HIGHER UNIVERSITY TECHNICIAN IN AQUACULTURE
PROJECTS SPECIALIST

COURSE SYLLABUS WITH BREAKDOWN OF THEMATIC UNITS

1. Course	**Research Methodology**
2. Competencies	Conduct the production of auxiliary organism cultured, based on the evaluation of the conditions of the Aquaculture systems, to contribute to the profitability of the organization Coordinate the aquaculture production, based on the established production systems and under a sustainable framework, to contribute to the profitability of the organization as well as to preserve and improve the environmental, social and economic surrounding. Develop sustainable aquaculture projects, based on market needs and established regulations, to contribute to the development of the sector.
3. Four Month Period	Third
4. Practical Hours	48
5. Theoretical Hours	27
6. Total Hours	75
7. Week Total Hours Four Month Period	5
8. Course Objective	The student will integrate a research project following the established methodology for the solution of aquaculture issues.

Theme Units	Hours		
	Practical	**Theoretical**	**Total**
I. Research Approaches	0	5	5
II. Research Protocol	2	10	30
III. Data Collection Instruments	1	7	20
IV. Data Analysis and Research Report	1	5	20
Totals	**48**	**27**	**75**

RESEARCH METHODOLOGY

THEMATIC UNITS

1. Theme Unit	**I. Research Approaches**
2. Practical Hours	0
3. Theoretical Hours	5
4. Total Hours	5
5. Objective	The student will identify the stages of the research process, to conduct aquaculture studies.

Themes	Learning to know	Learning to do	Learning to be
Fundamental Concepts.	Describe the concepts of: - Science - Classification of science - Scientific Method - Research - Research Methodology Identify the stages of the research process. Identify the structure of a research protocol.		- Observer - Systematic - Synthesis and analysis ability
Quantitative and Qualitative approach.	Identify the characteristics of the quantitative and qualitative approach for conducting research. Describe the advantages of the qualitative and qualitative approach for research.		-Observer -Systematic -Synthesis and analysis ability

RESEARCH METHODOLOGY

Evaluation Process		
Learning outcomes	**Learning sequence**	**Instruments and type of reagents**
Elaborate a concept map including the characteristics and the relationships of the following elements: - Scientific Methods - Research Methodology - Quantitative Approach - Qualitative Approach - Research Process - Research Protocol	1. Understand the main concepts related to research. 2. Identify quantitative and qualitative approaches of research. 3. Identify the stages of research process.	Essay Checklist

RESEARCH METHODOLOGY

Teaching Learning process	
Methods and teaching techniques	**Media and didactic materials**
Research tasks Debate Collaborative Teams	Computer Projector Internet Whiteboard

Learning Space		
Classroom	**Laboratory / Workshop**	**Company**
X		

RESEARCH METHODOLOGY

THEMATIC UNITS

1. Theme Unit	**II. Research Protocol**
2. Practical Hours	20
3. Theoretical Hours	10
4. Total Hours	30
5. Objective	The student will develop a research protocol, to solve an issue related to the aquaculture field.

Themes	Learning to know	Learning to do	Leaning to be
Approaching the issue	Identify the elements of the research issues: -Research objectives -Research question -Research justification and Viability.	Suggest a research issue/topic	-Observer -Systematic -Synthesis and analysis ability Organized
Theoretical framework	Identify the main features of the theoretical framework. Describe the sources of information in the content analysis of the document: -Documents -Records -Materials -Biographies and Life stories -Web Pages -Databases Identify the guidelines of the American Psychological Association (APA) format regarding quotations and references: -Internet sources -Electronics documents -Journal publications -Books	Write the theoretical framework of the research.	-Observer -Systematic -Synthesis and analysis ability Organized

Themes	Learning to know	Learning to do	Learning to be
Hypothesis.	Identify the significance and the type of research: - Exploratory - Descriptive - Correlational - Explicative Explain the concepts, characteristics, and variables of: - Hypothesis - Research Hypothesis - Invalid hypothesis - Alternative hypothesis - Statistical hypothesis Identify the procedure for formulating the hypothesis.	Formulate the research hypothesis.	-Observer -Systematic -Synthesis and analysis ability -Organized
Design.	Describe the characteristics of the different type of research design: - Experimental - Non-Experimental - Multiple Explain the elements of an activity chronogram	Determine the type of research design required. Elaborate an activity chronogram	-Observer -Systematic -Synthesis and analysis ability -Organized
Sampling definition and selection	Recognize the concepts of universe, population and sampling Identify the process of selecting the target population. Identify the sampling types and the procedure in the calculation of the probabilistic size of the sample. Identify the criteria of inclusion and exclusion	Establish the target population. Select the research sampling.	-Observer -Systematic -Synthesis and analysis ability -Organized

RESEARCH METHODOLOGY

Evaluation Process		
Learning outcomes	**Learning sequence**	**Instruments and type of reagents**

Suggest a research protocol related to the aquaculture field including the following points:
 	
- Approach of the problem:
  - Research objectives
  - Research question
  - Justification and viability
 	
- Theoretical framework with quotations and references according to APA format
- Significance of the research
- Hypothesis
- Research design
- Variables
- Sampling and population.
	1. Understand the elements of the approach of the research issue.
	
	2. Identify the most relevant sources of information related to the research.
	
	3. Understand the characteristics and the guidelines of the theoretical framework.
	
	4. Understand the characteristics of the research hypothesis and the types of design.
	
	5. Identify the sampling characteristics that apply to the research.
		Project
		Checklist

RESEARCH METHODOLOGY

Teaching Learning Process	
Methods and teaching techniques	**Media and didactic materials**
Projects based learning Research tasks Collaborative teams	Computer Projector Printed material Internet Whiteboard

Learning Space		
Classroom	**Laboratory / Workshop**	**Company**
X		

RESEARCH METHODOLOGY

THEMATIC UNITS

1. Theme Unit	**III. Data Collection Instruments**
2. Practical Hours	13
3. Theoretical Hours	7
4. Total Hours	20
5. Objective	The student will develop data collection instruments to obtain information in a research.

Themes	Learning to know	Learning to do	Learning to be
Classification of the instruments for collecting data.	Identify the types of instruments for collecting data. Describe the characteristics of the measurement instrument - Reliability - Validity - Objectivity	Select instruments for data collection according to the research protocol.	-Observer -Systematic -Synthesis and analysis ability -Organized
Observation	Identify the advantages and the disadvantages of the observation and data collection. Explain the characteristics and types of the observation systems: quantitative and qualitative. Identify the structure of the observation instruments.	Design and observation guide. Keep a logbook.	-Observer -Systematic -Synthesis and analysis ability -Organized
Interviews, surveys, and questionnaires.	Identify the characteristics and the types of interviews. Identify the characteristics and the types of surveys. Identify the characteristics and the types of questionnaires.	Design a questionnaire.	-Observer -Systematic -Synthesis and analysis ability -Organized

RESEARCH METHODOLOGY

Evaluation Process		
Learning outcomes	**Learning sequence**	**Instruments and type of reagents**
The student will add to the required research protocol, a portfolio of evidences including: - Observation guidelines - Logbook - Questionnaires - Sampling Justification - Collected data.	1. Differentiate the measurement instruments in the collection of data. 2. Understand the advantages and the disadvantages of the observation in data collection and in the observation systems. 3. Identify the structure of the instruments of observation. 4. Identify the characteristics and the types of interviews, surveys, and questionnaires when conducting a research.	Project Checklist

RESEARCH METHODOLOGY

Teaching Learning Process	
Methods and teaching techniques	**Media and didactic materials**
Projects based learning Research Tasks Collaborative teams	Computer Projector Printed Internet Whiteboard

Learning Space		
Classroom	**Laboratory / Workshop**	**Company**
X		

RESEARCH METHODOLOGY

THEMATIC UNITS

1. Theme Unit	**IV. Data Analysis and Research Report**
2. Practical Hours	15
3. Theoretical Hours	5
4. Total Hours	20
5. Objective	The student will integrate a research report, to present the results and conclusions of it.

Themes	Learning to know	Learning to do	Learning to be
Data Organization	Describe the structure of a data matrix and the frequency tables	Organize the data obtained in a data matrix and in a frequency table.	-Observer -Systematic -Synthesis and analysis ability -Organized
Statistical Analysis	Recognize the methods of statistical analysis applied to research. Identify the process of interpretation of the results.	Conduct the statistical analysis of the collected data. Interpret the statistical analysis generated.	-Observer -Systematic -Synthesis and analysis ability -Organized
Presentation of the Report	Describe the structure of a research report: - Cover page - Index - Summary - Body of the document: -Introduction - Theoretical framework - Methodology - Results - Discussion -Conclusions and recommendations - References - Appendixes	Present the report of the research.	-Observer -Systematic -Synthesis and analysis ability -Organized

RESEARCH METHODOLOGY

Evaluation Process		
Learning outcomes	**Learning sequence**	**Instruments and type of reagents**

Elaborate a report of the research including:
- Cover page
- Index
- Summary
- Body of the document:
  - Introduction
  - Theoretical framework
  - Methodology
  - Results
  - Discussion
  - Conclusions and recommendations
  - References
  - Appendixes
 	
Present an executive presentation of the research.
	1. Identify the use of the data matrix data and frequency tables.
	
	2. Understand the process of analysis and interpretation of the results.
	
	3. Identify the structure of the report of a research.
		Project
		Checklist

RESEARCH METHODOLOGY

Teaching Learning process	
Methods and teaching techniques	**Media and didactic materials**
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Learning Space		
Classroom	**Laboratory / Workshop**	**Company**
X		

RESEARCH METHODOLOGY

CAPACITIES DERIVED FROM THE PROFESSIONAL COMPETENCES TO WHICH THE COURSE CONTRIBUTES

Capacity	Performance Criteria
To diagnose the conditions of aquaculture systems through physicochemical and biological analysis techniques and historical records, to ensure the health, innocuousness and profitability of the production.	To prepare a report about the conditions under which an aquaculture system is found, that includes: - The steps for obtaining and processing the samples and their justification. - The analysis and interpretation of information (logs, histories, results analysis, laboratory reports). Conclusions and recommendations.
To inspect the operating conditions of the productive process through the analysis of the infrastructure, personnel and supplies, based on good management practices, to contribute to the quality of production.	To prepare an evaluation file according to the guidelines of the good practices manual for the respective species or species that includes: - The internal verification forms of good production practices duly completed - Formats of corrective recommendations for non-conformities detected - Schedule of corrections.
To diagnose the environment, social, economic, physical environmental and normative according to the criteria of regional diagnostic study, to identify the possibility of developing aquaculture projects	To prepare a technical report on the regional context of the aquaculture sector, describing the following aspects: 1. Social character of the population: composition, mortality rate, fertility, growth, education, migration, economically active population. 2. Economic nature: productive sectors, GDP, economic activities, 3. Physical-environmental character: geographical, biological, climatological characterization. 4. Normative character: applicable regulations 5. Opinion on the possibility for developing aquaculture Projects.
To state the potential market of an aquaculture product through an analysis of the situation of the markets, to identify marketing opportunities.	To prepare a report about the market analysis of aquaculture products that includes: - Characteristic of the markets of the main products and supplies. - Channels of distribution and sale. - Conditions and mechanisms for supplying raw materials and supplies. - Plan and marketing strategy: A) Price structure of products and by-products, as well as sales policies. B) Competitiveness analysis. C) Income projection - Letters of Intent and/or contracts for the purchase and sale of raw materials and products.

Capacity	Performance Criteria
To calculate the production capacity of a sustainable aquaculture project through a technical study, to establish the species and the required aquaculture production system.	To Prepare a report that reflects the productive potential of the sustainable aquaculture project, which should include: - Location and specific description of the project site - Infrastructure and equipment - The species to work with - The processes and technologies to be used. - The capacity of processes and production programs. - Scenarios with different processes of volumes. - Programs of execution, administrative, training and technical assistance. - Applicable regulatory framework. - Project production and investment costs. - Final report on the technical feasibility of the project.
To justify the profitability of the sustainable aquaculture project through a financial study. Consider the market analysis and the technical study to establish the financing requirements, yield and its approval.	To prepare the financial report of a sustainable aquaculture project that must contain the following criteria: - Budgets, investment program and funding sources. - Financial projection (fixed asset and working capital) annual - Current and projected financial situation - Analysis of cost-benefit (constant prices and values). - Conclusions and recommendations. - Annexes with supportive evidence in the document.
To evaluate the environmental impact of the sustainable aquaculture project through a study with reference to the applicable regulations, to establish the remediation and mitigation measures and to obtain the respective approval.	To prepare an Environmental Impact Statement for an aquaculture project that includes: - General information about the project, the promoter and the person responsible for the environmental impact study - Project description. - Linkage with the applicable legal systems in environmental matters, where applicable, with the regulation on land use. - Description of the environmental system and identification of the environmental problems detected in the area of influence of the project - Identification, description and evaluation of environmental impacts. - Preventive measures and mitigation of environmental impacts. - Environmental forecasts and, where appropriate, evaluation of alternatives. - Identification of the methodological instruments and technical elements that support the indicated information.

Capacity	Performance Criteria
To manage the financial support needed with the corresponding institutions according to the established procedure and regulations for the implementation of the sustainable aquaculture project.	To integrate a file of financial support for a sustainable project, including: - Institutions that provide financial support according to the characteristics of the project - Policies of operation of the institutions. - Request forms.
To supervise the technical conditions of the sustainable aquaculture project according to the technical criteria and the applicable regulations, to comply with the requirements of the implementation.	To present the design of a checklist that includes: -The technical criteria required for the project. -Description of the adjustments needed regarding infrastructure and equipment and their justification. Conclusions and recommendations for the implementation.

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BIBLIOGRAPHY

Author	Year	Title	City	Country	Publisher
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