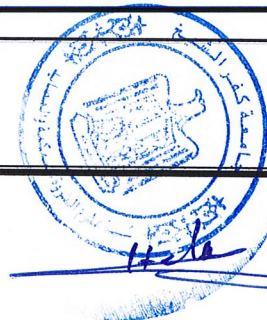




**Academic Reference Standards 2022  
(ARS – 2022)**

- 1- Aquaculture program**
- 2- Fish Processing & Biotechnology Program**
- 3- Fisheries and Aquatic Ecosystem**



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***National Authority for Quality Assurance and  
Accreditation of Education (NAQAAE)***

***1- Introduction***

Aquaculture and Fisheries sector is a promising sector that ensures the productivity of aquatic organisms and fishes through maintaining proper health and productivity indices.

This program aims to graduate professionals who can fulfill the community needs in the aquaculture and fisheries sector. In the same time, work in collaboration with other sectors for preservation of natural aquatic resources as well as aquatic biodiversity.

The aquaculture and fisheries program allows students to complete their study within four years and its structure is targeted to build-up the capacity of the graduates to integrate the principles of the basic, physical, biological, and social sciences. In the same time researches focus on the study of populations and communities of aquatic resources, their responses to exploitation, and changes in environmental conditions, and their management and utilization from the sub-cellular to the ecosystem level.

The multidisciplinary nature of fisheries science requires broad expertise in areas that may include biology, ecology,



genetics and breeding, oceanography, limnology, aquaculture, economics, biochemistry, biostatistics, seafood technology, pathology and diseases, marine biotechnology and management science.

As the human population is rapidly increasing, with the decrease in natural food resources, there is a serious demand for more food and animal protein. Since aquatic and fisheries resources are of the major components of the national agricultural income, this situation provides a good prospect for the fisheries profession.

### ***Career opportunities and employability profiles***

The majority of Fisheries sciences Graduates may expect to find challenging career opportunities. Most career opportunities in fisheries science are in the governmental and academic sectors, although in recent years, private sector and industries, research firms and aquaculture businesses offered increasingly diverse career choices. The potential job fields include: academic staff and researchers, General Authority for Fish Resources Development (GAFRD), seafood's industrial sectors, fish farms, Feeding industries, scientific research institutions, consultancy offices, school teaching, governmental institutions, Non-Governmental organizations (NGO's), and international organizations.





**1. 1. General Attributes:**

- 1.1.1-Demonstrate the proper application of the professional knowledge and skills with positive attitudes and behavior towards better health and productivity of fish and aquatic resources.
- 1.1.2- Be committed to continuous enhancement, coping with the most recent effective and efficient performance standards of the fisheries profession, and gaining community confidence.
- 1.1.3-Apply research concepts and technologies in different fields of fisheries sciences.
- 1.1.4-Express proper evaluation capacity and uncover curiosity.
- 1.1.5-Consider life-long learning skills.
- 1.1.6-Apply international ethical and legal frames.
- 1.1.7-Show satisfactory interpersonal and communication skills confirming the sensitive role of the fisheries graduates in society and disseminating the awareness of maintaining and enhancing aquatic resources quality and safety.
- 1.1.8-Share in multidisciplinary teamwork and be flexible for adaptation and working under contradictory conditions.
- 1.1.9- Use IT technology effectively.
- 1.1.10- Propose sustainable solutions for the fisheries problems.



## **2. Academic Reference Standards for Aquaculture Program**

The ARS for Aquaculture program should cover the requirements of knowledge and needed skills in aquatic organisms' farming and production. Sciences of limnology, biochemistry, aquaculture health and diseases, economics, processing and handling of fisheries products, aquaculture programming as well as specialized sciences in breeding, physiology, nutrition, and production systems are required to build up the capacity of the graduates of this program.

Aquaculture organisms' production business, artificial insemination firms, feed processing plants, biotechnology and feed analytical laboratories, feed trades and inspection, fisheries farm management, health quarantine and research stations are the main career opportunities for graduates of this program.

***Graduates of this program have the opportunities to:***

### ***First: In the field of Aquaculture development***

- Governmental fish farms and hatcheries.
- Private fish farms and hatcheries.
- Various fish products companies.
- Feed companies and factories, and livestock companies.
- Fish farms and hatcheries supplies company.
- Fish feed additives companies.





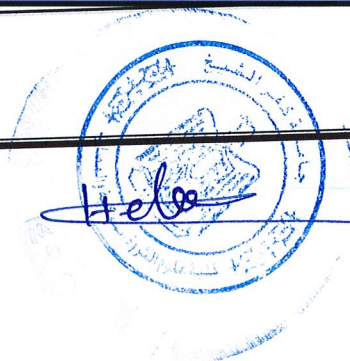
**Second: Research centers at the academic level.**

- Government, private, regional and international universities.
- The Central Laboratory for Fisheries Research - Abbassa - Sharqia and its branches in the governorates.
- The National Institute of Marine Sciences and Fisheries and its branches in the governorates. National Research Center.
- Desert Research Center and its research stations.
- Genetic Engineering Research Institute, Agricultural Research Center.
- The City of Scientific Research and Technological Applications, in Burj Al Arab.

***2.1. General and Transferable Skills***

***The graduate of Aquaculture program must be able to:***

- 2.1.1- Design, construct and manage aquatic farms and hatcheries
- 2.1.2- Calculate and estimate the nutritional needs of farmed aquatic organisms.
- 2.1.3- Prepare the diets of farmed aquatic organisms with an estimate of the quality of feed ingredients used in fish diets.
- 2.1.4- Estimate the water quality in laboratory and field.
- 2.1.5- Transfer and handling of live fish inside and outside the farm in ways that preserve their viability and vitality
- 2.1.6- Evaluate aquaculture farms technically and economically.
- 2.1.7- Handle and preserve fish after harvest.



- 2.1.8- Develop health prevention programs to prevent the spread of disease on aquatic farms and hatcheries.
- 2.1.9- Diagnose the diseases of fish and other cultured aquatic organisms.
- 2.1.10- Establish health prevention programs to prevent the spread of diseases on farms and hatcheries.
- 2.1.11- Show the best possible use of the professional information and skills with positive attitudes and behaviour towards better wellbeing and productive efficiency of aquatic animals.
- 2.1.12- Be committed to continuous improvement, and to deal with the latest standards of the profession of aquaculture effective and efficient performance and gain the confidence of the community.
- 2.1.13- Practice the concepts and research techniques in various areas of aquaculture.
- 2.1.14- Think carefully about life-long learning skills
- 2.1.15- Demonstrate acceptable interpersonal and communication abilities affirming the critical role of the aquaculture specialist in the community and raise awareness to keep the animal and human health.





**2.2. Knowledge and understanding**

***Graduates of Aquaculture program must acquire the following knowledge and understanding:***

- 2.2.1- Define terminology and methodology in chemistry and biology, recognize the basics of biophysics and statistics, explain the basics of nutrition, genetics and recognize the basic computer science and aquaculture terminology.
- 2.2.2-The physiological basis of endocrinology, reproduction, digestion, growth and adaptation
- 2.2.3- The interdisciplinary sciences relevant to fish and aquatic organisms' production.
- 2.2.4- Principals of feeding, reproduction and adaptation behaviour.
- 2.2.5-Nutrients, nutritional requirements, feeding practices and major steps of feed processing.
- 2.2.6-Feeding healthy and diseased of fish and crustaceans and practices applied to them and prevention malnutrition and metabolic diseases.
- 2.2.7-Modern feeding rules for fish larvae and work to reduce mortality in fish and crustaceans, especially at young ages.
- 2.2.8- Major concepts of aquaculture production systems
- 2.2.9- Managerial practices needed to overcome the adverse impact of micro- and macroclimates
- 2.2.10- Necessary procedures to prevent and control fish diseases
- 2.2.11- Principles of fish transportation and handling



- 2.2.12- The interaction between aquatic organisms and ecosystems.
- 2.2.13- Express the facts the normal behaviour, breeding, management of fish and crustaceans.
- 2.2.14- Memorize the principles of aquaculture economics and marketing of animal products.
- 2.2.15- Illustrate the normal macro- and micro-structure of various body tissues, organs and systems of different aquatic animals (fish and crustaceans).
- 2.2.16- Establish scientific knowledge about the principle of care of fish as well as health maintenance to realize animal welfare.
- 2.2.17- Identify various causes of animal (fish and crustaceans) diseases either bacterial, viral, fungal or parasitic, and their pathogenesis, macro/ and microscopic pathological lesions, and laboratory diagnosis
- 2.2.18- Be aware of general and specific epidemiological patterns of animal diseases (fish and crustaceans) and the most effective immunization protocols.
- 2.2.19- Be aware of modern application of new systems for hatching fish and crustaceans.
- 2.2.20- Define aquaculture laws necessary for accurate quarantine and transport of animals (fish and crustaceans) and the method of safe disposal.
- 2.2.21- Summarize the foundations of the laws and ethics, human rights.
- 2.2.22- Identify basis of fish taxonomy, endangered and threatened aquatic species.





**2.3. Practical skill:**

***The graduate of Aquaculture program must be able to:***

- 2.3.1- Demonstrate a practical ability to apply and analyze knowledge of biophysics, biology, organic chemistry.
- 2.3.2- Establish and manage fish farms.
- 2.3.3- Design and maintain aquaculture records to extract evidences and make decisions to improve productivity and health.
- 2.3.4- Calculate fish nutritional requirements according to age, productive and reproductive status.
- 2.3.5- Identify infectious diseases and take the necessary actions to control disease spreading.
- 2.3.6- Handle fish and their products properly.
- 2.3.7- Apply the international standards for fisheries welfare.
- 2.3.8- Calculate costs of production for fish farms.
- 2.3.9- Operate and maintain equipment and machinery used in fish farms.
- 2.3.10- Gain the scientific and cognitive skills to efficiently manage fish resources.
- 2.3.11- Skilfully applies the acquired knowledge and understanding of various basic and applied sciences to develop different methods of feeding fish and crustaceans.
- 2.3.12- Uses appropriate technologies to address technical and economic problems in various fields of fisheries.
- 2.3.13- Shows his professional abilities well.
- 2.3.14- Preserves natural resources and biodiversity.



- 2.3.15- Shows awareness of legal, ethical and social issues related to fisheries, fisheries and the aquatic environment.
- 2.3.16-Choose the most appropriate lab diagnosis methods.
- 2.3.17-Demonstrates his ability to develop his performance and qualifies for continuous and self-learning.
- 2.3.18-Apply the most convenient therapeutic and management protocols for diseased animals
- 2.3.19- Fluent in risk calculation and crisis management.
- 2.3.20- Relate the nutritional and managmental status of animal with reference to production and reproduction competence.
- 2.3.21- Formulate balanced rations to ensure increased production of aquatic animal (fish and crustaceans).
- 2.3.22- Fluent in fish accounting.
- 2.3.23- Fluent in the planning of aquaculture projects.
- 2.3.24-Operate emergency care to all aquatic animal species.
- 2.3.25-Demonstrate the most appropriate and safe procedures for protection of clients and co-workers.
- 2.3.26- Estimate the environmental impact of aquaculture projects.
- 2.3.27- Discover the risk of contamination, cross infection, zoonotic infection and predisposing factors for diseases and choose the suitable method to minimize it.





**2.4. Intellectual skills:**

***The graduates of Aquaculture program must be able to:***

- 2.4.1- Think in proper and scientific manners to identify the problems and, their causes to reach the appropriate solution for them on scientific bases.
- 2.4.2- Interpret the data to reach sound conclusions and recommendations as well as criticize and evaluate other works scientifically
- 2.4.3- Compare between different anatomical, histological structures and physiological biochemical function in different species of fish and crustaceans.
- 2.4.4- Draw preliminary breeding plan for genetic improvement
- 2.4.5- Discuss issues related to fish production based on scientific facts.
- 2.4.6- The ability to use local raw materials to form economic relationships to maximize profits.
- 2.4.7- Relate the type and composition of ration to the types of production, species and age of fish and crustaceans and designing the programs to increase the production.
- 2.4.8- Deal with behavioural and genetic disorders of fish and crustaceans.
- 2.4.9- Evaluate laboratory results for different samples of normal and diseased animal to reach accurate diagnosis.
- 2.4.10- Interpret bacteriological, parasitological as well as virological reports.
- 2.4.11- Compare between different infectious and zoonotic diseases.





- 2.4.12- Design the most appropriate method to manage the commercial farms of fish and crustaceans and select the measures of the relevant biosecurity for prevention and control of infectious diseases.
- 2.4.13- Recommending the most appropriate disinfection program for different types of fish and crustaceans.
- 2.4.14- Consider the different environmental pollutants and suggest measures for their control.
- 2.4.15- Evaluate the different programs for the prevention of diseases and finding solutions to problems.
- 2.4.16- Organize the information acquired in the basic sciences for development of career.
- 2.4.17- Create programs to increase the production.
- 2.4.18- Analyze the hygienic problems in the farms to provide suitable control measures.

### Curriculum Structure

The percentages mentioned in the following table for each area of study are a guide for the program and just recommended to follow, in addition to *12 Credit hours* of university obligatory courses.

Subjects	Credit hours	Percentage
Basic Science	42	32.3
Humanities (including language)	8	6.2
Specialty(Professional)	63	48.5
Field training project	9	6.9
Statistics and IT	8	6.1
Total	130	100





### **3. Academic Reference Standards for Fish Processing & Biotechnology Program**

The ARS for Fish Processing & Biotechnology program should cover the requirements of knowledge and needed skills in aquatic products processing, management and assessment, biotechnological techniques concerning aquatic animals and marine organisms. In addition to basic sciences related to fisheries fields, the sciences of Food technology & preservation, food microbiology & safety, Food chemistry & analysis and food engineering, animal genetics and breeding, marine biotechnology, molecular cell biology are the cornerstones of this program.

#### ***Graduates of this program have the opportunities to:***

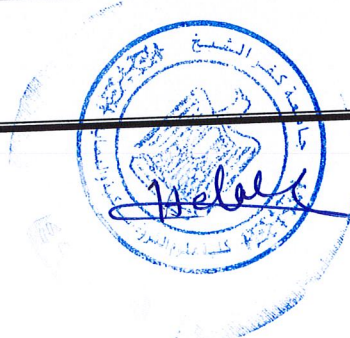
- Work in food processing firms, quality control organizations as food microbiologist, food standards officers
- Technical sales, research and development specialists,
- Food technologists and quality control overseers.
- Research centers, as a biotechnology researcher
- Research laboratories as molecular biology or biotechnology specialist.
- Work in biotechnology companies.



**3.1. General and Transferable Skills**

*The graduate of Fish Processing and Biotechnology program must be able to:*

- 3.1.1- Demonstrate the proper application of the professional knowledge and skills with positive attitudes and behavior towards better health and productivity of aquatic animal products.
- 3.1.2- Be committed to continuous enhancement, coping with the most recent effective and efficient performance standards of the fish processing and biotechnology and gaining community confidence.
- 3.1.3- Apply the modern methods for increasing the production and quality of seafood products.
- 3.1.4- Apply quality control and food safety standards and specify the appropriate methods for preserving various seafood products.
- 3.1.5- Decrease the number of contaminating and pathogenic microorganisms in seafood products to the approved international limits.
- 3.1.6- Evaluate aquaculture farms technically and economically.
- 3.1.7- Apply research concepts and technologies in different fields of biotechnology to improve aquatic animal productivity through genetic improvement.
- 3.1.8- Develop health prevention programs to prevent the spread of disease in aquatic farms and hatcheries.





3.1.9- Suggest new products and technologies to be applied in the seafood production and apply new biotechnological techniques for aquatic products examination and preservation.

3.1.10-Show satisfactory interpersonal and communication skills confirming the sensitive role of the Fish Processing & Biotechnology specialist in society and disseminating the awareness of maintaining aquatic animal and human health.

**3.2. Knowledge and understanding:**

***Graduates of Fish Processing & Biotechnology Program must acquire the following knowledge and understanding:***

3.2.1. Define terminology and methodology in chemistry and biology, recognize the basics of biophysics and biostatistics, Declare the basics of normal animal behaviour, care and breeding, the basics of genetics and recognize the basic computer science and Fisheries Terminology (English).

3.2.2. Express the facts of the fish processing, preservation, quality control and assurance for food factories and companies.

3.2.3. Memorize the principles of fisheries economics and marketing of fish products.

3.2.4. Express the fundamentals of genetic engineering and molecular biology tools.

3.2.5. Explain the biochemical bases of different organs functions, metabolic processes and homeostasis



- 3.2.6. Establish scientific knowledge about the principle of fish products additives and preservations.
- 3.2.7. Identify various causes of food-borne diseases either bacterial, viral, fungal or parasitic, and their pathogenesis, macro/ and microscopic pathological lesions, and laboratory diagnosis by molecular methods.
- 3.2.8. Outline the mechanisms of action of chemicals, their residual time and their impact on human health. In addition, graduates should be familiar with uses, quality control of processing preparations..
- 3.2.9. Define different problems of the toxicology and food contamination and infectious diseases due to fish and fish products.
- 3.2.10. Approach the basics of public health for fish products and environmental pollution including food hygiene of fish origin and emergency zoonotic diseases and modern methods for prevention.
- 3.2.11. State the basics of inspection, biological, chemical and physical examination of fish and fish products according to national and international food regulations
- 3.2.12. Describe the characteristic features of different causes of fish diseases and determination of their evolution with their gross and microscopic changes beside the laboratory diagnosis
- 3.2.13. Define sustainable fisheries development concepts as well as the tools and indicators of evaluating sustainability and apply the theories and methods for





interpreting and analyzing data related to fisheries sciences

3.2.14. Identify the basics of thermo-dynamics, processing flow, and mechanical operations during seafood processing, the basic principles and practices of cleaning and sanitation in food processing operations.

3.2.15. Define the national and international legislation and agencies relevant to the food quality and the methods for recycling of seafood by-products and treatment seafood industry wastes.

3.2.16. Identify basics of fish taxonomy, endangered and threatened aquatic species.

### ***3.3. Practical skill:***

***The graduate of Fish Processing & Biotechnology program must be able to:***

3.3.1. Apply skillfully the gained knowledge and understanding of different basic and biotechnological sciences in application for quality practice to develop different methods of inspection and control based upon these knowledge.

3.3.2. Use acquired knowledge and understanding to participate in the implementation of the proper solutions and mitigation measures of fish processing and biotechnology issues.

3.3.3. Demonstrate a practical ability to apply and analyze knowledge of biophysics, biology, organic chemistry, genetics and breeding.



- 3.3.4. Apply physical examination of healthy and infected fish products and collect relevant samples and perform lab analysis and use proper safety measurements to protect co-workers and assistants.
- 3.3.5. Choose the most appropriate lab examination methods
- 3.3.6. Comment perfectly on the findings of the common physical and laboratory inspection procedures
- 3.3.7. Write a conclusive report about the fitness of human food from fish origin for consumption and detect the biochemical and microbial residues in it.
- 3.3.8. Use the gained new information skillfully and appropriately and remain current with the emerging biotechnological knowledge options to enhance skills of dealing with fish companies.
- 3.3.9. Manipulate properly all procedures related to food hygiene, public health issues, notifiable diseases and disposal of fish by-products.
- 3.3.10. Discover the risk of contamination, cross infection, zoonotic infection and predisposing factors for diseases and choose the suitable method to minimize it.
- 3.3.11. Apply basic techniques in molecular biology including: nucleic acid extraction, PCR, rtPCR and other related techniques in the biotechnology lab. To aid in detection of mutation, pathogen, genetic improvement of aquatic animals.
- 3.3.12. Handle laboratory animals and perform an experimental design, interpret the results of the experiment and data analysis.





- 3.3.13. Write a report on the health and safety of food of aquatic origin for human consumption, as well as report of laboratory testing in biotechnology lab.
- 3.3.14. Apply safe and economic ways of handling aquatic animals byproducts
- 3.3.15. Use the gained skills of aquatic biology and marine biotechnology in proper sampling and sample preservation.
- 3.3.16. Apply different extraction methods to obtain natural extracts from aquatic organism and their chemical characterization, ability to be used in different applications.
- 3.3.17. Apply the good manufacture practices (GMP) in seafood processing, monitor sanitary food delivery and transportation system, and apply quality control standards and HACCP in seafood processing firms.

**3.4. Intellectual skills:**

*The graduates of Fish Processing & Technology program must be able to:*

- 3.4.1. Think in proper and scientific manners to identify the problems and, their causes to reach the appropriate solution for them on scientific bases.
- 3.4.2. Interpret the data to reach sound conclusions and recommendations as well as criticize and evaluate other works scientifically
- 3.4.3. Designing the programs to retard the spoilage of fish and fish products and judge the safety and quality of food and processed products of aquatic origin.



- 3.4.4. Deal with genetic disorders of farm fish and differentiate the gene sequences and mutation.
- 3.4.5. Correlate the clinical signs of the diseases with the biochemical changes and genetic changes in the fish and fish products.
- 3.4.6. Evaluate laboratory results for different samples of normal and diseased fish to reach accurate diagnosis using molecular biology tools.
- 3.4.7. Interpret bacteriological, parasitological as well as virological reports related to fish products.
- 3.4.8. Compare between different infectious and zoonotic diseases due to food-borne fish and fish products.
- 3.4.9. Judge the quality of fish, fish products and their fitness for consumption
- 3.4.10. Design the most appropriate method to manage the commercial companies of fish and select the measures of the relevant biosafety for prevention and control of infectious and zoonotic diseases
- 3.4.11. Consider the different environmental pollutants and suggest measures for their control.
- 3.4.12. Evaluate the different programs for the prevention of zoonotic diseases and finding solutions to problems in the areas of fish processing.
- 3.4.13. Organize the information acquired in the basic sciences for development of career.
- 3.4.14. Report any toxicity cases.
- 3.4.15. Analyze the hygienic problems in the factories to provide suitable control measures





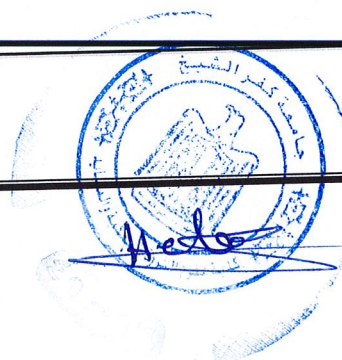
3.4.16. Capable of continuous learning to update and renew their inspection senses and quality skills.

3.4.17. Evaluate the importance of marine natural products and their use in different fields.

### Curriculum Structure

The percentages mentioned in the following table for each area of study are a guide for the program and just recommended to follow, in addition to *12 Credit hours* of university obligatory courses.

Subjects	Credit hours	Percentage
Basic Science	42	32.3
Humanities (including language)	6	4.6
Specialty(Professional)	65	50
Field training project	9	6.9
Statistics and IT	8	6.2
Total	130	100





#### **4. Academic Reference Standards for Fisheries and Aquatic Ecosystem Program**

The Fisheries and Aquatic Ecosystem program deals with multidisciplinary expertise from the biological, physical, and social sciences. Students of this program are required to have the basic knowledge about populations and communities of aquatic resources, their responses to exploitation, changes in environmental conditions, and management of fish and invertebrate resources from the sub-cellular to the ecosystem level. Graduates may expect to find challenging career opportunities. Most career opportunities in fisheries and aquatic ecosystem are in the government and academic sectors, although in recent years, private businesses, research firms and aquaculture businesses could offer increasingly diverse career choices.

##### ***4.1. General and Transferable Skills***

***The graduates of Fishery program must be able to:***

- 1.1. Place the different steps of the fisheries and aquatic ecosystem assessment process in the correct order
- 1.2. Explain the geographical, cultural, and ecological context of the fisheries and aquatic ecosystem under assessment.
- 1.3. Demonstrate knowledge of scientific information relating to the biological processes of the target species, or species with similar population dynamics
- 1.4. Score a fisheries and aquatic ecosystem using the default assessment tree
- 1.5. Understanding of the structure and function of ecosystems





- 1.6. Aware with the different laws and regulations related to fisheries and aquatic ecosystem and environmental aspects.

***4.2. Knowledge and Understanding:***

***Graduates of Fisheries and Aquatic Ecosystem program must acquire the following knowledge and understanding:***

- 4.2.1. The basic concepts and applications in ecology, oceanography, aquaculture, economics, mathematics, seafood technology, pathology and diseases, and management sciences.
- 4.2.2. The relevant interdisciplinary sciences to fish habitats, migration and stocks assessment.
- 4.2.3. Bioenergetics and population dynamics and assessment.
- 4.2.4. Physiology, ecology and management of wildlife populations
- 4.2.5. Wildlife laws and the endangered species act.
- 4.2.6. Natural resources and public policy
- 4.2.7. Applied probability and statistics

***4.3. Practical skill:***

***The graduate of Aquaculture program must be able to:***

- 4.3.1. Simulation and design of experiments for fisheries and aquatic ecosystem engineering,
- 4.3.2. Design and maintain fish stock records to extract evidences and make decisions to sustain size, productivity and health

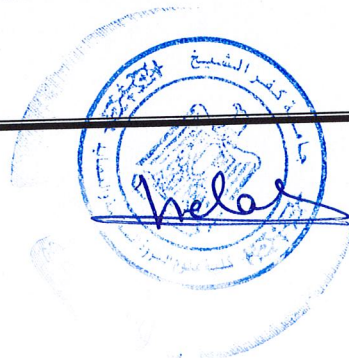


- 4.3.3. Handle harvested fish properly and safely.
- 4.3.4. Establish and manage appropriate techniques for each stock and condition
- 4.3.5. Estimate and evaluate fish population dynamics and stock size.
- 4.3.6. Operate and maintain equipment and machinery used in fish harvesting
- 4.3.7. Evaluate the effects of habitat quality on fish populations
- 4.3.8. Apply the wildlife laws and international standards in fisheries and aquatic ecosystem operation
- 4.3.9. Calculate costs of stock harvesting and marketing
- 4.3.10. Apply biostatistics tools for population prediction, modeling and assessment

#### ***4.4. Intellectual skills:***

***The graduates of Aquaculture program must be able to:***

- 4.4.1. Interpret assessment records to acquire proper decision
- 4.4.2. Suggest and assess solutions and alternatives to overcome population decrease, natural resource maintenance and endangered species protection.
- 4.4.3. Discuss predictions and risks of stock population size and natural resources.





### Curriculum Structure

The percentages mentioned in the following table for each area of study are a guide for the program and just recommended to follow, in addition to *12 Credit hours* of university obligatory courses.

Subjects	Credit hours	Percentage
Basic Science	42	32.3
Humanities (including language)	8	6.2
Specialty(Professional)	65	50
Field training project	9	6.9
Statistics and IT	6	4.6
Total	130	100



## **II. Glossary:**

### **1. Institution:**

A University, faculty or higher institute providing education programs leading to a first university degree or a higher degree (Master's or Doctorate).

### **2. Graduate Attributes:**

Competencies expected from the graduate based on the acquired knowledge and skills gained upon completion of a particular program.

### **3. National Academic Reference Standards (NARS):**

Reference points designed by NAQAAE to outline /describe the expected minimum knowledge and skills necessary to fulfill the requirements of a program of study.

### **4. Academic Standards:**

Reference points defined by an institution comprising the collective knowledge and skills to be gained by the graduates of a particular program. The academic standards should surpass the NARS, and be approved by NAQAAE.

### **5. Subject Benchmark Statements:**

Guideline statements that detail what can be expected of a graduate in terms of the learning outcomes to satisfy the standards set for the program. They enable the outcomes to be compared, reviewed and evaluated against agreed upon standards.





**6. *The Program:***

A set of educational courses and activities designed by the institution to determine the systematic learning progress. The program also imparts the intended competencies required for the award of an academic degree.

**7. *Intended Learning Outcomes (ILOs):***

Subject-specific knowledge, understanding and skills intended by the institution to be gained by the learners completing a particular educational activity. The ILOs emphasize what is expected that learners will be able to do as a result of a learning activity.

**8. *Knowledge and Understanding:***

Knowledge is the intended information to be gained from an educational activity including facts, terms, theories and basic concepts. Understanding involves comprehending and grasping the meaning or the underlying explanation of scientific objects.

**9. *Intellectual Skills:***

Learning and cognitive capabilities that involve critical thinking and creativity. These include application, analysis, synthesis and evaluation of information.

**10. *Professional and Practical Skills:***

Application of specialized knowledge, training and proficiency in a subject or field to attain successful career development and personal advancement.

**11. *General and Transferable Skills:***

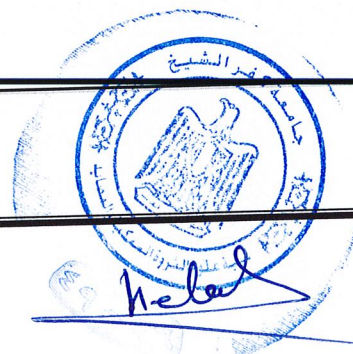
Skills that is not subject-specific and commonly needed in education, employment, life-long learning and self-development. These skills include communication, team work,



numeracy, independent learning, interpersonal relationship, and problem solving... etc.

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<http://www.fish.nagasaki-u.ac.jp/>
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- 10- School of Fisheries and Aquaculture Sciences, Universiti Malaysia Terengganu, Malaysia.  
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- 11- School of Fisheries, Aquaculture and Aquatic Sciences, Auburn University, Alabama, USA.  
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- 14- Faculty of Fisheries and Protection of Waters, University of South Bohemia, Czech Republic.  
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