KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI
COLLEGE OF SCIENCE
FACULTY OF BIOSCIENCES
DEPARTMENT OF THEORETICAL AND APPLIED BIOLOGY

Course Outline and Teaching & Learning Schedule

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5. Course Title: Fish & Fisheries Biology
6. Course Code: BIOL 458
7. Credits: 3 hours

8. Course Aim: The purpose of this course is to "equip students with knowledge & understanding about fish & fisheries biology & explore how their growth & production are assessed & also understand how unsustainable fisheries exploitation & improper management of aquatic resources affect fisheries & human health"

9. Course Unit Description:

a) Understand what fish is, their characteristics, and basic systematics.

b) Know and understand the functional anatomy of fishes – form and movement; respiration and ventilation; blood circulation; feeding and digestion; reproduction; nervous and sensory systems; hydromineral balance; and behavioural adaptations.

c) Understand fish population dynamics – basic population dynamics accounting and life history; recruitment, growth rate and growth parameters, regulation of recruitment and growth; mortality and factors regulating it as well as quantitative measures of mortality; some terms and concepts (fish stock, fishing effort, fishing intensity, population size, overpopulation, minimum viable population, methods for estimating fish population size, age and age determination, age group, year class, catch per unit effort, catchability, selectivity); fisheries theories; concept of overfishing; susceptibility to overfishing and regulating measures; barriers to effective management; resistance from fishermen; aquaculture –

10. Course Learning Outcomes:

At the end of the course students *will*:

1. **understand** what a fish is, their basic taxonomy and phylogeny as well as the characteristics of the major groups;

2. **know** and **understand** the functional anatomy of fishes in locomotion, gaseous exchange and respiration, blood circulation; feeding and digestion; reproduction; nervous and sensory systems; homeostatic controls; and behavioural adaptations;

3. **know** and **understand** the key terms and concepts in fisheries and fish population dynamics;

4. **know** and **understand** the key factors that regulate fish population dynamics;

5. **know** and **understand** the methods used for estimating fish population size;

6. **know** and **understand** the concept of overfishing and what renders a species vulnerable to overfishing;

7. **know** and **understand** key fisheries management theories, and their relationship to sustainable fisheries;

8. **know** what aquaculture is, its types, and desirable features of aquaculture species;

- be **actively** involved in **advocacy** through **education** for the protection of our water resources to secure it for fisheries resources and to contribute to the sustainable development goal (SDG) 14 that aims to conserve & sustainably use **oceans**, **seas**, & **marine resources** for **sustainable development**

10. Course Content Outline

11.Unit	12.Topics	13. Sub-topics (if any)	14.Week(s)
1	Introduction to fish and fish taxonomy	• Introduction to fish • Introduction to fish systematics • Features of major groups of fishes	1
2	Introduction to the functional anatomy of fishes	• Form and movement • Ventilation and respiration • Feeding and digestion • Reproduction • Nervous and sensory systems • Hydrominaral balance • Behavioural adaptations	2, 3, 4
3	Fish population dynamics, exploitation, and threats	• Key terms and concepts in fisheries and population dynamics • Fisheries management theories and short comings • Concept of overfishing • Introduction to aquaculture	5, 6, 7
	Seminar I & II	Fish diseases; Fish toxicology; Ecology and Distribution of tropical African fishes	8

15. Mode(s) of Delivery:

Due to COVID-19, the blended approach (face-to-face and online) will be used but the following strategies may be adopted:

- Lectures
- Class discussions
- Demonstrations
- Reading Assignments
- Group Seminar presentations

16. Assessment Policy:

Continuous Assessment (30%)

- Class Participation and Punctuality (5%)
- Assignments (10%)
- Mid-semester exams (15%)

End of Term Exams (70%)

- End of semester examination

17. Required Textbooks:

- Castro, P. & M. E. Huber. 1992. **Marine Biology**. Mosby Year Book. 592pp
- Hart, P. J. B, & J. D. Reynolds (ed). 1999. **Handbook of Fish & Fisheries**. Vol. 1& 2. Blackwell Publishing.
- Moyle, P. B. & J. J. Cech Jr. 2004. **Fishes: an introduction to ichthyology**. 5th ed. Pearson/Benjamin Cummings. N. Y. pp726.

19.Teaching and Learning Activities

20. Course Learning Outcome	21. Learning Indicator(s)	22. Teaching and Learning Strategies	23. Assessment Strategy to Measure Learning outcome	24. Reading Text(s)/Resource	25. Competencies/Skills/ Expected to be Developed
Demonstrate *understanding* of what a fish is, & *knowledge* of their basic taxonomy & phylogeny, & the features of the major groups.	Students should be able to *explain* what a fish is; *describe* the basic taxonomy & phylogeny; & *list* basic features of the major fish groups.	Lectures Discussions	Assignments Quizzes	Moyle &. Cech, 2004; Castro & Huber, 1992 – vol. I	Recalling skills Critical thinking Analytical thinking Problem-solving skills
Demonstrate *knowledge* & *understanding* of how the form & structure of the various organ systems in fishes enable them to thrive in the water habitat.	Students should be able to *know* the structure & form of the various organ systems in fishes & *explain* how their structure help them to thrive in the water habitat.	Lectures Discussions Demonstrations Field work Lab work	Assignments Quizzes Group presentations	Moyle &. Cech, 2004; Castro & Huber, 1992 – vol. I	Critical thinking Analytical thinking Problem-solving skills
Show **knowledge** & **understanding** the key terms & concepts in fisheries & fish population dynamics;	Students should be able *explain* key terms & concepts in fisheries & fish population dynamics	Lectures Discussions	Assignments Quizzes Group seminars	Castro & Huber, 1992 – vol. II	Critical thinking Analytical thinking Problem-solving skills
Show **knowledge** & **understanding of** the key factors that regulate fish population dynamics.	Students should be able to *explain* the factors that regulate fish population dynamics	Lectures Discussions	Assignments Quizzes	Castro & Huber, 1992 – vol. II	Critical thinking Analytical thinking Problem-solving skills
Demonstrate **knowledge** & **understanding** of the methods used for	Students should be able to *explain* various methods for	Lectures Discussions Demonstrations Field work Lab work	Assignments Quizzes	Castro & Huber, 1992 – vol. I	Critical thinking Analytical thinking Problem-solving skills

estimating fish population size	estimating fish population size				
Demonstrate **knowledge** & **understanding** of the concept of overfishing & what renders fish species vulnerable to overfishing;	Students should be able to *explain* the concept of overfishing; - they should be able to *explain* the various types of overfishing; - they should be able to *list* & *explain* various factors that render a fish species vulnerable to overfishing			Castro & Huber, 1992 – vol. II	
Demonstrate **knowledge** & **understanding** of the key fisheries mgt theories & their relationship to sustainable fisheries;	- Students should be able to *explain* the key mgt theories in fisheries; - be able to *explain* their drawbacks			Castro & Huber, 1992 – vol. II	
Demonstrate **knowledge** of what aquaculture is, its types, & desirable features of aquaculture species;	- Students should be able to *explain* the definition of aquaculture; - be able to list & *explain* the various types of aquaculture & analysed their basic features; - be able to *explain* various desirable features of a fish species that make them good for aquaculture			Castro & Huber, 1992 – vol. I;	

26. Course Projects

Personal reading assignment

You are expected to read **one (1)** reading material on aquatic ecology. From this, you will be required to answer questions related to their contents.

Date of Submission 6th Week

Group Seminar

Students will be made to select from among the following topics, research on them and make a presentation in class:

- Fish diseases;
- Mercury pollution and its impact on fishes & human health; &
- Ecology and Distribution of tropical African fishes

Date of Submission 8th Week

27. Academic Integrity

In all projects, students are expected to:

1. Adhere to ethical protocols in writing.
2. Originality and creativity will be rewarded.
3. Grammar and related matters must be checked before submission of work
4. Kindly adhere to deadlines for submission