REPUBLIQUE ALGERIENNE DEMOCRATIQUE ET POPULAIRE

MINISTERE DE L'ENSEIGNEMENT SUPERIEUR
ET DE LA RECHERCHE SCIENTIFIQUE

TRAINING OFFER ENGINEER

Speciality : Aquaculture Management

Establishment	Faculty / Institute	Department
National School of Marine Sciences and Coastal Planning (ENSSMAL)		**Living resources.**

Field: Natural and Life Sciences (SNV)

Sector : Marine and continental Hydrobiology.

(HBMC) Specialty: Aquaculture Management

Academic year: 2023-2024

الجمهورية الجزائرية الديمقراطية الشعبية

وزارة التعليم العالي والبحث العلمي

عرض تكوين مهندس
إدارة تربية الأحياء المائية

المؤسسة	الكلية/ المعهد	القسم
المدرسة الوطنية العليا لعلوم البحر و تهيئة الساحل		الموارد الحية

الميدان : علوم الطبيعة و الحياة

الشعبة : علم الاحياء المائية القارية و البحرية

التخصص : إدارة تربية الأحياء المائية

السنة الجامعية: 2023-2024

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I –Identity sheet

1 – Location of the training :

- National School of Marine Sciences and Coastal Planning (ENSSMAL)
- Department : Living Resources.

2- Partners of there training *:

- **Natioal Partners**
- **- Establishment of superior teaching**

- Establishments academics :

- Convention of bet in place of Network National of the Schools Superiors of domain of Natural and Life Sciences:

- ENSSMAL
- School National Superior Veterinarian from Algiers Rabie BOUCHAMA (ENSV),
- School National Superior Agronomic from Algiers Kasdi MERBAH (ENSA),
- School Superiors of Sciences of Food And Food Industries (ESSAIA),
- School Superior in Biological Sciences of Oran (ESSBO),
- The School Superior of Agronomy of Mostaganem (ESA),

- Convention with the University Abu Bakr BELKAID of Tlemcen,
- Convention with the University of the Sciences And Technologies Houari BOUMEDIENE (USTHB), (in the process of signing),

- School National polytechnic from Algiers,
- University Badji Mokhtar from Annaba – Department of the sciences of there sea,
- University Abdelhamid Ibn Badis of Mostaganem - Department of the sciences of there sea,
- University from Annaba : department of sciences of the sea,
- University of Mosaganem : Department of Science of there sea,
- University of Bejaia :

- Center National of Research and of Development of there Fishing and of Aquaculture (CNRDPA).
- Agency National of the Waste (AND)
- School of Training Technical of fishing and Aquaculture from Beni- Saf (EFTPA)
- Group Algerian Corporate Universities (GACU).
- Band GITRAMA (Band of Infrastructure of Maritime Works).
- Institute National Superior of there Fishing And of Aquaculture (INSPA).
- Institute of Technologies of the Peaches And of Aquaculture (ITPA Collo).
- Laboratory of Study Maritimes (LEM).
- Company of the Waters and of Sanitation from Algiers (SEAAL) (in progress of signature).
- Plateau Technical of the USTHB
- Directions of there Fishing And of there production Fisheries of the different wilayas.
- Spa Crops Marines – CULTMARE.
- Park National of Gouraya .
- Association For there Research, Information And Training Underwater (REEF).
- GARDEN
- Club diving KALYPSO submarine .
- School of diving underwater AQUAMAR (in signing course).
- Club diving PARADIVE underwater .

- Companies And others socio-economic partners:

Institution	Domain of activity	Nature And terms and conditions
Agency Spatial Algerian ASAL	Mapping/ remote sensing	Convention frame
Laboratory of Study Maritime LEM	Coastal engineering	Convention frame
Police station national of Coastline	Management / monitoring of coastline	Convention frame
CDER	Method analysis	Convention frame
CNRDPA (Bou- Ismaïl)	Fishing And aquaculture	Convention frame
CNRDB (Algiers)	Maritime transport	Convention frame
Direction general of the environment	Marine environment	Convention frame
GITRAMA	Works maritime	Convention frame
SONATRACH Police Station	/	Convention frame
Taza (Jijel)	Protected area	Convention frame
PN Big winds (Algiers)	Protected area	Convention frame
Gouraya National Park	Protected area	Convention frame
PN (Bejaia)	Protected area	Convention frame
National Coastline (Algiers)	Protected area	Convention frame
Laboratory analysis from Ain Benian	Control of quality	Convention frame
Police station National coastal (Algiers)	Treatment of the waters worn out And valuation sludge	Convention frame
Office National sanitation	Treatment of the waters worn out and sludge recovery	Convention frame
Institute Pastor of Algeria	Domain health human and veterinarian And pharmaceutical	Convention frame

- **International partners :**

- University from Istanbul (Türkiye)

- University Akdeniz Antalya (Turkey)

- University from Ankara (Turkey)

- University International of there Sea (UIM) (France).

- University of Nouakchott Al- Assria (Mauritania),

3 – Context And goals of there training A

– Access conditions

- Classes preparatory integrated of ENSSMAL
- Classes preparatory SNV
- Licenses domain SNV – sector : marine hydrobiology And continental

B - Objectives of training

Aquaculture today makes a significant contribution to global food security. With the decline of fish stocks, aquaculture represents the future path to meet the ever-growing demand for seafood.

Aquaculture production methods are varied and concern different aquatic environments (fresh, brackish, coastal and marine waters). The sector is thus faced with real challenges: availability of sites suitable for aquaculture, sustainability of resources, competition for space and resources, compliance with environmental requirements, health of farms, quality and safety of products, diversification and markets, land use planning and development social.

The aim of this training is to train operational engineers for the proper management of aquaculture farms and to equip them with the necessary skills in terms of development and innovation in this field.

C – Profiles And SKILLS targeted

List No exhaustive of the SKILLS wanted in training aquaculture :

- Choice and selection of the sites favorable to aquaculture
- Aquaculture engineering
- Biology of the species aquaculture
- Physiology of the aquaculture species
- Culture microalgae
- Culture of the macro- algae
- Breeding of zooplankton (artemia, daphnia, rotifers, etc.)
- Breeding in aquariums
- Breeding in basins
- Breeding in cages
- Breeding in sector (mussels, oysters, .. etc.)
- Systems of aquaponic productions .
- Aquaculture integrated multi- trophic.
- Mastery of there reproduction of the species of interest aquaculture.
- Mastery of larval rearing .
- Management of there health breeding farms aquaculture
- Food
- Sustainability aquaculture
- Management business (economics)
- Modeling : application has aquaculture
- Innovation

D – Potentials regional And national employability of the diplomas

- Creation of startups (aquaculture, valorization of aquaculture products)
- Ministry of there Fishing And of the Productions Fisheries (MPPH)
- National Center for Research and Documentation in the Field of Fishing and Aquaculture (CNRDPA)
- Sector private : exploitation
- Schools of training in techniques of there fishing and of aquaculture (TVET)

- Farms aquaculture private
- Institutes of vocational training .
- Schools higher agronomic studies
- Offices of studies specialized in aquaculture and in THE studies impact on the environment.
- Cells of management aquariums public.
- Companies of restoration of ecosystems natural.
- Companies of production of tools didactics related has aquaculture, the fishing and the environment.
- Business of production of tools of protection of the natural ecosystems .
- Business of production of flowers and of faunas aquatic of ornamentation.

E – Bridges towards other specialties

Master	USTHB
Master	University from Annaba
Master	University from Annaba
Master	University of Chlef
Master	University from Mostaganem

F – Indicators of followed by training

- Rate of presence students to teachings (course – TD – TP – Exit on THE ground).
- Number of sessions of rate practices realized by subject.
- Rate of success to exams.
- Number of startups created.
- Number of Labels " innovative » delivered.

G – Supervisory capacity

20 students

4 – Available human means

Teachers researchers of the school National Superior of the Sciences of there Sea And of the Development of Coastline (ENSSMAL).

name **Last name**	**Diploma**	**Grade**	**Type of intervention**	**Signing in**
Mr. Grimes Samir	Doctorate	Prof.	Teaching/Supervision	
Mr. Refes Wahid	Doctorate	Prof.	Teaching/Supervision	
Mr. Boulahdid Mostafa	Doctorate	Prof.	Teaching/Supervision	
mrs Bachari Houma	Doctorate	Prof.	Teaching/Supervision	
mrs Ait Aissa Djamila	Doctorate	MCA	Teaching/Supervision	
mrs Aissou Cherifa	Doctorate	MCA	Teaching/Supervision	
mrs Alouache Souhila	Doctorate	MCA	Teaching/Supervision	
mrs Boufersaoui Samira	Doctorate	MCA	Teaching/Supervision	
mrs Ould Ahmed Nora	Doctorate	MCA	Teaching/Supervision	
mrs Ghazi Malika	Doctorate	MCA	Teaching/Supervision	

mrs Boughamou Naima	Doctorate	MCA	Teaching/Supervision	
mrs Boumaza Salima	Doctorate	MCB	Teaching/Supervision	
mrs Benzouai Sihem	Doctorate	MCB	Teaching/Supervision	
mrs Keraghel Mahdia	Doctorate	MCB	Teaching/Supervision	
Mr. Ait Saidi Adel	Doctorate	MCB	Teaching/Supervision	
Mr. Laouedj Abdessalem	Doctorate	MCB	Teaching/Supervision	
Mrs. Mokhbi Dehbia	Doctorate	MCB	Teaching/Supervision	
mrs Abdedaim Hakima	Doctorate	MCB	Teaching/Supervision	
mrs Bahbah	Doctorate	MCB	Teaching/Supervision	
mrs Boumaour Amina	Doctorate	MCB	Teaching/Supervision	
mrs Djahnit Nora	Doctorate	MCB	Teaching/Supervision	
mrs Maouel Djamila	Doctorate	MCB	Teaching/Supervision	
mrs Khelifa Nedjma	Doctorate	MCB	Teaching/Supervision	

mrs Amar Imen	Magister	MAA	Teaching/Supervision	
mrs Amrouche Lynda	Magister	MAA	Teaching/Supervision	
mrs Bourabaine Fouzia	Magister	MAA	Teaching/Supervision	
Ms. Chaou Nadia	Magister	MAA	Teaching/Supervision	
mrs Ghalmi Rachida	Magister	MAA	Teaching/Supervision	
Mr. Kabrane Amine	Magister	MAA	Teaching/Supervision	
Mr. Bouaicha Farid	Magister	MAA	Teaching/Supervision	
Mr. Kada Mohamed	Magister	MAA	Teaching/Supervision	
Mr. Boughrira Abdelhak	Magister	MAA	Teaching/Supervision	
mrs Kaïdi Nawal	Magister	MAA	Teaching/Supervision	
Mr. Kassar Abderrahmane	Magister	MAA	Teaching/Supervision	
mrs Ladoul Sara	Magister	MAA	Teaching/Supervision	
mrs Lahmer Nahla	Magister	MAA	Teaching/Supervision	

Mr. Zeghache Abdelkader	Magister	MAA	Teaching/Supervision	
Mrs. Mouzali Leila	Magister	MAA	Teaching/Supervision	

B : Management External :

Speakers other establishments of the School, university and/or others:	**Establishment of attachment**	**speciality**	**Grade**	**Type of intervention**	**Signing in**
Mr. KARA Hichem	**University from Annaba**	**Ichthyology**	**Teacher**	Conferences	
Mr. DERBAL Farid	**University from Annaba**	**Ichthyology**	**Teacher**	Conferences	
Mr. MEZALI Karim	**University from Mostaganem**	**Marine ecology**	**Teacher**	Conferences	
Mr. BELHASNET Khaled	**Sector private**	**Aquaculture**	**Doctor**	Course, TD, TP	
Mr. DJEZAR Meliani	**University of Khmiss Meliana**	**Aquaculture**	**Master of Conferences**	Course, TD, TP	
Mr. ROUABAH Abdelkader	**Sector private**	**Aquaculture**	**Master of Conferences**	Course, TD, TP	
Mrs. CHEBANI Nedjoua	**University of Khmiss Meliana**	**Aquaculture**	**Master-Assistant**	Course, TD, TP	

*** : Course, TD, TP, Management of internship, supervision from memory, other (has to specify)**

5 – Means materials specific available

- **Two experimental aquaculture stations,** one of which is equipped and intended for freshwater aquaculture (Dely Ibrahim) and the other intended for marine aquaculture (currently being rehabilitated).

HAS- Laboratories Educational And Equipment :

Material available At level of the laboratories educational of the school :

- **Laboratory Aquaculture**

No.	Designation (By Order Alphabetical)	Kind	Quantity
1	BEAKER GRADUATE	2000 ML	3
2	BULBS HAS Decant	500 ML	4
3	BALL HAS FLAT BOTTOM	50 ML	9
4	BALL HAS FLAT BOTTOM	100 ML	10
5	BALL HAS FLAT BOTTOM	250ML	5
6	BALL HAS FLAT BOTTOM	500ML	10
7	BALL HAS FLAT BOTTOM	1000ML	6
8	BALL HAS ROUND BOTTOM	500 ML	3
9	BEAKER GRADUATE	1000 ML	2
10	BEAKER GRADUATE	600 ML	11
11	BEAKER GRADUATE	250 ML	19
12	BEAKER GRADUATE	100 ML	26
13	BEAKER GRADUATE	50 ML	28
14	BEAKER GRADUATE	25 ML	2
15	JAR IN GLASS	100ML	31
16	JAR IN GLASS	1500 L	9
17	JAR IN GLASS	1000 L	5
18	BOXES OF PETRI	150x25 mm	144
19	BOXES OF PETRI	100x20 mm	36
20	BOXES OF PETRI	200x30mm	10
21	CRYSTALLIZERS	180mm	6
22	CRYSTALLIZERS	150mm	2
23	CRYSTALLIZERS	115mm	1
24	CRYSTALLIZERS	300ML	1
25	FUNNEL	100mm (Long stem)	5
26	FUNNEL	75mm (Long) stem)	1
27	TEST TUBE GRADUATE	1000 ML	5
28	TEST TUBE GRADUATE	500 ML	7
29	TEST TUBE GRADUATE	250 ML	26
30	TEST TUBE GRADUATE	100 ML	6
31	TEST TUBE GRADUATE	50 ML	8
32	TEST TUBE GRADUATE	25 ML	5
33	TEST TUBE GRADUATE	10ML	3
34	TEST TUBE GRADUATE	2000ML :Plast	2

35	TEST TUBE GRADUATE	1000 ML:Plast	2
36	ERLEN MEYER	2000ML	1
37	ERLEN MEYER	1000 ML	3
38	ERLEN MEYER	500 ML	3
39	ERLEN MEYER	250 ML	3
40	ERLEN MEYER	150ML	11
41	ERLEN MEYER	100ML	1
42	ERLEN MEYER	50 ML	1
43	FLASK GAUGE	1000 ML	13
44	FLASK GAUGE	500 ML	20
45	FLASK GAUGE	250 ML	30
46	FLASK GAUGE	100 ML	29
47	FLASK GAUGE	50 ML	42
48	FLASK GAUGE	25 ML	11
49	BOTTLE BOROSILICATE	10L	13
50	BOTTLE BOROSILICATE	5L	3
51	BOTTLE DOSER OF ACID	250 ML (RANGE : 0.2 - 2 ml)	1
52	BOTTLE DOSER OF ACID	1000 ML (RANGE : 0.4 - 5 ml)	1
53	BOTTLE DOSER OF ACID	1000 ML(RANGE :1- 10 ml)	1
54	MORTAR IN PORCELAIN	VA18000	5
55	PIPETTE GRADUATE	1 ML	21
56	PIPETTE GRADUATE	2 ML	11
57	PIPETTE GRADUATE	5 ML	22
58	PIPETTE GRADUATE	10 ML	17
59	STEM IN GLASS	agitator	12
60	GLASS HAS CONCAVE WATCH	DIAM. 200 MM	8
61	GLASS HAS CONCAVE WATCH	DIAM.100MM	17

- **Laboratory Biology Navy 1**

No.	Designation (By Order Alphabetical)	Kind	Quantity
1	Needle histological	sharp	9
2	Needle histological	arrow	8
3	Needle histological	60°	6
4	Bins	stainless steel	6
5	Bins	plastic	4
6	Arm - Scalpels	stainless steel	11
7	Scissors	10	12
8	Freezer	whirlpool	1
9	Freezer	/	1
10	Cart	stainless steel	1
11	Blades slides	/	100
12	Lens ocular	/	31
13	lens of graduated microscope	/	18
14	Lens Blue	/	21
15	Lens blue/white	/	10

16	Magnifying glass	Motic	5
17	Magnifying glass	Motic (power)	5
18	Magnifying glass	Optech	2
19	Cork	/	11
20	Telescope lab	/	1
21	Microscope of camera	Zeiss	1
22	Microscope	Zeiss	9
23	Microscope	Euromax	10
24	Inverter	/	2
25	Feet has manual slides	Mutitoyo	4
26	Leaflet of magnifying glass Bottom black	plastic	27
27	Leaflet of magnifying glass Bottom white	plastic	20
28	Leaflet of transparent magnifying glass	glass	7
29	Pliers	/	14
30	Pliers shape chisel	/	1
31	Wash bottles	plastic	11
32	Probes	/	4
33	Spatula	/	2
34	Glass watch	/	12

- **Laboratory Biology Navy 2**

No.	Designation	Kind	Quantity
1	Needle histological	kind RIGHT lanceolate	10
2	Needle histological	kind RIGHT	8
3	Box dissecting	/	1
4	Scissors	surgical	5
5	Scissors	in stainless steel	7
6	Freezer	whirlpool infinity	1
7	Freezer	Condor	1
8	Blades	prepared	134
9	Blades	of slides	42
10	Magnifying glasses binoculars	Motic	12
11	Telescope of protection	/	1
12	Micrometer ocular1	OPTIKA M- 005	1
13	Micrometer ocular2	OPTIKA M- 005	1
14	Microscopes	Zeiss	4
15	Microscopes	Optika	5
16	Microscopes	Bioblue	4
17	Microscopes	Optech	1
18	Microscopes	dog h60	1
19	Foot has manual slide	MUTITOYO	4
20	Pliers	pointed	18
21	Pliers	kocher	1
22	Plateau	has cork	14
23	Plateau	in stainless steel	9
24	Plateau	in plastic	2
25	Overhead projector	/	
26	Scalpels in stainless steel	/	9

27	Probes	/	3

- **Laboratory Biology Navy 3**

No.	Designation	Kind	Quantity
1	Needles has dissection	straight fines	11
2	Needles has dissection	lanceolate	10
3	Bins	stainless steel	6
4	Scissors	of dissection ordinary	15
5	Freezer has drawer	/	1
6	Magnifying glasses binoculars	/	20
7	Sleeves of scalpels	/	17
8	Microscopes	/	20
9	Microscopes	Axio (without camera)	1
10	Vernier caliper	Manual	4
11	Pliers	kocher	3
12	Pliers dissecting	curve	5
13	Pliers dissecting	plates	20
14	Pliers dissecting	pointed	13
15	Wash bottles	/	5
16	glass plates	reversible black and white	2
17	glass plates	transparent	5
18	Probes	fluted	3
19	Kit dissecting	/	1
20	Glasses watch	/	6

- **Laboratory Biology Cellular And Molecular 1**

No.	Designation (By Order Alphabetical)	Kind	Quantity	Brand
1	Agitator	Magnetic/Heating	1	Labtech
2	Agitator	Magnetic/Heating	1	Labtech
3	Agitator	Magnetic	1	IKA Works
4	Cupboard thermoregulatory DBO	/	2	
5	Autoclave	/	1	Sano Clave
6	Bath Married	/	1	Memmert
7	Balance precision	Precision	1	OHAUS
8	Balance precision	Precision	1	OHAUS
9	Bunsen burner	/	32	
10	Freezer	has terroir	1	Whirlpool
11	DBOmeter	/	12	VELP
12	Oven	Universal	1	Memmert
13	Oven	Bacterio has 30°C	1	Memmert
14	Oven	Bacterio has 37°C	1	Memmert
15	Oven	Bacterio has 44°C	1	EN500
16	Oven	Bacterio has 44°C	1	Binder
17	Hood	/	1	TMLab
18	Magnifying glasses	Binocular	10	Motic
19	Microscope	Optical	10	Optika
20	Microscope Zeiss	Optical Carl Zeiss	1	Axio
21	Micropipettes	of 1 ml	1	
22	Micropipettes	of 0.1 ml	2	

23	Micropipettes	of 0.01 ml	2	

24	pH meter	/	1	HANNA
25	Pump empty	/	1	Vacuum Pump
26	Pump empty	/	1	Millipore
27	Ramp filtration	Six positions Stainless steel 250ml	1	Sartorium
28	Ramp filtration	Six positions Stainless steel 500ml	1	Sartorium
29	Fridge	/	1	Condor
30	Vortex	/	1	Daihan
31	Vortex	/	1	Iso Lab
32	Propipette	/	4	

- **Laboratory Biology Cellular And Molecular 2**

No.	Designation (By Order Alphabetical)	Kind	Quantity	Brand
1	Agitator Magnetic heating	/	1	Stuart
2	Agitator Magnetic heating	/	1	IKA
3	Cupboard to desiccator	/	1	SICCO
4	Bath of sand	/	1	Prolabo
5	Bath Married	/	1	Memmert
6	Beak bunsen	/	16	
7	Balance precision	1- 220g	1	Shimadzu
8	Balance	5kg	1	OHAUS
9	Box dissecting	/	2	OHAUS
10	Heated ball	/	1	
11	Centrifuge Refrigerated	Average	1	NF 400
12	Centrifuge Refrigerated And accessories	/	1	3K 30 Sigma
13	Centrifuge	small	1	Sigma 1- 6p
14	Distiller Kjedhal	/	1	Behr
15	Distributor of solvent or acid	/	1	Socorex
16	Distributer of disk of antibiotic	/	1	BBL
17	Electrophoresis	Horizontal	1	Sony video graphics printer Up-897MD
18	Electrophoresis	Horizontal	1	Fisher Bioblock Sc
19	Spreader of plate CCM	/	1	
20	Oven	0-250°C	1	Memmert
21	Oven	0-37 °C	1	Memmert
22	Extractor has soxhlet	4 positions	1	Behr laboratory - technology
23	Electrode of pH meter	/	1	SENTIX
24	Generator for electrophoresis	/	1	Consort
25	Extractor hood	/	1	OLab tech
26	Mineralizer kjedhal	/	1	Behr
27	Micropipette	100µl- 1000µl	1	Microline
28	Micropipette	20µl- 200µl	1	Transferpette
29	Micropipette	100µl	1	Transferpette
30	Micropipette	2µl- 20µl	1	Exacta
31	Micropipette	2µl- 20µl		Socorex

32	Micropipette	10µl- 100µl	1	Isolab
33	Mini centri of workbench	/	1	Fisher brand

34	PC desk For Spectro	/	1	
35	pH meter	/	1	Inolab
36	Hot plate	/	1	
37	Polarimeter	/	1	Atago polax 2L
38	Pump empty	/	1	millipore
39	Pump empty	/	1	
40	Portable refractometer	/	1	
41	Refractometer portable	/	1	Link
42	Fridge	/	1	condor
43	Refrigerant	system farm	1	Huber
44	Steam Rota	/	1	Buchi (R- 210)
45	Steam Rota	/	1	IKA
46	Spectrophotometer	UV visible 1800	1	Shimadzu
47	System filtration	single-user glass	1	Millipore
48	System filtration	single-user in stainless steel	1	
49	System filtration	three-poste stainless steel	1	
50	Thermocycler	/	1	5 prime - Techne
51	Table UV For electrophoresis	/	1	
52	Polarimeter tube	100mm	1	
53	Polarimeter tube	200mm	1	
54	thermometer	/	1	HANNA

- **Laboratory Biology Cellular And Molecular 3**

No.	Designation (By Alphabetical Order)	Kind	Quantity	Brand
1	Agitator Vortex	/	1	IKA
2	Cupboard of chemical storage	/	1	
3	Autoclave	/	1	Isolab
4	Bac	Stainless steel	1	
5	Balance precision	/	1	KERN
6	Beak benzene	/	8	
7	Centrifuge	/	1	SIGMA
8	Oven	/	1	NEW
9	Chemical Hood	/	1	ASEM
10	Ichthyometer in drink	/	4	
11	Micropipette 10-50µl	/	1	SINNOWA
12	Microscope	/	10	MOTIC
13	Microscope	/	4	Leitz
14	Pliers	/	7	
15	Hot plate	/	1	BIBBY
16	Hot plate	/	1	HARRY MANAGEMENT
17	Hot plate	/	1	HARRY MANAGEMENT
18	Propipette 25ml	/	2	
19	Support burette	/	10	

B- Land of internship and training in business

- Internships At level of the hatchery from El Ouricia (Setif)
- Internship at level of the farm of shrimp farming (Skikda)
- Internship At level of the shellfish farming (Tipaza, Ain Taya)
- Internship at level of the hatchery of there Garden nursery
- Exits on land For the study of the potentialities aquaculture of sites
- Internship of 6 months In THE frame of project of end of studies.
- Internship of 20 days (working days) in business, center of research Or other In THE frame of professional integration.

C – Laboratories of research of support :

- Laboratory of Conservation And Valorization of the Resources Marines (**LCVRM**),
- Laboratory of the Ecosystems Sailors And Coastlines (**EcosysMarl**) .

D – **Training doctoral and** projects **of research of support At master** :

ENSSMAL organizes 3rd cycle doctoral training courses (LMD and D98 Doctorates). Information relating to these doctoral training courses is as follows :

- Training marine hydrobiology And continent 2021- 2022
- Marine and Coastal Environment 2016-2017: Research options and areas:
  Marine Environment; Marine and Coastal Geosciences,
- Exploitation of Ichthyological Resources 2015-2016: Options and research axes:
  Management of Fisheries Resources; Aquaculture and Marine Biotechnology,
- Doctorate in sciences of there sea D98.

THE projects of research PRFU has ENSSMAL since 2018 are instructions In THE following table:

No.	PRFU code	Duration	Chief of project	Titled
1	D00L03ES160920180004.	2018-2021	BOULAHDID M.	Study of there pollution And of there fertility of waters of the ribs power plants Algerian women
2	D00L03ES160920180003.	2018 - 2021	REFES W.	Modeling of there distribution space - temporal of the species marine invasives on the Algerian coast
3	D00L03ES160920180002.	2018 - 2021	ALOUACHE S.	Microorganisms aquatic For biotechnological applications
7	D00L03ES160920220001	2022 - 2025	REFES W.	Bet in evidence of the performances breeding of the different strains of Artemia salina identified in Algeria
8	D00L03ES160920220002	2022-2025	BOULAHDID M.	Study of pollution and eutrophication in the waters of the central Algerian coast.

E- Spaces of works staff And TIC :

The school has of a large Library Digital, room of projection, room multimedia, 02 computer rooms, a conference room and a videoconferencing room.

II – Form organizational half-yearly of the teachings

1- Semestre 1 :

Teaching units	Materials		Credits	Coefficients	Volume hourly weekly (overall)				VHS 14-16 week	Fashion devaluation			
	Code	Titled			Course	TD	TP	AP*		CC*		Exam	
EU Fundamental Code: UEF1 Credits: 20 Coefficients : 11	UEF11	General aquaculture	5	3	1h30 (9 p.m.)	1h30 (9 p.m.)	1h30 (9 p.m.)	4:30 a.m. (63h)	63h	2	50%	1	50%
	UEF12	Physiology of the Aquatic organisms	6	3	1h30 (10:30 p.m.)	1h30 (9 p.m.)	1h30 (9 p.m.)	4:30 a.m. (64h30)	64h30	2	50%	1	50%
	UEF13	Microbiology products aquaculture	5	3	1h30 (9 p.m.)	1h30 (9 p.m.)	1h30 (9 p.m.)	4:30 a.m. (63h)	63h	2	50%	1	50%
	UEF14	Economy and management of the resources aquaculture	4	2	1h30 (9 p.m.)	1h30 (9 p.m.)	/	3:00 a.m. (42h)	42 hours	2	50%	1	50%
EU Methodology Code: UEM1 Credits: 7 Coefficients : 4	UEM11	Treatment And analysis data	4	2	1h30 (22h30)	1h30 (22h30)	/	3h00 (45h)	45 hours	2	50%	1	50%
	UEM12	Programming R	3	2	1h30 (10:30 p.m.)	1h30** (12h)	1h30** (10:30 a.m.)	4:30 a.m. (45h)	45 hours	2	50%	1	50%
EU Cross-curricular Code: UET1 Credits: 3 Coefficients : 2	UET11	Research documentary And communication	2	1	1h30 (9 p.m.)	1h30** (10:30 a.m.)	/	3:00 a.m. (31h30)	31:30	2	50%	1	50%
	UET12	English for Specific Purposes 1	1	1	1h30 (9 p.m.)	/	/	1h30 (9 p.m.)	9 p.m.	2	50%	1	50%
TOTAL SEMESTER 1			30	17	172h30	129h	73h30	375 hours	375 hours				

1- Semestre 1 :

AP* : *(Works of ground, Projects, Internships, ...), Others /to specify)* **- CC*:** *(continuous assessment)*
**** : 1h30 per 15 days**

1- Semestre 2 :

Teaching units	Materials		Credits	Coefficients	Volume hourly weekly (overall)					VHS 14-16 week	Fashion devaluation			
	Code	Titled			Course	TD	TP	other	AP*		CC*		Exam	
EU Fundamental Code: UEF2 Credits: 14 Coefficients : 8	UEF21	Ecology navy	5	3	1:30 (10:30 p.m.)	1h30 (22h30)	1:30 (10:30 p.m.)	/	4:30 a.m. (67h30)	67h30	2	50%	1	50%
	UEF22	Production of the ornemental species	4	2	1:30 (10:30 p.m.)	1h30** (12h)	1h30** (10h30)	/	4:30 a.m. (45h)	45 hours	2	50%	1	50%
	UEF23	Programming Python And Artificial intelligence	5	3	1:30 (10:30 p.m.)	1h30 (22h30)	1:30 a.m. (10:30 p.m.)	/	4:30 a.m. (67h30)	67h30	2	50%	1	50%
EU Code Methodology : UEM2 Credits: 15 Coefficients : 8	UEM21	Sustainable development	4	2	1h30 (22h30)	1h30** (12h)	1h30** (10h30)	/	4:30 a.m. (45h)	45 hours	2	50%	1	50%
	UEM22	Geomatics	5	3	1h30 (22h30)	3h (45h)	/	/	4:30 a.m. (67h30)	67h30	2	50%	1	50%
	UEM23	There treasury of the companies	4	2	1h30 (22h30)	1h30*** (7h30)	/	/	3:00 a.m. (30h)	30h	2	50%	1	50%
	UEM24	Internship	2	1	/	/	/	30****	30h00	30h	1	50%	1	50%
EU Transversal Code: UET2 Credits: 1 Coefficients : 1	UET21	English for Specific Purposes 2	1	1	1H30** (12h)	1H30** (10:30)	/	/	3:00 a.m. (10:30 p.m.)	10:30 p.m.	2	50%	1	50%

1- Semestre 2 :

Total Half 2	30	17	147	132	66h	30h	375 hours	375 hours

AP* : *(Works of ground, Projects, Internships, …), Others /to specify)* **- CC* :** *(control continuous)*

**** :** 1h30 per 15 days ***** :** 1h30 per 21 days ****** :** 30 hours for an internship from 05 days

3. Semestre 3

Teaching units	Materials		Credits	Coefficients	Volume hourly weekly (overall)				VHS 14-16 week	Assessment method			
	Code	Titled			Course	TD	TP	AP*		CC*		Exam	
EU Fundamental Code: UEF3 Credits: 22 Coefficients : 12	UEF3.1	Technology breeding aquatic invertebrates	6	3	1h30 (22h30)	1h30 (22h30)	1:30 (10:30 p.m.)	4:30 (67:30)	67h30	2	50%	1	50%
	UEF3.2	Management of there health of the breeding aquaculture	6	3	1h30 (10:30 p.m.)	1h30 (9 p.m.)	1h30 (10:30 p.m.)	4:30 a.m. (66h)	66h		50%		50%
	UEF3.3	Production of the algae	5	3	1h30 (9 p.m.)	1h30 (9 p.m.)	1h30 (9 p.m.)	4:30 a.m. (63h)	63	2	50%	1	50%
	UEF3.4	Nutrition species aquaculture	5	3	1h30 (9 p.m.)	1h30 (9 p.m.)	1h30 (9 p.m.)	4:30 a.m. (63h)	63	2	50%	1	50%
EU Methodology Code: UEM3 Credits: 7 Coefficients : 4	EMU 3. 1	Biotechnology aquaculture	5	2	1h30 (9 p.m.)	1h30 (10h30)	1h30 (9 p.m.)	4:30 (52:30)	52h30	2	50%	1	50%
	EMU 3. 2	Accounting and Mathematics financial	2	2	1h30 (9 p.m.)	1h30 (9 p.m.)	/	3:00 (42h)	42	2	50%	1	50%

3. Semestre 3

EU Transversal Code: UET3 Credits: 1 Coefficients : 1	UET3.1	English for Specific Purposes 3	1	1	1h30** (10h30)	1h30** (10h30)	/	3:00 a.m. (9 p.m.)	21	2	50%	1	50%
Total Half 3			30	17	1:30 p.m.	127h30	108h	375 hours	375 hours				

**** :** 1h30 per 15 days

4. Semestre 4

Teaching units	Materials		Credits	Coefficients	Volume hourly weekly (overall)					VHS 14-16 week	Fashion devaluation			
	Code	Titled			Course	TD	TP	Other	AP*		CC*		Exam	
EU Fundamental Code: UEF4 Credits: 16 Coefficients : 9	UEF4.1	Fish farming	6	3	1h30 (10:30 p.m.)	1h30 (10:30 p.m.)	1h30 (10:30 p.m.)	/	4:30 a.m. (67h30)	67h30	2	50%	1	50%
	UEF4.2	Reproduction Species of interest Aquaculture	5	3	1h30 (9 p.m.)	1h30 (9 p.m.)	1h30 (9 p.m.)	/	4:30 a.m. (63h)	63h	2	50%	1	50%
	UEF4.3	Food species aquaculture	5	3	1h30 (9 p.m.)	1h30 (9 p.m.)	1h30 (9 p.m.)	/	4:30 a.m. (63h)	63h	2	50%	1	50%
EU Methodological Code: UEM4 Credits: 13 Coefficients : 7	UEM4.1	Improvement genetic	4	2	1:30 (10:30 p.m.)	1h30** (9 p.m.)	1h30** (9 p.m.)	/	4:30 (64:30)	64h30	2	50%	1	50%
	UEM4.2	Management of water	2	1	1h30 (22h30)	1H30*** (12h)	/	/	3:00 (34h30)	34h30	2	50%	1	50%
	UEM4.3	Internship	7	4	/	/	/	(60h)	(60h)	60 hours	1	50%	2	50%
EU Transversal Code: UET4 Credits: 1 Coefficients : 1	UET4.2	Walk of the aquatic products	1	1	1h30 (22h30)	/	/	/	1h30 (22h30)	10:30 p.m.	1	50%	2	50%
Total Half 4			30	17	132h	97h30	85h30	60 hours	375 hours	375 hours				

4. Semestre 4

AP* : *(Works of ground, Projects, Internships, …), Others /to specify)* **– CC* :** *(control continuous)* **** :** 1h30 by 15 days *****:** 1h30 per 21 days

5. Semester 5

Teaching units	Materials		Credits	Coefficients	Volume hourly weekly (overall)				VHS 14-16 week	Fashion devaluation			
	Code	Titled			Course	TD	TP	AP*		CC*		Exam	
EU Fundamental Code: UEF5 Credits: 13 Coefficients : 8	UEF5.1	Aquaculture engineering	5	3	1h30 (9 p.m.)	1h30 (9 p.m.)	1h30 (9 p.m.)	4:30 a.m. (63h)	63h	2	50%	1	50%
	UEF5.2	Planning and management of production	2	1	1h30 (9 p.m.)	1h30* (10:30 a.m.)	/	3:00 a.m. (31h30)	31:30	1	50%	1	50%
	UEF5.3	Valorization of the products aquatic	4	3	1h30 (22h30)	1h30* (12h)	1h30 (22h30)	4:30 a.m. (57h)	57h	2	50%	1	50%
	UEF5.4	Marketing operational	2	1	1h30 (10:30 p.m.)	/	/	1h30 (10:30 p.m.)	10:30 p.m.	1	50%	1	50%
EU Methodology Code: UEM5 Credits: 4 Coefficients : 2	UEM5.1	Modeling : application to aquaculture	4	2	1h30 (22h30)	1:30 (10:30 p.m.)	/	3h00 (45h)	45 hours	2	50%	1	50%
EU Transversal Code: UET5 Credits: 8 Coefficients : 4	UET5.1	Entrepreneurship	4	2	1h30 (10:30 p.m.)	1h30 (10:30 p.m.)	/	3:00 a.m. (45h)	45 hours	2	50%	1	50%
	UET5.2	Management of projects	4	2	1h30 (10:30 p.m.)	1h30 (10:30 p.m.)	/	3:00 a.m. (45h)	45 hours	2	50%	1	50%
EU Discovery	UED5.1	Interactions aquaculture - environment - Company	4	2	1h30 (22h30)	1h30 (22h30)	/	3h00 (45h)	45 hours	1	50%	1	50%

Code: UED5 Credits: 5 Coefficients : 3	UED5.2	Research, development and innovation	1	1	1h30 (9 p.m.)	/	/	1h30 (9 p.m.)	9 p.m.	1	50%	1	50%
Total Half 5			30	17	198	1:30 p.m.	43:30	375 hours	375 hours				

AP* : *(Works of ground, Projects, Internships, ...), Others /to specify)* **– CC* :** *(control continuous)*

6- Semester 6

Unit teaching = 30 credits
MEMORY OF 6- MONTH INTERNSHIP

Project of END of study sanctioned by A memory And a defense.

	VHS	**Coefficient**	**Credits**
Work Staff	500h	11	20
Internship in business	250h	6	10
Seminars	-	-	-
Other (to specify)	-	-	-
Total Semester	750h	17	30

7- Overall summary of the training: (indicate the overall separate VH in progress, TD, for the 06 semesters of teaching, for the different types of UE)

EU / VH (hour)	**UEF**	**EMU**	**UET**	**UED**	**PFE**	**Total**
Course	**391.5**	**222**	**132**	**43.5**	**0**	**789**
TD	**334.5**	**174**	**88.5**	**22.5**	**0**	**619.5**
TP	**313.5**	**63**	**0**	**0**	**0**	**376.5**
Work staff	**1039.5**	**549**	**220.5**	**66**	**500**	**2375**
Other (to specify)	**0**	**90**	**0**	**0**	**250**	**340**
Total	**2079**	**1098**	**441**	**132**	**750**	**4500**
Credits	**85**	**46**	**14**	**5**	**30**	**180**
% in credits for each EU	**46%**	**24.40%**	**9.80%**	**2.93 %**	**16.67%**	**100%**

III – Program detailed by subject (1 detailed sheet per subject)

Semestre 1

Titled of engineering : Aquaculture management		
Semester : 1		
Titled of the EU : Fundamental		
Titled of there matter : General aquaculture		
Volume hourly : 63h	**Credits :** 5	**Coefficients :** 3
Goals of teaching : to know THE concepts of base of aquaculture, This module aims to prepare the student for aquaculture farming technology.		
Knowledge prerequisites recommended : UEF biology		
Content of there matter : (course 9 p.m.) - Introduction (definition, interest, goals, historical… .) 1. Aquaculture in the world and in Algeria 2. Evolution of the aquaculture production 3. The different categories aquaculture (Fish farming, Shellfish farming, Carcinoculture , Algoculture, aquaponics , etc.). 4. The modes of production (Extensive, intensive And semi- intensive) 5. Water : medium breeding (parameters of production, circuit open, circuit farm …) 6. The steps of a aquaculture - Choice and selection of parents - Preparation of the parents in view of the laying - Bridge (induced, natural) And harvest of the eggs - Incubation And hatching - Breeding larval - Pre magnification And magnification - Marketing 7. Food in aquaculture (THE phytoplankton, THE zooplankton, the food artificial, qualitative and quantitative aspect) 8. THE structures breeding aquaculture of water of sea And of water gentle (basins, pond, floating cages, shellfish farming lines, etc.) 9. The hatchery (definition, goals, compartments, equipment, design, etc.) 10. THE tranquilizers used in aquaculture (their job In there reproduction artificial and for transport) 11. THE transportation of the products aquaculture (eggs, larvae, fry, breeders …etc.) 12. There management of there health of the breeding aquaculture 13. Development And perspectives aquaculture		
Program of the works practices : (9 p.m.) - Bet in place of a medium breeding in circuit open And farm with his different compartments - Design of a model of a farm aquaculture with his different compartments - Characterization of a few species of phytoplankton (of interest aquaculture) - Characterization of a few species of zooplankton (artemia) - Characterization of a few species of zooplankton (daphnia, rotifer) - Fishing, choice And sexing of parents - Estimate of number of larvae And of fry in a medium breeding		

Programme des travaux dirigés : (21h)

- Conditionnement et fertilisation d'un étang d'élevage
- Visite d'un site à potentialité aquacole (détermination des paramètres physicochimiques, trophiques.…)
- Visite d'une ferme piscicole d'eau douce
- Visite d'une ferme piscicole marine
- Visite d'une ferme conchylicole

Mode d'évaluation :
- Examen de fin de semestre
- Contrôles continus

Semester 1

Titled of engineering : Management aquaculture		
Semester : 1		
Titled of the EU : Fundamental		
Matter title : Physiology of aquacultural organisms.		
Volume hourly : 64.5h	**Credits :** 6	**Coefficients :** 3
Goals of teaching : knowing the physiology of the organimsms of interest aquaculture (Pisces, crustaceans And mollusks).		
Knowledge prerequisites recommended : Biology		
Content of there matter : (course 22.5h) Chapter 1 : Physiology of the crustaceans decapods of interest aquaculture Chapter 2 : Physiology of the mollusks of interest aquaculture (gastropods, bivalves, cephalopods) Chapter 3 : Physiology of Pisces of interest aquaculture For each chapter, the parties following will be processed : 1. Morphology external And internal 2. Thermoregulation 3. System circulatory 4. System respiratory 5. Osmoregulation 6. System digestive 7. System reproductive 8. System excretory 9. System nervous And sensory 10. System endocrine 11. System muscular 10. Phenomenon of there molt (for crustaceans)		
Program of the works directed : (9 p.m.) 1- Changes respiratory And metabolic in report with THE environments hypoxic 2- Adaptations ecophysiological of the aquatic organisms has there decrease of pH 3- Adaptations morpho-physiological of the species to the conditions extremes 4- Impact of warming climate on THE organizations aquatic **Program of the practical work : (9 p.m.)** 1. Observation of there morphology external and internal 2. Anatomy of heart of fish 3. Observation macro And microscopic of the gills 4. Observation of different parts of tube digestive 5. Observation microphone And macroscopic of the gonads 6. Observation cuts histological on THE kidneys 7. Observation cuts histological on THE brain And organs sensory **Fashion devaluation :** - Review of end of semester - Continuous monitoring		

Semester 1

Titled of engineering : Management aquaculture		
Semester : 1		
Titled of the EU : Methodological		
Titled of there matter : Microbiology of the products aquaculture		
Volume hourly : 63h	**Credits :** 5	**Coefficients :** 3

Goals of teaching : HAS the outcome of this education, the student East capable of :

- Assess there quality microbiological of the products from of aquaculture.
- Assess THE risks of intoxication And poisoning eating following has the consumption of contaminated aquatic products.

Knowledge prerequisites recommended :
Knowledge recommended prerequisites: S1 S2

Content of there matter : (course 9 p.m.)

1. Microflora characteristic of the Pisces And others products from of aquaculture
   - Aspects qualitative, aspects quantitative, influencing factors flora
2. Study of there flora responsible of alteration of the products from Aquaculture spoilage mechanisms and shelf life
3. Study of there flora useful In different marine products
   - THE microorganisms agents of production of flavorings
   - THE microorganisms producers of inhibitors to wide spectrum
   - THE microorganisms producers of bacteriocins
   - THE microorganisms of the fermentations In the products traditional And modern
4. Influence of the treatments on there composition of there microflora (Pretreatment, storage and processing)
5. THE risks sanitary facilities of the products aquaculture (THE toxic infections And poisonings)
   - There presence of a product chemical toxic (different of the other toxins)
   - There presence of microorganisms and/or of their toxins
   - THE poisonings
   - Botulinum toxins Or botulinum
   - Enterotoxins (immunotoxins) staphylococcal
   - Infections of origin eating (toxi- infection)
   - Salmonella
   - Clostridium perfringens
   - Others infections of origin eating
   - Infections bacterial of origin eating has digestive symptoms
   - Infections bacterial origin eating has demonstrations non -digestive
   - Infestation (parasitic)
   - Infections viral of origin eating has demonstrations digestive
   - Poisoning eating by dinoflagellates

Program of the works directed : (9 p.m.)

- Study of case.

Program of the works Practices : (9 p.m.)

1. total mesophilic flora
2. Assessment of there quality bacteriological of flours of fish : Colimetry in medium solid and liquid medium
3. Search (presence/absence) of salmonella, shigella and vibrios in sea bream flesh

4. Recherche de Staphylococcus aureus dans la chair des moules (Méthode de Baird Parker et méthode de
5. Méthode de Giolliti Contoni
6. Recherche de l'entérotoxine de Staphylococcus aureus isolée dans la chair des moules.
7. Recherche et dénombrement des anaérobies sulfitoreducteurs (Clostridium) dans la chair de poisson
8. Recherche et dénombrement des levures et moisissures dans la chair de poisson
9. Recherche de Listeria dans les fruits de mer.
10. Recherche de bactéries dans le poisson ou fruit de mer par les outils de biologie moléculaire

Mode d'évaluation :

- Examen de fin de semestre
- Contrôles continus

Semester 1

Titled of engineering : Management aquaculture		
Half : 1		
Titled of the EU : Methodology		
Titled of there matter : Economy And management of the resources aquaculture		
Volume hourly : 42 hours	**Credits :** 4	**Coefficients :** 2
Goals of teaching : Acquire THE knowledge And tools In THE sciences of management And develop A spirit business And an acquaintance of business world .		
Knowledge prerequisites recommended : none		

Content of there matter : (course 9 p.m.)

Chapter 1 : Introduction to General Economy

1.1.3. Models economic organization

1.2. Branches of the economy

1.2.1. Microeconomics

1.2.2 Macroeconomics

Chapter 2 : Economy of the aquaculture resources

2.1. Environment natural And Economy

2.1.1. Right of property and dimension of GOOD common

2.1.2. Externalities in aquaculture

2.1.3. Assets environmental and failure of walk

2.2. Functioning economic of the companies aquaculture

2.2.1. Concept maximum sustainable yield

2.2.2. Marketing And Marketing of the products aquaculture

2.2.3. Industry of the products aquaculture

2.2.4. Insurance In aquaculture

2.2.5. Frame institutional aquaculture

Chapter 3 : Economy Blue and Economy social And solidarity

3.1. Concepts and applications

Program of the works directed : (9 p.m.)

- Exercises.
- Exhibits.

Fashion devaluation :

- Review of end of semester
- Continuous monitoring

Semestre 1

Titled of engineering : Management aquaculture		
Half : 1		
Titled of the EU : Methodology		
Titled of there matter : Treatment And analysis of the data		
Volume hourly : 45 hours	**Credits : 4**	**Coefficients : 2**

Goals of teaching : Improve THE knowledge And THE practices of the students in THE treatment And the analysis of the data environmental particularly the approach multivariate .

Knowledge prerequisites recommended : knowledge acquired in 1st year And 2nd year.

Content of there matter : (course 22.5h)

Chapter 01 : Correlations And regression multiples
1. THE model of there regression double
2. There regression not has not
Chapter 02 : Reminders on THE matrices And functions matrix
Chapter 03: Factorial analyses
1. Analysis in Components Main (ACP)
2. Analysis Factorial of the Correspondences (AFC)
3. Analysis factorial discriminating (AFD)
4. Analysis of the correspondences multiples
(ACM) Chapter 04: Classification Methods
1. Method of Classification Ascending Hierarchical (CAH)
2. K-Means
3. Classification spouse

Program of the works directed : (22.5h)

TD 01- Correlations And regression multiples
doubles TD 02- Step-by-step regression
TD 03- Analysis in Main Components
TD 04- Analysis Factorial of the Correspondences
(AFC) TD 05- Discriminant Factor Analysis (AFD)
TD 06- Analysis of the correspondences multiples (ACM)
TD 07- Method of Classification Ascending Hierarchical (CAH) TD
08- K-Averages
TD 09- Classification spouse

Fashion devaluation :

- Exam of END of half
- Controls continuous :

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• Tukey J. W.1953. "Tea Problem of Multiple Let's compare," Mimeographed Monograph, *Princeton University.*
• Scheffé, H. 1953. HAS method for judging all contrasts in tea analysis of variance, *Biometry* , 40: 87 – 104.
• Wayne, W. D. And Chad LC, C. L. 2018. Biostatistics: has foundation for analysis in tea health sciences. *Wiley* .

Semestre 1

Titled of engineering : Management aquaculture		
Half : 1		
Titled of the EU : Methodology		
Titled of there matter : Programming R		
Volume hourly : 45 hours	**Credits : 3**	**Coefficients : 2**
Goals of teaching : Use of language And pro-software R In THE calculations statistics And there modeling.		
Knowledge prerequisites recommended : Computer science of base		

Content of there matter : course (22.5h)

Chapter 01 : Introduction At language R

1. Download And facility of program R
2. Creation And handling of the main objects R (vector, matrix, data.frame , list)
3. Import / export of a file of data
4. Facility And use of the packages
5. Visualization And description of data below R

Chapter 02: Graphics with R

Chapter 03: Statistics descriptive under R

Works directed (12h)
- Exercises.

Works practices (10.5h)
- Application on computer.

Fashion devaluation :

- Review of end of semester
- Continuous monitoring

Semestre 1

Titled of engineering : Management aquaculture		
Half : 1		
Titled of the EU : Transversal		
Titled of there matter : Research documentary And communication		
Volume hourly : 31.5h	**Credits :** 2	**Coefficients :** 1

Goals of teaching : THE different units learning Who compose THE courses will allow students to acquire knowledge on research, exploitation and synthesis of scientific documents as well as the production of communications
scientists written And oral.

Knowledge prerequisites recommended : Preparatory training .

Content of there matter : (course 9 p.m.)

Chapter I : Research And exploitation of scientific documents

1. Interest of there scientific research
2. Definitions
3. Steps of there research scientist
   - 3.1.1. Define THE subject
   - 3.1.2. Define there strategy research
   - 3.1.3. Seek information / Find the sources
   - 3.1.4. Assess And use the information
   - 3.1.5. Quote sources
4. Plagiarism

Chapter II : There synthesis of scientific documents

1. Interest And methodology of synthesis of the documents scientists
2. Writing of a form reading

Chapter III : Communication scientist

1. There structure IMRAD
2. THE scientific publications
3. Realization of a presentation oral
4. Realization of a post scientist
5. Writing of a memory of research

Program of the works directed : (10.5h)

1. Use of a software of management of resources bibliographical
2. Exercise of creation of cards of reading
3. Exercise of research information on A subject scientist And writing of a scientific passage
4. Creation of a presentation oral
5. Creation of a canvas For A memory of research and one post scientist

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Semester 1

Titled of engineering : Management aquaculture		
Semester : 1		
Titled of the EU : Transversal		
Titled of there matter : English for Specific Purposes 1		
Volume hourly : 9 p.m.	**Credits :** 1	**Coefficients :** 1
Teaching objectives: This program is intended for future engineers to enable them to acquire of the knowledge of base, in order to of power analyze a corpus containing keywords, or scientific terminology.		
Recommended prior knowledge: general knowledge (beginner level) in English.		

Content of there matter : (course 9 p.m.)

Unit 1: Describing tea dimensions of an object
- Height, Width, Weight, depth, missed…
- Exercises
- Lexicon

Unit 2: Speaking about quantity
- Countable nouns: a/an, the, many, few, has few
- Uncountable nouns: much, little, has little
- Exercises: How much ….? How many…? How far…?
- How to talk about measurements?
- Lexicon

Unit 3: To say how often something does happen?
- Usually, often, rarely, sometimes, ounce, twice…
- Review of Here Simple tense
- Exercises
- Lexicon

Unit 4: Asking questions in Present simple tense
- How does …?
- Is it …?
- Exercises
- Lexicon

Unit 5: Comparison
- Comparative adjectives: …is bigger than…
- Superlative Adjectives: Tea biggest, tea best, …
- Similarity : …as big ace…
- Exercises
- Lexicon

Unit 6: Modification
- Pre-modification : Determiners , adjectives
- Postmodification: Relative clauses introduced by Who, which, that…
- Exercises
- Lexicon

Unit 7: Scientific affixation (Prefixes and suffixes)
- Suffixes
- Prefixes

- Exercises
- Lexicon

Unit 8: Figures, charts , graphs

- Reading figures
- Explaining graphs and charts
- Exercises

Lexicon

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Half 2

Titled of engineering : Management aquaculture		
Half : 2		
Titled of the EU : Fundamental UF2.1		
Titled of there matter 1 : Marine ecology		
Volume hourly : 67.5h	**Credits : 5**	**Coefficients : 3**

Goals of teaching :
Initiation has ecology navy practical and development ecological knowledge marine particularly on the functioning of pelagic and benthic ecosystems.

Knowledge prerequisites recommended : Biology general, ecology general, zoology, botanical.

Content of there matter : course (22.5h)

Chapter I : Foundation of ecology navy and concepts of base

1. Subdivisions and floors
    1.1. Domain pelagic
    1.2. Domain benthic
2. Factors ecological
    2.1. Factors abiotic
        2.1.1. Factors hydrological
        2.1.2. Factors edaphic
    2.2. Factors biotics
    2.3. Postman human
    2.4. Other factors

Chapter II : Domain pelagic

1. General knowledge
2. THE adaptations has there life pelagic
    2.1. Size and coloring
    2.2. Suspension, buoyancy, mobility And adaptations morphological
3. Composition of plankton
    3.1. Phytoplankton
    3.2. Zooplankton
4. Nekton
    4.1. Definition
    4.2. Composition
    4.3. Mobility And adaptations morphological
    4.4. Behavior gregarious
    4.5. Migration
5. Methods sampling

Chapter III : Domain benthic

1. Definition
2. Adaptations to the benthic life
3. THE substrate in so much as a structuring factor
    3.1. Varieties of substrates
    3.2. Stands of the funds hard
    3.3. Stands of the funds furniture

4. Requirements And food trends
5. Aspects And strategies of there reproduction
6. Methods sampling

Chapter IV : Production

1. Primary production
2. Production secondary And cycles trophic in medium marine

Chapter V : Populations, habitats remarkable And species protected And invasive in the Mediterranean

1. Stands And habitats remarkable of Mediterranean
2. Species protected And regulation
3. Species invasive

Works directed (22.5h)

1. Analyses of data of a population nektonic
2. Bionomics benthic : features stand analytics
3. Bionomics benthic : general characteristics
4. Bionomics benthic : groups ecological And clues benthic
5. Study and analysis digital of Posidonia

Program of the works practices (22.5h)

1. Exit on ground : Discovery ecological of medium sailor and sampling plankton
2. TP : Identification summary samples of plankton collected.
3. Exit on ground : Methods sampling of there wildlife And flora of medio- and upper supralittoral
4. TP : Identification summary samples of benthos collected
5. Field trip : Visit to a remarkable site: vermetid boardwalks and Posidonia barrier reefs

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References

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Semestre 2

Titled of engineering : Management aquaculture		
Half : 2		
Titled of the EU : Methodology		
Titled of there matter : Production of the ornamental species		
Volume hourly : 45 hours	**Credits : 4**	**Coefficients : 2**
Goals of teaching : Use of language And pro-software R In THE calculations statistics And there modeling.		
Knowledge prerequisites recommended : Computer science of base		

Content of there matter : course (22.5h)

Chapter 1: Definitions and concepts of base

1. Aquariology
2. Aquariophily
3. Bac breeding Or aquarium
4. Pond
5. Aquascaping
6. THE different types of tray breeding
7. Cycle of nitrogen And toxicity of the related products
8. Other concepts

Chapter 2 : Equipment of aquariophily

1. Equipment of tray freshwater
2. Equipment of the ponds in aquarium
3. Equipment of tray of water of sea
4. Equipment of aquascaping

Chapter 3 : The species used in aquarium

1. Species of water of gentle
2. Species of water of sea

Chapter 4 : Pathology and prevention of the diseases

1. THE diseases THE more municipalities in aquaristics, causes And treatment
2. Prophylaxis And treatment of water in aquarium

Works directed (12h)

- Interests of breeding of Pisces ornamental
- Examples breeding of Pisces ornamental

Works practices (10.5h)

- Workshop of assembly from an aquarium or pond external
- Visit of aquarium shops

Fashion devaluation :

- Review of end of semester
- Continuous monitoring

Semestre 2

Titled of engineering : Management aquaculture		
Half : 2		
Titled of the EU : Fundamental		
Titled of there matter : Programming python And intelligence artificial		
Volume hourly : 67.5h	**Credits : 5**	**Coefficients : 3**

Teaching Objectives: The course aims to analyze data in order to derive answers to problems in the field. Machine learning (ML) is a form of intelligence artificial (IA) Who East focused on there creation of systems Who learn,
Or improve their performances, in function of the data that they treat.

Knowledge prerequisites recommended :
Knowledge recommended prerequisites : Statistics, Mathematics, Computer science

Content of there matter : (course 22.5h)

1- Identify THE possibilities of Machine Learning
- Discover the domain of there Data Science
- Identify THE different steps of modeling
- Identify THE different types learning automatic 2-

Introduction to the Python language
- Numpy
- MathPlotlib
- Pandas

3- Identify THE techniques And tools of Machine Learning
- Transform of the needs professions in problems of Machine

Learning 4- Data cleaning
- Data Cleaning with Excel.
- Data Cleaning with Python.

5- Data Analysis
- Mean .
- Variance.
- Histograms .

6- Classification
- Logistics Regression .
- Validation.
- Support Vector Machine
- Artificial Neural Network

7- Train THE first algorithm of Machine Learning
- Establish A model statistical
- Program there linear regression
- Validation.
- Regression Polynomial.
- Decision Trees .

Works practices : (22.5h)

- Works on computer

Program of the works directed : (22.5h)

TD1- Identify THE different steps modeling
TD2- Identify THE different types learning automatic TD3-
algorithm with python
TD4- Transform of the needs professions in problems of Machine
Learning TD5- Data Cleaning with Excel.
TD6- Data Cleaning with Python.
TD7 - Data analysis
TD8- Classification with machine learning
TD9- Programming

Fashion devaluation :

- Review of end of semester
- Continuous monitoring

Semester 2

Titled of engineering : Management aquaculture		
Semester : 2		
Titled of the EU : Methodology		
Titled of there matter : Sustainable development		
Volume hourly : 45 hours	**Credits : 4**	**Coefficients : 2**
Teaching Objectives: This course aims to enable students to gain a global vision and understand the different social, economic, environmental and cultural dimensions and components of development as well as to grasp their complexity. Students will acquire knowledge on the concept of development sustainable, her evolution, And its bet in artwork has different scales. The analysis And THE tools of monitoring and assessment will be also addressed **.**		
Knowledge prerequisites recommended : S1		
Content of there matter : course (22.5h) - Introduction - THE models of development current And their limits. 1- History and definitions - Birth of concept of development sustainable And its evolution - Definitions of development sustainable - Perception of development sustainable - THE development sustainable of the areas marines And coastal - Effects, benefits And benefits of a approach based on THE sustainable development - Development sustainable And resilience - THE big programs of sustainable development 2- Main instruments legal international of development sustainable Convention – biodiversity – CBD and its protocols Convention - Change climate – UNFCCC And Agreement of Paris on THE Climate Convention - Desertification 3- Foundations And principles - THE foundations of development sustainable - Presentation of the principles of development sustainable 4- Evolution of the concept of sustainable development - Dates and conferences keys 5- Actors And tools of development sustainable 6- THE Goals of Development Sustainable (ODD) - Context and characteristics - THE 17 SDGs - THE contributions of the SDGs - Actors of the SDGs and their contribution - State of progress of there bet in work 7- Measuring sustainable development - THE indicators - The imprint ecological carbon footprint - THE GDP Green		

- The Index of development human (HDI)

- There ecological accounting

8- THE companies And THE development sustainable

- Historical
- The commitment of the companies In THE development sustainable (benefits, methodology and application)
- THE challenges of development sustainable In THE companies
- There responsibility social And environmental of the companies (CSR)

Works directed (12h)

- Realization of a investigation on THE development sustainable
- Study of case.

Program of the works practices (10.5h)

- Calculation of the indicators (example : Biodiversity, change climate, water, energy)
- Calculation of the ecological footprint
- Calculation of carbon footprint

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Semester 2

Titled of engineering : Management aquaculture		
Semester : 2		
Titled of the EU: Methodology		
Titled of there matter : Geomatics		
Volume hourly : 67h30	**Credits : 5**	**Coefficients : 3**

Goals of teaching : There geomatics East the whole of the tools And of the methods of integrating, processing and analyzing geospatial data in order to produce value-added data. The emphasis will then be placed on:
- There definition of there data geospatial (DG), his different sources, his types, its characteristics, etc.;
- THE different techniques integration, of structuring And analysis of the geospatial data .
- There design And there production of different types of maps.

Knowledge prerequisites recommended : computer science of base

Content of there matter : course (10:30 p.m.)

Course 1: Geomatics (1h30)
• Definitions
• Software
• Domains of applications (use) of there geomatics

Course 2 : Geospatial Data (DG) (1h30)
• Definition
• Or find some there DG ? (Sources)
• Models spatial (Raster, Vector)
• Components of there data geospatial (graphic parts, non-graphic and metadata)
• Concepts of quality And of properties

Course 3 : Reminders on THE systems of reference space (1h30)
• Definition
• System Cartesian geocentric
• Systems of contact details geographical (notions on THE ellipsoids)
• Systems of coordinates planes (notions on THE projections)
• Systems of local references and global
• THE systems of reference in force in Algeria
• Transformations between systems
• Concepts on THE systems of reference vertical (altitudes orthometric And ellipsoidal) and measurement techniques (notions on the geoid)

Course 4 : THE images/data satellites (2*1h30)
• Definition
• Types
• Diagrams acquisition
• THE radiation electromagnetic (REM) And its properties
• THE spectrum electromagnetic
• Energy of a wave EOM And sizes measured physics
• Interaction radiation/atmosphere
• Windows atmospheric useful in remote sensing
• Interaction radiation And matter
• Signature spectral

• Features (THE 4 resolutions)
• Techniques acquisition
• Levels (L1, L2, L3, L4)
Course 5 : Techniques integration of DG (2 * 1h30)
• Techniques integration of there graphic component
• Techniques integration of the data beneficiaries (seizure direct, by mask of input, calculation, etc.)
Course 6 : Edition of the DG (1h30)
• Definition
• Sources error
• Tools of correction of the editing errors
Course 7: Analysis of the data " Vector » (1h30)
• Definition
• Requests spatial
• Geoprocessing
Course 8: Analysis of the data " Raster » (1h30)
• Definition
• Operations local (arithmetic, statistics, relational Or of comparisons, mathematics, logic and conditionals)
• Operations of neighborhood (filters, Mathematical morphology)
• Operations global
• Reclassification
Course 9 : Pretreatment/Treatment of the data satellites. (3*1h30)
• Corrections geometric
• Corrections atmospheric
• Classification
• Filters
• Statistics zonal
Course 10 : Mapping (2*1h30)
• Introduction And historical
• Definition
• Types of maps (has large distribution) Or thematic (presentation of results Or of a study area)
• Components of a map (frame, title, etc.) by kind
• Bet in shape of the dressing
• Expression symbolic on A vector (point, polygon, polyline) real/virtual And A raster (color ramp)
• Variables visuals (shape, dimension, orientation, color, value, dynamic and structures)
• Properties of the variables visuals

Works directed (45h)

TD 1 : Access to bases of data open data online
TD2 : Presentation of the software (ArcGis , QGIS, SeaDAS , SNAP, etc.) TD 3: Integration techniques
TD 4 : Edition of the data vector TD
5: Spatial queries
TD 6: Geoprocessing
TD 7 : Analysis Spatial on of the rasters (Mapalgebra)
TD 8: Cartographic design
TD 9 : Initiation has there handling of the images satellites I

TD 10 : Corrections atmospheric TD 11: Classification TD 12: Filtering TD 13 : Application 1 : Analysis of the data of there color of Ocean TD 14: Application 2: Analysis of SST data
Fashion devaluation : - Review of end of semester - Continuous monitoring

Semestre 2

Titled of engineering : Management aquaculture		
Semester : 2		
Titled of the EU : Fundamental		
Titled of there matter : There treasury of the companies		
Volume hourly : 30h	**Credits :** 4	**Coefficients :** 2
Teaching objectives: Present the methodology for good cost control and of the expenses At level of a business, proceed to calculations of indicators And TO DO of the forecasts has short, medium and long term.		
Knowledge prerequisites recommended : None		
Content of there matter : (course 10:30 p.m.) Chapter 1 : There company treasury Chapter 2 : There management of there treasury In a Company Chapter 3: Financial balance Chapter 4 : There planning financial		
Program of the works directed : (7:30 a.m.) - Exercises and studies of case **Fashion devaluation :** - Review of end of semester - Continuous monitoring		

Semestre 2

Titled of engineering : Aquaculture management		
Semester: 2		
Titled of the EU : Methodology		
Titled of there matter : Internship		
Volume hourly : 30h	**Credits : 2**	**Coefficients : 1**
Goals of teaching : Internship insertion of the students in professional environment .		
Knowledge prerequisites recommended : None		
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Semestre 2

Titled of engineering : Management aquaculture		
Semester : 2		
Titled of the EU : Transversal		
Titled of there matter : English for Specific Purposes 2		
Volume hourly : 10:30 p.m.	**Credits :** 1	**Coefficients :** 1
Goals of teaching : THE program plans of to strenghten THE skills has describe the different forms. Of even, future engineers will be called upon to apply the different procedures, such as function and capacity, the relationship between cause and effect, the sequence logic of the sequences, And there method Who differs of a process has the other.		
Knowledge recommended prerequisites : ESP1 – S1.		
Content of there matter : (course 12h) Unit 1: Shapes • One dimensional shapes • Two dimensional shapes • Three dimensional shapes • Exercises • Lexicon Unit 2: Process 1 - Functions and ability • Function of devices • Instruments • Ability and capacity • Exercises • Lexicon Unit 3: Process 2 - Cause and effect • Actions and results • Changes of state • Causing , allowing and preventing • Exercises • Lexicon Unit 4: Process 3 - Purpose and Method • How things should be done • How things May be done • Describing experiments • Exercises • Lexicon **Works Directed (10:30 a.m.)** Application (unit 1 to 4).		
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Semestre 3

Titled of engineering : Management aquaculture		
Semester : 3		
Titled of the EU : Fundamental		
Titled of there matter : Technology breeding of the aquatic invertebrates		
Volume hourly : 67h30	**Credits :** 6	**Coefficients :** 3
Teaching objectives: trains students in knowledge of breeding techniques of different species of invertebrates of interest aquaculture (mollusks, crustaceans, echinoderms).		
Knowledge prerequisites recommended : Physiology invertebrates .		

Content of there matter : (course 10:30 p.m.)

1- Introduction And general information (Historical, main species raised, ….)
2- Breeding of the invertebrates in THE world and in Algeria
3- THE techniques of production of the :
- Molluscs : mold, oyster dig, clam, shell Healthy Jacques, other
- Crustaceans decapods: shrimp navy, shrimp of water gentle, crab, other
- Echinoderms : sea urchin, sea cucumber, others

For each species, THE chapters following must be treaties :
- Systematic
- Features morphological
- Features organic
- Geographic distribution
- Cycle And modes of production
- Technology breeding (Selection And maturation of the parents, food And biotechnical parameters, reproduction, laying and hatching, larval and post-larval rearing, harvesting, nursery, fattening)
- Statistics of production And country producers
- Walk And marketing
- Perspectives of development
- Problems and constraints

Program of the works directed : (10:30 p.m.)
- Determination of the performances of growth of a shellfish farming
- Determination of quality commercial of a shellfish farming
- Identification of the stadiums of reproduction of a bivalve
- Design hatcheries
- Packaging of the parents, laying And fertilization
- Visits of shellfish farms
- Visits of farms of shrimp farming

Program of the works practices : (10:30 p.m.)
1. Production of prey alive (phytoplankton)
2. Production of prey alive (daphnia, rotifer, brine shrimp)
3. Collection of spat of bivalves, boudinage Or bet in pouches (according to the species), bet in place on the sector for monitoring shellfish farming
4. Determination of the settings biotechnics of a shellfish farming

5. Induction artificial of there laying And breeding larval 6. Manufacturing of a shellfish farming sector
Fashion devaluation : - Review of end of semester - Continuous monitoring

Semester 3

Titled of engineering : Management aquaculture		
Half : 3		
Titled of the EU : Fundamental		
Titled of there matter : Management of there health of the breeding aquaculture		
Volume hourly : 66h	**Credits :** 6	**Coefficients :** 3
Goals of teaching : Knowledge of the risks of appearance of diseases being able to affect THE breeding aquaculture, THE measures of interventions preventive and curative		
Knowledge prerequisites recommended : Knowledge recommended prerequisites: S1 S2		

Content of there matter : (course 22.5h)

- Introduction to diseases of the aquaculture farms

I. Elements of immunology of the species of aquaculture interest

II. Elements of epidemiology

III. Diseases And disorders in the aquaculture farms :

1. Diseases And problems caused by there quality of medium breeding (environment)
2. Diseases of food origin
3. Virus And viruses
4. Bacteria And bacterial diseases
5. Parasites and parasitoses
6. Mushrooms and Mycoses
7. Diseases of undetermined etiology

IV. Diagnosis

1. Diagnosis of land
2. Diagnosis laboratory

V. Methods of prevention non- medical

1. Management of there quality of water And of the environment
2. Quality And good conduct of food
3. Exploitation of there genetic resistance to diseases
4. Prophylaxis sanitary And health police

VI. Methods of medical prevention

1. There vaccination

– There vaccination antibacterial
– There vaccination antiviral
– Vaccination antiparasitic

2. Measures therapeutic

– Basics of the intervention therapeutic
– Chemotherapy
– News therapeutic orientations

Program of the works Practices : (22.5h)

1. Identification of the parasites of a species issue of a breeding marine (parasitological diagnosis)
2. Identification of parasites of a species from freshwater farming (parasitological diagnosis)

3. Identification of the parasites of a species issue of a medium natural (parasitological diagnosis)
4. Surveys epidemiological At level of the farms fish farms
5. Surveys epidemiological At level of the farms of shrimp farming
6. Surveys epidemiological At level of the farms shellfish farming

Program of the works directed : (9 p.m.)

1. Lesions due to bacteria (diagnosis clinical)
2. Lesions due to virus (diagnosis clinical)
3. Lesions due with mushrooms (diagnosis clinical)
4. Lesions due to parasites (diagnosis clinical)
5. Lesions due to components of the environment (clinical diagnosis)
6. Lesions due to diseases nutritional (diagnosis clinical)

Fashion devaluation :

- Review of end of semester
- Continuous monitoring

Half 3

Titled of engineering : Management aquaculture		
Half : 3		
Titled of the EU : Fundamental		
Titled of there matter : Production of the algae		
Volume hourly : 63h	**Credits :** 5	**Coefficients :** 3
Goals of teaching : Acquire of the knowledge of base on THE methods of algae cultivation.		
Knowledge prerequisites recommended : Knowledge recommended prerequisites : Biology, Botany.		

Content of there matter : (course 9 p.m.)

Chapter I : Introduction has there awareness of algology

1-1- The classification of algae:
- THE Cyanobionts
- THE Rhodobionts
- THE Chromobionts
- THE Chlorobionts

1-2- Bet in evidence of the species of interest aquaculture : THE agarophytes And alginophytes 1-3- Interactions between algae and their environment

1-4- THE benefits And THE disadvantages of culture of the algae

Chapter 2: Culture algae

2-1- THE methods of culture in vitro

2-2- Culture founded on there reproduction sexual 2-3- Culture from “cuttings”

2-4- Method of culture of Cyanobionts 2-5- Method of culture of Rhodobionts
- Seeding
- Facility at sea
- There growth And the harvest
- Yield

2-6- Method of culture of Chromobiont 2-6-1- Forced culture method
- Seeding of the collectors
- Phase of growth in hatchery
- Phase preculture in water calm
- THE development in sea
- Harvest And yield

2-6-2- Method of traditional culture
- Seeding
- Phase of preculture
- THE development in sea
- Harvest And yield

2-7- Method of culture of Chlorobiont

Chapter 3: Use and valorization of algae

3.1. THE algae In food human and animal
3.2. THE Algae in the food industry
3.3. THE Algae in agriculture, In THE treatments of the wastewater ,
3.4. THE Algae in pharmacology
3.5. THE Algae in cosmetology
3.6. Others uses

Program of the practical work : (9 p.m.)

- Exit on ground : harvest And observation of the algae In THE medium natural.
- Exit on the ground : visit of a unit of algae recovery .
- Identification specific of the Cyanobionts has interest aquaculture.
- Identification specific Rhodobionts has interest aquaculture.
- Identification specific Chromobionts has interest aquaculture.
- Identification specific cholorobionts has interest aquaculture.
- Essay of algae cultivation .

Program of the works directed : (9 p.m.)

- Mini-projects on the culture And there valorization of algae
- Production video on THE cultures in open sea .

Fashion devaluation :

- Review of end of half
- Continuous monitoring

Semester 3

Titled of engineering : Management aquaculture		
Semester : 3		
Titled of the EU : Fundamental		
Titled of there matter : Nutrition of the species aquaculture		
Volume hourly : 63h	**Credits :** 5	**Coefficients :** 3
Goals of teaching : To know THE bases of there nutrition And THE mechanisms behavior eating in order to of power decide objectively with What, how And When to feed species in breeding.		
Knowledge prerequisites recommended : Knowledge recommended prerequisites: S1 S2		
Content of there matter : (course 9 p.m.) I. General information on there nutrition of the aquatic animals (3h) 1. Concepts fundamentals on nutrition 2. Origin of the particularities nutritional of the Pisces And crustaceans 2.1. Special features zoological 2.2. Special features organic 2.3. Special features ecological II. Basics of nutrition of the aquatic animals (6h) 1. Behavior eating And regulation of ingestion 1.1. Regulation central and peripheral of ingestion 1.2. Factors acting on ingestion voluntary 2. Physiology digestive And digestibility of the nutrients at the house of the fish 2.1. Reminder on anatomy of digestive tract 2.2. Enzymes digestive III. Nutrition And metabolisms (9 a.m.) 1. Energy nutrition 2. Nutrition protein 3. Nutrition lipid 4. Nutrition carbohydrate 5. Nutrition vitamin 6. Nutrition mineral IV. Carotenoids And pigmentation (3h)		
Program of the works Practices : (9 p.m.) 1. Extraction And dosage of the proteins has leave of there flesh of the Pisces by there method from KJELDAHL. Part 1 mineralization. 2. Extraction And dosage of the proteins has leave of there flesh of the Pisces by there method KJELDAHL. Part 2 distillation. 3. Extraction and dosage lipids totals to from there flesh and liver fish (Soxhlet method). 4. Extraction and identification of pigments by thin-layer chromatography from dried algae. 5. Levy of blood from live fish . 6. Extraction And dosage of the provitamins HAS by spectrophotometry has leave of blood, of the flesh and liver of fish. 7. Extraction and dosage of certain fat-soluble vitamins from blood and oil of the fish.		

8. Extraction And dosage of some salts minerals has from there flesh fish .

Program of the works directed : (9 p.m.)

1. Determination of the total fatty acid content of a fatty substance (fish oil, fish flesh).
2. Identification of lipids extracted from cod liver oil by thin-layer chromatography.
3- Studies of case.

Fashion devaluation :

- Review of end of semester
- Continuous monitoring

Semestre 3

Titled of engineering : Management aquaculture		
Semester : 3		
Titled of the EU : Methodology		
Titled of there matter : Aquaculture biotechnology		
Volume hourly : 52h30	**Credits :** 5	**Coefficients :** 2

Goals of teaching : Master THE tools of production And analysis in biotechnology, Realize A audit quality and optimize the management of a tool of production Or of
transformation ; Master there management of the systems in water (quality And quantity).

Knowledge prerequisites recommended :
Knowledge recommended prerequisites: S1 S2

Content of there matter : (course 9 p.m.)

1-Definition of the biotechnologies
aquaculture 2-Microbiological
Engineering
Culture And Kinetic microbial
fermenter technology
Application In THE domain of aquaculture (culture of spirulina, biological water treatment, probiotics , etc.)
3- Genius enzymatic
Enzyme kinetics
Inhibitors Reactors
enzymatic
Immobilization 4- Genetic
engineering enzymes
- Mutagenesis
- Cloning

Program of the works directed (10:30 a.m.) And works practices (9 p.m.) :

- Tool of genius genetic :
  - Extraction of the acids nucleic acids
  - Hybridization
  - Sequencing

- - Study of case :
  - Improvement genetic DNA vaccine,
  - Transgenesis.

Fashion devaluation :
- Review of end of semester
- Continuous monitoring

Semestre 3

Titled of engineering : Management aquaculture		
Semester : 3		
Titled of the EU : Methodology		
Titled of there matter : Accounting And financial mathematics		
Volume hourly : 42 hours	**Credits : 2**	**Coefficients : 2**
Goals of teaching : To apprehend THE fundamentals of there accounting general in the frame of business situations		
Knowledge prerequisites recommended : none		
Content of there matter : course (9 p.m.) - Mathematical financial : interests simple, compounds, annuities, amortization tables - Goals And issues of there accounting general - Organization an accountant, obligation legal, notion of heritage And of activity - Registration of the flow In THE accounts - Analysis of the documents commercials - Elaborate succinctly the different documents accountants And to understand their aim. - Calculations commercials - Depreciation, provisions, depreciations		
Works directed (9 p.m.) - Exercises		
Fashion devaluation : **Fashion devaluation :** - Review of end of semester - Continuous monitoring		

Semestre 3

Titled of engineering : Management aquaculture		
Semester : 3		
Titled of the EU : Transversal		
Titled of there matter : English for Specific Purposes 3		
Volume hourly : 9 p.m.	**Credits :** 1	**Coefficients :** 1
Goals of teaching : This teaching goes allow has the student of prepare her membership At world of work Who need the application of her acquired in English language .		
Knowledge prerequisites recommended : ESP2 – S2.		
Content of there matter : (course 10.5h) Unit 1: Writing Reports Unit 2: Application Forms Unit 3: Preparing a CV Unit 4: Oral Interviews and Tips • Questions and answers: Speaking about your skills • Play role activities for students **Works Directed (10.5 H)** Application (unit 1 to 4).		
Fashion devaluation : leave alone has the appreciation of the team of training. **References** • Kelly Keith, Science, Macmillan Vocabulary Practice Series, 2008. • McCarthy Michael, O'Dell Felicity, English Vocabulary in worn, Cambridge University Press, 1996.		

Semestre 4

Titled of engineering : Management aquaculture		
Semester : 4		
Titled of the EU : Fundamental		
Titled of there matter : Fish farming		
Volume hourly : 67.5h	**Credits :** 6	**Coefficients :** 3
- **Goals of teaching :** aim has form engineers capable to manage the whole activities of a establishment fish farming, of determine THE needs of the species has raise And THE places favorable has breeding, to optimize THE yields of productions.		
Knowledge prerequisites recommended : Knowledge prerequisites recommended: Biology And physiology.		
Content of there matter : (course 22.5h) Introduction (definition, interest, objectives, history, etc.) 1. Fish farming In THE world 2. Fish farming in Algeria 3. Fish farming continental : Carps, Pikeperch, Fish cat (Clarias gariepinus), Tilapia, other. 4. Marine fish farming (Sea bass, sea bream, meagre, tuna, other) For each species, THE chapters following must be treaties : - Systematic - Features morphological - Features organic - Geographic distribution - Cycle And modes of production -Technology breeding (reproduction, incubation, breeding larval, pre-magnification and magnification) - Walk And marketing - Perspectives of development - Problems and constraints		
Program of the works directed : (22.5h) - Visit of farms marine fish farms - Visit of farms fish farms of water gentle		
Program of the works practices : (22.5h) 1. Design of a unit breeding of fish 2. Treatment of the Artemia cysts 3. Production of prey alive 4. Extraction And conservation of the glands pituitary gland of fish 5. Selection, marking And control weight of the parents 6. Production of fry of Pisces (Carps) 7. Production of fry of Pisces (Fish cat) 8. Production of fry of Tilapia 9. Hatching (estimate of rate hatching) 10. Breeding larval in water clear/ in water green (follow up of the settings zootechnics) **Fashion devaluation :** - Review of end of semester - Continuous monitoring		

Semestre 4

Titled of engineering : Management aquaculture		
Semester : 4		
Titled of the EU : Fundamental		
Titled of there matter : Reproduction of the species of aquaculture interest		
Volume hourly : 63h	**Credits :** 5	**Coefficients :** 3
Goals of teaching : Describe THE bases physiological of there function reproductive and know the different modes of reproduction of molluscs, crustaceans and fish in aquaculture		
Knowledge prerequisites recommended : Physiology, biology		
Content of there matter : (course 9 p.m.) - There management breeders . - Identification of sex and estimate of there sexual maturity . - Role of the factors of medium. - Terms and conditions gonadal among the Pisces. - Gametogenesis. - Control neuroendocrine of reproduction in fish. - Control environmental of there reproduction in fish. - Effect stress on the reproduction in fish. - Induction of there laying. **Program of the works directed : (9 p.m.)** 1- Induction of there laying by modification of the factors of the environment 2- Fertilization of the eggs members and non -members 3- There guard parental 4- THE embryonic development **Program of the works practices : (9 p.m.)** 1- Selection And choice of the parents 2- Packaging parents 3- Verification of maturity sexual and packaging of the parents 4- Induction of there laying by treatment hormonal 5- Stripping, fertilization And incubation 6- Study of there quality of gametes 7- Follow up of embryonic development 8- Reproduction of a fish of water of sea 9- Reproduction of a fish of water gentle 10- Reproduction of a crustacean 11- Reproduction of a mollusk		
Fashion devaluation : - Review of end of semester - Continuous monitoring		

Semestre 4

Titled of engineering : Aquaculture management		
Semester : 4		
Titled of the EU : Fundamental		
Titled of there matter : Food of the species aquaculture		
Volume hourly : 63	**Credits : 5**	**Coefficients : 3**
Goals of teaching : To know THE bases of there nutrition And THE mechanisms behavior eating in order to of power decide objectively with What, how And When to feed species in breeding.		
Knowledge prerequisites recommended : S1 S2		

Content of there matter : (course 9 p.m.)

Chapter I : General information on food of the animals aquatic
- Importance of food At breast of a aquaculture
- Rationing
- Relationship : rationing- growth- food processing
- Factors of determination of rate of growth
- Regulation of ingested it in function of there value energy of there ration

4.1. Table of rationing/ feeding
5. Calculation of the clues of growth
5.2 Rate of rationing
5.3 Rate of growth specific TCS
5.4 The index of consumption and of conversion (IC)
6. Terms and conditions of food distribution

Chapter II : Main materials firsts used In food of the farmed aquatic animals

II.1. Materials firsts of animal origin
- Flour of Pisces
- Concentrates of Proteins Soluble of Fish (CPSP)
- Autolysate of fish
- Flour of meat terrestrial
- Flour of blood
- Products purified (oil of fish, oils II.2.Raw

materials of plant origin
- THE crabs
- Cereals And co- products
- Protein crops
- Products purified (oils plants, starch)

Chapter III : Additives food For animal feed aquatic
- Roles And natures
- Attractants
- Antioxidants
- Anti- stress
- Agents binders
- Conservatives

- Probiotics
- Enzymes

Chapter IV : Factors antinutritionals at the house of THE animals aquaculture

4.1. Factors antinutritionals of origin vegetable

- Acid phytic
- Anti -trypsics
- Glucosinolates /antithyroids
- Saponins
- Gossypol
- Tannins
- Alkaloids
- Toxins fungal And algae

4.2. Factors antinutritionals of origin animal

- Thiamines
- Histamines
- Peroxides

Chapter V : Formulation And manufacturing of aquaculture feed

5-1- Principle of formulation has lesser cost : report : price/quality

5-2- Manufacturing process

- Census of the materials firsts
- Grinding ; kind of crushers
- Dosage And weighing of the ingredients
- Homogenization
- Expansion-Extrusion
- Press
- Cooling and drying
- Crumble
- Coating
- Addition of binders and additives

5.3. Control of granule made

- Features geometric and physical
- Size particles
- Mass volumetric/ density
- Features mechanical
- Resistance has abrasion : hardness
- Resistance has crushing: hardness
- Ability has rehydration
- Stability In water

Program of the works Practices : (9 p.m.)

TPN°1. Manufacturing of a food kind granule dry For species Tilapia
(Visit to an ONAB industrial manufacturing unit)

TPN°2. Control of granule made (size, density, solubility)

TPN°3. Control nutritional of a food made : determination of rate of proteins TPN°4. Nutritional control of a manufactured food: determination of the lipid level TPN°5. Physicochemical control of a manufactured food

Program of the works directed : (9 p.m.)

- Description of growth
- Calculation of the clues of growth
- Table of rationing
- Studies of case.

Half 4

Titled of engineering : Aquaculture management		
Half : 4		
Titled of the EU : Methodological		
Titled of there matter : Improvement genetic		
Volume hourly : 64h30	**Credits :** 4	**Coefficients :** 2

Teaching objectives: The objective of the module is to provide an overview of recent advances in genetic And improvement animals And plants with of the examples individuals on of the species aquaculture And of the perspectives has AVERAGE And long terms.

Knowledge prerequisites recommended :
Knowledge prerequisites recommended : S3

Content of there matter : (course 10:30 p.m.)

I- Reminders on there biology molecular

II- Genetics quantitative And Genetic bases of the animals aquatic

1. Introduction
2. There variability At breast of the populations
3. Heredity and middle
4. Effect of the Genoa, variance genetic, heritability
5. There resemblance between related
6. Effect of the diets of reproduction
7. The contribution of the markers molecular

III. Goals And methods of improvement genetic in aquaculture

1. Applications industrial of the techniques genetics :
2. Improvement genetic by mutagenesis, selection And use of mutants
3. Improvement genetic by natural recombination
4. Improvement genetic by merger of the protoplasts
5. Improvement by handling genetic
6. Biotechnology of there reproduction animal :
7. There mastery of the cycles sexual
8. Insemination artificial
9. There biotechnology classic of the embryo
10. THE biotechnologies embryonic of future (DIV, sexing, cloning)

IV. Molecular genetics

V. Transgenesis

1. Definition
2. THE mouse giants transgenics
3. Importance economic, scientist And medical of there transgenesis
4. Principle of obtaining of a animal transgenic
5. There technology of transfer of embarrassed
6. Application of transgenesis

Program of the works Practices : (9 p.m.)

- Extraction of DNA from species of aquaculture interest (animal and/or plant species).
- Verification of there purity of DNA And quantification ; estimate of there concentration
- Dosage of DNA to the spectrophotometer.
- Visualization of DNA genomics, electrophoresis of DNA : Casting of a agarose electrophoresis gel and observation of DNA on the gel.

Program of the works directed : (9 p.m.) - Exercises on the part L And II of the course. - Exercises on Part IV and V of the course **Fashion devaluation :** - Exam of end of semester - Continuous monitoring

Semester 4

Titled of engineering : Management aquaculture		
Semester : 4		
Titled of the EU : Methodology		
Titled of there matter : Internship		
Volume hourly : 60 hours	**Credits : 7**	**Coefficients : 4**
Goals of teaching : Internship insertion of the students in medium professional.		
Knowledge prerequisites recommended : None		
Fashion devaluation : leave alone has the appreciation of the team of training.		

Semester 4

Titled of engineering : Management aquaculture		
Semester : 4		
Titled of the EU : Methodology		
Titled of there matter : Management of water		
Volume hourly : 34h30	**Credits : 2**	**Coefficients : 1**
Teaching objectives: present a market study model for aquatic products, teach them concepts for assessing quality and mastering health management of the products of there fishing And of aquaculture And THE models current of the circuits of distribution.		
Knowledge prerequisites recommended : S2 S3		
Content of there matter : (course 10:30 p.m.) Introduction 1. Aspects regulatory of water aquaculture farming 2. THE functions of water in aquaculture 2.1. Water as breeding environment 2.2. Transportation of oxygen, of the nutrients, of energy And of waste 3. Quality of water in aquaculture navy and continental 3.1. Chemical and physicochemical quality (Dissolved oxygen, temperature, ammonia, nitrates and nitrites, pH, salinity, alkalinity, CO2, materials in suspensions and organic matter) 3.2. Organic quality 4. Alteration of the waters 4.1. Causes of alteration of the aquaculture waters 4.2. Identification And quantification of the rejections of aquaculture In the environment : chemical pollutants, effluents, waste, corpses, genetic pollution 4.3. Case of the nitrites and ammonia 4.4. Bio-indicators of alteration of the waters 4.5. Impact of alteration of the waters on THE cultivated species 4.6. Methods of followed by there quality waters 5. Mastery of management of water breeding 5.1. Estimate of the needs in water And equipment of taking of water 5.2. Estimate of the needs in oxygen dissolved (Aeration And oxygenation) 5.3. Water flow estimation 5.3. Purification of water 5.4. Methods denitrification 5.5. Elimination of ammonia, of the nitrites And nitrates 5.6. Sterilization of water. 5.7. Treatment of the rejections solids 5.8. Treatment of the rejections dissolved 5.9. Recycling of water breeding 5.10. Biofiltration		

5.11. Columns airlift In there purification of the waters

5.12 Method of degassing of breeding water

6. Management integrated of the waters in aquaculture

6.1. Aquaponics And permaculture

6.2. Examples of aquaponics

Programs works directed (12h)

Case study

Fashion devaluation :

- Review of end of semester
- Continuous monitoring

Semestre 4

Titled of engineering : Management aquaculture		
Semester : 4		
Titled of the EU : Transversal		
Titled of there matter : Walk of the products aquatic		
Volume hourly : 10:30 p.m.	**Credits : 1**	**Coefficients : 1**
Teaching objectives: present a market study model for aquatic products, teach them concepts for assessing quality and mastering health management of the products of there fishing And of aquaculture And THE models current of the circuits of distribution.		
Knowledge prerequisites recommended : S1 S2		
Content of there matter : (course 10:30 p.m.) 1. Requests And requirements of consumer, sociology of there consumption (12H) : a) standards of quality and requirements regulatory b) traceability and regulatory requirements: HACCP approach, risk analysis and identification of critical points c) Health risk management, health standards and regulatory requirements: the PMS, establishment of the health control plan 2. Current marketing techniques: slaughter, treatment and/or processing, transport and distribution conditions, product presentation, cold chain and regulatory requirements (9H) 3. Answer of production has the evolution of there request (9H): - news techniques of production - news species (catfish, sturgeons, …) - new competing producers And globalized competition - news techniques of transfer packaging-distribution. Others: recreational fishing, restocking and field visits. **Fashion devaluation :** - Review of end of semester - Continuous monitoring		

Semestre 5

Titled of engineering : Management aquaculture		
Semester : 5		
Titled of the EU : Fundamental		
Titled of there matter : Genius aquaculture		
Volume hourly : 63h	**Credits :** 5	**Coefficients :** 3
Teaching objectives: Understand the importance of environmental constraints in the choice of livestock systems. Study the physical, chemical and biological parameters. determinant there bet in place of a project aquaculture And THE bases of genius civil And engineering necessary has there realization And has there management of these livestock systems .		
Knowledge prerequisites recommended : S3 S4		

Content of there matter : (course 9 p.m.)

1. Classification of the systems of production aquaculture.
    1.1. Systems open.
    1.2. Systems semi- closed.
    1.3. Systems closed.
    1.4 Systems hybrids.
2. Supply in water :
    2.1. Pumping.
    2.2. Pipeline.
    2.3. Heating And cooling.
3. Breeding in natural environments :
    3.1. Development of the lakes And ponds.
4. THE circuits closed :
    4.1. Principles and methods.
    4.2. Filtration, nitrification and disinfection.
    4.3. Aeration and oxygenation.
    4.5. Control of CO2 And of pH.
    4.6. Functioning And management of the circuits closed.
5. Breeding in cages :
    5.1. Selection of site.
    5.2. Types of cages.
    5.3. Problems related has breeding in cages.
6. Systems power supply :
    6.1. Interests.
    6.2. Types of equipment.
    6.3. Systems of control.
7. Selection of the Pisces And transfers has the interior of the aquaculture facilities .
8. Transportation of the Pisces living :
    8.1. Preparation.
    8.2. Transportation on the ground.
    8.3. Transportation in sea.
    8.4. Other transport.
9- Planning in aquaculture.

Program of the works Practices : (9 p.m.)

- Design of scale models of the different systems aquaculture farming .
- Visit of a marine hatchery

Program of the works directed : (9 p.m.)

TD1: Sizing breeding enclosures
TD2: Aeration /oxygenation of water in aquaculture
TD3: Sizing pumping systems TD4: Quantification
of fish farm discharges
TD5: Sizing systems filtration mechanical + sterilization
TP6: Design of a unit incubation of the eggs + system of drain And TD7 filter: Sizing biological filtration + livestock
TD8: Cages floating
TD9: Sizing of a farm breeding of fish cat (aspects technical- economic)

Fashion devaluation :

- Review of end of semester
- Continuous monitoring

Semestre 5

Titled of engineering : Management aquaculture		
Semester : 5		
Titled of the EU : Fundamental		
Titled of there matter : Planning And management of there production		
Volume hourly : 31.5h	**Credits :** 2	**Coefficients :** 1
Goals of teaching : Learn has to plan And has manage A cycle of production aquaculture.		
Knowledge prerequisites recommended : S3 S4		

Content of the matter : (course 31.5h)

Chapter 1 : Management of the data techniques

- Management of the stocks
- Management of the forecasts And orders
- Management visual
- Management workshop
- System Kanban
- The analysis of the flow
- Tools of resolution of issue (diagram cause and effect, Pareto , diagram of affinities …)

Chapter 2 : Management of the commercial data

- Cost of returns : definition, charges direct And indirect, Price purchase, purposes of a cost price
- Notion of accounting general
- Definition And purposes of the indicators of performance
- Definition And purposes of a painting of

Chapter 3: Animating the Quality System

- Participate has there bet in place of a approach Quality.
- Put in place of the indicators And paintings of edges.
- Follow piloting of there Quality.
- Identify THE non-conformities and/or malfunctions.
- Participate has there approach continuous improvement .
- Participate to audits internal.
- Participate has there bet in place of repositories certification Quality.
- Ensure there traceability of the products.

Program of the works directed : (9 p.m.)

- Practice of the simulations of logistics flows .
- Participate has exchanges with professionals .
- Workshops.

Fashion devaluation :

- Review of end of semester
- Continuous monitoring

Semestre 5

Titled of engineering : Management aquaculture		
Semester : 5		
Titled of the EU : Fundamental		
Titled of there matter : Valorization of the products aquatic		
Volume hourly : 57h	**Credits :** 4	**Coefficients :** 3
Goals of teaching : Teaching presents of way general THE different methods of processing and enhancing aquaculture products		
Knowledge prerequisites recommended : S3 S4		

Content of there matter : (course 10:30 p.m.)

1. Importance of processing and valorization of aquaculture products and socio-economic benefits
2. Reminders on the structure of the flesh, overall chemical composition of the flesh of the PMC and evolution of the fish muscle after its capture
3. THE causes of alteration of fish : Autolysis, contamination chemical, microbial contamination
4. Preparation of the Pisces, mollusks And crustaceans (PMC)
5. Conservation And transformation traditional of the PMC
   - 5.1. Drying - Freeze-drying
   - 5.2. Salting/ Desalination
   - 5.3. Smoking : Smoking has hot And Smoking has cold, smoking by smoke liquid And equipment
   - 5.4. Marinating : marinades cooked And floods
   - 5.5. Processes thermal
   - 5.5.1. Cold
   - 5.5.1.1. Refrigeration
   - 5.5.1.2. Freezing/deep freezing (negative cold)
   - 5.5.2. Heat (Cooking/Pasteurization/Sterilization)
   - 5.6. Silage (autolysates, chemical hydrolysates, enzymatic And heterolysates)
6. Techniques news
   - 6.1. Pre-packaging
   - 6.2. Packaging below empty / below modified atmosphere
7. Valorization of the algae marines
   - 7.1. THE algae food
   - 7.2. THE additives food
   - 7.3. THE substances biomedical Or food supplements
   - 7.4. THE cosmetics
   - 7.5. THE fertilizer and products for agriculture
   - 7.6. THE new materials

Program of the works practices (10:30 p.m.) and works directed (12h) :

First part : valorization of marine products

1. Extraction of agar agar has leave of algae reds (Rhodophyceae, Gelidium)
2. Extraction And dosage of the phenols contained In lettuce of sea Ulva lactica
3. Extraction, separation And identification of the pigments contents In Ulva And indigo synthesis
4. Extraction of there chitin And of the chitosans has leave of the shells of the crustaceans (shrimp)

5. Extraction of collagen has leave of the co- products
6. Extraction of the alginates has leave of the algae brunettes
7. Dosage of the sulfites In THE shrimp frozen
8. Extraction And dosage of acid benzoic has leave of the marine plants. Chemical synthesis of benzoic acid.

Second part : assessment of there quality of the products aquatic costs and transformed
9. Assessment sensory of there quality of the products aquatic has the state costs (scale French and European) and in frozen and cooked state.
10. Evaluation of the physical, chemical and microbiological quality of fresh and processed marine products
11. Determination of there content in ABVT And of the TMA by microtitration
12. Dosage of the chlorides contents In there flesh of the Pisces salty

Fashion devaluation :

- Review of end of semester
- Continuous monitoring

Semestre 5

Titled of engineering : Management aquaculture		
Semester : 5		
Titled of the EU : Fundamental		
Titled of there matter : Marketing operational		
Volume hourly : 10:30 p.m.	**Credits :** 2	**Coefficients :** 1
Goals of teaching : • To apprehend the whole of the elements of the offer commercial (THE mix) • Master THE different elements constituent each element of mix		
Knowledge prerequisites recommended : S3 S4		
Content of there matter : (course 10:30 p.m.) - Marketing mix : concepts, elements And consistency - Policy product : cycle of life, range, brand, packaging - Policy price : goals, constraints, methods fixing - Policy of distribution : choice of circuit, SEO, Brand of distributer - Policy of communication : goals, strategies, mix of communication, promotion sales - Design, development of the new products And evolution of the ranges : issues, risks and different stages (including marketing tests)		
Fashion devaluation : - Review of end of semester - Continuous monitoring		

Semestre 5

Titled of engineering : Management aquaculture		
Semester : 5		
Titled of the EU : Methodological		
Titled of there matter : Modeling: application has aquaculture		
Volume hourly : 45 hours	**Credits :** 4	**Coefficients :** 2
Teaching Objectives: Master the conceptual framework of Life Cycle Assessment (LCA) and its standardized steps. Apply LCA to an aquaculture system and model its environmental impacts and interactions.		
Knowledge prerequisites recommended : S3 S4		
Content of there matter : (course 10:30 p.m.) 1. Interest of there modeling For there selection of the sites aquaculture. - THE environmental factors to be modeled. 2. Modeling applied has there shellfish farming 2-1- THE tools of selection of the sites favorable has breeding of the mussels And of the oysters. 2-2- Simulation of the growth of mussels and oysters. 3. Modeling applied has there fish farming in a cage at sea 3-1- THE tools of selection of the sites favorable has breeding of the Pisces in cages in Wed. 3-2- Simulation of the growth of marine fish in breeding. 3-3- Evaluation of the filing of discharges. 4. Analysis of cycle of life (ACV) applied has aquaculture 4-1- LCA methodology. 4-1-1- There definition of the goals And of field of study 4-1-2- The life cycle inventory (LCI). 4-1-3- The assessment of the impacts environmental. 4-1-4- Interpretation of results. 4 2- The boundaries of the ACV. 4-3- Study case : application of LCA to the different systems of aquaculture production .		
Program of the works directed : (10:30 p.m.) Studies of case : - Selection of the sites favorable has breeding of the mussels And oysters - Selection of the sites favorable has breeding of the Pisces in cages in sea - LCA design . - Assessment of the impacts environmental of aquaculture activity **Fashion devaluation :** - Review of end of semester - Continuous monitoring		

Semestre 5

Titled of engineering : Management aquaculture		
Semester : 5		
Titled of the EU : Methodological		
Titled of there matter : Entrepreneurship		
Volume hourly : 45 hours	**Credits :** 4	**Coefficients :** 2
Goals of teaching : • Develop the spirit of enterprise • To understand THE challenges of there creation Or business takeover		
Knowledge prerequisites recommended : S3 S4		
Content of there matter : (course 10:30 p.m.) - Entrepreneurial approach - Of the idea to the project entrepreneurial - Actors of entrepreneurship - Study of the environment and definition of commercial potential of the future business - Construction of business plan - Choice of Status legal of the company		
Program of the works directed : (10:30 p.m.) - Studies of case **Fashion devaluation :** - Review of end of semester - Continuous monitoring		

Semestre 5

Titled of engineering : Management aquaculture		
Semester : 5		
Titled of the EU : Transversal		
Titled of there matter : Management of projects		
Volume hourly : 45 hours	**Credits :** 4	**Coefficients :** 2
Teaching objectives: The objective of this module is to make the student understand the basics of project management and master the organization to start a project. It allows him to know the skills of project management, assess and anticipate risks, master THE actors And THE instances of a project, to understand THE roles And THE responsibilities in environment of project And Also to animate a team project.		
Knowledge prerequisites recommended : S3 S4		

Content of there matter : (course 10:30 p.m.)

Chapter I: Project formalization

- Definitions And Typology
- THE seven facets of management of project
- Cycle of life of project

Chapter II : General approach of there conduct of project

- Organization of project
  - Perimeter
  - Teams
  - Tasks and responsibility
  - Parts stakeholders of project
  - Matrix SWOT
- Planning of project
  - Diagram of GANTT, PERT
  - Management of the finances
  - Management of the risks And opportunities
- Steering of project
  - Follow up resources
  - Indicator of piloting
  - Approach quality
- Communication of project
  - Means of communication
  - Communication plan

Chapter III : Studies technical and economic of project

- Case studies

Program of the works directed : (10:30 p.m.)

- Exercises.
- Exhibits.

Fashion devaluation :

- Review of end of semester
- Continuous monitoring

Semestre 5

Titled of engineering : Management aquaculture		
Semester : 5		
Titled of the EU : Discovery		
Titled of there matter : interactions aquaculture - environment - Company		
Volume hourly : 45 hours	**Credits : 4**	**Coefficients : 2**
Goals of teaching : To study THE interactions aquaculture-environment-society (at sense wide) And society-environment-aquaculture And THE strategies allowing to move forward towards a sustainable aquaculture .		
Knowledge prerequisites recommended : S3 S4		
Content of there matter : (course 10:30 p.m.) 1- THE environmental issues of aquaculture. 2- THE effects physical of the facilities. 2-1- Occupation of space and use of the resources in water. 2-2- Traffic of the currents And modification of the diets of sedimentation. 3- Characterization and quantification of aquaculture effluents. 3-1- THE rejections direct of the Pisces. 3-2- THE rejections related to systems breeding. 3-3- Methods for evaluating discharges. 4- THE risks related to the introductions of news species. 5- THE risks related to the exhausts of the species in breeding. 6- THE requirements in matter of security eating And of preservation of the environment 6-1- The use of GMOs (Genetically Modified Organisms) in aquaculture. 6-2- There contamination chemical. 6-2- There contamination microbial. 6-3- There contamination by THE algae harmful.		
Program of the works directed : (10:30 p.m.) Study of case **Fashion devaluation :** - Review of end of semester - Continuous monitoring		

Semestre 5

Title of engineering : aquaculture Management		
Semester : 5		
Titled of the EU : Discovery		
Titled of there matter : Research, development And innovation		
Volume hourly : 9 p.m.	**Credits : 1**	**Coefficients : 1**
Teaching objectives: to be able to participate and be a driving force for proposals For THE tests of qualification And industrialization of there Research, development And innovation		
Knowledge prerequisites recommended : none		
Content of there matter : (course 9 p.m.) - THE different types And strategies of innovation - THE tools of innovation - Industrialization And qualification of the new processes and products - Procedure global entrance R, D, I until balance sheet of launch - Formulation, application industrial - Process Startup		
Fashion devaluation : - Review of end of semester - Continuous monitoring		

III – Agreements / Conventions

Conventions of Cooperations National And International

1- At the national level:

- Convention of bet in place of Network National of the Schools Superiors of domain of Natural and Life Sciences:
  - ENSSMAL
  - School National Superior Veterinarian from Algiers Rabie BOUCHAMA (ENSV),
  - School National Superior Agronomic from Algiers Kasdi MERBAH (ENSA),
  - School Superior of the Sciences of Food And Industries Agri-food (ESSAIA),
  - School National Superior of Biotechnology Taoufik KHAZNADAR (ENSB),
  - School National Superior of the Forests (ENSF),
  - School Superior in Biological Sciences of Oran (ESSBO),
  - The School Superior of Agronomy of Mostaganem (ESA).
- Convention with the University Abu Bakr BELKAID of Tlemcen.
- Convention with the University of the Sciences And Technologies Houari BOUMEDIENE (USTHB) (in the process of being signed).
- Center of Research in Sciences Pharmaceuticals (CRSP).
- Center National of Research and of Development of there Fishing and of Aquaculture (CNRDPA).
- Group Algerian Corporate Universities (GACU).
- Center of Research Nuclear of Algiers (CRNA)
- Laboratory of Study Maritimes (LEM).
- Band GITRAMA (Band of Infrastructure of Maritime Works).
- Company of the Waters And of Sanitation of Algiers (SEAAL) (in course of signature).
- Plateau Technical of the USTHB.
- Agency National of the Waste (AND).
- DP World.
- IEC HALFAOUI.
- SPA CCS Industry .
- NEPHROPS Engineering Environmental.
- Institute National Superior of there Fishing And of Aquaculture (INSPA).
- Institute of Technologies of Peaches And of Aquaculture (ITPA Collo).
- School of Technical Training of fishing And Aquaculture from Beni- Saf (EFTPA).
- Direction of there Fishing And of the Resources Fisheries of Ain Temouchent .
- Spa Crops Marines – CULTMARE.
- Park National of Gouraya .
- Association For there Research, Information And Training Underwater (REEF).
- Club diving KALYPSO submarine .
- School of diving underwater AQUAMAR (in signing course).
- Club diving PARADIVE underwater .

2- At the international level :

- University from Istanbul (Turkey).
- University from Ankara (Türkiye).
- University Akdeniz (Antalya, Türkiye).
- University International of there Sea (France).
- University of Nouakchot Al Aasria (Mauritania).