NATIONAL BOARD FOR TECHNICAL EDUCATION

NATIONAL TECHNICAL CERTIFICATE

AND

ADVANCED NATIONAL TECHNICAL CERTIFICATE PROGRAMMES

CURRICULUM & COURSE SPECIFICATION

IN

FISHERIES CRAFT PRACTICE

JANUARY 2008

GENERAL INFORMATION

AIM

To give training and impart the necessary skills leading to the production of craftsmen and other skilled personnel who will be enterprising and self-reliant.

Entry Qualifications

I) Craft Programme

Candidates must not be less than 14 years of age and should have successfully completed three years of Junior Secondary education or its equivalent. Special consideration may be given to sponsored candidates with lower academic qualifications who hold trade test certificates or its equivalent (ACA, Artisan) and are capable of benefiting from the programme. The craft programme will last for a period of three (3) academic years.

II) Advanced Craft Programme

Candidates should possess the National Technical Certificate or its equivalent and should have had a minimum of two years post qualification cognate industrial experience. The advanced craft programme is a period of one (1) academic year.

The Curriculum

The Curriculum of each programme is broadly divided into three components:

a General Education, which accounts for 30% of the total hours required for the programme.
b Trade Theory, Trade Practice and Related Studies which account for 65% and
c Supervised Industrial Training/Work Experience, which accounts for about 5% of the total hours required for the programme. This component of the course, which may be taken in industry or in college production unit, is compulsory for the full-time students.

Included in the curriculum is the teacher's activities and learning resources required for the guidance of the teacher.

Unit Course\e/Modules

A Course/Module is defined as a body of knowledge and skills capable of being utilized on its own or as a foundation or pre-requisite knowledge for more advanced work in the same or other fields of study. Each trade when successfully completed can be used for employment purposes.

Behavioural Objective` S2s

These are educational objectives, which identify precisely the type of behaviour a student should exhibit at the end of a course/module or programme. Two types of behavioural objectives have been used in the curriculum. They are:

a General Objectives
b Specific learning outcomes

General objectives are concise but general statements of the behaviour of the students on completion of a unit of work such as understanding the principles and application in:

a Orthographic projection in engineering/technical drawing;
b Loci in Mathematics
c Basic concepts of politics and government in Political Science
d Demand and supply in Economics

Specific learning outcomes are concise statements of the specific behaviour expressed in units of discrete practical tasks and related knowledge the students should demonstrate as a result of the educational process to ascertain that the general objectives of course/programme have been achieved. They are more discrete and quantitative expressions of the scope of the tasks contained in a teaching unit.

General Education in Technical Colleges

The General Education component of the curriculum aims at providing the trainee with complete secondary education in critical subjects like English Language, Economics, Physics, Chemistry, Biology, Entrepreneurial Studies and Mathematics to enhance the understanding of machines, tools and materials of their trades and their application and as a foundation for post-secondary technical education for the above average trainee. Hence, it is hoped that trainees who successfully complete their trade and general education may be able to compete with their secondary school counterparts for entry into the universities, polytechnics or colleges of education (technical) for Degree, ND or NCE courses respectively. The Economics (former Social Studies) component is designed to broaden the trainee's social skills and his understanding of his environment.

For the purpose of certification, only the first three courses in mathematics will be required. The remaining modules are optional and are designed for the above average students.

National Certification

The NTC and ANTC programmes are run by Technical Colleges accredited by NBTE while the National Business and Technical Examination Board (NABTEB) situated in Benin, Edo State conducts the final National examination and awards certificates.

Trainees who successfully complete all the courses/modules specified in the curriculum table and passed the national examinations in the trade will be awarded one of the following certificates:

S/N	LEVEL	CERTIFICATE
	Technical /Business	
1.	Craft Level	National Technical Certificate (NTC) or National Business Certificate (NBC)
2.	Advanced Craft Level	Advanced National Technical Certificate (ANTC) or Advanced National Business Certificate (ANBC)

Guidance Notes for Teachers Teaching the Curriculum

The number of hours stated in the curriculum table may be increased or decreased to suit individual institutions' time table provided the entire course content is properly covered and the goals and objectives of each module are achieved at the end of the term.

The maximum duration of any module in the new scheme is 300 hours. This means that for a term of 15 weeks, the course should be offered for 20 hours a week. This can be scheduled in sessions of 4 hours in a day leaving the remaining hours for general education. However, if the program is properly organized and there are adequate resources, most of these courses can be offered in two sessions a day, one in the morning and the other one in the afternoon. In so doing, some of these programmes may be completed in lesser number of years than at present.

The sessions of 4 hours include the trade theory and practice. It is left to the teacher to decide when the class should be held in the workshop or in a lecture room.

INTEGRATED APPROACH IN THE TEACHING OF TRADE
Theory, Trade Science and Trade Calculation

The traditional approach of teaching trade science and trade calculation as separate and distinct subjects in technical college programmes is not relevant to the new programme as it will amount to a duplication of the teaching of mathematics and physical science subjects in the course. The basic concepts and principles in mathematics and physical science are the same as in the trade calculation and trade science. In the new scheme therefore, qualified persons in these fields will teach mathematics and physical science and the instructors will apply the principles and concepts in solving trade science and calculation problems in the trade theory classes. To this end, efforts have been made to ensure that mathematics and science modules required to be able to solve technical problems were taken as pre-requisite to the trade module.

valuation of Programme/Module

For the programme to achieve its objectives, any course started at the beginning of a term must terminate at the end of the term.

Instructors should therefore device methods of accurately assessing the trainees to enable them give the student's final grades at the end of the term. All students who have successfully completed their modules will take a national examination. The final award will be based on the aggregate of the scores attained in the course work and the national examination**.**

PROGRAMME OBJECTIVES FOR FISHERIES CRAFT PRACTICE:

Assist in determining suitable environment, planning, layout, construction and development of fish pond/farm.
Assist in carrying out simple aqua-cultural practices.
Assist in the construction, operation and maintenance of simple fishing gear and crafts (nets, traps, lines, out-board engines etc).
Assist in modern techniques associated with management practices in fishing enterprise.
Assist in fisheries extension and co-operation.
Acquire computer skills and entrepreneurial knowledge enough to set up or engage in a meaningful fishery-related business.

CURRICULUM TABLE FOR NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE

S/N	**COURSE CODE**	**SUBJECT MODULE**	**Y**	**E**	**A**	**R**	**1**	**-**	**Y**	**E**	**A**	**R**	**2**	**-**	**Y**	**E**	**A**	**R**	**3**	**-**	**TOTAL DURATION**
-	**-**	**-**	**T**	**1**	**TM**	**2**	**TM**	**3**	**TM**	**1**	**TM**	**2**	**TM**	**3**	**TM**	**1**	**TM**	**2**	**TM**	**3**	**-**
-	-	-	***L***	***P***	***L***	***P***	***L***	***P***	***L***	***P***	***L***	***P***	***L***	***P***	***L***	***P***	***L***	***P***	***L***	***P***	**-**
1	CMA 12-15	Mathematics	2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	-	216
2	CEN 11-17	English Lang	2	-	2	-	2	-	3	-	3	-	3	-	3	-	3	-	3	-	288
3	CPH 10-12	Physics	2	-	2	-	2	-	2	1	2	1	2	1	2	1	2	1	2	1	288
4	CCH 11-12	Chemistry	2	-	2	-	2	-	2	1	2	1	2	1	2	1	2	1	2	1	288
5	CBB 11-13	Biology	2	-	2	-	2	-	2	1	2	1	2	1	2	1	2	1	2	1	288
6	CEC 11-13	Economics	2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	-	216
7	CBM 10	Entrepreneurship	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	-	2	-	72
8	ICT 11-15	Computer Studies	-	-	-	-	-	-	1	2	1	2	1	2	1	2	1	2	-	-	180
9	CTD 11-13	Drawings	-	3	-	3	-	3	-	3	-	3	-	3	-	2	-	2	-	2	288
10	CME 11	General Metal Work 1	2	5	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	168
11	FIT 101	Intro to Physical Geography	-	-	-	-	4	6	-	-	-	-	-	-	-	-	-	-	-	-	120
12	FIT 201	Introduction to Fisheries tech	-	-	-	-	-	-	4	6	-	-	-	-	-	-	-	-	-	-	120
13	FIT 202	Basic Aquaculture	-	-	-	-	-	-	-	-	4	6	-	-	-	-	-	-	-	-	120
14	FIT 203	Fishing Gear & Craft technology	-	-	-	-	-	-	-	3	-	3	-	6	-	-	-	-	-	-	144
15	FIT 301	Introduction to Fish Farm Engr	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	6	-	-	144
16	FIT 302	Intro to Post Harvest Tech & Marketing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	6	120
			14	**8**	**14**	**8**	**16**	**9**	**18**	**17**	**18**	**17**	**14**	**14**	**16**	**13**	**16**	**13**	**19**	**11**	**3,060**

CURRICULUM TABLE FOR ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE

S/N	COURSE CODE	SUBJECT MODULE	TERM 1		TERM 2		TERM 3		TOTAL DURATION
			L	P	L	P	L	P	
1	CMA 21-22	Mathematics	2	-	2	-	2	-	72
2	CEN 21-22	English Lang & Communication	2	-	2	-	2	-	72
3	CEC 21-23	Economics	2	-	2	-	2	-	72
4	CTD 21	Engr Drawing & Design	-	3	-	3	-	-	72
5	CEM 21	Entrepreneurship	2	-	2	-	2	-	72
6	ICT 21-22	Auto-Card	1	2	1	2	-	-	72
7	FIT 401	Fishing Gear & Craft Tech 11	2	4	2	4	2	4	216
8	FIT 402	Fish Seed production	2	4	2	4	2	4	216
9	FIT 403	Practical fishing	-	6	-	6	-	6	216
TOTAL			**13**	**19**	**13**	**19**	**12**	**14**	**1,080**

PROGRAMME: **NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE**

MODULE: **FIT 101 - INTRODUCTION TO PHYSICAL GEOGRAPHY**

DURATION: **120 HOURS**

GOAL: **The course is designed to acquaint students with the knowledge of physical geography and its relevance to fisheries science.**

GENERAL OBJECTIVES: On completion of this module, the trainee should be able to:

Theoretical Content

1.0 Understand the relevance of physical geography to fisheries science.

2.0 Understand various instruments used in measuring weather records.

3.0 Understand the nomenclature, locations of continents and oceans on a map and the relief features of the basin.

4.0 Understand major forms of life in aquatic environment.

Practical Content

1.0 Know the difference between freshwater, brackish and marine water in fisheries science.

2.0 Know the instrument used in measuring weather records.

PROGRAMME: NATIONAL TECHNICAL CERTICATE IN FISHERIES CRAFT PRACTICE		
Module: INTRODUCTION TO PHYSICAL GEOGRAPHY (THEORY)	**Course Code: FIT 101**	**Contact Hours 120 Hrs**
Course Specification: This course is designed to acquaint students with the knowledge of physical geography and its relevance to fisheries science.		

Week	**General Objectives.1.0: UNDERSTAND THE RELEVANCE OF PHYSICAL GEOGRAPHY TO FISHERIES SCIENCE**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
1-2	1.1 Define physical geography. 1.2 Describe the components of physical geography Relevant to fisheries science. e.g. Relief, ocean current, temperature, wind etc 1.3 List out the components of fisheries science. 1.4 Identify all the types of aquatic environment in which Fishes live. 1.5 Describe the physical and chemical characteristics of the following: - - Fresh water - Brackish water and - Marine environment. 1.6 Identify lakes, estuaries and deltas in natural situations and on maps. 1.7 Distinguish between lakes, rivers, lagoons and estuaries.	Give the definition of physical geography. Explain the components of physical geography relevant to fisheries science listed in 1.2. Explain types of aquatic environment in which fishes live. Explain the physical and chemical characteristics of freshwater, brackish water and marine environment. Discuss how to identify and distinguish lakes, rivers, lagoons and estuaries in natural situation and on maps.	Map of Nigeria showing major water bodies Flip charts or chalk board Map Documentary films

Week	General Objectives. 2.0: UNDERSTAND VARIOUS INSTRUMENTS USED IN MEASURING WEATHER RECORDS.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
3-5	2.1 Explain the use of the following instruments in the measurement of weather records: - i) Rain gauge ii) Wind vane iii) Thermometer iv) Hygrometer v) Barometer vi) Sunshine recorder	Lecture on the use of the relevant instrument listed in 2.1.	Rain gauge Wind vane Thermometer Hygrometer Barometer Sunshine recorder
	2.2 Explain the uses of weather records to fisheries science.	Lecture on the importance of taking weather records to fisheries science.	
Week	**General Objectives 3.0: UNDERSTAND THE NOMENCLATURE, LOCATIONS OF CONTINENTS AND OCEANS ON A MAP AND THE RELIEF FEATURES OF THE BASIN.**		
6-8	**Specific Learning Objectives:**	**Teachers Activities**	**Resources**
	3.1 Draw the map of the world. 3.2 Identify the oceans of the world on a map.	Guide students to draw map of the world and identify oceans on it.	Map of the world
	3.3 Differentiate among mountains, hills, valleys and other land configurations.	Give the differences among mountains, hills, valleys and other land configurations.	
	3.4 Explain the relationship of land configurations to types of lakes, rivers and other water bodies.	Discuss the relationship of land configurations to types of lakes, rivers and other water bodies.	

Week 9-12	General Objectives.4. 0: UNDERSTAND MAJOR FORMS OF LIFE IN AQUATIC ENVIRONMENT.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
	4.1 Describe the importance of phytoplankton and zooplankton in aquatic environment. 4.2 Identify important invertebrates (crustaceans mainly) 4.3 List the importance of crustaceans in aquatic environment. 4.4 Identify important fin and shell fishes in the sea and their adaptive features. 4.5 Identify common aquatic weeds in Nigeria.	Discuss the importance of phytoplankton and zooplankton in aquatic environment. Enumerate important invertebrates (crustaceans) and their importance in aquatic environment. Mention important fin and shell fishes found in the sea and their adaptive features. Mention common aquatic weeds in Nigeria. Show students pictorial and live collection of common aquatic weeds in Nigeria.	Samples of fin and shell fishes Samples of invertebrate (crustaceans) Collection of phytoplankton and zooplankton found in aquatic environments. Common aquatic weeds in Nigeria (pictures and live).

PROGRAMME: NATIONAL TECHNICAL CERTICATE IN FISHERIES CRAFT PRACTICE		
Module: INTRODUCTION TO PHYSICAL GEOGRAPHY (PRACTICAL CONTENT)	**Course Code: FIT 101**	**Contact Hours 120 Hrs**
Course Specification: This course is designed to acquaint students with the knowledge of physical geography and its relevance to fisheries science.		

Week	**General Objectives.1.0: KNOW THE DIFFERENCE BETWEEN FRESHWATER, BLACKISH AND MARINE WATER IN FISHERIES SCIENCE.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
1-2	1.1 Distinguish between the three kinds of aquatic environment namely; fresh, brackish and marine water. 1.2 Differentiate the features of lakes, rivers, lagoons and estuaries.	Carryout simple test for salinity, conductivity, pH, turbidity of fresh, brackish and marine water in order to distinguish the three kinds of aquatic environment. Take students on excursions to lakes, rivers, lagoons and estuaries and guide them to identify and differentiate their features.	Water sampler Volumetric flask Measuring cylinder Beaker pH meter Conductivity meter Salinometer Such disc Eco sounder Sounding line Flip charts or chalk board Map Documentary films

Week	General Objectives.2. 0: KNOW THE INSTRUMENT USED IN MEASURING WEATHER RECORDS.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
3-5	2.1 Measure weather parameters such as rainfall wind, temperature, humidity, pressure, light intensity (sunshine) using appropriate weather measuring instruments namely: - - Rain gauge - Wind vane - Thermometer - Hygrometer - Barometer - Sunshine recorder	Demonstrate the use of instruments of taking weather records such as: - Rain gauge for rainfall. - Wind vane for wind. - Thermometer for temperature. - Hygrometer for humidity. - Barometer for pressure. - Sunshine recorder for sunshine or light intensity.	Rain gauge Wind vane Thermometer Hygrometer Barometer Sunshine recorder

PROGRAMME: **NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE**

MODULE: **FIT 201 – INTRODUCTION TO FISHERIES TECHNOLOGY**

DURATION: **120 HOURS**

GOAL: **The course is designed to introduce students to the general overview of fisheries**.

GENERAL OBJECTIVES: On completion of this module, the trainee should be able to:

Theoretical content: -

1.0 Understand basic fish biology

2.0 Understand fisheries development in Nigeria

3.0 Understand the concept of fisheries technology

Practical content: -

1.0 Know basic principles of fish classification.

2.0 Know external morphology of bony fish.

3.0 Know internal morphology (anatomy) of bony fish.

4.0 Know fisheries development in Nigeria.

PROGRAMME: NATIONAL TECHNICAL CERTICATE IN FISHERIES CRAFT PRACTICE		
Module: INTRODUCTION TO FISHERIES TECHNOLOGY THEORETICAL CONTENT)	**Course Code: FIT 201**	**Contact Hours: 120 Hrs**
Course Specification: This course is designed to introduce students to the general overview of fisheries.		

Week	**General Objectives. UNDERSTAND BASIC FISH BIOLOGY**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
1-4	1. 1 Identify different types of fish e.g. (a) bony/cartilaginous fish (b) finfish/shell fish.	Give examples on the different types of fish such as: - (a) Bony fish – Tilapia spp, claries spp. (b) Cartilaginous – shark, skate, rays. (c) Fin fish - Tilapia spp, claries spp, shark (d) Shell fish - crayfish, prawn, oysters.	Documentary on any aspect of fisheries in Nigeria. Map of Nigeria showing major water bodies Flip charts or chalk board. Preserved specimen of different types of fish e.g. Freshwater fishes – letus, Heterotis. Saltwater fish – ethmalosa (bonga fish), croaker. Scalefish – Tilapia spp, heterotus. Scaleless fish – clariids.
	1.2 Group fishes into: - a) freshwater/saltwater fishes. b) Scale/Scale less fishes.	Explain the characteristics of the two groups of fish listed in 1.2.	
	1.3 List external features of fish and their functions. 1.4 List the internal features of fish and their functions. 1.5 Outline the processes of growth, feeding and reproduction of fish.	Describe the external and internal features of fish and their functions. Explain the processes of growth, feeding and reproduction of fish.	

Week	General Objectives. UNDERSTAND FIHERIES DEVELOPMENT IN NIGERIA		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
5-8	2.1 Explain the importance of fish in human nutrition. 2.2 Outline the history of fisheries development from pre-independence Nigeria to date. 2.3 Explain the status of fisheries resources production in Nigeria economy. e.g. fisheries statistics, fisheries potentials etc. 2.4 Explain the roles of the following fisheries sub-sector economy a) Artisan (subsistence, small-scale & commercial) b) Industrial c) Aqua-culture 2.5 Identify the problems associated with each sub-sector in 2.4 and suggest possible solutions.	Lectures on the importance of fish to man. Lectures on fisheries development, resources potential, production status and their importance to Nigeria economy. Discuss the three fisheries sub-sector economy listed in 2.4 and problems associated with each highlighting possible solutions. Show documentaries on fisheries sub-sector economy mentioned in 2.4.	Documentary on all aspects of fisheries sub-sector economy in Nigeria. Federal Department of Fisheries (FDF) publications on current statistics of fisheries production.

Week	General Objectives. 3.0: UNDERSTRAND THE CONCEPT OF FISHERIES TECHNOLOGY		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
9-12	3.1 Explain the following: - a) Fish technology - handling, processing, and preservation. b) Fishing technology – gear and craft c) Aquaculture technology - Culturing.	Discuss various aspects of fisheries technology listed in 3.1.	Flip charts of processing Activities using gear and craft Documentaries on fisheries technology listed in 3.1

PROGRAMME: NATIONAL TECHNICAL CERTICATE IN FISHERIES CRAFT PRACTICE		
COURSE: INTRODUCTION TO FISHERIES TECHNOLOGY (PRACTICAL CONTENT)	**Course Code: FIT 201**	**Contact Hours 120 Hrs**
Course Specification: This course is designed to introduce students to the general overview of fisheries...		

Week	**General Objectives. KNOW BASIC PRINCIPLES OF FISH CLASSIFICATION.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
1-3	1.1 Identify external features used in classifying fish e.g. scales, burbles, fins etc.	Explain the basic principles of fish classification using external features e.g. scales, burbles, fins etc Show samples of external features used in the classification of fish.	Fish museum Preserved specimens of the relevant fishes. Specimens /chart of finfish and shellfish e.g. shrimp, oysters, crayfish etc.
	1.2 Differentiate between fin fishes and shellfishes.	Show samples of fin fishes and shell fishes as follows: - Shell fish e.g. prawn, oyster, etc - Finfish e.g. Tilapia, etc. Guide students to differentiate between fin fishes and shell fishes.	Preserved specimen of "ancient" e.g. polypterdae and "modern" fish e.g. Tilapia etc. Fresh specimen of relevant fishes.
	1.3 Identify the main groups of Nigerian Fishes (marine, brackish water and fresh water species) and their diagnostic features. 1.4 Describe main characteristics of each group of Nigerian fishes identified in 1.3.	Show specimens of fishes from the three aquatic environment (marine, brackish and fresh water) highlighting their diagnostic features and main characteristics.	

Week	General Objectives. 2.0: KNOW EXTERNAL MORPHOLOGY OF BONY FISH.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
4-6	2.1 Measure the morphometric or meristic characters of fish i.e. standard length, total length, trunk, head, girth and tail region of a typical fish. 2.2 Identify different types of fish scales - Ctenoid, ganoids, cycloid, and placoid. 2.3 Differentiate different types of fish scales listed above	Undertake laboratory measurements of fish. Guide students to identify fish scales listed in 2.2 highlighting their differences. Draw different fish scales identified in 2.2. .	Measuring board, ruler, and fish specimen. Various fish scales, prepared slides of fish scales and microscopes.
Week	**General Objectives 3.0: KNOW INTERNAL FEATURES OF BONY FISH.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
7-9	3.1 Identify the alimentary canal and associated structures e.g. mouth, teeth, pharynx, oesophagus, stomach, intestine, pancreas, liver, kidney and Spleen of fish. 3.2 Identify other internal organs of fish e.g. gas bladder, gills, gonads, heart and pituitary gland. 3.3 Dissect fish to see the alimentary canal. 3.4 Draw to scale fish alimentary canal relative to body length.	Undertake laboratory dissection of fish showing different parts of the alimentary canal from mouth to anus and other internal organs. Demonstrate how to dissect and measure alimentary canal relative to length. Guide students to draw to scale fish alimentary canal relative to body length.	Dissecting kit, preserved and fresh specimens of fish and ruler. Fresh and preserved fish specimen.

Week	General Objectives 4.0: KNOW FISHERIES DEVELOPMENT IN NIGERIA		
	Specific Learning Objectives	**Teachers Activities**	**Resources**
10-12	4.1 Identify the following fisheries sub-sector in Nigeria: - a) Artisanal (subsistence, small-scale and commercial) b) Industrial c) Aqua-culture	Show students documentary on the listed fisheries sub-sector. Conduct class visits to fish landing site, fish farm, cold room	Documentaries Chart Landing site, fish farm, cold room.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE

MODULE: FIT 202 – BASIC AQUACULTURE

DURATION: 120 HOURS

GOAL: The course is designed to acquaint students with the general principle of aquaculture particularly as it affects warm water fish species.

GENERAL OBJECTIVES: On completion of this module, the trainee should be able to:

Theoretical content: -

1.0 Understand the meaning and scope of aquaculture.

2.0 Understand various types of fish farming systems

3.0 Understand the importance of natural feeds and supplementary feeding in ponds.

4.0 Understand enemies of fish under culture.

5.0 Understand the construction of aquarium and its management

Practical content: -

1.0 Know the meaning and scope of aquaculture

2.0 Know various types of fish culture systems

3.0 Know the principle of fish seed production

4.0 Know the methods of harvesting fish

5.0 Know enemies of fish under culture

6.0 Know the mechanism of constructing an Aquarium.

PROGRAMME: NATIONAL TECHNICAL CERTICATE IN FISHERIES CRAFT PRACTICE		
Course: **BASIC AQUACULTURE (THEORETICAL CONTENT)**	**Course Code: FIT 202**	**Contact Hours 120 Hrs**
Course Specification: This course is designed to acquaint students with general principle of aquaculture particularly as if affects warm water fish species.		

Week	**General Objectives.1.0: UNDERSTAND THE MEANING AND SCOPE OF AQUACULTURE**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
1-2	1.1 Define aquaculture 1.2 Outline the history of aquaculture with particular reference to Nigeria, the present status and its prospects in future. 1.3 Explain the potential of aquaculture in boosting fish production in Nigeria. 1.4 Identify major culturable fish types in Nigeria e.g. table fish, ornamental fish, shellfish. 1.5 Identify common non-culturable fish species. 1.6 Differentiate between culturable and non-culturable fish species (i.e. fin fishes and shell fishes).	Lectures on the meaning of aquaculture, its development and the potential in boosting fish production with particular reference to Nigeria. Enumerate major culturable fish types in Nigeria listed in 1.4 and their characteristics. Mention common non-culturable fish species and their characteristics. Discuss the differences in appearance, features and characteristics of culturable and non-culturabe fish species.	Charts, Pictures, Video clips Tables Fish museum Tilapia <u>Clarias spp</u> <u>Heterobranchus</u> <u>Heterotis</u> <u>Mullet</u> <u>Chrysichthys</u> Shrimps Macrobracium Paenus spp, Aquarium fishes e.g. Gold fish, Barbus spp. Etc

Week	General Objectives 2.0: UNDERSTAND VARIOUS TYPES OF FISH FARMING SYSTEMS		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
3-4	2.1 Define extensive, semi-intensive and intensive fish farming systems. 2.2 List the differences between extensive, semi-intensive and intensive fish farming systems. 2.3 Explain the merits and demerits of the three culture systems mentioned in 2.2 above. 2.3 Identify the facilities for the culture of fish	Explain the three classifications of fish farming systems listed in 2.1. Explain the differences of the three fish culture system above, as well as their merits and demerits. Explain different facilities used in culturing fish.	Reservoirs, pond, raceways, aquaria, tanks, cages, pens, recirculation systems.
Week	**General Objectives 3.0: UNDERSTAND THE IMPORTANCE OF NATURAL FEEDS AND SUPPLEMENTARY FEEDING IN PONDS.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
5-6	3.1 Mention natural and supplementary feeds for fishes and their importance. 3.2 Differentiate between natural and supplementary feeds composition and methods of feeding. 3.3 List the methods available for the production of natural fish feed. 3.4 Explain locally available common fish feedstuffs and method of its formulation.	Discuss the importance and feeding methods of natural and supplementary feeds to fishes knowing their differences. Explain the method available for the production of natural fish feed. Discuss locally available common fish feedstuffs and methods of their formulation.	Natural fish feeds Different feed stuffs e.g. corn meal, soybean meal, groundnut cake, fish meal, palm kernel cake etc, Vitamin and mineral mixtures. Grinding mill, domestic mixer, scoop/cup, bowls, buckets, cooking pots, frying pans.

Week	General Objectives. 4.0: KNOW ENEMIES OF FISH UNDER CULTURE.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
7 - 8	5.1 Explain water pollution and its sources. 5.2 Identify ways of dealing with problems of water Pollution in fish culture. 5.3 Describe simple methods of improving water quality. 5.4 Identify fish predators and control. 5.5 Describe methods of controlling fish predation. 5.6 Identify aquatic weeds associated with pond culture. 5.7 Describe methods of controlling aquatic weeds. 5.8 List common fish diseases and parasites and how to control them.	Discuss different sources of water pollution, its associated problems and methods of improving water quality. Discuss methods of controlling fish predation. Discuss different aquatic weeds associated with pond culture and their control measures. Explain common fish diseases and parasites and their control measures.	Paddles Canoe Secchi disc Alum Palm frond/grass/hay Water hycinth (dried or fresh) Water lettuce, water lily, etc. Weed album Preserved/pictures of diseased fish Preserved/pictures of parasitised fish A chart of parasities and fish diseases.
Week	**General Objectives 5.0: UNDERSTAND THE MECHANISM OF CONSTRUCTING AN AQUARIUM AND ITS MANAGEMENT.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
9-10	6.1 Define Aquarium. 6.2 List types of aquaria (natural and artificial) 6.3 List the materials for construction of an aquarium. 6.4 Name some of the natural plants used in the construction of aquaria. 6.5 List some common ornamental fishes raised in aquaria. 6.6 List the common fish feed used in aquaria. 6.7 Describe the methods of maintaining aquaria.	Give the definition of an aquarium and its classification into natural and artificial. Enumerate materials used in constructing an aquarium. Describe types of natural plants used in the construction of aquaria. Describe types of ornamental fishes raised in aquaria. Describe different aquaria fish feed. Discuss methods of maintaining aquaria.	Glass, frames/stand Silicon glue/sealants Aquarium gun/Silicon gun Aerators/Air pumps/blowers Filters Aquatic plants Aquarium fish seeds Ornamental fishes e.g. Gold fish, Jewelfish etc.

PROGRAMME: NATIONAL TECHNICAL CERTICATE IN FISHERIES CRAFT PRACTICE		
Module: BASIC AQUACULTURE (PRACTICAL CONTENT)	**Course Code: FIT 202**	**Contact Hours 120 Hrs**
Course Specification: This course is designed to acquaint students with the general principle of aquaculture particularly as it affects warm water fish species.		

Week	**General Objectives. 1.0: KNOW THE MEANING AND SCOPE OF AQUACULTURE**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
1 - 2	1.1 Identify key species of fish cultured in Nigeria	Show students preserved or fresh culturable and non-culturable fish species.	Tilapia spp. Clarias spp. Heterobranchus Heterotis
	1.2 Identify major fish types in Nigeria e.g. table fish, ornamental fish, shellfish.	Guide students in identifying major fish types listed in 1.2.	Mullet Chrysichthys Shrimps
	1.3 Identify the characteristics of culturable and non-culturable fish species (i.e. fin fishes and shell fishes).	Guide students in identifying the characteristics of culturable and non-culturable fish species in 1.3.	Macrobracium Paenus spp Aquarium fishes e.g. Gold fish, Sword tail,
	1.4 Separate fishes into culturable and non-culturable fish species.	Guide students to separate fishes into culturable and non-culturable species.	Jewel fish etc.
	1.5 Draw different culturable and non-culturable fish species.	Conduct practical on drawing of culturable and non-culturable fish species (fin fish and shell fish)	

	General Objectives 2.0: KNOW VARIOUS TYPES OF FISH CULTURE SYSTEMS		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
3-4	2.1 Identify the facilities for the culture of fish.	Take students to see different fish farming facilities used in culturing fish.	Reservoirs, pond, raceways, aquarium, tanks, cages, pens, recirculating systems.
	2.2 Prepare ponds for Stocking.	Guide students on pond preparation for stocking.	Already prepared pond.
	2.3 Stock pond as desired.	Guide students to stock pond.	
	2.4 Compound simple fish ration.	Conduct practicals on compounding simple fish ration.	Grinding mill, domestic mixer, scoop/cup, bowls, buckets, cooking pots, frying pans, etc.
	2.5 Carry out practical feeding of fish.	Demonstrate feeding of fish.	
	2.6 Produce fish feed pellets.	Demonstrate production of fish feed pellets.	
	2.7 Package fish feed pellets.	Demonstrate packaging of fish feed pellets.	

Week	General Objectives 3.0: KNOW THE PRINCIPLE OF FISH SEED PRODUCTION		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
5-6	3.1 Describe hypophysation of fish 3.2 Describe sexing of broodstock 3.3 Carry out frys/fingerlings handling and management procedures e.g. feeding and water management. 3.4 Package fish fry/fingerlings for transportation 3.5 Identify locally available common fish feedstuffs 3.6 Describe the procedure for compounding simple fish rations/feeds e.g. mixing, milling etc. 3.7 Describe different feeding methods	Guide students to identify locally available common fish feed stuffs. Demonstrate the methods of compounding simple fish rations/feeds in 3.2. Demonstrate varied feeding methods. Demonstrate hypophysation of fish. Demonstrate sexing of broodstock. Demonstrate frys/fingerlings handling and management procedures listed in 3.6. Demonstrate packaging of fish frys/fingerlings for transportation.	Broodstock, pituitary glands and other synthetic hormones. Artemia, eggs, hose, plankton. Syringes Distilled water Small mortar and pestle Hand towels Etc
Week	**General Objectives 4.0: KNOW THE METHODS OF THE HARVESTING FISH.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
7-8	4.1 Identify equipment used for harvesting fish by (a) Partial and (b) Total cropping, 4.2 Harvest and crop fish by partial and total cropping.	Guide students to identify equipment used in harvesting fish by partial and total cropping. Demonstrate the two methods of harvesting and cropping fish namely partial and total cropping.	Seine nets Cast nets Scoop nets Canoe Paddles Basins Buckets

Week	General Objectives 5.0: KNOW ENEMIES OF FISH UNDER CULTURE		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
9-10	5.1 Identify fish predators e.g. frogs/toads crocodiles, alligators, water tortoise, turtles, dragonfry lavae, birds etc. 5.2 Identify aquatic weeds. 5.3 Describe methods of controlling fish predators and aquatic weeds listed above. 5.3 Describe common fish diseases and parasites and how to control them.	Guide students in identifying fish predators and aquatic weeds in existing ponds. Illustrate methods of controlling fish predators and aquatic weeds. Guide students to observe diseased fishes e.g. fungi infection, bloat, fin rot etc and how to treat them.	Water hyacinth (dried or fresh) Water lettuce, water lily, etc. Weed album Preserved/pictures of diseased fish Preserved/pictures of parasitised fish A chart of parasites and fish diseases.
Week	**General Objectives 6.0: KNOW THE MECHANISM OF CONSTRUCTING AN AQUARIUM.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
11-12	6.1 Identify materials for construction of an aquarium. 6.2 Identify types of Aquarium (natural and artificial) 6.3 Identify natural plants found in an aquarium. 6.4 Identify common fish feed used in an aquarium. 6.5 Identify common ornamental fishes raised in an aquarium. 6.6 Construct an aquarium as a class exercise.	Show students materials for constructing aquaria. Show students types of aquaria (natural and artificial) Show students natural plants found in an aquarium. Show students some common fish feed used in an aquarium. Show students common ornamental fishes raised in an aquarium. Assist students in constructing aquaria as a class exercise.	Glass, Frame/stand Silicon glue/sealants Silicon gun Aerators Filters Aquatic plants Aquarium fish feeds e.g - flakes, pellets etc. Ornamental fishes e.g - Gold fish, Jewel fish etc.

PROGRAMME: **NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE**

MODULE: **FIT 203 – FISHING GEAR AND CRAFT TECHNOLOGY (PRACTICAL ONLY)**

DURATION: **144 HOURS**

GOAL: **The course is designed to teach students the basic principles of designing, constructing, and using common fishing gear and crafts in Nigeria.**

GENERAL OBJECTIVES:

On completion of this module, the trainee should be able to:

1.0 Know various classification of fishing gear.
2.0 Know netting materials for gear construction.
3.0 Know the basic processes of net construction.
4.0 Know different types of fishing craft/boats.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE			
Course: FISHING GEAR AND CRAFT TECHNOLOGY (PRACTICAL ONLY)		**Course Code: FIT 203**	**Contact Hours 144 Hours**
Course Specification: This course is designed to teach the students the basic principles of designing, constructing and using common fishing gear and crafts in Nigeria.			
WEEK	**General Objectives 1.0 KNOW THE VARIOUS CLASSIFICATIONS OF FISHING GEAR**		
	Specific learning objectives	**Teachers activities**	**Resources**
1-2	1.1 Identify all the traditional and modern fishing gear used in Nigeria. 1.2 Classify fishing gear and methods under: -Active fishing gear (trawl, cast net, seine nets, claps nets, etc) -Passive fishing gear (gill net, trammel nets, traps etc.)	Conduct physical Identification and sketches of the relevant fishing gear mentioned in 1.1 and 1.2.	Collection of active and passive gears (models)
	General Objective: 2.0 KNOW NETTING MATERIALS FOR GEAR CONSTRUCTION.		
3-5	2.1 Identify natural fiber materials for net construction. 2.2 Identify synthetic fiber materials for net construction. 2.3 Describe physical characteristics of synthetic fibers (flexibility, strength, etc). 2.4 Carry out identification tests on the various types of synthetic fibers (water and visual tests)	Guide students to make physical identification and reports on the natural and synthetic fibers materials used for net construction. Guide students to carry out identification tests (water and visual tests) on various types of synthetic fibers.	Collections of samples of : Cotton Sisal Ramie (Root fibers) Synthetic Fibers (PA, PE, PP) Net Loft

Week	General Objectives 3.0: KNOW THE BASIC PROCESSES OF NET CONSTRUCTION.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
6-9	3.1 Define terms associated with net construction viz. normal and T –cut, bar cut, combination cut etc. 3.2 Carry out all the processes involved in net construction, namely; braiding, strand formation (rope), tapering, creasing, joining, knotting etc. 3.3 Describe hanging ratio (coefficient) and its effects on shape of net and application constraints. 3.3 Mount netting material on support ropes (head and foot) 3.5 Mount net using 50% and 60% hanging	Explain the meaning of the terms listed in 3.1. Demonstrate the processes in net construction listed in 3.2. Explain hanging ratio and its effects on shape of net and application constraints. Guide students to mount netting materials on support ropes (head and foot) and also to mount net using 50% and 60% hanging.	Net loft Gear models Cutting Blades Mending needles Netting material Kuralon rope Markers
	4.0: KNOW DIFFERENT TYPES OF FISHING CRAFT/BOAT		
10-12	4.1 Describe a typical fishing craft and boat. 4.2 Classify crafts into calabash; bamboo rafts (aids) canoes, dingy, boats, and trawlers etc. 4.3 Identify different types of fishing boat e.g. wooden, glass fibre, steel, ferrocement etc. 4.4 Differentiate between mechanized and non-mechanized boats. 4.5 Identify simple tools for building boats. 4.6 Identify boat parts. 4.7 Draw a simple fishing boat plan. 4.8 Design simple fishing boat (model).	Show students various aids/models/sketches of relevant fishing craft/boat. Guide students to classify crafts as listed in 4.2 and types of fishing boats as listed in 4.3. Illustrate the differences between mechanized and non-mechanized boats. Show simple tools used for building boats and different boat parts. Guide students on drawing and designing of simple boat.	Metal/wood workshop. Craft models (calabash, bamboo rafts, canoes, dingy etc) Life size model boats (dingy, trawler, outboard engine on wooden, ferrocement or glass fiber boat). Complete Tools box.

PROGRAMME: **NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE**

MODULE: **FIT 301 – INTRODUCTION TO FISH FARM DESIGN AND CONSTRUCTION (PRACTICAL ONLY),**

DURATION: **144 HOURS**

GOAL: **The course is designed to enable students understand the basic design and construction of simple fish culture facilities and how to maintain them.**

GENERAL OBJECTIVES:

On completion of this module, the trainee should be able to: -

1.0 Know the criteria to apply in selection of site for fish farms.
2.0 Know the design of simple fish farm structures.
3.0 Know the use and construction of fish farm facilities.
4.0 Know the concept of Hatchery design.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE			
Course: INTRODUCTION TO FISH FARM DESIGN AND CONSTRUCTION (PRACTICAL ONLY)		**Course Code: FIT 301**	**Contact Hours: 144 Hours.**
Course Specification: This course is designed to enable students understand the basic design and construction of simple fish culture facilities and how to maintain them.			
WEEK	**General Objective 1.0: KNOW THE CRITERIA TO APPLY IN SELECTION OF SITE FOR FISH FARMS.**		
	Specific Learning Objective	**Teachers Activities**	**Resources**
1-3	1.1 Describe fish farm engineering. 1.2 Carry out reconnaissance survey of farm site for vegetation, water source, water quality, topography, etc. 1.3 Determine elevation and distance using simple instruments like, hand level, kern levels, ranging poles, measuring tapes etc.	Explain fish farm engineering. Guide students to carry out reconnaissance survey of farm site for the factors listed in 1.2. Use hand level, kern level, ranging pole, measuring tape to determine elevation and distance. Supervise site survey and graph drawn from practical in 1.3.	Staff rod, kern level, measuring tape, ranging pole, tripod stand. Digger, shovel, soil-auger, Cutlass, soil analysis kit. Drawing table and instruments. Water quality kit. Laboratory.
	1.4 Perform simple soil suitability tests e.g. permeability test, soil structure/plasticity test. 1.5 Perform simple water quality test e.g. temperature, turbidity, dissolved oxygen, PH, alkalinity, ammonia, etc.	Conduct practical with students on soil suitability tests listed in 1.4. Demonstrate how to determine water quality test listed in 1.5 using water quality kit or titration method in the laboratory.	Soil samples Water testing kits e.g. - Lovibond comparator - PH meter etc. Water sampler Laboratory.

Week	General Objectives 2.0: KNOW THE DESIGN OF SIMPLE FISH FARM STRUCTURES.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
4-6	2.1 Identify the common structures found in fish farm e.g. pond, sluice gate, wooden tank, fibre glass tank, concrete tank etc. 2.2 Describe the design of fish farm structures such as (a). Earthen pond e.g. barrage, contour, etc. (b). Other holding facilities e.g. aquarium tank, concrete tank, homestead pond, raceway, plastic tank, wood/ plank tank, fibre glass tank.	Take students out to see some common fish farm structures listed in 2.1. Supervise students' trips to fish farms and their reports on the design of fish farm structures mentioned in 2.2 Demonstrate practical design of varied fish farm structure listed in 2.1 and 2.2.	Ponds Concrete tank Shovel Digger Measuring tapes Head pan Wheel barrow Spade Borehole/Reservoir (Dam) Builder's level (Plum)
	2.3 Make simple design of ancillary farm structures e.g. store, net rack, hatchery, counting shed etc. 2.4 Sketch pond, dyke, core trench.	Demonstrate practical design of varied ancillary fish farm structure listed in 2.3. Show drawings and designs of pond, dyke, core trench. Give assignment on pond design.	

Week	General Objectives 3.0: KNOW THE USE AND CONSTRUCTION OF FISH FARM FACILITIES.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
7-10	3.1 Identify the following inlet and outlet devices: dyke (dam), monk, dyke protection devices, sluice gate, spillway, etc. 3.2 Describe the procedure for the construction of a typical earthen pond. 3.3 Describe the procedure for the construction of homestead/concrete pond, transportation tank etc. 3.4 Determine surface area of pond for stocking based on size and species of fishes.	Show students the devices in 3.1 and assist them in making identification of the devices. Conduct practical on earthen pond construction. Conduct practical on the construction of homestead/concrete pond, transportation tank etc. Guide students to determine surface area of ponds for use in stocking them based on size and species of fishes.	Fishpond. Bahamas grass, stone, cement etc. Glass sheet net, plant shooter etc Sealant, Resin catalyst. Accelerator, plastic basin Diamond cutter. Hollow block, cement, sand gravel, digger, shovel, etc.
	3.5 Undertake management of dyke protection devices. 3.6 Construct/assemble model earthen pond, aquarium tank, hapa/cage, and pen. 3.7 Set up other small fish farm holding structures e.g. fibreglass tank, plastic bowl, wood/plank tank etc. 3.8 Cut glasses using diamond cutter.	Describe the management of dyke protection devices. Assign students in groups to construct various models in 3.6. Assign students in groups to set up other small fish farm holding devices listed in 3.7. Demonstrate how to cut glasses using diamond cutter.	

	3.9 Take part in the construction of a standard fishpond both earthen and concrete.	Assist students in constructing a standard fishpond earthern or concrete. Ensure that each graduating class adds a standard fish pond to the college fish farm.	
Week	**General Objectives 4.0: KNOW THE CONCEPT OF HATCHERY DESIGN**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
11-12	4.1 Mention various types of hatchery e.g. in-door, outdoor. 4.2 Mention other supporting structures e.g. Nursery Pond, Spawning tank etc . 4.3 Identify incubator, spawning tank, brood stock tank etc. 4.4 Identify various types of hatchery and hatchery structures listed in 4.1 and 4.2 in an existing hatchery while on a visit.	Describe various types of hatchery and other supporting structures listed in 4.1 and 4.2. Show students incubator, spawning tank, brood stock tank in an existing fish farm. Visit existing hatchery with students. Construct hatchery models with students. Give assignment on the design of a model hatchery.	Spawning tank, incubator, Glass sheet, cement, fiberglass, tanks, silicone/sealant, spawning mats etc.

PROGRAMME: **NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE**

MODULE: **FIT 302 – INTRODUCTION TO POST HARVEST TECHNOLOGY AND MARKETING**

DURATION: **120 HOURS**

GOAL: **This course is designed to acquaint students with the knowledge of fish handling, preservation, processing and marketing.**

GENERAL OBJECTIVES:
On completion of this module, the trainee should be able to:

Theoretical Content: -

1.0 Understand the nutritive value of fish in the diet.
2.0 Understand various fish handling methods and equipment.
3.0 Understand various causes of fish spoilage.
4.0 Understand various methods of processing and preserving fish
5.0 Understand various outlets for marketing fish and fish seeds.

Practical Content: -

1.0 Know various fish handling methods and equipment.
2.0 Know the techniques of evaluating freshness and spoilage of fish.
3.0 Know various methods and equipment used for processing and preserving fish.

PROGRAMME: NATIONAL TECHNICAL CERTICATE IN FISHERIES CRAFT PRACTICE		
Module: INTRODUCTION TO POST HARVEST TECHNOLOGY AND MARKETING. (THEORETICAL CONTENT)	**Course Code: FIT 302**	**Contact Hours : 120 Hours**
Course Specification: This course is designed to acquaint students with the knowledge of fish handling preservation, processing and marketing.		

Week	**General Objectives 1.0: UNDERSTAND THE NUTRITIVE VALUE OF FISH IN THE DIET.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
1-2	1.1 Outline the nutritional composition of fish 1.2 Outline the importance of fish in human nutrition. 1.3 List other uses of fish e.g. as a source of oil, jewelries, leather, fish cake etc.	Explain the nutritional composition of fish and its importance in human nutrition. Explain various uses of fish listed in 1.3.	Fish oil (Cod liver oil) Fish skin Fish cake Fish meal Etc.

Week	**General Objectives 2.0: UNDERSTAND VARIOUS FISH HANDLING METHODS AND EQUIPMENT.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
3-4	2.1 List common fish handling equipment (a). Onboard (b). At Landing site (c). Off shore 2.2 Enumerate the uses and maintenance of common fish handling equipment. 2.3 Enumerate various fish handling methods. 2.4 Outline how the various fish handling methods affect the quality of fish.	Describe various handling equipment commonly used by fisher folk and their maintenance. Describe various fish handling methods and their effects on fish quality.	Fish handling containers e.g. basin, boxes, canoes, sacks. Thermometer, Fish samples shed. Gutting board, gutting knife, table etc.

Week	General Objectives3.0: UNDERSTAND VARIOUS CAUSES OF FISH SPOILAGE.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
5-7	3.1 List the causes of fish spoilage. 3.2 List factors responsible for spoilage of fish (a). Bacteria (b). Enzymes (c). Chemical oxidation 3.3 Identify locations/site of the microorganisms on the fish. 3.4 Outline spoilage organisms of fish and their control measures. 3.5 Outline the characteristics of freshly caught and deteriorating fish.	Discuss the causes of fish spoilage. Explain factors responsible for fish spoilage e.g. bacteria, enzymes, chemical oxidation. Describe the locations/site of the microorganisms on the fish. Explain spoilage organisms of fish and methods of controlling them. Explain the differences between freshly caught and deteriorating fish..	Freshly caught fish Deteriorating fish

Week	General Objectives. 4.0: UNDERSTAND VARIOUS METHODS OF PROCESSING AND PRESERVING FISH.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
8 - 10	4.1 Describe the various fish processing methods e.g. boiling, frying, smoking, sun drying, salting, fermentation, canning etc. 4.2 Describe the various preservation methods e.g. chilling, icing, freezing, brining etc. 4.3 List the equipment for each method in 4.1 & 4.2 above. 4.4 Differentiate between icing, freezing and cold storage (chilling). 4.5 Outline the advantages and disadvantages of each of the methods in 4.1 & 4.2 above.	Discuss various fish processing methods listed in 4.1 Discuss various fish preservation methods in 4.2. Describe various equipment used in processing and preserving fish. Enumerate the differences between icing, freezing and cold storage (chilling). Explain the advantages and disadvantages of various methods of processing and preserving fish.	Pots, frying pans, fish smoking kiln, ice box, deep freezer/refrigerator. Trays, fish racks. Canned fish products
Week	**General Objectives 6.0: UNDERSTAND VARIOUS OUTLETS FOR MARKETING FISH.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
11-12	6.1 List forms of fish for marketing. 6.2 Identify outlets for marketing the following: - -. Fish seed - Table fish - Shell fish - Ornamental fish etc. 6.3 List constraints associated with fish marketing.	Mention various forms of fish for marketing. Explain various means and stations for marketing fish seed, table fish, shell fish, ornamental fish etc. Explain the problems experienced in fish marketing.	Chart showing marketing distribution channels...

1PROGRAMME: NATIONAL TECHNICAL CERTICATE IN FISHERIES CRAFT PRACTICE		
Module: INTRODUCTION TO POST HARVEST TECHNOLOGY AND MARKETING. (PRACTICAL CONTENT)	**Course Code: FIT 302**	**Contact Hours 120 Hours.**
Course Specification: This course is designed to acquaint students with the knowledge of fish handling preservation, processing and marketing.		

Week	**General Objectives 1.0: KNOW VARIOUS FISH HANDLING METHODS AND EQUIPMENT.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
1-2	1.1 Identify common fish handling equipment:- (a) Onboard (b) At Landing site (c) Off shore	Show students common fish handling equipment listed in 1.1.	Fish oil (Cod liver oil) Fish skin Fish cake Fish meal Etc.
	1.2 Describe the effect of temperature on keeping quality of fish.	Demonstrate the effect of temperature on keeping quality of fish by keeping fish in shade, in water, and in the sun.	
	1.3 Describe the effect of gutting on keeping quality of fish.	Perform gutting of fish in relation to keeping the quality of fish.	
Week	**General Objective 2.0: KNOW THE TECHNIQUES OF EVALUATING FRESHNESS AND SPOILAGE OF FISH**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
	2.1 Identify the physical properties of freshly caught fish e.g. eyes, gut, gill appearance and flesh.	Show physical properties of freshly cut fish.	Sample of some of the commercially important fish in Nigeria e.g. Chrysichthys spp, Tilapia spp, Lates Niloticus, Crocker, Pseudotholitus spp, Sardinella spp (sadine), Ethmalosa spp (Bonga) etc.
	2.2 Identify changes that occur in fish stored at various temperatures on the flesh, eyes, gills and general appearance.	Conduct visual assessment of fishes stored under different environmental conditions e.g. temperature, moisture.	
	2.3 Identify signs of deterioration in fish e.g. off colour, off odour, flabbiness.	Demonstrate the methods of identifying signs of deterioration in fish e.g. off colour, off odour, flabbiness	

Week	General Objectives3.0: KNOW VARIOUS METHODS AND EQUIPMENT USED FOR PROCESSING AND PRESERVING FISH .		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
5-6	3.1 Identify the equipment used for processing and preserving fish. 3.2 Process fish by any of the following methods: - boiling, frying, smoking, sun drying, salting, fermentation, etc. 3.3 Preserve fish by any of the following methods: - chilling, icing, freezing, brining. 3.4 Design simple smoking kilns, salting vat.	Show students various equipment used for processing and preserving fish. Demonstrate various methods of processing and preserving fish listed in 3.2 and 3.3. Guide students to design simple smoking kilns, salting vat.	Pots, frying pans, fish smoking kiln, Ice box, Deep freezer/ refrigerator, Trays, Fish racks, etc.

ADVANCED NATIONAL TECHNICAL CERTIFICATE

IN

FISHERIES CRAFT PRACTICE

PROGRAMME: **ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE**

MODULE: **FIT 401 –FISHING GEAR AND CRAFT TECHNOLOGY II**

PRE-REQUISITE: **FIT 203 - FISHING GEAR AND CRAFT TECHNOLOGY**

DURATION: **216 HOURS**

GOAL: **This course is designed to teach students methods of designing and constructing various types of fishing gear and craft in the marine and inland water bodies of Nigeria.**

GENERAL OBJECTIVES:
On completion of this module, the trainee should be able to:

Theoretical contents: -

1.0 Understand the use of twines and ropes in gear and craft construction.
2.0 Understand various types of knots used in net mending.
3.0 Understand the nomenclature of fishing twines and ropes.
4.0 Understand the design of various fishing gear.
5.0 Understand basic maintenance of fishing gear and accessori**es.**

Practical contents: -

1.0 Know the use of twines and ropes in gear and craft construction.
2.0 Know various types of knots used in net mending.
3.0 Know net braiding and mending.
4.0 Know how to design and construct various fishing gear.
5.0 Know functions of fishing gear accessories.
6.0 Know basic maintenance of fishing gear and accessories.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTICATE IN FISHERIES CRAFT PRACTICE		
Course: FISHING GEAR AND CRAFT TECHNOLOGY 11 (THEORETICAL CONTENT)	**Course Code: FIT 401**	**Contact Hours: 216 Hours**
Course Specification: This course is designed to teach students methods of designing and constructing various types of fishing gear and craft in the marine and inland water bodies of Nigeria		

Week	**General Objectives1.0: UNDERSTAND THE USE OF TWINES AND ROPES IN GEAR AND CRAFT CONSTRUCTION**.		
1-2	**Specific Learning Objective**	**Teachers Activities**	**Resources**
	1.1 List types of twines and ropes used in net construction. 1.2 Outline the functions of twines and ropes in net construction. 1.3 List tools used for gear construction (needles, knives etc) 1.4 Outline the functions of tools used in gear construction listed in 1.2 above...	Explain types of twines and ropes used in net construction. Explain the functions and uses of various twines and ropes in net construction. Explain various tools used for gear construction (needles, knives etc) and their functions.	PP ropes Kuralon ropes Mounting twines Rope farm natural fibers. Knives, scissors, net spools and needles. Charts showing diagrams of tools.
Week	**General Objectives. 2.0: UNDERSTAND VARIOUS TYPES OF KNOTS IN NET MENDING**.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
3	2.1 List basic types of knot e.g. reef knot, sheet bend, clove hitch knots etc. 2.2 Describe the uses of various knots in construction and mending of nets.	Explain basic types of knot listed in 2.1. Explain the uses of various knots in constructing and mending nets.	Twine and rope models. Identified knots Sketch.

Week	**General Objectives 3.0: UNDERSTAND THE NOMENCLATURE OF FISHING TWINES AND ROPES.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
6	3.1 List the components of netting yarn 3.2 Describe the system of yarn count (Tex, denier swinage, English and Metric system to the tex) using appropriate formulae. 3.3 Differentiate between the systems of yarn count listed above. 3.4 Calculate and convert the conventional system of yarn count to the tex using appropriate formulae...	Enumerate components of netting yarn. Explain the system of yarn count listed in 3.2. Enumerate the differences between the systems of yarn count in 3.2. Give appropriate formulae for the calculation and conversion of conventional system of yarn count to the tex.	Rope models Net loft.
Week	**General Objectives 4.0: UNDERSTAND THE MECHANISM OF DESIGNING VARIOUS FISHING GEAR.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
7-8	4.1 Describe various types of net. 4.2 Distinguish between gill net and trammel net. 4.3 Determine choice of fishing gear and methods with respect to: - A) Species B) Fishing areas C) Economic consideration.	Explain various types of net. Enumerate the differences between gill net and trammel net. Explain the criteria for a choice of fishing gear and method with respect to the factors listed in 4.3.	Net loft.
Week	**General Objectives 5.0: UNDERSTAND BASIC MAINTENANCE OF FISHING GEAR AND ACCESSORIES.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
12	5.1 Outline procedure for fishing gear and accessories maintenance: - - On board the fishing vessel - During fishing operation - On-shore after fishing - During storage.	Discuss the procedure for maintaining gear and accessories on all the stations listed in 5.1.	Various fishing gear Storage platform.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTICATE IN FISHERIES CRAFT PRACTICE		
Course: FISHING GEAR AND CRAFT TECHNOLOGY 11 (PRACTICAL CONTENT)	**Course Code: FIT 401**	**Contact Hours: 216 Hours**
Course Specification: This course is designed to teach students methods of designing and constructing various types of fishing gear and craft in the marine and inland water bodies of Nigeria		

Week	**General Objectives1.0: KNOW THE USE OF TWINES AND ROPES IN GEAR AND CRAFT CONSTRUCTION.**		
	Specific Learning Objective	**Teachers Activities**	**Resources**
1-2	1.1 Identify types of twines and ropes used in net Construction.	Assist students to make identification of twines and ropes used in net construction.	PP ropes Kuralon ropes Mounting twines Rope farm natural fibers.
	1.2 Identify tools used for gear construction e.g. needles, knives etc.	Show students tools used in gear construction. Guide students to identify the tools above and their uses...	Knives, scissors, net spools and needles. Charts showing diagrams of tools.
	1.3 Splice ropes and twines.	Demonstrate various methods of splicing ropes and twines.	
	1.4 Apply simple safety rules while working with twines and ropes.	Explain simple safety rules while working with twines. Demonstrate the application of safety rules employed while working with twines and ropes.	

Week	General Objectives. 2.0: KNOW VARIOUS TYPES OF KNOTS USED IN NET MENDING.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
3 - 4	2.1 Identify basic types of knots e.g. reef knot, sheet bend, clove hitch knots etc. 2.5 Identify methods of tying knots. 2.3 Tie knots for net mending.	Make sketches of various types of knots. Assist students in identifying various types of knots listed in 2.1. Demonstrate various methods of tying knots. Assist students to tie knots for net mending.	Twine and rope models. Identified knots Sketches of knots.
Week	**General Objectives 3.0: KNOW NET BRAIDING AND MENDING.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
5 - 6	3.1 Identify the two types of net braiding. 3.2 Prepare tears for mending. 3.3 Carry out mending of hole on a net. 3.4 Explain the terms the run of the knots", azimuth etc.	Use suitable working materials to demonstrate net braiding, mending of tears and holes on nets. Assist students in carrying out practical on net braiding and mending. Conduct practical on net braiding and mending to describe the terms "the run of the knots", azimuth.	Net loft Pieces of netting materials Net mending tools.

Week	General Objectives 4.0: KNOW HOW TO DESIGN AND CONSTRUCT VARIOUS FISHING GEAR.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
7-8	4.1 Identify various types of net. 4.2 Identify other fishing gear e.g. cast net, Hook and line and Seine net. 4.3 Construct and mount gill net. 4.4 Construct other fishing gear such as Cast net, Hook and line and Seine net. 4.5 Identify other traditional fishing gear like traps, handclaps etc. 4.6 Construct the traditional fishing gear listed above. 4.7 Mount the constructed traditional fishing gear mentioned in 4.6.	Show students various types of net e.g. gill net. Show students other fishing gear listed in 4.2. Assist students in carrying out practical on the following: - - Constructing and mounting of gill net. - Constructing other fishing gear listed in 4.4. Show students various traditional fishing gears listed in 4.5. Demonstrate how to construct and mount all the traditional fishing gear mentioned in 4.5.	Net loft
Week	**General Objectives 5.0: KNOW FUNCTIONS OF FISHING GEAR ASSESSORIES**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
9	5.1 List fishing gear accessories e.g. buoys, floats, sinkers etc. 5.2 Enumerate functions of fishing gear accessories listed above. 5.3 Identify fishing gear accessories e.g. buoys, floats, sinkers etc. 5.4 Identify local materials suitable for making fishing gear accessories e.g. stones, wood, bamboo, calabash etc.	Explain the function of fishing gear accessories listed in 5.1. Take students on a field trip and assist them in identifying various fishing gear accessories and the local materials suitable for making them as listed in 5.3 and 5.4.	Buoys Floats Sinkers Local materials for making fishing gear accessories e.g. stone, wood, bamboo, calabash etc.

Week	General Objectives 6.0: KNOW BASIC MAINTENANCE OF FISHING GEAR AND ACCESSORIES.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
11- 12	6.1 Describe procedure for fishing gear and accessories maintenance on the following stations: - - On board the fishing vessel - During fishing operation - On-shore after fishing - During storage. 6.2 Carry out maintenance of fishing gear and accessories.	Demonstrate the correct procedure for maintaining fishing gear and accessories on all the stations listed in 6.1. Conduct many practical with students using fishing gear and accessories and elaborate on their correct maintenance culture.	Various fishing gear and accessories. Storage platform.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE

MODULE: FIT 402 – FISH SEED PRODUCTION

PRE-REQUISITE: FIT 202 - BASIC AQUACULTURE

DURATION: 216 HOURS

GOAL: This course is designed to acquaint students with general fish seed production and hatchery maintenance.

GENERAL OBJECTIVES:

On completion of this module, the trainee should be able to:

Theoretical Contents: -

1.0 Understand the principle and methods of fish seed production.
2.0 Understand the concept of hatchery management.

Practical Contents: -

1.0 Know the principle and methods of fish seed production.
2.0 Know hatchery management.
3.0 Know the methods of preparing natural and artificial fish food.
4.0 Know enemies of frys and fingerings.

PROGRAMME: ADVANCED NATIONAL CERTIFICATE IN FISHERIES CRAFT PRACTICE.		
Course: FISH SEED PRODUCTION (THRORETICAL CONTENT)	**Course Code: FIT 402**	**Contact Hours: 216 Hours**
Course Specification Course Specification: This course is designed to acquaint students with general fish seed production and hatchery maintenance.		

Week	**General Objectives 1.0: UNDERSTAND THE PRINCIPLE AND METHODS OF FISH SEED PRODUCTION.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
1-3	1.1 Outline the methods of natural propagation of fish in ponds. 1.2 Outline the methods of artificial propagation of fish E.g. by induced breeding. 1.3 Explain the need for care and maintenance of brood fish. 1.4 Explain the need for specialized feeding of Frys/fingerlings. 1.5 Enumerate the reasons for hybridization	Explain natural propagation of fish in ponds. Explain different methods of artificial propagation of fish in 1.2. Discuss the need for care and maintenance of brood fish. Discuss the importance of specialized feeding of frys/fingerlings. Explain the reasons for hybridization.	Brood stock from any of the cultutrable species earlier discussed. Hormone e.g. Ovarian, Pituitary Syringe and needle Napkins Polythene bag (clear) Oxygen Cylinder Plastic buckets (covered) White jerry cans
Week	**General Objective 2.0: UNDERSTAND THE CONCEPT OF HATCHERY MANAGEMENT**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
4-6	2.1 Describe the various types of hatchery e.g. in-door, outdoor. 2.2 Describe other supporting structures e.g. Nursery pond, spawning tank.	Explain various types of hatchery i.e. in-door, outdoor. Explain hatchery supporting structures listed in 2.2	Spawning tank Incubator Charts.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTICATE IN FISHERIES CRAFT PRACTICE		
Course: FISH SEED PRODUCTION (PRACTI CAL CONTENT)	**Course Code: FIT 402**	**Contact Hours: 216 Hours**
Course Specification Course Specification: This course is designed to acquaint students with general fish seed production and hatchery maintenance.		

Week	**General Objectives 1.0: KNOW THE PRINCIPLE AND METHODS OF FISH SEED PRODUCTION.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
1-3	1.1 Carry out hypophysation on fish e.g. natural and Induced breeding. 1.3 Describe methods of transporting fish. 1.3 Package fish fry/fingerings for transportation.	Demonstrate hypophysation methods on fish e.g. natural and induced breeding. Mention different methods of transporting fish. Illustrate various methods of transporting fish (pictorial and live) Demonstrate packaging of fish fry/fingerlings for transportation.	Brood stock from any of the culturable species earlier discussed e.g. Ovary, prime, pituitary gland. Syringe and needle Napkins and towels Laying nests. Polythene bags (transparent) Oxygen cylinder Plastic buckets Water jerry cans
Week	**General Objective 2.0: KNOW HATCHERY MANAGEMENT**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
4-6	2.1 Identify hatchery structures e.g. incubator, spawning tank, brood stock tank etc 2.2 Design in-door and outdoor hatchery.	Visit hatchery with students and guide them in identifying the structure listed in 2.1. Guide students in carrying out hatchery construction exercises both in-door and outdoor.	Spawning tank Incubator Water tank Scoop net Charts

Week	General Objectives 3.0: KNOW THE METHODS OF PREPARING NATURAL AND ARTIFICIAL FISH FOOD		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
7-9	3.1 Culture natural fish food e.g. plankton, periphyton, maggots etc. 3.2 Prepare artificial fish food for frys/fingerlings e.g. boiled poultry eggs, Artemia etc.	Conduct practical on how to culture natural fish food e.g. plankton, periphyton, maggots etc. Assist students in preparing artificial fish food for frys/fingerlings using boiled poultry eggs, Artemia.	Manure, substrates such as bamboo, palm fronds. Synthetic materials e.g. tyres. Boiled poultry eggs Artemia Culture planting substances e.g. Algae, Rotifiers.
Week	**General Objectives 4.0: KNOW ENEMIES OF FRYS AND FINGERLINGS**.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
10-12	**4.1** Identify natural enemies of frys and fingerlings e.g. dragonfly, frogs/toads, tortoise, water scorpion etc. **4.2** Describe control measures for enemies of frys and fingerlings listed in 4.1. . **4.3** Separate fingerlings of similar sizes e.g. shooters/jumpers, advanced fingerlings (post fingerlings), etc.	Explain natural enemies of frys and fingerlings as listed in 4.1. Take students on a visit to a fish farm and show them various means of controlling enemies of frys and fingerlings e.g. netting, perimeter trenches etc. Assist students in sorting fingerlings of similar sizes using examples of 4.3.	Charts showing enemies of fish frys and fingerlings e.g. dragonfly, frogs/toads, tortoise, water scorpion etc. Live and preservered samples of enemies of fish frys and fingerlings listed above. Collection of live samples of fingerlings for the sorting exercise.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE

MODULE: FIT 403 – PRACTICAL FISHING

DURATION: 216 HOURS

GOAL: This course is designed to teach the students basic fishing methods using simple equipment.

GENERAL OBJECTIVES:
On completion of this module, the trainee should be able to: -
Practical Contents only:
1.0 Know the preparation necessary for fishing trips.
2.0 Know fish detection methods.
3.0 Know how to catch fish.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FISHERIES CRAFT PRACTICE			
Course: PRACTICAL FISHING (Practical content only)		**Course Code: FIT 403**	**Contact Hours: 216 Hours**
Course Specification: This course is designed to teach the students basic fishing methods using simple equipment.			
WEEK	**General Objective 1.0: KNOW THE PREPARATION NECESSARY FOR FISHING TRIPS.**		
1-4	**Specific Learning Objective:**	**Teachers Activities**	**Resources**
	1.1 Assemble necessary materials for fishing trip (boat, engine, fuel, fishing gear and accessories)	Guide students to assemble materials for fishing trip (boat, engine, fuel, fishing gear and accessories)	Models of fishing equipment e.g. - nets - boat - life jackets.
	1.2 Identify suitable site for fishing operation	Lead students to locate suitable fishing site.	- out board engine, boat - paddles - ETC.
	1.3 Select appropriate fishing gear suitable for the chosen site.	Assist students to apply appropriate fishing gear to any chosen site.	Various fishing gear. First aid box. Water body.
	1.4 Carry out swimming exercises.	Guide students on swimming exercise	

Week	General Objectives 2.0: KNOW FISH DETECTION METHODS.		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
1-4	2.1 Carry out local methods of detecting fish in water. 2.2 Carry out physical parameters of detecting fish e.g. visual surveys. 2.3 Identify common species in lotic and lentic water bodies. 2.4 Carry out swimming exercises.	Take students on a field trip and demonstrate local methods of detecting fish in water. Demonstrate physical parameters of detecting fish e.g. visual surveys. Take students to landing jetties and show them common species in lotic and lentic water bodies. Guide students on swimming exercises.	Fishing site.
Week	**General Objectives 3.0: KNOW HOW TO CATCH FISH.**		
	Specific Learning Objectives:	**Teachers Activities**	**Resources**
9-12	3.1 Classify fishing gear into active and passive. 3.2 Identify suitable site for active fishing. 3.3 Carry out fishing using appropriate active gear e.g cast net, seine net, hook and line etc. 3.3 Identify suitable site for passive fishing. 3.5 Carry out fishing using appropriate passive gear e.g long line, gill net, various traps etc.	Assist students in carrying out active and passive fishing using appropriate fishing methods and gear.	Various fishing gear (Active and Passive)

	3.6 Perform other fishing methods using fish aggregating devices (natural and artificial reefs).	Guide students in identifying and using fish aggregating devices (natural and artificial reefs).	Natural and artificial reefs
	3.7 Use simple fishing gear for sports and recreation.	Demonstrate the use of simple fishing gear for sports and recreation e.g. hook and line, baits etc.	Hook and line Baits Water body.
	3.8 Identify obnoxious/unacceptable fishing methods e.g. use of chemicals (Gamalin -20, Rotenone), plants extracts, explosives (dynamite).	Describe the practice of obnoxious/unacceptable fishing methods listed in 3.8.	Obnoxious/unacceptable fishing materials e.g. chemicals (Gamalin-20, Rotenone), Plant extracts, explosives (dynamite**).**
	3.9 Carry out swimming exercises.	Guide students on swimming exercises.	

LIST OF FACILITIES FOR NTC FISHERIES CRAFT PRACTICE.

LIST OF PARTICIPANTS FOR CURRICULUM DEVELOPMENT WORKSHOP FOR NTC & ANTC FISHERIES CRAFT PRACTICE AT N.B.T.E KADUNA FROM 22 -26TH JANUARY, 2006.

S/N	NAMES	ADDRESS	PHONE NOS &
1	Dr E. Omorejie (Chairman)	Department of Zoology, University of Jos, Plateau State.	
2	Dr K. Balogun	Department of Biological Science, A. B.U, Zaria.	
3	Mr A.B. Adimula	Federal College of Fresh Water Fisheries Technology, P.M.B 15000, New Bussa, Niger State.	
4	Mr John Attah	Federal College of Fisheries, Lagos.	
5	Agbabiaka Adegoke	Department of Fisheries, Michael Okpara College of Agriculture Umuagwo, Imo State.	
6	Engr (Mrs) Ngozi Okelekwe (Secretary & Co-ordinator)	National Board for Technical Education Kaduna.	Janelive2003”yahoo.com 08033941915

LIST OF PARTICIPANTS FOR CURRICULUM CRITIQUE WORKSHOP FOR NTC & ANTC FISHERIES CRAFT PRACTICE AT KWARA STATE POLYTECHNIC ILORIN FROM 6 -10TH FEBURAR, 2007.

S/N	NAMES	ADDRESS	PHONE NOS
1	V.N Nwachukwu	Dept of Science Laboratory Technology, Akanu Ibiam Federal Polytechnic Unwana, Ebonyi State.	
2	Mr A.B. Adimula	Federal College of Fresh Water Fisheries Technology, P.M.B 15000, New Bussa, Niger State.	
3	Mr John Attah	Federal College of Fisheries, Lagos.	
4	Agbabiaka Adegoke	Department of Fisheries, Michael Okpara College of Agriculture Umuagwo, Imo State.	
5	Sesan B. Akandi	Baraka Fish Farm Nig, Idi-Ogbede, Olunlade village Ilorin.	08034896734
6	Dr Ladan A. Aliyu	FISHOUSE Aquaculture ltd, Former UTC, 14 Ahmadu Bello Way, Kad, fishouseinternational”yahoo.com.	08033115817 08028534965.
7	Lawal Maikeffi	Fisheries Department, Ministry of Agriculture, Kaduna.	08033319935
8	Lawan Abdulkarim	National Board for Technical Education (NBTE), Kaduna.	08037013711 lawannbte@yahoo.co.uk
9	E.B.Umo-Otong (Co-ordinator)	National Board for Technical Education Kaduna.	08037015992
10	Engr (Mrs) Ngozi Okelekwe (Secretary)	National Board for Technical Education Kaduna.	Janelive2003”yahoo.com 08033941915