

PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA
MINISTRY OF HIGHER EDUCATION
AND SCIENTIFIC RESEARCH

HARMONIZATION

MASTER TRAINING OFFER

ACADEMIC

Establishment	Faculté / Institut	Département
Mohamed Khider University, Biskra	Faculty of Exact Sciences and Natural Sciences and Life	Natural Sciences and Life

Domain: Natural Sciences and Life

Sector: biologic Sciences

Specialty: Applied Microbiology

Academic year: 2016-2017

الجمهورية الجزائرية الديمقراطية الشعبية

وزارة التعليم العالي والبحث العلمي

مواصفة

عرض تكوين ماستر

أكاديمي

القسم	الكلية/ المعهد	المؤسسة
علوم الطبيعة والحياة	العلوم الدقيقة وعلوم الطبيعة والحياة	جامعة محمد خيضر - بسكرة

الميدان: علوم الطبيعة والحياة

الشعبة: علوم بيولوجية

التخصص: ميكروبيولوجيا تطبيقية

السنة الجامعية: 2016-2017

Half-yearly teaching organization sheet

1. 1st Semester

Teaching unit	SHV	H.V Weekly				Coeff	Credits	Evaluation method	
	15 weeks	C	DW	PW	Pers Work			Continuous	Exam
Fundamental Teaching Units (FU)	202.5	6	3	4.5	247.5	9	18		
Fundamental Teaching Units (FTU11)									
Module FTU111: Animal'sBacterial Pathologies	45	1.5	-	1.5	55	2	4	40%	60%
Module FTU112: Food biochemistry and physicochemistry	67.5	1.5	1.5	1.5	82.5	3	6	40%	60%
Fundamental Teaching Units (FTU22)									
Module FTU211 : Pharmacology	45	1.5	-	1.5	55	2	4	40%	60%
Module FTU212 : Toxicology	45	1.5	1.5	-	55	2	4	40%	60%
Methodologic Teaching Units (MTU12)	105	3	0	4	120	5	9		
Module MTU111: Tools and Methodology of Molecular Biology	67.5	1.5	-	3	75	3	6	40%	60%
Module MTU111: Immunological and Radio-biological Techniques	37.5	1.5	-	1	45	2	3	40%	60%
Discovery Teaching Unit (DTU11)	45	1.5	0	1.5	5	2	2		
ModuleDTU111: MedicalMicrobiologic Analyses	45	1.5	-	1.5	5	2	2	40%	60%
Transversal Teaching Unit (TTU11)	22.5	1.5	0	0	2.5	1	1		
Module TTU111: Communication	22.5	1.5	-	-	2.5	1	1	-	100%
Total Semester 3	375	12	3	10	375	17	30		

- Presentiel teaching:theoretical: 225 h
- Presentiel teaching: practical work: 150 h
- Virtuel teaching: personnel work: 375 h

2. 2^{ed} Semester

Teaching unit	SHV	H.V Weekly				Coeff	Credits	Evaluation method	
	15 weeks	C	DW	PW	Pers Work			Continuous	Exam
Fundamental Teaching Units (FU)	202.5	6	3	4.5	247.5	9	18		
Fundamental Teaching Units (FTU12)									
Module FTU121: Animal's viral and fungal's Pathologies	45	1.5	-	1.5	55	2	4	40%	60%
Module FTU122: Microbial Interactions	67.5	1.5	1.5	1.5	82.5	3	6	40%	60%
Fundamental Teaching Units (FTU22)									
Module FTU221 : Bioengineering in industrial microbiology	45	1.5	-	1.5	55	2	4	40%	60%
Module FTU222 : Prokaryotic Gene Expression and Regulation	45	1.5	1.5	-	55	2	4	40%	60%
Methodologic Teaching Units (MTU12)	105	3	0	4	120	5	9		
Module MTU121: Clinical Microbiology	67.5	1.5	-	3	75	3	6	40%	60%
Module MTU122: Biostatistique	37.5	1.5	-	1	45	2	3	40%	60%
Discovery Teaching Unit (DTU12)	45	1.5	0	1.5	5	2	2		
Module DTU121: Bioinformatics	45	1.5	-	1.5	5	2	2	40%	60%
Transversal Teaching Unit (TTU12)	22.5	1.5	0	0	2.5	1	1		
Module TTU121: Legislation	22.5	1.5	-	-	2.5	1	1	-	100%
Total Semester 3	375	12	3	10	375	17	30		

- Presentiel teaching: theoretical: 225 h
- Presentiel teaching: practical work: 150 h
- Virtuel teaching: personnel work: 375 h

3. 3rd Semester

Teaching unit	SHV	H.V Weekly				Coeff	Credits	Evaluation method	
	15 weeks	C	DW	PW	Pers Work			Continuous	Exam
Fundamental Teaching Units (FU)	202.5	6	3	4.5	247.5	9	18		
Fundamental Teaching Units (FTU13)									
Module FTU131: Bacterial Typing	45	1.5	-	1.5	55	2	4	40%	60%
Module FTU132: Applied Enzymology and Enzymatic Engineering	67.5	1.5	1.5	1.5	82.5	3	6	40%	60%
Fundamental Teaching Units (FTU22)									
Module FTU231 : Biological Treatment of Waste and Effluents	45	1.5	-	1.5	55	2	4	40%	60%
Module FTU232 : Microbiology and Food Hygiene	45	1.5	1.5	-	55	2	4	40%	60%
Methodologic Teaching Units (MTU12)	105	3	0	4	120	5	9		
Module MTU131: Scientific Research Methodology	67.5	1.5	-	3	75	3	6	40%	60%
Module MTU132: Microbial Phytopathologies	37.5	1.5	-	1	45	2	3	40%	60%
Discovery Teaching Unit (DTU12)	45	1.5	0	1.5	5	2	2		
Module DTU131:Scientific English II	45	1.5	-	1.5	5	2	2	40%	60%
Transversal Teaching Unit (TTU12)	22.5	1.5	0	0	2.5	1	1		
Module TTU131: Entrepreneurship	22.5	1.5	-	-	2.5	1	1	-	100%
Total Semester 3	375	12	3	10	375	17	30		

- Presentiel teaching:theoretical: 225 h
- Presentiel teaching: practical work: 150 h
- Virtuel teaching: personnel work: 375 h

4. 4thSemester

Domain: Natural Sciences and Life

Sector: Biologic Sciences

Specialty: Applied Microbiology

Internship in a laboratory, experimental station or company, culminating in a dissertation and oral presentation.

			VHS	Coeff	Crédits
Fundamental Teaching Units (FU 14)	Personnelwork	Dissertation (manuscript)	400	6	12
		Dissertation (Presentation)	50	3	6
Methodologic Teaching Units (MTU14)	Internship in a laboratory...etc.	Presentation of an internship report (written)	225	4	9
Discovery Teaching Unit (DTU14)	Seminars and/or master days		50	2	2
Transversal Teaching Unit (TTU14)	Teamwork in Biskra's NLS department	- scientific event - scientific magazine - scientific conference	25	1	1
	Total Semester4		745	16	30

5. Overall training summar:

VH \ UE	FTU	MTU	DTU	TTU	Total
Courses	270	135	67.5	67.5	540
DW	135	0	0	0	135
PW	202.5	180	67.5	0	450
personnel work	742.5	360	15	7.5	1125
Semester 4	450	225	50	25	750
Total	1800	900	200	100	3000
Credits	72	36	8	4	120
% in credits for each TU	60	30	6.7	3.3	100

Detailed program by subject

Establishment	Faculty	Department
<i>Mohamed Khider University, Biskra</i>	<i>Faculty of Exact Sciences and Natural Sciences and Life</i>	Nature and Life Sciences
Domain	Section	Specialty
Nature and Life Sciences	<i>Biological Sciences</i>	<i>Applied Microbiology</i>

Course leader : Asma MAKHLOUF	
Cycle : Master 1	
Course title: Animal's Bacterial Pathologies	
Course content :	
Chapter I	Domestic and Savage Animals Bacterial Zoonoses <ul style="list-style-type: none"> - Brucellosis - Tuberculosis - Salmonellosis - Listeriosis - Campylobacteriosis (Vibriosis) - Chlamydiosis - Escherichia coli (O157 : H 7) - Anthrax - Querryfever - Leptospirosis - Lymedisease - Bartonellosis - Ornithose-Psittacosis - Pasteurellosis - Pseudotuberculosis - Rickettsiosis - Erisipeloid - Shigellosis - Staphylococci - Streptobacillosis - Streptococcies - Tetanos - Tularemia - Yersiniosis - Borreliosis - Melioidosis - Horse diseasegladders - Pest - Sodoku

Establishment	Faculty	Department
<i>Mohamed Khider University, Biskra</i>	<i>Faculty of Exact Sciences and Natural Sciences and Life</i>	<i>Natural Sciences and Life</i>
Domain	Section	Specialty
<i>Naturel Science and Life</i>	<i>Biological sciences</i>	Applied Microbiology

Course leader REBAI Redouane	
Cycle : Master1	
Course title: Food biochemistry and physicochemistry, UEF112	
Course content :	
Chapter I	The constituents of foods and their properties
ChapterII	Sensory properties of foods.
ChapterIII	Modification of organoleptic characteristics
ChapterIV	Foods of animal origin.
ChapterV	Foods of plant origin.
ChapterVI	Fatty substances. Introduction. Change processing
ChapterVII	Additives. Definition. Technological additives. Sensory additives. Additive for nutritional purposes.
ChapterVIII	Food spoilage and means of control

Establishment	Faculty	Department
<i>Mohamed Khider University, Biskra</i>	<i>Faculty of Exact Sciences and Natural Sciences and Life</i>	<i>Natural Sciences and Life</i>
Domain	Section	Specialty
<i>Naturel Science and Live</i>	<i>Biological Sciences</i>	<i>Appliedmicrobiology</i>

Course leader : AMINA YAHYAOU I	
Cycle : MASTER 1	
Course title: PHARMACOLOGY	
Course content :	
Chapter I	General information about medication
ChapterII	Origin and nature of medicines
ChapterIII	Main groups of active substances
ChapterIV	Pharmacokinetics of medicinalproducts
ChapterV	Pharmacodynamics of drug substances

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Domain	Section	Specialty
<i>Naturel Science and Live</i>	<i>Biological sciences</i>	<i>Applied Microbiology</i>

Course leader : MERABTI Ibrahim	
Cycle : Master 1	
Course title: ToxicologyUEF212	
Course content :	
Chapter I	General Toxicology Data
ChapterII	Nature of the different toxic groups
ChapterIII	Mechanisms of action of toxicants
ChapterIV	Toxicological study
ChapterV	Typical principles of poisoning
ChapterVI	Mutagenesis, carcinogenesis and teratogenesis

Establishment	Faculty	Department
<i>Mohamed Khider University, Biskra</i>	<i>Faculty of Exact Sciences and Natural Sciences and Life</i>	<i>Natural Sciences and Life</i>
Domain	Section	Specialty
<i>Naturel Science and Live</i>	<i>Biological sciences</i>	<i>Applied Microbiology</i>

Course leader : Asma MEDDOUR	
Cycle : Master 1	
Course title : Tools and Methodology of Molecular Biology	
Course content :	
Chapter I	<p>Tools of molecular biology</p> <ol style="list-style-type: none"> 1. Enzymes: restriction enzymes: origin, nomenclature and methods of restriction 2. Cloning vectors 3. DNA banks (DNAc preparation, genomics)
ChapterII	<p>Methods of molecular biology</p> <ol style="list-style-type: none"> 1. Extraction and purification of nucleic acids 2. PCR strategy 3. Sequencing 4. Cloning 5. Molecular hybridization 6. Nucleic acid electrophoresis 7. South and North Blot 8. Western blotting for proteins 9. ELISA

Establishment	Faculty	Department
<i>Mohamed Khider University, Biskra</i>	<i>Faculty of Exact Sciences and Natural Sciences and Life</i>	<i>Natural Sciences and Life</i>
Domain	Study	Specialty
<i>Natural Sciences and Life</i>	<i>biological sciences</i>	<i>AppliedMicrobiology</i>

Course leader : Hayat TRABSA	
Cycle : Master1	
Course title: Immunological and Radio-biological Techniques	
Course content :	
Chapter I	A\ Applied immunology 1\ Mechanisms of the antigen-antibody reaction
ChapterII	2\ Obtaining immunological reagents: 2.1 polyclonal antibodies 2.2 monoclonal antibodies 2.2.1 hybridization techniques 2.2.2 interest and application of monoclonal antibodies
ChapterIII	3\ Measurement of cellular immunity: 3.1 lymphoblastic transformations 3.2 measurement of cellular cytotoxicity 3.3 measurement of cytokines
ChapterIV	4\ Immunochemical techniques and areas of application: 4.1 immunodiffusion 4.2 immunoelectrophoresis 4.3 immunoenzymology, case of ELISA
ChapterV	B\ Radiobiological techniques 1\ Radioisotopes and their use 1.1 research using tracer elements 1.2 industrial applications 1.3 medical applications 2\ Radiometric analysis 3\ Analysis by isotope dilution 4\ Radioimmunological assays

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Domain	Section	Specialty
<i>Naturel Science and Live</i>	<i>biological science</i>	<i>AppliedMicrobiology</i>

Course leader : AMAIRI TOUFIK	
Cycle : first year master degree	
Course title: Medical microbiology analysis	
Course content :	
Chapter I	IMPLEMENT THE BASIC CONCEPTIONS AND GENERAL PRINCIPLES APPLYING TO THE EXECUTION OF ANALYTICAL PROCESSES IN A MEDICAL LABORATORY
ChapterII	APPLY MEDICAL LABORATORY ANALYTICAL TECHNIQUES RELATING TO TRANSFUSIONAL SCIENCE <ul style="list-style-type: none"> - Prepare globular suspensions - Control the temperature during sample incubation - Use a centrifuge safely - Perform reagent quality control analyzes - Carry out ABO groupings in various situations - Perform antibody screening and identification analyzes - Select compatible blood products - Perform blood compatibility tests in various situations - Perform the direct antiglobulin test
ChapterIII	APPLY MEDICAL LABORATORY ANALYTICAL TECHNIQUES RELATING TO HISTOLOGY <ul style="list-style-type: none"> - Use the hood to use the reagents used for coloring and the solvents used to treat and color fabrics - Demonstrate understanding of the risks associated with the use of the microtome - Use the microtome to safely produce tissue sections - Perform H&E staining on tissue sections produced in the laboratory - Perform special staining on various tissue preparations - Adjust the microscope according to Köhler illumination

	<ul style="list-style-type: none"> - Evaluate the staining of tissue slides using the microscope
ChapterIV	<p>APPLY MEDICAL LABORATORY ANALYTICAL TECHNIQUES RELATING TO MICROBIOLOGY</p> <ul style="list-style-type: none"> - Implement the principles linked to the different sterilization techniques applicable to microbiology - Perform the Köhler adjustment - Perform routine staining and special staining necessary for bacterial identification - Determine the properties of the stains carried out by looking at the stained slides under the microscope and identifying the different elements found in clinical specimens (polymorphonuclear cells, epithelial cells, bacteria, yeasts, mucus and artifacts) - Distinguish between different culture media and their uses - Practice the technique of transplanting bacterial colonies by seeding different culture media - Perform different inoculation techniques used in microbiology - Choose the appropriate culture media and biochemical tests, depending on the unknowns to be identified and the type of specimen - Perform bacterial identification tests as well as antibiograms according to recognized methods - Perform an antibiogram using the Kirby-Bauer method
ChapterV	<p>APPLY ANALYTICAL PRINCIPLES AND TECHNIQUES RELATED TO OTHER BIOLOGICAL LIQUIDS AS WELL AS TO STOOLS</p> <ul style="list-style-type: none"> - Perform serum protein electrophoresis - Run cholesterol oxidase analysis to measure total cholesterol and HDL - Perform analytical techniques for the determination of enzymes and bilirubin - Put into practice the principles of analytical techniques for salicylates and ethanol - Calculate pH, pCO₂, pO₂ and bicarbonates using the Henderson-Hasselbach equation - Perform analytical techniques for the measurement of blood gases and electrolytes
ChapterVI	<p>APPLY THEORETICAL CONCEPT AND PRINCIPLES WHEN IMPLEMENTING THE BLOOD SAMPLE COLLECTION PROCEDURE</p> <ul style="list-style-type: none"> - Explain the theoretical notions and theoretical principles relating to phlebotomy - Explain the various types of blood samples in simulated situations, taking into account theoretical notions and principles as well as the client's particularities

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<i>Naturel Science and Live</i>	<i>Biologic sciences</i>	<i>AppliedMicrobiology</i>

Course leader : DOUADI Yacer	
Cycle : Master 1	
Course title:Communication	
Course content :	
Chapter I	Strengtheninglanguageskills
ChapterII	Communication methods
ChapterIII	Internal and external communication
ChapterIV	Meeting techniques
ChapterV	Oral and written communication

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Domain	Section	Specialty
<i>Naturel Science and Live</i>	<i>Biological sciences</i>	<i>AppliedMicrobiology</i>

Course leader :	
Cycle : Master 1	
Course title: Animal's viral and fungal's Pathologies	
Course content :	
Chapter I	Viral pathologies:Fundamental virology
ChapterII	Molecular and medical virology <ul style="list-style-type: none"> o pathophysiology of viral infections o molecular interrelationships between viruses and target cells o virology and immunology, o viral genetics o virology and epidemiology, o virology and structural biochemistry
ChapterIII	Plant viral pathologies <ul style="list-style-type: none"> - genome, - pathogenicity, - virus ecology
ChapterIV	Fungal pathologies- Pathogenic yeasts : <ul style="list-style-type: none"> - identification of common and emerging species, - possible serodiagnosis and histopathology - clinical, - pathophysiology, - epidemiology, - diagnosis and treatment.
ChapterV	Pathogenic filamentous fungi: <ul style="list-style-type: none"> - identification of common and emerging species, - possible serodiagnosis and histopathology - clinical, - physiopathology, - epidemiology, - diagnosis and treatment.

ChapterVI	Dermatophytes : - identification of different species - clinical, - epidemiology
ChapterVII	Tropical mycoses : - identification of main species, - possible serodiagnosis, - histopathology - clinical - epidemiology - diagnosis and treatment.

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<i>Naturel Science and Life</i>	<i>Biological sciences</i>	Applied Microbiology

Course leader : <i>Boulmaizsara</i>	
Cycle : Master 1	
Course title: <i>Microbial interactions</i>	
Course content :	
Chapter I	<p>A reminder of Biodiversity and microbial ecology</p> <ol style="list-style-type: none"> 1. Photosynthetic bacteria, autotrophic bacteria, myxobacteria, trichome bacteria, appendicular and budding bacteria, spirochetes, Gram-negative heterotrophic bacteria, Gram-positive heterotrophic bacteria; actinomycetes, rickettsiae, chlamydia, mycoplasmas 2. Bacteriophage biodiversity. 3. Evolution of viruses 4. Filamentous fungi, plant pathogenic fungi 5. Yeasts: models and tools. 6. Biodiversity of lactic acid bacteria: importance for basic and applied research. 7. Stress responses in lactic acid bacteria
ChapterII	<p>Bacterial adhesion</p> <ul style="list-style-type: none"> - Bacterial adhesins and their related receptors - Interaction of bacterial adhesins with the extracellular matrix - Effects of bacterial adhesins on cells and tissues - Induction of bacterial virulence genes
ChapterIII	<p>Bacterial pathogenesis</p> <ul style="list-style-type: none"> - Man's relationship with microorganisms <p>1- Indifference to marine microorganisms</p>

	<p>2- Commensalism</p> <p>3- Mutualism</p> <p>4- Parasitism the bacterium harms or lives at the expense of the host</p> <ul style="list-style-type: none"> - Bacterial infection - Aggression of the organism - Pathogenicity
ChapterIV	<p>Microbial biofilms</p> <ul style="list-style-type: none"> - Biofilm structure <ul style="list-style-type: none"> o Heterogeneity o Morphogenetic factors o Growth and detachment - Mass transfer and microbial activity - Biofilm control - Methods for studying biofilms <ul style="list-style-type: none"> o Cultivation <ul style="list-style-type: none"> o Microscopic staining methods
ChapterV	<p>Quorum Sensing</p> <ul style="list-style-type: none"> - Quorum Sensing in Gram- bacteria: The LuxI/LuxRParadigm <ul style="list-style-type: none"> o The Agrobacterium tumefaciensTraI/TraR System - Gram-Positive Quorum Sensing: Peptide Signals and Two- Component Signal Transduction - The Streptococcus pneumoniae Competence System - Quorum Sensing in Vibrio harveyi: Integration of AHL and Two- Component Signaling - Quorum Sensing in Myxococcusxanthus: A unique sensory system <ul style="list-style-type: none"> - Interference of eukaryotes with Quorum Sensing
ChapterVI	<p>Bacterial interactions in the digestive tract</p> <ul style="list-style-type: none"> - Microbial population in the digestive tract - Methods for studying bacterial interactions in the digestive tract - Bacterial interactions concerning the population levels of different strains in the ecosystem <ul style="list-style-type: none"> o Factors in the establishment of a bacterial strain in the digestive tract <ul style="list-style-type: none"> ☐ Bacterial antagonisms ☐ Synergistic effects

	<ul style="list-style-type: none"> - Metabolic interactions between bacterial strains present in the digestive tract - Effect of host and food on the expression of bacterial interactions - Mechanisms of bacterial interactions
ChapterVII	<p>Interaction of soil microflora</p> <ul style="list-style-type: none"> - Soil components - Soil organization - Biological functioning of the soil <ul style="list-style-type: none"> o Soil food webs: role in nutrient flow o Mineralization and immobilization o Biological interactions in the soil ☐ Interactions between microbial populations ☐ Interactions between microorganisms and plants <ul style="list-style-type: none"> - Non-symbiotic interactions - Symbiotic interactions - Mycorrhizal symbioses - Nitrogen-fixing symbioses - Genetics <ul style="list-style-type: none"> o Nodulation genes o Induction of Nod genes o Extracellular nodulation factors o Nitrogen-fixing genes
ChapterVIII	<p>Symbiotic associations</p> <ol style="list-style-type: none"> 1- Cyanobacteria-Plant 2- Ciliates-Prokaryotes 3- Termites-Prokaryotes
ChapterIX	<p>Syntrophism in prokaryotes</p> <ul style="list-style-type: none"> - Cooperation in microbial communities - Amino acid degradation - Syntrophic degradation of fermentation intermediates - Metabolic transfer between species - Anaerobic methane oxidation
ChapterX	<p>Response to bacterial stress</p>

	<ul style="list-style-type: none">- Response to stress- The heat shock response- Control of heat shock in Gram-negative bacteria- Stress response in E. coli- Heat shock control
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Course leader : BABA ARBI Souad	
Cycle : Master 1	
Course title: Bioengineering in Industrial Microbiology	
Course content :	
Chapter I	Study of strains and yeasts <ol style="list-style-type: none"> 1. Lactic acid bacteria, acetic acid bacteria, yeasts and molds 2. Selection of strains and leavens 3. Improvement 4. Conservation of strains : Different conservation methods, problems related to these methods, choice of method.
ChapterII	Production of strains and leavens <ol style="list-style-type: none"> 1. The stages of production 2. Biomass production: monitoring of the main growth parameters 3. Growing Conditions :Physico-chemical factors influencing the development of strains: pH, temperature, oxygenation, supply of nutrients (fed batch, etc.), optimization.
ChapterIII	Different types of metabolite production <ol style="list-style-type: none"> 1. Primary metabolites: alcohols, amino and organic acids, enzymes, vitamins, polysaccharides. 2. Secondarymetabolites:antibiotics 3. Bioconversions 4. Vaccine production
ChapterIV	Food preparation and processing <ol style="list-style-type: none"> 1. Fermenter system 2. Batch or batch fermentation processes 3. Feed batch 4. Continuous fermentation

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Course leader : BENBELAID Fethi	
Cycle : Master01	
Course title: Prokaryotic Gene Expression and Regulation	
Course content :	
Chapter I	Organization Of Genes And Mode Of Expression
ChapterII	Gene Regulation In Prokaryotes
	Notions Of (+) And (-)Control
	Regulation Through Genomic Rearrangements
	Transcriptional Control Of Gene Expression
	Induction Of The Lactose Operon
	Repression Of The Tryptophan Operon
	Control Of Lytic/Lysogenic Cycles Of Phage λ
Control Of Trans/Trad Coupling: Attenuation Of The Tryptophan Operon	

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Course leader : AMAIRI TOUFIK	
Cycle : Master 1	
Course title :ClinicalMicrobiology	
Course content :	
Chapter I	Introduction
ChapterII	Principles and methods of bacteriological diagnosis
ChapterIII	<p>Main bacterial species</p> <p>Gram positive Cocci <i>Staphylococcus</i> generalities <i>Staphylococcus aureus</i> <i>Streptococcus</i> generalities <i>Streptococcus pyogènes</i>(A) <i>Streptococcus agalactiae</i> (B) <i>Streptococcus pneumoniae</i> <i>viridansgroup streptococci</i> <i>Enterococcus</i></p> <p>Gram négative Cocci <i>Neisseriameningetidis</i> <i>Neisseria gonorrhoeae</i></p> <p>Gram-positive bacillus <i>Listeria monocytogènes</i></p> <p>Gram-negative bacillus (glucose-fermenting) Entérobactéries (généralités) <i>Escherichia coli</i> <i>Shigella</i> <i>Salmonella</i> Entérobactériesopportunistes</p> <p>Non-fermenting gram-negative bacillus (NFGNB) <i>Pseudomonas aeruginosa</i></p>

	<p>Gram negative bacillus (difficult growing) <i>Haemophilus influenzae</i> <i>Campylobacter</i></p> <p>Anaerobic Bacteria generalities to anaerobic Bacteria <i>Bactéroïdes fragilis</i> (Gram negative) <i>Clostridium perfringens</i> (Gram positive)</p> <p>other bactéria <i>Legionella pneumophila</i> <i>Mycobacterium tuberculosis</i> (BK) <i>Treponema pallidum</i> (Syphilis) <i>Brodetella pertussis</i> (Whooping cough)</p> <p>Antibiotics Classification of antibiotics Methods for studying antibiotics Resistance mechanism</p> <p>Hygiene Nosocomial infections Investigation of an epidemic</p>
ChapterIV	<p>Main analyzes carried out in medical bacteriology Cytobacteriological examination of urine (CBEU) Cytobacteriological examination of cerebrospinal fluid (CSF) Cytobacteriological examination during septicemia (Blood culture) Cytobacteriological examination during pulmonary infections Cytobacteriological examination of the throat Cytobacteriological examination during infection of the ENT sphere Cytobacteriological examination of stools (coproculture) Cytobacteriological examination of sexually transmitted infections</p>

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Domain	Study	Specialty
<i>Natural Sciences and Life</i>	<i>Biological sciences</i>	<i>Applied Microbiology.</i>

Course leader : Chala Adel	
Cycle : Master 1	
Course title: Biostatistics	
Course content :	
Chapter I	Definitions of concepts: <ul style="list-style-type: none"> - Descriptive Statistic. - Characteristics parameters.
Chapter II	Interferential statistics <ul style="list-style-type: none"> - Introduction to distribution laws: normal law - Principle of testing: conformity testing - Comparison of multiple means: one-way analysis of variance – Two ways analysis of variance ANOVA2 Two ways analysis of variance with repetition. Two ways analysis of variance without repetition.
ChapterIV	Correlation of two variables <ul style="list-style-type: none"> - Regression with an explanatory variable - Determination of the correlation coefficient - Determination of the slope of the line
ChapterV	Statistical tests <ul style="list-style-type: none"> -Homogeneous test of variation *Kolmogorov test. *Shapiro-Wilk test.
Chapter IX	-Application with SPSS, and theuse of calculator.

	-Application examples in biology science.
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Establishment	Faculty	Department
<i>Mohamed Khider University, Biskra</i>	<i>Faculty of Exact Sciences and Natural Sciences and Life</i>	<i>Natural Sciences and Life</i>
Domain	Section	Specialty
<i>Naturel Science and Life</i>	Biological sciences	Applied microbiology

Course leader REBAI Redouane	
Cycle : Master1	
Course title: Bioinformatics	
Course content :	
Chapter I	Application of the computer tool on genotypic techniques
ChapterII	Method based on the non-amplification of nucleic acid
ChapterIII	Methods based on nucleic acid amplification
ChapterIV	Bioinformatics tools

Establishment	Faculty	Department
<i>Mohamed Khider University, Biskra</i>	<i>Faculty of Exact Sciences and Natural Sciences and Life</i>	<i>Natural Sciences and Life</i>
Domain	Section	Specialty
<i>Naturel Science and Life</i>	<i>BiologicalSciences</i>	<i>Appliedmicrobiology</i>

Course leader : Dr ZEROUAL Samir	
Cycle : Master I	
Course title: Legislation	
Course content :	
Part I	<ul style="list-style-type: none"> • General concepts of law (introduction to law, criminal law). • Presentation of Algerian legislation (www.joradp.dz, references to texts). • General regulations (consumer protection law, hygiene, labeling and information, food additives, packaging, brand, safety, preservation). • Specific regulations (individual work, presentations). • Control organizations (CPD, ACCQUE, The municipal hygiene office, NOLM). • Standardization and accreditation (IANOR, ALGERAC). • International standards (ISO, Codex Alimentarius, NA, AFNOR).
Part II	<p>General information on Principles of good laboratory practice and ethical standards of the profession.</p> <p>I. Place of experimentation in society</p> <ol style="list-style-type: none"> 1. Legitimacy of animal experimentation 2. Animal protection 3. Design of experimental procedures and projects <p>II. Ethics in animal testing</p> <ol style="list-style-type: none"> 1. Reasons for using animals in experiments 2. Rule of 3 Rs 3. Ethics Committee 4. Duties of animal users <p>III. Food safety.</p> <p>Hazard analysis and control.</p> <p>Quantitative risk analysis.</p> <p>Regulatory and normative aspects.</p> <p>Psycho-sociological aspects of food security, trust and crisis</p>

	IV. The main texts on radiation protection
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Domain	Section	Specialty
<i>Naturel Science and Life</i>	<i>Biological sciences</i>	<i>Applied Microbiology</i>

Course leader : BENBELAID Fethi	
Cycle : Master 2	
Course title: Bacteriology	
Course content :	
Chapter I	The different steps of bacterial typing
	Sampling
	Isolation
	Identification of the bacterial species
	Typing (identification of bacterial strains)
Chapter II	Phenotypic techniques
	Biotyping
	Serotyping
	Antibiotyping
	Lysotyping
	Bacteriocinotype
	Toxinotyping
Chapter III	Genotypic techniques
	Method based on non-amplification of nucleic acid
	Methods based on nucleic acid amplification
	Bioinformatics tools

Establishment	Faculty	Department
<i>Mohamed Khider University, Biskra</i>	<i>Faculty of Exact Sciences and Natural Sciences and Life</i>	<i>Natural Sciences and Life</i>
Domain	Section	Specialty
<i>Naturel Science and Live</i>	<i>Biological Sciences</i>	<i>AppliedMicrobiology</i>

Course leader : Deghima Amirouche	
Cycle : Master 2	
Course title: Applied Enzymology and Enzymatic Engineering	
Course content :	
Chapter I	Isolation and purification of enzymes
ChapterII	Enzyme production
ChapterIII	Conformation and catalyticactivity
ChapterIV	Industrial enzymes
ChapterV	Immobilized enzymes
ChapterVI	Use of enzymes in fine chemistry

Establishment	Faculty	Department
<i>Mohamed Khider University, Biskra</i>	<i>Faculty of Exact Sciences and Natural Sciences and Life</i>	<i>Biological science</i>
Domain	Section	Specialty
<i>Natural Sciences and Life</i>	Biological sciences	<i>Applied Microbiology</i>

Course leader : Samia Charifi	
Cycle : Master 2	
Course title: Biological treatment of waste and effluents	
Course content :	
Chapter I	Waste and Methanogenic Effluents : <ul style="list-style-type: none"> - Introduction - Aerobic Processes or Anaerobic Processes - Application areas - Assessment Criteria
Chapter II	Digestion Technology : <ul style="list-style-type: none"> - Biological Parameters - Waste and Effluents in Industries and Public Communities - Digestion Systems - Technology of Digestion Systems
Chapter III	System techniques : <ul style="list-style-type: none"> - Sizing Parameters - Digester Technology, - Peripheral Treatments, - Commissioning, Operation, and Monitoring
Chapter IV	Preliminary Studies : <ul style="list-style-type: none"> - Technical Performance of Anaerobic Digestion, - Treatment and Valorization of Biogas and Process Materials
Chapter V	Project Development : <ul style="list-style-type: none"> - Methanization, a Link in Treatment chains , - Technical Aspects of biogas Valorization, - Costs and Revenues. - Legislative Aspects.

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Domain	Section	Specialty
<i>Natural Sciences and Life</i>	<i>Biological Sciences</i>	<i>Applied Microbiology</i>

Course leader : <i>Kenza Mohammedi</i>	
Cycle : <i>Master 2</i>	
Module: <i>Microbiology and Food Hygiene</i>	
Module content :	
Chapter I : Food microbiology	<p>1. Alcoholic fermentation</p> <p>2. Homolactic and heterolactic fermentation</p> <p>3. Acetic fermentation</p> <p>Production of vinegar made from an alcoholic substrate (cider, wine, etc.) by transformation of alcohol into acetic acid using acetic bacteria (Acetobacter and Gluconobacter). These bacteria can also oxidize glucose.</p> <p>Study of acetic fermentation with a strain of Acetobacteraceti under semi-aerobic conditions.</p> <ul style="list-style-type: none"> - Quantifications (fermentation monitoring): - Biomass measurements (OD and counts) - Assays (enzyme kits): total acidity, glucose, ethanol - Enzymatic activities (spectrophotometric kinetics): alcohol dehydrogenase, Acetaldehyde dehydrogenase
Chapter II : Food hygiene	<p>1. The evolution of the microbial population of foods</p> <ul style="list-style-type: none"> - The origin of microorganisms - The relationships between the food and the microorganism <p>2. Food defects related to the presence of microorganisms</p> <ul style="list-style-type: none"> - Food poisoning. The study of pathogenic microorganisms (toxin-producing microorganisms, enteroinvasive microorganisms, viruses, prions). - Food spoilage mechanisms and factors. <p>3. Evaluation and improvement of the microbiological quality of foods</p>

	<ul style="list-style-type: none">- Critical analysis of the methods currently used to assess the microbiological quality of foods.- Methods to reduce the risks linked to the presence of pathogens. The HACCP approach (Hazard analysis and critical control points).
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Domain	Study	Specialty
<i>Naturel Science and Live</i>	<i>Biological Sciences</i>	<i>Applied Microbiology</i>

Course leader : Warda KHERROUR
Cycle : Master 2
Course title: Scientific Research Methodology
Course content :
<p>In-person:</p> <p>Groups will be formed by the teachers, articles will be chosen and distributed, and the groups will, based on an article published about 5 years prior:</p> <ul style="list-style-type: none"> • Conduct a literature review to "historically" contextualize the subject, i.e. find earlier articles on the topic • Perform literature searches to understand the rationale behind the methods and strategies used in the article • Look for follow-up literature on the article (confirmation? refutation?) • Groups should begin preparing their oral presentation, which will consist of a 20 minute presentation followed by questions from teachers and other students. • Choose a research topic which will be the subject of the final semester thesis. • Define the experimental strategy. <p>Practical Work:</p> <ul style="list-style-type: none"> • The study of practical examples of research work. • The design of an experimental setup. • To this end, students will be grouped in threes or fours to gain experience with teamwork.

Personal Work:

Presentation of a research work in the form of a short document (10 pages max.) and a structured oral presentation.

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<i>Naturel Science and Live</i>	<i>Biological sciences</i>	<i>Applied Microbiology</i>

Course leader : BENBELAID Fethi	
Cycle : Master 2	
Course title:Microbial phytopathologies	
Course content :	
Chapter I	Diseases And Accidents In Plant
	The Objectives Of Plant Pathology
	Brief History Of Plant Pathology
	Meaning Of A Disease In A Plant
	Classification Of Diseases And Accidents In Plants
	The Consequences Of Diseases On Crops
ChapterII	The Principles Of Phytopathology
	Disease-SpecificPrinciples
	Principles Of Etiology
	Pathogen And Parasite
	The Degrees Of Parasitism
	Diagnostic Principles
	Diagnosis Of Plant Diseases
	Cyclic Events That Lead To Disease
	Life Cycle Of A Pathogen
	Cycle Of A Disease
	Principles Of Epidemiology
	Principles Of Disease Control
ChapterIII	Morphological Aspects Symptoms Of Diseases
	Generalized Symptoms
	Localized Symptoms
	Necrotic Symptoms
	Hyperplastic Symptoms

	Metaplastic Symptoms
ChapterIV	Study Of Specific Diseases Caused By Fungi
Chapter V	General Phytobacteriology
	The Characteristics Of Plant Parasitic Bacteria
	Symptomatology Of Bacterial Affections
	Diagnosis Of Bacterial Diseases
	Conservation And Methods Of Phytopathogenic Bacteria
	Measures Against Phytopathogenic Bacteria
Chapter VI	Plant Virology
	The Characteristics Of Plant Viruses
	Symptoms Caused By Viruses In Plants
	Diagnosis Methods Of Viral Diseases
	The Fight Against Phytopathogenic Viruses

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<i>Naturel Science and Live</i>	<i>Biological sciences</i>	<i>Applied Microbiology</i>

Course leader :	
Cycle : Master 2	
Course title:Scientific English	
Course content :	
Chapter I	STUDY OF SCIENTIFIC TEXTS WRITTEN IN ENGLISH
Chapter II	TRANSLATION OF SCIENTIFIC TEXTS FROM FRENCH TO ENGLISH
Chapter III	USE OF COMPUTER TOOLS FOR TRANSLATION (THE WEB)

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<i>Naturel Science and Live</i>	<i>Biological sciences</i>	<i>Applied Microbiology</i>

Course leader :	
Cycle : Master 2	
Course title:Entrepreneurship	
Course content :	
Chapter I	Business and business management Setting up a business creation project
Chapter II	How an innovative company works 1. Entrepreneurship 2. Management 3. Strategic and operational marketing 4. Innovation management 5. Scientific communication 6. Human resources management and corporate sociology 7: What are the challenges of quality? 8. Quality and management 9. Communication and human resources 10. Business management 11. Project management

