**DEMOCRATIC PEOPLE'S REPUBLIC OF ALGERIA**

**MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH**


# Training offer
# BACHELOR: 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** | **Food, Nutrition and Pathology** |

# Bachelor's Degree Identity Card

**Title**: **Food, Nutrition and Pathology**
**Page Type :** training.
**Language** ; French / English
**Translation** :**الغذاء و التغذية وعلم الأمراض**
**Status**
Published.
**Program Overview**
The objective of this specialty is to train students with solid scientific and technical skills in the field of Nutrition, Food and Health Sciences, able to master concepts and methods, develop experimental schemes, to develop a critical analysis of experimental situations. It also aims to train future quality control and assurance managers in the fields of environment, agri-food, medicine and cosmetics to meet requirements for continuous quality improvement.
The Food, Nutrition and Pathology degree is developed to allow the acquisition of fundamental and technical bases, through in-depth teaching of Physiology of Integrated Systems, Food Biochemistry , Food Safety, Food Microbiology, food toxicology, analytical technique and the physico-chemical properties of foods.
The candidate should be able at the end of his training to meet the requirements that the world imposes on its future executives both in the field of work in companies or laboratories (professional integration) and in research and higher education (PG./Doctorate and teaching).
**Curriculum Highlights**
The program integrates knowledge in biology, biochemistry, physiology, nutrition and pathology, providing an overview of the relationship between food 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 or medical analysis laboratories, hospital or private, where it will be able to participate effectively in the various activities of monitoring, diagnosingand decaracterisation of pathogenic germs and their anti-bioresistance. 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 services of health and safety, at the level of fraud departments, in the food industry sector (milking, canning, beverages, ERIAD, milk and derivatives, confectionery, ice cream,... )
**Admissions Information**
Offers: Bachelor Degree in Experimental Sciences
**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. Biochemistry: Study of the chemical processes that take place in living organisms, with a particular focus on nutrient metabolism.
2. Physiology: Study of the functioning of organs and systems in the human body, including the digestive system, endocrine system and cardiovascular system.
3. Food Microbiology: Study of micro-organisms, including bacteria, viruses and fungi, and their role in food and health. Understanding of the microbiological risks associated with food and measures to prevent food-borne infections.

4. Dietetics: Study of the principles of balanced eating and the development of food plans adapted to individual and collective needs. Development of skills in nutrition counselling and therapeutic education.
5. Nutrition and pathologies: Study of the links between diet and chronic diseases, such as cardiovascular disease, diabetes, obesity and cancer.
6. Food safety: -Food quality management.
-Toxicology and microbiological safety of food.

**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:

- **Nutrition and Metabolic Diseases:**
  - Advanced nutritional strategies for the prevention and management of pathologies.
- **Nutrition and Cardiovascular Diseases:**
  - Study of the pathophysiological mechanisms involved in cardiovascular diseases and the role of diet in their prevention and treatment.
- **Nutrition and Cancer:**
  - Nutritional interventions to improve the quality of life of cancer patients and reduce the side effects of treatments.
- **Nutrition and Digestive Diseases:**
  - In-depth knowledge of chronic inflammatory bowel diseases, functional intestinal disorders, and liver diseases.
- **Nutrition and Neurodegenerative Diseases:**
  - Study of the links between diet and Alzheimer's disease, Parkinson's disease, and other neurodegenerative diseases. Exploration of nutritional strategies to prevent or slow the progression of these diseases.
- **Nutrition for High-Level Athletes:**
  - Optimization of diet to improve athletic performance and promote recovery. Design of personalized dietary plans for athletes in different disciplines.
- **Nutritional Epidemiology:**
  - Mastery of methods for studying the links between diet and health at the population level.

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

# II – Semi-annual Learning Organization Sheet

## Common Base «Natural and Life Sciences»

**Semester 1**

| Teaching units | Subject matter | | Credits | Coefficients | Hours weekly | | | SSH (15 semaines) | Other * | Mode of evaluation | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Code | Title | | | Course | Tutorials | Practical Work | | | CM* | | Exam | |
| Fundamental TU<br>Code : FTU1.1<br>Credits : 18<br>Coefficients : 9 | F 1.1.1 | General and organic chemistry | 6 | 3 | 1h30 | 1h30 | 1h30 | 67h30 | 82h30 | x | 40% | x | 60% |
| | F 1.1.2 | Cell biology | 8 | 4 | 1h30 | 1h30 | 3h00 | 90h00 | 110h00 | x | 40% | x | 60% |
| | F 1.1.3 | Mathematical Statistics | 4 | 2 | 1h30 | 1h30 | - | 45h00 | 55h00 | x | 40% | x | 60% |
| Methodology TU<br>Code : MTU.1.1<br>Crédits : 9<br>Coefficients: 5 | M 1.1.1 | Geology | 5 | 3 | 1h30 | 1h30 | 1h00 | 60h00 | 65h00 | x | 40% | x | 60% |
| | M 1.1.2 | Communication and Expression Techniques I (in French) | 4 | 2 | 1h30 | 1h30 | - | 45h00 | 55h00 | x | 40% | x | 60% |
| Discovery<br>Code : UED.1.1<br>Crédits : 2<br>Coefficients : 2 | D 1.1.1 | Working method and terminology | 2 | 2 | 1h30 | 1h30 | - | 45h00 | 5h00 | x | 40% | x | 60% |
| Transversal TU<br>Code : UET 1.1<br>Crédits : 1<br>Coefficients : 1 | T 1.1.1 | Universal History of the Biological Sciences | 1 | 1 | 1h30 | - | - | 22h30 | 2h30 | - | - | x | 100% |
| Total Semester 1 | | | 30 | 17 | 10h30 | 9h30 | 5h30 | 375h00 | 375h00 | | | | |

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

## Common Base «Natural and Life Sciences»

**Semester 2**

| Teaching units | Subject matter | | Credits | Coefficients | Hours weekly | | | HW (15 semaines) | Other * | Mode of evaluation | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Code | Title | | | Course | Tutorials | Practical Work | | | CM* | | Exam | |
| **Fundamental TU Code : FTU1.1 Credits : 18 Coefficients : 9** | F 1.1.1 | Thermodynamics and chemistry of solutions | 6 | 3 | 1h30 | 1h30 | 1h30 | 67h30 | 82h30 | x | 40% | x | 60% |
| | F 1.1.2 | Plant Biology | 8 | 4 | 1h30 | 1h30 | 3h00 | 90h00 | 110h00 | x | 40% | x | 60% |
| | F 1.1.3 | Animal Biology | 4 | 2 | 1h30 | 1h30 | - | 45h00 | 55h00 | x | 40% | x | 60% |
| **Methodology TU Code : MTU.1.1 Crédits : 9 Coefficients: 5** | M 1.1.1 | Physical | 5 | 3 | 1h30 | 1h30 | 1h00 | 60h00 | 65h00 | x | 40% | x | 60% |
| | M 1.1.2 | Communication and Expression Techniques 2 (in English) | 4 | 2 | 1h30 | 1h30 | - | 45h00 | 55h00 | x | 40% | x | 60% |
| **Discovery TU Code : UED.1.1 Crédits : 2 Coefficients : 2** | D 1.1.1 | Life sciences and socio-economic impacts | 2 | 2 | 1h30 | 1h30 | - | 45h00 | 5h00 | x | 40% | x | 60% |
| **Transversal TU Code : UET 1.1 Crédits : 1 Coefficients : 1** | T 1.1.1 | Working method and terminology 2 | 1 | 1 | 1h30 | - | - | 22h30 | 2h30 | - | - | x | 100% |
| **Total Semester 2** | | | 30 | 17 | 10h30 | 9h30 | 5h30 | 375h00 | 375h00 | | | | |

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

**Annex to the curriculum of the second year Field: Science of nature and life Food Sciences**

**Semestre 3**

| Teaching Unite | Subject matter | Credits | Coeff | Weekly Hours | | | SSH* (15 semaines) | Other* | Mode of evaluation | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Title | | | Course | Tutorials | Practical Work | | | Cm* | | Exam | |
| **Fundamental TU** **Code : FTU 3.1** **Crédits : 6** **Coefficients : 3** | Plant physiology | 4 | 2 | 1h30 | - | 1h30 | 45h00 | 55h00 | x | 40% | x | 60% |
| | Food and food system | 2 | 1 | 1h30 | - | - | 22h30 | 27h30 | x | x | x | 100% |
| **Fundamental TU** **Code : FTU 3.2** **Crédits : 12** **Coefficients : 6** | Biochemistry | 6 | 3 | 3h00 | 1h30 | - | 67h30 | 82h30 | x | 40% | x | 60% |
| | Genetic | 6 | 3 | 3h00 | 1h30 | - | 67h30 | 82h30 | x | 40% | x | 60% |
| **Methodology TU** **Code : MTU 3.1** **Crédits : 4** **Coefficients: 2** | Communication and Expression Techniques (in English) | 4 | 2 | 1h30 | 1h30 | - | 45h00 | 55h00 | x | 40% | x | 60% |
| **Methodology TU** **Code : UEM 3.2** **Crédits : 5** **Coefficients: 3** | Biophysics | 5 | 3 | 1h30 | 1h30 | 1h00 | 60h00 | 65h00 | x | 40% | x | 60% |
| **Discovery TU** **Code : UED 3.1** **Crédits : 2** **Coefficients : 2** | Environment and sustainable development | 2 | 2 | 1h30 | 1h30 | - | 45h00 | 5h00 | x | 40% | x | 60% |
| **Transversal TU** **Code : TTU 3.1** **Crédits : 1** **Coefficients : 1** | Ethics and University Ethics. | 1 | 1 | 1h30 | - | - | 22h30 | 2h30 | - | - | x | 100% |
| Total Semester 3 | | 30 | 17 | 15h00 | 7h30 | 2h30 | 375h00 | 375h00 | | | | |

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

**Annex to the curriculum of the second year Field: Science of nature and life Food Sciences**

**Semestre 4**

| Unités d'enseignement | Subject matter Title | Credits | Coeff | Weekly Hours | | | SSH* (15 Weeks) | Other* | Mode of evaluation | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Course | Tutorials | Practical Work | | | CM* | | Exam | |
| **Fundamental TU**<br>**Code : FTU 3.1**<br>**Crédits : 6**<br>**Coefficients : 3** | Animal physiology | 6 | 3 | 3h00 | - | 1h30 | 67h30 | 82h30 | x | 40% | x | 60% |
| **Fundamental TU**<br>**Code : FTU 3.2**<br>**Crédits : 12**<br>**Coefficients : 6** | Microbiology | 8 | 4 | 3h00 | 1h30 | 1h30 | 90h00 | 110h30 | x | 40% | x | 60% |
| | Food and Basic Food Technology | 4 | 2 | 1h30 | 1h30 | - | 45h00 | 55h00 | x | 40% | x | 60% |
| **U E Méthodologie**<br>**Code : UEM 4.1**<br>**Crédits : 4**<br>**Coefficients: 2** | Applied Immunology | 4 | 2 | 1h30 | 1h30 | - | 45h00 | 55h00 | x | 40% | x | 60% |
| **Methodology TU**<br>**Code : UEM 3.2**<br>**Crédits : 5**<br>**Coefficients: 3** | Biostatistics | 5 | 3 | 1h30 | 1h30 | 1h00 | 60h00 | 65h00 | x | 40% | x | 60% |
| **Discovery TU**<br>**Code : UED 3.1**<br>**Crédits : 2**<br>**Coefficients : 2** | Plants and Environment | 2 | 2 | 1h30 | 1h30 | - | 45h00 | 5h00 | x | 40% | x | 60% |
| **Transversal TU**<br>**Code : TTU 3.1**<br>**Crédits : 1**<br>**Coefficients : 1** | Computer Tools | 1 | 1 | 1h30 | - | - | 22h30 | 2h30 | x | X | x | 100% |
| Total Semester 4 | | 30 | 17 | 13h30 | 7h30 | 4h00 | 375h00 | 375h00 | | | | |

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

## Third Year Program, Bachelor's Degree: Food, Nutrition and Pathology

**Semester 5:**

| Teaching Units | SSH | Weekly Hours | | | | Coeff | Credits | Education | | Mode of evaluation | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15Week | Course | Tutorials | Practical Work | Other | | | presently | Remotely | Continuous (40%) | Exam (60%) |
| **Fundamental Teaching Unit** | | | | | | | | | | | |
| **FTU 3.1.1(O/P) : Nutritional and food biochemistry** | | | | | | | | | | | |
| **Subject matter 1**: Food biochemistry and regulation | 45h00 | 1h30 | - | 1h30 | 55h00 | 2 | 4 | | | x | x |
| **Subject matter 2** : Dietetics and food composition | 45h00 | 1h30 | - | 1h30* | 55h00 | 2 | 4 | | | x | x |
| **Subject matter 3** Nutrition and Pathologies | 45h00 | 1h30 | - | 1h30* | 55h00 | 2 | 4 | | | x | x |
| **FTU 3.1.2(O/P) : Physiology of integrated systems** | | | | | | | | | | | |
| **Subject matter 1 :** Physiology of digestion | 67h30 | 3 h | 1h30 | | 82h30 | 3 | 6 | | | x | x |
| **Methodology Teaching Unit** | | | | | | | | | | | |
| **MTU 1(O/P)** | | | | | | | | | | | |
| **Subject matter 1** : Applied statistics | 45h00 | 1h30 | 1h30 | 1h00 | 55h00 | 2 | 4 | | | x | x |
| **Subject matter 2** : Traceability of food | 60h00 | 1h30 | 1h30 | 1h00 | 65h00 | 3 | 5 | | | x | x |
| **Discovery Teaching Unit** | | | | | | | | | | | |
| **DTU 1(O/P) Subject matter 1 :** General endocrinology | 45h | 1h30 | 1h30 | | 5h | 2 | 2 | X | X | x | x |
| **Transversal Teaching Unit** | | | | | | | | | | | |
| **UET1(O/P) Subject matter 1** : Food additives and contaminants | 22h30 | 1h30 | | | 2h30 | 1 | 1 | X | X | x | 100% |
| **Total Semester 5** | **375h00** | **13h30** | **6h** | **6h30** | **375h00** | **17** | **30** | | | | |

# Third Year Program, Bachelor's Degree: Food, Nutrition and Pathology

**Semester 6:**

| Teaching Units | SSH | Weekly Hours | | | | Coeff | Credits | Education 15Weeks | | Mode of evaluation | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 Weeks | Course | Tutorials | Practical Work | Other | | | presently | Remotely | Continuous (40%) | Exam (60%) |
| **Fundamental Teaching Unit** | | | | | | | | | | | |
| **FTU.1 (O/P) Food Security** | | | | | | | | | | | |
| **Subject matter 1 :** Food quality management | 45h | 1h30 | 1h30 | - | 55h00 | 2 | 4 | | | x | x |
| **Subject matter 2 :** Toxicology and Microbiological food safet | 45h | 1h30 | - | 1h30* | 55h00 | 2 | 4 | | | x | x |
| **FTU.2(O/P) :** | | | | | | | | | | | |
| **Subject matter 1** : Food Microbiology | 67h30 | 3h | | 1h30 | 82h30 | 3 | 6 | | | x | x |
| **Subject matter 2 :** Health and Nutritherapy | 45h | 1h30 | 1h30 | - | 55h00 | 2 | 4 | | | x | x |
| **Methodology Teaching Unit** | | | | | | | | | | | |
| **MTU 1(O/P)** | | | | | | | | | | | |
| **Subject matter 1 :** Physico-chemical properties of food | 60h | 1h30 | 1h | 1h30 | 65h | 3 | 5 | | | x | x |
| **Subject matter 2:** Analytical techniques | 45h | 1h30 | | 1h30 | 55h | 2 | 4 | | | x | x |
| **Discovery Teaching Unit** | | | | | | | | | | | |
| **DTU 1(O/P)** | | | | | | | | | | | |
| **Subject matter 1 :** physiology of major functions | 45h | 1h30 | 1h30 | | 5h | 2 | 2 | X | X | x | X |
| **Transversal Teaching Unit** | | | | | | | | | | | |
| **TTU 1(O/P)** | | | | | | | | | | | |
| **Subject matter 1** : Entrepreneurship | 22h30 | | | | 2h30 | 1 | 1 | X | X | / | 100% |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total Semester 6** | **375h00** | **12h.0** | **5h.** | **6h** | **375h** | **17** | **30** | | | | |

## Overall training summary:

| | Fundamental Teaching Units | Methodological Teaching Units | Discovery Teaching Units | Transversal Teaching Units | **Total** |
|---|---|---|---|---|---|
| **Course** | 810 | 270 | 112.5 | 135 | 1327.5 |
| **Tutorials** | 180 | 22.5 | 0 | 0 | 202.5 |
| **Practical Work** | 225 | 337.5 | 112.5 | 0 | 675 |
| Personal Work | 1485 | 720 | 30 | 15 | 2250 |
| **Other** | | | | | |
| **Total** | 2700 | **1350** | 300 | 150 | 4500 |
| **Credits** | 108 | 54 | 12 | 6 | **180** |
| **Percentage of Credits per teaching unit** | **60** | **30** | **6.67** | **3.33** | **100.00** |

# Detailed syllabus of the S5 and S6 subjects

**Semester: 5**

**Fundamental Teaching Unit 1 (3.1.1): Nutritional and Food Biochemistry**

**Course 1: Food Biochemistry and Regulation**

- **Credits:** 4
- **Coefficient:** 2

**Teaching Objectives:**

- Acquire a thorough understanding of the biochemical processes involved in the digestion, absorption, and metabolism of macronutrients.
- Understand the molecular transformations of food and their impact on nutritional quality.
- Develop practical skills in the biochemical analysis of food.

**Recommended Prior Knowledge:**

- Food biochemistry and composition, as well as the physiology of digestion.

**Course Content:**

- **I- Energy Requirements and Bioenergetics**
- **II- Proteins**
  - 1- Anabolism
  - 2- Catabolism
  - 3- Protein Content in the Body
  - 4- Nitrogen Balance
- **III- Carbohydrates**
  - 1- Structure and Classification of Sugars (Glc, Fructose, Gal, Lactose, Sucrose…)
  - 2- Catabolism (glycogenolysis, aerobic and anaerobic glycolysis)
  - 3- Carbohydrate Content of Major Foods
- **IV- Lipids**
  - 1- Structure and Classification
  - 2- Catabolism (lipase action, fatty acid activation, β oxidation)
- **V- Molecular Transformations**
  - (oxidation, condensation, denaturation reactions…)

**Practical Work:**

- Studies of the physicochemical characteristics of orange juice
- Citric acid titration in lemon
- Thin layer chromatography
- Determination of Dornic acidity in milk and dairy products
- Protein titration in some food products
- Fat titration by Soxhlet

**Assessment Method:**

- Quizzes, reports, presentations.

**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**Bibliographic References:**

**1.**Biochimie alimentaire.2008.Alaisetal.
**2.**Biochimie des aliments. 2002.Doins edition

**Semester: 5**
**Fundamental Teaching Unit 1 (3.1.1): Nutritional and Food Biochemistry**
**Course 2 :** Dietetics and Food Composition
**Credits**: 4
**Coefficient**:2

Teaching objectives (Describe what students were supposed to have learned from this topic -maximum 3 lines).

**Recommended Prior Knowledge:**

- Food biochemistry and composition, as well as the physiology of digestion.

**Course contents :**

**I- Intake and Needs**

- 1- Recommended intake of minerals and vitamins
- 2- Protein requirements
- 3- Carbohydrate requirements
- 4- Lipid and essential fatty acid requirements
- 5- Special needs (age, pregnancy, breastfeeding, sports...)

**II- Dietetics as Supportive Therapy**

- 1- Nutritional prescription
- 2- Application of dietetics in pathologies (CVD, nephropathy, gout, osteoporosis, digestive pathologies, deficiencies, eating disorders...)

**III- Food Composition**

- 1- Water and minerals
- 2- Beverages (coffee, tea, herbal teas, sodas, alcohol...)
- 3- Trace elements
- 4- Protein-rich foods
- 5- Lipid-rich foods
- 6- Carbohydrate-rich foods
- 7- Fruits and vegetables
- 8- Condiments
- 9- Vitamins

**IV- Preventive Nutrition**

**Practical Work:**

- 1- Food surveys and nutritional assessment (survey to be conducted in a retirement home for example)
- 2- Food glycemic index: practical protocol (video followed by discussion)
- 3- Dietary prescription: steps to follow (video followed by discussion)
- 4- Dietary management of the obese patient (video followed by discussion)
- 5- Dietary prescription in hypertension (survey of doctors in the public and private sectors)
- 6- Dietary prescription in type 2 diabetes (survey of practitioners in the public and private sectors)
- 7- Preventive nutrition: dietary prescription in pre-diabetic individuals (survey of practitioners in the public and private sectors)
- 8- Factors determining breastfeeding plans in working women (survey of midwives working in health centers and polyclinics)

**Assessment Method:**

- Presentations, quizzes, reports.

**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**Bibliographic References:**

- Dietetics and Nutrition. 2009. Apfelbaum et al.
- Practical Manual of Nutrition. 2009. Médart.

**Semester: 5**

**Fundamental Teaching Unit 1 (3.1.1): Nutritional and Food Biochemistry**

**Course 3: Nutrition and Pathologies**

- **Credits:** 4
- **Coefficient:** 2

**Teaching Objectives:**

- Upon completion of this course, the student will be able to perform a systemic reasoning linking nutritional needs and deficiencies with physiological dysfunctions leading to major metabolic diseases.

**Recommended Prior Knowledge:**

- Physiology of major bodily functions.

**Course Content:**

- **I- Metabolic Diseases**
  - 1- Regulation of fasting and postprandial blood glucose
  - 2- Pathophysiology of hyperglycemia
    - Type 1 diabetes
    - Type 2 diabetes
  - 3- Molecular mechanisms of insulin resistance
  - 4- Metabolic syndrome
  - 5- Pathophysiology of hypoglycemia
  - 6- Lipoprotein metabolism
  - 7- Pathophysiology of dyslipoproteinemias
  - 8- Pathophysiology of phenylketonuria
- **II- Other Nutrition-Related Pathologies**
  - 1- Food allergies
  - Cancers…

**Practical Work:**

- Diabetes,
- Hypertension,
- Obesity, osteoporosis,
- Anemia, celiac disease,
- Kwashiorkor, goiter, beriberi, rickets

**Assessment Method:**

- Presentations, quizzes, reports.

**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**Bibliographic References:**


- Maladies métaboliques de la nutrition.1977.Lubetzky
- Traité de diabétologie.2005.Grimaldietal

**Semester: 5**
**Fundamental Teaching Unit 1 (3.1.2): Physiology of Integrated Systems**
**Course 2: Physiology of Digestion**

- **Credits:** 2
- **Coefficient:** 1

**Teaching Objectives:**

- In direct relation to nutrition, the knowledge acquired in this course will allow students to better situate their specialization in relation to major bodily functions.

**Recommended Prior Knowledge:**

- Animal Biology.

**Course Content:**

- **I- General Anatomophysiology of the Digestive Tract**
- **II- Physiology of Digestion**
    - 1- Food intake
    - 2- Digestive functions
    - 3- Physiology of the buccoesophageal phase
    - 4- Physiology of the gastric phase
    - 5- Physiology of the intestinal phase
    - 6- Food metabolism in the digestive tract
    - 7- Intestinal absorption of nutrients
    - 8- Physiological functions of waste elimination
- **III- Hepatodigestive Function: Anatomophysiology and Metabolic Homeostasis**

**Practical Work:**

- Analysis and synthesis of recent articles on human nutrition and digestive pathologies, methods of exploring the digestive tract.

**Assessment Method:**

- Presentations, quizzes, reports.

**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**Bibliographic References:**


1. Manuel d'anatomie et de physiologie humaine. 2009. Tortora. Edition de Boeck.

2. Clés de la Biologie Humaine. 207. Ferrera et Car.

**Semester: 5**
**Methodological Teaching Unit 1 (3.1):**
**Course 1: Applied Statistics**

- **Credits:** 4
- **Coefficient:** 2

**Teaching Objectives:**

- Introduce students to data survey and analysis techniques, experimental methodology, and experimental design.

**Recommended Prior Knowledge:**

- Basic statistics.

**Course Content:**
**1. Introduction**
**Part One: Data Survey and Analysis Techniques**

1. Sampling Techniques
2. Survey Techniques (questionnaires). Application to a business plan
3. Statistical Estimation
4. Hypothesis Testing
5. Regression Analysis. Application to quality control

**Part Two: Experimental Methodology and Experimental Design**

Analysis of Variance. Establishing the experimental design and choosing the appropriate model. One-way ANOVA. Two-way ANOVA

**Practical Work:**

- Practical work is conducted on computers using statistical software (Excel-stat, R, SPSS, etc.). The goal of the sessions is to:
  - Familiarize students with the software.
  - Use the software to apply the concepts covered in the course to real datasets.
  - Interpret data representations and the results of statistical estimations or tests.

**Assessment Method:**

- Presentations, quizzes, reports.

**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**Bibliographic References:**

T.LChap.,2003.IntroductoryBiostatistics.Ed.Wiley&Sons,Hoboken,NewJersey,552p.
J.MLegay,1966.Exercicesdestatistiquepourbiologistes,Ed.Flammarion(Paris),304p.
SMorgenthaler.,2001.Introductionàlastatistique,Ed.Pressespolytechniquesetuniversitairesromandes, 318p.
D.SPaulson.,2008.BiostatisticsandMicrobiology:ASurvivalManual.Ed.Springer,226p.
KProtassov.,2002.Analysestatistiquedesdonnéesexpérimentales,Ed.EDPEssonne,148p.
BScherrer,LegendreP,&MohanB,2007.Biostatistique.V1,Ed.Gaetanmorin,816p

**Semester: 5**
**Methodological Teaching Unit 1 (3.1):**
**Course 2: Food Traceability**

- **Credits:** 5
- **Coefficient:** 3

**Teaching Objectives:**

- Enable students to acquire the essential basic principles of traceability.

**Recommended Prior Knowledge:**

- Applied microbiology, food composition.

**Course Content:**

- **1. National and International Traceability Regulations**
  - ISO, Codex Alimentarius, Algerian texts.
- **2. The Place of Traceability in Food Safety**
  - The different objectives of traceability (safety, legal, improvement, and economic).
- **3. Elements to Trace**
  - Forms of traceability.
    - Upstream traceability.
    - Internal traceability.
    - Downstream traceability.
    - Total traceability.
  - Traceability documentation.
- **4. Controls**
  - The role of authorities.
  - Product controls.
  - Food industry controls.

**Practical Work:**

- Educational outings: visits to food processing industries (fruit and vegetable processing industry, dairy industry, etc.).

**Assessment Method:**

- Presentations, quizzes, reports.

**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**References:**

AFNOR,2002.Traçabilitédanslafilièreagricoleetalimentaire.
D.Portetelleetal.,2000.Traçabilitédanslafilièreanimale.Biot.Agr.Soc.Envir.,4(4),233-240.
T.Chi-Dung,2002.Traçabilitétotaleenagro-alimentaire:méthodologiepratiqueetsuivi.www.afnor.fr.
ASO22005,Systèmedetraçabilitédanslachaînealimentaire:principesgénérauxrelatifsàlaconceptionetà laréalisation.Apublier.
S.Magalie,2007.Traçabilitédanslesecteuragro-alimentaire.Magalie.schott@voirin-consultants.com.

**Semester: 5**
**Discovery Teaching Unit (UED1):**
**Course: General Endocrinology**

- **Credits:** 2
- **Coefficient:** 2

**Teaching Objectives:**

- Introduce students to the actions of hormones related to nutrition.

**Recommended Prior Knowledge:**

- Biochemistry and animal biology.

**Course Content:**

1. **Energy Balance, Metabolism, and Nutrition**
    - 1.1. Energy metabolism
    - 1.2. Intermediate metabolism
    - 1.3. Nutrition
2. **The Thyroid Gland**
    - 2.1. Actions of thyroid hormones
    - 2.2. Mechanism of action of thyroid hormones
3. **Endocrine Functions of the Pancreas**
    - 3.1. Mechanisms of action of insulin
    - 3.2. Glucagon
    - 3.3. Endocrine regulation of carbohydrate metabolism
4. **Adrenal Medulla and Adrenal Cortex**
    - 4.1. Physiological actions of glucocorticoids
    - 4.2. Pharmacological and pathological effects of glucocorticoids
5. **Parathyroid Glands**
    - 5.1. Calcium metabolism
    - 5.2. Mechanism of action of parathyroid hormone and calcitonin
6. **Pituitary Gland**
    - 6.1. Growth hormone
    - 6.2. Physiology of growth
7. **Gonads**
    - 7.1. Pituitary gonadotropins and prolactin
    - 7.2. Pregnancy and lactation

**Practical Work:**

- Presentations on module chapters:
    - Mechanism of action of hormones; Type 1 diabetes mellitus; Goiter; Adrenal gland disorders; Parathyroid gland disorders; Pituitary gland and hypothalamic control disorders; Adrenal pathologies; Ovarian dysfunction; Gestational diabetes; Gynecomastia; Diabetes insipidus; Hypercalcemia; Cushing's syndrome; Acromegaly; Endocrine disruptors (pesticides, analgesics....); Menstrual cycle regulation.

**Assessment Method:** Presentations, quizzes, reports.
**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**References:**


- Idelman S., Verdetti J. Endocrinology and Cellular Communications. EdpSciences, 2000.
- Chanson P., Young J. Treatise on Endocrinology. Medicine-Sciences, Flammarion 2007.

- Dupovy J.P. Hormones and Major Functions. Volume 1, Ellipses, Paris, 1992

**Semester: 5**
**Transversal Teaching Unit (UET1):**
**Course: Food Additives and Contaminants**

- **Credits:** 1
- **Coefficient:** 1

**Teaching Objectives:**

- Introduce students to basic concepts in toxicology related to the use of food additives and the risks of food contaminants.

**Recommended Prior Knowledge:**

- Biochemistry and microbiology.

**Course Content:**

- **I. Basic Concepts in Toxicology**
- **II. Additives:**
    1. Preservatives and antioxidants
    2. weeteners
    3. Texture agents: thickeners, gelling agents, modified starches, emulsifiers, stabilizers
    4. Colorings and flavorings
    5. Flavor enhancers
    6. Additives with nutritional purposes (vitamins, trace elements)
    7. Additives and water activity depressants
    8. Processing aids (enzymes, clarifiers, antifoaming agents...)
    9. Food additive legislation
- **III. Contaminants:**
    - Toxicology of metals and metalloids: generalities, cases of mercury, lead, cadmium, arsenic, aluminum
    - Toxicology of nitrates and nitrites
    - Toxicology of dioxins
    - Toxicology of pesticides: generalities, cases of organochlorines, organophosphates, carbamates, and pyrethroids
    - Toxicology of mycotoxins
    - Food allergies

**Assessment Method:**

- Presentations, quizzes, reports.

**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**References:**

JL.MULTON,1992.Additifsetauxiliairesdefabricationdanslesindustriesagroalimentaires.F75384Paris Cedex08,France;TechniqueetDocumentationLavoisier.Ed.2,XXX,754pp.ISBN2-85206-606-8.
H.RICHARD,1992.Epicesetaromates.F75384ParisCedex08,France;TechniqueetDocumentation Lavoisier.Ed.2,XXX,754pp.ISBN2-85206-774-9.
CF.Moffat,WhittleKJ,1999.Environmentalcontaminantsinfood.SheffieldAcademicPress,Engla nd,584 p.
J.Adrian,1987.Compositiondublé.FondationRonac,p:11-34.
CF.Moffat,KJWhittle,1999.Environmentalcontaminantsinfood.SheffieldAcademicPress,England,584 p.Texteslégislatifsrégissantlesadditifsalimentairesetcontaminants
NormesNationalesetInternationalesrelativesauxadditifsalimentairesetcontaminants

**Semester: 6**
**Fundamental Teaching Unit (UEF3.2.1): Food Safety**
**Course 1: Food Quality Management**

- **Credits:** 4
- **Coefficient:** 2

**Teaching Objectives:**

- After completing this course, students will have the necessary knowledge of the procedures and regulatory aspects of preventing and preserving the sanitary quality of food.

**Recommended Prior Knowledge:**

- None specified.

**Course Content:**

1. The concept of quality
2. Quality characteristics
3. Quality tools
4. ISO standards
5. Work and organization standards
    - a. Good Manufacturing Practices (GMP)
    - b. Good Laboratory Practices (GLP)
    - c. Good Hygiene Practices (GHP)
6. Standardization organizations
7. Certification, Accreditation, Audit
8. National and international legislation
9. Application of the HACCP method in the food industry

**Practical Work:**

- Series of exercises on the course chapters:
    - Organoleptic study of food products
    - Physicochemical analysis of food (water content determination)
    - Physicochemical analysis of food (ash content determination)
    - Conformity study of food packaging
    - Microbiological criteria of food (3 sessions)
    - Case study of HACCP application in the food industry

**Assessment Method:**

- Presentations, quizzes, reports.

**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**Bibliographic References:**

1. Quality Management: Tools and Practical Applications, ISHIKAWA. Dunod, 2007.
2. Food Product Quality: Policy, Incentives, Management and Control. Tec&Doc, 1994.

**Semester: 6**
**Fundamental Teaching Unit (UEF3.2.1): Food Safety**
**Course 2: Food Toxicology and Microbiological Safety**

- **Credits:** 4
- **Coefficient:** 2

**Teaching Objectives:**

- After completing this course, students will be able to identify the risks associated with food contamination and understand their consequences.

**Recommended Prior Knowledge:**

- None specified.

**Course Content:**

- I. Microbiological safety of food
    1. Principle of foodborne illness
        - Bacterial toxicity
        - Mycotoxins
    2. Microbial groups in food safety
    3. Microorganism/food associations
    4. Microbiological control of food
- II. Food toxicology
    1. Toxicities and mechanisms of action of toxic substances
    2. Study methods
    3. Harmful natural substances in food
    4. Food additives
    5. Metals
    6. Alcohols, ketones, peroxides, nitrates, nitrites, nitrosamines
    7. Pesticide residues in food
    8. Packaging residues in food
    9. Prevention and legislation

**Assessment Method:**

- Presentations, quizzes, reports.

**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**Bibliographic References:**

1. Practical Guide to Toxicology, Reichl Franz-Xavier, De Boeck, 2004.
2. Food Microbiology. T.1, Microbiological Aspects of Food Safety and Quality, Bourgeois Claude-Marcel, Ed. Tec.e

**Semester: 6**
**Fundamental Teaching Unit (UEF3.2.2):**
**Course: Food Microbiology**

- **Credits:** 6
- **Coefficient:** 3

**Teaching Objectives:**

- Provide the necessary information on the main microorganisms relevant to the food industry and assess the sanitary and hygienic quality of food.

**Recommended Prior Knowledge:**

- Microbiology.

**Course Content:**

- Introduction
- I. Major bacteria
- A. Major microbial groups in food microbiology
- II. Influence of manufacturing techniques on microbes
    1. Destruction of manufacturing flora on microbes
    2. Chemical factors (antiseptics, fungicides, antibiotics)
    3. Flora stabilization
- III. Microbiological problems in a food factory
- V. Intoxications and foodborne illnesses
    1. Botulism
    2. Salmonellosis
    3. Staphylococci
    4. Mycotoxins
    5. Seafood toxins
- VI. Microbiological analysis of food

**Practical Work:**

- Microbiological analysis of food
    1. Water
    2. Milk
    3. Fermented milk and cheese
    4. Butter and fat
    5. Meat and meat products
    6. Fish and seafood
    7. Alcoholic and non-alcoholic beverages
    8. Vegetable products and derivatives
    9. Canned goods
    10. Various foods (creams, ready meals, etc.)

**Assessment Method:**

- Presentations, quizzes, reports.

**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**References:**


- CM. BOURGEOIS and JP. LARPENT, 1996. Food Microbiology. Volume 2. Fermented Foods and Food Fermentations. 2nd edition. Technique et Documentation Lavoisier Paris. ISBN 2-85206-517-7.
- CM. BOURGEOIS et al., 1996. Food Microbiology. I. Microbiological Aspects of Food Safety and Quality. 2nd edition. Technique et Documentation Lavoisier Paris. F75384 Paris France, ISBN 2-85206-451-0. 419pp.

**Semester: 6**
**Methodological Teaching Unit (UEM1.1):**
**Course: Health and Nutritional Therapy**

- **Credits:** 4
- **Coefficient:** 2

**Teaching Objectives:**

- Enable students to understand the basics of nutritional therapies.

**Recommended Prior Knowledge:**

- Biochemistry and Human Nutrition.

**Course Content:**

1. Specific needs 1.1. Fetus 1.2. Infant 1.3. Child 1.4. Adolescent
2. Nutritional therapy and female reproductive life
3. Nutritional therapy intervention in cardiovascular systems
4. Immune system, prevention of infectious diseases
5. Pollution, allergies
6. Free radicals, degenerative diseases, cancers
7. Intervention in age-related deterioration
8. Digestive and intestinal disorders, use of prebiotics and probiotics
9. Interest and importance of physiological antioxidants, essential fatty acids, vitamins, minerals, and essential amino acids.

**Practical Work:**

- Analysis and synthesis of recent articles on nutritional therapies
    1. Functional foods
    2. Gut flora and health
    3. Nutrigenomics
    4. Plant-based milks and derivatives
    5. Dietary regimens
    6. Medicinal plants: benefits and limitations
    7. Biological activities of olive oil and olive leaves
    8. Probiotics, prebiotics, and symbiotics
    9. Xenobiotics

**Assessment Method:**

- Presentations, quizzes, reports.

**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**References:**


1. Cazel A.R. , Gayet B. Keys to Nutritional Therapy. Quintessence Edition 2002.
2. Curtay J.P. Nutritional Therapy. Scientific Basis and Medical Practice. Nutri Doc 2008.
3. Roberfroid M., Coxam U., Delzenne N.I. Functional Foods. Tec et Doc 2011.

**Semester: 6**
**Methodological Teaching Unit (UEM1.1):**
**Course: Physicochemical Properties of Food**

- **Credits:** 5
- **Coefficient:** 3

**Teaching Objectives:**

- This module aims to teach students the importance of water activity and the functional properties of various food constituents (proteins, lipids, and polysaccharides).

**Recommended Prior Knowledge:**

- Biochemistry.

**Course Content:**

- CHAPTER I. WATER
    - Generalities
        1. Water structure
        2. Physical properties
        3. Water activity
        4. Behavior of water in solutions during freezing
        5. Adsorption isotherms
        6. Hysteresis phenomena of isotherms
        7. Sorption isotherms in the food industry
- CHAPTER II. PROTEIN SYSTEMS
    1. Physical properties of proteins
    2. Extraction of food proteins
    3. Egg proteins: properties and uses
    4. Functional properties of dairy proteins and improvement
    5. Protein ingredients
- CHAPTER III. LIPIDS
    0. Chemical and physical properties of lipids
    1. Functional properties of certain fats
    2. Nutritional needs for fats
    3. Conservation and alteration
- CHAPTER IV. STUDY OF POLYSACCHARIDES
    0. Cellulose and its derivatives
    1. Starch
        1. Gelatinization and retrogradation phenomena
        2. Rheological behavior
        3. Functional properties of native and modified starches
        4. Amylolytic enzymes and their uses
    2. Dietary fiber

**Practical Work:**

- Enzymatic browning
- Non-enzymatic browning
- Sugar determination by refractometer
- Determination of physical indices of oils
- Determination of chemical indices of oils
- Vitamin C determination in fruits and vegetables

**Assessment Method:**

- Presentations, quizzes, reports.

**Weighting:**

- Exam: 60%

- Continuous assessment: 40%

**References:**


- Dilmi-Bouras A. (1998). Food Constituents... Edition, OPU, Algiers, 272 p.
- Dilmi-Bouras A. (2004). Food Biochemistry. Edition OPU, Algiers, 110 p.
- Dilmi-Bouras A. (2006). General Biochemistry. Dar El-Hadith Edition, Algiers, 290 p.

**Semester: 6**
**Methodological Teaching Unit (UEM1.2):**
**Course: Analytical Techniques**

- **Credits:** 4
- **Coefficient:** 2

**Teaching Objectives:**

- Mastery of analytical techniques.

**Recommended Prior Knowledge:**

- Chemistry and biochemistry.

**Course Content:**

- Main spectrophotometric techniques
    1. Molecular absorption spectrometry
        - UV-Visible molecular absorption spectrometry
        - Infrared molecular absorption spectrometry
    2. Atomic emission spectrometry
    3. Atomic absorption spectrometry
    4. Nuclear Magnetic Resonance
- Main separation techniques
    1. Chromatography
    2. Electrophoresis
        - Focusing
    3. Labeling methods
        - Isotopic methods
        - Radioimmunoassay
        - Radioenzymatic assay

**Practical Work:**

- Solution preparation
- UV-Visible spectrophotometry
- Refractometry
- Lipid determination
- Protein determination
- Total sugar determination
- Chromatographic techniques: Thin layer, Gas chromatography

**Assessment Method:**

- Presentations, quizzes, reports.

**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**References:**


- Skoog. Holler. Nieman. 2003. Principles of Instrumental Analysis. De Boeck Edition.
- George Charalambous. 1983. Instrumental Analysis of Food. Academic Press Edition.
- Jacques Bérarud. 2003. The Biological Analysis Technician. Tec et Doc Edition.
- Plas O., Allay J., Chassin M. 2005. Biological Analyses. Doin Edition.
- Beck Moreau. 1992. Practical Guide to Medical Analyses by Simple and Rapid Methods. Vigot Edition.

**Semester: 6**
**Discovery Teaching Unit (UED1):**
**Course 1: Physiology of Major Functions**

- **Credits:** 1
- **Coefficient:** 1

**Teaching Objectives:**

- Upon successful completion of this course, students will be able to trace the physiology of blood, the nervous system, and the respiratory, cardiovascular, and urinary systems.

**Recommended Prior Knowledge:**

- Animal biology.

**Course Content:**

- I- Blood
    1. Liquid compartment and role of blood cells
    2. Primary and secondary hemostasis
- II- Nervous system: Structure, organization, and general functions
- III- Cardiovascular system: Homeostasis at rest and during exercise
- IV- Respiratory system: Functional anatomy, mechanisms, and homeostasis
- V- Urinary system: Functional anatomy and hydromineral homeostasis

**Practical Work:**

- Analysis and synthesis of recent articles

**Assessment Method:**

- Presentations, quizzes, reports.

**Weighting:**

- Exam: 60%
- Continuous assessment: 40%

**Bibliographic References:**

1. Manual of Human Anatomy and Physiology. 2009. Tortora. De Boeck Edition.
2. Keys to Human Biology. 207. Ferrera and Car.

**Semester: 6**
**Discovery Teaching Unit: UED 1 (O/P)**
**Course: Entrepreneurship and Project Management**

- **Credits:** 1
- **Coefficient:** 1
- **Teaching Method:** Distance learning

**Teaching Objectives:**

- Introduce learners to project development, launch, monitoring, and implementation.

**Recommended Prior Knowledge:**

- Economics, Marketing.

**Course Content:**

1. Entrepreneurship and business management 1.1. Definition of a business 1.2. Business organization 1.3. Supply management: Purchasing, inventory, and warehouse management 1.4. Production management: Production methods and policies 1.5. Commercial management and marketing: * Product policy * Price policy * Advertising * Sales techniques and team
2. Business creation project development 2.1. Definition of a project 2.2. Project specifications 2.3. Project financing methods 2.4. Project implementation phases 2.5. Project management 2.6. Time management 2.7. Quality management 2.8. Cost management 2.9. Task management

**Assessment Method:**

- Final Exam (100%)

**Bibliographic References:**

1. Bertrand Moingeon and Laurence Lehmann-Ortega (2010), "Genesis and Deployment of a New Business Model: A Striking Case Study," Management, 13: 4, 266-297.
2. Dauchy D., 2010, 7 Steps to a Solid Business Model, Dunod.
3. Verstraete J., Jouison-Laffitte E., Business Model for Entrepreneurship, De Boeck Universite, 2009.