



THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

Department of Fisheries and Aquaculture Technology

FAT505 – Fish Genetics

COURSE PARTICULARS

Course Code: FAT505

Course Title: Fish Genetics

No. of Units: 2

Course Duration: One hour of theory and three hours of practical per week for 15 weeks.

Status: Compulsory

Course Email Address:

Course Webpage:

Prerequisite: NIL

COURSE INSTRUCTORS

Mr. O. M. Popoola

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COURSE DESCRIPTION

Understanding of genetics, as the biological basis of heredity and variation among organisms, has expanded the knowledge of applications of genetics and genome technologies in agricultural practices. In aquaculture settings, current genetic improvement programs focus on selecting superior broodstocks, using better breeding practices, increasing sustainability, and minimizing environmental problems. We will examine the role that genetic approaches play in meeting these goals.

The class will start by examining the underlying principles relevant to reproduction and reproductive cycles in bony and cartilaginous fishes; Principles of hybridization and polyploidy in fish. The concept of gametogenesis in fish will also be taught. Monohybrid

and dihybrid inheritances and cytological bases of inheritance will be covered. Probability and Goodness of fit. Linkage, crossing-over and genetic mapping of chromosomes. Polygenic inheritance, Sex determination, and inheritance related to sex in ornamental fishes will also be learnt. Identification of genetic material and protein synthesis code, principal and practical systematic, nomenclature and identification of fish will be covered.

COURSE OBJECTIVES

The objectives of this course are to:

- enable students to understand the principle behind reproduction in fish
- provide students with necessary skills to determine the sex of some species of fish.
- Provide students with knowledge on how to identify genetic materials and protein synthesis code in fish.
- provide students with knowledge of ploidy production in fish.

COURSE LEARNING OUTCOMES / COMPETENCIES

Upon successful completion of this course, the student will be able to:

(Knowledge based)

- explain the principle of hybridization in fish.
- classify and explain the reproductive circles in fish.
- understand crossing over and genetic mapping of chromosome in fish

(Skills)

- produce polyploidy fish:

GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

Class Attendance	10%
Practicals	10
Assignments	10%
Test(s)	10%
<u>Final Examination</u>	<u>60%</u>
<u>TOTAL</u>	<u>100%</u>

GENERAL INSTRUCTIONS

Attendance: It is expected that every student will be in class for lectures and also participate in all practical exercises. Attendance records will be kept and used to determine each person's qualification to sit for the final examination. In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible with any of the instructors, indicating the reason for the absence.

Academic Integrity: Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances are prohibited. You are not allowed to make copies of another person's work and submit it as your own; that is plagiarism. All cases of academic dishonesty will be reported to the University Management for appropriate sanctions in accordance with the guidelines for handling students' misconduct as spelt out in the Students' Handbook.

Assignments and Group Work: Students are expected to submit assignments as scheduled. Failure to submit an assignment as at when due will earn you zero for that assignment. Only under extenuating circumstances, for which a student has notified any of the instructors in advance, will late submission of assignments be permitted.

Code of Conduct in Lecture Rooms and Laboratories: Students should turn off their cell phones during lectures. Students are prohibited from engaging in other activities (such as texting, watching videos, etc.) during lectures. Food and drinks are not permitted in the laboratories.

READING LIST

¹Rex A. Dunham 2004: Aquaculture and Fisheries Biotechnology; Genetic Approaches
CABI Publishing, CAB International 875 Massachusetts Avenue Oxfordshire OX10 8DE
Cambridge, MA 02139 UK

²Jeremy W. Dale, Malcolm von Schantz and Nick Plant 2012: From Genes to Genomes
Third Edition Concepts and Applications of DNA Technology Wiley-Blackwell

²A.R. Beaumont and K Hoare 2002 Biotechnology and genetics in Fisheries and
Aquaculture Blackwell publishing

Legend

1-Available on the Internet.

2- Available as Personal Collection .

COURSE OUTLINE

Week	Topic	Remarks
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1	Introduction and Course Overview Types of reproduction	During this first class, the expectation of the students from the course will also be documented.
2 & 3	Reproductive cycles in bony and cartilaginous fishes.	
4 & 5	Principles of hybridization and polyploidy in fish.	The principle will be discussed, and the practical will involve demonstration of polyploidy production in fish.
6	Gametogenesis.	This will be discussed on demonstration will be made with slide
7 & 8	Monohybrid and dihybrid inheritances.	
9 & 10	Cytological bases of inheritance Probability and Goodness of fit..	
		MID-SEMESTER TEST

11 & 12	Linkage, crossing-over and genetic mapping of chromosomes. Polygenic inheritance.	Students will be divided into groups and given sub-topics to write on and present during class session.
13 & 14	Sex determination, inheritance related to sex in ornamental fishes. Identification of genetic material.	
15	REVISION	This is the week preceding the final examination. At this time, evaluation will be done to assess how far the students' expectations for the course have been met.