PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA

MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH

Higher School of Saharan Agriculture

El Oued

HIGHER SCHOOL OF SAHARAN AGRICULTURE - ELOUED

المدرسة العليا للفلاحة الصحراوية - الوادي

Academic Program

2nd Cycle

Animal Production

3rd Year

5th Semester

Teaching Unit: Fundamental
Subject: Camel farming
VHS: 67h30min (C/T/PW)
Credits: 5
Coefficient: 3
Evaluation method: Continuous assessment: 40% Exam: 60 %.

Learning Objectives

- • Master the biological, anatomical, and physiological characteristics of the dromedary (Camelus dromedarius).
- • Understand the specificities of its breeding, reproduction, and valorization within the Algerian context.
- • Integrate the unique features of the camel sector into sustainable animal production strategies.

Course Content

1. General Knowledge of the Camelid Animal

- **1.1. History and Domestication of the Dromedary:** Geographical and evolutionary origins; Role in pastoral societies.
- **1.2. Economic and Social Importance of Camelids in Arid Zones:** Multifunctionality (draft power, meat, milk, transport); Role in pastoral resilience.

2. Anatomy and Physiological Particularities

- **2.1. Morphological Features and Ecological Adaptations:** Physical constitution, thermoregulation, resistance to dehydration.
- **2.2. Digestive, Respiratory, and Circulatory Systems:** Major physiological specificities (rumination, hematology, etc.).
- **2.3. Implications for Livestock Management:** Behavior, adaptation to extensive or semi-intensive systems.

3. Reproductive Physiology

- **3.1. Male and Female Reproductive Tracts:** Specific anatomical characteristics.
- **3.2. Sexual Cycles and Reproductive Behaviors**
- **3.3. Breeding Methods:** Natural mating, artificial insemination, breeding herd management.
- **3.4. Gestation, Parturition, and Neonatal Care**

4. Camel Nutrition

- **4.1. Nutritional Requirements and Digestibility**
- **4.2. Specific Forage Plants and Feeding Strategies**

- **4.3. Feed Management under Extreme Conditions**

5. Camel Production

- **5.1. Milk Production:** Yield, composition, factors of variation.
- **5.2. Meat Production:** Quality, growth, butchery valorization.
- **5.3. Other Products:** Leather, wool, manure, transport or draft services.

6. Camel Herd Management

- **6.1. Herd Organization and Farming Systems:** Extensive, semi-intensive, transhumant.
- **6.2. Health Practices and Prophylaxis:** Major diseases, preventive measures.
- **6.3. Animal Welfare and Resource Management**

7. Status of Camel Farming in Algeria

- **7.1. Geographical Distribution and Herd Sizes**
- **7.2. Main Camel-Rearing Regions:** Sahara, High Steppes.
- **7.3. Development Constraints and Valorization Policies**
- **7.4. Perspectives and Applied Research**

TUTORIAL WORK (TD):

- **TD 1:** Comparative analysis of the physiological adaptations of the dromedary with other ruminants (cattle, sheep) in arid climates.
- **TD 2:** Evaluation of milk and meat yields according to feed type and livestock management.
- **TD 3:** Analysis of graphs and tables on camel reproduction (fertility curves, seasonality, gestation length).
- **TD 4:** Design of a mini-project for a camel farming operation (breed selection, feeding, reproduction, market outlets).

PRACTICAL WORK (Travaux Pratiques - TP):

- **TP 1:** Observation of diagrams or anatomical specimens of the dromedary digestive and reproductive systems.
- **TP 2:** Ration formulation adapted to different categories (young stock, pregnant females, lactating females).
- **TP 3:** Analysis of the physicochemical parameters of camel milk (density, pH, fat content – demonstration or data analysis).
- **TP 4:** Observation of management practices on a camel farm (or alternatively, critical analysis of a technical documentary video).

Teaching Unit: Fundamental
Subject: Fish Farming (Aquaculture)
VHS: 45h (C/PW)
Credits: 5
Coefficient: 2
Evaluation method: Continuous assessment: 40% Exam: 60 %.

Learning Objectives

- • Acquire fundamental knowledge in inland aquaculture and fish reproduction.
- • Master breeding techniques and fish production management.
- • Understand the aquatic food chain and product valorization methods.
- • Evaluate the current status and perspectives of aquaculture in Algeria.

Course Content

1. General Introduction

- **1.1. Definition of Aquaculture and Fish Farming**
- **1.2. Socio-Economic Importance of Aquaculture**
- **1.3. Historical Evolution and Current Status at Global and National Scales**

2. Status of Fish Farming in Algeria

- **2.1. Suitable Zones for Aquaculture:** Dams, hill reservoirs, oases, ponds.
- **2.2. Farmed Species:** Tilapia, carp, catfish, sea bass, sea bream...
- **2.3. Sector Constraints and Perspectives:** Technical, regulatory, economic.

3. Fish Reproduction

- **3.1. Anatomy and Physiology of Reproductive Systems**
- **3.2. Seasonality and Endocrine Regulation of Reproduction**
- **3.3. Fertilization Mechanisms in Freshwater Species**

4. Fish Breeding Techniques

- **4.1. Natural Reproduction:** Conditions and farming practices.
- **4.2. Artificial Reproduction:** Hormonal induction, gamete collection, and fertilization.
- **4.3. Incubation, Hatching, and Fry Care**

5. Aquatic Food Chain

- **5.1. Food Chain Organization in Aquatic Environments**
- **5.2. Primary and Secondary Production, Role of Phytoplankton / Zooplankton**
- **5.3. Fish Feeding:** Natural vs. artificial.

6. Freshwater Fish Farming Techniques

- **6.1. Types of Farming Systems:** Ponds, floating cages, raceways/tanks, RAS (Recirculating Aquaculture Systems).

- **6.2. Stocking Density, Water Quality, Oxygenation**
- **6.3. Feeding Practices and Growth Monitoring**

7. Production and Productivity of Water Bodies

- **7.1. Estimation of Biological Productivity**
- **7.2. Technical Monitoring Indicators:** Biomass, yield, feed conversion ratio (FCR).
- **7.3. Stocking and Harvesting Techniques**

8. Valorization of Aquacultural Products

- **8.1. Processing and Preservation:** Drying, smoking, freezing.
- **8.2. Marketing and Distribution Channels**
- **8.3. Health Regulations and Product Quality**

PRACTICAL WORK (PW):

- **TP 1:** Virtual or real dissection of a fish to identify reproductive and digestive organs.
- **TP 2:** Demonstration of hormonal reproduction protocol (using diagrams, videos, or educational material).
- **TP 3:** Analysis of basic water quality parameters (temperature, pH, oxygen, ammonia) in a real or simulated farming setup.
- **TP 4:** Simulation of zootechnical calculations: biomass, growth rate, feed conversion ratio, yield per hectare.

Teaching Unit: Fundamental
Subject: Beekeeping (Apiculture)
VHS: 45h (C/T)
Credits: 4
Coefficient: 2
Evaluation method: Continuous assessment: 40% Exam: 60 %.

Learning Objectives

- • Acquire in-depth knowledge of bee biology and physiology.
- • Master beekeeping techniques and colony management.
- • Understand the importance of apiculture in the ecosystem, particularly pollination and honey production.
- • Know how to organize an apiary and optimize apicultural production.

Course Content

1. Biology of Bees

- **1.1. Bee Races:** Overview of main bee races used in apiculture: Apis mellifera, local races, etc.
- **1.2. Bee Colonies:** Colony structure, role of queen, workers, and drones. Colony life cycle and social organization.

2. Bee Anatomy and Physiology

- **2.1. External Anatomy of Bees:** Description of different body parts: head, thorax, abdomen, wings, mouthparts.
- **2.2. Internal Anatomy of Bees:** Internal organs: digestive, respiratory, nervous, and reproductive systems.
- **2.3. Physiology of Digestion and Reproduction:** Digestive process (food, pollen, nectar) and reproductive system of queen and workers.

3. Bee Feeding Behavior

- **3.1. Foraging and Collection of Nectar and Pollen:** Feeding behaviors and collection mechanisms of nectar and pollen by bees.
- **3.2. Storage and Processing Behaviors:** Nectar storage, honey production, and transformation of nectar into honey by worker bees.

4. Activities within the Colony

- **4.1. Role of Worker Bees:** Worker functions: cleaning, hive maintenance, feeding queen and larvae.
- **4.2. Role of Drones:** Reproductive role and behavior in the colony.
- **4.3. Role of the Queen:** Central role of queen in the colony, reproduction, and brood management.

5. The Apiary and Beekeeping Tools

- **5.1. Types of Hives:** Different types of hives (Langstroth, Dadant, Warré) and their utilization.
- **5.2. Extraction and Packaging of Beehive Products:** Honey extraction equipment, harvesting techniques, filtration, and packaging.

6. Beekeeping Management

- **6.1. Establishing an Apiary:** Site selection, apiary maintenance, and spatial layout.
- **6.2. Hive Operations:** Hive maintenance: monitoring, frame replacement, seasonal hive management.
- **6.3. Colony Maintenance:** Methods to ensure colony health: disease prevention, parasite treatment, etc.

7. Transhumance (Migratory Beekeeping)

- **7.1. Definition and Objectives:** Importance of transhumance for pollination and honey production.
- **7.2. Transhumance Practices:** Techniques for moving hives according to seasons and flower blooms.

8. Honey Flora and Pollination

- **8.1. Main Honey Plants:** Plant species favorable for nectar production: trees, herbs, and flowers.
- **8.2. Nectar Secretion:** Process of nectar production by plants and its role in the ecosystem.
- **8.3. Role of Bees in Pollination:** Importance of bees for crop pollination and biodiversity.
- **8.4. Bee-Assisted Pollination Techniques:** Agricultural practices using bees to improve crop yields.

9. Bee Improvement

- **9.1. Genetic Selection:** Techniques for improving bees to increase productivity and disease resistance.
- **9.2. Queen Rearing:** Queen rearing process and selection of top breeding stock.
- **9.3. Colony Multiplication:** Methods for splitting colonies, swarm management, and creating new hives.

10. Beehive Products

- **10.1. Honey:** Types of honey, characteristics, and nutritional properties.
- **10.2. Beeswax:** Uses of beeswax and harvesting techniques.
- **10.3. Pollen and Royal Jelly:** Nutritional and commercial value of pollen and royal jelly.
- **10.4. Other Beehive Products:** Propolis, bee venom, and their therapeutic applications.

11. Status of Beekeeping in Algeria

- **11.1. Analysis of the Beekeeping Sector:** Study of honey production in Algeria, main beekeeping regions, constraints, and opportunities.

- **11.2. Challenges and Perspectives:** Issues related to diseases, transhumance, and climatic conditions.

TUTORIAL WORK (TD):

- **TD 1:** Comparative study of bee races (comparison of different bee races used in apiculture (Apis mellifera and others), their characteristics, advantages, and disadvantages regarding the Algerian climate).
- **TD 2:** Diagnosis of colony health (observation of colonies, identification of signs of common diseases (varroa, nosema, etc.) and appropriate solutions).
- **TD 3:** Honey and beeswax harvesting techniques (simulation of honey harvest, extraction, filtration, and beeswax collection).
- **TD 4:** Apiary planning and transhumance management (designing a transhumance plan for an apiary, site selection, and hive relocation calendar).

Teaching Unit: Fundamental
Subject: Horse Breeding
VHS: 45h (C/T)
Credits: 4
Coefficient: 2
Evaluation method: Continuous assessment: 40% Exam: 60 %.

Learning Objectives

Provide students with in-depth knowledge of equine farming in relation to biological, physiological, and production specificities of equids, with a focus on the situation in Algeria.

Course Content

I. Knowledge of the Livestock Animal

- **A.** History and domestication of the horse
- **B.** Equine breeds and their aptitudes (draft, sport, leisure, reproduction, etc.)
- **C.** Economic, social, and cultural importance of the horse in Algeria

II. General Biology and Physiology

- **A.** Fundamental biological characteristics
- **B.** Vital functions (respiration, circulation, digestion, thermoregulation)
- **C.** Natural behavior and equine ethology

III. Anatomical and Physiological Features of Equids

- **A.** General anatomy: skeleton, muscular system, internal organs
- **B.** Digestive system specificities (monogastric, hindgut fermentation)
- **C.** Locomotor system and specificities for equestrian activities
- **D.** Health implications and prevention of common pathologies

IV. Implications for Livestock Management

- **A.** Housing and infrastructure layout (stalls, paddocks, loose boxes)
- **B.** Hygiene, routine care, and animal welfare
- **C.** Handling and restraint of the horse
- **D.** Health management and prophylaxis of equine diseases

V. Specific Nutrition

- **A.** Nutritional requirements according to age, activity, and physiological state
- **B.** Typical rations and feeding practices
- **C.** Authorized and toxic feeds for horses
- **D.** Supplementation and water management

VI. Specific Reproductive Physiology

- **A.** Mare sexual cycle
- **B.** Reproductive behavior
- **C.** Breeding techniques (natural mating, artificial insemination)
- **D.** Gestation, foaling, and foal care
- **E.** Common reproductive pathologies

VII. Equine Production

- **A.** Production objectives (sport, work, reproduction, meat, leisure)
- **B.** Reproductive and zootechnical performance
- **C.** Genetic selection and improvement of local breeds

VIII. Status of Equine Farming in Algeria

- **A.** Geographical distribution of equine populations
- **B.** Local breeds (Barb, Arab-Barb, Purebred Arabian, etc.)
- **C.** Public policies and support institutions (ONDEFOC, national studs, etc.)
- **D.** Challenges and development perspectives for the equine sector

TUTORIAL WORK (TD):

- **TD 1:** Identification of local equine breeds and their characteristics.
- **TD 2:** Formulation of a feeding plan for a horse according to its activity level.
- **TD 3:** Observation and analysis of equine behavior.
- **TD 4:** Case study on an equine farm in Algeria (health, economic, and technical aspects).

Teaching Unit: Methodology
Subject: Special Livestock Farming
VHS: 45h (C/PW)
Credits: 4
Coefficient: 2
Evaluation method: Continuous assessment: 40% Exam: 60 %.

Learning Objectives

Provide students with the necessary knowledge to understand and master breeding techniques for animal species other than conventional livestock (cattle, sheep, goats, and laying hens), with a special emphasis on alternative meat and egg-producing species.

Course Content

I. Poultry Farming Other Than Chickens

- **A. Species Concerned:** Turkey, Duck, Goose, Pheasant, Quail, Guinea Fowl, Ostrich.
- **B. Biological and Behavioral Characteristics:** Specific anatomical and physiological data, ethological behaviors and needs.

II. Breeding Management for Egg Production

- **A.** Nutritional requirements and ration formulation
- **B.** Housing, equipment, and environmental conditions
- **C.** Laying cycle management
- **D.** Egg collection, sorting, and preservation
- **E.** Health and hygiene in poultry farming

III. Breeding Management for Meat Production

- **A.** Growth and zootechnical performance
- **B.** Feeding according to growth phases
- **C.** Fattening techniques
- **D.** Reproduction management for meat production
- **E.** Slaughter, processing, and valorization

IV. Productivity and Product Quality

- **A.** Quality criteria for eggs and meat
- **B.** Factors influencing productivity
- **C.** Certification, traceability, and commercial valorization

V. Status of Special Poultry Farming in Algeria

- **A.** Populations and main production regions
- **B.** Public and private initiatives

- **C.** Development constraints and perspectives
- **D.** Marketing and distribution outlets

PRACTICAL WORK (PW):

- **TP 1:** Identification of alternative species and their zootechnical characteristics.
- **TP 2:** Design of a breeding plan for quail or guinea fowl (egg or meat production).
- **TP 3:** Comparative study of growth performance in rabbits (local vs. hybrid breeds).
- **TP 4:** Technical and economic analysis of a farm-scale rabbit production project in Algeria.

Teaching Unit: Methodology
Subject: Agricultural Experimentation
VHS: 37h 30min (C/T)
Credits: 3
Coefficient: 2
Evaluation method: Continuous assessment: 40% Exam: 60 %.

Learning Objectives

Train students in the design, implementation, and analysis of experimental protocols related to animal production. Upon completion, students will be able to define clear experimental hypotheses, select relevant experimental designs, perform basic and advanced statistical analyses, utilize specialized digital software tools, and critically appraise experimental trials.

Course Content

1. Introduction to Agricultural Experimentation

- • **Objectives of Agricultural Experimentation:** Validation of agronomic hypotheses (treatment effects, varieties, cultural practices); Optimization of animal and crop production systems.
- • **Challenges of Agricultural Experimentation:** Natural variability (soil, climate, biological); Control of confounding factors; Repeatability and reproducibility of trials.

2. General Principles of Experimentation

- • **Experimental Methodology:** Formulation of hypotheses (H_0 and H_1); Trial planning (variables, replications, controls).
- • **Basic Statistical Analyses:** Comparison of two means (Student's t-test, Mann-Whitney U test); Comparison of k means (One-way ANOVA, post-hoc tests).

3. Experimental Designs

- • **Completely Randomized Design (Simple Paired Student Design):** Pairing of experimental units.
- • **Randomized Complete Block Design (RCBD):** Control of spatial or temporal heterogeneity.
- • **Latin Square Design:** Double control of blocking effects (rows × columns).
- • **Other Designs:** Confounding (partial confounding of effects); Incomplete blocks (for trials with logistical constraints); Series of trials (meta-analysis and data aggregation).

4. Advanced Methods of Comparison

- • **Post-Hoc Tests:** Duncan's multiple range test; Rank multiplication methods (Tukey, Bonferroni).

- • **Multidimensional Inference:** Two-way / Three-way ANOVA; Interactions between variables.

5. Modeling and Digital Tools

- • **Modeling in Animal Experimentation:** Growth curves, mixed-effects models (fixed and random effects).
- • **Statistical Analysis Software:** R / SAS (ANOVA, linear models); SPSS / JMP (Interactive analyses); Python (pandas, statsmodels: Handling large datasets).

6. Concrete Case Studies

- • Examples of trials in animal production (nutrition, genetics).
- • Critical analysis of published agronomic literature.

TUTORIAL WORK (TD):

- **TD 1:** Construction of an experimental protocol in animal production (Formulation of a hypothesis regarding feed or treatment effects; definition of variables, controls, and suitable design; preparation of trial plan with replications).
- **TD 2:** Statistical analysis of an experimental dataset (Application of t-test, one-way ANOVA, or non-parametric tests; interpretation of results and graphical representation; discussion of sources of variability).
- **TD 3:** Comparison of experimental designs (Comparative study of randomized complete blocks, Latin square, and factorial designs; advantages and limitations according to trial conditions; simulation of results and efficiency analysis).
- **TD 4:** Critical appraisal of a scientific experimental publication (Selection of an article on animal production experimentation; analysis of methodology, sampling, designs, data treatment, limitations, and biases).

Teaching Unit: Methodology
Subject: Research Methodology
VHS: 22h 30min (C)
Credits: 2
Coefficient: 1
Evaluation method: Continuous assessment: 100%

Learning Objectives

Introduce students to the scientific approach and methodological tools necessary for producing, communicating, and valorizing research work in animal production. Develop skills in reading, understanding, synthesizing, and disseminating scientific information.

Course Content

I. Study of Scientific Articles

- **A. Typology of Scientific Publications:** Original articles, literature reviews, conference communications.
- **B. Structure of a Scientific Article:** Abstract, introduction, materials and methods, results, discussion, conclusion; Critical reading and hypothesis identification.
- **C. Evaluation of Scientific Quality:** Methodological validity criteria, impact factor and indexed journals, publication ethics.

II. Scientific Communication Techniques

- **A. Writing a Research Report or Thesis:** Standard outline, argumentative logic, clear and concise writing, hypothesis/objective formulation, presentation of results.
- **B. Oral Presentations:** Public speaking techniques, visual aids (PowerPoint, Prezi, Canva), time management and audience interaction.
- **C. Designing a Scientific Poster:** Structure, design, relevant content, visual impact, and legibility.

III. Referencing and Information Management

- **A. Literature Search:** Scientific databases (ScienceDirect, Scopus, Google Scholar), keywords, Boolean operators.
- **B. Bibliographic Referencing:** Citation styles (APA, Vancouver, ISO 690), reference management software (Zotero, Mendeley, EndNote).
- **C. Plagiarism and Scientific Integrity:** Plagiarism detection, citations, and paraphrasing.

IV. Popularization and Dissemination of Science

- **A. Popularizing Scientific Content:** Adapting language for the general public or farmers, scientific mediation tools.

- **B. Audiovisual and Digital Methods:** Video presentations, infographics, podcasts, social media for sharing results.
- **C. Field Surveys and Practical Demonstrations:** Questionnaire design, survey methodology (sampling, biases, data analysis), organizing technical workshops/demonstrations.

V. Typographical and Editorial Conventions

- **A. Scientific Typography Rules:** Capitalization, punctuation, units, symbols, species and substance nomenclature.
- **B. Page Layout and Document Standardization:** Pagination, headings, captions, compliance with institutional/editorial guidelines.

Teaching Unit: Discovery
Subject: Biotechnology and Processing of Animal Products
VHS: 22h 30min (C)
Credits: 1
Coefficient: 1
Evaluation method: Exam: 100%

Course Content

1. Fundamentals of Applied Biotechnology in Animal Products
- • Introduction to animal biotechnology.
- • Applications of biotechnology in animal production and processing.

2. Microbiology and Fermentation in Animal Product Processing
- • Role of microorganisms in fermentation (cheeses, yogurts, cured meats).
- • Microbiological quality control of animal products.

3. Processing Technologies for Meat and Meat Products
- • Slaughter procedures and meat preservation.
- • Production of fermented meat products (sausages, hams).

4. Dairy Technologies and Processing of Milk Products
- • Pasteurization, homogenization, and fermentation processes.
- • Production of cheeses, yogurts, and fermented milks.

5. Biotechnology in the Valorization of Animal Co-Products
- • Extraction of collagen, gelatin, and other functional proteins.
- • Utilization of by-products in nutraceuticals and cosmetics.

6. Quality Control and Sanitary Safety of Animal Products
- • **Analytical Methods:** HPLC, spectrometry, ELISA.
- • HACCP standards and food safety regulations.

7. Emerging Innovations and Biotechnologies
- • Cultured meat (cellular agriculture).
- • Applications of nanotechnologies and recombinant enzymes.

8. Ethics, Regulation, and Societal Impact of Animal Biotechnologies
- • Debates on GMOs and animal welfare.
- • International regulations (EFSA, FDA, WOAH/OIE).

Teaching Unit: Transversal
Subject: Entrepreneurship and Project Management
VHS: 22h 30min (C)
Credits: 1
Coefficient: 1
Evaluation method: Continuous Assessment: 100%

Learning Objectives

Provide students with essential skills to understand business operations and create their own entrepreneurial projects, particularly in animal production, nutrition, and agricultural service sectors.

Course Content

I. Fundamentals of Business and Functional Management

- **A. What is a Business?** Definition, economic and social role; Company typologies (sole proprietorship, LLC, cooperative, etc.); Economic, legal, and tax environment.
- **B. Business Organization:** Organizational chart and main functions; Roles of different departments (production, purchasing, sales, HR, etc.).
- **C. Supply Management:** Purchasing management (supplier selection, negotiation, contracts); Inventory management (turnover, storage costs, reorder points).
- **D. Production Management:** Production modes (artisanal, industrial, make-to-order, mass production); Production policy (planning, quality, costs).
- **E. Commercial Management and Marketing:** Product policy (range, packaging, differentiation); Pricing policy (costing, pricing strategies); Communication and advertising (channels, targets, messaging); Sales team and techniques (prospecting, customer retention, CRM).

II. Business Creation and Entrepreneurial Project Management

- **A. Project Definition and Typology:** Entrepreneurial, innovation, and social projects; Objectives, feasibility, expected impacts.
- **B. Project Specifications / Terms of Reference:** Identifying needs or opportunities; Objectives, expected results, constraints.
- **C. Financing Modes:** Personal equity, bank loans, grants, microcredit, venture capital, state support programs (e.g., ANADE, CNAC, ANGEM).
- **D. Project Implementation Phases:** Market research, business plan, administrative and legal procedures, operational implementation.

- **E. Project Steering and Management:** Monitoring, scheduling, adjustments; Project management tools (Gantt, SWOT, PERT); Cost, HR, and timeline management; Risk management.

III. Personal Work Program and Practical Applications

- **A. Thematic Presentations:** Case studies of agricultural and agrifood businesses; Critical analysis of existing projects.
- **B. Business Creation Simulation Workshops:** Formulation of a fictitious project related to animal production or nutrition.
- **Project Examples:** Gluten-free food production; Balanced feed manufacturing for livestock; Dairy processing unit setup; Low-sugar/low-salt food production unit for special dietary needs.

Teaching Unit: Transversal
Subject: Scientific English
VHS: 22h 30min (C)
Credits: 1
Coefficient: 1
Evaluation method: Exam: 100%

Learning Objectives

- • Acquire technical vocabulary in biotechnology and animal processing.
- • Understand and write scientific documents in English (articles, reports, protocols).
- • Present a scientific topic orally with clarity.
- • Develop reading and listening comprehension (conferences, scientific podcasts).

Course Content

Theme 1: Basic Scientific Vocabulary

- • Key terms in cell biology, microbiology, and genetic engineering.
- • Specific vocabulary related to animal products (meat, milk, by-products).
- • Common abbreviations (PCR, DNA, HACCP, GMO).

Theme 2: Reading and Analyzing Scientific Documents

- • Structure of a scientific article (abstract, introduction, methodology, results).
- • Comprehension exercises based on publications in animal biotechnology.
- • Identifying key information (hypotheses, results, conclusions).

Theme 3: Technical Writing

- • Writing an abstract or an experimental protocol.
- • Formulating hypotheses and describing results.
- • Using the passive voice and logical connectors (however, therefore, in contrast).

Theme 4: Oral Communication

- • Presenting a research project (structure: Introduction → Methods → Results → Discussion).
- • Practicing pronunciation of technical terms.
- • Role-playing: defending an idea in a scientific meeting.

Theme 5: Listening Comprehension

- • Listening to TED Talks or lectures on biotechnology (e.g., cultured meat, CRISPR applications).
- • Note-taking and reformulation exercises.