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開課班級：四熱農二A

授課老師：歐卡爾

學分數：3

#### 課程大綱：

The course is to provide the basics of aquatic biology on the aspects of natural history and diversity of fish. • Basic anatomy of Fish and Shellfish • Study of food and feeding habits of commercially important fish. • Digestive system, Natural fish food, Types of feeding • Qualitative and Quantitative methods of analysis of stomach contents. • Age and growth determination by direct and indirect methods. • Reproductive biology: maturity stages, gonadosomatic index, pondoral index, fecundity, sex ratio and spawning. • Eggs and larval stages and developmental biology of finfishes and shell fishes. • Tagging and marking of finfish and shellfish. • Behavior and cognition. Schooling, orientation and migration. • Symbiosis and biodiversity

#### outline:

Biology is the study of life forms and in this undergraduate course the students will be studying life history events of fishes, including shellfishes in the context of fisheries and important aquaculture species. The main aim of this course is to introduce the immensely fascinating world of fish biology, to give advanced information on the unique adaptations of various biological systems of fish and shellfish, to provide basic practical skills in different aspects of aquatic biology such as sampling of fish and shellfish, quantitative meristic and morphometrics, comparative studies on gills, scales, pharyngeal teeth and brain of fishes and to understand the principles of aquatic biology life in freshwater; lentic and lotic environments, freshwater wetlands will be discussed in this course.

#### 教學型態：

課堂教學

#### 成績考核方式：

平時成績:35%

期中考:25%

期末考:40%

其它:%

#### 本科目教學目標：

Students will be trained in the aspects of aquatic biology. Students will be provided with update knowledge of fish and shellfish biology and their issues in management.

#### 參考書目：

1. Dr. Lynwood and S. Smith, 2003. Introduction to fish physiology, Narendra Publishing House, Delhi. 352 pp. 2. Srivastava, C.B.L. 2008. Fish Biology. Narendra Publ. Hse., India, 329 pp. 3. Bone, Q and R.H. Moore. 2008 (Third Ed.). Biology of fishes. Taylor & Francis Group, New York. 4. Helfman, G.S., Collette, B.B., Facey, D.E. and Bowen, B.W. 2009. The Diversity of Fishes. Biology, Evolution and Ecology. John Wiley & Sons Ltd, Oxford



課程進度表：

週次	起訖月日	授課單元(內容)	備註
第1週	2.20~2.27	1.-Introduction to Anatomy- External Anatomy of fish Objective: To introduce the importance of aquatic biology with respect to aquaculture practices. Brief up about the anatomy and structural morphology of fish in the aquatic environment.	19日正式上課。19~23日加退選，復(轉)學生及延修生選課，雙主修、輔系申請，23日申辦抵免學分截止日
第2週	2.27~3.06	Oral-region-associated-structure of fish	28日和平紀念日(放假)
第3週	3.06~3.13	Food-Feeding-Habit-of-Finfishes Objectives: To introduce the oral regions of fish and associated structures and their modification in teeth, and gills, This knowledge is important to understand the food and feeding habits of fish biology.	
第4週	3.13~3.20	Digestive-System-of-Finfishes Objectives: To understand the mechanisms that control the movement and digestion of food, methods of assessing digestibility of feed, factors affecting digestion and absorption of food nutrients, and feeding processes in fish are discussed. An understanding of feeding habits, feeding mechanisms, and the digestion and absorption processes can help fish farmers and nutritionists maximize the use of feed.	11日成績優異提前畢業者提出申請截止日,14日第1次校教評會
第5週	3.20~3.27	Aquatic_system_And_Health Objectives: Introduce the aquaculture system types and their importance in food security. The aquatic system faces several challenges and one such is a disease for proper health management. This lecture discusses the factors for health management in the aquatic system and the importance of stress-driving factors in the aquatic system from the biological point of view,	
第6週	3.27~4.03	Food and feeding habits of fish; objective's introduce the concept of food and adaptations in fish for feeding	
第7週	4.03~4.10	Spring holiday	3日(三)校慶補假(112年11月25(六)日校慶活動日)。4日(四)兒童節、民族掃墓節(放假)，5日(五)民族掃墓節補假
第8週	4.10~4.17	The circulatory system in fish	10日校課程委員會。11日第2



		Objective: to introduce the blood circulation system in aquatic animals. The mechanisms of blood transport in teleost and gas exchanges.	次校教評會
第9週	4.17~4.24	MID-TERM_Examination	15~21日期中考試
第10週	4.24~5.01	Haematopoieses and;haematopoietic organs;System-in-Finfishes Objectives: to introduce the blood types and;haematopoietic progenitor cells and to differentiate into mature blood cells: erythrocytes, lymphocytes, thrombocytes, granulocytes, and monocytes. The pronephros, or head kidney, is a basic organ forming the blood elements and is also a reservoir of blood cells.	22~26日學士班申請轉系,27~28日四技二專統一入學測驗,28日教師期中成績上網登錄截止日
第11週	5.01~5.08	Migration patterns in fishes Objective: to introduce different types of migration in fish from sea water to freshwater and from freshwater to seawater. The importance of migration with respect to biodiversity in aquatic organisms will be highlighted.	
第12週	5.08~5.15	Introduction to Aquatic Microbiology: Microbes in the aquatic environment Objective:;1. Define the term aquatic microbiology. 2. List the importance of studying aquatic microbiology. 3. Discuss the general impacts of microbes on the aqua industry.	11日多益測驗(暫定)
第13週	5.15~5.22	Aquatic_microbiology_lecture_2 Objective: Overview of the characteristics of Microbes and;their roles and impact on the aquatic environment (benefits and diseases)	16日第3次校教評會。19日博士班招生(暫定)
第14週	5.22~5.29	Antibiotic_resistance_in_aquatic_system Objective: Antibiotic resistance in aquaculture is a growing concern as it can negatively impact human health and the environment.	20~24日體育運動週,22日水上運動會(暫定),24日申請停修課程截止
第15週	5.29~6.05	Mode of action of antibiotic resistance in microbes in aquatic system Objective: Factors responsible for antibiotic resistance in microbes and their control	27~31日藥物濫用防制宣導週
第16週	6.05~6.12	THERAPEUTIC Drugs Used in aquatic SYSTEM and THEIR influence on FISH Objective: to introduce the responsible use of drugs in the aquatic system	3日校務會議。3~9日畢業班(學士)期末考試。
第17週	6.12~6.19	Sense-Organs-in-Fishes	10日端午節(放假),12日畢業



			班授課教師送交學期成績截止
第18週	6.19~6.26	FINAL_EXAM	17~23日期末考試