108 學年度第 1 學期第 1 次 校課程委員會議

提案傳閱附件　　目錄

傳閱附件 1-1--本校各學院所屬各系(所)課程中英文摘要-農學院

各系(所)中心新增課程中英文摘要

一、 農學院

(一) 森林系：

森林產業實地實務(微型課程)　　1　選　　羅凱安

課程於 6 或 7 月暑假實施，以工作坊的方式進行，利用三天時間安排學生到產業實地現場實地接觸體會森林產業(如育苗造林、森林經營驗證、森林行政管理、林木收穫採伐以及林產品加工等)之重要經營管理工作，並與相關業界人員座談。可加深學生對現有森林產業現場環境及工作現況的瞭解，培養森林產業相關工作之興趣，以及增加在校學習期間相關課程教學之成效。

Management Practice of Forestry Industries Summary　　1 E　　K.A. Lo

. The course will be implemented in the summer of June or July, in the form of workshop. Three days will be used to arrange students to come to the industrial field to experience the important management tasks of forest industry (such as nursery and plantation, forest management certification, forest management and administration, forest harvesting and forest products processing etc.) and discuss with the personnel of relevant businesses or institutes. It can deepen students' understanding of the current environment and situation of forest industries via on-site visit, improve interests of students in forest industry-related work, and increase the comprehensive effectiveness of relevant courses during the university semester.

鄉土踏查　　1　選　　羅凱安、陳美惠

本課程為「地方創生與永續設計」跨領域學分學程之微型課程，與業師共同帶領修課學生實際參與地方自然人文資源之觀察與紀錄，為投入地方創生事務作準備，參與時數須達 18 小時以上。

Community Survey　　1 E　　K. A. Lo, and M. H. Chen

This course is one of small course of “Sustainable Design and Regional Innovation Program”. Professional specialist faculty will collaboratively lead students participant observation and survey of specific community and prepare it for forwarding relative courses of the program. The involved hours should be over 18 hours

溝通技巧應用　　1　選　　羅凱安

本課程為「地方創生與永續設計」跨領域學分學程之微型課程，修課學生將充分練習溝通技巧與簡報行銷能力，為投入地方創生事務作準備，參與時數須達 18 小時以上。

Application of Communication Skill　　1 E　　K. A. Lo

This course is one of small course of “Placemaking and Sustainable Design Program”. Professional specialist faculty will collaboratively lead students participant the communication skills and marketing abilities and prepare it for forwarding relative courses of the program. The involved hours should be over 18 hours

(二) 木材科學與設計系：

設計素描　　3　選　　侯博倫

設計素描課程的主要目的是訓練學生熟練各種設計題材的徒手繪畫技巧，課程內容包含實物寫生與設計概念草圖表達技巧。本課程在設計表達技巧的訓練，包括使用鉛筆、針筆等工具表現各種題材的造形、光影與質感。本課程是學生未來學習設計的基礎。

Design Sketch　　3　E　　B. L. Hou

The objective of this course is to familiarize the students with the sketch of design . Course content includes the sketch of different subjects and presentation of design concept. The core of the course is familiarization of the presentation skills of form, light and texture of different subjects. This course is a pre-requisite for students pursuing a career in design.

繪圖基礎　　2　選　　侯博倫

繪圖基礎課程的主要目的是讓學生了解繪圖的基本知識，構圖原理與生活上的快速描繪技巧，讓學生能夠快速透過簡單的線條，快速捕捉生活中的靈感，並繪成圖面。本課程可視為設計素描的前導課程，旨在快速的呈現構想，是學生進入設計繪圖的基本課程。

Basic drawing skills　　2　E　　B. L. Hou

The objective of this course is to

The main purpose of the drawing foundation course is to let students understand the basics of drawing, the principle of composition and the quick drawing skills in life, so that students can quickly capture the inspiration of life and draw pictures through simple lines. This course can be regarded as a leading course in the design of sketches, designed to quickly present ideas, and is the basic course for students to enter design drawings

(三) 動物科學與畜產系：

畜產設備智能化設計概論　　2 選　　鄭富元

設備自動化一直是農畜牧業的發展趨勢，本課程介紹的主題有：基本電學、控制器、繼電器、通訊方式、人機介面，並會有實習操作單元，讓學生了解人機介面之通訊設定與程式設計。

Introduction of Intelligent Design Applied on Animal Science　　2　E　　F.Y.Cheng

Mechanical automation has always been an important issue in agriculture. The topics introduced in this course include the basic electricity, controllers, relay, communications technology and human machine interface etc. Practice unit will be conducted during the course to make students understanding the skill of communication and macro design in human machine interface.

傳閱附件 1-2--本校各學院所屬各系(所)課程中英文摘要-工學院

二、 工學院

(一) 機械工程系：

工程數學(2)　　2　選

本課程為提供已有常微分方程式基礎的同學修習，內容包括線性微分方程組、向量分析、傅立葉分析、偏微分方程式等。

Engineering Mathematics(2)　　2　E

This ∞urse 0缸ers advanced topics for students who have learned ordinary di叮叮ential equations. The course includes systems of homogeneous linear di叮叮ential equations, vector analysis, Fourier analysis and partial differential equations.

自動化加工　　3　選

數控工具機(CNC)為現今機械工業的主力，工業機械手臂作為工件物流與機台串聯的角色，是智慧製造的最佳助手。本課程主皆為介紹使用工業型機械手臂於電腦整合系統(CIM)中，課程內容令電腦數值控制車銳床之操作與控制，電腦輔助製造軟體應用、工業機器人介紹、工業機器人結構與末端工具、成測器、控制器、控制程式介紹等，最後並介紹工業型機械手臂於電腦整合系統中之應用與實作。

Automatic Processing　　3　E

Computer Numerical Control (CNC) machine is the main force of today's machinery industry , as the role of workpiece logistics and machine series in series, the industrial robot 缸m is the best assistant for smart manufacturing. The purose of this course is to introduce the industrial robot in Computer-Integrated Manufacturing (CIM) system, the topics cover programming practice and operation for computer numerical controlled machine, robotic end-effector, sensors, actuators， signals processing, programmable logic controller, etc., to control the mechanism to reach the function

(二) 材料工程研究所：

鋼鐵電弧銲接實務　　3　選　　曾光宏

本課程目標主要你介紹鋼鐵料電弧鐸接之理論、方法及程序，並於課程中進行鋼纖鐸接實務培訓，以及輔導學生參加技術士技能檢定，可使學生獲得職業詮照，並使成為學生日後職場就業之關鍵技能。本課程授課內容色括:(1)安全操作、(2)鋒接實務、(3)切割實務、(4)接頭幾何與鐸接符號、(5)鋼織性質與破壞性試驗、(6)鋼鐵錚接冶金、(7)鐸道瑕疵與缺陷、(8)鐸道目視檢驗。

Arc welding practices for steels　　3　E　　Kuang-Hung Tseng

The 0叫ectives of this course are to introduce to the students the theories, methods, and procedures of arc welding for steels. The practice course also includes training in arc welding for steels. With the objective of practices course, a training topic on the skill test of certified technician is presented. Students are expected to gain the occupational certification and will become their critical skill in the future employment. This course includes: (1) Safe practices, (2) Welding practices, (3) Cutting practices, (4) Joint geometry and welding symbols，(5) Steel properties and destructive testing, (6) Welding metallurgy

of steels, (7) Discontinuities and defects of welds, (8) Visual Inspection of welds.

(三) 先進材料學士學位學程：

可程式控制實務　　3　選

本課程要局為介紹近來工業界最常用之可程式控制器， 其優點為精確、功能大、價格低、抗高溫及擴充性大。課程內容色括:控制器軟硬體介紹、撰寫程式、周邊設備架設、系統安裝及維修及故障排除。

PLC Practice　　3　E

The purpose of this course is to introduce the most-used Programmable Logic Controller (PLC) in industries. The advantages of PL C are precision, easy-use, low-cost, anti high-temp and easy-expand. The course includes as follow : the hardware and software of PLC, the PLC programming, the peripherals setup, and systems installation, maintaining equipments and eliminating malfunction.

傳閱附件 1-3--本校各學院所屬各系(所)課程中英文摘要-管理學院

三、 管理學院

(一)企業管理系：

人力資源管理調查研究專題　　3 選　　林鉦棽，下

本課程目的在於介紹學習者如何透過各種社會科學法進行有關人力資源管理與組織行為等相關議題的實徵調查，已深入了解相關現象與學習如何配合調查結果進行相關制度的設計與規劃。

Research Project on Human Resource Management　　3　E　　Cheng-Chen Lin

The main propose is to introduce the basic concepts and analytic tools in the fields of human resource management and organizational behavior to students, by which the students can use the related skills to deeply understand the empirical issues and effectively implement human resource management practices.

(二)資訊管理系：

金融資料探勘　　3 選

現今快速發展之金融科技，將許多傳統的金融分析方法轉換成金融的科技，其中三種最熱門的投資項目為付款，群眾募資與借貸及金融資料分析方法。本課程將著重於其中之金融資料分析方法將討論量化投資的應用，金融之量化投資是在投資的各個階段中，利用數學、統計、機器學習等分析工具來建立預測模型。本課程旨在對量化投資作廣泛與初步的介紹，並佐以 Python 語言實作，希冀學生能藉此課程對資訊科技與金融結合應用。

Financial Data Mining　　3　E

The rapid emergence of FinTech has turned conventional approaches to financial technology by three popular investment categories: payments, lending/crowdfunding, and data & analytics. The objective of this course is to explore financial data mining based on quantitative trading data. Data Mining in Finance presents a comprehensive overview of major algorithmic approaches to build predictive models, including mathematics, statistical, machine-learning methods, and then examines the suitability of these approaches to quantitative trading data. This course primarily provides concepts and analytical approaches on analyzing financial data by using Python language. Students will learn advanced methods and skills for Fintech.

(三)時尚設計與管理系：

印花圖案設計　　2　選

本課程示範各種印染圖案設計的技法。學生可於實務上利用多元技藝來創作出嶄新且具個人風格的印染圖案作品。結合課程中所介紹的各類布料設計案例與技藝的實習演練，本課程目標在於發展出具藝術風格之衣飾或家飾。

Printing Pattern Design　　2　E

The course demonstrates various techniques of textile pattern designs. Students will experiment

with their projects by applying multiple techniques to create patterns that reveal personal style. By combining various design cases studied within the course, and by experimenting with fabric design skills, the course aims at developing artistic styles associating with clothing or interior materials.

印花圖案設計實習　　1 選

印花圖案設計的技藝實習，透過實務演練或輔以電腦設計，學生將實務上利用多元設計元素創作出嶄新印花圖案作品。透過演練各類布料設計案例與技藝研習演練，發展系列衣飾/家飾圖案設計。

Design Practice of Printing Patterns　　1　E

The course demonstrations various techniques of practicing textile pattern designs. Students will experiment on their projects by applying multiple design elements to create textile patterns. Associating CAD with experiments of fabric design skills, the course aims at developing creative pieces and pattern designs of clothing or interior materials.

(四)工業管理系：

製造資訊系統設計實務　　3 選

豐田精實生產現場強調目視化管理，也就是將所有治具或零件或半成品、生產活動及任何生產系統的效能指標，都能以簡單形式表現出來，生產線上任何人都能馬上獲知生產的狀況。因此量身訂製發展製造資訊系統，用以協助生產現場對目視化管理的需求就產生。本課程藉由教導 Ragic 軟體，企業雲端資料庫，讓程式能力不佳的工管系學生也能透過本課程學習發展資訊系統，來解決現代化工廠製造端生產資訊不透明的問題。

The Practice of Manufacturing Information System　　3　E

Toyota production system or lean manufacturing are emphasized on visual management. It means the placement in plain view of all tools, parts, WIP, production activities and indicators pf production performance. Then the status of the production system can be understood at a glance by everyone involved. Hence, design a manufacturing information system according to the specified is needed. The course will be taught Ragic, web database builder, to help students with poor coding abilities can also develop information system and solving the problem of unclear production data between workstations at modern manufacturing factories.

(五)農企業管理系：

地方創生參與式工作坊(微型課程)　　0.6　選　　林俊男、周宛俞

本課程為「地方創生與永續設計」跨領域學分學程之微型課程，與業師共同辦理參與式工作坊，以瞭解如何協助地方創生的推動。

Place-making Participatory Workshop　　0.6　E　　C.N. Lin and W.Y. Chou

This course is one of the micro-course for the “Place-making and Sustainable Design Program.” Professional specialist and faculty will collaboratively to lead students to organize and participate in a community workshop.

社會企業創業企劃(微型課程)　　0.6　選　　彭克仲、周宛俞

本課程為「地方創生與永續設計」跨領域學分學程之微型課程，與業師共同帶領修課學生在地方上以社會企業理念的提出創業企劃。

Social Enterprise Planning　　0.6　E　　K.C. Peng and W.Y. Chou

This course is one of the micro-course for the “Place-making and Sustainable Design Program.” Professional specialist and faculty will collaboratively lead students to plan a rural enterprise based on the social enterprise concept.

鄉村地方特色遊程體驗(微型課程)　　0.8　選　　林俊男、周宛俞

本課程為「地方創生與永續設計」跨領域學分學程之微型課程，與業師共同帶領修課學生參與社區或部落自辦的深度遊程，帶領學生實際體驗振興地方的各種模式。

Rural Community Tourism Experience　　0.8　E　C.N. Lin and　W.Y. Chou

This course is one of the micro-course for the “Place-making and Sustainable Design Program.” Professional specialist and faculty will collaboratively lead students to participate in rural in-depth tour, and make student have extensive experience and ideas about rural development approaches.

傳閱附件 1-4--本校各學院所屬各系(所)課程中英文摘要-人文暨社會科學院

四、 人文暨社會科學院

(一)幼兒保育系:

家政學　　2　選　　羅棚淳、上

本課程皆在探討有關學習幼兒與兒童發展的知識，家庭經學與家人關餘的技能，以增進家庭和諧與家庭幸福。。

Home Economics　　2　E　　HSU- CHUN LO

This course aims to explore the knowledge of children's development and learning, Family management and relationship, and to promote the harmony and well-being of family.

(二)休閒運動健康系：

個人運動訓練與指導　　1　選

本課程主要目的在培養學生成為個人運動指導員，並考取相關証照。課程內容包含:健康體過能、運動生理學、人體解剖學、肌力訓練、特殊族祥、運動訓練 OPT 棋組、運動行銷、講述能力等。

Personal Exercise Training　　1　E

The main purpose of thís course is to train students to becone personal exercise training and obtain relevant licenses. Course content includes: physical fitness, exercise physiology, human anatomy, strength training, speciaI population, sports training OPT modules, sports marketing, communication skilIs, etc.

緊急救護技術與實務(1)　　2　選

本課程之目的，在於教授各種情境中，實用的急救技巧，期望學生可以將這些技巧運用在危急狀況的傷病患上，達到自救救人的能力。

Emergency Medical Services Technology and Practice (1)　　2　E

The purpose ofthis lectllre is to teach practical first-aid skil1s in various sitllations. We. hope our students call perfonn these skil1s 011 sick or injured people , and improve their ability to save others and themselves.

緊急救護技術與實務(2)　　2　選

課程之目的，在於教授各種情境中，實用的急救技巧，期望學生可以將這些技巧運用在危急狀況的傷病患上，達到自救救人的能力。。

Emergency Medical Services Technology and Practice (2)　　2　E

The purpose ofthis lectllre is to teach practical first-aid skil1s in various sitllations. We. hope our students call perfonn these skil1s 011 sick or injured people , and improve their ability to save others and themselves.

健康管理　　2　選

本課程之百尚在霍遇文獻導讀方式，富農學生了解建康促進以及疾病預防之關鍵影響因索，且透過文獻之蒐祭典分析，歸納出動態生活&.靜態生活與健康促進及疾病預防之間的相關性。透過本課程，其能培養學生對於健康生活形態之認同，並建立一套正確且有效的指導模式。

Health Promotion and Disease Prevention 2 E

The purpose ofthis course is to guide students how to read the literature reviews, by doing so, students can get more aw 訂'eness how to promote healthy and prevent diseases. Through collecting and analyzing the literature review, students can sum up the life style between development and static state, finally to discuss the relationship between promoting healthy and preventing disease.

體適能與肌力訓練 2 選

種過能可分為健康過能及運動過能，兩者相互聯繫，而健康種過能是所有趣逍能的基礎。健康過能包含的要旁有:心肺耐力過能、肌力過能、肌耐力過施、柔軟性通絡、身體組成．運動過能包含的要素有:協調性、速度、爆發力、平衡性、敏捷性、反應時間。肌力訓練:利用各種不同的訓練方式來達到增加肌肉量的訓練，所以只要是能夠「增加人種肌肉力量的訓練」，'就是「肌力訓練」。

本課程目的即在透過學理基礎的教授，以及實務採作的訓練，培 4 串學生在體能訓練指導方面之技能與知識。

Fitness and Strength Training 2 E

Physical fitness can be divided into healthy fitness and exercise fitness, the two are linked to each other, and healthy fitness is the basic foundation for all physical fitness. Elements of healthy fitness include: cardiorespiratory endurance, muscle strength, muscle endurance, flexibility, and body composition. Exerci5e fitnes5 include the elements: coordination, speed, power, balance, agility, and reaction time. Strength Training: Use a variety of training methods to achieve increased mU5cle training, 50 long as it is able to "increase the training of human muscle strength," is "muscle training."

The purose of this course is to train students' skills and knowledge of physical training coaching through the academic teaching and practical training.

運動數據監控儀器實務應用 2 選

本課程主要目的除了學習運動數據監控儀器外，也被學生 T 解運動科學在體育和運動高度專業化發展的今日，運動和體育科學作為-門學術研究的課程，其重要性也日漸增加並受到重視。如何透過運動數據監控儀器來應用在實務中，理解人艦在從事體育活動的時候會產生哪些變化，希望透過此課程，盾的去學生對運動科學的興趣。

Appl ication of Sports Data Moni toring Insturment 2 E

The main objective ofthis course is not only designed to Ie 創 11 how to operate the sports data surveiIIance instru1llents but aIso imparts students how spo 前 science graduaIIy gain its importance 組 d value in athleticism under this highly-professionaIized era of sport， as weII as when sport and sport-related discipIines have been anlaIgamated to an academic course. With a view to inspire students' interest in spOli science, the cot1rse aims on observing changes in physicaI indexes during sport activities by Iearning sports data surveiIIance instruments. And ultimately, put it into practicaI practice

(三)應用外語系:

英語演說(2) 2 選 石儒居

本課程之目的，在使學生瞭解進階英語演說之類型和技巧，並透過實際的演練培養學生在演說的能力和專業力。

English Speaking(2)　　2　E　　Ru-Chu Shih

This is a 1-semester elective class for students to get familiar with advanced public speaking types and events. The course content includes informative speaking, persuasive speaking, and impromptu speaking. Students in this class will be given opportunities to develop effective skills in the research, organization, and presentation of various types of speeches. Students will be expected to apply effective verbal and nonverbal communication skills in presenting speeches to demonstrate their effective use of media to enhance speech presentations; and to apply effective speaking and listening skills as they present, observe, critique, and respond to criticism of speech presentations. The students will be asked to present their speech practices in class, and the self-filmed videos online.

影視翻譯　　2　選　　李俊忠

高速網路時代來臨，外語節目除透過傳統戲院及有線電視傳播之外，如今更新增行動裝置平台（如 Netflix、Apple TV+）等多元管道，故可預見未來台灣的影視字幕翻譯市場勢必大幅成長。若學生能熟悉字幕翻譯之技巧，將有助拓展翻譯工作機會。

本課程首先將解說影視翻譯與一般文件翻譯之異同，進而介紹影視翻譯之特色（如時間及空間限制），並傳授學生從事影視翻譯之技巧及注意事項，最後透過大量練習及討論點評，以幫助學生做好進入影視翻譯市場之準備。

Subtitling Translation　　2　E　　Andy Le

This course is designed to help students familiarize themselves with the skills and strategies for subtitling English programs and movies into Chinese to cash in on the booming translator demand generated by the ubiquitous super-speed Internet. Students will be introduced to the similarities and differences between subtitling and translation of general texts and then to the definition, formats, principles and limitations of subtitle translation. Practice makes perfect; this can't be truer when it comes to translation. Therefore, translation assignments are given regularly to help students acquire hands-on experience and reinforce their subtitle translation skills through class discussionand peer learning. It is hoped that by the end of this course, students will feel confident of working as a subtitle translator

科技英文翻譯　　2　選　　王瀚陞

本課程透過介紹科技英文文體的特點包括其詞彙、語法及文體總貌，讓學生進行科技著述、論文與報告的中譯練習，以培養其透徹分析句子深層結構、努力學習科技知識、及準確翻譯科技詞義的能力。

Translation of English for Science and Technology　　2　E　　H. S. Wang

Through introducing to students the features of English for Science and Technology (EST), including its vocabulary, grammar, and style, this course also provides them with ample English-to-Chinese translation exercises on scientific writings, papers and reports, with a view to cultivating their abilities to conduct a thorough analysis of the deep structure of sentences, to acquire knowledge of science and technology, and to accurately translate the meanings of scientific and technological texts.

傳閱附件 1-5--本校各學院所屬各系(所)課程中英文摘要-國際學院

五、 國際學院

(一)熱帶農業暨國際合作系：

產業實習　　9　選

為結合課堂教育，強化學生「學以致用」能力，本課程以實地實作模式，讓學生至相關產業實習，了解產業的實務工作內容，學習相關專業知識及實務操作技術，並培養正確的工作態度及學習解決問題的能力，讓學生早日進入企業界，培養學生成為具有專業技能與實作經驗之人才。

Industry Internship　　9　　E

In order to apply the classroom education to the industry, students will go to the related industries for their internship. The students will understand the operation and learn the knowledge and techniques of food industry. They will also realize the correct working attitude and problem-solving skills. through this practical training course, the students will be trained as a qualified personnel with professional knowledge and working experience.

菇蕈學特論　　2　選

食用菌如洋菇、草菇、鮑魚菇、木耳、金針菇及香菇等菇類之生理、生態及形態之認識，栽培方法為基本內容。介紹各種菇類栽培之理論與實際配合，探究菇類生長之條件，對目前國內外流行而適合企業化經營之食用菌類特別作有系統之說明，以利選讀生將來應用。

Special Topic on Mushrooms Cultivation　　2　　E

Edible fungi such as common mushroom, chinese mushroom, oyster mushroom, Jelly fungi mushroom and shiitake are the major subjects to be discussed in lectures. The physiology, ecology and morphology provide basic information to culture the mushroom. Knowing how to compost manure, isolates the mycelia theory and practical operation, especially emphasized on large-scale commercial cultivation of mushrooms in status and future of the world, and to meet the need of techniques and knowledge for mushroom production.

進階量化分析專題　　3　選　　廖世義

本課程主要目的是幫助學生學習及建構結構方程模式，並了解其在相關領域的研究應用，也讓學習者了解跟評述相關的研究論文。藉著理論觀念的釐清和實務應用議題的討論，來達成以解決問題為導向的教學目標。本課程議題包含：線性結構基本觀念介紹、模式配適度指標的說明、路徑分析、確認性因素分析、拔靴法程序及模式有效性驗證，並討論中介模式及干擾模式及其混合模式，群組模式的比較、潛變數成長曲線模式和貝氏分析的討論，透過 SPSS, AMOS 及 Smart-PLS 應用軟體的實作練習，並討論橫斷面及縱貫性等相關研究的發展及應用，來達成本課程的教學目標，有助於學生了解近年來進階量化研究方法的概念及其實務應用。

Special Topics for Advanced Quantity Analysis　　3　　E　　Shu-Yi Liaw

The main goal of this course is for the students to realize and be able to conduct their own structural equation Model (SEM) and its practical application in specific fields. The learners can understand and critique published SEM related articles and research. These goals are supported by the conceptual and applied examples contained in the following issues. The topics include structural equation modeling (SEM), model fit indices, path analysis, confirmatory factor analysis, Bootstrap procedure and model validation. By the way, mediation, moderation, and conditional process analysis with a regression-based approach are mentioned. Finally, Mix models, group models comparison, latent growth curve model and Bayesian analysis are also discussed. The software, namely, SPSS, AMOS and Smart-PLS will be applied

as practice tool. By the discussion of related horizontal and longitudinal research will be also developed. Theoretical models are also presented after each discipline, and therefore can be formulated and tested. Achievement of teaching goals will help the graduate students to realize the modern concepts of advanced quantity analysis and its practical application

進階養蜂學　　2　選

課堂上除介紹蜜蜂生物學知識、有趣的生態現象與行為外，並分配蜂群讓修課同學實際飼養蜜蜂，並採收蜂蜜、蜂蠟產品，修課同學可從實際養蜂過程中印證課堂所學內容，以明瞭蜜蜂對人類的貢獻與其生態地位。

Advanced Apiculture　　2　　E

The biology of honey bees and the craft of apiculture will be examined by exploring the natural history, biogeography and ecology of honey bees. Honeybee colony social structure, pests/diseases, pollination ecology, management and current topics in beekeeping will be discussed

進階養蜂學實習　　1 選

課堂上更深入介紹蜜蜂生物學知識、進階的生態現象與行為外，並分配蜂群讓修課同學實際飼養蜜蜂，並採收蜂蜜、蜂王漿, 蜂蠟 和花粉等產品，修課同學可從實際養蜂過程中印證課堂所學內容，以明瞭蜜蜂對人類的貢獻與其生態地位。

Practice of Advanced Apiculture　　1　　E

This course is intended to teach the advanced of beekeeping techniques in the field. Major topics include identification of different castes of honey bees, rearing honey bees, harvesting royal jelly, wax, honey, pollens and other products from beehives and other related topics.

基礎昆蟲學　　2　選

繼基礎昆蟲學後，本課程從昆蟲之發生演化、行態、生理、生態等角度探討昆蟲之適存與多樣性，提供昆蟲於自然與人為環境下之角色與功能的思考空間。

Introduction to Entomology　　2　　E

This course is to introduce fundamentals of entomology in insect evolution, morphology, physiology, behavior and ecology, and their adaptation and diversity.　Also included in the contents are the roles and functions of insects in the national and agricultural environments.

實驗動物操作技術　　2　選

課程主要是讓學生實際操作實驗動物(以小鼠及大鼠為主)的飼養管理及動物配種、懷孕檢查、繁殖、採血、灌食、注射及基礎實驗動物外科技術操作等。此外，也會教導學生如何誘導小鼠(或大鼠)成為特定的疾病模式以輔助進行相關健康食品的功能性評估。

Laboratory Animal Operations Technic　　2　　E

The course will train the students to be an technician doing the laboratory animals (rat and mice) housing & management, breeding, tissue collection, gavage, injection, and general surgical technics. Additionally, the students will create specific disease animal model to evaluate the beneficial effects of interested substance on physiological functions in this course.

實驗動物操作技術實習　　1　選

課程主要是介紹飼養管理實驗動物，以小鼠、大鼠及兔子為主，包括動物配種、懷孕檢查、繁殖、採血、灌食、注射及基礎實驗動物外科技術操作等相關知識。

Practice of Laboratory Animal Operation Technic 1 E

Lecture provides student to learn the feeding and management on laboratory animal, such as mouse, rat and rabbit. Courses containing the mating of laboratory animal, examination of pregnancy, breeding, blood sampling, injection, and the fundamental operation of animal surgeries.

(二)動物用疫苗國際學位專班：

期刊論文寫作與投稿 2 選 鄭力廷

一篇完整的科學期刊論文需有合理的實驗設計，可靠的數據，與有意義的學術價值，並以清楚與簡潔的方式呈現。課堂包含擬稿，投稿，審稿意見回覆。學生應備有研究題目與數據結果以利討論與寫作。

Manuscript Preparation and Submission 2 E L.T. Cheng

A well-told story in science research contains sound experimental design, robust results, and significant scientific value, all presented in a clear and concise fashion. The entire manuscript preparation, submission, and rebuttal process will be covered. Students should have their own data and results in advance to benefit the most from the class.

動物用疫苗檢驗標準及技術 2 選 朱純燕等合授

課程內容包括反芻動物、伴侶動物、禽類及豬用疫苗等，各種動物用疫苗之國內及歐洲藥典檢驗標準及技術。訓練修課學生具備新開發苗製造許可證申請之實用能力，可直接與產業界人才需求接軌之課程。

Standards and Techniques on Vaccines for Veterinary Use 2 E C.Y. Chu etc

This course provides hands-on experience for standards and techniques on vaccines for veterinary use, according to Chinese and European pharmacopoeia. Processes covered include ruminants, companion animal, avian and swine vaccines. Students will learn practical inspection techniques useful for application licenses new vaccines, allowing direction transition into industry.

疫苗應用生物資訊學 2 選 王祥宇等合授

課程內容包括各類生物資源相關資料庫應用方法與疫苗開發所需之分析工具，包括：資料庫應用、基因序列分析、基因體資料取得、轉錄體分析與蛋白質結構分析等內容。訓練修課學生具備開發疫苗時所需之微生物抗原分析與分子生物資訊操作能力，可直接應用於研究工作中之所需之生物資訊操作知識。

Bioinformatics in Vaccine Development 2 E Hsian-Yu Wang etc

This course covers the bioinformatics web tools for the study of the vaccine development, including: application of database, sequence analysis, genomic information obtaining, transcriptome analysis and protein structure analysis. To train students work with antigen discovery and informatics operation in molecular biology. This bioinformatics ability could be directly employed in the study.

動物細胞培養疫苗生產技術 2 選 王祥宇等合授

課程內容包括動物細胞培養基礎與應用實作。教授學生於實驗室中操作細胞培養之知識，並佐以實作應用，使學生習得無菌操作觀念、細胞生長觀測、細胞數評估法、細胞反應與病毒培養技術。

使學生熟悉疫苗生產需求之細胞量產技術操作技術。

Animal Cell Culture for Vaccine Production 2 E Hsian-Yu Wang etc

This course covers the basic and application practice in animal cell culture technology. Students will learn about the cell culture knowledge used in biology labs and in the vaccine plant, including: aseptic operation, cell growth observation, cell proliferation assessment, cellular response analysis and virus culture technique. This will make students familiar with the cell culture technology used in vaccine industrial.

(三)國際學院：

外交實務概論 2 選

本課程探究複雜的外交實務現象以提升我們對日常生活的瞭解。本課程為學生提供外交體系與領域的基礎知識。課程將從外交官員的角度討論許多國家的政治和經濟狀況。本課程旨在培養學生對外交事務的興趣、增強他們對國際外交發展的基礎認識、提高學生對國家間外交關係重要性的認識。

Introduction to Diplomatic Affairs 2 E

This course discusses the complicated phenomena of diplomatic affairs and promotes the understanding of our daily lives. This course provides students with fundamental knowledge of the diplomatic world. Politics and economy statuses of many countries will be discussed from diplomats' point of view. This course aims to foster students' interest in understanding international affairs; to enhance their perception over the development of diplomatic relationship among countries; and to raise students' awareness of the importance of diplomatic relations among countries.

全球議題與批判思考 2 選

生活在這個高度全球化的世界中，每個人或多或少都會感受到各種引起全世界關注的問題之影響。這些包含全球暖化、貿易戰、移民議題、區域衝突等問題。為了使學生保有批判性和獨立性的思維，本課程討論當前正在發生的國際議題，並訓練學生針對全球性問題的各種主流觀點表現出反思和挑戰新聞報導之邏輯性。

Critical thinking on global issues 2 E

Everyone living in this highly globalized world more or less receives impact from various issues that draw world-wide attention, such as global warming, trade wars, immigration issues, regional conflicts, and so on. In order to maintain critical and independent thinking, students are trained to show reflection and challenge the various mainstream perspectives promoted in news reports regarding various global issues and get to discuss currently-occurring internationally-intertwined issues.

專業溝通與表達 2 選

本課程設計針對學生在專業領域所需要的專業溝通技巧與內容設計進行理論的講解與實務的演練。主題包含: 溝通概念講解、專業學術領域的演講訓練(包含口語訊息與非口語訊息的設計技巧)、促進商業目的之視覺溝通理論、廣告或多媒體文本設計演練、職場情境案例與溝通技巧演練、求才與求職情境的溝通策略與演練。

Effective professional communication 2 E

This course enables students of multiple disciplines to have effective communication skills as required for professional performance by means of introducing relevant communication strategy

frameworks and practices. The topics include general principles of communication-related concepts; professional presentations for academic purpose (including verbal and nonverbal display); visual communication and effective promotion of business; advertising and multimedia projects; workplace communication and practices based on imagined scenarios; job recruiting and job hunting communication techniques.

多元文化交流　　2　選

本課程旨在幫助學生瞭解多元文化之多樣性、文化公平性、文化同理心和文化交匯等議題，並培養相關知識、觀點和技能。本課程分為兩個部分：(1) 探索多元文化交流的相關議題，(2) 基於文化和語言兩個層面，探索不同學生族群之文化議題與適應挑戰。隨著學生越來越意識到當今世界多樣性的價值和優勢，學生會越來越意識到需要更加反思自己作為全球公民應該具備的角色。

Issues in multicultural-encounters　2　E

This course is designed to help students understand issues, such as, multicultural diversity, cultural fairness, cultural empathy, and multiculturalism, and develop relevant knowledge, perspectives and skills. The course is divided into two parts: (1) exploring relevant topics of multicultural communication, and (2) exploring cultural issues and adaptation challenges of different student groups in cultural and linguistic aspects. As students become increasingly aware of the value and strength of diversity in today's world, students can become increasingly aware of the need to be more reflective of their role as global citizens..

行銷設計微學堂新開課程中英文課綱

行銷企劃與實作(微型課程)　　0.6　選　　蔡展維

1.行銷企劃與策略
2.文案撰寫
3.整合運用。

Marketing Plan and Practice　　0.6 E　　C. W. Tsai

1.Marketing plan and tactics
2.Copywriting
3.Integrated application

後製修圖影像處理(微型課程)　　0.6　選　　蔡展維

1.軟體介面介紹及工具使用
2.影像後製技巧教學
3.作品改善檢討暨成果

Photo Retouching and Editing　　0.6 E　　C. W. Tsai

1.The interface in Adobe Lightroom software.
2.Tips for editing, organizing, storing and sharing photo across different device, especially by using laptop.
3.Final presentation.

商業視覺設計 1(Adobe Illustrator)(微型課程)　　0.6　選　　蔡展維

1.軟體介面介紹及工具使用
2.Illustrator 使用技巧教學
3.作品改善檢討暨成果展示

Commercial Design 1(Adobe Illustrator)　　0.6 E　　C. W. Tsai

1.The interface in Adobe Illustrator software.
2.Tips for creating logos, icons and drawings by using industrial-standard vector graphic software.
3.Final presentation.

商業視覺設計 2(Adobe Photoshop)(微型課程)　　0.6　選　　蔡展維

1.軟體介面介紹及工具使用
2.Photoshop 使用技巧教學

3.作品改善檢討暨成果展示

Commercial Design 2(Adobe Photoshop)　0.6 E　C. W. Tsai

1.The interface in Adobe Photoshop software.
2.Tips for making imaging and graphic design for the purpose of producing a commercial poster.
3.Final presentation.

數位行銷與實作(微型課程)　0.6　選　蔡展維

1.數位行銷趨勢
2.常用社群平台操作
3.整合運用

Digital Marketing and Practice　0.6 E　C. W. Tsai

1.Digital marketing trends.
2.Key Social media platforms
3.Integrated application

數位影音製作(微型課程)　0.6　選　蔡展維

1.影音行銷趨勢與案例觀摩
2.故事腳本設計
3.影片拍攝剪輯
4.作品改善檢討暨成果展示

Video Making and Editing　0.6 E　C. W. Tsai

1.Video marketing trends & Case study.
2.Script & Storyboard.
3.Video recording and editing.
4.Final presentation.

簡報製作與表達 1(微型課程)　0.6　選　蔡展維

1.資訊層級
2.資料視覺化
3.綜合演練

Presentation and Communication Skills 1　0.6 E　C. W. Tsai

1.The concept of information hierarchy.
2.Design slides by using visual aid.
3.Final presentation.

簡報製作與表達 2(微型課程)　0.6　選　蔡展維

1.資訊層級
2.簡報邏輯表達

3.綜合演練

Presentation and Communication Skills 2　　0.6 E　　C. W. Tsai
1.The concept of information hierarchy.
2.Logical training.& Communication skills.
3.Final presentation.

攝影基礎與商業攝影(微型課程)　　0.6　選　　蔡展維
1.攝影基礎概念及構圖
2.攝影秘訣及拍攝練習
3.作品改善檢討暨成果展

Digital Photography and Commercial Application　　0.6 E　　C. W. Tsai
1.Photography and composition.
2. Tips for photography.
3.Final presentation

職能培力微學堂新開課程中英文課綱

天賦潛能開發(微型課程)　　0.6　選　　蔡展維
1.潛意識溝通表達術
2.問對問題・改變定義
3.適才適性的 DNA 性格學
4.發現天賦・適性開展

Talent Potentical Development　　0.6 E　　C. W. Tsai
1.Doing self-expression by using subconscious
2.Ask correct questions.
3.Knowing yourself by using DNA Characterology.
4.Find your talent.

天賦潛能應用(微型課程)　　0.6　選　　蔡展維
1.啟動改變的天賦策略
2.催眠談判・異質管理
3.找到人生的阿基米德點
4.正向心理・儲蓄幸福

Talent Potentical Application　　0.6 E　　C. W. Tsai
1.How to make good use of your talent.
2.Realize the advantage and disadvantage of people in your group.
3.Realize personal values and attitudes, and make a change！

4. Be positive.

自我管理與實現(微型課程)　　0.3　選　　蔡展維

1.時間管理
2.目標管理
3.實作職涯藍圖

Self-management and Achievement　　0.3 E　　C. W. Tsai

1.Time management.
2.Management by objective.
3.Do the career plan.

職場問題分析與解決(微型課程)　　0.3　選　　蔡展維

1.問題定義與問題意識
2.問題的描述
3.問題發現與分析的工具
4.問題解決的步驟流程與標準化

Job Problem Solution　　0.3 E　　C. W. Tsai

1.Define the problem.
2.Describe the bottleneck.
3.Analysis tools.
4.Problem-solving process.

AI 簡介(微型課程)　　0.5　選　　陳永祥

1.AI 介紹
2.機器學習 - 人工智能的基礎
3.文本和語言 - 理解語言
4.計算機視覺 - 通過人工智能看世界
5.機器人 - 作為平台的對話

Introduction to Artificial Intelligence (AI)　　0.5E　　Y.-H. Chen

1.Introduction
2.Machine Learning - The Foundation of AI
3.Text and Speech - Understanding Language
4.Computer Vision - Seeing the World Through AI
5.Bots - Conversation as a Platform

Python 數據科學簡介(微型課程)　　0.5　選　　陳永祥

1.Python 基礎知識
探索 Python 語言基礎知識，包括基本語法，變量和類型

2.Python 列表
創建和操作常規 Python 列表
3.函數和包
使用功能和導入包
4.Numpy
構建 Numpy 數組，並執行有趣的計算
5.Matplotlib
在真實數據上創建和自定義繪圖
6.控制流和 Pandas
使用控制流增強腳本，並了解 Pandas DataFrame

Introduction to Python for Data Science 0.5E Y.-H. Chen

1.Python Basics
Explore Python language fundamentals, including basic syntax, variables, and types
2.Python Lists
Create and manipulate regular Python lists
3.Functions and Packages
Use functions and import packages
4.Numpy
Build Numpy arrays, and perform interesting calculations
5.Matplotlib
Create and customize plots on real data
6.Control flow and Pandas
Supercharge your scripts with control flow, and get to know the Pandas DataFrame

計算機視覺與圖像分析(微型課程) 0.5 選 陳永祥

1.應用經典圖像分析技術
2.使用 OpenCV 庫實現經典的圖像分析算法
3.比較經典和深度學習對象分類技術
4.使用 Microsoft Cognitive Toolkit 將 Microsoft ResNet，一個深度卷積神經網絡（CNN）應用於對象分類
5.應用轉移學習來增強

Computer Vision and Image Analysis 0.5E Y.-H. Chen

1.Apply classical Image Analysis techniques, such as Edge Detection, Watershed and Distance Transformation as well as K-means Clustering to segment a basic dataset.
2.Implement classical Image Analysis algorithms using the OpenCV library.
3.Compare classical and Deep-Learning object classification techniques.
4.Apply Microsoft ResNet, a deep Convolutional Neural Network (CNN) to object classification using the Microsoft Cognitive Toolkit.
5.Apply Transfer Learning to augment ResNet18 for a Fully Convolutional Network (FCN) for Semantic Segmentation.

深度學習解釋(微型課程)　　0.5　選　　陳永祥

1.深度學習簡介和機器學習概念的快速回顧。
2.使用邏輯回歸構建一個簡單的多類分類模型
3.從簡單的端到端模型開始，將手寫數字圖像中的數字檢測到深度神經網絡
4.使用卷積網絡改進手寫數字識別
5.構建模型以使用循環網絡預測時間數據
6.使用循環 LSTM（長期短期記憶）單位構建文本數據應用程序

Deep Learning Explained

1. Introduction to deep learning and a quick recap of machine learning concepts.
2.Building a simple multi-class classification model using logistic regression
3.Detecting digits in hand-written digit image, starting by a simple end-to-end model, to a deep neural network
4.Improving the hand-written digit recognition with convolutional network
5.Building a model to forecast time data using a recurrent network
6.Building text data application using recurrent LSTM (long short term memory) units

開發 Azure Cognitive Services，Bot 和 IoT 解決方案(微型課程)　0.5　選　陳永祥

1. 開發 Azure 認知服務解決方案
2. 創建和集成機器人
3. 創建和實施物聯網解決方案

Develop Azure Cognitive Services, Bot, and IoT solutions　　0.5E　Y.-H. Chen

1.Develop Azure Cognitive Services solutions
2.Create and intergrate bots
3.Create and implement IoT solutions

機器學習原理：Python 版(微型課程)　　0.5　選　　陳永祥

1. 機器學習簡介
2. 探索數據
3. 數據準備和清潔
4. 監督學習入門
5. 提高模型性能
6. 機器學習算法
7. 無監督學習

Principles of Machine Learning:Python Edition　　0.5E　Y.-H. Chen

1.Introduction to Machine Learning
2.Exploring Data
3.Data Preparation and Cleaning
4.Getting Started with Supervised Learning

5.Improving Model Performance
6.Machine Learning Algorithms
7.Unsupervised Learning

機器學習原理(微型課程)　　0.5　選　　陳永祥

1. 探索分類
2. 機器學習中的回歸
3. 如何改進監督模型
4. 有關非線性建模的詳細信息
5. 推薦系統

Principles of Machine Learning　　0.5E　Y.-H. Chen

1. Explore classification
2. Regression in machine learning
3. How to improve supervised models
4. Details on non-linear modeling
5. Recommender systems

【108-2】NoSQL 數據解決方案簡介(微型課程)　0.5　選　　陳永祥

1. NoSQL 基礎知識
2. Azure Cosmos DB 中的 NoSQL 選項概述
3. 使用 DocumentDB API，Tables API 和 MongoDB API 的基本技術
4. 用於訪問和提高 NoSQL 存儲性能的其他技術

Introduction to NoSQL Data Solutions　　0.5E　Y.-H. Chen

1.NoSQL fundamentals
2.NoSQL options in Microsoft Azure
3.Core techniques for using DocumentDB, Azure Table Storage, and MongoDB
4.Other techniques for accessing and improving performance of your NoSQL storage

【108-2】大數據簡介(微型課程)　　0.5　選　　陳永祥

1. 數據簡介
2. 數據基礎
3. 數據庫的基礎知識
4. 大數據簡介

Introduction to Big Data　　0.5E　Y.-H. Chen

1.Introduction
2.Data Basics
3.Fundamentals of Databases
4.Introduction to Big Data

【108-2】使用 Azure Data Lake Analytics 處理大數據(微型課程)　0.5　選　陳永祥

1. Azure Data Lake Analytics 入門
2. 使用 U-SQL 目錄
3. 在 U-SQL 中使用 C＃函數
4. 監視和優化 U-SQL 作業

Processing Big Data with Azure Data Lake Analytics　　0.5E　　Y.-H. Chen

1.Azure Data Lake technologies to store and process data using U-SQL jobs
2.Create and use U-SQL catalog objects
3.Extend your data processing scripts with custom C# code
4.Monitor and optimize U-SQL jobs

【108-2】使用 Azure 機器學習開發大數據解決方案(微型課程)　0.5　選　陳永祥

1. Azure 機器學習
2. 使用 Azure 機器學習
3. 操作機器學習模型
4. 在大數據解決方案中使用 Azure 機器學習

Developing Big Data Solutions with Azure Machine Learning　　0.5E　　Y.-H. Chen

1.Introduction to Azure Machine Learning
2.Building Predictive Models with Azure Machine Learning
3.Operationalizing Machine Learning Models
4.Using Azure Machine Learning in Big Data Solutions

【108-2】使用 Excel 分析和可視化數據(微型課程)　0.5　選　陳永祥

1.從多個來源收集和轉換數據
2.發現並組合 mashup 中的數據
3.了解數據模型創建
4.探索，分析和可視化數據

Analyzing and Visualizing Data with Excel　　0.5E　　Y.-H. Chen

1.Gather and transform data from multiple sources
2.Discover and combine data in mashups
3.Learn about data model creation
4.Explore, analyze, and visualize data

鋁合金及其國防科技應用(微型課程)　　0.1　選　　李英杰

使學生瞭解高強度鋁合金之分類與強化機制，及其在國防武器之應用，如戰甲車輛防彈外殼、海軍船艦之甲板及空軍戰機蒙皮等關鍵零組件之運用概況，進而知悉現行國防武器系統之關鍵鋁合金技術與未來發展趨勢。

Aluminum alloy and the application of defense technology　　0.1E　　Y.-C.Lee

To enable students to understand the classification and strengthening mechanisms of high-strength aluminum alloys and their application in defense weapons. For example, the use of key components such as the bulletproof shell of the armored vehicle, the deck of the naval ship, and the skin of the air force fighter. Furthermore, it is aware of the key aluminum alloy technologies and future development trends of the current national defense weapon system.

創新創業微學堂新開課程中英文課綱

創業家經驗分享與實作(微型課程)　　0.4　選　　陳又嘉

1.創業家經驗分享
2.工藝產品設計與實作體驗
3.材料辨識、應用與模型製作

Entrepreneurs to share experiences and actual operation　　0.4E　　C.-Y. Chia

1. Entrepreneurs to share experiences.
2. The design and practice of handmade works.
3. Material identification, application and production model.

市場調查與顧客分析(微型課程)　　0.3　選　　陳又嘉

1.瞭解市場調查基礎工具
2.認識募資平台及應用方式
3.瞭解顧客心理對產品之影響

Market research and consumer analysis　　0.3E　　C.-Y. Chia

1. Knowing the tool and skill of marketing research.
2. Understanding the fundraising platform and knowing how it works.
3. To realize the impact of product from consumer cognition

網頁實戰通(微型課程)　　0.3　選　　陳又嘉

1.網站架設與製作
2.編輯的藝術
3.電商平台應用與架設模擬

The method of website build up **0.3E** **C.-Y. Chia**

1. Build up the structure of website.
2. The logic of website editing.
3. How the e-commerce platform work and operation simulate.

銷售基本功(微型課程) **0.3 選** **陳又嘉**

1.口條練習與人際溝通
2.社交禮儀與應對練習
3.傳統通路與網路管道銷售分析

Entrepreneurs to share experiences and actual operation **0.3E** **C.-Y. Chia**

1. Oral practicing and communicating.
2. To develope the social skill and behavior.
3. Traditional marketing channel and internet channel sales analysis.

實務專題基礎能力訓練(1) (微型課程) **0.5 選** **陳又嘉**

1.簡報設計及排版教學及實作練習
2.學術型海報製作教學

Basic practical skill training (1) **0.5E** **C.-Y. Chia**

1.Teaching and Practicing for Briefing and Layout Design
2.Teaching for Academic Poster Making

實務專題基礎能力訓練(2) (微型課程) **0.5 選** **陳又嘉**

1.台風及口條訓練教學及練習
2.企劃書撰寫教學及現場 QA

Basic practical skill training (2) **0.5E** **C.-Y. Chia**

1. Teaching and Practice for Presentation Ability
2. Teaching and Practice for Writing Proposal

產業增能微學堂新開課程中英文課綱

地理資訊系統與智慧遙測應用於農業資源管理(微型課程) **1 選**
陳建璋

為因應智慧農業之發展，當前農業地理資訊系統與遙測技術已近成熟，且已廣泛應用於農業生產及農業管理。本課程主要透過密集式微課程方式訓練學生實習操作以下專業設備：GPS 精準即時坐標、GIS 農業資源管理及運用空間資訊、RS 農業遙測影像辨識技術、UAV 燕人栽具應用，主要應用如農業水資源管理、大面積農業災害偵測、精準農業等，進而整合建立農業地理資訊系統。

GIS and Remote Sensing for agricultural resource management 1E J.C. Chen

The efficiency and accuracy of agricultural data are improved when remote sensing data products and GIS are used. Spatial tools such as the Global Positioning System (GPS), Geographic Information Systems (GIS), Remote Sensing (RS) and UA V for storing and analyzing spatial data can help us make better decisions in agriculture, land development, envirorunental protection and restoration. Specifically this decision making tools can be used in the context of agriculture in assessment of crop area extent, management of water resources, identification of pest attacks and diseases, yield assessment studies, land suitability assessment for agriculture disaster management and precision agriculture. This course will offer a mixture of lectures, demonstrations and hands-on exercises using open source GIS and RS software.

TFT-LCD 產業達人(微型課程) 1 選 陳念慈/李佳言

本課程為教導學生對 TFT-LCG 的基本原理認識，以及深入瞭解 TFT-LCD 材料與設備、TFT-LCD 製作與 TFT-LCD 產業之運作，運用業界所普遍使用的 TFTLCD 材料與生產設備介紹，使學生瞭解產業人員與工程師在 TFT-LCD 業界可扮演的角色與任務。授課內容包括 TFT-LCD 產業、應用、製程簡介、廠務系統介紹。

Introduction to TFT-LCD 1E N.T. Chen/C.Y Lee

顯示器產業簡介(微型課程) 0.5 選 李文宗

本課程主要介紹顯示器產業製程相關基本知識，提供學生了解顯示器產業目前的發展狀況，應用領域，與相關產業的發展。內容包含顯示器產業簡介、TFT-LCD 介紹、面板設計基礎與驅動電路簡介。

Introduction to the Display Industry 0.5E W.T. Lee

This course introduces the fundamental knowledge of the manufacturing process for the display industry, and provides students with an understanding of the current development status, application fields, and the development of the related industries to the display industry. The content includes the introduction to the display industry, TFT-LCD, panel design, and drive circuit.

咖啡產業達人(微型課程) 1 選 賴宏亮/林啟弘

本課程主要內容在敘述咖啡之分類、品種、來源、分佈、用途、成分、性狀、適應、栽培、管理、收穫、加工調製、貯藏、沖泡方法、品評及案例研究等。

Introduction to coffee industry 1E H.L. Lay /C.H Lin

The main contents of this course will describe the classification, cultivar, origin and history, usage, ingredient, characters, distribution, adaptation, culture, management, harvest,

manufacture process, storage, extraction method, cupping and case study of Coffee.

連鎖餐飲品牌經營(微型課程)　　1 選　　蔡展維

以飲食文化聞名的台灣，善於接受各種文化與創新，為孵化餐飲品牌的絕佳基地，更造就了許多成功的連鎖餐飲品牌。本課程由餐飲連鎖經營介紹、產業趨勢及品牌經營，教授學生透過品牌經營與系統化及創新的管理，為餐飲界帶給未來更多方向與可能性。

The Operation Management of Chain Restaurant's Brands　　1E　　C. W. Tsai

連鎖餐飲創新管理(微型課程)　　1 選　　蔡展維

以飲食文化聞名的台灣，善於接受各種文化與創新，為孵化餐飲品牌的絕佳基地，更造就了許多成功的連鎖餐飲品牌。然而，緊接而來的課題就是該如何創造差異化及特殊的體驗，在競爭激烈的餐飲市場異軍突起。本課程透過創意思考與工作流程改善等，教授學生創新管理，為餐飲界帶給未來更多方向與可能性。

The management of Innovation on chain restaurant industry　　1E　　C. W. Tsai

連鎖餐飲營運實務(微型課程)　　1 選　　蔡展維

本課程透過安心食品(摩斯漢堡)以日本職人的精神與西方科學化餐飲的能力，以行動學習，教授學生食材及食品安全的知識，以及營運實務，為餐飲界培育無縫接軌之優質人才。

The operation management of chain restaurant industry　　1E　　C. W. Tsai

連鎖餐飲管理實務(微型課程)　　1 選　　蔡展維

本課程透過安心食品(摩斯漢堡)以日本職人的精神與西方科學化餐飲的能力，以行動學習，教授學生餐廳實際營運與管理實務，為餐飲界培育無縫接軌之優質人才。

The management of chain restaurant industry　　1E　　C. W. Tsai

大師開講新開課程中英文課綱

訂做你的人工智慧(微型課程)　　0.1 選　　金石文

●AlphaGo 現象

●資料科學時代與人工智慧
●甚麼是人工智慧?
●舊瓶裝新酒：論傳統與當代人工智慧
●人工智慧與機器學習方法初探
●幾個小例子
●結論與展望

Build your own AI 0.1E S.W. Chin

●The AlphaGo Phenomenon
●The Era of Data Science and AI
●What is Artificial Intelligence?
●Modern AI vs. Traditional AI
●Types of Machine Learning Algorithms
●Two Examples of Machine Learning
●Conclusion and Remark

生物玻璃之原理與應用(微型課程) 0.1 選

李英杰

自從生物活性玻璃被發明以來，由於其優秀的生物活性、生物相容性與降解特性被應用於為牙齒填料、骨填充材料及藥物釋放相關領域。本課程將深入淺出的介紹生物活性玻璃材料基本原理及近年來的臨床運用，主要目的為幫助學生對生醫相關發展有進一步的認識。

Principle and application of bioactive glass 0.1E Y.-C.Lee

Since bioactive glass (BG) has been reported, it already been applied in the fields of tooth fillers, bone implants and drug carriers because of its superior biocompatibility, bioactivity and degradability. This course is going to introduce the fundamental concepts and the clinical applications of BG in the recent years. The main propose is to help students have a better understanding of biomedical development.

環境視覺設計的原則與經驗分享(微型課程) 0.1 選

柯雪琴

提昇對環境視覺的關心與觀察，將設計放入公共空間內，且富有現代感、文化氣息等之視覺設計環境，並分享整體指標系統實務設計規劃。

本課程主要教導學生：

1.公共設施之環境視覺設計概論
2. CIS 與環境視覺的設計原則說明
3.實際執行的設計案例分享

(Course Name) 0.1E H.-C.Ko

設計思考與設計創造力(微型課程) 0.1 選

柯雪琴

應用設計思考來啟發設計創造力
本課程主要教導學生：
1.設計思考與設計思考的過程與方法
2.如何採設計思考引發設計創造力
3.案例分析

Design thinking and design creativity 0.1E H.-C.Ko

故事-語言學習的神奇力量(微型課程) 0.1 選

石儒居

此課程以循序漸進的方式闡述「故事」為所有領域學習的基底，更是語言習得的核心元素，從
(a) 分享個案故事，
(b) 腦神經研究的發現，
(c) PISA-OECD (全球經濟發展組織執行之全球知識素養與教育評比) 所做之結論，至
(d) 實證研究之結果,
導出故事於人類語言學習的重要性。所提每一項教學或語料庫研究，也同時提供可參考之教學方法與策略。
目標聽眾以語言習得研究者、語言教師、研究生，或大三以上學生最為適切。

Story-The Magic Power Of Language Acquisition 0.1E R.-C. Shih

This seminar aims to illustrate how “story” becomes the foundation of learning in most realms, more so in the area of language acquisition. I’ll argue from:
(a)Personal anecdotes,
(b)Brain or neuroscientific research,
(c)Conclusions made by OECD, and
(d)Findings from related empirical studies
to demonstrate the power of story in language learning. All studies (teaching or corpus related) discussed also present teaching implications. The most beneficiary target audiences include language learning researchers, language teachers, graduate students, junior or senior students.

漢學之樂樂無窮—談科技大學生該具備的人文素養(微型課程) 0.1 選

趙修霈

科大學生除了充實自身專業技能之外，人文素養更是不可或缺。透過這次演講，希望能夠透過傳統與現代漢學的豐富意涵，和同學們談談科技大學學生該具備的人文素養，厚實文學底蘊。
本課程主要教導學生：
1.科技與人文並重

2.科技大學的文學通識課程
3.漢學領域介紹及其現代運用

(Course Name)　0.1E　H.-P. Chao

大學期間該培養的思考能力(微型課程)　0.1 選

石儒居

此課程以演講和討論的方式，介紹科技社會中職業人士所需要的心理準備；演講的重點包括：
1.未來的職場世界
2.您需要什麼能力和素養
3.在大學階段您如何準備自己

The thinking competence needed in future career　0.1E　R.-C. Shih

This seminar purports to discuss some critical issues happen to the future careers and the competencies needed for professional practitioners. Tissues addressed in this seminar include:
1.The future occupational world;
2.The competencies needed to be prepared, and;
3.The approaches to well prepare youngsters.

未來世界的包容性設計(微型課程)　0.1 選　梁茲程

本課程與雲科大創意生活設計系蔡旺晉老師合作開設，相關課程大綱待補。

包裝設計與應用(微型課程)　0.1 選　梁茲程

本課程與雲科大創意生活設計系張岑瑤老師合作開設，相關課程大綱待補。

傳閱附件 1-7--本校各學院所屬各系(所)課程中英文摘要-語言中心

六、 語言中心

水產專業外語(微型課程) 0.5 選

為提升養殖系學生外語閱讀及口說能力，強化其專業能力，藉以吸收來自全球各地之資訊。尤以英文作為重要第二語言為主，讓學生不再害怕面對英文。藉著微型課程的實施，讓學生能有效的學習英文發音，加強英文詞彙量，未來不論面對英文報告或是交談溝通，皆能輕易上手。

English For Aquaculture 0.5 E

In order to enhance the ability of professional English reading and speaking, to make students able to realize the global information, as this reason, we set up this professional language course in aquaculture. In this course, we major to improve the students in the vocabulary and speaking, hence, to let the students effectively learn the second language. In the future, we hope they could face to the international challenge.

利用字根字首擴展生物英文詞彙(微型課程) 0.5 選

本課程整理生物專業英語詞彙中常用的字首與字尾，配合舉例與課堂活動，培養學生對專業名詞的敏銳度並熟悉專業字彙的組成，進而在遇到新的字彙時能運用已知字根字首推斷詞彙意義，減少死記背誦的學習負擔。本課程整理生物專業英語詞彙中常用的字首與字尾，配合舉例與課堂活動，培養學生對專業名詞的敏銳度並熟悉專業字彙的組成，進而在遇到新的字彙時能運用已知字根字首推斷詞彙意義，減少死記背誦的學習負擔。

Understanding Word Roots to Expand Vocabulary in Biology 0.5 E

This course organizes the prefixes and suffixes commonly used in biological English vocabulary. With examples and classroom activities, students get familiarized with the composition of academic wording styles and in turn gradually acquire the ability to infer the connotation of new vocabulary. The skills learned in this course would greatly reduce the need of memorization..

傳閱附件 2----水產養殖系 109 學年度產學攜手專班「水產養殖科技專班」課程規劃

.

四年制 水產養殖系

(一)教育目標

培育具有水族繁養殖、水族營養與飼料、經營管理與永續資源保育等專業知識與應用技能，使學生具有創業或服務相關產業之能力。

(二)校定共同必修科目

中英文科目名稱	學分數	第一學年		第二學年		第三學年		第四學年		備註
		上	下	上	下	上	下	上	下	
通識課程 General Education	12	2	2	2	2	2	2			通識選項課程： 人文學科：2 門 社會科學：3 門 數理與應用科學：1 門
國文 Chinese	4	2	2							國文(閱讀與寫作)(1) 國文(閱讀與寫作)(2)
大一英文 Freshman English	4	2	2							大一英文(1) 大一英文(2)
英語聽講練習 101~102 English Listening & Speaking Practice	2	1	1							英語聽講練習 101 英語聽講練習 102
憲法 Constitution	2				2					
體育 Physical Education	4	1	1	1	1					一年級： 大一體育(1)、 大一體育(2) 二年級： 體育選項(需修讀不同興趣體育課程)
生活服務教育 Student Life Service Education	0	0	0							
通識教育講座 Lectures on General Education	1			1						各系依序開課，開課學期不定
外語實務 Foreign Language Proficiency Test	0	0								畢業前修畢 通過標準依「外語實務課程實施要點」規定
合計	29	8	8	4	5	2	2	0	0	

（三）學院共同必修科目

中英 文科目名稱	學分數	第一學年		第二學年		第三學年		第四學年		備註
		上	下	上	下	上	下	上	下	
普通化學(1) General Chemistry（1）	3	3								
普通化學實驗(1) General Chemistry Lab.（1）	1	1								
生物統計 Biometry	2				2					
生物統計實習 Practice of Biometry	1				1					
實務專題 Special Projects	2					1	1			
合計	9	4	0	0	3	1	1	0	0	

(四)專業必修科目

中英 文科目名稱	學分數	第一學年		第二學年		第三學年		第四學年		備註
		上	下	上	下	上	下	上	下	
水產概論 Introduction to Fisheries	3	3								
水產養殖學 Introduction to Aquaculture	2		2							
水質學 Analyais of Water Quality	2		2							
水質學實習 Practice of Water Quality Analyais in Aquaculture	1		1							
魚類學 Introduction to Ichthyology	2		2							
水族營養學 Fish Nutrition	2			2						
餌料生物學 Cultivation of Living Organisms	2			2						
餌料生物學實習 Practice of Cultivation of Living Organisms	1			1						
水族生理學 Fish Physiology	3			3						
水產繁殖學 Fish Breeding & Propagation	2				2					
水產繁殖學實習 Practice of Fish Breeding & Propagation	1				1					
養殖場實習 Practice of Aquafarm	1					1				
魚病學 Fish Diseases	2					2				
魚病學實習 Practice of Fish Diseases	1					1				
水產經營與管理 Aquaculture Business Management	2						2			
養殖環境管理學 Management of Aquaculture Environment	2						2			
養殖場實務操作實習(1)	9							9		
養殖場實務操作實習(2)	9								9	

中 英	文 科 目 名 稱	學分數	第一學年		第二學年		第三學年		第四學年		備 註
			上	下	上	下	上	下	上	下	
合	計	47	3	7	8	3	4	4	9	9	

(五) 專業選修科目

中文科目名稱 英	學分數	第一學年		第二學年		第三學年		第四學年		備註
		上	下	上	下	上	下	上	下	
生態學 Ecology	2	2								
浮游生物學 Planktonic Biology	2	2								
生物學 Biology	3	3								
海洋學概論 Oceanography	2	2								
河川生態學 Stream Ecology	2	2								
湖沼學 Limnology	2	2								
海洋生物技術 Marine biotechnology	2	2								
養殖科技專業實習(1) Professional internship of Aquaculture Technology (1)	3	3								
水生植物學 Aquatic Botany	2		2							
水生植物學實習 Practice of Aquatic Botany	1		1							
魚類學實習 Practice of Ichthyology	1		1							
海洋生態學 Marine Ecology	2		2							
水產毒物學 Aquatic Toxicology	2		2							
水產無脊椎動物學 Aquatic Invertebrate Zoology	2			2						
水產無脊椎動物學實習 Practice of Aquatic Invertebrate Zoology	1			1						
魚類養殖技術 Fish Culture Techniques	2			2						
魚類養殖技術實習 Practice of Fish Culture Techniques	1			1						
水產微生物學 Aquatic Microbiology	2			2						

中英 文科目名稱	學分數	第一學年		第二學年		第三學年		第四學年		備註
		上	下	上	下	上	下	上	下	
水產微生物學實習 Practice of Aquatic Microbiology	1			1						
水族生理學實習 Practice of Fish Physiology	1			1						
生物化學實驗 Biochemistry Lab.	1			1						
生物化學 Biochemistry	2			2						
水產機電與自動化 Electromechanics and Automation in Aquaculture	2			2						
水產機電與自動化實習 Practice of Electromechanics and Automation in Aquaculture	1			1						
水產專業外語 Aquaculture Foreign Language	2			2						
養殖科技專業實習(2) Professional internship of Aquaculture Technology (2)	3			3						
甲殼類養殖技術 Crustacea Culture Techniques	2				2					
甲殼類養殖技術實習 Practice of Crustacea Culture Techniques	1				1					
水產品衛生與安全 Seafood Hygiene and Safety	3				3					
冷凍學 Frozen Technology	2				2					
飼料原料與製造 Feedstuffs and Manufacture	2				2					
飼料原料與製造實習 Practice of Feedstuffs and Manufacture	1				1					
水汙染生物學 Aspects of Biology in Aquatic Pollution	2				2					
魚類生態學 Fish Ecology	2				2					
魚類學各論 Ichthyology	2				2					
水產寄生蟲學 Aquatic Animal Parasitology	2				2					
水產寄生蟲學實習 Practice of Aquatic Animal Parasitology	1				1					

中 英 文科目名稱	學分數	第一學年		第二學年		第三學年		第四學年		備註
		上	下	上	下	上	下	上	下	
水產加工學 Fish Processing Techniques	2					2				
水產加工學實習 Practice of Fish Processing Techniques	1					1				
分子生物學 Molecular Biology	2					2				
循環水養殖學 Introduction to Recirculating Aquaculture	2					2				
貝類養殖技術 Shellfishes Culture	2					2				
貝類養殖技術實習 Practice of Shellfishes Culture	1					1				
飼料品質與管制實務 Practice of Quality Control of Aquatic Animal Feed	2					2				
水族遺傳育種學實習 Practice of Fish Genetics and Breeding	1					1				
水產品行銷 Fishery Product Marketing Management	2					2				
水產生物技術應用 Application of Aquatic Biotechnology	2					2				
生殖生理學 Reproductive Physiology	2					2				
水產養殖與水耕整合系統 Aquaponic system	2					2				
水族遺傳育種學 Fish Genetics and Breeding	2					2				
水產飼料添加物 Aquatic Feed Additives	2					2				
飼料配製實作 Feed Processing Practice	2					2				
生物安全養殖經營管理實作 Practice of Aquaculture Biosecurity Management	2					2				
海水觀賞魚—小丑魚生產與銷售實務 Production and Marketing of Marine Ornamental Fish, Anemonefish	2					2				

中英 文科目名稱	學分數	第一學年		第二學年		第三學年		第四學年		備註
		上	下	上	下	上	下	上	下	
海水觀賞魚—小丑魚生產與銷售實務實習 Practice in the Production and Marketing of Marine Ornamental Fish, instruments Anemonefih	1					1				
養殖科技專業實習(2) Professional internship of Aquaculture Technology (2)	3					3				
觀賞魚養殖與管理 Culture and Management of Ornamental Fish	2						2			
觀賞魚養殖與管理實習 Practice of Culture and Management of Ornamental Fish	1						1			
免疫學概論 Introduction to Immunology	2						2			
栽培漁業 Stock Enhancement	2						2			
藻類繁養殖學 Culture of Algae Propagation	2						2			
藻類繁養殖學實習 Practice of Culture of Algae Propagation	1						1			
細胞生物學 Cell Biology	2						2			
休閒漁業 Recreational Fisheries	2						2			
無特定病源 SPF 餌料生物量產實作 Mass Production of Resources SPF-Live	2						2			
水族病毒學 Aquatic Virology	2						2			
水產資源學 Fishery and Aquacultural Resources	2						2			
水產藥理學 Aquatic Pharmacology	2						2			
水產品運銷 Aquacultural Products Transportation & Selling	2						2			
漁業政策與法規 Fishery Policies and Laws	2						2			
養殖工程學 Aquaculture Engineering	2						2			

中 英 文 科 目 名 稱	學分數	第一學年		第二學年		第三學年		第四學年		備註
		上	下	上	下	上	下	上	下	
智慧水產養殖 Intelligent Aquaculture	1						1			
物聯網基礎與養殖產物應用 Internet of Thing and Application in Aquaculture	1						1			
水產儀器操作與原理 Theory and operation of aquacultural instruments	2						2			
合 計	134	18	8	21	20	35	32	0	0	

水產養殖系

Department of Aquaculture

一、必修科目 Required Courses

132001 水產概論　　3　必　　邱謝聰

本課程為漁業科學、水產養殖及水產加工之入門科目。本課程介紹水產生物生存之環境、水產生物之生理、生態特性及作為食物角色之重要性。其次，對飼料，養殖經營及管理等有關之科學作一概要介紹，使學生對養殖，漁業及有關科學有一整體之認識。

132001 Introduction to Fisheries　　3　R　　S. T. Chiu

This course is an entry level course for fishery sciences, aquaculture & fish processing techniques, which provides students knowledges on aquatic environment, aquatic animal physiology, aquatic ecology, and the role of aquatic organisms as food. Besides, the knowledge of other fisheries related fields such as fish nutrition and feed and aquaculture economics are also introduced.

132002 水產養殖學　　2　必　　鄭文騰

本課程為介紹世界水產養殖現況及台灣養殖現況，後再討論有關養殖水質處理、養殖系統、養殖設備及依生物學的觀點，介紹各種具有經濟價值之水產生物之養殖技術。

132002 Introduction to Aquaculture　　2　R　　W. Cheng

The theme of the course provides the students the current knowledge of aquacultural techniques, survey of the fields, water qualities and treatments, culture systems, culture facilities, and biology and culture techniques of the commercially aquatic organism .

132003 水質學　　2　必　　吳宗孟

本課程介紹下列水質分析技術:pH、透明度、導電度、鹽度和氯度、鹼度及酸度、二氧化碳、硬度及鈣和鎂、溶氧量、氨—氮、亞硝酸—氮、硝酸—氮、硫及其化合物、磷及磷酸鹽和矽酸、化學氧需求量和生物化學氧需求量.

132003 Analysis of Water Quality　　2　R　　Z. M. Wu

This course introduceds the technology of analysis of water quality as followed: pH , transparency, conductivity, salinity and chlorinity, alkalinity and acidity, carbon dioxide, hardness and calcium, magnesium dissolved oxygen, ammonia—nitrogen, nitrite—nitrogen, nitrate—nitrogen, sulfur and its, compound, phosphorus and phosphate, chemical oxygen demand　biological oxygen demand.

132004 水質學實習　　1　必　　吳宗孟

本實習安排學生實際操作下列水質分析技術:pH、透明度、導電度、鹽度和氯度、鹼度及酸度、二氧化碳、硬度及鈣和鎂、溶氧量、氨—氮、亞硝酸—氮、硝酸—氮、硫及其化合物、磷及磷酸鹽和矽酸、化學氧需求量和生物化學氧需求量.

132004 Water Quality Analysis in Aquaculture Lab.　　1　R　　Z. M. Wu

This practice includes　the technology of analysis of water quality as followed : PH, transparency, conductivity, salinity and chlorinity, alkalinity and acidity, carbon dioxide, hardness and calcium, magnesium, dissolved oxygen, ammonia—nitrogen, nitrite—nitrogen, nitrate—nitrogen, sulfur and

its, compound, phosphorus and phosphate, chemical oxygen demand　biological oxygen demand.

132005 魚類學　2　必　曾美珍

魚類學主要介紹包括魚類的外部形態、系統分類、解剖、演化及分佈情形，而此課程除了可讓學生學習到基本的魚類學知識外，也介紹近年來在其他地區魚類學相關研究的發展情形，及提供最近魚類研究的一些想法。

132005 Introduction to Ichthyology　2　R　M. C. Tseng

The emphasis of ichthyology has traditionally been on the morphology, systematics, anatomy, evolution, and distribution of fishes. The purpose of this course is to provide that basic ichthyological background but also to integrate it with recent developments in other area and to provide some feeling by recent research on fishes.

132006 水族營養學　2　必　邱謝聰

本課程之主要目的是在於使學生瞭解魚類與蝦類之營養需求，內容包括：魚類與蝦類之基礎營養學、營養物質之代謝、蛋白質與胺基酸之需求、脂肪酸之需求、及維生素與礦物質求。

132006 Fish Nutrition　2　R　S. T. Chiu

The purpose of this course is to give the students more familiar with the requirment of nutrients and design technique of feed formulation for the fish and shrimps. Which contains the basic nutritional principle of fish, metabolism of all nutrients. Also　research protein and amino acids, fatty acids, vitamin and minerals requirment.

132007 餌料生物學　2　必　劉俊宏

本課程係專門規劃提供學生水產餌料生物之知識，同時增進學生瞭解餌料生物之形態、生態、培養及於水產養殖上之利用技術，其主要內容包括植物性浮游生物之微藻、動物性浮游生物之輪蟲、水蚤、橈角類、豐年蝦、牡蠣受精卵，至較大型之紅蟲等。

132007 Cultivation of Living Organisms　2　R　C. H. Liu

The course is especially designed to provide students with the modern knowledge of aquatic live-foods in one semester lecture and the same time that enhances their under-standing of live-foods on morphology, ecology and cultivation, and application techniques in aquaculture. The main topics including microalgae, rotifera, copepods, brine shrimp, oyster fertilized eggs, blood worm etc.

132008 餌料生物學實習　1　必　劉俊宏

本實習課程提供一個實務的機會，讓學生能瞭解各種餌料生物之形態及習性特徵，進而訓練學生實務操作培養餌料生物，其中包括其主要內容包括植物性浮游生物之微藻分離及培、動物性浮游生物之輪蟲、水蚤、橈角類、豐年蝦、牡蠣受精卵，至較大型之紅蟲培養等。

132008 Practice of Cultivation of Living Organisms　1　R　C. H. Liu

This Lab： provides with a real learning opportunity for students to be capable of understanding the characteristics morphology and living habits of various live-foods, and than to train them having a practical tichnique of cultivation of those live-foods which are included microalgae isolation and cultivation, and rotifera, copepods, brine shrimp, oyster fertilized eggs, blood worm cultivation etc..

132009 水族生理學 3 必 陳英男

本課程使學生對魚蝦之各組織、器官之位置、形狀大小、構造、功能及魚蝦之各器官間之相互影響以及魚蝦在環境中生命之維持間有一具體之概念。此外，本課程使學生對魚蝦之營養需求、環境需求及疾病之免疫機制有一初步認識以建立學生對水產養殖、水質、魚病等課程之基礎。

132009 Fish physiology 3 R Y. N. Chen

This course provides students the knowledge of fish and shrimp physiology, which include structure, position, color, size, texture, functions, and the interactions between organs, and how those organs work together to keep the life of the animals. This course also provide basic knowledge on fish nutrition, fish enviroment requirement and fish disease prevention mechanism to offers student a background for aquaculture, fish disease and water quality.

132010 水產繁殖學 2 必 陳英男

本課程乃介紹主要經濟水產養殖動物之種魚選擇、培育、催熟與產卵、孵化並探討種苗的培育技術。有關魚蝦類生殖生理，脂肪酸的購成與繁殖之相關性一併列入討論。

132010 Fish Breeding & Propagation 2 R Y. N. Chen

This course instructs the selection, culture, hormonal injection techniques and ovulation of economically aquatic organism maturation and hatch of fertilized eggs and culture larvae (or fry) techniques. Physiological responses and fatty acid composition in fish and shrimp was also discussed.

132011 水產繁殖學實習 1 必 吳宗孟

本課程是介紹重要養殖水產生物種的選擇與培育、催熟與產卵及孵化與種苗的培育技術。從種魚蝦的挑選、性別的辨別、物理催熟方法、化學注射方法、腦下垂體的取得與注射、單倍體多倍體的操作原理與方法。

132011 Practice of Fish Breeding & Propagation 1 R Z. M. Wu

The Lab. training requires students involved in the following subjects; actual treatment and propagation of aquaculture organism maturation, fertilized eggs and larvae culture techniques. Induce of single sex cultivation of some economical species. Besides, students have to choose one fish or shrimp species to grow and make it breed either in artificial way or natural way.

132012 養殖場實習 2 必

課程將教導學生實際養殖場中各種養殖器具之操作、養殖場水質之管理、操作措施。各種魚、蝦、貝類之養殖及遇到緊急狀況(如:浮頭、泛池等)之應變措施。

132012 Practice of Aquafarm 2 R

In this class, students will be ask to operate all practical equipment, water quality determination and all operational procedures in aqua farm and taught how to manage the aqua farm such as low dissoloved oxygen in order to success in aquaculture.

132013 魚病學 2 必 張欽泉

本課程講解比較魚類及其它動物之主要生理解剖構造之不同，以了解魚病發生之過程，介紹各種魚病之病因、診斷、疫學預防及控制。及講解與公共衛生有關之魚類疾病。

132013 Fish Diseases 2 R C. C. Chang

This Course emphasizes on major differences in fish and animal structure and histology, physiological features for undertanding of fish disease development, Etiology, diagnosis, epizootiology, prevention and control of disease in fish, including those important to the public health.

132014 魚病學實習 1 必 張欽泉

本課程講解及實際操作各種魚類病原(包括細菌、病毒、黴菌及寄生蟲等)之分離、鑑定及診斷技術。本課程亦包括魚類疾病之預防與治療及魚類免疫學診斷技術之應用。

132014 Practice of Fish Diseases 1 R C. C. Chang

Instruction and practice of isolation, identification techniques for various types of fish pathogens, such as bacteria, virus, fungi and parasite etc. will be included in this course. The contents of this course also include immunology practices, prevention and treatment method for fish diseases.

132015 水產經營與管理 2 必 陳英男

本課程分成兩部份，第一部分為企業資金之經營運用，含有關養殖企業之經濟理論，成本結構，經營效果評估，生產計畫及投資計畫之擬定，帳目記錄方法以及銷售道之介紹，第二部份為養殖技術及產品品質之提升法，以建立品牌以因應進入 WTO 之衝擊為目的，含魚苗選擇及放養，養成技術及收成後品質之保持等技術。由此課目，學生可得到從事養殖企業之經營管理之知識。

132015 Aquaculture Business Management 2 R Y. N. Chen

This course is divided into two parts. First part is about the capital management, which include concepts of basic aquaculture economy, cost-return analysis method, business management effect evaluation method, annual production and investment plan, cash flow chart and market channel. Second part introduce how to establish reputation of aquaculture product, which include good pre-stocking skill, good production and management skill and good post-harvest techniques. From this course, students will gain knowledge of aquaculture business management.

132016 養殖環境管理學 2 必 鄭文騰

本課程之目的為提供學生養殖之永續經營概念及方法。首先說明養殖企業若未先經規劃管理可能會產生之種種問題而這些問題亦會危害養殖企業本身，其中包含地層下陷及其有關問題。其次說明養殖環境不良對水產養殖之影響，其中包含魚產品品質不良及魚體疾病之產生。最後介紹台灣及其它各國針對以上問題之預防或補救措施及立法，以期能達到養殖之永續經營。

132016 Management of Aquaculture Environment 2 R W. Cheng

This course provides students concept of sustainable aquaculture. First introduce why an uncontrolled aquaculture industry may cause environment problems, and those problems may also hurt aquaculture industry itself. Such as land shrinkage & other related problems. Second, introduce how an unsuitable environment can influence aquaculture industry, which include bad quality product and disease problem. Finally introduce the laws and methods which are used to prevent or stop the above said problems, so that sustainable aquaculture may be achived.

132017 養殖場實務操作實習 9 必

透過本課程讓學生有機會實際進行水產養殖相關實務訓練，並根據學生需求及興趣分配至不同實習場所，如飼料廠、養殖場、育苗場、水產加工廠等，使學生瞭解產業脈動及做好職前準備。

132017 Practice training of aquaculture 9 R

This course would provide an opportunity for students to do the different practice training of aquaculture depend on their requirement and interest, like feed processing plant, aquafarm, hatchery, aquatic production processing factory and so on. This would helps students understand industry trends and do well in pre-vocational preparation.

二、選修科目 Elective Courses

132018 生態學 2 選

概述生態學的定義及發展史、生態系統、生物與環境、族群生態學、群落生態及應用生態學。

132018 Ecology 2 E

Overview of the definition and development of ecological history, ecosystems, organisms and the environment, population ecology, community ecology and applied ecology.

132019 浮游生物學 2 選

課程預計介紹生物浮游的原理、浮游生物的種類、浮游生物的立體分布、浮游生物的生活型態及其生活史、浮游生物在養殖上的應用。

132019 Planktonic Biology 2 E

The course introduces the principal of planktonic biology, planktonic species and its distribution in geographic positions to students. The content of this course also covers the introduction of life cycle, life patterns of planktonic organisms and its application in aquaculture to students.

132020 水生植物學 2 選 翁韶蓮

課程將介紹水生植物之分類與特性，環境因子對水生植物之影響，水生植物之生理構造，光與光合作用，營養鹽之角色與吸收，成長與光合作用等。另一部份將著重在當今 DNA 科技的部分。此部分的章節有遺傳的染色體基礎、遺傳的分子基礎、從基因到蛋白質、真核細胞之基因體結構表現、重組的 DNA 科技等。

132020 Aquatic Botany 2 E S.L.Wong

Lectures will focus on classification of aquatic botany; environmental factors affect its distribution and physiology, physiological structure, light and photosynthesis, nutrients and uptake, growth, etc. Besides, the gene part will have some lectures. They are: the chromosomal basis of inheritance, the molecular basis of inheritance, from gene to protein, genome organization and expression in eukaryotes, genome organization and expression in eukaryotes, and DNA technology.

132021 水生植物學實習 1 選 翁韶蓮

課程將介紹水生植物之分類與特性，水生植物之生理構造與觀察方法，光與光合作用之測定，成長之測定方法等。藻類的觀察與認識。

132021 Practice of Aquatic Botany 1 E S. L. Wong

Lectures will show students how to classify and observe aquatic plants, measurement of growth on various species, measurement of light and photosynthesis relative to primary productivity, nutrient effect on their growth, etc.

132022 魚類學實習 1 必 曾美珍

在魚類學實習課中的學習包括魚類分類學、解剖學、生活史、形態學、生態學、族群遺傳(分子)分析。

132022 Practice of Ichthyology 1 R M. C. Tseng

Studies in the Ichthyology lab include taxanomy, anatomy, life history, morphology, ecology, population genetic (molecular) analyses of variable fishes.

132023 河川生態學 2 選 葉信平

本課程介紹河川的環境（水力學、化學因子、物理因子、自營性及非自營性生物），生態（能量來源、營養關係、食性），營養鹽動力學，生態工法等。

132023 Stream Ecology 2 E S. P. Yeh

This course introduces the stream's environment (hydrology, chemical and physical factors), ecology (energy sources, trophic relationships, food habits), nutrient dynamics and ecological engineering methods.

132024 湖沼學 2 選 張欽泉

本課程討論地表所有淡水水域之物理、化學、地質、生態及生物特性，以湖沼為主，而河川及河口均在討論之範圍內。由於魚池亦為淡水水體，雖然其面積及深度均較小，但其水質之物、化性質及生態環境與天然淡水水體亦有類似之處，是故亦加以討論。湖沼學可視為淡水養殖之基礎課程之一。由於水中之許多生物都可作為養殖對象，因此對這些水族及其生存環境之瞭解，有助於學生對養殖技術之提升。

132024 Limnology 2 E C. C. Chang

This course introduces all the freshwater regimes in the world, which include the physical, chemical, biological and geological aspects of lake, river & estuaries. Fish pond can be considered as one special case of lake, so is also be discussed. This course can be considered as one of the basic course of aquaculture, because most of the aquatic animals which are used in aquaculture are from on of the above regimes (either lake, river or estuaries), so familiar with the aquatic environment and the organisms in those environment will help students to have a better management technique in aquaculture.

132025 海洋生物技術 2 選

本課程介紹基礎分子生物學，並針對海洋或水產養殖物種為主題，探討生物技術運用在分類學、遺傳學、育種學、與病理學之研究及其未來可能的發展與應用

132025 Marine Biotecnology 2 E

The basic molecular biology is introduced, and the discussions on the researches of the use of biotechnology in taxonomy, genetics, breeding, and pathology, and their possible developments and applications are conducted.

132026 水產無脊椎動物學 2 選

課內將介紹無脊椎的原生、中生類動物及一些重要的節肢動物、軟體動物、棘皮動物

等，如海參、海膽、龍蝦、花枝、長腳蝦、蟳等養殖種類之形態、生態、分布和生活史等有關的知識。

132026 Aquatic Invertebrate Zoology 2 E

Key components of invertebrate, such as protozoa, metazoa, mollusca, arthropoda, echinodermata will be introduced in the class. Some important species in aquaculture industry will be emphasized and given as examples in the class. All examples, including aquatic sea urchin, crab, lobster, squid, prawn, grass crab, and so on, will be discussed on their biology, distribution, ecology and life history for aquaculture.

132027 水產無脊椎動物學實習 1 選

課內將介紹無脊椎的原生、中生類動物及一些重要的節肢動物、軟體動物、棘皮動物等，如海參、海膽、龍蝦、花枝、長腳蝦、蟳等養殖種類之形態、生態、分布和生活史等有關的知識。

132027 Practice of Aquatic Invertebrate Zoology 1 E

Key components of invertebrate, such as protozoa, metazoa, mollusca, arthropoda, echinodermata will be introduced in the class. Some important species in aquaculture industry will be emphasized and given as examples in the class. All examples, including aquatic sea urchin, crab, lobster, squid, prawn, grass crab, and so on, will be discussed on their biology, distribution, ecology and life history for aquaculture.

132028 魚類養殖技術 2 選

本課程介紹淡水池塘單養及混養之養殖技術與原則，單養之魚種包括鰻魚、金魚、吳郭魚、牛蛙、錦鯉、中華鱉、鯰魚、烏魚、鱸魚和眞泥鰍等淡水魚類。

132028 Fish Culture Techniques 2 E

This course introduces the principle and practice of freshwater culture . The content includes the information of farm and hatchery , and the techniques of culturing and propagation of freshwater fish、shrimp and shellfish .

132029 魚類養殖技術實習 1 選

本實習課程介紹淡水池塘單養及混養之養殖技術與原則，單養之魚種包括鰻魚、金魚、吳郭魚、牛蛙、錦鯉、中華鱉、鯰魚、烏魚、鱸魚和眞泥鰍等淡水魚類。

132029 Practice of Fish Culture Techniques 1 E

This practice course introduces the principle and practice of freshwater culture . The content includes the information of farm and hatchery , and the techniques of culturing and propagation of freshwater fish、shrimp and shellfish .

132030 水產微生物學 2 選 曾美珍

本課程之目的在於使學生對於在魚類及其製品之水產微生物的繁殖與控制之方法有所了解，其內容包括水產微生物之分類、水產微生物之培養及水產微生物之抑制原理。

132030 Aquatic Microbiology 2 E M.C. Tseng

The objective of Aquatic Microbiology is to introduce the philosophy of development in fishery microbiology and to understand how we control microbiology in the fish and it’s products. The

emphasis of this course has been on the taxonomy of fishery microbiology, culture of fishery microbiology, and control philosophy of fishery microbiology.

132031 水產微生物學實習　　1　選　　曾美珍

本課程之目的在於使學生對於在魚類及其製品之水產微生物的培養與控制具操作經驗，本實習之內容包括水產微生物之活化與培養、水產微生物之檢驗與鑑定及水產微生物之控制。

132031 Practice of Aquatic Microbiology　1　E　M.C. Tseng

The objective of this course is to give the student more confidence in the practically handling the fishery microbiology of fish and it's products. The exercise of aquatic microbiology contains activation and culturation of fishery microbiology, determination and indentification of fishery microbiology, and control of fishery microbiology.

132032 水族生理學實習　　2　選　　陳英男

本課程以解剖觀察及實驗方式，使學生對魚蝦之各組織、器官之位置、形狀大小、構造、功能及魚蝦之各器官間之相互影響以及魚蝦在環境中生命之維持間有一具體之概念。

132032 Practice of Fish Physiology　2　E　Y.N. Chen

This course provides students the knowledge of fish and shrimp physiology through anatomical and experimental observation, which include structure, position, color, size, texture, functions, and the interactions between organs, and how those organs work together to keep the life of the animals.

132033 生物化學實驗　　1　選　　林鈺鴻

本實習係專門訓練學生對於生物體，具備有分離和純化生物分子之技術，諸如蛋白質、酵素、核酸、脂質及色素體等，並討論實驗方法使學生瞭解生化現象以激起從各種不同學習背景的學生的興趣，為本課程之目的。

132033 Biochemistry Lab.　1　E　Y. H. Lin

This Lab. designed is to train the students having modern techniques on the isolation and purification of biomolecules from living matters, such as proteins, enzymes, nucleic acids, carbohydrates, lipids and pigments, and to discuss the experimental methods needed to understand biochemical phenomena, The final from a variety of background.

132034 甲殼類養殖技術　　2　選

本課程專門介紹草蝦（虎蝦）、淡水長臂大蝦、白蝦及螃蟹養殖新技術，其中包括食物鏈之建立，水色管理、水質管理、池底管理、救水技術、池塘診視、生物制衡技術、生物製劑之利用技術及疾病防治等。

132034 Crustacea Culture Techniques　2　E

This course is to introduce the modern techniques on the culture of grass shrimp (tiger prawn)*(P. monodon)*, giant freshwater prawn *(M. rosenbergi)*, white shrimp *(P. vannamei)* and carhs. The main topics are focused on the establishment of food-chain, water colour management, water quality management, pond bottom management, water colour saving techniques, diagnosis of pond situation, biocontrol techniques, microbial using techniques and prevention of crustacean diseases etc.

132035 甲殼類養殖技術實習　　1　選　　劉俊宏

本課程旨在培育學生具有國內外重要養殖甲殼類之繁養殖及育種技術，提高學生之甲殼類類繁養殖實務經驗，課程內容包括草蝦、斑節蝦、白蝦、紅尾蝦、沙蝦、龍蝦、淡水長臂大蝦等重要養殖甲殼類之繁養殖相關技術，如催熟、育苗、選種、幼生發育觀察、養成等。

132035 Practice of Crustacea Culture 1 E C.H. Liu

Techniques

This course provides a real practice opportunity for students to learn the technologies of cultivation, breeding and propagation of crustacean which includes ripening, larval cultivation, broodstock selection, the observation of life stages of larva and cultivation of important cultured crustacean of tiger shrimp, kurama prawn, white shrimp, red tail shrimp, sand shrimp, lobster, freshwater prawn etc.

132036 水產品衛生與安全 3 選 邱謝聰

本課程主要是使學生瞭解在加工過程中水產品在加工過程中，有關衛生與安全之基本理論與操作方式。本課程內容包括：1.水產品之污染 2.水產品之中毒 3.水產品之有害金屬 4.水產品之寄生蟲 5.水產品添加物 6.食品(水產品)衛生管理法規。

132036 Seafood Hygiene and Safety 3 E S.T.Chiu

This course introduces the basic theories of seafood hygiene and safety in the processing：1.Contamination of Seafood 2.Seafood poisoning 3.Toxic Metals in Seafood 4.Sanitary Insect in Seafood 5.Seafood additives 6.Phylosophy of food (major in seafood) safety related Law and Regulation.

132037 冷凍學 2 選 邱謝聰

本課程內容主要是讓學生瞭解冷凍學之原理與冷凍品之製造流程與要項課程內容包括：1.冷凍的基礎概念 2.保藏原理 3.冷藏法 4.冷凍法 5.冷凍連鎖 6.解凍 7.冷凍衛生與安全。

132037 Frozen Technology 2 E S.T.Chiu

This course introduces the basic theories and frozen processing of food (major in sea food).1. Fundamental of freezing 2. Principles of freezing 3.Cold storage 4.Frozen storage 5.Cold chain processing 6.Defrozen processing 7.Sanitation and safety in freezing processing.

132038 飼料原料與製造 2 選 邱謝聰

本課程乃探討魚類完全配合飼料製造之現代加工技術，內容包括：1.單味飼料之生產方式與一般生產過程之影響因素。2.配合飼料之製造包括設計、粉碎、混合、製粒，油脂添加之有關技術。3.養魚飼料之製造技術等。

132038 Feedstuffs and Manufacture 2 E S. T. Chiu

The objective of this course is to give the students the moden technique about the formula feed industry of the fish and shrimps which contains:(1).The processing of the ingredient feed and the influent factors about general processing problems.(2)The engineering of formula feed, including design, milling, grinding, mixing, pelleting and the technique of addition oil.(3)The technique of manufacturing of the fish formula feeds.

132039 飼料原料與製造實習 1 選 邱謝聰

本課程主要讓學生瞭解及練習完全配合飼料之現代加工技術，內容包括：(一)單味飼料之認識。(二)配合飼料之製造包括設計、粉碎、混合、製粒，油脂添加之有關技術。

(三)魚類與蝦類飼料之製造技術。

132039 Practice of Feedstuffs and Manufacture 1 E **S. T. Chiu**

This lecture contains the practice of feed processing technique about the formula feed of fish and shrimps which contains:(1)The knowledge of the ingredient of feed.(2)The engineering of formula feed, including design, milling, grinding, mixing, pelleting and the technique of addition oil.(3)The technique of manufacturing of the fish or shrimps formula feeds.

132040 水污染生物學 2 選

課程將涵蓋水生生態系、生物鍊、生物累積等基本生態觀念介紹。並就各環境污染物，如廢酸、重金屬、農藥等，分別說明其對水生生物的影響及水污染法規說明。

132040 Aspects of Biology in Aquatic Pollution 2 E

The effect of aquatic pollution on fish and aquatic organisms will be explained in the course. The topics include some key pollutants, such as, waste acid, heavy metals, pesticides and others. The context of Water Pollution Protection Act of ROC will be also discussed in the class.

132041 魚類生態學 2 選 曾美珍

課程以講敘魚類與有生無生環境間之關係，包括影響魚類之環境因子探討、族群的變動、種內與異種間之聚集分布與遷移、魚類之分不與遷移、魚類之繁殖、魚類之攝食與他種之營養關係等為主。

132041 Fish Ecology 2 E **M.C. Tseng**

Lectures will focus on the relationship between fish and environmental factors as well as fish and biological factors. Therefore, it including introduction of environmental factors, population dymanics of fishes, relationship among fishes and other organisms, reproduction of fishes, distribution of fishes, migration of fishes, and on.

132042 魚類學各論 2 選 曾美珍

本課程將讓同學學習到世界上淡水及海水魚類的多樣性，並探討魚種間的演化關係。主要是讓學生了解世界魚類之分類、解剖、生態、行為及分佈情形，特別強調在魚類間形態、生態和行為的多樣性，並提供學生有關漁業及魚類保育的訊息。

132042 Ichthyology 2 E **M.C. Tseng**

This course will provide information on the diversity of fishes in the freshwater and marine environments of the world and their evolutionary relationships. The objective of this course is to understand classification, anatomy, ecology, behavior, and distribution of fishes of the world. Emphasis is on morphological, ecological, and behavioral diversification of fishes in a phylogenetic context. Some information will be given on fisheries and fish conservation.

132043 水產加工學 2 選 邱謝聰

水產加工品學之範圍主要包括食用品與工業用品。水產食用品加工品之製造方式是以新鮮水產品依乾燥、鹽藏、罐製及冷凍方式來完成。水產加工之工業產產品之項目包括魚粉、魚油、魚骨粉、珊瑚、貝殼及珍珠等產品。

本課程內容包括上述所提及水產品的加工程序及此工業之發展與展望。

132043 Fish Processing Techniques 2 E **S. T. Chiu**

The manufactured marine products are usually classified roughly into articles of food and industrial uses.Marine products include dried, salted, canned and frozen materials which are used in the same way as raw fresh ones.Articles for industrial use are fish meal, fish oil, fish bone meal, coral, shell, pearls et al.

This lecture contains the processing of marine seafood products that mentioned above outlook of this industry.

132044 水產加工學實習　　1　選　　邱謝聰

本課程內容主要在使得學生能練習水產加工品(包括水產冷凍品、水產罐製品、水產乾製品、水產魚香腸及水產副產品)之加工方式及其過程，我們希望學生能對上述水產加工方式及流程能實際操作並進一步能改進發展之。

132044 Practice of Fish Processing　　1　E　　S. T. Chiu

Techniques

This lecture contains the practice of marine products processing including refrigeration of marine products, canned marine products, dried marine products, fish sausage and fish solubles. We hope the pupil can learn how to make it and develop a new ones.

132045 分子生物學　　2　選

課程包括有核酸、蛋白質的分子結構說明，核酸、蛋白質的生物合成及在生物代謝過程的分子調控。核酸的檢測方法及其應用。課程後段介紹基因選取、重組建構、轉形、轉殖表現及其應用。

132045 Molecular Biology　　3　E

The course covers the introduction of basic structures of nucleic acids and proteins in molecular level. The biosynthesis of nucleic acids and proteins in molecular level will also be introduced in the class. Third part of the course includes the molecular regulation of nucleic acids and proteins in biological pathways.

132046 循環水養殖學　　2　選

首先本課程介紹循環水養殖發展之背景及目前國內、外發展之概況，其次將循環水養殖分成室外池及室內超集約兩大系統來說明，並分別介紹其物理、生物、微生物及混合式過濾系統之原理、優劣點及限制。最後說明如何設計循環水養殖系統，以及循環水養殖發展之遠景。

132046 Introduction to Recirculating　　2　E

Aquaculture

First, this course introduces the developing background of recirculating aquaculture around the world. Then the recirculating aquaculture systems are discussed based on outdoor and indoor two categories, and different types of treatment, such as physical, biological, microbiological and mixed type within these two categories are discussed which include their principle, good and weak points and limitations. Finally, how to design the recirculating aquaculture systems, and the outlook of the recirculating aquaculture are also be introduced.

132047 貝類養殖技術　　2　選　　劉俊宏

本課程專以講授貝類之繁養殖技術，其內容包括陸貝類、淡水貝類及海洋貝類。陸貝類以非洲大蝸牛、法國食用蝸牛為主，淡水貝類以河蜆、田螺、雪螺為主，海產貝類以文蛤、牡蠣、鮑魚、扇貝及真珠養殖為主。

132047 Shellfishes Culture 2 E C. H. Liu

This course is specially designed to provide students with the update techniques on the propogation and cultivation of shellfishes, in which are inclucled land snails, freshwater shellfishes, and marine shellfishes. The main topics are focused on Africom giant snail, French edible snails, river clams, freshwater snail, marine clams, oyster, abalone, scallop and pearl cultures.

132048 貝類養殖技術實習 1 選 劉俊宏

本課程旨在教導學生國內外重要養殖貝類之繁養殖及育種技術，提高學生之貝類繁養殖實務經驗，課程內容包括文蛤、蜆、九孔、牡蠣、扇貝、車渠貝等重要養殖貝類之繁養殖相關技術，如催熟、育苗、選種、幼生發育觀察、養成等。

132048 Practice of Shellfish Culture 1 E C. H. Liu

This aims of this course is to teach students the technologies of shellfish cultivation, breeding and propagation. The course includes the training program of ripening, larval cultivation, broodstock selection, the observation of life stages of larva and growth out of shellfish of clam, freshwater clam, small abalone, oyster, scallop, giant clam etc.

132049 飼料品質與管制實務 2 選 邱謝聰

本課程內容主要是讓學生瞭解冷凍學之原理與冷凍品之製造流程與要項課程內容包括：1.冷凍的基礎概念 2.保藏原理 3.冷藏法 4.冷凍法 5.冷凍連鎖 6.解凍 7.冷凍衛生與安全。

132049 Practice of Quality Control of Aquatic Animal Feed 2 E S.T.Chiu

This course introduces the basic theories and frozen processing of food (major in sea food).1. Fundamental of freezing 2. Principles of freezing 3.Cold storage 4.Frozen storage 5.Cold chain processing 6.Defrozen processing 7.Sanitation and safety in freezing processing.

132050 水族遺傳育種學實習 1 選

學生課內將學習族群遺傳性質的選擇方式，如何利用遺傳形質的選擇作育種，及如何操作染色體組。課程後段學生將學習如何選取、重組水生生物基因，選擇基因如何表現及如何檢測。

132050 Practice of Fish Genetics and Breeding 1 E

Students attending in this course will be asked to perform some skills, including how to describe the distribution of a specific characteristics in fish population, and how to construct a recombinant DNA and transfer it to plasmid. Finally students will learn how to detect the expression of inserted gene.

132051 水產物行銷 2 選 邱謝聰

本課程將以水產養殖與水產加工等之行銷管理學與技術作一深入探討。其中包括：行銷規劃、市場區隔、行銷組合、水產品的行銷特質、運銷成本、運銷制度、消費市場之變化及國際貿易等。

132051 Fishery Product Marketing Management 2 E S.T.Chiu

This course targets at the theory and technique of marketing management for the fish farming and fish product processing. The content investigates the marketing planning, market segmentation, marketing mix, marketing attributes of fish products, marketing costs, marketing system, changes of consumer market and international trade.

132052 水產生物技術應用　　2　選　　劉俊宏

本課程主要在介紹目前國內外水產生物技術之發展及應用，包括於相關技術之操作及應用，如於病害診斷及防治、基因轉殖魚之操作、生技飼料之開發、新品種之培育等。課程內容將激發學生對海洋生物技術相關領域的學習興趣。

132052 Application of aquatic biotechnology　2 E　　C. H. Liu

This course introduces the current development and application of aquatic biotechnology in the world, including the manipulation and application of related technologies in disease diagnosis and prevention, transgenetic fish, biotech-feed and new species breeding etc.

132053 生殖生理學　　2　選　　陳英男

介紹魚類生殖型態特性、生殖週期、生殖細胞之發育成熟過程及調控機制等基礎理論、全盤深入討論，並應用於人工操控促進性腺發育成熟、產卵受精及繁殖技術之開發、並探討性分化，性別控制以及品種改良等理論與應用之課題。

132053 Reproductive Physiology　　2　E　　Y. N. Chen

Introduction and discussion on the reproductive biology and physiology of teleosteans, including mode and characteristics of fish reproduction, reproductive periodicity, and fundamentals of oocyte growth and maturation and the controlled mechanisms involved in the processes. Applications of the fundamental knowledge in the reproductive physiology for the technology development for the manipulation of ovarian development and growth and further control of spawning aimed for hatchery technology development and refinement will be emphasized. In addition, sex differentiation and control, and the theory and applications of stock improvements are also discussed.

132054 水產養殖與水耕整合系統　　2　選

本課程之教學目標在於使修習者理解水產養殖(Aquaculture)與水耕(Hydroponics)整合系統(Aquaponics，養耕系統)之原理、兩子系統之營養鹽平衡控制、營養鹽轉換處理及系統之規劃設計建造，以增加對永續性水產養殖相關研究及水產養殖生產所必備之知識。

132054 Aquaponic system　　2　E

The purposes of this course are to let students understand the principles of aquaponics system in which aquaculture system is integrated with hydroponic system. In addition, the control of nutrient balance between these two sub-systems and the conversion of nutrients with various types will be introduced. And the planning, designing and construction of aquaponics systems will be discussed. These are all to afford students the essential knowledge for the research and production of sustainable aquaculture.

132055 觀賞魚養殖與管理　　2　選

本課程介紹目前台灣觀賞魚的養殖和繁殖、水族造景和水草之管理、水族器材、水族箱之水質處理與管理和水族箱之養殖管理。

132055 Culture and Management of Ornamental Fish　　2　E

The course is comprised of the artificial propagation and management of aquarium fish cultured in

Taiwan、aquarium design and management of aquarium plant、Aquarium apparatus、the process and control of water quality in aquarium and the management of aquarium .

132056 觀賞魚養殖與管理實習 1 選

本實習介紹目前台灣觀賞魚的養殖和繁殖、水族造景和水草之管理、水族器材、水族箱之水質處理與管理和水族箱之養殖管理。

132056 Practice of Culture and Management of Ornamental Fish. 1 E

The course is comprised of the artificial propagation and management of aquarium fish cultured in Taiwan, aquarium design and management of aquarium plant, Aquarium apparatus, the process and control of water quality in aquarium and the management of aquarium .

132057 免疫學概論 2 選 鄭文騰

本課程包括下列各主題：

1、應變性及先天性免疫；2、參與免疫反應之細胞；3、主要組織相容性複體；4、辨識抗原之分子；5、抗體多樣化的產生；6、抗原的辨識；7、抗體反應中的細胞協同作用；8、細胞性免疫反應；9、免疫反應之調節；10、免疫之遺傳控制；11、補體；12、免疫的演化; 13. 對病毒、細菌及黴菌之免疫；14、對寄生蟲及原蟲之免疫。

132057 Introduction to Immunology 2 E **W. Cheng**

The course covers following topics：

1. Adaptive and innate immunity; 2. Cells involved in the immune response; 3. Major histocompatibility complex; 4. Molecules which recognize; 5. Generation of diversity; 6. Antigen recognition; 7. Cell cooperation in the antibody response; 8. Cell-mediated immune responses; 9. Regulation of the immune response; 10. Genetic control of immunity; 11. Complement; 12. Evolution of immunity; 13. Immunity to virus, bacterial and fungi, 14. Immunity to protozoa and worms.

132058 栽培漁業 2 選 劉俊宏

講解栽培漁業之定義，時代背景和需要，說明我國栽培漁業中心之設置情形和栽培漁業方面之技術，並探討所生產之產品之處理及販賣方式，最後舉例說明栽培漁業之事例。

132058 Stock Enhancement 2 E **C. H. Liu**

This course firstly explains the definition of the stock enhancement, then it' s background and needs in the world. Secondly, it mentions about the foundation of the stock Enhancement Center is Taiwan area. Also, it goes into the technical details about stock Enhancement. Finally, this course gives several examples on stock Enhancement.

132059 藻類繁養殖學 2 選 翁韶蓮

由藻類之定義與研究範圍開始，進行介紹藻類之棲息環境分布，生活史及光如何影響光合作用、營養鹽對生長的影響，再進入藻類的應用。最後再進入到藻類的養殖各論，分浮游藻及大型藻兩大類。

132059 Culture of Algae Propagation 2 E **S. L. Wong**

This course will first mention about the physiological and ecological factors, which affect growth and occurrence of algae. Reproduction of algae, structure of algae, light and photosynthesis,

nutrients and growth, etc. Therefore, I will break them into three major groups as red, brown, and green seaweeds. And introduce the cultivation of phytoplankton and seaweed.

132060 藻類繁養殖學實習　1　選　翁韶蓮

介紹並實際進行各種重要經濟性大型藻類之養殖技術及利用組織培養技術來進行繁殖。課程將利用可採集到之海藻如菩提藻、青海菜、海帶等。從孢子和配子的的催熟取得、密度的控制、附著物選擇與附著方法、培養基配置選擇與組織培養、大規模葉狀體養殖方法。

132060 Practice of Culture of Algae Propagation　1　E　S. L. Wong

This course will introduce and mention about cultivation and tissue culture of several economical important seaweeds. They will be *Grateloupia, Monostroma*, *Laminaria*, and some other collectable seaweed. Culture technique including harvest of spore and cultivation of young gametophyte or carposporophyte. They will following by different culture systems and teniques of mature thalli.

132061 細胞生物學　2　選　葉文吉

課程預計介紹細胞的基本結構，從外觀至顯微結構。並闡述、比較動植物間的差別。課程內也將說明細胞內外物質進出、交換的細胞調控理論及影響因子的作用方式。

132061 Cell Biology　2　E　W. J. Yeh

The basic structure of cell will be introduced to students in the class. The explanation of the difference between animal and plant cells will be given to students. Some major topics including how cells regulate the transport of materials from both sides of cell membrane and how special factors control the cell function, will be presented in the class.

132062 休閒漁業　2　選　葉信平

內容包括休閒漁業的涵義，觀光魚市、漁村民宿、漁業文化博物館、傳統漁業作業、養殖場之旅、海上箱網休閒公園、休閒船釣、賞鯨等，另也介紹國外觀光休閒漁業的概況。

132062 Recreational Fisheries　2　E　S.P. Yeh

This course covers recreational fish market, bed & breakfast in fish village, fishery culture museum, traditional fishery operation, fish farm tour, sea cages leisure park, sport fishing, and whale watching.

132063 SPF 餌料生物量產實作　2　選

本課程的目的在教導學生如何篩選無特定病原之餌料生物，內容包括微藻、輪蟲、枝角類、橈角類、豐年蝦等。此外，在課程中也將教導學生如何進行這些篩選出的無特定病原餌料生物的量產，以應用於水產幼苗之培育。

132063 Mass Production of SPF-Live Food Lab.　2　E　S.P. Yeh

The objects of this course are going to teach students how to screen the specific pathogen free (SPF)-live foods, including microalgae, rotifer, daphnia, copepod, Artemia and so on. In addition, students would also be trained to learn how to mass produce the selected SPF-live foods for aquaculture larval breeding.

132064 生物安全育種與繁殖實作　2　選

課程介紹水產養殖動物的生殖行為、生殖生理、人工繁殖方法與種苗培育過程。指導學生實際操作各項種苗繁殖及培育工作，從中獲取經驗並涵養成技術。

132064 Practicum for Biosecurity 2 E

Selective Breeding and Propagation of Aquatic Animal

This course introduce the reproductive behavior, reproductive physiology, procedures of artificial propagation and seed production of aquatic animals in aquaculture. Furthermore, the course instructs students to acquire the experience and skill in aquatic seed production through practicing the manipulation of such production.

132065 養殖工程學 2 選

養殖工程為對魚類或水產養殖物應用工程原理與技術,以排除生存環境之障礙供其生長育成以供人類利用。多數生物學者研究指出傳統海水或淡水養殖可提供人類成長所需永續產量。養殖工程分為二部份,第一部份探討環境因子對水產養殖之交互影響,分別對物理及生物參數探討對水產環境及人類間交互影響;其對工程師設計養殖之觀點時之影響及重要性之探討。第二部份針對養殖對象之工程考量,此部份所陳述甚廣對象包括工程師, 生物學者,養殖業者,學生等 ,分別應用其所學過基礎化學代數等學科進行設計養殖池。在此所用通用原理經由個案探討可達成特別養殖環境系統之設計。

132065 Aquaculture Engineering 2 E

Aquacultural engineering is the application of engineering principles and procedures to fisheries and to the cultures of aquatic organisms. Most biological studies indicate the traditional fisheries are approaching the maximum sustainable yield the oceans and major bodies of fresh water are capable of supporting. This knowledge, increasing world demand results from increasing affluence in many countries and the great need for more protein to feed growing populations, has stimulated rapidly increasing interest in aquaculture.

This introduction to aquacultural engineering is devided into two parts. Part I concentrates on the interaction of the environment with aquatic organisms. It defines the physical and biological parameters of the aquatic environment of interest to culturists and fisheries people, and discusses the influence and importance of these parameters on aquatic organisms from the viewpoint of an engineer.

Part II emphasized the engineering consideration of cultured, as opposed to fisheries, aspects of aquaculture. These are presented in a form accessible not only engineers but to biologists, aquaculturists, students, and others who have training in basic chemistry and algebra. Here also general principles are stressed as opposed to specific system designs.

132066 水產寄生蟲學 2 選 鄭文騰

本課程介紹：魚類與寄生蟲之關係、魚類寄生蟲研究現況、魚類寄生蟲的分類鑑定與生活史、診斷技術及預防與治療技術。

132066 Aquatic Animal Parasitology 2 E W. Cheng

This course instructs students the relation between fishes and parasites, recent diagnostic techniques and research of fish parasites, classification and life history of the parasites, diagnostics, prevention and control of fish parasites.

132067 水產寄生蟲學實習 1 選 鄭文騰

本實習為訓練學生孰知各種魚類寄生蟲的外觀型態與構造、標本的製作及保存、種類的鑑定與防治方法，相關新科技應用在寄生蟲之鑑定與防治。

132067 Practice of Aquatic Animal Parasitology 1 E **W. Cheng**

This Lab. Trains students to understand all sort of fish parasites on morphology and structure , treatment and preservation of fish parasites, classification and life cycle of fish parasites, prevention and control of fish parasites.

132068 海洋生態學 2 選 **翁韶蓮**

本課程將分別介紹海洋的構造，海洋中水的流動，海洋中生物之組成，影響海洋生物分佈之因子，海洋生態系中生物組成之變動，食物鏈和食物網。最後，再深入探討人類的活動（生產、休閒、捕撈等）如何影響到整個海洋生態系。

132068 Marine Ecology 2 E **S. L. Wong**

The class will combine the following subjects: 1.the structure of ocean 2.water circulation and motion in ocean 3.comportion of marine in organisms 4.The factors affect distribution of marine organisms 5.changes of marine community in ecosystem 6.Food chains and food web in the ecosystem. Then, we will discuss how human activities affect the marine ecosystem in over all. Introduction of practical examples in Taiwan will also discussed in lectures.

132069 水產毒物學 2 選 **邱謝聰**

本課程內容包括：(1)一般毒物形成之結構與原理(2)微生物對於食物成份中之毒性影響(3)非營養成分之代謝(4)致癌性物質(5)營養性成分及致癌性(6)水產品之毒性物質(7)有毒之河魨。我們希望學生能對水產毒物之形成能有清楚概念。

132069 Aquatic Toxicology 2 E **S. T. Chiu**

This lecture contain:(1)General toxicological principles (2)The Role of intestinal microflora in the toxicity of food component (3)Metabolism of nonnutritive components (4)Carcinogenesis (5)Nutritional factors and carcinogenesis (6)Toxicology of marine foods (7)Toxic puffer fish . We hope the students to learn about the conception of marine toxicity.

132070 水產機電與自動化 2 選 **葉信平**

本課程授課包括一般機電安全及電工原理，養殖場自動化監控，以及養殖相關電動機具如增氧及溫控、抽水幫浦、飼料處理及製造、自動投餌等之介紹。

132070 Electromechanics and Automation in Aquaculture 2 E **S.P. Yeh**

This course instructs students with the general electromechanical security and electrician's principle, aquafarm automation and control, and introduction of related equipments that deal with oxygen pump, water temperature monitor, pump, feed processing and manufacture, auto-feeder.

132071 水產機電與自動化實習 1 選

本課程在提供學生基本的機電實務技能。學生將由此課程學習到常用的機電元件功能及應於養殖自動化及控制，如供養設備、水質監測、抽水機、飼料製成設備、自動投餵機等。在課堂中，學生需親自裝設及熟悉這些元件的使用。最後透過實務操作評量，使同學了解對課堂所學技能之熟悉度。

132071 Practice of Electromechanics and Automation in Aquaculture 1 E

This course provides students with the basic training in mechatronics skill. Students taking this course will learn the function of some frequently used mechatoronics components and their applications in aquafarm automation and control, and introduction of related equipments that deal with oxygen pump, water temperature monitor, pump, feed processing and manufacture, auto-feeder. Students have to practice these skills in class to be familiar with the skills. Finally, an exams will be given to let students to demonstrate their capability of using such skills.

132072 水產飼料添加物　　2　選　　林鈺鴻

水產動物飼料除了提供蛋白質、脂肪、碳水化合物、維生素及礦物質等主要營養素外，為提供飼料其他功能性，例如誘引性、色澤、飼料安定性或利用性等目的，飼料添加物之使用為必需。本課程將介紹水產飼料所使用之飼料添加物，包括抗菌劑、抗氧化劑、色素、酵素、有機酸、黏著劑、誘引劑、營養補充劑、益生菌及益菌生、荷爾蒙等十大類。此課程可幫助學生了解飼料產業所使用之飼料添加物型態與功能。

132072 Aquatic Feed Additives　　2　E　　Y. H. Lin

Traditionally, aquafeed supplies protein, lipid, carbohydrate, vitamins and minerals for the demands of aquatic animals. In order to provide other additional function of feeds, such as palatability, color, stability or utilization, it is necessary to supplement some feed additives in aquafeed. The course will introduce the feed additives used in aquafeed, including antimicrobial agents, antioxidant, pigments, enzymes, organic acids, attractants, nutritional supplements, probiotics and prebiotics, and hormones. The course will help our students to understand the types and functions of all the feed additives used in aquafeed industry.

132073 飼料配製實作　　2　選

水產飼料為水產養殖產業成敗之關鍵，相關產業界亟需擁有飼料製作能力之人力資源投入。本課程目的為強化學生飼料實務製作技能，訓練學生具有獨立設計專用配方、原料選擇、飼料造粒機械操作與品質管制之能力。課程規劃由學生獨立操作，加強實作，建立完整飼料配製實作能力，以期與產業界接軌。

132073 Feed Processing Practice　　2　E

Aquafeed is the key of the aquaculture industry. Relative industry need manpower having the ability to produce the aquafeed. The purpose of this course is to strengthen skill of feed manufactory and to train our students having ability of designation of specific feed formulation, feedstuff selection, operation of feed machine and quality control by themselves. The course plan our students operate aloneand strengthen the practice to built up the feed processing capacity and to narrow the gap between academic and industry.

132074 生物安全養殖經營　　2　選　　葉信平

管理實作

全球水產繁養殖產業正遭受嚴重地疫病侵襲，造成重大的經濟損失，眾所周知，疾病是預防重於治療，本課程銜接水產繁養殖技術相關基礎課程，建立水產繁養殖生物安全防疫設施，並規畫防疫作業流程，藉以訓練學生具有生物安全之觀念及熟悉生物安全之作業模式與流程，提升水產繁養殖技術，促進產業之永續經營。

132074 Practice of Aquaculture Biosecurity Management Lab.　2　E　　S.P. Yeh

The aquaculture industry wasimpacted by disease infection, and this caused huge economic loss. It was well known that prevention was more important than treatment. Therefore, the present course

was mainly to connect the basic ones related to aquatic breeding and cultivating to establish the aquatic biosecurity system, and to organize the processing of disease prevention. These were capable to bring the students the concept of biosecurity and made them being familiar with the operation and processes, which increased the skills of aquatic breeding and cultivating for promoting sustainable development.

132075 水族病毒學　　2　選　　曾美珍

病毒學現今急劇蓬勃發展，這門課程主要提供有興趣的大學部學生，學習病毒學的基本知識及介紹病毒學與現代生物學之間的關連。此課程主要有四個部份， 第一部份是介紹病毒的結構；第二部份是關水族病毒與宿主間的關係；第三部份是水族病毒感染的路徑；第四部份是討論水族病毒的分類分群。

132075 Aquatic Virology　　2　E　　M.C. Tseng

The field of virology has matured and grown immensely during this time. This course will serve many undergraduates interested in acquiring a solid foundation in virology and its relationship to modern biology. This course includes Part I introduces structures of various viruses, Part II concerns the interactions of aquatic viruses and hosts, Part III is about the pathway of aquatic virus infection, Part IV discusses the families and groupings of aquatic viruses.

132076 水產資源學　　2　選

課程介紹海洋生態基本觀念，食物供給、水產生物繁殖、發育與生長，自然死亡、漁撈死亡及漁獲、漁生產力、魚類生態、型態及漁業的關係。一些經濟魚類及水產生物的應用、產量及現況。如何管理經濟魚類及水產生物的資源。

132076 Fishery and Aquacultural Resources　　2　E

The basic concept of marine ecology, food supply, fishery breeding, growth of fish population, natural mortality and fishing mortality in fishery industry will be introduced to students in the course. The course also presents the concepts of production and application in economic fish species and how to control and regulate the productivity in fish resource.

132077 水產藥理學　　2　選　　張欽泉

課程包括水產藥物之來源、藥物動力學、影響藥物藥理作用之因素等。針對水產養殖現場常用藥品分別講述，使學生能具有藥理學基礎，建立正確用藥的概念。

132077 Aquatic Pharmacology　　2　E　　C. C. Chang

The contents of the course include the introduction of the source in aquatic drugs, pharmacokinetics and pharmacology. Moreover, descriptions of common using drugs also are The contents of the course include the introduction of the source in aquatic drugs, pharmacokinetics and pharmacology. Moreover, descriptions of common using drugs also are available for students to set up the concepts of safe drugs using.

132078 水產品運銷　　2　選　　葉信平

本課程介紹水產養殖方面的產品，特別是活魚輸送的沿革、活魚生理學、活魚市場現況、消費及流通型態、生產地及其設施以及運輸工程方面。

132078 Aquacultural Products Transportation & Selling　　2　E　　S.P.Yeh

This course provides students the knowledge of aquaculture products, especially the history of live

fish transport, life fish physiology, market status, and its consumption and circulation channels, production area and facility, and transport engineering.

132079 漁業政策與法規 2 選

介紹及講解漁業法制頒演變依據，漁業法規與海洋法公約、國際責任制漁業關連性，漁業權漁業與補償制度，特定漁業與各項子法之規範，漁業資源保育與海洋生態關係、養殖漁業與土地容許使用關係。

132079 Fishery Policies and Laws 2 E

This course consists of explanation of fishery law and other related rules by articles, introduction of basic concept of fishery management and administration. Introduction and explanation of the process of fishing law constitution and announcement. Relation among the international responsible fishery and fishies law & convention on law of sea. Fishing rights and the compensatory system. Specibic fishery and all fisheries laws concerned Relation between fisherier resources conservation and marine ecosystem. Relations between farmed fisheries and permission for land use.

132080 生物學 3 選 吳宗孟

生物學為研究有生命的科學，教學的目的在於讓所有學生了解生命的複雜性與生命各階層的功能和構造，包含各自分離和合併的功能。這課程主要介紹基礎的理論，讓學生了解生物的基礎知識，進而教導學生瞭解地球上的生物與研究生物的方法。

132080 Biology 3 E Z. M. Wu

Biology is the Study of all Living Things. The teaching goal in Biology is to instill in all students a deeper appreciation for the complexity of living organisms and an understanding of how they function together and separately. This course will provide students with an introduction to the basic principles of biology and how they are applied to the search for the origins of life on Earth.

132081 海洋學概論 2 選 翁韶蓮

本課程教授內容有海洋學發展演變，地球-海洋及其中生命之起源，海洋疆界，海盆起源-地球板塊運動，海洋沈積物，海水特性，大氣-海洋交互作用，海洋環流，海浪，潮汐，海岸，近岸，海洋棲所，生物生產力-能量傳遞，海洋表層及底棲動物，海洋中糧食及海洋污染。

132081 Oceanography 2 E S.L. Wong

This course introduces the history of oceanography, the origin of the earth-its oceans and life in the ocean, marine provinces, the origin of ocean basins-global plate tectonics, marine sediments, the nature of water, air-sea interaction, ocean circulation, waves, tides, the shore, the coastal ocean, the marine habitat, biological productivity-energy transfer, animal of the pelagic environment, animal of the benthic environments, food from the ocean, and marine pollution.

132082 生物化學 2 選 林鈺鴻

生物化學係在專門講授魚類之構造成份、活性物質及有關色素之構造與功能，其中包括蛋白質、核酸、酵素、脂質荷爾蒙、毒素及胡蘿蔔素等，俾使學生對水產產物有所認識。

132082 Biochemistry 2 E Y. H. Lin

Biochemistry is provided a specific topics on the structure and function of constituents of fishes, bioactive marine natural products and related pigments, in which are included proteins, nucleic

acids, lipids, enzymes, fish growth hormones, sexual hormones, marine toxins and carotenoids. The purpose of this course is to enhance the students to understand modern biochemical concepts in fishes and their products.

132083 水族遺傳育種學　　2　選　　吳育昇

課程涵蓋魚類及水生生物遺傳形質介紹及遺傳基本原則，課程內並教授如何利用遺傳形質的選擇作育種。介紹魚類及水生生物體染色體或核酸的檢測方法，及如何操作染色體組及其應用。課程後段介紹魚類及水生生物基因選取、重組建構、轉形、轉殖表現及其應用。

132083 Fish Genetics and Breeding　　2　E　　Y. S. Wu

The course covers the introduction of basic characteristics in fish and aquatic organisms and their genetic principle. The students attending this class will be taught how to select the genetic characters for breeding and how to detect the nucleic acids and manipulate chromosome set. Finally in the course, the genetic construction of gene and transformation and gene expression will be introduced to students.

132084 養殖科技專業實習　　3　選

本課程內容主要是讓學生有機會至其他水產相關研究機構或私人企業進行實務操作，以提升學生之實務經驗及技能，達到學理及實務並重之目的，並可使學生提早瞭解產業脈動，做為就業前之準備。

132084 Professional internship of Aquaculture Technology　　3 E

This aims of the course are to provide the practice opportunities for students at other aquaculture related organizations and private companies. The output goal is to enable improved students' real experiences and skills in aquaculture which will help to fulfilling interaction between theory and practice, understating the industry dynamic and preparation for employment.

132085 智慧水產養殖　　2　選

藉由感測、物聯網技術、巨量資料分析、智動化設備的完整裝置，水產養殖產業將可能達到智慧化生產的階段。本課程主要教授智慧化生產的各階段知識，及應用在水產養殖產業之現況，培養學生具備智慧化養殖的基礎知識及觀念。

132085 Intelligent Aquaculture　　2　E

Intelligent production in aquaculture may be conducted by integrating sensing, internet of thing (IoT), big data analysis and intelligent automatic equipment. This course introduce the knowledge and the application at present related to intelligent production in aquaculture, and cultivate the student to possess the basic knowledge and concept of intelligent production in aquaculture.

132086 物聯網基礎與養殖產業應用　　2　選

本課程主要教授學生目前最新的物聯網相關技術，包括各種感測器簡介及應用、物聯網技術簡介及應用，以及巨量資料分析技術簡介與應用，期望能夠讓學生具備物聯網相關技術基礎概念，並思考如何應用於水產養殖產業。

132086 Internet of Thing and Application in Aquaculture　　2 E

This course introduce the latest technique related to internet of thing (IoT) including the theory introduction and application on environmental sensor, communication method and big data analysis. The object of course is aimed to cultivate student to possess the basic concept of IoT and ability of planning for the application of IoT in aquaculture industry.

132087 水產儀器操作與原理　　2　選

本課程教授水產養殖實務、應用及研究過程中，會使用的相關儀器的介紹、操作及原理，包括螢光顯微觀察系統、聚合酶連鎖反應儀、即時聚合酶連鎖反應儀、多槽溫控式核酸增幅儀、電泳膠影像攝影系統、全波長酵素免疫分析儀、染色體照相及核型分析系統、自動生化分析儀、紫外光可見光分光光譜儀、螢冷光顯像接收分析系統、細胞電穿孔儀、蛋白質等電化學分析儀、高效能液相層析儀、自動樣品注射器、原子吸收光譜儀、氣相層析儀、自動血液分析儀及水產科技飼料實習廠內設備等。

132087 Theory and operation of aquacultural instruments　　2 E

This course is designed to teach the fundamental theory and operation of instruments involved in aquacultural practices, researches and applications. The instruments include fluorescence microscopy system, polymerase chain reaction (PCR) machine, real-time PCR machine, gel digital imaging analyzer, enzyme-linked immunosorbent assay (ELISA) reader, chromosome image and karyotype analysis system, automated clinical chemistry analyzer, UV/visible spectrophotometer, fluorescence/chemo luminescence imaging analyzer, electroporator, IEF system, HPLC system, autosampler, AA spectrometer, and equipments in the feed mill.

132088 海水觀賞魚—小丑魚生產與銷售實務　　2選

本課程在使學生學習海水觀賞魚-小丑魚的「生產、管理、行銷」完整供應鏈知識，包含種魚照顧、生殖調控、餌料生物培養、育苗、養成、體色調整及銷售，並由教師提出實務性問題引導學生討論，及總結形成知識進行問題導向式學習，亦由業界專家傳授產業現況知識與經驗，並至校外參訪以增廣見聞深化知識。

132092Production and Marketing of Marine Ornamental Fish, Anemonefish 2 E

This course introduces the whole supply-chain knowledge in the production, management and marketing of anemonefish, including caring brood fish, controlled reproduction, production of live feeds for fish larvae, fish larvae cultivation, growing the fish, color developing on market-sized fish and marketing. The lecture is designed as a problem-based learning (PBL) course. Students discuss and try to resolve the questions related to production technique proposed by teacher, and then concluded by teacher to constitute the knowledge in the class. This course also introduces the industrial status by invited professional experts and increase students' professional experience via visiting industrial farm or organization.

132089 海水觀賞魚—小丑魚生產與銷售實務實習　　2選

本課程在使學生學習海水觀賞魚-小丑魚的「生產、管理、行銷」完整供應鏈操作實務技能，包含種魚照顧、生殖調控、餌料生物培養、育苗、養成、體色調整及銷售。由教師指導及示範，教學助理協助修課學生進行實務性操作以熟悉各項技術。

132089 Practice in the Production and Marketing of Marine Ornamental Fish, instruments Anemonefih　　2　E

This aim of this course is to guide the students to practice the techniques and procedures of the whole supply-chain in production, management and marketing of anemonefish. The techniques include caring brood fish, controlled reproduction, production of clean live feeds for fish larvae, fish larvae cultivation, growing the fish, and color developing on market-sized fish. The students will practice the techniques according to teacher's demonstration and by the assistance from teaching assistants in the hatchery farm.

132090 水產專業外語　　2　選

本課程為培養學生參與國際水產養殖業相關事務，並加強學生海外實習經驗，擬加強

學生語言能力，開授水產養殖專業外語課程，教授學生英文、印尼、泰語、越南語等養殖相關專業用語，以提升學生與國際接軌之基本溝通能力。

132090 Aquaculture foreign language 2 E

The goals of this course are to enable students to participate in international aquacultural related affairs and increase students' overseas internship experiences. To reach the goal, professional aquacultural related terms in English, Indonesian, Thai, Vietnamese and many others are taught to improve students' professional language skills. In addition, students' basic global language communicative abilities are strengthened to help them connect themselves to the world.

108 學年度第 1 學期教師申請開授通識課程

1. 「國際組織」" International Organizations"

中、英文課程綱要：

本課程旨在培育學生具備國際視野的思辨與分析能力，有系統地了解各國政府、非政府團體或甚至企業或公民如何透過國際組織一同協力解決人類所遇見的各種社會經濟、環境或永續問題。課程設計分成四大部分，先從探討為何國際上需要國際組織及如何組成國際組織的理論與實務背景談起，其次將介紹聯合國體系的運作及以議題導向的其他國際組織發展，最後綜合回顧國際組織在人類世的未來挑戰。透過此課程的規劃，期待學生可以一方面更熟悉全球治理運作，一方面也帶領學生關心更多世界各國共同會面對到的發展難題，以拓展學生未來可將專業技術與知識應用在更多國際合作計劃的可能性。

This course aims at equipping students with reflective and analytical ability from an international perspective via systematic understanding of how states, non-governmental organizations (NGOs), corporate or citizen engage in international organizations (IOs) to collectively solve socio-economic, ecological or sustainability problems. The course is divided into four sections, starting with discussion on why IOs were needed in the international arena and how to formulate IOs theoretically or empirically. Secondly, the operation of the United Nations will be introduced, followed by other development of IOs based on thematic discussion. Lastly, a review on future challenges of IOs in the Anthropocene will conclude the course. Through the above-mentioned course design, on the one hand students are expected to be familiar with the operation of global governance; on the other hand, the course will lead students to focus on common developmental problematics faced by nations around the world in order to expand students' future capacity to apply different professional skills and knowledge into diverse international cooperation projects.

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2. 「區域政經發展」" Regional Political Economic Development"

中、英文課程綱要：

第二次世界大戰之後，國與國之間的關係從傳統的二元合作提升到以地理區域為單位的多元合作，國家除了鞏固自身利益，同時也相信透過共同鞏固鄰國的利益，也就是區域主義，可以帶來更永續的互賴發展模式。此課程首先將帶領學生一同了解區域主義的興起背景、不同批判觀點與機會，其次將經由認識世界上幾大區域組織，如歐盟、東協、北美自由貿易協定和中國近年來提出的一帶一路個案來探討各種區域政治經濟發展的趨勢。透過對區域政經發展的理論與個案討論，學生可以更了解世界經濟走向，各國競合的歷史背景與未來發展之挑戰與機會。

In the post-World War II era, relation between states grew from bilateral to multilateral cooperation based on geographical unit. Asides from strengthening self-interest, states also believe in a more sustainable interdependence of developmental model via safeguarding common interests among neighboring countries, namely regionalism. This course will first

lead students to explore the background on rise of regionalism, different critical perspectives and opportunities. Then, a few world's largest regional cooperation such as European Union, ASEAN, NAFTA or Belt and Road Initiative introduced by China in recent years are selected as case studies to discuss various political and economic trends in the regions. Via theoretical review and case studies of regional political and economic development, students are expected to improve their understanding of the world economic trends, the historical background of coopetition between states and the future challenges and opportunities of development.

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4. 「人工智慧與生活」" Artificial Intelligence and Life"

中、英文課程綱要：

這門課程向學生介紹了人工智慧的基礎知識與在日常生活中所應用的領域。這門課程的特色是幫助學生獲得敏銳的洞察能力，知悉在不同環境下是如何運用人工智慧。修完課程後，學生將具備以下能力：理解知識表示與學習方法於智慧系統中的應用；在由計算機的角度了解人類智慧當中，正確地評價問題解決方式、洞察力和語言。

英文授課大綱:

This course introduces students to the basic knowledge and application domain of artificial intelligence in daily life. The features are to help students gain intuition about how artificial intelligence methods work under a variety of circumstances. Upon completion of this course, students should be able to use intelligent systems by understanding the role of knowledge representation and learning in intelligent system, and appreciate the role of problem solving, vision, and language in understanding human intelligence from a computational perspective.

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5. 「資訊素養」" Information Literacy"

中、英文課程綱要：

這門課程向學生介紹了電腦基礎概論、網路與資訊安全、辦公室軟體實務與電腦進階應用。這門課程的特色是幫助學生獲得電腦的基礎知識與在日常生活中所應用的領域。修完課程後，學生應該具備運用電腦的觀念與技能來解決日常所遇到的問題的能力。

英文授課大綱:

This course introduces students to the computer basic introduction, network and information security, Microsoft office implementation and advance computer technology application. The features are to help students gain computer basic knowledge and application domain in daily life. After students completed this course, they should be able to use computer conception and skill to solve the problems which are met in daily operation.

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6. 「水資源與水利科技」"Water Resources and Water Technology"

中、英文課程綱要：

水的科學包涵水的物理傳輸、化學宿命、及生物降解等內容。本課程主要闡述

國內對於水的開發與使用所面臨的各種問題，建立學生對水科學與水利科技的認識與發展。課程內容涵蓋的課題包括：(1)水與環境及人文的關係，(2)水的開發與保育，(3)地面水及地下水的傳輸與宿命，(4)韌性城市，(5)水的活化再利用，(6)環境教育，(7)防災救災資訊系統，(8)全球水資源影集觀賞與討論，(9)教學參訪等。

英文課程綱要

Water science including of physical transport, chemical fate, and biodegradation. This course primary explains facing various problems from the use of water in Taiwan. And establishes students that understanding and development of water science and water technology. The course includes: (1) relationship between environment and humanities with water, (2) water resources development and conservation, (3) transport and fate of surface water and groundwater, (4) resilient city, (5) water resources activation and reuse, (6) environmental education, (7) disaster prevention and relief information systems, (8) appreciation and discussion of global water resources albums, (9) teaching visits.

傳閱附件 4-----社會工作系擬修訂進修部「實務專題」課程由選修改為必修案學生說明會

社會工作系 107 學年度第 2 學期課程說明會

壹、時間：108 年　月　日（星期　）

貳、地點：

參、說明事項：

一、106 學年度起，進修部課程規劃表三上及三下「實務專題」課程，由選修改為必修。

說明：一、「實務專題」為本系 Capstone 課程。

二、評鑑對 Capstone 課程要求

(一) Capstone 課程須為必修。

(二) Capstone 課程開設在學生修習完基礎課程後，大三下或大四上。

(三) Capstone 關鍵在團隊合作(非個人參與)、動手做(教師少授課多指導)、整合所學。校內外實習、個人論文、大會考或 Seminar 無法算是 Capstone 課程。

(四) Capstone 課程要能對應全部系訂核心能力。

(五) Capstone 是整合性課程，可檢視專業性及通用性的核心能力。

(六) 須要求有實作成果展現(包括小組書面報告及簡報等，可提供成果發表會或以競賽方式執行)

二、人文暨社會科學院開設之「長照高階人才培育課程~居家服務督導員」，列為系上學生之畢業選修學分。

說明：一、因應長照 2.0 人才培育機制，為增強學生的就業能力與就業率，依據健康照護產學合作中心（由國立臺北護理健康大學辦理）所規劃長照課程模組，於 106 學年度第 2 學期開始開設居家服務督導員課程。

二、此課程共計 6 門課程，12 學分，授課師資聘高屏地區長照領域公私部門業師前來授課。學生修滿規定之學分數，可獲得教育部健康照護產學合作中心頒發之修業證書。

三、「長期照護個案管理與實務」課程可抵本系「照顧管理與個案管理」或「長期照顧」選修課程　。

附件

國立屏東科技大學 社會工作系 四年制進修部課程規劃表(107-110 學年度)

學年	第一學年				第二學年			
學期	第一學期		第二學期		第一學期		第二學期	
修別	科目	學分	科目	學分	科目	學分	科目	學分
必修	通識選項課程	2	通識選項課程	2	通識選項課程	2	通識選項課程	2
	國文(閱讀與寫作)(1)	2	國文(閱讀與寫作)(2)	2	通識教育講座	1		
	大一英文(1)	2	大一英文(2)	2	憲法	2	社區工作	3
	英語聽講練習 101	1	英語聽講練習 102	1			社會政策與社會立法	3
	大一體育(1)	1	大一體育(2)	1	運算思維與資訊科技應用(院)	0	社會工作實習準備	2
	外語實務(註2)	0					社會統計	3
			社會學	3				
	心理學	3	社會個案工作	3	社會心理學	3		
	社會工作概論	3			社會團體工作	3		
					人類行為與社會環境	3		
小計		14		14		14		13
專業選修	志願服務與志工管理	2	行政法	2	兒童少年福利服務	2	兒童少年保護服務	2
			家庭社會工作	2	司法社會工作	2	婦女福利服務	2
			社會問題	2	貧窮與社會救助	2	學校社會工作	2
			社會工作實務	2	社會福利概論	3	社會團體工作實務	2
					社會個案工作實務	2	早期療育與社會工作	2
					性別與醫療	2		
					預防醫學	2		
小計		2		8		15		10

1

國立屏東科技大學 社會工作系 四年制進修部課程規劃表(107-110 學年度)

學年	第三學年				第四學年				學分總計
學期	第一學期		第二學期		第一學期		第二學期		
修別	科目	學分	科目	學分	科目	學分	科目	學分	
必修	通識選項課程	2	通識選項課程	2	社會工作管理	3	社會工作實習(2)：社會福利方案實習/	4	
	方案設計與評估	3	社會工作研究法(2)	3	社會工作實習(1)：社會福利機構實習/	4			
	社會工作研究法(1)	3	社會福利行政	3	社會工作實習(1)：社會救助機構實習/		社會工作實習(2)：社會救助方案實習/		
	社會工作倫理	3	社會工作理論	3			社會工作實習(2)社區工作方案實習		
	實務專題	1	實務專題	1	社會工作實習(1)：社區工作機構實習/		【社會工作實習(2)三選一】		
					社會工作實習(1)：社會行政機構實習				
					【社會工作實習(1)四選一】				
小計		~~11~~12		~~11~~12		7		4	~~88~~90
專業選修	諮商理論	3	諮商技巧	3	災難社會工作	2	社會工作督導	3	
	原住民社會工作	2	非營利組織管理	3	女性主義與社會工作	2	~~社會工作專業訓練與實作~~	~~2~~	
	青少年犯罪與觀護工作	2	社會保險	2	多元文化與社會工作	2			
	身心障礙社會工作	2	醫務社會工作	3	社會工作專業訓練與實作	2	社會資源開發與管理	2	
	就業服務與社會工作	2	精神醫療社會工作	3			臨終關懷與社會工作	2	
	家庭暴力理論與實務	2	老人社會工作	2			長期照顧	2	
	~~實務專題~~	~~1~~	實務專題	~~1~~					
小計		~~14~~13		~~17~~16		~~6~~8		~~11~~9	~~83~~81

註：1. 本系學生至少應修滿 128 學分始得畢業【必修 ~~88~~90 學分，選修 ~~40~~38 學分（其中本系專業選修至少需 ~~27~~25 學分）】

2.「外語實務」每學期皆開放修課，並須於畢業前依本校「外語實務課程實施要點」規定修畢。

3. 通識選項課程:人文學科(永久碼:01264)2 門、社會科學(永久碼:01265)2 門、自然與生命科學(永久碼: 01266)1 門、數理與應用科學(永久碼: 01267)1 門。

4.系必修「心理學」及「社會學」各 3 學分，抵免院必修「心理學」2 學分、「社會學（1）」2 學分，以符合社工師規定應考資格。

2

課務組

社會工作系 107 學年度第 2 學期課程說明會
簽到單

壹、時間：108 年4月24日（星期三）8:45

貳、地點：EH227

學號	姓名	簽名	學號	姓名	簽名
E10761001			E10761029		
E10761003			E10761030		
E10761004			E10761031		
E10761006			E10761032		
E10761008			E10761036		
E10761009			E10761038		
E10761011		休學	E10761043		
E10761013			E10761044		
E10761014			E10761046		
E10761017			E10761048		
E10761018			E10761049		
E10761019			E10761050		
E10761020			E10761051		
E10761021			E10761052		
E10761022			E10761053		
E10761023			E10761054		
E10761024			E10761055		
E10761025					

國立屏東科技大學
社會工作系

社會工作系 107 學年度第 2 學期課程說明會
簽到單

壹、時間：108 年 4 月 23 日（星期二）14:25

貳、地點：綜合大樓 IH220

學號	姓名	簽名	學號	姓名	簽名
E10661002			E10661030		休學
E10661003			E10661031		
E10661004			E10661033		
E10661005			E10661035		
E10661006			E10661036		
E10661007			E10661037		
E10661008			E10661039		
E10661009			E10661040		
E10661010			E10761100		
E10661011			E10761101		
E10661013			E10761102		
E10661015			E10761104		
E10661016			E10761105		
E10661017			E10761110		
E10661021			E10761112		
E10661022		休學	E10761113		
E10661025			E10761114		
E10661028			E10461010		

國立屏東科技大學 社會工作系

傳閱附件 5----應用外語系 107-110 學年度入學生必、選修學分數案學生說明會

應用外語系 107 學年度入學課程規畫表調整說明

時間:108 年 10 月 17 日
地點:IH218

1. 依據本系學生未來就業方向考量增開大學部四年級上學期共同選修課程「英文演說(2)」2 學分，增開三年級下學期專業選修商務組課程「影視翻譯」2 學分，增開四年級上學期專業選修商務組課程「科技英文翻譯」2 學分，增開四年級上學期專業選修英語教學組課程「素養導向教學設計與評量」2 學分，適用年度為 107 學年度課程規畫表中；增開碩士班一年級下學期專業選修英語教學組課程「核心素養教學評量專題研究」3 學分，適用年度為碩士班 108 學年度課程規劃表中。

2. 更改四年級上學期專業選修商務組課程「會展概論」名稱為「會展產業英文」，適用年度為 107 學年度課程規畫表中。

3. 調整大學部三年級上學期必修「媒體科技與語言學習」2 學分至三年級下學期；調整大學部三年級上學期必修「英語演說」2 學分至三年級下學期；調整大學部三年級下學期必修「專題論文寫作」2 學分至三年級上學期；調整大學部三年級下學期專業選修英語教學組「電腦輔助英語教學」2 學分至四年級上學期；調整大四上學期必修課程「實務專題」2 學分至大三下學期 1 學分及大四上學期 1 學分。適用年度為 107 學年度課程規畫表中。

4. 刪除大學部二年級下學期專業選修商務組「國際貿易概論與實務」2 學分、三年級下學期專業選修英語教學組「測驗與評量」2 學分、四年級上學期專業選修商務組「會展實務」2 學分、四年級下學期必修「外語實習」2 學分。適用年度為 107 學年度課程規畫表中。

5. 本系畢業學分必修減少兩學分，為 93 學分，將此兩學分增至選修，成為 37 學分，畢業總學分維持 130 學分不變。

6. 為使學生接觸不同領域之課程並多元學習，並配合學校跨域課程及微學分課程之開設，擬上修外系選修承認學分至 16 學分。

以上說明若同學皆同意，請於後方同意表簽名。

國立屏東科技大學
應用外語系

應用外語系 107 學年度入學課程規劃調整同意表

學號	同意簽名
B10760001	
B10760002	
B10760003	
B10760005	
B10760006	
B10760007	
B10760008	
B10760009	
B10760010	
B10760011	
B10760012	
B10760013	
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B10760021	
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B10760037	
B10760038	
B10760040	
B10760041	
B10760042	

B10760043	
B10760044	
B10760046	
B10760047	
B10760048	
B10760049	
B10760051	

B10760052

B10760053

B10760054

B10760055

國立屏東科技大學
應用外語系