 552p.
DS Paulson., 2008. Biostatistics and Microbiology: A Survival Manual. Ed. Springer, 226p. K
Protassov., 2002. Statistical Analysis of Experimental Data, Ed. EDP Essonne, 148p.
B Scherrer, Legendre P, & Mohan B, 2007. Biostatistics. V1, Ed. Gaetan Morin, 816p. Daniel
Schwartz, Philippe Lazar, 2001. Medical and biological statistics Ed Flammarion
D. Scwarz and J. Bouyer, 2002. Statistics and biology

Master's degree title: Nutrition and Pathology
Semester: 2
Title of UEM1: Biostatistics and Food Formulation. Title of subject:
Formulation and structuring of foods. Credits: 4
Coefficients: 2
Teaching method: face-to-face

Teaching objectives

Acquisition of knowledge on the functionality of the most important ingredients and additives and their interactions. The formulation, production and physicochemical properties of certain important structures with the aim of mastering the technological aspects of product innovation.
Recommended prior knowledge: Food technology, rheology

Content of the subject:

Food rheology
Properties and conditions of use of flavorings, additives and technological aids. Hydrocolloids: thickening and gelling agents
Emulsions and foams Crystallization
of fats
State of water and glass transition theory Encapsulation
Food Packaging and Labeling Regulations Basics

Practical work:
Chemical composition, structure of foods and their constituents.
Practical exercise to develop an innovative food product in a group.

Physicochemical analyses of the innovative food product.

Personal work: Trip to a food industry: discovery of workshop work for the formulation of a food.
Assessment method:TP control, output report handling,
Weighting: Exam: 60% Continuous assessment: 40%

References:Documentary resources from the institution's library and SNDL.

Master's degree title: Nutrition and Pathology
Semester: 2
Title of UED1: Food consumption in the world and public health Title of the subject: Food consumption in the world and public health
Credits: 2
Coefficients: 2
Teaching method: face-to-face and distance learning

Teaching objectives: Understanding that the public health of a population is a reflection of its food consumption pattern.
Recommended prior knowledge: Statistics, food biochemistry, epidemiology

Content of the subject:
INTRODUCTIONFOOD
CONSUMPTION
Definition of concepts
Functions of food consumption Evaluation of food
consumption AGRO-NUTRITIONAL MODEL (MAN)
Definition
Agro-nutritional classification of foods Methodology for
constructing nutritional doses Typology of agro-nutritional
models in the world
Nutritional composition of the diet in major regions of the world Food consumption and public health
FOOD CONSUMPTION MODEL (FCP)

Definition of concepts
Analysis of food consumption patterns Determining food consumption patterns Evolution of MCA
Food safety

Practical work:
Organization of workshops presenting examples of the link between a given food consumption pattern and the prevalence of specific pathologies.
Comprehensive consideration of cancer prevention. Prevention of obesity in children and adolescents.

Personal work:outings at hospital level to carry out surveys on chronic pathologies and food consumption patterns.

Assessment method: Exit report, presentations, questions**Weighting:**Exam: 60% Continuous assessment: 40%**References**

Hercberg S. & Galan P. (1985). Food consumption patterns in the world and coverage of nutritional needs. In: Hercberg S., Dupin H., Papoz L. & Galan P. Epidemiological approach and prevention policy. Nutrition and public health. Paris: Lavoisier, 3-28. Hercberg S. & Galan P.(1982).
Food consumption patterns in the world and coverage of nutritional needs. Cah. Nutr. Diét., XVII(2), 120-124. Herpin N. (1984). Basket and budget: the diet of urban workers. French Review of Sociology, XXV, 20-48.
Hoddinott J. & Yohannes Y. (2002). Dietary diversity as a food security indicator, 2002. Washington: FANTA,http://www.fantaproject.org/sites/default/files/resources/DietaryDiversity-HH-FS- Indicator-2002.pdf, (08/14/2011).

Master's degree title: Nutrition and Pathology
Semester: 2
Title of UET1: Legislation Title of subject: Legislation Credits: 1
Coefficients: 1
Teaching method: Distance learning

Teaching objectives: Introduce the learner to regulatory concepts, definitions and origins of legal texts and knowledge of criminal consequences.

Recommended prior knowledge: Notions on law and general regulations.
Content of the subject:

General notions on law Presentation of
Algerian legislation
General regulations (consumer protection law, hygiene, labeling and information, food additives, packaging, brand, safety, conservation).
Specific regulations
Control bodies (DCP, CACQUE, hygiene office, ONML). Standardization and accreditation (IANOR, ALGERAC).
International standards (ISO, Codex Alimentarius, NA, AFNOR)

Assessment method:01 exam at the end of the semester

Weighting: Exam: 100%

References:

- Official Journal of the Algerian Republic
- AFNOR, Collection of standards

Master's degree title: Nutrition and Pathology
Semester: 3
Title of UEF1: Food, immunity and dietetics Title of the subject:
Food, nutrition and immunity Credits: 6
Coefficients: 3
Teaching method: face-to-face

Teaching objectives: The teaching aims to provide students preparing for research with theoretical knowledge on the role of nutrition in immunity.

Knowledge prerequisites recommended: Concepts of base of nutrition and immunology.

Content of the subject:

Complex interactions between nutrition and immunity
The immune system
Nutritional needs of the immune system Consequences
of malnutrition on immunity
Impact of immune responses on nutritional status Immune
responses to food antigens Nutritional modulation of immunity

Role of lipids in immunity and inflammation Influence of
probiotics on immune function
Influence of nutrition on the immune system throughout life Immune function
and malnutrition
Assessment of immune deficiency linked to malnutrition
Nutritional deficiencies and immunity
Proinflammatory cytokines acting on metabolism Chronic
inflammatory syndrome
Diabetes and immunity
Immuno-nutritional therapy

Practical work:

Proper Handling of a Live Mouse
Teach the student how to immunize a mouse (injection of a purified protein) Demonstrate to the student how to collect serum from an immunized mouse Electrophoresis of immunized and non-immunized sera
Serodiagnosis by ELISA: Enzyme linked Immunosorbent Assay

Practical work:
Strengthening the immune system with nutrients Food supplements
and immunity
The Mediterranean Diet and Immunity Macronutrients,
Micronutrients and Immunity

Personal work: Analysis and synthesis of recent articles concerning the role of diet in immunity and therapy.

Assessment method:practical work control, manipulation, presentations
Weighting: Exam: 60% Continuous assessment: 40%

References:

Plumey L. The big book of food. Eyrolles, 2014
ASSlM. Clinical immunology. Eds MEDSl, McGraw-Hill, 1990b, 262-263
Bostoff J, Scaddlno OK, Male D, Roltt lM. Clinical immunology. De Boeck University, Brussels, 1993, 1-8
Cantorna Mt, Nashold Fe, Hayes Ce. In vitamin A deficiency multiple mechanisms establish a regulatory T helper cell imbalance with excess Th1 and insufficient Th2 function.]*Immunol1994,*152: 1515-1522
Cantorna Mt, Nashold Fe, Hayes Ce. Vitamin A deficiency results in a priming environment conducive for Th1 cell development.*Eur] Immunol1995,*25: 1673-1679

Cave NJ, Marks SL. Evaluation of the immunogenicity of dietary proteins in cats and the influence of the canning process. Am J Vet Res2004; 65:1427-33.

Master's degree title: Nutrition and Pathology
Semester: 3
Title of UEF1: Food, immunity and dietetics Title of the subject:
Dietetics
Credits: 6
Coefficients: 3
Teaching method: face-to-face

Teaching objectives: The teaching aims to give students knowledge about diets in different pathological situations.

Knowledge prerequisites recommended: Nutrition, physiology, biochemistry, pathophysiology..

Content of the subject:
INTRODUCTION
I/Evaluation of dietary intake II/Diets
1/ Obesity diet 2/ Hyperlipidemia
diets 3/ Diabetic diets
4/ Diet for hyperuricemia and gout

5/ Diet for functional hypoglycemia 6/ Low-sodium
diet
7/Lactose-free diet 8/Gluten-free
diet
9/Diets for urinary stones III/Dietetics for
renal failure IV/Artificial nutrition

Practical work:
Food log
Methods for assessing dietary intake Data exploitation
Limitations of dietary intake assessment methods
Assessment of dietary intake as part of therapeutic nutritional monitoring.

Personal work: Analysis and synthesis of articles on dietetics and different diets. Outings for internships at hospitals.

Assessment method:internship reports, presentations, questions
Weighting: Exam: 60% Continuous assessment: 40%

REFERENCES:

Apfelbaum M., Forrat C., Nillus P. Dietetics and nutrition. 5th Ed. Coll. Abstracts. Masson, Paris, 1999.
Azaïs-Braesco V., Guilland J.-C. Vitamins. In: Treatise on artificial nutrition for adults.
X. Leverve, Cosne J., Erny P., Hasselmann M. Ed. Mariette-Guena Paris 1998.
Basdevant A., Laville M., Lerebours E. Treatise on clinical nutrition for adults. Medicine-Sciences Flammarion, Paris, 2001
Le Moel G., Saverot-Dauvergne A., Gousson T., Gueant J.-L. Vitamin status. Paris EM inter 1998.
Schils ME, Olson JA, Shike M., Ross AC Modern nutrition in health and disease. 9th Ed. Williams & Wilkins, Baltimore, 1998.
Flourié B. Residue-free diets: what definition, what indications? Gastroenterol Clin Biol.1999; 23: B124-B129.
Marteau P., Rault D., Gehin R. Lactose in diets used in digestive pathology. Gastro Enterol Clin Biol. 1999; 23: B101-B105.
Romon M. Evaluation of dietary intake. In: Treatise on clinical nutrition for adults. A. Basdevant, M. Laville, E. Lerebours. Ed. Flammarion Paris 2001.
Cristian Carip. Pathophysiology: Pathophysiological Basis of Dietetics, The Manual. 3rd edition Lavoisier, Tec et Doc, 2014

Master's degree title: Nutrition and Pathology
Semester: 3
Title of UEF2: Nutraceuticals and Health Title of the subject: Nutraceuticals and Health Credits: 6
Coefficients: 3
Teaching method: face-to-face

Teaching objectives: The teaching aims to give students knowledge about new health foods such as nutraceuticals, functional foods and their role in the prevention of chronic pathologies.

Recommended prior knowledge: Nutrition, physiology, biochemistry, pathophysiology.

Content of the subject:

I. /Nutraceuticals and functional foods
1. Nutraceuticals
2. Functional foods

II. /Sources of Nutraceuticals
1. /Nutraceuticals of plant origin

2. /Nutraceuticals of animal origin
3. /Microbial and algal nutraceuticals
3.1/Probiotics
3.2/Algae
III. / Nutraceuticals and chronic pathologies
1. /Cardiovascular diseases
2. /Metabolic disorders
3. /Cancer
4. /Other pathologies
IV. /Regulations and healthy eating

Practical work:
Production of some examples of products:
- calcium-enriched yogurt for bone mass maintenance
- soy and essential amino acid intake
- whey tryptophan in the form of effervescent tablets

Practical work:
Regulatory context Food application
Drug application
"Galenic" forms appropriate for health food
The controls required for marketing and development.

Personal work: Analysis and synthesis of recent articles dealing with the sources and impact of functional foods and nutraceuticals on chronic pathologies.

Assessment method:reports, presentations, questions
Weighting: Exam: 60% Continuous assessment: 40%

REFERENCES:

1. Wildman, REC ed. Handbook of Nutraceuticals and Functional Foods CRCPress, Boca Raton, 2000.
2. RE Aluko, Functional foods and Nutraceuticals, Springer, 2012
3. Yashwant V Pathak, Handbook of Nutraceuticals, CRC Press, 2010
4. Shibamoto T. Functional food and health, Oxford University Press, 2008.
5. Goldberg, I. Functional Foods: Designer Foods, Pharma foods, Nutraceuticals, Chapman & Hall, 1994.
6. Robert EC Handbook of Nutraceuticals and Functional Foods. 2nd Ed. Wildman, 2006**.**

Master's degree title: Nutrition and Pathology
Semester: 3
Title of UEM1: Nutritional Anthropometry and Genomics Surveys Title of the subject: Surveys Food and Nutritional Anthropometry Credits: 5
Coefficients: 3
Teaching method: face-to-face

Teaching objectives: Allows the student to have knowledge of the concepts of food surveys and their implementation in the field.

Recommended prior knowledge: Biostatistics.

Content of the subject:

INTRODUCTION

I Methods of collecting food intake
I.1 Collection of contributions on defined days
I.1.1 Food records
I.1.2 24-hour reminder

I.2 Collection of usual contributions
I.2.1 Food history
I.2.2 Consumption frequency questionnaires
I.3 Collective data collection
I.3.1 At the country level: food availability data
I.3.2 At the household level: food purchasing and expenditure data
I.3.3 Statistics
II Data exploitation
II.1 Two types of approaches: food/nutrient vs. food profile
II.2 Two contexts: epidemiology vs. clinical
III Limitations of food surveys
III.1 Some theoretical notions
III.1.1 Precision (or reproducibility) of the method
III.1.2 Validity (or accuracy) of the method
III.1.3 Nature of the error
III.2 The different sources of errors in food surveys

Practical work:

- Variability of food intake
- Composition table errors
- Errors in estimating quantities
- Underestimation of dietary intake
- Validation of the measurement of food intake

Personal work:

- Presentations
- Workshops to learn the practical methods of conducting dietary and anthropometric surveys and assessing their reliability.

Assessment method: presentations, reports, interrogation
Weighting: Exam: 60% Control continuous: 40%

References:

-Thompson FE, Byers T. Dietary assessment resource manual. J. Nutr., 1994, 124, 2245S-2317S.
-Freudenheim JL A review of study designs and methods of dietary assessment in nutritional epidemiology of chronic disease. J. Nutr., 1993, 123,401-405.
-Biró G., Hulshof KFAM, Ovesen L., Amorim Cruz JA Selection of methodology to assess food intake. Eur. J. Clin. Nutr., 2002, 56 Suppl 2,S25-S32.

-Romon M. Evaluation of dietary intake. In: “Treatise on clinical nutrition”, A.Basdevant, M. Laville, E. Lerebours. Médecine-Sciences Flammarion, Paris, 2001, 109-120.
-Tucker KL Assessment of usual dietary intake in population studies of gene-diet interaction.Nutr. Metab. Cardiovasc. Dis., 2007, 17, 74-81.
-Romon M., Borys JM: Dietary intake assessments: for who? why? Ann. Endocrinol., 2002, 63, S25-S29.
-Rumpler WV, Kramer M., Rhodes DG, Moshfegh AJ, Paul DR: Identifying sources of reporting error using measured food intake. Eur. J. Clin. Nutr., 2007,1-9.

Master's degree title: Nutrition and Pathology
Semester: 3
Title of UEM1: Nutritional Anthropometry and Genomics Surveys

Subject title: Genomics and Nutrition
Credits: 4
Coefficients: 2
Teaching method: face-to-face

Teaching objectives: Genomic analyses in relation to nutrition, the role of nutrigenomics in the prevention of pathologies.

Recommended prior knowledge: Human nutrition, biochemistry, genetics.

I. / Genome analysis
1. /Introduction

2. /Definitions
3. / The polymerase chain reaction (PCR)
4. / The concept of DNA bank
5. /Sequencing

II. /Nutrigenomics

1. /Introduction
2. / Nutrition and post-genomics
3. / The role of nutrigenomics
3.1. / Nutrigenomics and the maintenance of homeostasis
3.2. / Nutrigenomics and prevention of pathologies
3.3. / Nutrigenomics and reduction of the progression of pathologies
3.4. / Personalized nutrition

Practical work:

Nutrigenomics tools
-Transcriptomics
-Proteomics
-Metabolomics

Personal work:analysis and synthesis of recent articles dealing with sequencing, tools and the role of nutrigenomics in the prevention of chronic pathologies.

Assessment method: Reports, presentations, questioning
Weighting: Exam: 60% Control continuous: 40%
References:

Celis-Morales and*al.*(2017). Effect of personalized nutrition on health-related behavior change: evidence from the Food. The European randomized controlled trial.Int J Epidemiol; 46(2):578-588.
Comerford KB, Pasin G. (2017). Gene-Dairy Food Interactions and Health Outcomes: A Review of Nutrigenetic Studies. Nutrients; 9(7).
Kussmann M and Fay LB. (2010). Mass Spectrometry and Nutrition Research. RSC Publishing: 332.
Ordovas and*al.*(2018). Personalized nutrition and health. BMJ; 361:2173.
Peregrin T. (2001). The new frontier of nutrition science: nutrigenomics. J Am Diet Assoc;101(11):1306. 602.
Tagu D, Jaubert-posamai S, Merau A. (2018). Principles of molecular biology and genomic techniques. 3rd edition. Editions Quae; 267.
Yates RJ and Veenstra TD. (2019). Proteomics for Biological Discovery. WILEY Blackwell. second edition, 329

Master's degree title: Nutrition and Pathology
Semester: 3
Title of UED1: Phytomicronutrients, nutritional and therapeutic interest Title of the subject: Phytomicronutrients, nutritional and therapeutic interest
Credits: 2
Coefficients: 2
Teaching method: face-to-face and distance learning

Teaching objectives: The teaching aims to provide students preparing for research with theoretical knowledge on the nutritional interest, the biological effects of phytomicronutrients as well as their mechanism of action in the prevention of chronic diseases.

Recommended prior knowledge: Fundamental bases on phytotherapy and nutritional biochemistry.

Content of the subject:
Classification and interest of phytomicronutrients Sources and consumption of phytomicronutrients Mode of action of phytomicronutrients
Physicochemical action of phytomicronutrients
Antibacterial effects of phytomicronutrients
Phytomicronutrients, scavengers of reactive oxygen species Indirect antioxidant and anti-inflammatory effects of phytomicronutrients Effect of phytomicronutrients on cholesterol metabolism Phytomicronutrients and intestinal microbiota
Effect of phytomicronutrients on metabolic syndrome
Phytomicronutrients and prevention of osteoporosis
Phytomicronutrients and prevention of atherosclerosis
Phytomicronutrients and prevention of cancers
Colors, phytomicronutrients and health

Practical work:
Industry Orientation "Active Substances"
Phytotherapy-Aromatherapy, recognition of dry medicinal plants Plants with therapeutic and nutritional interests
The herbal medicine

Personal work: Outings at the level of the pharmaceutical industries for the study of industrial production processes, development of a medicinal substance of plant origin.

Assessment method:TP control, handling, exit report**Weighting:** Exam: 60%
Control continuous: 40%**References:**

Collin S., Crouzet J., 2011 Pocket atlas of nutrition
Biesalski HK, Grimm P., 2010 Encyclopedia of Vitamins – From Nutrient to Medicine.
Chanussot F., 2008 Food functional Collection Sciences And agri-food techniques.
Roberfroid MB, Coxam V., Delzenne N. ,2nd ed., 2008 Behaviors Andfood consumption in France.
Hebel P., Crédoc, 2007 Nutrition and cardiovascular healt

Master's degree title: Nutrition and Pathology
Semester: 3
Title of UET1: Entrepreneurship Title of subject: Entrepreneurship Credits: 1
Coefficients: 1
Teaching method: Distance learning Teaching objectives

Introduce students to project planning, launch, monitoring, and implementation. Explore the industrial sector and its environment: business economics, production management, marketing, new information and communication technologies, etc. Teach students to work methodically.

Recommended prior knowledge: Project management and commerce.

Content of the subject:

1. The launch of the Creation Process
2. Sources and types of financing for business creation
3. Business organization
4. Commercial operations
- What is the operating budget?
- How to manage product costs and operating costs?
- What are production costs and how to manage them?
5. Supply management
- Purchasing and inventory management
- Organization of stores…
6. Production management
- Production method,
- Production policy…
7. Sales and Marketing Management
- Product and pricing policy,
- Advertisement,
- Sales Techniques and Team
8. Project management
- Definition of a project
- The different phases of project implementation
- Project management
- Management of deadlines, quality, costs and tasks

Student's personal work:

Documentation for knowledge enrichment in the field of business economics, marketing, and new information technologies.

Assessment method:course exam: 100%

References:
Documentary resources from the institution's library and SNDL.