屏東科技大學 - 數位學習平台

課程名稱:(1131)海洋生物技術(2)(8014)_博觀賞魚專班二A(1131)Marine biotechnology(2)(8014)

授課教師:劉俊廷

《尊重智慧財產權,請使用正版教科書,勿非法影印書籍及教材,以免侵犯他人著作權》

開課班級: 博觀賞魚專班二A 學分數:2

課程大綱:

海洋生物技術2(含實習)為一門針對水生動物食用添加劑之科學及其效果驗證方法的課程。本課程包含正課與實作部分,正課主要包含各類水生動物用飼料添加劑的介紹與其功能的闡述;實作部分則主要聚焦於免疫學相關解驗方法的實作與檢驗樣品的採集。透過研習本課程,期望建立學生對常用及特殊目的飼料添加劑的使用能建立完整的認知,更能夠針對欲改善或促進之功效,使用多種方法驗證添加劑使用後之效果。

outline:

Marine Biotechnology 2 (including internship), offers an in-depth exploration of the science behind food additives for aquatic animals and the methods used to verify their effectiveness. The course encompasses lectures to elucidate knowledge and functions of a diverse range of aquatic animal feed additives and practical components focus on implementing immunology-related assays and acquiring animal samples. Upon completion of the course, students are expected to possess a comprehensive understanding of both common and specialized feed additives in aquaculture and acquire the various laboratory skills necessary to assess the efficacy of additives to specific desired outcomes.

教學型態:		成績考核方式:
課堂教學+實習(校內、	,	平時成績:20% 期中考:35% 期末考:45% 其它:%

本科目教學目標:

參考書目:

page 1 / 3



屏東科技大學 - 數位學習平台

課程名稱:(1131)海洋生物技術(2)(8014)_博觀賞魚專班二A(1131)Marine biotechnology(2)(8014)

授課教師:劉俊廷

課程進度表:

Introduction to Aquatic Animal Feed Additives 選選,轉學(系)生、復學生及 運修生選課,雙主修、輔系 申請,12日申辦抵免學分截 止日 加付	週次	起訖月日	授課單元(內容)	備註
第2週 9.16~9.23 Important Immune-Related Enzyme and Protein in Aquatic Animals Understanding key enzymes and proteins involved in the immune system of aquatic animals 9.23~9.30 Practice: Superoxide Dismutase (SOD) Activity 28日(日)孔子誕辰紀念日/教	第1週	9.09~9.16		
Protein in Aquatic Animals Understanding key enzymes and proteins involved in the immune system of aquatic animals 第3週 9.23-9.30 Practice: Superoxide Dismutase (SOD) Activity Assay Test SOD change in fish macrophage 第4週 9.30~10.07 Probiotics and Prebiotics 第5週 10.07~10.14 Practice: Photosynthetic Bacteria Culture 第6週 10.14~10.21 Enzymes as Feed Additives Types of enzymes used in aquaculture feeds Functions and benefits 第7週 10.21~10.28 Practice: Cytotoxicity Assay Applying cytotoxicity assays, e.g., AlamarBlue, CCK-8, or MTT, to assess the safety and efficacy of feed additive. 第8週 10.28~11.04 Practice: fish blood, shrimp, or clam hemolymph extraction Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam 第9週 11.04~11.11 Midterm Exam (presentation) 第10週 11.18~11.25 Practice: Lysozyme examination Test lysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage Importance of minerals and vitamins in aquatic animal nutrition Deficiency symptoms and their impact on immunity Practice: Superoxide Dismutase (SOD) Activity 28B(E)(E)(E)(F)(F)(F)(F)(F)(F)(F)(F)(F)(F)(F)(F)(F)			Overview of the course objectives	
### Understanding key enzymes and proteins involved in the immune system of aquatic animals ### 9.33 回 9.23~9.30 Practice: Superoxide Dismutase (SOD) Activity 28日(日)孔子誕辰紀念日/教師節(放假),29日(一)補假	第2週	9.16~9.23		
第3週 9.23-9.30 Practice: Superoxide Dismutase (SOD) Activity Assay Test SOD change in fish macrophage 第4週 9.30~10.07 Probiotics and Prebiotics 29日成績優異提前畢業者提出申請截止日 第5週 10.07~10.14 Practice: Photosynthetic Bacteria Culture 6日(一)中秋節(放假), 10日(五)國慶日放假) 10.14~10.21 Enzymes as Feed Additives Types of enzymes used in aquaculture feeds Functions and benefits 24日(五)補限,25日(六)光復 Applying cytotoxicity Assay Applying cytotoxicity assays, e.g., AlamarBlue, CCK-8, or MTT, to assess the safety and efficacy of feed additive. 第8週 10.28~11.04 Midterm Exam (presentation) Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam 11.11~11.18 Practice: Lysozyme examination Test ysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory burst activity Minerals and Vitamins as Additive Importance of minerals and vitamins in aquatic animal nutrition Deficiency symptoms and their impact on immunity LH.			1	
第3週 9.23~9.30 Practice: Superoxide Dismutase (SOD) Activity Assay Frest SOD change in fish macrophage 第4週 9.30~10.07 Probiotics and Prebiotics 29日成績優異提前畢業者提出申請截止日第5週 10.07~10.14 Practice: Photosynthetic Bacteria Culture 5日(一)中秋節(放假), 10日(五)國慶日(放假) 10.14~10.21 Enzymes as Feed Additives Types of enzymes used in aquaculture feeds Functions and benefits 4月9月ying cytotoxicity Assay Applying cytotoxicity Assay Applying cytotoxicity assays, e.g., AlamarBlue, CCK-8, or MTT, to assess the safety and efficacy of feed additive. 第8週 10.28~11.04 Practice: fish blood, shrimp, or clam hemolymph extraction Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam 11.11~11.18 Practice: Lysozyme examination Test lysozyme concentration change in cell, cultural supernatant and fish serum. 第10週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory Burst Activity Assay Test fish Burst Activity Assay Test fi			1	
第4週 9.30~10.07 Probiotics and Prebiotics 29日成績優異提前畢業者提出申請截止日第5週 10.07~10.14 Practice: Photosynthetic Bacteria Culture 5日(一)中秋節(放假), 10日(五)國慶日(放假) 10.14~10.21 Enzymes as Feed Additives Types of enzymes used in aquaculture feeds Functions and benefits 5別線 10.21~10.28 Practice: Cytotoxicity Assay Applying cytotoxicity assays, e.g., AlamarBlue, CCK-8, or MTT, to assess the safety and efficacy of feed additive. 第8週 10.28~11.04 Practice: fish blood, shrimp, or clam hemolymph extraction Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam 30日校課程委員會 3~9日期中考試 11.11~11.11 Practice: Lysozyme examination Test lysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory burst activity			animals	
第4週 9.30~10.07 Probiotics and Prebiotics 29日成績優異提前畢業者提出申請截止日 第5週 10.07~10.14 Practice: Photosynthetic Bacteria Culture 5日(元) 中では 10.14~10.21 Enzymes as Feed Additives 7 Types of enzymes used in aquaculture feeds Functions and benefits 7 Practice: Cytotoxicity Assay Applying cytotoxicity assays, e.g., AlamarBlue, CCK-8, or MTT, to assess the safety and efficacy of feed additive.	第3週	9.23~9.30		
第3週 10.07~10.14 Practice: Photosynthetic Bacteria Culture 6日(一)中秋節(放假),10日(五)國慶日(放假) 第6週 10.14~10.21 Enzymes as Feed Additives Types of enzymes used in aquaculture feeds Functions and benefits				師節(放假),29日(一)補假
第5週 10.07~10.14 Practice: Photosynthetic Bacteria Culture 6日(一)中秋節(放假) , 10日(五)國慶日(放假) 第6週 10.14~10.21 Enzymes as Feed Additives Types of enzymes used in aquaculture feeds Functions and benefits 2 Practice: Cytotoxicity Assay Applying cytotoxicity assays, e.g., AlamarBlue, CCK-8, or MTT, to assess the safety and efficacy of feed additive. 第8週 10.28~11.04 Practice: fish blood, shrimp, or clam hemolymph extraction Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam 第9週 11.04~11.11 Midterm Exam (presentation) 3~9日期中考試 13日教務會議,16日教師期中 lysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory burst activity Importance of minerals and vitamins in aquatic Baba. 27日運動大會夜間開				
## 10.07~10.14 Practice: Photosynthetic Bacteria Culture	第4週	9.30~10.07	Probiotics and Prebiotics	
第6週 10.14~10.21 Enzymes as Feed Additives Types of enzymes used in aquaculture feeds Functions and benefits	77 = VIII	40.07.40.44		
Types of enzymes used in aquaculture feeds Functions and benefits 合式防災疏散演練。18日多			,	五)國慶日(放假)
第7週 10.21~10.28 Practice: Cytotoxicity Assay Applying cytotoxicity Assay Applying cytotoxicity assays, e.g., AlamarBlue, CCK-8, or MTT, to assess the safety and efficacy of feed additive. 第8週 10.28~11.04 Practice: fish blood, shrimp, or clam hemolymph extraction Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam 第9週 11.04~11.11 Midterm Exam (presentation) 3~9日期中考試 13日教務會議,16日教師期中 lysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory burst activity 11.25~12.02 Minerals and Vitamins as Additive Importance of minerals and vitamins in aquatic 路跑。27日運動大會夜間開幕,28日運動大會活動,29日101週年校慶活動日,照常上班	第6週	10.14~10.21	1 -	
第7週 10.21~10.28 Practice: Cytotoxicity Assay Applying cytotoxicity assays, e.g., AlamarBlue, CCK-8, or MTT, to assess the safety and efficacy of feed additive. 第8週 10.28~11.04 Practice: fish blood, shrimp, or clam hemolymph extraction Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam 第9週 11.04~11.11 Midterm Exam (presentation) 3~9日期中考試 13日教務會議,16日教師期中 lysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory burst activity 11.25~12.02 Minerals and Vitamins as Additive Importance of minerals and vitamins in aquatic painmal nutrition Deficiency symptoms and their impact on immunity 124~28體育運動人會活動 , 29日101週年校慶活動日,照常上班				
Applying cytotoxicity assays, e.g., AlamarBlue, CCK-8, or MTT, to assess the safety and efficacy of feed additive. 第8週 10.28~11.04 Practice: fish blood, shrimp, or clam hemolymph extraction Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam 第9週 11.04~11.11 Midterm Exam (presentation) 3~9日期中考試 13日教務會議,16日教師期中 lysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory burst activity 第12週 11.25~12.02 Minerals and Vitamins as Additive Importance of minerals and vitamins in aquatic animal nutrition Deficiency symptoms and their impact on immunity Applying cytotoxicity assays affects affety and efficacy of fish or hemolymph from white leg shrimp or bivalve clam 30日校課程委員會 30日校課程委員會 30日校課程委員會 3~9日期中考試 13日教務會議,16日教師期中 成績上網登錄截止日 24~28體育運動過。24日校園路跑。27日運動大會夜間開幕,28日運動大會夜間開幕,28日運動大會活動,29日101週年校慶活動日,照常上班	グラン田	40.04.40.00		
第8週 10.28~11.04 Practice: fish blood, shrimp, or clam hemolymph extraction Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam 11.04~11.11 Midterm Exam (presentation) 3~9日期中考試 13日教務會議,16日教師期中 lysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory burst activity 第12週 11.25~12.02 Minerals and Vitamins as Additive Importance of minerals and vitamins in aquatic Apin animal nutrition Deficiency symptoms and their impact on immunity 100 100 100 100 100 100 100 100 100 10		10.21~10.28	, , ,	
第8週 10.28~11.04 Practice: fish blood, shrimp, or clam hemolymph extraction Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam 11.04~11.11 Midterm Exam (presentation) 3~9日期中考試 13日教務會議,16日教師期中 lysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory burst activity 第12週 11.25~12.02 Minerals and Vitamins as Additive Importance of minerals and vitamins in aquatic 路跑。27日運動大會夜間開 animal nutrition Deficiency symptoms and their impact on immunity 日101週年校慶活動日,照常上班				宣白學與人捷口(放限)。
第8週 10.28~11.04 Practice: fish blood, shrimp, or clam hemolymph extraction Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam 3~9日期中考試 3~9日期中考試 3~9日期中考試 11.04~11.11 Midterm Exam (presentation) 3~9日期中考試 11.11~11.18 Practice: Lysozyme examination Test lysozyme concentration change in cell, cultural supernatant and fish serum.			-	
Practice: fish blood, shrimp, or clam hemolymph extraction Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam 第9週 11.04~11.11 Midterm Exam (presentation) 3~9日期中考試 第10週 11.11~11.18 Practice: Lysozyme examination Test lysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory burst activity 第12週 11.25~12.02 Minerals and Vitamins as Additive Importance of minerals and vitamins in aquatic animal nutrition Deficiency symptoms and their impact on immunity Practice: Lysozyme examination Test 13日教務會議,16日教師期中成績上網登錄截止日 24~28體育運動週。24日校園 24~28體育運動週。24日校園 24~28體育運動過。24日校園 24~28體育運動過。24日校園 24~28體育運動力會活動,29日101週年校慶活動日,照常上班	第8組	10.28~11.04	emeacy of feed additive.	
### hemolymph extraction Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam #### 11.04~11.11 Midterm Exam (presentation) ###################################	770/2	10.20**11.04	Practice: fish blood, shrimp, or clam	00日次旅往安兵首
### Practice withdrawing blood from fish or hemolymph from white leg shrimp or bivalve clam #### 11.04~11.11 Midterm Exam (presentation) #### 11.04~11.11 Midterm Exam (presentation) ### 13.09日期中考試 ### 13.04~11.11 As a practice: Lysozyme examination Test lysozyme concentration change in cell, cultural supernatant and fish serum. ### 13.04 App			• • • • • • • • • • • • • • • • • • • •	
### hemolymph from white leg shrimp or bivalve clam ### 10週				
第9週 11.04~11.11 Midterm Exam (presentation) 3~9日期中考試 第10週 11.11~11.18 Practice: Lysozyme examination Test lysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory burst activity 第12週 11.25~12.02 Minerals and Vitamins as Additive Importance of minerals and vitamins in aquatic animal nutrition Deficiency symptoms and their impact on immunity 10.04~11.11 Midterm Exam (presentation) 3~9日期中考試 13日教務會議,16日教師期中成績上網登錄截止日 成績上網登錄截止日 成績上網登錄截止日 数様上網登錄截止日 数様上網登錄截止日 数様上網登錄截止日 数様上網登錄截止日 数様上網登錄截止日 数様上記書 数様上記				
第10週 11.11~11.18 Practice: Lysozyme examination Test lysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory burst activity 第12週 11.25~12.02 Minerals and Vitamins as Additive Importance of minerals and vitamins in aquatic animal nutrition Deficiency symptoms and their impact on immunity 101週年校慶活動日,照常上班			, , ,	
第10週 11.11~11.18 Practice: Lysozyme examination Test lysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory burst activity 第12週 11.25~12.02 Minerals and Vitamins as Additive Importance of minerals and vitamins in aquatic animal nutrition Deficiency symptoms and their impact on immunity 101週年校慶活動日,照常上班	第9週	11.04~11.11		3~9日期中考試
lysozyme concentration change in cell, cultural supernatant and fish serum. 第11週 11.18~11.25 Practice: Respiratory Burst Activity Assay Test fish macrophage respiratory burst activity 第12週 11.25~12.02 Minerals and Vitamins as Additive Importance of minerals and vitamins in aquatic animal nutrition Deficiency symptoms and their impact on immunity Lux Display Displa			7	
第11週			lysozyme concentration change in cell, cultural	
Test fish macrophage respiratory burst activity 第12週 11.25~12.02 Minerals and Vitamins as Additive Importance of minerals and vitamins in aquatic 路跑。27日運動大會夜間開 animal nutrition Deficiency symptoms and their impact on immunity 日101週年校慶活動日,照常上班			supernatant and fish serum.	
第12週 11.25~12.02 Minerals and Vitamins as Additive 24~28體育運動週。24日校園 Importance of minerals and vitamins in aquatic 路跑。27日運動大會夜間開 animal nutrition Deficiency symptoms and their impact on immunity 日101週年校慶活動日,照常上班	第11週	11.18~11.25	Practice: Respiratory Burst Activity Assay	
Importance of minerals and vitamins in aquatic 路跑。27日運動大會夜間開 animal nutrition Deficiency symptoms and 幕,28日運動大會活動,29 their impact on immunity 日101週年校慶活動日,照常上班			Test fish macrophage respiratory burst activity	
animal nutrition Deficiency symptoms and 幕,28日運動大會活動,29 their impact on immunity 日101週年校慶活動日,照常 上班	第12週	11.25~12.02		24~28體育運動週。24日校園
their impact on immunity 日101週年校慶活動日,照常上班				
上班				
			their impact on immunity	日101週年校慶活動日,照常
75.10/2 12.02 12.00 140tioc. Wasiophage i Hagosytosis	笙13 语	12 02~12 00	Practice: Macrophage Phagocytosis	上址
ı	구·U별	12.02~12.09	Tactice. Macrophage i Hagocytosis	

page 2 / 3



屏東科技大學 - 數位學習平台

課程名稱:(1131)海洋生物技術(2)(8014)_博觀賞魚專班二A(1131)Marine biotechnology(2)(8014)

授課教師:劉俊廷

		Examination	
		Laboratory session on evaluating fish	
		macrophage phagocytosis activity	
第14週	12.09~12.16	Herbal and Botanical Additives (1)	12日申請停修課程截止日
		Overview of herbal and botanical additives	
		Active compounds and their effects on	
		immunity	
第15週	12.16~12.23	Herbal and Botanical Additives (2)	
		Related research paper review and discussion	
第16週	12.23~12.30		22日校務會議。25日行憲紀
		Additive for Improve Appetite of Aquatic	念日(放假)
		Animal or; Methods to deliver food additive	
		Feed additives aimed at enhancing appetite	
		and feed intake ;to faster the weight-gaining in	
		aquatic species	
第17週	12.30~1.06	Practice: Brine shrimp enrichment	1日(四)開國紀念日(放假)
		Enrich nutrition of brine shrimp to deliver	
		chemicals into fish larvae.	
第18週	1.06~1.13	Final Exam (Student Presentations)	5~11日期末考試,10~11日
			學生退宿

page 3 / 3