

106 學年度第 1 學期第 2 次 校課程委員會議

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各系(所)中心新增課程中英文摘要

一、 語言中心

馬來語 (2)

2 選

本課程銜接馬來語 (1)，由複習字母及發音、基礎片語、基礎句型、基本文法、日常用語詞彙及簡易生活會話開始，進階至生活實用語句，例如：自我介紹、職業、購物、交通、問路、觀光、點餐…等，針對學生的馬來語進階能力培養。學生可充分掌握與馬來西亞人之日常生活口語對話，能夠看懂報章雜誌之標題，並且能以電子郵件或社群網站與馬來西亞人進行簡單的交流。並帶領學生認識古今的馬來西亞歷史和當今馬來西亞文化、環境及人文。

Malaysia Language (2)

2 E

Students will expand the fundamental knowledge they learned in the course Malaysia Language (1). By starting with reviews of pronunciation, the alphabet, basic phrases and grammatical structures and daily conversations, students will improve their communication skills in relation to different topics, such as self-introduction, occupations, shopping, traffic, asking for directions, sightseeing, ordering meals, and so on. Students will be able to carry out simple communication in Malaysian via conversations, e-mail or community websites, and understand the headlines in newspapers, and furthermore know the culture and history of ancient and modern Malaysia.

傳閱附件 1-2--本校各學院所屬各系(所)課程中英文摘要-農學院

二、 農學院

(一) 植物醫學系：

植物害物防治處方

2 選

楊永裕、下

本課程主要針對重要經濟作物上的有害生物（病、蟲、草害）問題，由綜合防治管理觀點切入，結合農藥作用機制以及抗藥性管理的學理基礎，目標是強化學生對害物診斷與藥劑治療（處方）所需的知識和經驗。

Plant Prescriptions of Pests Control

2 E Y.Y.Yang , S

This course focuses on the pests (pathogens, insects, weeds) control of important economic crops from the comprehensive management point of view, combined with both the mechanism of action of pesticides and theoretical basis for the resistance management. The purpose is to strengthen the ability and experience of students required for diagnosis of pests and use pesticide to cure the crop (prescription).

蟲害案例研究與分析

2 選

陳文華，下

有鑑於田間有害生物及其他非生物性之危害因子，常有互相混淆徵狀，易造成診斷鑑定上之誤判，通常需要有相當經驗與專業方能準確診斷鑑定出危害因子，因此本課程提供蟲害案例分析及診斷解說，藉由分享及經驗傳承，協助學生正確診斷田間作物蟲害。

Case Study and Analysis of Pests

2 E

W. H. Chen , F

In view of field pests and other non-biological hazard factors, often confused with each other, easily lead to misidentification of diagnostic tests, usually require considerable experience and expertise to accurately diagnose and identify the hazards, so this course provides pests Case studies and diagnostic explanations to help students correctly diagnose crop pests in the field by sharing and sharing their experiences.

(二) 食品科學系：

362065 食品毒物學(2 選)

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食品毒物學課程，研習多樣性食品中，天然或合成毒藥與有毒物質，如何造成人體傷害或嚴重的副作用。本課程涵蓋食品安全性和毒理學，包括對食品中有毒物質的性質，特性，作用和檢測的學習。

362065 Food toxicology (2S)

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Food toxicology studies how natural or synthetic poisons and toxicants in diverse food products cause harmful or adverse side effects in living organisms. This course covers various aspects of food safety and toxicology, including the study of the nature, properties, effects, and detection of toxic substances in food.

362048 風險溝通(2 選) 下

現今食安事件一再發生，而污染源又極為多元的情況下，與食品安全相關之風險管理措施，已經逐漸受到世界各國之關注。許多國家紛紛透過立法及建立專責機構，強化對現代食品之監督管

理。面對複雜的食物安全風險，風險溝通是進入食品安全生活以及保障我們安全最重要的一個課題。本課程以科學為基礎，學習食品安全風險發生如何積極與大眾溝通之策略。食品安全資訊需要客觀的安全和主觀的安心並存，安全是科學、安心是人性，中間的轉換需要透過正確傳播模式將訊息傳遞到消費者、政府和食品界手中。

362048 Risk communication(2S) S

Food and safety incidents happen again and again, and sources of pollution are extremely diverse, and food safety related risk management measures, has gradually been the concern of all countries in the world. Many countries have adopted laws and established institutions to strengthen the supervision and administration of modern food. In the face of complex food safety risks, risk communication is one of the most important issues for entering a safe food and protecting our safety. This course is based on science and learns strategies for how to actively communicate with the general public. Food safety information requires both objective security and subjective peace of mind. Security is science and peace of mind is human nature.

362078 咖啡製作與實習(2 選)

本課程將教導學生從了解咖啡產地開始，進而了解咖啡果實品種、每個品種的生長環境和狀況及其適種海拔和風味，並了解咖啡果實如何做後製處理和發酵。再學習處理後的咖啡如何烘焙並保留咖啡中原本的物質及咖啡熟豆如何沖煮與萃取，同時藉由實作及參訪咖啡相關產業，使學生學習咖啡製作技術。

362079 Coffee making and practice(2s)

In order to let student learn coffee making technology, several topics will be included in this course:

1. The coffee cherry varieties, growing environment, suitable planting altitude and flavor.
2. How to process and ferment coffee cherry?
3. How to roast coffee and retain the original material in coffee cherry?
4. How to brew coffee?
5. Practice coffee making
6. Visit coffee related industries.

三、 工學院

(一) 機械工程系：

322048 機器人手臂的機構設計

2 選

楊政融、上

本課程將教授各式基礎工業機器人機構運動，包括工業機器人主體部分機構運動、驅動系統部分機構運動、控制系統部分機構運動以及工業機器人四種臂部的運動形式介紹(包括直角坐標型、圓柱坐標型、球坐標型、關節型)。除此之外，也將介紹工業機器人運動中點位型和連續軌跡型的控制機能、具備智能系統的工業機器人(觸覺、力覺與視覺)所需之機構設計。最後，透過兩次專題練習來提升學員對此技術的熟悉程度。

322048 Mechanism Design and Practice in Robot 2S

Yang Cheng-Jung, F

This course will teach the basic mechanism movement of industrial robot, including the movement of the main body part, the drive system, the control system, and the movement of the four types of industrial robots (including rectangular coordinate, coordinate system, spherical coordinate type, joint type). In addition, the mechanism design of the industrial robot (tactile, force and vision) with the intelligent system of the industrial robot in the point of position and continuous trajectory control function will be introduced. In the end, two project exercises will use to help students understand more of this technology.

322049 機器人手臂的機構設計實習

1 選

楊政融、上

本課程將教授各式基礎工業機器人機構運動，包括工業機器人主體部分機構運動、驅動系統部分機構運動、控制系統部分機構運動以及工業機器人四種臂部的運動形式介紹(包括直角坐標型、圓柱坐標型、球坐標型、關節型)。除此之外，也將介紹工業機器人運動中點位型和連續軌跡型的控制機能、具備智能系統的工業機器人(觸覺、力覺與視覺)所需之機構設計。最後，透過兩次專題練習來提升學員對此技術的熟悉程度。

322049 Mechanism Design and Practice in Robot 1S

Yang Cheng-Jung, F

This course will teach the basic mechanism movement of industrial robot, including the movement of the main body part, the drive system, the control system, and the movement of the four types of industrial robots (including rectangular coordinate, coordinate system, spherical coordinate type, joint type). In addition, the mechanism design of the industrial robot (tactile, force and vision) with the intelligent system of the industrial robot in the point of position and continuous trajectory control function will be introduced. In the end, two project exercises will use to help students understand more of this technology.

32072 人工智慧在機器人手臂的應用 2 選

陳永祥、上

這門課程向學生介紹了人工智慧在機器人手臂的應用之基礎知識表達、解決問題和學習方法。幫助學生獲得在不同環境下是如何運用將人工智慧應用在機器人手臂。修完課程後，學生將具備以下的知識：人工智慧的理論是如何應用在機器人手臂上。

32072 Artificial intelligence application in robotic arm 2S

Yung Hsiang Chen, F

This course introduces students to the basic knowledge representation, problem solving, and learning methods of artificial intelligence application in robotic arm. It helps students gain about how artificial intelligence applies to robotic arm under a variety of circumstances. Upon completion of this course, students should be able to understand how artificial intelligence theorems will be applied into robotic arm system.

32073 人工智慧在機器人手臂的應用實習 1 選

陳永祥、上

這門課程向學生介紹了人工智慧在機器人手臂的應用之基礎知識表達、解決問題和學習方法。幫助學生獲得在不同環境下是如何運用將人工智慧應用在機器人手臂。修完課程後，學生將具備以下的知識：人工智慧的理論是如何應用在機器人手臂上。

32073 Artificial intelligence application in robotic arm 1S Yung Hsiang Chen,F

This course introduces students to the basic knowledge representation, problem solving, and learning methods of artificial intelligence application in robotic arm. It helps students gain about how artificial intelligence applies to robotic arm under a variety of circumstances. Upon completion of this course, students should be able to understand how artificial intelligence theorems will be applied into robotic arm system.

322046 機器人手臂的控制系統 2 選 陳金山、上

本課程要旨為介紹工業用機械手臂之控制系統，工業用機械手臂之控制最常用為伺服控制器，其優點為精確、功能大、及擴充性大。課程內容包括：伺服控制系統軟硬體介紹、撰寫程式、安裝及維修。

32046 Control System and Practice of Robot Arm 2S CHEN, CHIN-SHAN , F

The purpose of this course is to introduce the controlsystem of robot arm in industries. The advantages of servo controller are precision and easy-expand. The course includes as follow : Hardware and software of servo control system, Programming of servo control system, Maintaing and Installing of servo control system.

322047 機器人手臂的控制系統實習 1 選 陳金山、上

本課程要旨為介紹工業用機械手臂之控制系統，工業用機械手臂之控制最常用為伺服控制器，其優點為精確、功能大、及擴充性大。課程內容包括：伺服控制系統軟硬體介紹、撰寫程式、安裝及維修。

322047 Control System and Practice of Robot Arm 1S CHEN, CHIN-SHAN , F

The purpose of this course is to introduce the controlsystem of robot arm in industries. The advantages of servo controller are precision and easy-expand. The course includes as follow : Hardware and software of servo control system, Programming of servo control system, Maintaing and Installing of servo control system.

32068 機器人手臂智能感測之實務 3 選 李文宗、上

本課程主要目標為介紹各式應用於機械手臂之感測器之原理、構造、特性、對應電路及其應用等。於課程中安排實習課程，以期培養同學實際動手的能力。感測器內容包含光、電、磁、溫度、濕度、聲音、壓力及化學量(含生化)、近接感測等。

32068 Applications of Smart Sensors for robotic arm 3S Wen-Tzong Lee, Ph.D. 、F

The course aim at systematically introduction of theory and applications of various sensors for robotic arms. The course presents an overview of the state of the art of sensors for robotic arms. Robotic arms sensing mainly gives robotic arm the ability to see, touch, hear and move and uses algorithms that require environmental feedback. It includes commercially available as well as experimental transducers, based on optical, acoustic, capacitive, inductive, resistive, and magnetic sensing principles.

32076 進階機器人手臂智能感測之實務 1 S 李文宗、下

本課程主要目標為介紹各式應用於機械手臂之感測器之原理、構造、特性、對應電路及其應用等。於課程中安排實習課程，以期培養同學實際動手的能力。感測器內容包含光、電、磁、溫度、濕度、聲音、壓力及化學量(含生化)、近階感測等。

Advanced Applications of Smart Sensors for robotic arm 1S Wen-Tzong Lee, Ph.D. 、S

The course aim at systematically introduction of theory and applications of various sensors for

robotic arms. The course presents an overview of the state of the art of sensors for robotic arms. Robotic arms sensing mainly gives robotic arm the ability to see, touch, hear and move and uses algorithms that require environmental feedback. It includes commercially available as well as experimental transducers, based on optical, acoustic, capacitive, inductive, resistive, and magnetic sensing principles.

322044 可程式控制**2 選****陳金山、三上**

本課程要旨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。課程內容包括：控制器軟硬體介紹、撰寫程式、安裝及維修。

322044 Programmable Logic Controller 2S**Chen,Chin-Shan,3F**

The purpose of this course is to introduce the most-used programmable controller (PLC) in industries. The advantages of PLC are precision , easy-use , low-cost ,anti high-temp and easy-expand. The course includes as follow : Hardware and software of PLC,Programming of PLC,Maintaing and Installing of PLC.

322045 可程式控制實習**1 選****陳金山、三上**

本課程要旨為訓練學生能實際操作可程式控制器之能力。包括，程式撰寫，週邊設備架設，系統安裝與維修。

322045 Programmable Logic Controller internship 1S**Chen,Chin-Shan,3F**

The aim of this course is to develop the students with the ability of operating programmable controller. The course's subjects include the PLC programming , the peripherals setup, and systems installation and maintaing.

32062 機電整合**2 選****陳金山、上**

本課程主要學習機電整合系統之相關元件及其基本架構。內容包括控制系統架構及微處理器控制系統介紹、機電特性簡介、運算放大器各種應用電路設計與信號調整、電力控制半導體、感測器、機電元件匹配與介面等。本課並安排電腦實習來輔助正課重點內容學習。

32062 Mechatronics and lab 2S**Chen,Chin-Shan,F**

This course studies the basic practice of electromechanical system components and structures. It introduces basic control system components and configuration, from feedback control system structure and microprocessor-based control system to components realization such as mechanical system design, power driver circuits design and sensor selection; topics include interface circuits between the mechanics and electronics, operational amplifier design and signal conditioning. computer simulatin lab is provided to assist major topics study.

32063 機電整合實習**1 選****陳金山、上**

本課程主要學習機電整合系統之相關元件及其基本架構。內容包括控制系統架構及微處理器控制系統介紹、機電特性簡介、運算放大器各種應用電路設計與信號調整、電力控制半導體、感測器、機電元件匹配與介面等。本課並安排電腦實習來輔助正課重點內容學習。

32063 Mechatronics and lab 2S**Chen,Chin-Shan,F**

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32067 機電整合系統**2 選****陳金山、上**

本課程主要學習機電整合系統之相關元件及其基本架構。內容包括控制系統架構及微處理器控制系統介紹、機電特性簡介、運算放大器各種應用電路設計與信號調整、電力控制半導體、感測器、機電元件匹配與介面等。本課並安排電腦實習來輔助正課重點內容學習。

32067 Mechatronics and lab**2S****Chen,Chin-Shan,F**

This course studies the basic practice of electromechanical system components and structures. It introduces basic control system components and configuration, from feedback control system structure and microprocessor-based control system to components realization such as mechanical system design, power driver circuits design and sensor selection; topics include interface circuits between the mechanics and electronics, operational amplifier design and signal conditioning. computer simulatin lab is provided to assist major topics study.

32067 機電整合系統實習**1 選****陳金山、上**

本課程主要學習機電整合系統之相關元件及其基本架構。內容包括控制系統架構及微處理器控制系統介紹、機電特性簡介、運算放大器各種應用電路設計與信號調整、電力控制半導體、感測器、機電元件匹配與介面等。本課並安排電腦實習來輔助正課重點內容學習。

32067 Mechatronics and lab**1S****Chen,Chin-Shan,F**

This course studies the basic practice of electromechanical system components and structures. It introduces basic control system components and configuration, from feedback control system structure and microprocessor-based control system to components realization such as mechanical system design, power driver circuits design and sensor selection; topics include interface circuits between the mechanics and electronics, operational amplifier design and signal conditioning. computer simulatin lab is provided to assist major topics study.

32069 機器人手臂力覺感測之技術 0.5 選**李文宗、上**

本課程主要目標為介紹各式應用於機械手臂之力覺感測器之原理、構造、特性與應用等。於課程中安排實習課程，以期培養同學實際動手的能力。感測器內容包含負載、應力與壓力感測器等。

Introduction to Mechanics Sensors for Robotic Arm**0.5 S****Wen-Tzong Lee, Ph.D.F**

The course aim at systematically introduction of applications of various mechanics sensors for robotic arms. The course presents an overview of the state of the art of mechanics sensors for robotic arms. It includes commercially available as well as experimental transducers, based on loading, stress and pressure sensors application.

32070 機器人手臂視覺感測之技術 0.5 選**李文宗、上**

本課程主要目標為介紹各式應用於機械手臂之機械視覺原理與其應用。於課程中安排實習課程，以期培養同學實際動手的能力。視覺感測內容包含基礎光學、影像處理與機械視覺等。

32070 Introduction to Machine Vision for Robotic Arm**0.5 S****Wen-Tzong Lee, Ph.D.、F**

The course aim at systematically introduction of applications of machine vision for robotic arms. The course presents an overview of the state of the art of machine vision for robotic arms. It includes optics, image processing and machine vision application.

32070 機器人手臂組裝作業之技術 0.5 選**林宜弘、上**

本課程內容以主題範例導向實務學習培訓學生具有機器手臂的實務技術，課程內容學習主題為手臂組裝作業之操作控制技術，主題範例如下：

1. 6 軸關節零件鉤鎖組裝作業技術
2. Delta 平面型手臂鉤鎖組裝作業技術
3. Scara 手臂鉤鎖組裝作業技術

4. Delta 快速取放包裝作業技術

The Techniques and Practices of Robot Arm Assembly Operation 0.5S Lin,Yi-Hong,F

The objectives of this course will train students with the practical skills of industrial robot arm with learning of application examples orientation- based . The topics of practical learning are as follows:

1. Devices- locked assembly operation technique of 6 Axis Robot arm control.
2. Devices- locked assembly operation technique of Delta Robot arm control.
3. Devices- locked assembly operation technique of Scara Robot arm control.
4. The fast pick-place package operation technique of Delta Robot arm control.

32071 機器人手臂農產品深度加工之技術 0.5 選

林宜弘、上

本課程內容以主題範例導向實務學習培訓學生具有機器手臂的實務技術，課程內容學習主題為手臂農產品深度加工作業之操作控制技術，主題範例如下：

1. 手臂應用於去魚鱗加工之作業技術
2. 手臂應用於削鳳梨皮加工之作業技術
3. 手臂應用於椰子切蓋加工之作業技術
4. 手臂應用於抓取水果加工之作業技術

The Techniques and Practices of Robot Arm Applied to the Deep Processing of

Agricultural Products

0.5S

Lin,Yi-Hong,F

The objectives of this course will train students with the practical skills of industrial robot arm with learning of application examples orientation- based . The topics of practical learning are as follows:

5. Fish scaling operation technique of Robot arm control.
6. Pineapple Peeling operation technique of Robot arm control.
7. Coconut shell cutting operation technique of Robot arm control.
8. Fruit picking operation technique of Robot arm control.

32064 機器人手臂的實務

2 選

林宜弘、下

本課程內容在培訓學生具有工業機器手臂之實務技術，課程內容強調實作能力技術養成，包括工業手臂維修、保養、應用與實務設計。

手臂應用技術為主要重點內容，學習主題如下：

1. 工業機械手臂結合力覺感測技術
2. 工業機械手臂結合視覺感測技術
3. 工業機械手臂之 3D 量測技術
4. 工業機械手臂之組裝技術
5. 工業機械手臂之農產品深度加工技術

32064 The Techniques and Practices of Robot Arm 2S

Lin,Yi-Hong , S

The objectives of this course will train students with the practical skills and knowledge of industrial robot arm technique . The contents of practical learning are among robot repair , maintenance , control, application and design and so on. Above all, the learning in practice is the most important in this course . The topics of practical learning are as follows:

1. Robot arm with force sensor technique.
 2. Robot arm with vision sensor technique
 3. Robot arm applied to 3D measurement technique
 4. Robot arm applied to ensembling technique
- Robot arm applied to deep processes in the agricultural products

32065 機器人手臂的實務實習

1 選

林宜弘、下

本課程內容在培訓學生具有工業機器手臂之實務技術，課程內容強調實作能力技術養成，包括工業手臂維修、保養、應用與實務設計。

手臂應用技術為主要重點內容，學習主題如下：

1. 工業機械手臂結合力覺感測技術

2. 工業機械手臂結合視覺感測技術
3. 工業機械手臂之 3D 量測技術
4. 工業機械手臂之組裝技術
5. 工業機械手臂之農產品深度加工技術

32065 The Techniques and Practices of Robot Arm 1S Lin,Yi-Hong , S

The objectives of this course will train students with the practical skills and knowledge of industrial robot arm technique . The contents of practical learning are among robot repair , maintenance , control, application and design and so on. Above all, the learning in practice is the most important in this course . The topics of practical learning are as follows:

1. Robot arm with force sensor technique.
 2. Robot arm with vision sensor technique
 3. Robot arm applied to 3D measurement technique
 4. Robot arm applied to ensembling technique
- Robot arm applied to deep processes in the agricultural products

32076 進階機器人手臂的實務 1 S 林宜弘、下

本課程內容在培訓學生具有工業機器手臂之進階實務技術，課程內容加強手臂實務設計及控制之能力，學習主題如下：

1. 6 軸關節行手臂設計及控制
2. Delta 平面型手臂設計及控制
3. Scara 手臂設計及控制
4. 手臂之系統整合應用技術

The Techniques and Practices of Advanced Robot Arm 1 S Lin,Yi-Hong ,S

The objectives of this course will train students with the practical skills and knowledge of advanced industrial robot arm technique . The contents of practical learning are focused on the knowledges of robot design and design. The topics of practical learning are as follows:

1. The technique of 6 Axis Robot arm design and control.
2. The technique of Delta Robot arm design and control.
3. The technique of Scara Robot arm design and control.
4. The application of Robot arm integral system.

(二) 車輛工程系：

．電動車輛散熱技術 3 選 王耀男 下

電動車散熱技術為教導學生對電動車輛零組件中需要熱管理部份的基本原理認識，例如馬達散熱流場、散熱水套、水泵、電池模組散熱射系統，以及初步瞭解整個車輛冷凍空調系統，而使學生瞭解電動車散熱技術在綠能車輛工業扮演的角色與任務。

Electrical Vehicle Heat Removal Technique 3 E Y. N. Wang S

This course is aimed to provide some basic concepts for thermal management in electrical vehicle parts, such as motor cooling system, water pump, thermal field analysis for battery module, evaporator and an introduction to vehicle air-conditioning systems. So, students can understand the role and objectives of heat exchanger in the electrical vehicle engineering.

車聯網路基礎與應用 3 選 輪授 下

本課程培養學生認識車輛聯網技術的基礎與應用，從目前世界上的智慧城市發展、未來智慧車輛發展與車輛主動安全的角度，讓學生理解車聯網技術發展趨勢與重要性，藉由學習專用短距無線通訊技術(DSRC)、IEEE802.11p 標準、4.5G LTE-V 和 5G 行動網路的各種通訊協定，閱讀 SAE J2735 和 SAE J2945 標準的車聯網規範，使學生理解車聯網的各種服務、技術發展與實際應用。

Fundamentals and Applications of Vehicle Connected Networks 3 E Rotation S

This course teaches the students to learn the basics and application of connected vehicle network technology. From the current view of global smart city development, the future development of intelligent vehicles, and dynamic safety system in a vehicle, so that students understand the development trend and importance of connected vehicle technology. By the studying various communication protocols of dedicated short-range wireless communication technology (DSRC), IEEE802.11p standard, 4.5G LTE-V and 5G mobile networks. Reading the SAE J2735 and SAE J2945 standard connected vehicle specifications. Finally, students understand the various service, technology development, and practical application.

車輛主動式安全控制與實務 3 選 陳立文 下

車輛主動式安全控制與實務主要是介紹近來車輛上駕駛安全裝置的控制系統，並作模擬分析與控制實驗，所介紹的系統包含車身動態穩定系統、循跡控制系統、陡坡輔助系統、緊急煞車警示系統、防鎖煞車系統、煞車力輔助系統、電子煞車力分配系統等，

Vehicle active safety control system and practice 3 E L. W. Chen S

This course introduces major active safety control system equipped on vehicles. Simulations and practices of those control systems are emphasized in this course. The electronic stability control system, tracking control system, hill hold control system, emergency signal system, anti-skid braking system, brake assist system, electronic brake force distribution system are all included in the lessons.

電動車動力系統設計實務 3 選 蔡建雄 下

本課程將介紹如何制定電動車輛產品輪廓，並且由產品輪廓轉換成動力系統的規格，以及常見的車用馬達與車載 DC-DC 轉換器設計方法與流程說明，並應用商業軟體模擬分析工具，進行虛擬車輛動力系統(HIL)測試。

Design and Practice of Electric Vehicle Powertrain System 3 E C. H. Tsai S

This course introduces the basic principles of electric vehicle (EV) powertrain design. For the first part, the design principles and characteristics of all components in EV powertrain system are introduced. For the second part, this course is also to perform a hardware-in-loop performance test for a virtual EV powertrain system by utilizing commercial simulation software.

自動駕駛電動車概論 3 選 輪授 上

本課程培養學生學習未來無人電動車技術的開發，電動車和自動駕駛系統的結合將是未來智慧車輛科技的趨勢，藉由學習電動車的電控系統、動力系統和充電系統，搭配自動駕駛系統技術的了解，熟悉自動駕駛系統 SAE Lv1~Lv5 的各個等級的自動駕駛系統的能力，使學生理解目前自動駕駛電動車的發展趨勢、設計理念、感測模組技術、主動安全系統設計、電能管理系統控制和決策模組開發技術。

Introduction to Electrical Vehicle Autopilot 3 E Rotation F

This course teaches the students to learn the development of driverless electric vehicle technology for the future. The combination of the electric vehicles and the autonomous driving system will be the trend of intelligent vehicle technology. By the learning of electric control system, power system and charging system in an electric vehicle, and autonomous driving system technology understanding. Familiarizing with the ability of each level of the autonomous driving system in SAE Lv1 ~ Lv5. Finally, students understand the current trend of driverless electric vehicle, design concepts, sensing module technology, dynamic safety system design, power management system and decision-making module development technologies.

底盤系統設計與實務 3 選 黃馨慧 上

本課程介紹了車輛懸吊和制動設計的理論和實務。內容包括基礎懸吊分析、轉彎/轉向特性，制動設計，翻覆中心，極限操控等。本課程內容之產出為一輛實際原型車輛。

Automotive chassis design and practice 3 E S. H. Huang F

This course provides coverage of the theory and practice of vehicle suspension and braking design. The contents including information of basic suspension analysis, cornering/steer characteristics, braking design, roll centers, limit handling. And the output is a prototype of a real vehicle.

車輛外型與結構設計實務 3 選 林章生 上

提供學生車輛外型,工程最佳化,材料和車輛結構的力量/性能的基本概念和分析方法。

Design and practice of appearance and structure of vehicles 3 E C.S. Lin F

To provide students with applications of appearance design and engineering optimization of vehicle, as well as with fundamental concepts and analytical methods on the strength/performance of materials and vehicle structures.

電腦視覺與影像處理 3 選 輪授 上

本課程培養學生具備電腦視覺概念和影像處理的能力，電腦視覺技術為未來交通載具和智慧機器人技術開發的重要感測技術之一，藉由學習電腦視覺的數位影像形成原理、影像處理和分析技術、影像認知與辨識技術，了解電腦視覺如何進行色彩識別、圖形偵測、三維影像建立，並搭配機器學習演算法、分類器演算法和追蹤演算法的介紹，使學生具備使用監督式學習演算法進行影像分群、影像辨識和物體追蹤的能力。

Computer Vision and Image Processing 3 E Rotation F

This course teaches the students to learn the ability of computer vision concepts and image processing. Computer vision technology is one of the important sensing technologies for future traffic vehicles and intelligent robot technology development. By learning digital imaging principle, image processing and analysis technology, image recognition, and identification technology in a computer vision concept. To understand how computer vision for color recognition, graphic detection, and 3D imaging, and to achieve the machine learning algorithm, classifier algorithm and tracking algorithm. Finally, students have the ability to use the supervised learning algorithm for grouping, recognition and object tracking.

自動駕駛模組設計實務 3 選 輪授 上

本課程培養學生熟悉無人自走車內各自動駕駛系統模組的策略設計與原理，藉由學習自動駕駛系統的理論、架構和控制方法，理解車輛行駛的主動安全系統考量和失效模式原理，介紹目前自動駕駛車的各種設計規範與 SAE J3016 標準，使學生具備自動駕駛系統開發的能力，了解自動駕駛車的駕駛軌跡運算和決策演算法策略設計，並結合機器學習方法，進行控制策略設計，以進行智慧化自動駕駛系統的開發。

Autopilot Design Practice for Unmanned Vehicle 3 E Rotation F

This course teaches the students to familiarize with each autonomous driving system module design strategies and principles. By theory, architecture and control methods of learning the autonomous driving system, understand the dynamic safety systems of the vehicle traveling and failure mode principle. It includes introducing the current design specifications of the autonomous driving system and SAE J3016 standard. Finally, students can build the ability of autonomous driving system development, understand the driving trajectory calculation and decision algorithm design of a driverless vehicle, and combine the machine learning method to carry out the control strategy design for the intelligent autonomous driving system development.

車載通訊及大數據分析 3 選 輪授 下

本課程培養學生認識使用車載通訊技術進行大數據資料蒐集的方法，以及大數據分析技術的原理與發展趨勢，從智慧城市技術角度切入大數據技術未來對於智慧車輛發展的影響，使學生理解車間通訊(V2V)、車路通訊(V2I)、車和行人通訊(V2P)和車和網路通訊(V2N)的技術原理和各項應用服務的開發技術，並學習專用短距無線通訊技術(DSRC)、IEEE802.11p 標準、4.5G LTE-V 和 5G 行動網路的各種通訊技術，了解大數據資料蒐集、大數據資料庫建置和非監督式學習資料分析技術。

Vehicular communication and Big Data Analysis

3 E

Rotation

S

This course teaches students to learn the large-scale data collection method by using telematics technology. It also introduces the trends, principles, and impact of big data analysis and intelligence vehicle in the view of a smart city building. Students study the technology development, principles and application services of V2V, V2I, V2P, and V2N. By the studying various communication protocols of dedicated short-range wireless communication technology (DSRC), IEEE802.11p standard, 4.5G LTE-V and 5G mobile networks. Finally, students understand big data collection, big data database construction and data analysis via unsupervised learning.

伺服影像追蹤控制

3 選

輪授

下

本課程培養學生認識使用影像追蹤技術進行伺服馬達控制的方法，透過學習數位影像原理、影像處理技術和影像分析技術，用以建立物體分類、物體辨識、和軌跡追蹤的訓練模型，並結合使用程式語言進行伺服馬達控制、攝影機 PTZ 控制和智慧機器人控制等影像追蹤互動應用軟體的開發，使學生具備即時智慧影像追蹤技術的能力，用以發展智慧機器人和無人自動駕駛車的開發能力。

Visual Servo Tracking Control

3 E

Rotation

S

This course teaches students to learn how to use the object tracking method in the camera to control the servo motor. It can establish the training model of object classification, object identification, and trajectory tracking via studying the digital imaging principle, image processing, and image analysis. By using program language to develop the image tracking interactive application software, such as servo motor control, camera PTZ control and intelligent robot control. Finally, students can obtain the ability of intelligent images tracking development, capabilities of intelligent robots building and driverless vehicle construction.

車輛結構動力學

3 選

林章生

下

提供學生車輛結構動力學的基本理論和解決方法，以及實際振動分析。

Dynamics of Vehicle Structures

3 E

C.S. Lin

S

To provide students with fundamental theory and solution methods of dynamics of vehicle structures, with an emphasis on practical vibration analysis.

影像識別與追蹤實驗

1 選

輪授

下

本課程培養學生具備影像處理與分析技術的能力，讓學生實際錄製真實環境的影像資料或圖片檔案用以建立一影像資料庫，接著從資料前處理開始進行，練習手動進行影像標記程序，並學習在 Linux 作業系統環境進程式撰寫和演算法開發，熟悉使用 OpenCV 和 OpenCL 進行機器學習演算法的程式撰寫，完成資料前處理作業、特徵擷取、特徵最佳化和分類器模型訓練，使學生具備影像辨識和物體追蹤應用程式的開發能力。

Image Recognition and Tracking Experiments

1 E

Rotation

S

This course teaches students to implement the image processing and analysis technologies. Students record the video data and image files in a real environment to build an image database. Then, they carry out the data pre-processing, practice image labeling procedures, and develop in the Linux operating system environment for programming and algorithm. By familiar with the use of OpenCV and OpenCL for machine learning algorithms to complete the data pre-processing, feature extraction, feature

optimization and classifier model training. Finally, students can develop the image recognition and object tracking application.

自動駕駛系統實驗

2 選

輪授

下

本課程培養學生具備自動駕駛系統 SAE Lv4 開發的能力，讓學生進行感測層、決策層和人機介面層的設計，使用 MATLAB 進行 Lidar、Radar、Camera、CAN 資料、OBDII 資料和 GPS 經緯度等車身資料擷取，練習進行障礙物辨識、物體定位、資料時間序列同步和資料融合運算，並將資料融合後結果傳送到決策層，進行自動駕駛系統決策層的路徑規劃、行為決定和軌跡運算開發，最後使用視覺化方式設計人機介面層並呈現其模擬結果。

Autopilot System Experiments

2 E

Rotation

S

This course teaches students to implement the autonomous driving system SAE Lv 4 and design the perception layer, design-maker layer, and human machine interface layer. They learn to capture the ego-vehicle information such as Lidar, Radar, Camera, CAN data, OBDII data and GPS latitude and longitude information by using MATLAB programing. The implementations of obstacle identification, object positioning, data time series synchronization and data fusion calculation, and then send the data to the decision-making layer. During the decision-making layer in driverless car, it needs to build the path planning, behavior decision, and trajectory calculation. Finally, students can perform a human machine interface to show the simulation results.

人工智慧與深度學習

3 選

輪授

上

本課程培養學生熟悉使用深度學習進行人工智慧開發的技術，學習非監督式學習的技術發展、深度學習神經網路架構和各種重要神經網路元件，熟悉大數據資料庫建置、維護、搜尋、分析與相關軟體使用等技術，使學生了解大數據資料庫的架構、環境和建置方法，搭配使用 Python 程式設計進行 CNN、RNN、LSTM 和 DBM 等深度學習演算、訓練及分析數據之特徵，並結合 GPU 加速深度學習的神經網路運算，建置人工智慧系統學習如何自動辨識與分類。

Artificial Intelligence and Deep Learning

3 E

Rotation

F

This course teaches students to study the usage of deep learning techniques for artificial intelligence development. It needs to learn unsupervised learning technology, the neural network architecture of deep learning and a variety of important neural network components. Besides that, familiarize with big data database construction, maintenance, search, analysis and related software usage. Finally, students can understand the structure, environment, and usage of big data database and use Python programming perform CNN, RNN, LSTM, or DBM for learning, training, and analysis of data characteristics. Besides that, students need to combine with GPU to accelerate the neural network computing of deep learning, to build artificial intelligence system to learn how to automatically identify and classify.

電動機驅動電路設計

3 選

余致賢

上

本課程教學以電機驅動為發展主軸，課程著重於馬達驅動理論介紹與電路實作，於實務基礎上授以專業理論，藉以厚植學生實作與問題解決能力。課程內容包括：馬達相位控制(PHASE CONTROLLER)，截流器(CHOPPER)，變流器(INVERTER)，及各式馬達等驅動器之電力電路及驅動電路製作及問題診斷。

Design and Implementation of Electric Motor drive circuit

3 E

C. H. Yu

F

The purpose of this course is to let students possess the ability of motor drive design and implementation. The contents of the course include phase-controlled rectifier and chopper of DC motor, inverter of AC motor, and principle of all kinds of motors' driver and problem diagnosis.

工程最佳化

3 選

林章生

上

提供學生工程最佳化的基本概念和理論，以及設計應用開發數值優化算法的能力。

Engineering Optimization**3 E****C.S. Lin****F**

To provide students with fundamental concepts and theories of engineering optimization, and the ability to develop numerical optimization algorithms for design applications.

數位訊號處理實務**3 選****陳立文****上**

本課程之教學目的在使學生瞭解數位訊號處理的理論基礎及其應用技術。本課程內容包含：離散傅立葉轉換及快速傅立葉轉換、Z-轉換之應用、微分、積分、數位濾波器之設計及其應用、Kalman 濾波器設計、介面技術及程式撰寫、適應性訊號處理理論簡介、工程應用及實作探討。

Practice in digital signal processing**3 E****L. W. Chen****F**

This course introduces the fundamental theory of digital signal processing and its relevant applications. The course content includes: Discrete-time Fourier Transform and Fast Fourier Transform、Z-Transform and its application、Design techniques of differentiator, integrator, digital filter as well as their applications. Design of Kalman filter, interface technology and programming, introduction to adaptive signal processing, Engineering application and implementation discussions.

人工智慧演算法實習**0.5 選****輪授****上**

本課程培養學生熟悉人工智慧技術的原理，首先使學生了解監督式學習的各種機器學習演算法，如 SVM 和 AdaBoost 演算法的理論與其應用，接著介紹類神經網路的理論與發展，說明非監督式學習的深度學習理論基礎與其應用，使學生實際擷取線上各種已標記完成之影像資料庫的資料，搭配使用 MATLAB、WEKA 或 Python 程式語言軟體，完成特徵擷取、特徵選擇、特徵最佳化和分類器模型訓練，並實現人工智慧應用程式。

AI Algorithm Practice**0.5 E****Rotation****F**

This course teaches students to implement the concept of artificial intelligence techniques. First of all, students understand a variety of machine learning algorithms of supervised learning, such as SVM and AdaBoost algorithm theory and its application. Then it introduces the theory and development of the neural network and explains the theoretical basis of unsupervised learning and its application. Finally, students can capture the images which had been labeling from the online image database to perform the feature extraction, feature selection, feature optimization, and classifier training through the MATLAB, WEKA, and Python.

感測器訊號處理實習**0.5 選****輪授****上**

本課程培養學生熟悉各種感測器的數位訊號處理技術，理解各種感測器之測量系統、介面電路和監控電路，使學生透過練習使用程式語言進行嵌入式系統的建置，利用各式感測器模組進行如溫度、濕度、亮度、壓力或電流等感測器訊號的擷取，在嵌入式系統中亦增加通訊模組，用以建置物聯網系統將感測器訊號傳送到後台資料庫，完成一雲端感測器訊號蒐集與物聯網應用軟體。

Sensor Signal Processing Practice**0.5 E****Rotation****F**

This course teaches students to implement the digital signal processing techniques for various sensors, and understand the measurement system of sensors, interface circuit, monitoring circuit. Students can build the embedded system via programing language, and carry out the sensing data collection, such as temperature, humidity, brightness, pressure or current by using sensing module. The embedded system also adds the communication module to construct the internet of thing for sending the sensing data to the database. Finally, students need to complete a cloud sensor signal collection system and the internet of things application software.

傳閱附件 1-4--本校各學院所屬各系(所)課程中英文摘要-管理學院

四、 管理學院

(一)時尚設計與管理系：

流行分析 2 選

以服裝歷史背景來分析流行與社會、文化的關係及其發生的原因與傳播途徑。

Fashion Trend and Forecasting 2 E

Historic analysis of fashion in relation to the social and cultural environment.

傳閱附件 1-5--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

五、 人文暨社會科學院

(一)社會工作系：

社會工作督導專題

3 選

督導是機構提供有效管控服務品質的重要制度，並且是協助社工員提供適當處遇服務的重要機制。本課程的主要目的，是讓學生學習督導方法與技能，使學生具備督導角色扮演能力，在組織中能適當發揮督導功能，有效協助社工員處理實務工作的困難以及專業上的成長。課程內容主要有社會工作督導的理論基礎、被督導經驗的整理與反思、督導關係的建立與經營、督導技巧訓練等。

Seminar of Social Work Supervision **3 E**

Supervision is an important system in place for institutions to effectively monitor the quality of its services, as well as to assist social workers in providing the most appropriate treatment services. The main purpose of this course is to allow students to learn the methods and skills of supervision so that they are capable of playing the role of a supervisor in an organization, and hence be able to assist social workers in dealing with difficulties in practice and promoting professional growth. The core of the course includes the theoretical basis of social work supervision, the reflection on the experience of being supervised, the establishment and management of the supervisory relations, and the training of supervisory skills etc.

社會工作海外專業實習

2 選

本課程旨在提供本系學生海外專業實習，以瞭解國際社會工作實務現況，進而培養學生專業知能。課程目標是開展國際觀，增強學生就業能力。

Overseas Practice of Social Work **2 E**

This course provides the overseas training to students in the department of Social Work. The students will realize current status of international Social Work Practice, and enhance their professional capacity. The goal of this course is to broaden students' global view, and increase career capacity.

原住民族與社會工作專題

3 選

本課程在於介紹原住民社會福利政策與社會工作實務的實踐，以原住民族歷史發展脈絡為基礎，以及對於文化與政治的瞭解，才能瞭解原住民社會福利政策以及社會工作現況的發展及可能的因應策略，並輔以相關的理論基礎(例如反殖民、基變觀點、增權等)來討論原住民社會工作的可能發展。本課程亦將會介紹美國、加拿大、澳洲及紐西蘭等國的原住民社會工作之發展現況。

Seminar in Indigenous Social Work **3 E**

This course would help research students to understand and discuss the political, educational, economic, and social systems of these Indigenous peoples have been influenced by the impact of several different colonial periods. As a result of these colonial experiences, Taiwanese Indigenous groups face similar issues as other Indigenous peoples around the world. Hence, the course would provide relevant theories in terms of indigenous social work and the development of indigenous social work in different countries.

傳閱附件 1-6--本校各學院所屬各系(所)課程中英文摘要-國際學院

六、 國際學院

(一)熱帶農業暨國際合作系：

大數據分析與應用

3 選

廖世義

課程主要在讓國際學生對大數據有基本應用的概念，說明大數據分析應用在農業、製造業、商業行銷、線上零售業、健康照顧和金融業等不同領域，來說明大數據實際的在各產業運用，以滿足國際學生多樣化的背景。因此本課程的目的是讓學生熟悉大數據的應用和相關分析工具，落實在不同的產業面。首先介紹大數據資料的蒐集方法、應用成果、相關的技術分析的概念、資訊倫理與安全，因大數據易面臨到道德倫理等相關議題。同時以真實的資料庫案例進行深度討論與說明大數據應用的優點及限制。第二部分為介紹幾種演算法應用在不同的實際產業，透過應用軟體 STATISTICA v13 的資料探勘模組，如：購物籃分析、決策樹、分群技術等演算法，讓同學熟悉資料探索之應用。本課程期末將要求參與的同學分組進行實務上產業之調查與分析，針對同學感興趣的個案進行大數據的個案分析，撰寫一份期末專案報告，針對實務個案提出幾點經營管理的建議。學生參加完本課程後，將會懂得運用來自不同產業的真實經營數據，且能以解決問題為導向來分析數據後提出經營管理的建議。本課程的目標是要讓學生擁有綜合運用分析技術的能力，並能解決未來就業工作上的實務相關問題。

Big Data Analysis and Applications

3 E

This course provides Big Data concept and applications of Big Data analytics in different fields such as agriculture, manufacturing, marketing, online retailing, health care and banking. The objective of this course is to familiarize student with Big Data analysis as a tool for addressing the application in different fields. The course begins with a basic introduction to big data, as well as associated technical, conceptual and ethical challenges. Strengths and limitations of big data research are discussed in depth using real-world examples. The next part is analysis implementation of actual cases by introducing and applying special algorithms in different fields, familiar with applications of data exploration software as STATISTICA (v13) and its data miner. These specific algorithms include association rules, decision tree, clustering, and classification. Students then engage in case study exercises in which small groups of students develop and present a big data concept for a specific real-world case. Attending this course, students will have an opportunity to access to real data from different industries and know how to analysis the data with problem based learning. The goal by the end of this semester is for student to have “analytics portfolio” consisting of data analytics skill that students can use for their future career

(二)土壤與水工程國際碩士學位學程

田間灌溉實習(1)

1選

待聘，一下

本課程主要目的在提供學生田間土壤水份含量觀測實習的機會，利用本校灌溉試驗場各項土壤水份監測系統之設備學習取得土壤中含水量資料供作灌溉管理之用。

Field Irrigation Practice(1)

1

E

The main objective of this course is to give an opportunity to the students on the methods of soil moisture measuring. By using the soil moisture monitoring facility equipped in the irrigation and drainage experimental field in the campus, the students will learn various techniques of obtaining soil moisture data for the use in irrigation management and research.

水土保持概論**2****選****待聘，一下**

本課程主要目的為研究土地之利用，並保護土地，防止劣化，重建被沖蝕及貧瘠之土地，而且使土壤能保持適當之水分供作物利用，以維持農地之永續生產及收益。其內容包括：沖蝕之原因及沖蝕之過程，再介紹合理利用土地為基礎之水土保持方法，諸如覆蓋、敷蓋、綠肥、等高耕作、輪作、間作、平台階段、山邊溝等農地水土保持方法。

Introduction to Soil and Water Conservation**1****E**

This course is study the proper land use, protecting the land against all forms of soil deterioration, rebuilding eroded and depleted soil, conserving moisture for crop use, proper agricultural drainage and irrigation where needed and increasing yield and farm income. The contents are: Principle of soil erosion, erosion process, practices of soil and water conservation, excoverting, mulching, green manure, contour farming, rotation, interplanting, terrace and hillside ditch etc..

田間灌溉實習(2)**1 選****待聘，二上**

本課程主要目的在提供學生田間土壤水份含量觀測實習的機會，利用本校灌溉試驗場各項土壤水份監測系統之設備學習取得土壤中含水量資料供作灌溉管理之用。

Field Irrigation Practice(2)**1 E**

The main objective of this course is to give an opportunity to the students on the methods of soil moisture measuring. By using the soil moisture monitoring facility equipped in the irrigation and drainage experimental field in the campus, the students will learn various techniques of obtaining soil moisture data for the use in irrigation management and research

(三)觀賞魚科技國際學位專班**水生動物疾病學特論(2)****2 選****吉田 照豐**

本課程講述較深入的水生動物疾病知識尤其著重於發生於臺灣的疾病。內容包括個別疾病之致病因子、致病機序及控制方法。本課程亦介紹最新的水生動物疾病診斷及控制技術，如分子診斷技術、DNA 疫苗、新的生物製劑及增進群體健康的新方法等。

Special Topic on Clincial Aquatic animal Diseases 2 2 E**Terutoyo Yoshida**

This course is to understand the life cycle of pathogens and mechanisms of survival in host cells and diseases in aquaculture, how to enumerate micro-organisms, methodologies to prevent and cure microbial diseases and to handle, manipulate and sampling fish.

魚病與營養免疫(2)**2 選****Kimberly Dawn
Johnstone**

本課程的目的是教導魚類疾病和營養免疫力。課程內容包括疾病對水產養殖系統的影響、魚類重要細菌病原體、魚類的重要病毒病原體、抗體診斷、分子診斷、魚的免疫反應概述、免疫反應的宿主病原體相互作用調節劑、測定魚類免疫反應的方法、疾病控制、疫苗策略和疫苗開發、益生菌和功能性飼料之開發與應用。

Fish diseases and**2 E****Kimberly Dawn**

nutrition immunity 2

Johnstone

The purpose of this course is to teach the fish disease and nutrition immunity. Course contents include the impact of disease on aquaculture systems, important bacterial pathogens of fish, important viral pathogens of fish, antibody-based diagnostics, molecular-based diagnostics, overview of the immune response of fish, host pathogen interactions modulators of the immune response, methods of measuring the immune response of fish, experimental; design disease control in an aquaculture setting, vaccine strategies and vaccine development, the role of fish nutrition in fish health functional feeds, pre and probiotics, and functional feeds immunostimulants.

海洋生物技術(2)

2 選

青木宙

本課程旨在探討水產生物技術在生物資訊、重組 DNA、蛋白質的生產和免疫診斷測試的發展，尤其注重於養殖相關品種和問題。重點是旨在使學生能在廣泛的領域具應用生物技術的實踐經驗。

Marine Biotechnology 2

2 E

Takashi Aoki

The aim of the Aquaculture Biotechnology is to provide in-depth training in bioinformatics, recombinant DNA, protein production, and development of immunodiagnostic tests with a particular focus on species and issues with relevance to aquaculture. The emphasis is on hands-on experience designed to equip students with the confidence of applying biotechnology in a wide range of areas.

傳閱附件 2--「國際熱帶農業科技國際學生產學合作專班」106 學年度入學課程規劃追認案

106-109 學年度熱帶農業暨國際合作系 國際熱帶農業科技學士學位專班-四年制

Department of Tropical Agriculture and International Cooperation Curriculum
International Bachelor Degree in Tropical Agriculture Table for Undergraduate Program, 2017-2020

畢業學分總表

必修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
校定共同必修 學分（一） Required credits for the university	30	9	7	5	5	2	2	0	0	外籍生 Foreign Students
國際學院共同必修 學分（二） Required credits for the college	10	0	2	3	0	0	1	4	0	
系共同必修學分 （三） Required credits for the department	33	6	4	9	6	2	2	1	3	
畢業學分 Credits counted for graduation	外國生必修學分數 Required Credits for Foreign Students					73				合計 Total 130
	外國生選修學分數 Elective Credits for Foreign Students					57				

必修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
備註 Remarks	學生可根據個人興趣以及開課時程自由選擇選修學分的科目，獲得多樣的基礎農業知識。若學生要選擇專業，目前本系提供”動物生產”以及”植物生產”兩種專業。有意選擇專業的學生必須於選修學分中有 (>70%)是來自”動物生產”或是”植物生產”的科目，使得在其畢業證書上加註專業領域。 For elective credits, students can choose courses freely in all fields according to their personal interests and availability of courses, and acquire general and diversified knowledge in agriculture. If a major is desired, the department currently offers two majors, “Animal Production” and “Plant Production”. A student must complete > 70% elective credits in the same major, either “Animal Production” or “Plant Production”, so that the major can be specified on the graduate certificate.									

(一)校定共同必修科目 (Required credits for the University)

必修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1st	2nd	1st	2nd	1st	2nd	1st	2nd	
		semester	semester	semester	semester	semester	semester	semester	semester	
外籍生必修 Required Courses for Foreign Students										
應用華語（1） Applied Mandarin (1)	2	2								
應用華語（2） Applied Mandarin (2)	2		2							
應用華語（3） Applied Mandarin (3)	2			2						
應用華語（4） Applied Mandarin (4)	2				2					
台灣歷史、地理與 文化 History, Geography and Culture in Taiwan	2	2								
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
共同必修 Required Courses All Students										
英文（1） English (1)	2	2								

必修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
英文 (2) English (2)	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							每週上課 2 小時
通識課程 General Education	12	2	2	2	2	2	2			英文授課 通識選項課程： 人 文 學 科 :2 門 (Contemporary Leisure and Health Promotion) 社會科學:3 門 (Social Science) 數理與應用科學:1 門 (Introduction of Geographic Information System and Its Applications)
合 計 Total	30	9	7	5	5	2	2	0	0	外籍生 Foreign Students

(二)國際學院共同必修科目 (Required Courses for the College)

必修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
實務專題 Special Projects	2						1	1		
生態學 Ecology	2		2							
電子計算機概論 Introduction to Computers	0		0							每週上課 2 小時
生物統計/統計學 Biometry/ Statistics	2			2						
生物統計實習/ 統計學實習 Practice of Biometry/ Practice of Statistics	1			1						每週上課 2 小時
永續發展趨勢 Trends in Sustainable Development	3							3		
合 計 Total	10	0	2	3	0	0	1	4	0	

(三)系共同必修 (Required Courses for the Department)

必修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester	
普通化學 General Chemistry	3	3								
普通化學實驗 General Chemistry Lab.	1	1								
農藝園藝概論 Introduction to Agronomy and Horticulture	2	2								
有機化學 Organic Chemistry	2				2					
有機化學實驗 Organic Chemistry Lab.	1				1					
動物科學導論 Introduction to Animal Science	2		2							
食品科學概論 Introduction of Food Science	2		2							
世界養殖概論 Introduction to World Aquaculture	2			2						
行銷學 Marketing	2			2						
生物化學(1) Biochemistry (1)	2			2						
生物化學實驗(1) Biochemistry Lab. (1)	1			1						
微生物學 Microbiology	2				2					
微生物學實習 Practice of Microbiology	1				1					
生物技術 Biotechnology	2					2				
農企業管理 Agribusiness Management	2						2			
國際經濟暨合作 International Economy and Cooperation	2								2	
專題討論 Seminar	2							1	1	輪授 Teacher Rotation
校外實習 (1) Practice of Industrial Training (1)	2			2						暑期實習

合 計 Total	33	6	4	9	6	2	2	1	3	
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(四)專業選修 (Elective Courses)

選修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
植物學 Botany	2	2								植物組 Plant group
植物學實習 Practice of Botany	1	1								植物組 Plant group
作物學 Field Crops	2		2							植物組 Plant group
作物學實習 Practice of Field Crops	1		1							植物組 Plant group
植物生理學 Plant Physiology	3			3						植物組 Plant group
植物生理學實驗 Plant Physiology Lab.	1			1						植物組 Plant group
林產與木材科學 Forest Products and Wood Science	2			2						植物組 Plant group
土壤與肥料 Soil and Fertilizer	2			2						植物組 Plant group
土壤與肥料實習 Practice of Soil and Fertilizer	1			1						植物組 Plant group
植物繁殖技術 Plant Propagation Techniques	2				2					植物組 Plant group
植物繁殖技術實習 Practice of Plant Propagation Techniques	1				1					植物組 Plant group
蔬菜學 Olericulture	2					2				植物組 Plant group
蔬菜學實習 Practice of Olericulture	1					1				植物組 Plant group
花卉學 Floriculture	2					2				植物組 Plant group
花卉學實習 Practice of Floriculture	1					1				植物組 Plant group
植物保護學 Plant Protection	2					2				植物組 Plant group
植物保護學實習 Practice of Plant Protection	1					1				植物組 Plant group

選修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
作物育種學 Crop Breeding	2						2			植物組 Plant group
作物育種學實習 Practice of Crop Breeding	1						1			植物組 Plant group
植物組織培養技術 Plant Tissue Culture Techniques	2						2			植物組 Plant group
植物組織培養技術 實習 Practice of Plant Tissue Culture Techniques	1						1			植物組 Plant group
果樹學 Pomology	2						2			植物組 Plant group
果樹學實習 Practice of Pomology	1						1			植物組 Plant group
農產品生鮮處理技 術 Postharvest Technology of Agricultural Products	2						2			植物組 Plant group
農產品生鮮處理技 術實習 Practice of Postharvest Technology of Agricultural Products	1						1			植物組 Plant group
設施園藝 Horticultural Production Under Structures	2							2		植物組 Plant group
設施園藝實習 Practice of Horticultural Production Under Structures	1							1		植物組 Plant group
造園學 Landscape Architecture	2							2		植物組 Plant group
造園學實習 Practice of Landscape Architecture	1							1		植物組 Plant group
雜草管理 Weed Management	2							2		植物組 Plant group
雜草管理實習 Practice of Weed Management	1							1		植物組 Plant group
草坪管理 Turf Management	2							2		植物組 Plant group

選修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
草坪管理實習 Practice of Turf Management	1							1		植物組 Plant group
作物營養學 Crop Nutrition	2							2		植物組 Plant group
作物營養學實習 Practice of Crop Nutrition	1							1		植物組 Plant group
特用作物學 Special Crops Science	2								2	植物組 Plant group
特用作物學實習 Practice of Special Crops Science	1								1	植物組 Plant group
食用菌栽培 Cultivation of Edible Fungi	2								2	植物組 Plant group
食用菌栽培實習 Practice of Cultivation of Edible Fungi	1								1	植物組 Plant group
動物學 Zoology	2	2								動物組 Animal group
動物學實習 Practice of Zoology	1	1								動物組 Animal group
水產生物學 Aquatic Biology	3	3								動物組 Animal group
動物解剖生理學 Anatomy and Physiology of Animal	3		3							動物組 Animal group
動物解剖生理學實習 Practice of Anatomy and Physiology of Animal	1		1							動物組 Animal group
禽畜環境生理學 Environmental Physiology of Domestic Animals	2		2							動物組 Animal group
牧場實務實習 Practice of Animal Farm	2			1	1					動物組 Animal group
動物舍規劃與自動化 Animal House Arrangement and Automation	2			2						動物組 Animal group

選修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
動物營養學 Animal Nutrition	2				2					動物組 Animal group
水產養殖學 Introduction to Aquaculture	3				3					動物組 Animal group 有實習課 Including Practice
家禽飼養管理 Poultry Feeding and Management	1					1				動物組 Animal group
家禽飼養管理實習 Practice of Poultry Feeding and Management	1					1				動物組 Animal group
豬隻飼養管理 Pig Feeding and Management	1					1				動物組 Animal group
豬隻飼養管理實習 Practice of Pig Feeding and Management	1					1				動物組 Animal group
乳用家畜飼養管理 Dairy Livestock Feeding and Management	1					1				動物組 Animal group
乳用家畜飼養管理 實習 Practice of Feeding and Management in Dairy Livestock	1					1				動物組 Animal group
動物育種學 Animal Breeding	3					3				動物組 Animal group
水族營養學 Fish Nutrition	3					3				動物組 Animal group 有實習課 Including Practice
乳品加工 Processing of Dairy Products	2					2				動物組 Animal group
乳品加工實習 Practice of Dairy Products	1					1				動物組 Animal group
肉品加工 Processing of Meat Products	2						2			動物組 Animal group

選修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
肉品加工實習 Practice of Meat Products	1						1			動物組 Animal group
免疫學概論 Introduction to Immunology	2						2			動物組 Animal group
動物繁殖學 Animal Reproduction	2						2			動物組 Animal group
飼料製造技術 Feed Manufacture Technology	2						2			動物組 Animal group
飼料製造技術實習 Practice of Feed Manufacture Technology	1						1			動物組 Animal group
養殖經營與管理 Aquaculture Business Management	2						2			動物組 Animal group
養殖場實習 Practice of Aquafarm	2							1	1	動物組 Animal group
水族動物疾病學 Aquatic Animal Diseases	3							3		動物組 Animal group 有實習課 Including Practice
動物飼料學 Animal Feeds and Feeding	2							2		動物組 Animal group
禽畜保健與傳染病 防治（1） Livestock Health and Transmissible Diseases (1)	2							2		動物組 Animal group
禽畜保健與傳染病 防治實習（1） Practice of Livestock Health and Transmissible Diseases (1)	1							1		動物組 Animal group
禽畜保健與傳染病 防治（2） Livestock Health and Transmissible Diseases (2)	2								2	動物組 Animal group

選修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
禽畜保健與傳染病 防治實習(2) Practice of Livestock Health and Transmissible Diseases (2)	1								1	動物組 Animal group
水產遺傳育種學 Fish Genetics and Breeding	3								3	動物組 Animal group
寵物科學(1) Pet Science(1)	2					2				動物組 Animal group
寵物科學(2) Pet Science(2)	2						2			動物組 Animal group
養燕學 Apiculture	2							2		植物組 Plant group 動物組 Animal group
養蜂學 Swiftlet Farming	2								2	植物組 Plant group 動物組 Animal group
養蜂學實習 Practice of Swiftlet Farming	1								1	植物組 Plant group 動物組 Animal group
農業數學應用 Mathematical applications in Agriculture	2		2							植物組 Plant group 動物組 Animal group
動植物保護與農業 Animal and Plant Protection and Agriculture	2			2						植物組 Plant group 動物組 Animal group
食品加工與實習 Food Processing and Practice	3			3						植物組 Plant group 動物組 Animal group
食品微生物與實習 Microbes Detection and Practice	3				3					植物組 Plant group 動物組 Animal group
食品殺菌技術與實習 Food Sterilization and Practice	3					3				植物組 Plant group 動物組 Animal group
生物化學(2) Biochemistry (2)	2					2				植物組 Plant group 動物組 Animal group

選修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
生物化學實驗(2) Biochemistry Lab. (2)	1					1				植物組 Plant group 動物組 Animal group
遺傳學 Genetics	2					2				植物組 Plant group 動物組 Animal group
遺傳學實習 Practice of Genetics	1					1				植物組 Plant group 動物組 Animal group
分子生物學 Molecular Biology	2						2			植物組 Plant group 動物組 Animal group
校外實習 (2) Practice of Industrial Training (2)	2					2				植物組 Plant group 動物組 Animal group *可於暑期開 課 Summer Class is available
校外實習 (3) Practice of Industrial Training (3)	2							2		植物組 Plant group 動物組 Animal group *可於暑期開 課 Summer Class is available
食品生物化學 Food Biochemistry	2							2		植物組 Plant group 動物組 Animal group
應用華語 (5) Applied Mandarin (5)	2					2				外籍生 Foreign Students
應用華語 (6) Applied Mandarin (6)	2						2			外籍生 Foreign Students
應用華語 (7) Applied Mandarin (7)	2							2		外籍生 Foreign Students
英文 (3) English (3)				2						
英文 (4) English (4)					2					

選修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
英文 (5) English (5)	2					2				
英文 (6) English (6)	2						2			
鄉村社會學 Rural Sociology	2	2								
工程力學 Engineering Mechanics	3		3							
生產管理 Production Management	3			3						
食品機械 Food Machinery	2			2						
測量學 Surveying	2			2						
測量學實習 Surveying Practice	1			1						
流體力學 Fluid Mechanics	3			3						
流體力學實習 Practice of Fluid Mechanics	0			0						
地理資訊系統概論 Introduction of GIS	2				2					
人力資源管理 Human Resource Management	3				3					
農場企業經營 Farm Business Management	3				3					
食品企業經營 Food Business Management	3				3					
電腦輔助製圖 Computer Aided Drafting	2				2					
土壤物理學 Soil Physics	3				3					
土壤物理學實習 Soil Physics Lab.	1				1					

選修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
水文學 Hydrology	3				3					
財務管理 Financial Management	3					3				
灌溉學 Irrigation	3					3				
灌溉方法 Irrigation Methods	3					3				
生物產業機械 Biological Industry's Machinery	2					2				
生物產業機械實習 Practice of Biological Industry's Machinery	1					1				
農業金融市場 Agricultural Financial Markets	3						3			
策略管理 Strategic Management	3						3			
農業經營組織管理 Agribusiness Organization	3						3			
國際農企業 Transnational Agribusiness	3						3			
基礎工程數學 Fundamental Engineering Mathematics	2						2			
電工學 Electrical Engineering	2						2			
電工學實習 Practice of Electrical Engineering	1						1			
渠道水力學 Open-Channel Hydraulics	3						3			
排水 Drainage	3						3			
水土保持概論 Introduction to Soil and Water Conservation	2						2			

選修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
內燃機 Internal Combustion Engine	2						2			
內燃機實習 Practice of Internal Combustion Engine	1						1			
文獻選讀與寫作 Scientific Reading and Writing	2							2		
農企業投資管理 Agribusiness Investment Management	3							3		
灌溉工程設計與實習 Irrigation Design and Practice	3							3		
油氣壓學 Hydraulics and Pneumatics	2							2		
油氣壓學實習 Practice of Hydraulics and Pneumatics	1							1		
田間灌溉實習(1) Field Irrigation Practice (1)	1							1		
休閒農場經營 Leisure Farm Management	3								3	
田間灌溉實習(2) Field Irrigation Practice (2)	1								1	
地下水 Groundwater	3								3	
水資源工程與規劃 Water Resources Engineering and Planning	3								3	
國際農業發展 International Agriculture Development	2							2		植物組 Plant group 動物組 Animal group
農業自動化概論 Introductory Agricultural Automation	2				2					植物組 Plant group 動物組 Animal group

選修科目總稱 Names of Courses in Chinese and English	學 分 數 No. Credits	第一學年 1 st Academic Year		第二學年 2 nd Academic Year		第三學年 3 rd Academic Year		第四學年 4 th Academic Year		備註 Remarks
		1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	1 st semester	2 nd semester	
農業自動化概論實習 Practices of Introductory Agricultural Automation	1				1					植物組 Plant group 動物組 Animal group
肉品原料與利用 Raw Material Quality and Utilization of Meat	2						2			動物組 Animal group
熱帶蟲害管理 Tropical Insect Pests Management	2				2					植物組 Plant group
農業技術推廣和教育 Agricultural technology extension and education	2				2					植物組 Plant group 動物組 Animal group
基礎植物保護 Fundamentals of Plant Protection	2				2					植物組 Plant group
熱帶農業栽培系統 Agriculture in tropical regions	2				2					植物組 Plant group
醱酵生產技術與實習 Fermented Food Processing and Practice	3								3	植物組 Plant group 動物組 Animal group
合 計 Total	283	11	14	31	45	53	62	46	29	

熱帶農業暨國際合作 系(所) 大學部

課程與核心能力關聯表

【共同必修】			
科目名稱 \ 核心能力項目	1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.
普通化學 General Chemistry	✓		
普通化學實驗 General Chemistry Lab.	✓		
有機化學 Organic Chemistry	✓		
有機化學實驗 Organic Chemistry Lab.	✓		
農藝園藝概論 Introduction to Agronomy and Horticulture	✓	✓	
動物科學導論 Introduction to Animal Science	✓	✓	
食品科學概論 Introduction of Food Science	✓	✓	
世界養殖概論 Introduction to World Aquaculture	✓		
行銷學 Marketing	✓	✓	✓
生物化學(1) Biochemistry (1)	✓		
生物化學實驗(1) Biochemistry Lab. (1)	✓		
微生物學 Microbiology	✓		✓
微生物學實習 Practice of Microbiology	✓		✓
生物技術 Biotechnology	✓	✓	
農企業管理 Agribusiness Management	✓	✓	
專題討論 Seminar		✓	✓
國際經濟暨合作			✓

【共同必修】			
科目名稱 \ 核心能力項目	1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.
International Economy and Cooperation			
生態學 Ecology	√	√	

【專業選修】			
科目名稱 \ 核心能力項目	1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	3. 具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.
植物學 Botany	✓	✓	
植物學實習 Practice of Botany	✓	✓	
作物學 Field Crops	✓	✓	
作物學實習 Practice of Field Crops	✓	✓	
植物生理學 Plant Physiology	✓	✓	
植物生理學實驗 Plant Physiology Lab.	✓	✓	
林產與木材科學 Forest Products and Wood Science	✓	✓	✓
植物繁殖技術 Plant Propagation Techniques	✓	✓	
植物繁殖技術實習 Practice of Plant Propagation Techniques	✓	✓	
蔬菜學 Olericulture	✓	✓	✓
蔬菜學實習 Practice of Olericulture	✓	✓	✓
土壤與肥料 Soil and Fertilizer	✓	✓	
土壤與肥料實習 Practice of Soil and Fertilizer	✓	✓	
植物組織培養技術 Plant Tissue Culture Techniques	✓	✓	✓
植物組織培養技術實習 Practice of Plant Tissue Culture Techniques	✓	✓	✓
花卉學 Floriculture	✓	✓	✓
花卉學實習 Practice of Floriculture	✓	✓	✓

【專業選修】			
科目名稱 \ 核心能力項目	1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.
植物保護學 Plant Protection	✓	✓	✓
植物保護學實習 Practice of Plant Protection	✓	✓	✓
作物育種學 Crop Breeding	✓	✓	✓
作物育種學實習 Practice of Crop Breeding	✓	✓	✓
果樹學 Pomology	✓	✓	✓
果樹學實習 Practice of Pomology	✓	✓	✓
特用作物學 Special Crops Science	✓	✓	
特用作物學實習 Practice of Special Crops Science	✓	✓	
設施園藝 Horticultural Production Under Structures	✓	✓	
設施園藝實習 Practice of Horticultural Production Under Structures	✓	✓	
雜草管理 Weed Management	✓	✓	✓
雜草管理實習 Practice of Weed Management	✓	✓	✓
草坪管理 Turf Management	✓	✓	✓
草坪管理實習 Practice of Turf Management	✓	✓	✓
作物營養學 Crop Nutrition Management and Diagnostic Techniques	✓	✓	
作物營養學實習 Practice of Crop Nutrition Management and Diagnostic Techniques	✓	✓	
造園學 Landscape Architecture	✓	✓	

【專業選修】			
科目名稱 \ 核心能力項目	1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.
造園學實習 Practice of Landscape Architecture	✓	✓	
食用菌栽培 Cultivation of Edible Fungi	✓	✓	
食用菌栽培實習 Practice of Cultivation of Edible Fungi	✓	✓	
動物學 Zoology	✓	✓	
動物學實習 Practice of Zoology	✓	✓	
水產生物學 Aquatic Biology		✓	
養殖場經營管理 Aquaculture Business Management	✓	✓	✓
動物解剖生理學 Anatomy and Physiology of Animal	✓	✓	✓
動物解剖生理學實習 Practice of Anatomy and Physiology of Animal	✓	✓	✓
牧場實務實習 Practice of Animal Farm	✓	✓	✓
動物舍規劃與自動化 Animal House Arrangement and Automation	✓	✓	✓
動物營養學 Animal Nutrition	✓	✓	✓
水產養殖學 Introduction to Aquaculture		✓	✓
家禽飼養管理 Poultry Feeding and Management	✓	✓	✓
家禽飼養管理實習 Practice of Poultry Feeding and Management	✓	✓	✓
豬隻飼養管理 Pig Feeding and Management	✓	✓	✓

【專業選修】			
科目名稱 \ 核心能力項目	1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.
豬隻飼養管理實習 Practice of Pig Feeding and Management	✓	✓	✓
乳用家畜飼養管理 Dairy Livestock Feeding and Management	✓	✓	✓
乳用家畜飼養管理實習 Practice of Feeding and Management in Dairy Livestock	✓	✓	✓
動物育種學 Animal Breeding	✓	✓	✓
水族營養學 Fish Nutrition and Feed	✓	✓	✓
乳品加工 Processing of Dairy Products	✓	✓	
乳品加工實習 Practice of Dairy Products	✓	✓	
肉品加工 Processing of Meat Products	✓	✓	
肉品加工實習 Practice of Meat Products	✓	✓	
免疫學概論 Introduction to Immunology	✓	✓	✓
動物繁殖學 Animal Reproduction	✓	✓	✓
飼料製造技術 Feed Manufacture Technology		✓	
飼料製造技術實習 Practice of Feed Manufacture Technology		✓	
養殖場實習 Practice of Aquafarm	✓	✓	✓
水族動物疾病學 Aquatic Animal Diseases	✓	✓	✓
動物飼料學 Animal Feeds and Feeding	✓	✓	
禽畜保健與傳染病防治(1) Livestock Health and Transmissible Diseases (1)	✓	✓	✓

【專業選修】			
科目名稱 \ 核心能力項目	1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.
禽畜保健與傳染病防治實習(1) Practice of Livestock Health and Transmissible Diseases (1)	✓	✓	✓
禽畜保健與傳染病防治(2) Livestock Health and Transmissible Diseases (2)	✓	✓	✓
禽畜保健與傳染病防治實習(2) Practice of Livestock Health and Transmissible Diseases (2)	✓	✓	✓
禽畜環境生理學 Environmental Physiology of Domestic Animals	✓	✓	
水產遺傳育種學 Fish Genetics and Breeding	✓	✓	✓
寵物科學(1) Pet Science(1)	✓		
寵物科學(2) Pet Science(2)	✓		
養燕學 Apiculture	✓	✓	
養蜂學 Swiftlet Farming	✓	✓	
養蜂學實習 Practice of Swiftlet Farming	✓	✓	
食品加工與實習 Food Processing and Practice	✓	✓	
食品微生物與實習 Microbe Detection and Practice	✓	✓	
食品殺菌技術與實習 Food Sterilization and Practice	✓	✓	
分子生物學 Molecular Biology	✓	✓	
食品生物化學 Food Biochemistry	✓	✓	
應用華語(5) Applied Mandarin (5)		✓	
應用華語(6) Applied Mandarin (6)		✓	
應用華語(7)		✓	

【專業選修】				
科目名稱	核心能力項目	1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	3. 具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.
Applied Mandarin (7)				
英文 (3) English (3)				✓
英文 (4) English (4)				✓
英文 (5) English (5)				✓
英文 (6) English (6)				✓
財務管理 Financial Management			✓	✓
工程力學 Engineering Mechanics			✓	✓
生產管理 Engineering Mechanics			✓	
食品機械 Food Machinery	✓		✓	
測量學 Surveying			✓	
測量學實習 Surveying Practice			✓	
流體力學 Fluid Mechanics			✓	✓
流體力學實習 Practice of Fluid Mechanics			✓	✓
地理資訊系統概論 Introduction of GIS	✓		✓	
生物化學 (2) Biochemistry (2)	✓			
生物化學實驗 (2) Biochemistry Lab.(2)	✓			
肉品原料與利用 Raw Material Quality and Utilization of Meat	✓		✓	
人力資源管理 Human Resource Management			✓	✓
農場企業經營 Farm Business Management			✓	✓
食品企業經營			✓	✓

【專業選修】			
科目名稱 \ 核心能力項目	1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.
Food Business Management			
電腦輔助製圖 Computer Aided Drafting		✓	✓
土壤物理學 Soil Physics		✓	✓
土壤物理學實習 Soil Physics Lab.		✓	✓
水文學 Hydrology		✓	✓
灌溉學 Irrigation		✓	
灌溉方法 Irrigation Methods		✓	
生物產業機械 Biological Industry's Machinery		✓	✓
生物產業機械實習 Biological Industry's Machinery Lab.		✓	✓
農業金融市場 Agricultural Financial Markets		✓	✓
策略管理 Strategic Management		✓	✓
農業經營組織管理 Agribusiness Organization		✓	✓
國際農企業 Transnational Agribusiness		✓	✓
基礎工程數學 Fundamental Engineering Mathematics		✓	✓
電工學 Electrical Engineering		✓	✓
電工學實習 Electrical Engineering Lab.		✓	✓
渠道水力學 Open-Channel Hydraulics		✓	✓
排水 Drainage		✓	✓

【專業選修】			
科目名稱 \ 核心能力項目	1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.
水土保持概論 Introduction to Soil and Water Conservation	✓	✓	✓
內燃機 Internal Combustion Engine		✓	✓
內燃機實習 Internal Combustion Engine Lab.		✓	✓
文獻選讀與寫作 Scientific Reading and Writing			✓
農企業投資管理 Agribusiness Investment Management	✓	✓	✓
灌溉工程設計與實習 Irrigation Design and Practice		✓	
油氣壓學 Hydraulics and Pneumatics		✓	✓
油氣壓學實習 Practice of Hydraulics and Pneumatics		✓	✓
田間灌溉實習(一) Field Irrigation Practice (1)		✓	✓
休閒農場經營 Leisure Farm Management		✓	✓
田間灌溉實習(二) Field Irrigation Practice (2)		✓	✓
地下水 Groundwater		✓	✓
水資源工程與規劃 Water Resources Engineering and Planning	✓	✓	
農業數學應用 Mathematical applications in Agriculture		✓	✓
動植物保護與農業 Animal and Plant Protection and Agriculture	✓	✓	✓
鄉村社會學 Rural Sociology	✓		
遺傳學	✓	✓	

【專業選修】				
科目名稱	核心能力項目	1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	3. 具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.
Genetics				
遺傳學實習 Practice of Genetics	✓	✓		
養殖經營與管理 Aquaculture Business Management	✓	✓		
肉品原料與利用 Raw Material Quality and Utilization of Meat	✓	✓		
農業自動化概論 Introductory Agricultural Automation	✓	✓		
農業自動化概論實習 Practices of Introductory Agricultural Automation	✓	✓		
國際農業發展 International Agriculture Development		✓	✓	
校外實習（1） Industrial Training(1)		✓	✓	
校外實習（2） Industrial Training(2)		✓	✓	
校外實習（2） Industrial Training(2)		✓	✓	

熱帶農業暨國際合作 系(所) 大學部 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	1.培養生物學技術。 Develop skills in biological theory. 2.具資訊處理編排能力。 Demonstrate information handling and organization. 3.具科學儀器操作技能。 Demonstrate skill in operating scientific equipment.	1.生物化學 Biochemistry 2.生物化學實習 Biochemistry Lab 3.有機化學 Organic Chemistry 4.有機化學實驗 Organic Chemistry Lab. 5.食品生物化學 Food Biochemistry 6.普通化學(1) General Chemistry (1) 7.普通化學實習 (1) General Chemistry Lab. (1)	筆試及實做測驗 Written and Technical Skills exam.
2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	1.團隊合作 Demonstrate team work. 2.具資訊處理編排能力。 Demonstrate ability of handling and organizing information. 3.具公眾演說及學術寫作能力。 Demonstrate skills in public speaking and academic writing.	1.國際農業發展 International Agriculture Development. 2.專題討論 Seminar	1.學生口頭報告 Student Presentations. 2.筆試及口試 Written and Oral Exams.
3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.	1.團隊合作。 Demonstrate Team work. 2.培養儀器操作技巧。 Develop skills in operating equipment. 3.具國際農業系統了解能力。 Demonstrate understanding of international	1.國際農業發展 International Agriculture Development. 2.校外實習 (1) Practice of industrial training (1)	筆試及口試 Written and Oral Exams.

	<p>agriculture systems.</p> <p>4.具危機思考能力。 Demonstrate critical thinking.</p>	<p>3.校外實習（2） Practice of industrial training（2）</p> <p>4.校外實習（3） Practice of industrial training（3）.</p>	
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熱帶農業暨國際合作 系(所) 大學部 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	1.具備基本地理資訊系統相關之能力。 Demonstration of basic knowledge of GIS. 2.具備基本林產製造知識。 Demonstration of basic knowledge of forest products.	1.地理資訊系統概論 Introduction of GIS 2.林產與木材科學 Forest Products and Wood Science	進行筆試與實際操作評估 Evaluation by written exam and field exam.
2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	具備應用地理資訊系統或林產之專業知能於相關農業生產。 Demonstration of professional ability to apply GIS or forest knowledge in agricultural practice.	1.地理資訊系統概論 Introduction of GIS 2.林產與木材科學 Forest Products and Wood Science	進行筆試與實際操作評估 Evaluation by written exam and field exam.
3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.	以英文上課因此具備參相關之國際合作之語文能力。 Class is taught in English to ensure the language ability in international cooperation project.	1.地理資訊系統概論 Introduction of GIS 2.林產與木材科學 Forest Products and Wood Science	以英文進行檢核其學習成效 All evaluations are conducted in English.

熱帶農業暨國際合作 系(所) 大學部 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	1.具備農園藝作物量產技術之能力 Demonstration of the ability to mass propagate agricultural and horticultural crops	1.植物組織培養技術 Plant tissue culture techniques 2.植物組織培養技術實習 Practice of plant tissue culture techniques 3.植物繁殖與保存 Plant Propagation and conservation 4.植物繁殖與保存實習 Practice of Plant Propagation and conservation 5.植物保護學 Plant Protection 6.植物保護學實習 Practice of Plant Protection 7.動植物保護與農業 Animal and Plant Protection and Agriculture	1.進行筆試檢視學生學習成效 Classroom examination to evaluate the learning performance of the students 2.田間和實驗室實際操作檢視學生操作技術 Field and laboratory practices to evaluate the technical skills of the students 3.繳交書面報告檢視學生資料蒐集及彙整的能力 Written reports to evaluate students' ability to collect and analyze data
2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	2.具備農園藝作物周年生產的能力 Demonstration of the ability to conduct year-round production of agricultural and horticultural crops	1.植物組織培養技術 Plant tissue culture techniques 2.植物組織培養技術實習 Practice of plant tissue culture techniques	1.進行筆試檢視學生學習成效 Classroom examination to evaluate the learning performance of the students

		習 Practice of plant tissue culture techniques 3.植物繁殖技術 Plant Propagation Techniques 4.植物繁殖技術實習 Practice of Plant Propagation Techniques 5.植物保護學 Plant Protection 6.植物保護學實習 Practice of Plant Protection 7.動植物保護與農業 Animal and Plant Protection and Agriculture 8.養蜂學 Swiftlet Farming 9.養蜂學實習 Practice of Swiftlet Farming	2.田間和實驗室實際操作檢視學生操作技術 Field and laboratory practices to evaluate the technical skills of the students 3.繳交書面報告檢視學生資料蒐集及彙整的能力 Written reports to evaluate students' ability to collect and analyze data
3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.	1.以英文上課因此具備參相關之國際合作之語文能力。 Class is taught in English to ensure the language ability in international cooperation project.	1.植物組織培養技術 Plant tissue culture techniques 2.植物組織培養技術實習 Practice of plant tissue culture techniques 3.植物繁殖與保存 Plant Propagation and conservation	

		<p>4.植物繁殖與保存實習 Practice of Plant Propagation and conservation</p> <p>5.植物保護學 Plant Protection</p> <p>6.植物保護學實習 Practice of Plant Protection</p> <p>7.動植物保護與農業 Animal and Plant Protection and Agriculture</p> <p>8.養蜂學 Swiftlet Farming</p> <p>9.養蜂學實習 Practice of Swiftlet Farming</p>	
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熱帶農業暨國際合作 系(所) 大學部 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	1.具備特用作物栽培與利用之能力 Demonstration of the ability to cultivate and process special crops 2. 具備植物生理相關知識 Demonstration of the knowledge related to plant physiology	1.特用作物學 Special crop science 2.特用作物實習 Practice of special crop science 3.植物生理學 Plant Physiology 4.植物生理學實驗 Plant Physiology Lab. 5.作物學 Field Crops 6.作物學實習 Practice of Field Crops 7. 植物學 Botany 8. 植物學實習 Practice of Botany	1.進行筆試檢視學生學習成效 Classroom examination to evaluate the learning performance of the students 2.現場實際操作檢視學生技術應用之能力 Field and laboratory practices to evaluate the technical skills of the students 3.繳交書面報告檢視學生資料蒐集及彙整的能力 Written reports to evaluate students' ability to collect and analyze data
2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	1.具開發新特用作物之能力 Demonstration of the ability to explore potential new special crops 2.具植物生理知識屆以發展作物 Demonstrate of the knowledge in plant	1.特用作物學 Special crop science 2.特用作物實習 Practice of special	1.進行筆試檢視學生學習成效 Classroom examination to evaluate the learning performance of the students 2.現場實際操作檢視學生技術應用之

	physiology to produce crops	crop science 3.植物生理學 Plant Physiology 4. 植物生理學實驗 Plant Physiology Lab. 5. 作物學 Field Crops 6. 作物學實習 Practice of Field Crops 7. 植物學 Botany 8. 植物學實習 Practice of Botany	能力 Field and laboratory practices to evaluate the technical skills of the students 3.繳交書面報告檢視學生資料蒐集及彙整的能力 Written reports to evaluate students' ability to collect and analyze data
3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.			

熱帶農業暨國際合作 系(所) 大學部 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	1.具庭園景觀設計之能力 Demonstration of the ability to design gardens	造園學 Landscape architecture 造園學實習 Practice of landscape architecture	1.進行筆試檢視學生學習成效 Classroom examination to evaluate the learning performance of the students
2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	2.具庭園景觀施工與維護之能力 Demonstration of the ability to construct and maintain gardens	造園學 Landscape architecture 造園學實習 Practice of landscape architecture	2.實地操作檢視學生庭園設計與施工之能力 Field practice to evaluate the ability of the students to design and construct gardens.
3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.			

熱帶農業暨國際合作 系(所) 大學部 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	1.認知世界農糧食作物生產情形、供需概況及未來展望 Knowledge of world crop production, food supply and demand, and the future development 2.認識農業歷史、農藝作物特徵、生育情形、生產方式及生態角色 Understanding the development of agriculture, botany of food crops, crop growth and improvement, and agroecosystems 3.具備栽種一般農藝作物及園藝作物之基本技能 Ability to grow general agronomic and horticultural crops 4.認識各種作物、生產系統及影響作物之環境因子 Knowledge of basic principles of crop science: science of crop plants and soil, development of crop production, and environmental factors affecting crops 5.具備栽種糧食作物之基本技能 Ability to cultivate food crops 6.認識土壤與肥料之基本特性、功能及與作物之關係 Knowledge of soil science and fertilizers, their functions, and relationships with crop plants 7.具備分析土壤物理化學性質及肥料施用之技能 Skills in basic soil analysis and fertilizer application 8.具備植物保護之基本技能 Ability to protect plants 9.具備作物育種之基本技能	1.農藝園藝概論 Introduction to Agronomy and Horticulture 2.作物學 Field Crops 3.作物學實習 Practice of Field Crops 4.土壤與肥料 Soil and Fertilizer 5.土壤與肥料實習 Practice of Soil and Fertilizer 6.植物保護學 Plant Protection 7.植物保護學實習 Practice of Plant Protection 8.作物育種學 Crop Breeding 9.作物育種學實習 Practice of Crop Breeding 10.蔬菜學 Olericulture 11.蔬菜學實習 Practice of Olericulture 12.花卉學 Floriculture 13.花卉學實習	1.課堂答問 A & Q in the class 2.筆試 Paper test 3.報告 Report 4.實際操作 Practice

	Ability to breed crops	<p>Practice of Floriculture</p> <p>14. 雜草管理 Weed Management</p> <p>15. 雜草管理實習 Practice of Weed Management</p> <p>16. 草坪管理 Turf Management</p> <p>17. 草坪管理實習 Practice of Turf Management.t</p> <p>18. 作物營養學 Crop Nutrition</p> <p>19. 作物營養學實習 Practice of Crop Nutrition</p> <p>20. 鄉村社會學 Rural Sociology</p> <p>21. 果樹學 Pomology</p> <p>22. 果樹學實習 Practice of Pomology</p> <p>23. 設施園藝 Horticultural Production Under Structures</p> <p>24. 設施園藝實習 Practice of Horticultural Production Under Structures</p> <p>25.養蜂學 Swiftlet Farming</p> <p>26.養蜂學實習 Practice of Swiftlet Farming</p>	
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<p>2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.</p>	<p>1.認識作物營養失調症狀、診斷技術、管理原則與改善方法。 Knowledge of nutrient disorder symptoms of crops, analysis technique, managing and improving methods.</p> <p>2.具備診斷及改善作物營養失調症狀之技能 Ability to identify and improve crop nutrition problems</p>	<p>1.作物營養學 Crop Nutrition</p> <p>2.作物營養學實習 Practice of Crop Nutrition</p> <p>3.植物保護學 Plant Protection</p> <p>4.植物保護學實習 Practice of Plant Protection</p> <p>5.作物育種學 Crop Breeding</p> <p>6.作物育種學實習 Practice of Crop Breeding</p> <p>7. 蔬菜學 Olericulture</p> <p>8.蔬菜學實習 Practice of Olericulture</p> <p>9.花卉學 Floriculture</p> <p>10.花卉學實習 Practice of Floriculture</p> <p>11. 雜草管理 Weed Management</p> <p>12. 雜草管理實習 Practice of Weed Management</p> <p>13. 草坪管理 Turf Management</p> <p>14. 草坪管理實習 Practice of Turf Management</p> <p>16. 造園學</p>	<p>1.課堂答問 A & Q in the class</p> <p>2.筆試 Paper test</p> <p>3.報告 Report</p> <p>4.實際操作 Practice</p>
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		Landscape Architecture 17. 造園學實習 Practice of Landscape Architecture 18. 果樹學 Pomology 19. 果樹學實習 Practice of Pomology 20. 設施園藝 Horticultural Production Under Structures 21. 設施園藝實習 Practice of Horticultural Production Under Structures	
3. 具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.	1. 具備參與國際合作計畫所需之國際農業發展、農藝園藝概論、作物學、土壤與肥料及作物營養管理與診斷技術等相關知識及分析診斷技能 Ability to contribute tropical agriculture related knowledge and skill at international level	1. 農藝園藝概論 Introduction to Agronomy and Horticulture 2. 作物學 Field Crops 3. 作物學實習 Practice of Field Crops 4. 土壤與肥料 Soil and Fertilizer 5. 土壤與肥料實習 Practice of Soil and Fertilizer 6. 作物營養學 Crop Nutrition 7. 作物營養學實習 Practice of Crop Nutrition 9. 花卉學 Floriculture 10. 花卉學實習	1. 課堂答問 A & Q in the class 2. 筆試 Paper test 3. 報告 Report 4. 實際操作 Practice

		<p>Practice of Floriculture</p> <p>11. 果樹學</p> <p>Pomology</p> <p>12. 果樹學實習</p> <p>Practice of Pomology</p> <p>13. 蔬菜學</p> <p>Olericulture</p> <p>14. 蔬菜學實習</p> <p>Practice of Olericulture</p> <p>16. 雜草管理</p> <p>Weed Management</p> <p>17. 雜草管理實習</p> <p>Practice of Weed</p> <p>18. 草坪管理</p> <p>Turf Management</p> <p>19. 草坪管理實習</p> <p>Practice of Turf Management</p> <p>20. 作物育種學</p> <p>Crop Breeding</p> <p>21. 作物育種學實習</p> <p>Practice of Crop Breeding</p> <p>22. 設施園藝</p> <p>Horticultural Production Under Structures</p> <p>23. 設施園藝實習</p> <p>Practice of Horticultural Production Under Structures</p>	
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熱帶農業暨國際合作 系(所) 大學部 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	1.具備基本國際經濟暨合作知識 Demonstration of the basic knowledge of international economic and Cooperation 2.具備基本國際農業發展知識 Demonstration of the basic knowledge of international agricultural development 3.具備基本農企業管理知識 Demonstration of the basic knowledge of agricultural business management 4.具備基本農業經濟知識 Demonstration of the basic knowledge of agricultural economics 5.具備基本經營、管理及行銷之知識 Demonstration of the basic knowledge of operation, management and marketing	1.國際經濟暨合作 International Economy and Cooperation 2.農企業管理 Agribusiness Management 3.行銷學 Marketing 4.農企業投資管理 Agribusiness Investment Management	1.作業指派及進行筆試檢視學生應具備的基礎知識 Evaluation by homework assignments and comprehensive exam. to ensure students' ability of comprehension. 2.分組報告並繳交書面報告檢視學生分組報告及彙整相關資料的能力 Evaluation by both oral and written reports to ensure students' ability of collecting and integrating information.
2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	1.具備應用國際經濟的知識於農業生產上。 Demonstration of the ability of applying the knowledge of international economy and cooperation in agricultural practice. 2.具備應用農業政策發展及行銷的知識於農業生產上。 Demonstration of the ability of applying the knowledge of agricultural policy and development, and agricultural marketing in agricultural practice. 3.具備農企業管理及營運的能力。 Demonstration of the ability of applying the knowledge and skills of management and	1.國際經濟暨合作 International Economy and Cooperation 2.農企業管理 Agribusiness Management 3.行銷學 Marketing 4.生產管理 Production Management 5.人力資源管理	1.作業指派及進行筆試，檢視學生應具備的基礎知識。 Evaluation by homework assignments and comprehensive exam. to ensure students' ability of comprehension. 2.分組報告並繳交書面報告，檢視學生分組報告及彙整相關資料的能力。 Evaluation by both oral and written reports to ensure students' ability of collecting and integrating information.

	<p>accounting in agricultural practice</p> <p>4.具備應用經濟學之知識於農業生產上。 Demonstration of the ability of applying the knowledge of economics in agricultural practice.</p> <p>5.具備應用基本經營、管理及行銷之知識於農業生產上。 Demonstration of the ability of applying the knowledge and skills of marketing in agricultural practice.</p>	<p>Human Resource Management</p> <p>6.農場企業經營 Farm Business Management</p> <p>7.食品企業經營 Food Business Management</p> <p>8. 財務管理 Financial Management</p> <p>9.農業金融市場 Agricultural Financial Markets</p> <p>10.策略管理 Strategic Management</p> <p>11. 農業經營組織管理 Agribusiness Organization</p> <p>12.國際農企業 Transnational Agribusiness</p> <p>13.基礎工程數學 Fundamental Engineering Mathematics</p> <p>14.農企業投資管理 Agribusiness Investment Management</p> <p>15.休閒農場經營 Leisure Farm</p>	
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		Management 16. 農業數學應用 Mathematical applications in Agriculture	
3. 具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.	1. 具備國際市場的經濟的概念，並能相互合作發揮所長的能力 Demonstration of the ability of applying the knowledge of international economy and cooperation to participate in international projects. 2. 具備良好的外語溝通、寫作、閱讀的能力 Demonstration of the ability of communication, writing, and reading in English. 3. 具備收集國際農業相關資訊，並有解決問題的能力。 Demonstration of the ability of search and integrate international agriculture-related information, and problem-solving skills.	1. 國際經濟暨合作 International Economy and Cooperation 2. 農企業管理 Agribusiness Management 3. 行銷學 Marketing 4. 人力資源管理 Human Resource Management 5. 農場企業經營 Farm Business Management 6. 食品企業經營 Food Business Management 7. 財務管理 Financial Management 8. 農業金融市場 Agricultural Financial Markets 9. 策略管理 Strategic Management 10. 農業經營組織管理	1 作業指派及進行筆試檢視學生應具備的基礎知識 Evaluation by homework assignments and comprehensive exam. to ensure students' ability of comprehension. 2. 分組報告並繳交書面報告檢視學生分組報告及彙整相關資料的能力 Evaluation by both oral and written reports to ensure students' ability of collecting and integrating information.

		<p>Agribusiness Organization 11.國際農企業 Transnational Agribusiness 12.基礎工程數學 Fundamental Engineering Mathematics 13.農企業投資管理 Agribusiness Investment Management 14.休閒農場經營 Leisure Farm Management 15.農業數學應用 Mathematical applications in Agriculture</p>	
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熱帶農業暨國際合作 系(所) 大學部 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	1.具備基因知識 With the knowledge of genes 2.具備染色體遺傳分析能力 Able to analyze chromosome genetics 3.具備疾病預防隔離檢疫能力 Able to prevent disease outbreak and quarantine 4.具備養殖場管理相關知識與技能 With ability and knowledge of manage an aquafarm 5.具備禽畜保健與預防傳染病相關知識 Demonstrate to livestock health and transmissible diseases	遺傳學 Genetics 遺傳學實習 Practice of Genetics 免疫學概論 Introduction to Immunology 分子生物學 Molecular Biology 微生物學 Microbiology 微生物學實習 Practice of Microbiology 養殖場實習 Practice of Aquafarm 水族動物疾病學 Aquatic Animal Diseases 動物飼料學 Animal Feeds and Feeding 禽畜保健與傳染病防治(1) Livestock Health and Transmissible Diseases (1) 禽畜保健與傳染病防治實習(1) Practice of Livestock Health and Transmissible Diseases (1)	1.進行筆試檢視學生應具備的基本知識 Paper test for the knowledge 2.繳交書面報告檢視學生彙整相關資料能力 Evaluate term paper or final report students submitted

		禽畜保健與傳染病防治 (2) Livestock Health and Transmissible Diseases (2) 禽畜保健與傳染病防治 實習 (2) Practice of Livestock Health and Transmissible Diseases (2) 水產遺傳育種學 Fish Genetics and Breeding 養殖經營與管理 Aquaculture Business Management	
2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	1.具備國際養殖現況知能 With the knowledge of current status of international aquaculture 2.具備水生生物繁殖能力、養殖技術與育種能力 With the ability to culture and reproduce 3.具備水質分析能力 With the ability to analyze water quality 4.具備管理及運作養殖場技能 With the skill to manage and running aquafarm 5. 具備禽畜保健與預防傳染病技能 Demonstrate the skills of livestock health and transmissible diseases	世界養殖概論 Introduction to World Aquaculture 水產養殖學 Introduction to Aquaculture 飼料生物學 Cultivation of Live Feed 水族營養學 Fish Nutrition and Feed 水產遺傳育種學 Fish Genetics and Breeding 養殖場實習 Practice of Aquafarm 水族動物疾病學 Aquatic Animal Diseases 動物飼料學 Animal Feeds and Feeding	1.進行筆試檢視學生應具備的基本知識 Paper test for the knowledge 2.繳交書面報告檢視學生彙整相關資料能力 Evaluate term paper or final report students submitted 3.現場實際操作檢視學生繁養殖技術能力 Evaluate the techniques students learned in field

		禽畜保健與傳染病防治 (1) Livestock Health and Transmissible Diseases (1) 禽畜保健與傳染病防治 實習 (1) Practice of Livestock Health and Transmissible Diseases (1) 禽畜保健與傳染病防治 (2) Livestock Health and Transmissible Diseases (2) 禽畜保健與傳染病防治 實習 (2) Practice of Livestock Health and Transmissible Diseases (2) 水產遺傳育種學 Fish Genetics and Breeding 養殖經營與管理 Aquaculture Business Management	
3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.	1.具備科學文章閱讀及寫作能力 With the ability to read and write the scientific papers 2. 具備國際市場的經濟的概念，並能相互合作發揮 所長的能力 Demonstration of the ability of applying the knowledge of international economy and cooperation to participate in international projects.	文獻選讀與寫作 Literature Reading and Writing 微生物學 Microbiology 微生物學實習 Practice of Microbiology 遺傳學 Genetics 遺傳學實習	1.進行筆試檢視學生應 具備的基本知識 Paper test for the knowledge 1.繳交書面報告檢視學 生彙整相關資料能力 Evaluate term paper or final report students submitted

		Practice of Genetics 養殖場實習 Practice of Aquafarm 水族動物疾病學 Aquatic Animal Diseases 禽畜保健與傳染病防治 (1) Livestock Health and Transmissible Diseases (1) 禽畜保健與傳染病防治 實習 (1) Practice of Livestock Health and Transmissible Diseases (1) 禽畜保健與傳染病防治 (2) Livestock Health and Transmissible Diseases (2) 禽畜保健與傳染病防治 實習 (2) Practice of Livestock Health and Transmissible Diseases (2) 水產遺傳育種學 Fish Genetics and Breeding	
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熱帶農業暨國際合作 系(所) 大學部 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	1.具備生物技術之能力 Demonstration of the ability to apply biotechniques	1. 生物技術 Biotechnology	1.進行筆試檢視學生學習成效 Classroom examination to evaluate the learning performance of the students 2.現場實際操作檢視學生技術應用之能力 Field and laboratory practices to evaluate the technical skills of the students 3.繳交書面報告檢視學生資料蒐集及彙整的能力 Written reports to evaluate students' ability to collect and analyze data
2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	2.具開發新生物技術之能力 Demonstration of the ability to develop potential new techniques	1. 生物技術 Biotechnology	1.進行筆試檢視學生學習成效 Classroom examination to evaluate the learning performance of the students 2.現場實際操作檢視學生技術應用之能力 Field and laboratory practices to evaluate the technical skills of the students 3.繳交書面報告檢視學生資料蒐集及彙整的能力 Written reports to evaluate students' ability to collect and analyze data

<p>3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.</p>			
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熱帶農業暨國際合作 系(所) **大學部** 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	1.具備動物類,家禽類及家畜知識與技能 Demonstration of the ability to have knowledge on animals, poultries and livestock. 2.具備動物育種相關知識 With the knowledge of animal breeding 3. 具備畜產業加工相關知識 With the basic knowledge in animal processing	1.動物學 Zoology 2.動物學實習 Practice of Zoology 3.動物科學導論 Introduction to Animal Science 4.動物解剖生理學 5.動物解剖生理學實習 6.牧場實務實習 7.動物舍規劃與自動化 8.動物營養學 9.家禽飼養管理 10.家禽飼養管理實習 11.豬隻飼養管理 12.豬隻飼養管理實習 13.乳用家畜飼養管理 14.乳用家畜飼養管理實習 15.動物育種學 16.乳品加工 17.乳品加工實習 18. 肉品加工 19. 肉品加工實習 20. 動物繁殖學 21.寵物科學(1)	1.進行筆試檢視學生學習成效 Classroom examination to evaluate the learning performance of the students 2.田間和實驗室實際操作檢視學生操作技術 Field and laboratory practices to evaluate the technical skills of the students 3.繳交書面報告檢視學生資料蒐集及彙整的能力 Written reports to evaluate students' ability to collect and analyze data

		22.寵物科學(2) 23.養燕學	
2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	1.具備動物類，家禽類及家畜生產與繁殖的能力 Demonstration of the ability to conduct round production and reproduction of animals and poultries. 2.具備動物育種技能 With the ability of animal breeding 3.具備乳品及肉品加工方面技能 With the ability of dairy processing and meat product 4.具備製造飼料相關技能 With the ability of feed manufacturing	1.動物學 Zoology 2.動物學實習 Practice of Zoology 3.動物科學導論 Introduction to Animal Science 4.動物解剖生理學 5.動物解剖生理學實習 6.牧場實務實習 7.動物舍規劃與自動化 8.動物營養學 9.家禽飼養管理 10.家禽飼養管理實習 11.豬隻飼養管理 12.豬隻飼養管理實習 13.乳用家畜飼養管理 14.乳用家畜飼養管理實習 15.動物育種學 16.乳品加工 17.乳品加工實習 18.肉品加工 19.肉品加工實習 20.動物繁殖學 21.飼料製造技術 22.飼料製造技術實習 23.肉品原料與利用 24.寵物科學(1)	1.進行筆試檢視學生學習成效 Classroom examination to evaluate the learning performance of the students 2.田間和實驗室實際操作檢視學生操作技術 Field and laboratory practices to evaluate the technical skills of the students 3.繳交書面報告檢視學生資料蒐集及彙整的能力 Written reports to evaluate students' ability to collect and analyze data

		25. 寵物科學(2) 26. 養燕學	
3. 具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.	1. 具備參與國際合作計畫所需之動物, 家禽類及家畜等相關知識及分析診斷技能 Ability to contribute tropical agriculture related knowledge and skill at international level 2. 具備收集國際農業相關資訊, 並有解決問題的能力。 Demonstration of the ability of search and integrate international agriculture-related information, and problem-solving skills.	1. 動物解剖生理學 2. 動物解剖生理學實習 3. 牧場實務實習 4. 動物舍規劃與自動化 5. 動物營養學 6. 家禽飼養管理 7. 家禽飼養管理實習 8. 豬隻飼養管理 9. 豬隻飼養管理實習 10. 乳用家畜飼養管理 11. 乳用家畜飼養管理實習 12. 動物育種學 13. 動物繁殖學	

熱帶農業暨國際合作 系(所) 大學部 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	1.具備食品科學，食品加工及食品殺菌的知識。 Demonstrate the ability to food science knowledge 2.具科學儀器操作技能。 Demonstrate skill in operating scientific equipment.	1.食品科學概論 Introduction of Food Science 2.食品加工與實習 Food Processing and Practice 3.食品微生物與實習 Microbes Detection and Practice 4.食品殺菌技術與實習 Food Sterilization and Practice 5.食品機械 Food Machinery 6.農業自動化概論 Introductory Agricultural Automation 7.農業自動化概論實習 Practices of Introductory Agricultural Automation	1.進行筆試檢視學生學習成效 Classroom examination to evaluate the learning performance of the students 2.實驗室實際操作檢視學生操作技術 Laboratory practices to evaluate the technical skills of the students
2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	1.具備食品科學技術 Demonstrate the technique on food science 2.具備食品機械操作技術 With the skill of operating food machinery 3.具備技能操作生物產業之相關	1.食品科學概論 Introduction of Food Science 2.食品加工與實習 Food Processing and Practice 3.食品微生物與實習	1.學生口頭報告 Student Presentations. 2.筆試及口試 Written and Oral Exams.

	<p>機械 With ability of operative biological industry's machinery</p> <p>4.具備操作內燃機技術 With the skill to operate internal combustion engine</p>	<p>Microbes Detection and Practice.</p> <p>4. 食品殺菌技術與實習 Food Sterilization and Practice</p> <p>5.食品機械 Food Machinery</p> <p>6.生物產業機械 Biological Industry's Machinery</p> <p>7.生物產業機械實習 Biological Industry's Machinery Lab.</p> <p>8.內燃機 Internal Combustion Engine</p> <p>9.內燃機實習 Internal Combustion Engine Lab.</p>	
<p>3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.</p>	<p>以英文上課因此具備參相關之國際合作之語文能力。 Class is taught in English to ensure the language ability in international cooperation project.</p>	<p>1. 生物產業機械 Biological Industry's Machinery</p> <p>2. 生物產業機械實習 Biological Industry's Machinery Lab.</p> <p>3.內燃機 Internal Combustion Engine</p> <p>4.內燃機實習 Internal Combustion Engine Lab.</p>	

熱帶農業暨國際合作__系(所) 大學部 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.			
2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	具備第二外語能力 Second language Ability	1.應用華語(5) Applied Mandarin (5) 2.應用華語(6) Applied Mandarin (6) 3.應用華語(7) Applied Mandarin (7)	1.學生口頭報告 Student Presentations. 2.筆試及口試 Written and Oral Exams.
3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.	具備第二外語溝通能力 Communication ability of second language	1.英文(五) English (5) 2.英文(六) English (6)	

熱帶農業暨國際合作 系(所) 大學部 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.	1.具備土木測量及流體力學之基本知識 With the knowledge of civil engineering measurement and fluid mechanics 2.具備水土保持之基本知識 With the basic knowledge of soil and water conservation	1.測量學 Surveying 2.測量學實習 Surveying Practice 3.流體力學 Fluid Mechanics 4.流體力學實習 Practice of Fluid Mechanics 5. 地理資訊系統概論 Introduction of GIS 6.水土保持概論 Introduction to Soil and Water Conservation 7.水資源工程與規劃 Water Resources Engineering and Planning	
2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	1.具備土木測量及流體力學之操作技能 With the operating skills on civil engineering measurement and fluid mechanics 2.具備土壤物理性檢測技能 With the ability to detect soil physics 3.具備電腦製圖能力 With ability to draft by computer 4.具備渠道水力與排水使用相關技能 With the ability of operating channel hydraulics and drainage	1.工程力學 Engineering Mechanics 2.測量學 Surveying 3.測量學實習 Surveying Practice 4.流體力學 Fluid Mechanics 5.流體力學實習 Practice of Fluid	

	<p>5.具備水土保持實行技術 Demonstrate of approaching soil and water conservation techniques</p> <p>6.具備油氣壓操作技術 With the skill to operate hydraulics and pneumatics</p>	<p>Mechanics</p> <p>6.電腦輔助製圖 Computer Aided Drafting</p> <p>7. 土壤物理學 Soil Physics</p> <p>8. 土壤物理學實習 Soil Physics Lab.</p> <p>9. 水文學 Hydrology</p> <p>10.灌溉學 Irrigation</p> <p>11.灌溉方法 Irrigation Methods</p> <p>12.地理資訊系統概論 Introduction of GIS</p> <p>13.渠道水力學 Open-Channel Hydraulics.</p> <p>14.排水 Drainage</p> <p>15.水土保持概論 Itroduction to Soil and Water Conservation</p> <p>16.灌溉工程設計與實習 Irrigation Design and Practice</p> <p>17.油氣壓學 Hydrailics and Pneumatics</p> <p>18.油氣壓學實習 Hydraulics and Pneumatics</p> <p>19. 田間灌溉實習(一) Field Irrigation Practice (1)</p> <p>20. 田間灌溉實習(二) Field Irrigation Practice (2)</p>	
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		21. 地下水 Groundwater 22.水資源工程與規劃 Water Resources Engineering and Planning	
3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.	以英文上課因此具備參相關之國際合作之語文能力。 Class is taught in English to ensure the language ability in international cooperation project.	1.電腦輔助製圖 Computer Aided Drafting 2. 土壤物理學 Soil Physics 3. 土壤物理學實習 Soil Physics Lab. 4.水文學 Hydrology 5.灌溉方法 Irrigation Methods 6.渠道水力學 Open-Channel Hydraulics 7. 排水 Drainage 8. 水土保持概論 Itroduction to Soil and Water Conservation 9.油氣壓學 Hydrailics and Pneumatics 10.油氣壓學實習 Hydraulics and Pneumatics 11. 田間灌溉實習(一) Field Irrigation Practice (1) 12. 田間灌溉實習(二) Field Irrigation Practice (2) 13. 地下水 Groundwater	

熱帶農業暨國際合作系(所) 大學部 課程與核心能力之關聯檢核表

核心能力 Core Capabilities	能力指標與核心素養 Capabilities Index and Core Accomplishment	對應課程 Related Courses	檢核機制 Evaluation
1.具熱帶農業基礎知識與技能。 Demonstration of basic knowledge and skills in tropical agriculture.			
2.具應用專業知識於農業生產之技能。 Demonstration of the ability to apply professional knowledge and skills in agricultural practice.	具電工實作能力 With the ability to operate electrical engineering	1. 電工學 Electrical Engineering 2. 電工學實習 Electrical Engineering Lab.	1.學生口頭報告 Student Presentations. 2.筆試及口試 Written and Oral Exams.
3.具參與國際合作計畫能力。 Demonstration of the ability to participate in international cooperation projects.	以英文上課因此具備參相關之國際合作之語文能力。 Class is taught in English to ensure the language ability in international cooperation project.	1. 電工學 Electrical Engineering 2. 電工學實習 Electrical Engineering Lab.	

熱帶農業暨國際合作系 (大學部 國際專班)

Department of Tropical Agriculture and International Cooperation

一、必修科目 Required Courses

普通化學

3 必 上

本課程的目的在使學生習得化學之基本概念並熟悉化學的理論與計量方法，其內容如下：1. 緒論，2. 原子，分子和離子，3. 化學計量，4. 水溶液的反應，5. 氣體，7. 原子的電子結構，8. 週期表，9. 化學鍵 I: 共價鍵，10. 化學鍵 II: 分子模型與原子的混成軌域，11. 有機化學緒論，13. 溶液的物理性質，15. 化學平衡。

General Chemistry

3 R F

The purpose of this course is to make the students learning the basic concepts of chemistry and familiarity with chemical theory and measurement methods. The outlines are offered as below: 1. Introduction, 2. Atoms, Molecules, and Ions, 3. Stoichiometry, 4. Reactions in Aqueous Solutions, 5. Gases, 7. The electronic structure of atoms, 8. The Periodic Table, 9. Chemical Bonding I: The Covalent Bond, 10. Chemical Bonding II: Molecular Geometry and Hybridization of Atomic Orbitals, 11. Introduction to organic chemistry, 13. Physical Properties of Solutions, 15. Chemical Equilibrium.

普通化學實驗

1 必 上

本課程開設之目標為訓練學生使熟悉各種化學之基本操作，並驗證各有關之化學原理。其內容為：1.安全及環保教育講習。 2. 混何物分離。 3.密度測量。 4. 質量守恆定律。 5. 化學式的測定。 6. 固體中水分測量。 7. 定組成定律。 8. 氧化還原反應。9. 溶液的配製。10. 氧化還原滴定。 11.化學平衡。 12.—酸及鹼之 pH 值測定。13.酸鹼滴定。14. 滴定曲線繪製。

General Chemistry Lab.

1 R F

This course provides students a profound understanding of subject-matter from laboratory work and familiarity with basic laboratory technique. The outlines are as below: 1. Basic laboratory rules and safety. 2. Separation of mixtures. 3. Determination of density. 4. Law of conservation of mass. 5. Determination of empirical formula. 6. Determination of water content in solid. 7. Law of definite composition. 8. Oxidation-Reduction reactions. 9. Solution preparation. 10. Oxidation-Reduction titration. 11. Chemical equilibria. 12. Determination of pH. 13. Acid-Base titration. 14. Titration curve.

農藝園藝概論

2 必 上

這是門概論課程，介紹園藝作物：果樹、蔬菜、花卉的生產、處理、和利用原理；觀賞植物在景觀和環境上的運用。認識相關的科技與產業，它們在經濟上的重要性和在國內的分布情況。了解園藝栽培在世界上對於提供養分和食物，改善環境生活品質，美化景觀，及醫藥利用上所扮演的角色。使學生對農藝作物之生長發育與環境因子之關係及對栽培管理技術有一整體性之瞭解。內容包括介紹農藝作物之分類、生理、生長與環境之關係，以及栽培與管理技術，包括繁殖、施肥、灌溉、病虫害及採收貯藏等。

Introduction to Agronomy and Horticulture

2 R F

Basic principles of production, processing and utilization of fruit, vegetable, flower and ornamental crops are introduced in this course. The economic importance and distribution of horticultural enterprises, roles of horticulture in world nutrition and food supply, improvement of environmental quality in the landscape, aesthetic values, and medicinal uses are also covered. This course is to introduce the growth and development of different agronomic crops and their relationships with different environmental factors. Also, the cultural system for each crop including propagation, fertilizing, irrigation, pest management and postharvest techniques etc, will be introduced.

有機化學

2 選 上

本課程乃著重於重要之碳化合物（包括烷、醇、醚、有機鹵化物，芳香族化合物、醛、酮、酸、酯、胺）之官能基本反應，各類之合成方法，相互間之關係以及其實際之應用。

Organic Chemistry

2 E F

A systematic study of the important classes of carbon compounds (alkane, alcohol, ether, organic halide, aromatic compound, aldehyde, ketone, carboxylic acid, ester and amine) - reactions of their functional groups, methods of synthesis, relations, and uses.

有機化學實驗

1 選 上

本課程為配合非主修有機化學者之教材而開設，期促使學生熟悉一般實驗技術，並從實驗中增加對教材之了解，除物理常數之測定外，並依各官能基本之不同之化合物逐一實驗：烷、烯、炔、苯、有機鹵化物、醇、醚、醛、酮、羧酸、羧酸衍生物及胺等，每一實驗的重點是在不同官能基所產生的不同化學反應試驗。

Organic Chemistry Lab.

1 E F

This course is devised in conjunction with the lecture material of the non-major organic chemistry. It intends to provide students a profound understanding of subject-matter from laboratory work and familiarity with basic laboratory technique. In addition to measurements of physical constants, the course is carried out in a functional approach: alkanes, alkenes, alkynes, benzenes, organic halides, alcohols, ethers, aldehydes, ketones, carboxylic acids, and the derivatives of carboxylic acid, amines. Each experiment emphasizes on the common chemical properties ascribed to functional groups.

動物科學導論

2 必 下

讓學生對「動物科學與畜產系」之學習領域與相關科學有一初步認識，便於衡量自己未來方向。引導認識本系教育目標、研究方向和主題，並認識學校實習畜牧場和技藝訓練中心畜牧組，以及介紹如何利用圖書館以及網際網路等管道，探索動物科學與畜產相關資源，循序漸進培養動物科學與畜產興趣及往後的規劃。

Introduction of Animal Science 2 R S

Introduction Department of Animal science
2. Overview of animal science
3. The evolution of livestock farming systems
4. Our relationship with domestic animals is a symbiosis
5. Animal behavior and farm animal management
6. Environmental factors for animals
7. Product identification and traceability in farm animal
8. Manure and wastewater treatment
9. Organic biological farming and livestock
10. Environmental Hormones (Endocrine disruptor chemicals)
11.

Functional foods and Extracting bioactive compounds from animal products12.
Biotechnology in animal nutrition, physiology and health

食品科學概論 2 必 下

食品科學導論旨在為學生提供的食品科學重點食品化學和組成、食品加工、工程、食品營養和貼標、食品安全、食品微生物學和食品添加劑的概述。

Introduction of Food Science 2 R S

Introduction to Food Science is designed to provide students with an overview of Food Science with emphasis on food chemistry and composition, food processing and engineering, food nutrition and labeling, food safety, food microbiology, and food additives.

世界養殖概論 2 必 上

對世界各國養殖業發展之情形及遠景做一敘述。內容包括介紹世界養殖業目前發展趨勢及新技術之開發情形，並介紹世界主要養殖種類及養殖國家之養殖發展概況及未來發展趨勢等，期能給學生養殖之世界觀以利日後從事養殖事業之發展。

Introduction to World Aquaculture 2 R F

This course will introduce the aquaculture development status in the world, which include the present situation, future outlook, and new developed technique in aquaculture. Besides, the status of major culture species, major cultured countries and the future of aquaculture will also be introduced. The purpose of this course is to train students to have a worldwide point of view in aquaculture.

行銷學 2 必 上

本課程旨在瞭解滿足社會各階層對商品或勞務需求所做的研究、分析、預測、產品發展、訂價、推廣、交易及實體配銷等系列的人類活動。包括：(1) 行銷之基本觀念、(2) 行銷體系與行銷環境、(3) 策略性行銷規劃與行銷管理、(4) 各種市場與購買者行為分析、(5) 市場需要之測定與市場區隔、(6) 產品決策、(7) 價格決策、(8) 溝通與促銷組合決策、(9) 通路決策

Marketing 2 R F

The major goal of this course is to understand a series of human action about all social stratification by making study, forecasting, product development, pricing, promotion, trade and physical distribution to satisfy needs of goods and services.

It includes: The concept of marketing, the marketing environment, strategic marketing planning and management, different kind of markets and consumer behavior analysis, market demand forecasting and segmenting, product decision, pricing decision, communication and promotion mix decision, place decision.

生物化學(1) 2 必 上

本課程主要提供學生有關生物化學的概念，其內容包括四大部份：

細胞內大分子構造之介紹--包括醣類、蛋白質及脂質之構造、生化反應之催化及控制、代謝能量之產生及儲存、遺傳訊息簡介--包括儲存、轉移及表現。

Biochemistry(1) 2 R F

The course is to offer concepts of biochemistry, including the following topics: macromolecules- carbohydrates, proteins and lipids; Biochemical reactions, their catalysis and regulation; Biosynthesis and storage of biological

energy; Genetics-storage, transfer and expression of genetic messages.

生物化學實驗(1)

1 必 上

此實習之內容包括以下三大部：PH 值之測定法、緩衝溶液之製備、氨基酸之滴定曲線；蛋白質一般反應、氨基酸及蛋白質之定性分析、蛋白質之定量分析；醣類之定性分析與定量分析。

Biochemistry Lab.(1)

1 R F

The course contains the following categories: determination of pH values, preparation of buffers, and titration curve of amino acids; General reactions of proteins, qualitative and quantitative determination of amino acids and proteins; Quantitative and qualitative determination of carbohydrates.

微生物學

2 必 下

本課程之目的，在使學生瞭解微生物細胞之形態、構造及功能，以及微生物的生長與代謝、遺傳及防治，以建立日後與病原微生物有關學科之基礎。

Microbiology

2 R S

The purpose of this course is to study the microbiological science and to give students the basic knowledge further study of phytopathogenic microbiology. Course contents include the morphology、structure and function of microorganisms, microbial growth and metabolism, microbial genetics, and the control of microorganisms.

微生物學實習

1 必 下

本實習之目的在訓練並建立學生在微生物學領域之基本基礎與技術，課程內容包括顯微鏡在微生物大小測量之運用，細菌的染色，培養基之製備，移種技術，微生物之分離、培養及接種技術，微生物之生理生化測試，微生物之定量及物理與化學因子抗微生物活性之評估。

Practice of Microbiology

1 R S

The purposes of this course were critically selected and tested to instruct students effectively in the basic principles and techniques within microbiological areas. Course contents include the microscopic measurement of microorganisms, bacterial staining, media preparation, culture transfer techniques, techniques for isolation, cultivation, and inoculation of microorganisms, physiological and biochemical tests of microorganisms, determination of cell number of microorganisms, and evaluation of the antimicrobial activity of physical and chemical agents.

生物技術

2 必 上

介紹生物計數之基本觀念及其所涵蓋之 (1) 遺傳工程及 (2) 細胞組織、器官培養、與細胞融合等兩大範疇。說明基因構造、表現原理及操作基因轉移、載體利用等所需之技術。簡介細胞、組織培養、細胞融合之技術。介紹利用生物技術在農業上之作物、家畜、魚類的改良，並應用於疾病防治及抗拒逆境上之現況及未來。介紹生物技術在微生物、食品營養、發酵上之應用及未來。

Biotechnology

2 R F

Introduce the concept of biotechnology and it's two major categories of (1) genetic engineering and (2) cell, tissue and organ culture and cell fusion. Interpret the structure and expression of gene, the technology for manipulation of gene transfer for utilization of gene introduce the development at nowadays and future.

農企業管理**2 必 下**

本課程乃系統性地介紹一個農企業經理人應具備之技能。包括：(1)農企業管理學內涵(2)農企業經營規劃與決策(3)消息收集與分析(4)預測方法(5)農企業產品與生產規劃(6)農企業資金與預算(7)農企業成本與收益觀念(8)不同評價之成本項目與效益分析(9)農企業行銷(10)農業政策與環保問題(11)農企業組織(12)人力資源(13)農企業控制原則(14)農企業經營目標之設計。

Agribusiness Management**2 R S**

The course gives a systematic knowledge for agribusiness manager includes as follows (1) The contents of Agribusiness; (2) Planning and Decision; (3) Information collection and Analysis; (4) Forecasting; (5) Products and Production planning; (6) Capital and Budget; (7) Cost and Revenue; (8) Cost evaluation and Benefit analysis; (9) Agribusiness marketing; (10) Agricultural policy and Ecosystem protection; (11) Agribusiness Organization; (12) Manpower Resources; (13) Controlling; (14) Management Indicators.

國際經濟暨合作**2 必 下**

1. 培育熱帶及國際農業基礎專業人才。 2. 傳承農業科技和永續經營的生態環境。 3. 促進農、林、漁、牧專業技術的發展。

International Economy and Cooperation**2 R F**

This course is designed teach students the concepts and knowledge of world economy and international trade.

專題討論**1 必 上/下**

本課程旨訓練研究生對於與畜產科學或論文有關的題目。經由資料之收集、研讀與彙整。令學生從而習得相關之專業知識。並由之獲得資料之分析、歸納與邏輯思考、試驗設計與統計、數據分析與統整之能力。並藉由書面報告、口頭發表及討論之歷練，以培養學生之論文撰寫能力及口頭表達能力。

Seminar**1 R F/S**

The purpose of this course is to give graduate students the trainings on searching information, reviewing references related to animal science or their research topics, therefore, the abilities on logical thinking, experimental design, data collection and analysis, results discussion. Students are required to select a topic in the field of animal science or that related to their thesis. Students must give oral presentation and dissertation.

校外實習 (1)**2 必 上**

本課程提供學生在校外之實習，以了解產業之現況。

Practice of Industrial Training (1)**2 R F**

The course is designed for the external and industrial training of undergraduate student to realize current status of agricultural industry.

二、選修科目 Elective Courses

植物學

2 選 上

本課程之目的在使學生瞭解植物學之基本知識。包括植物細胞、根、莖、葉、花、果實及種子之構造與功能，以及由低等植物至高等植物，包括藻類、菌類、苔蘚類與蕨類等之形態與生活史。

Botany

2 E F

The purpose of this course is to provide students with basic botanical science. Course contents include the structure and function of plant cells, roots, stems, leaves, flowers, fruits and seeds of higher plants, the morphology and life cycles of lower and higher plants, including algae, fungi, mosses and ferns .

植物學實習

1 選 上

本實驗課程首先讓學生熟習顯微鏡之操作，繼而在顯微鏡下觀察植物細胞之構造、有絲分裂過程以及植物各組織與根、莖、葉、花、果實及種子等器官之構造；觀察低等植物如藻類、菌類、苔蘚類與蕨類等之形態與構造。

Practice of Botany

1 E F

The objective is firstly to acquaint the students with the techniques of operating the microscope. Secondly, to enable the students observing the structure and mitosis process of plant cells; the anatomy of roots, stems, leaves, fruits and seeds of higher plants will be observed under a microscope. The morphology and structure of lower plants, such as algae, fungi, mosses and ferns are also studied in this course.

作物學

2 選 下

本課程目的在培養對農作物生產及改良之人才。主要內容在敘述作物之意義、範圍及研究方法。

Field Crops

2 E S

The objective of this course is to give students confidence in knowing agricultural crops. The main contents of this course will describe the definition, sort, and study method of crops.

作物學實習

1 選 下

進行主要糧食作物之栽種並瞭解植物生長特性、培養方法、管理和收穫的技術。種子特性、植物字元，將研究生理和生態結構。香港郵政亦會推出採後處理技術和存儲方法。

Practice of Field Crops

1 E S

Conducting field practice of major food crops to understand the plant growth characters, culture methods, managing and harvest techniques. Seed characteristics, plant characters, physiological and ecological structures will be studied. Postharvest handling techniques and storage methods will also be introduced.

植物生理學

3 選 上

本課程在使學生獲得有關植物生理學之基本知識，課程內容包括植物生理之概念、植物之吸水及蒸散作用、礦物營養及養分之吸收輸送、光合作用、呼吸作用、氮素、脂質及其他二次代謝

物之代謝。

Plant Physiology

3 E F

The purpose of this course is to acquaint students with knowledge of basic principles and the application of plant physiology on the agricultural system. The contents include: Introduction of concepts in plant physiology, the process of water absorption and transpiration, absorption and translocation of mineral, nutrient, photosynthesis, respiration, metabolism of nitrogen lipid and secondary metabolites.

植物生理學實驗

1 選 上

本實驗課程在使學生能以實驗印證理論，增進學生對理論之瞭解。實驗內容包括擴散作用、滲透作用、原生質分離之觀察、水勢、滲透勢、蒸散作用及根壓之測定，礦物營養診斷、輸導作用、呼吸作用、呼吸酵素之一般檢驗，植物蛋白質之抽取及分析、光補償點之測定及利用薄層色層分析法分離光合色素、葉綠素吸收光譜與定量之測定、植物生長調節劑生理功能之觀察等。]

Plant Physiology Lab.

1 E F

The laboratory work is to acquaint students with understanding of both practical operation as well as theoretical aspects of the lecture subjects. The contents include the observation of diffusion, osmosis and plasmolysis, measurement of water potential and transpiration, plant nutrition and symptoms of mineral deficiency, measurement of root pressure, translocation of organic solutes in phloem, quantity of respiratory enzymes, extraction and quantitative determination of plant protein, separation of photosynthetic pigments by TLC, chlorophyll absorption spectrum and quantitative determination, physiological functions of growth regulators.

林產與木材科學

2 選 上

Forest Products and Wood Science

2 E F

This course is to introduce the basic knowledge of forest products and wood science. Students will learn chemical and physical properties of wood based materials and the manufacture processes of wood products such as plywood, particle board, Medium density fiberboard, lumber production, pulp and paper, and testing procedures of structural properties.

土壤與肥料

2 選 上

本課程的目的，在使學生認識土壤與肥料，並瞭解它們在地球上所扮演的角色。土壤部份的課程內容有認識土壤、土壤的生成與分類、土壤的物理與化學、土壤有機質與生物、土壤水份、土壤與植物及土壤管理。肥料部份的課程內容有認識肥料、肥料元素、有機質肥料與化學肥料、肥料需要量的決定及肥料施用法。

Soil and Fertilizer

2 E F

The purpose of this course is to know soil and fertilizer and to understand their roles on earth. The contents of the soil part include knowing soils, genesis and classification of soils, soil physics and chemistry, organic matters and soil biology, water in soils, plants and soils and soil management. The contents of the fertilizer part include knowing fertilizers, fertilizer elements, organic and inorganic fertilizers, decision making for fertilizer requirement and fertilizer application methods.

土壤與肥料實習**1 選 上**

本課程藉由實際操作讓學生對土壤、肥料及兩者與作物生產間的關係有更深刻的印象。實習內容包含：(1)土壤樣品的採集與調制，(2)土壤剖面觀察，(3)土壤總密度與土粒密度的測定，(4)土壤機械分析，(5)田間容水量的測定，(6)土壤 pH 值和石灰需要量的測定，(7)不同土壤 pH 值對作物生育的影響，(8)土壤有機質和無機養份的測定，(9)土壤 CEC 的測定，(10)肥料認識與分析，(11)肥料用量實驗，(12)堆肥製作，(13)不同堆肥成熟度對作物生育的影響。

Practice of Soil and Fertilizer**1 E F**

The laboratory course uses hands-on experiments to let students know more about soils, fertilizers and their roles in crop production. The experiments include: (1) Soil sampling and preparation, (2) Description of soil profile, (3) Determination of bulk density and particle density, (4) Particle size analysis, (5) Measurement of field capacity, (6) Soil pH and lime requirement, (7) pH effect on crop growth and development, (8) Soil organic matter and mineral nutrients analysis (9) Cation exchange capacity, (10) Knowing fertilizers and fertilizer analysis, (11) Optimizing fertilizer application, (12) Compost making, (13) Compost maturity on crop growth and development.

植物繁殖技術**2 選 下**

本課程主要在介紹各種植物繁殖方法的理論及技術。內容包括：繁殖用之設施、介質、肥料、容器及其衛生處理；種子繁殖--種子的篩選、生產和管理、種子繁殖的技術；營養繁殖--母本選拔及管理，扦插法、嫁接法、壓條法；無菌微體繁殖法--組織培養；特殊植物之繁殖方法。

Plant Propagation Techniques**2 E S**

The objective of this course is to introduce the principles and techniques of plant propagation. The content includes: propagation structures, media, fertilizers, sanitation and containers; seed propagation-seed selection, production and handling, and propagation by seed; vegetative stock selection and management, propagation by cuttings, grafting, budding and layering; aseptic methods of micropropagation; propagation of selected plants.

植物繁殖技術實習**1 選 下**

本實習操作配合"植物繁殖技術"課程，使學生熟習各種植物繁殖技術。實習項目包括：栽培環境、介質、肥料、容器及消毒方法之認識；種子活力測定、播種、育苗、定植、及採種和保存技術；營養繁殖用之母本選拔及管理，扦插、嫁接、壓條等繁殖技術；組織培養。

Practice of Plant Propagation Techniques**1 E S**

The objective of this course is making students familiar with the techniques of plant propagation. The content is: study on propagation structures, media, fertilizers, sanitation and containers; seed selection, production and handling, propagation by seed; stock plant selection and management, propagation by cuttings, grafting, budding, and layering; tissue culture.

蔬菜學**2 選 上**

本課程之目的，在使學生獲得有關蔬菜栽培及生產之基本原理與技術等知識，講授內容包括：蔬菜園藝之性質及利益、蔬菜之效用、蔬菜之種類及分類、蔬菜生產之類型、氣候及土壤與蔬菜生產之關係、蔬菜之育苗及塑膠布之應用、肥料及水分之管理、蔬菜生產之栽培管理、蔬菜採收及收穫後處理、蔬菜病蟲害防治、蔬菜品種與生產、蔬菜各論，就目前台灣所栽培之重要蔬菜種類加以闡述。

Olericulture**2 E F**

The goals of this course are to acquaint students with knowledge of basic principles and techniques of vegetable production. The topics include: Introduction of properties and benefits of vegetable production, food value of vegetables, classification of vegetables, types of vegetables production, the relationship between soil and weather condition of vegetables production, vegetables seedling growing and the application of mulching with PE, fertilizers and irrigation, cultivation management, control of disease and insects, varieties of vegetables, introduction of the individual vegetable crops in Taiwan.

蔬菜學實習**1 選 上**

使學生實際練習蔬菜之栽培及管理技術，包括蔬菜種類及種子之認識，整地、播種、灌溉、施肥、中耕除草、病蟲害防治、育苗、採收等生產技術之練習。期能使每一位學生栽培不同蔬菜，互相觀摩學習並提出栽培心得。

Practice of Olericulture**1 E F**

The objective of this course is to acquaint students practice the methods and technique of vegetable crop production, including identification of vegetables varieties and seeds, soil preparation, nursery, fertilizing, irrigation, cultivation, weed and pest control and harvest etc. Through discussion and practice of individual vegetables crop, let students understanding of both practical operation as well as theoretical aspects of the lecture subjects.

花卉學**2 選 上**

本課程旨在介紹與花卉生產相關的科技、產業和應用範圍。內容包括定義，相關學科，分類，產業概況，花卉應用，植物生長發育及開花生理：營養生長與生殖生長的轉變機制、環境因子的影響，產期調節，採收後處理和運銷。並將主要作物依其特性分為：短日植物、日中性植物、球根植物、觀葉植物、花壇植物，簡介其商業化生產方式。

Floriculture**2 E F**

The objective of this course is to introduce floriculture related sciences, technologies, and businesses. Included topics are: definition, classification, and scopes of floriculture; floral utilization; flowering physiology and induction; postharvest management; introduction to commercial production of major short-day plants, day-neutral plants, bulbs, foliage plants and bedding plants.

花卉學實習**1 選 上**

實習單元有：穴盤育苗、田間及盆栽作物的栽培管理、草花辨認、花卉的利用設計及英文論文研讀。

Practice of Floriculture**1 E F**

Topics of activities are: plug production, outdoor plants and potted plants growth and management, plant identification, floral utilization, and literature review.

植物保護學**2 選 上**

課程目的在讓學生瞭解各種作物病原及害蟲之診斷及管理技術。其內容包括作物病蟲害種類特性、病原、害蟲為害症狀、致病機制以及管理方法，並以數種具有代表性的

病蟲害，討論病原及害蟲特性、致病與為害過程、管理方法選擇、使用及效果評估等。

Plant Protection 2 E F

The purpose of the course is to offer knowledge on techniques of plant disease and insect pest management and identification. The topics cover different kinds of plant diseases and insect pests, pathogen, symptoms, mechanism of pathogenesis and injury of insect pests. Representative plant diseases and insect pests are used as examples to explain the above topics.

植物保護學實習 1 選 上

主要配合正課安排實習內容，期能以實際操作了解病原菌與害蟲的為害及診斷與管理技術的效果。內容包括室內的基本操作、病蟲害辨識、網室內的接種及防治實驗，以及田間的作物病害蟲診斷與管理方法等。

Practice of Plant Protection 1 E F

The purpose is to cope with the lecture course, to learn the practice and techniques of management and identification on plant pathogen and insect pests. The topics include basic operation, identification and control techniques of plant diseases and insect pests on crop.

作物育種學 2 選 下

作物育種技術主要介紹無性繁殖作物、自交、異交作物育種原理及方法，熟悉各種不同之育種理論及技術。講授內容計有以下之章節：1.緒論：介紹育種史及育種之重要性。2.作物育種之遺傳學基礎。3.自交不和合及雄不稔性。4.引種法。5.純系育種法。6.選拔育種法。7.雜交育種法。8.回交育種法。9.雜種優勢(F1)育種技術。10.抗病品種之育成。11.遠緣雜交。12.抗蟲育種。13.誘變育種。14.遺傳工程之現況及在農園作物上之應用。

Crop Breeding 2 E S

The goals of this course are to acquaint students with knowledge of principles and techniques used in crop breeding. Course contents include: 1. Introduction: history and importance of crop breeding. 2. Genetic background of breeding. 3. Self-incompatibility and male sterility. 4. Crop introduction. 5. Pure-line breeding. 6. Selection. 7. Hybridization. 8. Back cross. 9. F1 hybrid breeding. 10. Breeding for disease resistance. 11. Interspecific hybridizations. 12. Breeding for insect resistance. 13. Mutation breeding. 14. Genetic engineering in crop improvement.

作物育種學實習 1 選 下

作物育種實習，主要介紹各農園藝作物之育種方法及育種技術，如豆科作物、禾本科作物、十字花科、茄科及瓜類等之育種技術，包括花器構造之認識，雜交方法，多倍體處理及後裔之處理等項目。

Practice of Crop Breeding 1 E S

In this course important agronomic and horticultural crops are introduced. Crops include legume crops, cereals, cruciferae vegetables, solanaceae vegetables and cucurbitaceae vegetables. Contents of laboratory exercises include observation of flower structure, hybridization methods, colchicine treatment and progeny selection etc...

植物組織培養技術 2 選 下

該課程著重於討論植物組織培養之各種技術。並輔以最新國內外文獻，探討今後發展之方向。講授內容由培養的理念及操作時所需之器具、藥品、培養法、條件以及植物組織、細胞等培植體為材料之技術。除包括器官培養、癒合組織誘導、體胚發生、單細胞分離及培養等基礎技術外，並探討體細胞雜交，單倍體培養、基因轉移、二次代謝產物生產及種原保存等培養技術之利用價值。

Plant Tissue Culture Techniques

2 E S

The objective of this course is to discuss methods of tissue culture, and its applications on crop production and breeding. Students are trained to obtain knowledge through seminars. This course includes methodology of plant tissue culture, medium composition and preparation, callus induction, organogenesis, somatic embryo genesis, meristem culture, gene transfer and cell isolation and culture, the production of secondary metabolites in plant biotechnology, and germplasm preservation.

植物組織培養技術實習

1 選 下

本實習著重於利用實驗室設備，由學生實際操作，並配合教學進度以了解植物組織培養技術之基礎操作方法，及熟悉諸如殺菌斧、無菌操作台、組織培養工具等之有效使用。實習內容由容器清洗、調製各種培養基開始，並以果樹、花卉、蔬菜等為培養材料，除了繼代培養、誘導癒合組織、體胚誘導、胚培養、無菌播種外，並行側芽、莖頂等器官之培養及基因轉移。

Practice of Plant Tissue Culture Techniques

1 E S

The objective of this course is to offer students with practices of tissue culture, including equipments such as autoclave, clean bench, centrifuge and cutting techniques. Most materials are from horticultural crops. The practices involve training of glass washing, medium preparation, callus induction, somatic embryogenesis embryo culture, virus free seedling, bud, meristem and cell separation and culture technique and gene transfer.

果樹學

2 選 下

本課程提供基本果樹生產管理技術，內容包括果樹栽培之環境要素、植株栽培及生理特性，開花結果習性，繁殖方法，育種，果樹栽培管理方法及各種果樹生產模式。

Pomology

2 E S

The course provides fundamental technology of fruit production and orchard management. Environmental factors, botanical and physiological characteristic, flowering, pollination and fruit bearing habits, propagation, breeding, orchard management and production of important fruit crops are covered.

果樹學實習

1 選 下

本實習課程提供果樹學田間實地操作之訓練，包括：1.果樹之建立與管理，2.土壤肥料管理，3.果樹整枝修剪，4.果苗繁殖，5.果樹分級、包裝、採收後處理技術。

Practice of Pomology

1 E S

The course is designed for training of field practices of fruit crops. Emphasis will be placed on 1. Establishment and management of orchard. 2. Soil and soil fertility management. 3. Pruning and training of fruit trees. 4. Propagation and nursery practices. 5. Grading, packing, and postharvest technology.

農產品生鮮處理技術

2 選 下

本課程主要在介紹園產品採後生理之變化，以及採後處理技術應用之原理與原則，並說明園產品的採後處理流程，包括選別、分級、包裝、預冷、貯藏及運輸等等。

Postharvest Technology of Agricultural Products 2 ES

This course is to make students practice the various postharvest handling and storage techniques, including packaging, handling, storage, quality analysis, and determination of respiration rate and ethylene production, among others to let students understand both practical operation as well as theoretical aspects of the lecture subjects.

農產品生鮮處理技術實習 1 選 下

本實習主要在使學生熟悉農園產品採收後處理之有關技術，內容包括包裝、果品處理、貯藏、品質分析、呼吸率及乙烯發生率測定...等等，使學生能將理論與實習實際結合。

Practice of Postharvest Technology of Agricultural Products 1ES

This course is to make students practice the various postharvest handling and storage techniques, including packaging, handling, storage, quality analysis, and determination of respiration rate and ethylene production, among others to let students understand both practical operation as well as theoretical aspects of the lecture subjects.

設施園藝 2 選 上

本課程主要介紹園藝設施種類、構造規劃和材料選擇。此外討論設施內光線、溫度、溼度、空氣等微氣候之特性、管理控制方法和作物的反應。並以水耕栽培為例、深入介紹無土栽培的運用和施肥、灌溉技術。另外簡介溫室病蟲害防治、生長調節劑的使用、穴盤育苗等及相關的機械化設備。

Horticultural Production Under Structures 2 E F

This course is designed for students planning careers in commercial horticultural production under structures. The contents include types of structures and materials; microclimate in the greenhouse and its management; techniques of watering, fertilization; media and growth regulator handling; disease and pest control. Hydroponics, plug system and related appliances are also briefly introduced.

設施園藝實習 1 選 上

實習以循環式水耕栽培為主要項目，同時練習養液配製、設施內環境變化觀察及管理，並做合理的病蟲害防治。另外練習孵豆芽；實際觀測各種設施架構、栽培方式和灌溉系統，了解其特色、優缺點和價格。

Practice of Horticultural Production 1 E F **Under Structures**

Circulated hydroponic production is the major topic of this course, which includes nutrient solution composing, environmental management and pests control. Projects also content bean sprout production, greenhouse structure and irrigation system measuring, and evaluating, as well as price estimation of irrigation systems.

造園學 2 選 上

本課程包含 1.緒論：造園的意義、範圍、分類、人與自然的關係 2.造園史：東洋造園史、西洋造園史、中國造園史。 3.造園設計基礎 4.基地測量 5.基地分析 6.造園規劃和設計 7.植栽和植

栽設計 8.造園材料 9.庭園管理與維護。

Landscape Architecture 2 E F

This course includes: 1. Introduction. 2. The garden in history. 3. Basis of landscape architecture. 4. Site survey. 5. Site analysis. 6. Planning and design. 7. Plants and planting design. 8. Landscape materials. 9. Landscape maintenance and conservation.

造園學實習 1 選 上

本實習包含：造園設計實務（園地測量、繪製設計圖樣）、造園施工實物（土工、木工、石工、水電工）、庭園管理與維護實務（器具之使用、樹木植栽之修剪及維、草皮之管理及維護）。

Practice of Landscape Architecture 1 E F

This course includes : 1. Practices of landscape design: (1) Site survey (2) Drawing landscape map. 2. Practices of landscape construction: (1) Earth-work (2) Wood-work (3) Rock-work (4) Water and electric power. 3. Practices of garden maintenance and conservation: (1) Using and maintenance of instruments (2) Pruning (3) Maintenance and management of lawn.

雜草管理 2 選 上

本課程主要介紹雜草的認識、分類、鑑定、生理、生態及對作物、環境、人類的影響，繼而說明草害管理的演變及主要管理技術。

Weed Management 2 E F

Several topics of weed management are included: how to identify weeds, classification, physiology, ecology, effects of weeds on crops, environment and human beings, the history of weed management and management techniques.

雜草管理實習 1 選 上

本實習主要介紹認識雜草及雜草的生態相，進而了解各種雜草的管理技術包括生物性、化學性殺虫劑特性之介紹及應用。

Practice of Weed Management 1 E F

This is a practical course of weed management. The purposes are how to know weeds, ecological distribution, management techniques, biological and chemical controls.

草坪管理 2 選 上

本課程介紹草坪之種類及用途；適用於草坪之溫、熱帶各類草種，及其植株特性與繁殖方法，另草坪之設計、規劃、整地、栽植、管理、維護、病虫害種類及其防治方法，均逐一說明。

Turf Management 2 E F

The course will introduce different types of turfgrasses and their uses especially those adapted to the temperate and tropical areas. On major turfgrass species, the plant characteristics and propagation techniques will be discussed. For the turf establishment and management, design, preparation, maintenance, pest management techniques will also be discussed.

草坪管理實習 1 選 上

認識各類溫、熱帶草坪之草種、植株特性、繁殖方法，並實際讓學生進行草坪之整地、栽植、管理、病虫害認知與防治等，並配合實地參觀以加深印象。

Practice of Turf Management**1 E F**

The practical field culture and management techniques on turf will be conducted by students to know how to prepare turf sites, turfgrass propagation techniques, use of fertilizers, and pest control on our practice turf farm. Field trips to golf course and seminar on turf management will also be conducted.

作物營養學**2 選 上**

本課程主要在闡明作物營養管理的原則與方法，並介紹作物無機營養失調症狀及其診斷技術與改善方法。

Crop Nutrition**2 E F**

The course emphasizes the principle and methods of crop nutrition management, symptoms of nutrient disorders, diagnostic techniques and amendment methods.

作物營養學實習**1 選 上**

本實習主要在使學生認識作物無機營養失調的症狀，以及熟悉作物無機營養的診斷技術與分析方法。

Practice of Crop Nutrition**1 E F**

The course offers hands-on practices on identifying symptoms of crop nutrient disorders and other diagnostic techniques, especially on plant and soil analysis.

特用作物學**2 選 下**

本課程目的在培養嗜好作物、糖料作物、纖維作物、油用作物等之生產、改良人才。主要內容在敘述特用作物之意義、用途、成分、性狀、分類、品種、來源、分佈、適應、栽培、管理、收穫、調製、貯藏、改良、範圍及研究方法。選擇特用作物中之一類-嗜好作物如茶、菸、可可和咖啡等說明其栽培改良方法。

Special Crops Science**2 E F**

The objective of this course is to give students more confidence in their ability for producing and improving the recreation crops. The main contents of this course will describe the definition, sort, and study method of special crops. We will describe the cultivation and improvement of the recreation crops, such as tea and tobacco plant etc.

特用作物學實習**2 選 下**

本課程目的在培養嗜好作物、糖料作物、纖維作物、油用作物等之生產、改良人才。主要內容在敘述特用作物之意義、用途、成分、性狀、分類、品種、來源、分佈、適應、栽培、管理、收穫、調製、貯藏、改良、範圍及研究方法。選擇特用作物中之一類-嗜好作物如茶、菸、可可和咖啡等說明其栽培改良方法。

Practice of Special Crops Science**2 E F**

The course includes tobacco, tea and coffee on their plant characteristics, seedbed preparation, sowing, seedbed treatment, transplanting, field management, fertilization, control of disease and pest, harvesting, preparation method, storage, tasting of products, and component analysis.

食用菌栽培**2 選 下**

本課程內容包括：菇蕈種類、菇蕈生物學、菇蕈栽培、菇蕈菌種製作、菇蕈栽培基質種類與準備、菇蕈菌絲營養生長及菇體發育與栽培環境、及台灣主要食藥用菇蕈的栽培。

Cultivation of Edible Fungi**2 E S**

The contents of this course are including the categories、biology and cultivation of mushroom ,preparation of mushroom spawn and culture substrate , effects of cultivation environmental factors on vegetative growth and fruiting body development , and cultivation of major edible and medicinal mushrooms , such as common mushroom、Chinese mushroom、oyster mushroom、Jelly fungi mushroom 、almond portobello and shiitake in Taiwan.

食用菌栽培實習**1 選 下**

配合正課的內容，除就本地常見食用菌提供同學練習栽培外，也配合以幻燈片及網路資源等，讓同學們了解食用菌廣泛的種類及分佈等。

Practice of Cultivation of Edible Fungi**1 E S**

The purposes of this lab are sets on introducing students with a few protocol on cultivating edible fungi, especially locally commercialized kinds of edible fungi.

動物學**2 選 上**

本課程之設計主要是幫助學生了解動物之演化、分類與生理功能。內容包括器官的發育、細胞分裂與遺傳、動物行為與生態、原生生物、假體腔動物、軟體動物、環節動物、節肢動物、昆蟲、魚類、兩生類、爬蟲類、鳥類、哺乳類。

Zoology**2 E F**

The object of this course is helping the students to understand the evolution, classification and physiological function of the animal. The contents include: development of tissue, organ, system, cell division and inheritance, animal behavior and ecology, protozoa, pseudocoelomate body plan, molluscan, annelida, arthropod, hexapod, fish, amphibian, reptile, bird and mammal.

動物學實習**1 選 上**

本課程之設計主要是幫助學生學習動物的一般構造及功能。內容包括光學顯微鏡使用、動物細胞及原生生物外部構造之觀察、蚯蚓及蝦解剖構造之觀察、以及脊椎動物之循環、呼吸、排泄、生殖、肌肉、消化與骨骼等系統解剖構造的瞭解。

Practice of Zoology**1 E F**

The object of this course is helping the students to learn the general structure and function of animal. The contents include: utilization of light microscopy, observation of the external features of animal cells and protozoa, observation of the anatomic structures of pheretima and crayfish, understanding the anatomic structures of circulatory, respiratory, excretory, reproduction, digestive, muscle and skeleton systems of vertebrates.

水產生物學**3 選 上**

本課程的目的是讓學生了解水產生物的種類特性及構造，並藉由實務的操作及觀察認識不同水產生物的生理與生態。

Aquatic Biology**3 E F**

The purpose of this course is to enable students to understand kinds, characteristics and structures of aquatic organisms and to understand the physiology and ecology of aquatic organisms by the practical operation and observation.

動物解剖生理學**3 選 下**

本課程以解剖學為基礎，依生理系統介紹禽畜之身體各部位構造與功能，依次分別為骨骼、肌肉、神經、血管循環、呼吸、消化、吸收、代謝、排泄、內分泌及生殖等系統。

Anatomy and Physiology of Animal 3 E S

The object of this course will introduce animal anatomy and physiology with organ system. The lectures contain skeleton system, joints, muscles system, nerves system, cardiovascular system, respiratory system, digestion system, urinary system, endocrine system and reproductive system.

動物解剖生理學實習**1 選 下**

本課程將利用標本及實際解剖生物來介紹身體構造，並在實驗室以顯微鏡、檢測試劑及多項小型手術用具，透過實驗操作來進一步了解血液、心臟、循環、呼吸、泌尿及生殖之生理現象。

Practice of Anatomy and Physiology of Animal 1 ES

Students will learn animal anatomy with specimens and necropsy and will learn physiological function on blood cell, heart function, circulation, respiratory volume and reproductive cycle by microscopy and polygraph instruments.

禽畜環境生理學**2 選 下**

本課程主要討論環境因素、氣候條件以及動物的各種生理控制機構；進而探討環境對動物所造成的影響，以及克服的方法；從動物行為、飼養管理以及畜舍設計等方面來提高畜牧生產的效率。台灣地處亞熱帶，每年長達 6~7 個月的時間處在高溫高濕的緊迫環境，如何克服環境緊迫所造成的不良影響，提高畜牧生產，實為一重要課題。

Environmental Physiology of Domestic Animal 2 E S

This course will discuss the environmental factors, climatic conditions and physiological mechanisms of domestic animals, and further investigate the effects of environments on the performance of animals. The important object of this course is to evaluate some methods to overcome the animal production problems due to the warm humid environments in Taiwan.

牧場實務實習**1 選 上/下**

本課程之目的在使學生在牧場實務實習中，將所學理論與實際配合，在操作中學習。課程內容如下：畜牧之現在及未來之展望，二、牧場工作簡介，三、養豬實習：(一)繁殖豬、(二)小豬、(三)肉豬，四、蛋雞實習，五、肉雞實習，六、種雞實習，七、孵化實習，八、肉牛實習，九、乳牛實習：(一)仔牛照顧、(二)繁殖管理、(三)產乳管理，十、牧草管理：(一)種草、(二)一般管理、(三)收穫、(四)製造乾草，十一、犬隻管理。

Practice of Animal Farm 1 E F/S

The purpose of the course is to let students match the theory and practice, to reach the goal of training---learning by doing. The following items are included: 1. future and past of animal production, 2. introduction of animal farm, 3. practice of swine production, 4. practice of layer production, 5. practice of broiler production, 6. practice of feeder production, 7. practice of hatchery production, 8. practice of beef cattle production, 9. practice of dairy cattle production, 10. management of grassland, 11. management of dogs.

動物舍規劃與自動化**2 選 上**

動物需要：環境需要、行為需要、動物福利之考量、環境對健康之影響；基本原理：材料、熱量交換原理、通風、整體規劃、禽畜尺寸；畜舍各論：豬舍、雞舍、牛舍、羊舍。

Animal House Arrangement and Automation 2 E F

Animal requirement: environment requirement, behavior requirement, animal welfare needs, environment and health. Basic requirement: material, thermal exchange, ventilation, arrangement, size of animals. Animal house arrangement: pig house, poultry house, cattle house, goat and sheep house.

動物營養學 2 選 下

本課程主要討論動物營養的基本概念，以及如何利用各種飼料原料配合成平衡的各種動物飼料，在台灣的環境下，從事家禽飼養。討論內容包括：營養素的代謝、營養需要量的測定及資料應用、飼料原料的選擇、及各種家禽的營養需要與飼料配製，包括：肉雞、蛋雞、種雞、火雞、肉鴨、蛋鴨及鵝等。並討論動物營養學的原理，包括：營養學的發展、動物營養消化生理、飼料的營養組成分、消化率測定、營養需要量測定、營養素的代謝利用過程，包括碳水化合物、脂質、蛋白質、礦物質、維生素及水之代謝；最後並討論營養性疾病及營養知識的應用。

Animal Nutrition 2 E S

This course is designed to discuss the basic concepts of poultry nutrition and how to use feed ingredients to formulate balanced poultry feeds for poultry production, especially under Taiwan environmental conditions. The contents include: metabolism of nutrients, nutrition requirements and application of information, feed ingredients, and feed formulation for all kinds of poultry, include: broilers, layers, breeders, turkeys, ducks and geese. This course will also discuss the principle and application of animal nutrition. The contents include: the development of nutrition, digestive physiology, the composition of feed, the measurement of digestibility, the metabolism of nutrients; carbohydrates, fats, proteins, minerals, vitamins and water; nutritional deficiency and application of nutritional knowledge.

水產養殖學 3 選 下

本課程先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。

Introduction to Aquaculture 3 E S

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.

家禽飼養管理 1 選 上

本課程介紹家禽飼養管理之理論與實務作業技術，包括：家禽品種、種蛋經營、孵化作業、育雛及一般飼養管理、雞舍與設備操作、疾病防治與產品屠宰、包裝及銷售等事務，使學生對家禽產業之整合，生產現況與未來發展有全盤之認識。

Poultry Feeding and Management 1 E F

The objective of this course is to introduce the theory and practical operation technique of poultry to the students. The contents include: breeds and students of poultry, management of breeders, hatching operation, brooding and rearing, houses and equipment operation, disease control, processing and

marketing products .

家禽飼養管理實習

1 選 上

本課程實習內容主要配合「家禽飼養管理」課程，使學生實際進行生產過程所需要之操作訓練，包括：種蛋之處理、孵化技術、飼養試驗、配合課程之需要邀請現場人員作專題研討、並參觀實習，包括：自動化飼養系統、屠宰作業、雞蛋洗選包裝等，使學生充分瞭解家禽生產之作業技術。

Practice of Poultry Feeding and Management 1 EF

This practice course is associated with the poultry productive technique to enforce the students on the skill and technique part through field practice. Learning by doing is the basic concept of technique education. In this course students are allocated into groups to operate the whole process for poultry production, include: hatching eggs operations, hatchery technique and feeding trials. In addition there will be seminars and direct discussion with industry people, field trip to commercial farm processing plant, etc. Through this practice course students will get a comprehensive knowledge of poultry production.

豬隻飼養管理

1 選 上

本課程目的在於介紹台灣高溫多濕的環境下，養豬事業之成就與豐富之經驗以及國內外養豬業之先進技術與科學知識。其內容包括豬隻生理解剖、遺傳育種、品種選拔與改良、生物技術與生殖、營養與飼料、飼養管理、環境與污染控制、經濟經營規模與市場產銷等知識，再配合實際操作，使學生參與養豬現場之訓練，以期成為務實之經營者。

Pig Feeding and Management 1 E F

The purpose of this course is to introduce a technical basis and rich experience for successful production of swine industry under the high temperature and high moisture environments in Taiwan, and to provide the current new knowledge and technology of the world's swine science. The contents of this course advance in swine: physiology and anatomy, genetics and breeding, breeds selection and improvement, biotechnology and reproduction, feeds and nutrition, feeding and management, environment and waste control, economic size and marketing and so on. The practical training on-farm can be enhanced in this course.

豬隻飼養管理實習

1 選 上

實習內容在使學生實際從事養豬技術、規劃及經營之訓練，以造就成為真正養豬經營之專業人才，諸如品種與選種評分、豬場清洗與消毒、分娩介助、發情觀察與配種、豬場紀錄規劃、豬舍建築設計與豬舍配置規劃、飼料需求量估計、飼養成本之概估、經濟經營規模擬定、投資報酬之分析、市場供需資料之搜集及總生產成本與收益之計算與分析。

Practice of Pig Feeding and Management 1 E F

The contents of swine productive practice are to provide a training of students on technique, planning and management of swine production. It contains: swine breeding and selection, washing and sanitation of pig house, farrowing nurse, estrus observation and service, productive record, design and scaling of growing-finishing house and farrowing house, requirements of feeds, feeding cost, the decision of economic size, the analysis of investment and margin, collecting the information of the supply and demand on market, calculation and analysis of

the total cost of production and total revenue.

乳用家畜飼養管理

1 選 上

本課程主要著重於熱帶地區高溫多濕環境下乳用家畜飼養管理之理論與實務。對於擠乳管理、電腦管理系統、完全混合日糧飼養系統、畜舍降溫裝置、最新反芻營養科技資料以及乳用家畜較常發生之疾病與其防治加以闡述，以訓練學生對於經營農場更具信心。

Dairy Livestock Feeding and Management 1 E F

This course lays special emphasis on the feeding and management of dairy livestock in the high temperature and humid environment. It includes milking management, computer management system, TMR feeding system, house cooling equipment, recent ruminant nutrition knowledge, disease control and prevention of dairy cows, it will give the students more confidence in running the dairy farm.

乳用家畜飼養管理實習

1 選 上

本課程之內容旨在讓學生熟悉乳用家畜管理技術。例如人工授精與妊娠診斷、公牛精液選擇、擠奶機功能檢測、血液檢查、粗料乾物質快速測定、營養代謝性疾病之認識與檢測；並鼓勵學生多與民間乳牛場接觸，以發掘現存之問題與設法解決達到理論與實際之配合。

Practice of Feeding and Management in Dairy Livestock 1 E F

The purpose of this course is to give the students more familiar with the management tool of dairy livestock. It includes artificial insemination and pregnancy diagnosis, bull frozen semen selection, milking machine function testing, blood test of dairy cow, rapid testing of roughage dry matter contents, nutritional metabolic disorders. The students were encouraged to visit private dairy farm so that they could explore more problems and try to find solutions from theory to practice.

動物育種學

3 選 上

本課程目的在使學生習得將遺傳學基本法則應用於改進禽畜生產性能上，識別對禽畜生產及其效率具經濟價值之性狀，利用所獲得的各項資料評估動物的育種價值並準確性評估各種育種選拔計劃之可行性及預期效果。

Animal Breeding 3 E F

This course is to introduce the primary principle of genetics for the animal production. The student will understand the economic trait of animal and apply the principle of genetics on the performance improvement of animal production. The performance improvement and progeny evaluation are intended to give the student a feeling for what can be expected from the application of animal breeding in the changing of animal population. The student will sense the underlying concept that process and profits come from a balanced consideration of genetic, environmental and economic considerations.

水族營養學

3 選 上

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。

Fish Nutrition**3 E F**

The purpose of this course is to give the students more familiar with the requirement 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 requirement.

乳品加工**2 選 上**

本課程著重於乳製品之加工技術、加工原理、原料配合、品質管制及貯藏等。乳製品種類則涵蓋液乳、發酵乳、冰淇淋、乾酪、乳酪及乳油等。期使學生於乳品加工技術之操控更具信心。

Processing of Dairy Products**2 E F**

The objective of this course is to give the students more confidence in processing theory and techniques of dairy products, formula designation, quality control and storage methods. The kinds of dairy products include liquid milks, ice cream, cheese, butter and cream etc.

乳品加工實習**1 選 上**

本實習配合乳品技術之課程內容，包括乳品成分微生物檢驗與液乳、發酵乳、冰淇淋、乾酪、乳油及乳酪之製造。期使學生熟悉乳品之製造，並對產品配、製程及品質之操控具信心。

Practice of Dairy Products**1 E F**

The objective of this course is to give students more confidence in formula, processing and quality control of dairy products. It includes the chemical, physical and microbial examination of dairy products, and manufacture of liquid milks, fermented milks, ice cream, cheese, cream and butter etc

肉品加工**2 選 下**

本課程介紹肉品加工有關技術之學理與所使用設備的原理。重點將著重於使學生瞭解各種加工技術，包括肉品之醃漬、嫩化、煙燻、乳化、乾燥、添加物使用與肉品保存等之原理與應用。

Processing of Meat Products**2 E S**

This course introduces technologies related to meat processing and principles of the equipments and facilities related. The purpose of this course is educating students with knowledge include meat marination, tenderization, smoking, emulsion, drying, food additives addition, meat product preservation, and etc.

肉品加工實習**1 選 下**

本課程配合肉品加工技術之正課，使得學生能在瞭解肉品加工技術有關之原理及設備的功能外，更能實際正確地操作各項設備，以製作各項產品，包括：醃漬肉排、香腸、火腿、臘肉、貢丸、叉燒、油雞等。

Practice of Meat Products**1 E S**

In this course, it educates students how to handling the meat processing equipments correctly. Moreover, students will apply these equipments to produce several meat products, including marinated chops, sausages, hams, Chinese bacon, Chinese meatball, BBQ pork, poultry products.

免疫學概論**2 選 下**

本課程的主要目的是提供學生一個對免疫學的基本概念，隨著農場管理技術的進步，

家畜的飼養密度和生長表現都持續的在提升。在這種情況下，動物更容易受到傳染病的危害而對產業造成嚴重的經濟損失。動物本身的免疫力在抵抗外來病原菌和病毒上扮演著重要的角色。本課程式著重在介紹免疫系統、各種免疫反應、宿主及病原交互作用、及疫苗、獲得這方面的知識能讓學生了解農場的疾病防治。

Introduction to Immunology 2 E S

The objective of this course is to provide the students a basic background of immunology. The housing density and the growth performance of domestic animals keep increasing as the consequence of advanced farm management. Under this circumstance, animals are more susceptible to infectious diseases which lead to significant economic losses to the industry. The immunity plays a pivotal role in protecting the animals from invading pathogens and viruses. This course is focused on the introduction of immune system, different types of immune responses, host-pathogen interaction, and vaccination. Acquisition of such knowledge is fundamental for the students to understand disease-controlling strategies of animal husbandry.

動物繁殖學 2 選 下

本課程著重於討論禽畜繁殖問題及新近發展之繁殖技術，包括雌雄種畜生殖機能之評估與改善，繁殖管理之新觀念與方法，生殖性狀之選拔，人工授精與體外授精技術之應用，性別選擇，配子和胚之顯微操作及保存，與胚移植技術等，並以有助於解除緊迫環境下禽畜之繁殖困擾者為優先，修習本課程之學生可藉課堂討論與國內外相關文獻之閱讀以掌握繁殖技術之最新發展，提升改善禽畜繁殖效率之能力。

Animal Reproduction 2 E S

The objective of this course is to give the students more confidence in their abilities for improving the reproductive efficiency of the livestock. Dealing with the modern concepts and the recent techniques in livestock reproduction, it consists of the following subjects: evaluation and improving of the reproductive functions of the breeding livestock; reproductive management; selection on the reproductive characteristics; methods of sex selection; applications of artificial insemination and in vitro fertilization; micromanipulation and preservation of the gametes and embryos; the technique of embryo transfer; and so on. The topics being put in the priority are those techniques that are capable of being used for restoring the prevalent reproductive failure of the livestock under the environmental stress. For catching up the new developing concepts.

飼料製造技術 2 選 下

本課程乃教授禽畜及魚類完全配合飼料製造工業之現代技術，內容包括：單味飼料之生產方式與一般生產過程之影響因素、飼料預混劑之製造技術、配合飼料之製造包括設計、收料、混合、製粒、包裝儲存與糖蜜、油脂等液體原料添加之有關技術、養魚飼料之製造技術等。

Feed Manufacture Technology 2 E S

The objective of this course is to acquaint the students with the modern technique about the formula feed industry of the livestock, poultry and fish. The course contains the processing of the ingredient feed and the influent factors

about general processing problems; processing and adding of feed premix; the engineering of formula feed, including design, receiving, grinding, mixing, pelleting, bagging, weighing, loading and the technique of addition of liquid ingredients; and the technique of manufacturing of the fish formula feeds.

飼料製造技術實習

1 選 下

本課程乃教授禽畜及魚類完全配合飼料製造工業之現代技術。內容包括：單味飼料之生產方式與一般生產過程之影響因素、飼料預混劑之製造技術、配合飼料之製造包括設計、收料、混合、製粒、包裝儲存與糖蜜、油脂等液體原料添加之有關技術、養魚飼料之製造技術等。

Practice of Feed Manufacture Technology 1 E S

The objective of this course is to acquaint the students with the modern technique about the formula feed industry of the livestock, poultry and fish. The course contains the processing of the ingredient feed and the influent factors about general processing problems; processing and adding of feed premix; the engineering of formula feed, including design, receiving, grinding, mixing, pelleting, bagging, weighing, loading and the technique of addition of liquid ingredients; and the technique of manufacturing of the fish formula feeds.

養殖經營與管理

2 選 下

本課程將試著介紹完整的水產養殖概念給所有上此門課的學生。由於水產養殖的生物品種、形式及養殖系統非常多元化。養殖系統則依據不同的環境、地區甚至經濟情況發展而成。本課程希望所有上完此課程的學生能有更清楚的概念，並於未來從事水產養殖相關事業時能作出最佳的計畫。

Aquaculture Business Management 2 E S

This curriculum is trying to introduce the whole concept of Aquaculture to student. There are many different Aquaculture species, types and systems, which are developed according to different environment, area and economic condition. Students who completed this curriculum can have a well understanding and take a right protocol to start his business in the Aquaculture Industry in the future.

養殖場實習

1 選 上/下

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)之應變措施。

Practice of Aquafarm 1 E F/S

In this class, students will be ask to operate all practical equipment in farm and taught how to manage the farm in order to success in aquaculture.

水族動物疾病學

3 選 上

本課程講解比較魚類及其他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。又附帶講解與公共衛生有關之魚類疾病。

Aquatic Animal Disease 3 E F

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

動物飼料學**2 選 上**

本課程介紹動物飼料的基本常識,包括分析飼料成分的方法,各種不同飼料的種類,飼料的儲存與加工,如何設計和配方完全飼料。

Animal Feeds and Feeding**2 E F**

The basic knowledge of animal feeds are introduced in this course, including the methods used for analyzing feed composition, various types of feed, feed storage and processing, balancing feeds, and formulation of feeds

禽畜保健與傳染病防治(1)**2 選 上**

使學生實際瞭解消毒及預防措施,並介紹禽畜常見的傳染病、寄生蟲病及其它疾病發生原因、症狀及其預防要領,並使疾病發生時能及時作正確處理。

Livestock Health and Transmissible Diseases(1) 2 E F

This course will introduce the theory of selected important animal disease to students. It will provide the students' knowledge to control animal diseases, aseptic procedure, and disease prevention conception.

禽畜保健與傳染病防治實習(1)**1 選 上**

本課程係配合禽畜保健而開,主要使學生在操作觀察中瞭解各種禽畜常見疾病之特徵,並其預防及消毒措施,使學生實習後對禽畜之保健預防有更進一步認識。

Practice of Livestock Health and Transmissible Diseases(1)**1 E F**

This course lays on the methods of disease diagnosis and prevention. It provides the basic concepts and operative practices of swine, cattle, chicken and dog disease.

禽畜保健與傳染病防治(2)**2 選 下**

介紹禽畜常見的傳染病、寄生蟲病及其它疾病發生原因、症狀及其預防要領,並使疾病發生時能及時作正確處理。

Practice of Livestock Health and Transmissible Diseases(2)**2 E F**

This course will introduce the theory of selected important animal diseases to students. It will provide the students knowledge to control animal diseases, aseptic procedure, and disease prevention conception.

禽畜保健與傳染病防治實習(2)**1 選 下**

藉由本課程概括介紹本課程主要講授引起動物疾病之細菌,病毒,黴菌,黴漿菌,披衣菌等微生物之形態,分類,生理,培養,鑑定,消毒,滅菌,致病性,控制和免疫機制。

Livestock Health and Transmissible Diseases(2)**1 E S**

To ensure students understand the animals and livestock of a common infectious disease prevention and the importance of, students also learned that the latest infectious diseases relevant knowledge.

水產遺傳育種學**3 選 下**

課程涵蓋下述幾個主題:魚類及水生生物遺傳形質介紹、魚類及水生生物遺傳原則、魚類及水生生物遺傳形質的選擇、應用及族群育種方法、魚類及水生生物體內染色體或核酸改變的檢測

方法介紹、魚類及水生生物染色體組的操作及其應用、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。

Fish Genetics and Breeding

3 E S

The course covers following topics: The genetic characteristics in fish population and aquatic organisms, the genetic principals in fish and aquatic organisms, a selection of genetic characteristics for application to human life and breeding methods in fish population, the detection of a change of chromosome or DNA in fish cells, chromosome manipulation and application in fishery biology, gene selection, constructure, transformation, expression and application in fishery biology.

寵物科學(1)

2 選 上

本課程之授課內容包括：伴侶動物種類來源、品種、繁殖與育種、營養、飼養與管理、畜舍和保定，以及保健。本課程所提供飼養寵物之相關常識，將有助於寵物飼養技術之提升。

Pet Science(1)

2 E F

The purpose of this course provides the necessary information including origins, breeds, reproduction and breeding, nutrition, feeding and management, housing and handling, health care in companion animals. It is hoped that this study will serve as a guide for advanced in the field of companion management.

寵物科學(2)

2 選 下

本課程之授課內容包括：伴侶動物種類來源、品種、繁殖與育種、營養、飼養與管理、畜舍和保定，以及保健。本課程所提供飼養寵物之相關常識，將有助於寵物飼養技術之提升。

Pet Science(2)

2 E S

The purpose of this course provides the necessary information including origins, breeds, reproduction and breeding, nutrition, feeding and management, housing and handling, health care in companion animals. It is hoped that this study will serve as a guide for advanced in the field of companion management.

農業數學應用

2 選 下

本課程將提供學生應用數學技能，他們需要的現代農業產業。本課程將專注於解決問題的方法，學生將在現實世界中遇到的數學和邏輯能力在作物生產，畜牧業生產，園藝，及財務管理。

Mathematical applications in Agriculture

2 E S

This course will provide students the applied math skills they need for the modern farming industry. The course will focus on methods for solving problems students will encounter in the real world using math and logic skills in crop production, livestock production, horticulture, and financial management.

動植物保護與農業

2 選 F

本課程涵蓋植物與動物的保護，在植物方面,主要的課題為植物疾病所引起的經濟損失,植物疾病的致病機制、診斷和預防。在動物保護方面,內容著重在入侵種對本土種的威脅,濫用抗生素的負面影響,動物疾病在國際間散播的例子,以及轉基因動物在未來農業的角色,風險和規範。

Mathematical applications in Agriculture

2 E F

The course covers the protection of plants and animals. For plants, the major topics are, economical losses, pathogenesis, diagnosis, and prevention of plant diseases. On the other hand, the content of animal protection focuses on the threatening of invasive species to local species, the adverse effects associated with antibiotic administration, examples of animals diseases spread internationally, and possible risks and regulations of transgenic animals that might play a role in the future agriculture.

食品加工與實習

1 選 上

本課程包含畜水產加工及蛋乳製品加工。包括原料種類、生化特性、鮮藏與保存，及各類加工技術。並介紹加工過程中之理化變化及產品保存與品質測定。配合正課的內容，包括肉品生產過程及品管作業包裝，煉製品之罐頭、魚丸、魚蝦醬油及其他加工品之製造及開發。

Food Processing and Practice

1 E F

The course emphasizes on the processing of meat seafood, milk and egg. Biochemical properties of the raw material, its extended shelf life, preservation and quality check in products during processing are included. The lab provides the chance to practice the processing of dried pork bundle、sausage、cured meat、fish ball、dehydrated fish stick and shrimp sauce products.

食品微生物與實習

3 選 下

講授與食品有關的微生物及其各種有關的生理、酵素等一般的概念。利用食品微生物之發酵技術來製造食品的方法，以及食品腐敗之原因與其防止方法。實習講授食品中微生物數之計測方法，有用食品微生物之分離、培養方法，以及單獨利用細菌、酵母、黴菌或混合菌來製造食品的方法，食物中毒菌之分離鑑定及其計測。

Microbes Detection and Practice

3 E S

The course is to teach the food related microorganisms and the common concept of their physiological, enzyme etc. Application the fermentation technique of microbes on food processing. The food putrefaction and the contamination prevention were also introduced. The lab technique covers the cell count of microbes in food, the isolation and cultivation of food microbes. Bacteria、yeast、mold or mixed of them were applied on food processing, the isolation, identification and counting of food poisoning microbes were also involved.

食品殺菌技術與實習

3 選 上

本課程配合食品殺菌技術之課程內容，作實際之操作、試驗或參觀等其內容包括各類食品之熱傳導速率測定、微生物耐熱性曲線製作、加熱殺菌值測定、各種密封食品加熱殺菌條件之探討、化學藥劑對食品之保存與安全性試驗、物理除菌等試驗及至加工廠或相關單位參觀，以瞭解食品生產之殺菌實務。

Food Sterilization and Practice

3 S F

The lab is to match the lecture to have the practice to run the food sterilization techniques. The thermal conductivity rate was determined to evaluate the thermal death curve and lethal rate of microorganisms. The chemical and physical sterilization were also tested and setup a field trip for students.

生物化學(2)

2 選 上

修讀學生需具備生化分子結構之基本概念，本課程將介紹此些生化分子在生物體內之代謝與合成，了解生物體如何由此些生化分子獲取能量及合成生長所需之大分子。其授課內容包括醣解

作用，檸檬酸循環、電子傳遞鏈、肝糖合成、脂肪及含氮化合物之代謝與合成等項目。

Biochemistry (2)

2 E F

Students should have the basic concepts of biomolecules before they take this course. This course is designed to introduce the metabolism and anabolism of biomolecules. The topics include glycolysis, citric acid cycle, electron transfer chain, glycogen synthesis, β -oxidation of fatty acid, biosynthesis of lipid, metabolism and anabolism of nitrogen-containing compounds.

生物化學實驗(2)

1 選 上

本課程目的在使學生藉由實際操作了解生劃分子的特性及生化反應的原理，並學習 pH 計、分光光度計等儀器的操作。實習內容包括：緩衝溶液之製備、胺基酸之滴定、胺基酸及蛋白質之定性分析、蛋白質之定量、醣類之定量分析、酵素活性測定及膠過濾法。

Biochemistry Lab. (2)

1 E F

This course is designed for students to understand the characteristics of biomolecules and the principles of biochemical reactions in the lab. Students will also learn how to operate the some instruments such as pH meter, spectrophotometer in this course. It includes buffer preparation, titration of amino acid, qualitative and quantitative analysis of amino of amino acid and protein, quantitative analysis of carbohydrates.

遺傳學

2 選 上

本課程之目的，在使學生瞭解生物如何遺傳、遺傳拼圖、細胞遺傳、變異、遺傳物質之構造、核酸複製、轉錄、轉譯、基因表現之調控、基因工程、族群遺傳學、及生物進化、遺傳學與社會之關係。

Genetics

2 E F

The purpose of this course is to provide undergraduate students knowledge of how organisms inherit, genetic mapping, cytogenetics, variation, the structure of genetic materials, DNA replication, transcription, translation, control of gene expression, genetic engineering, population genetics, evolution, and the relationship of genetics and the society.

遺傳學實習

1 選 上

本課程之目的，在使學生透過實際操作與試驗，瞭解遺傳學之原理，實驗內容包括：碗豆七個性狀遺傳、植物根尖染色體觀察、果蠅唾腺染色體、減數分裂、統計方法、細菌抗藥性、質體之抽取及限制酵素切割及電泳分離、血型、人類遺傳。

Practice of Genetics

1 E F

The purpose of this laboratory is to train undergraduate students with practical genetics, including the basic principles of genetics, inheritance of pea traits, root tip chromosomes, Drosophila salivary polytene chromosomes, meiosis, statistical methods, bacterial antibiotic resistance, plasmid isolation, restriction, and gel electrophoresis, blood type, and human genetics.

分子生物學

2 選 下

本課程將以基本分子生物學為基礎，針對學生研究之主體，選擇適合之專題研究報告探討其在分子生物學上之意義，以加深學生在分子生物學上的知識。課程主要著重在：1) 基因的基本理論結構 2) 基因的表現及其控制理論 3) 基因轉殖的分子生物學 4) 細胞結構的分

子生物學。

Molecular Biology 2 E S

This course is to introduce the fundamental knowledge of molecular biology. Its contents include: gene structure; gene expression and control theory; special topics of gene transfer; and cell structure.

校外實習 (2~3) 2 選 上

本課程提供學生在校外之實習，以了解產業之現況。

Practice of Industrial Training (II~III) 2 E F

The course is designed for the external and industrial training of undergraduate student to realize current status of agricultural industry.

食品生物化學 2 選 上

本課程在銜接生物化學之課程，提供修讀食品科學學生各類不同食物在加工前後及貯藏間生物化學變化的知識。課程內容包括肉類、魚類、蔬果、穀類、烘焙產品、乳製品等原料物質的變化。

Food Biochemistry 2 E F

In order to connect biochemistry course for food science students, this course is to provide knowledge of biochemical reaction usually occurring in various foods. The course contents include the biochemical changes of raw meat, fish, vegetables and fruits, cereal, baking and dairy products before and after processing or during storage.

應用華語 (五~七) 2 選 上/下

本課程之教學教材是選用以國立屏東科技大學通識教育中心國文教學小組所編印之《國文教材選》、《實用中文寫作教材》為主，課程內容散文、小說、詩詞兼容。透過古典與現代文學的閱讀與應用寫作，提升學生對於文學觀察、感受與想像的能力，並進而引發對於生命群己之深度思辯。

Applied Mandarin (V~VII) 2 E F/S

The main purpose of our course aims to promote students' abilities of reading, thinking, appreciating and writing in Chinese. It is equally divided into Reading part and Writing part. The selecting articles then divided into two parts: the classics and the modern literature. There are ancient prose, rhymed composition, verse in the classics and contemporary prose, novel, and poems in the modern literature. All articles are chosen collaboratively by every teacher in view of representative and current so that to cultivate the literary appreciating ability and cultural character. Besides the writing exercise in classroom for 3 pieces each semester, some extracurricular books as supplemental material will be appointed and the reading report should be handed in. By this kind of teaching, the student' level in Chinese writing could be promoted.

英文(三~六) 2 選 上/下

學生於該課程中拓展對於英文的了解，並日加深對英文的認識，以至能夠延伸其運用英文的能力。該課程會漸進引導學生，接觸托福與多益的教材，以加強學生的英語文法、用詞以及實用方面之能力。本中級課程兼顧學生在英語使用上的流利度與正確性。英

文一~四為必修課程。

English (III~VI) 2 E F/S

In this course, students broaden and deepen their understanding of English and extend their abilities to use it. The students are briefly introduced to TOEFL and TOEIC material to strengthen their grammatical, lexical and functional use of the language. Both fluency and accuracy are given equal attention at this intermediate level. English I-IV is prerequisite.

鄉村社會學 2 選 上

本課程旨在探討鄉村社會學的基本概念與變遷，剖析台灣鄉村社會的體系結構與新世代的衝擊問題，以及討論農村再生、各國鄉村發展政策等重要研究議題，以期增進學生對鄉村社會發展之理論基礎與實務層面之了解，並培養其對鄉村社會議題之關注與研究興趣。

Rural Sociology 2 E F

The course is designed to enable students to acquire basic sociological concepts and understand the interconnections between rural and urban economies and cultures. Students are exposed to the process of social change and to current issues in rural societies of Taiwan and across the globe. Students will also engage in the discussion about rural poverty and problems through reading materials, films, a field trip, and report presentations.

工程力學 3 選 下

介紹力量平衡方程式與各種相關問題之解析。課程大綱：力系統觀念，等值力系統之轉換，力系統之平衡，形心及慣性矩，桁架問題之解析，樑問題之解析，吊索問題之解析，流體問題之解析，能量原理。

Engineering Mechanics 3 E S

The main contents of this course include the force equilibrium equations and various analytical problems: introduction to force system, equivalent force system transformation, equilibrium equations of force system, geometry center and moment of inertia, analysis of trusses, analysis of beams, analysis of cables, analysis of fluids, energy principles, and important sections

生產管理 3 選 上

本課程在使學生獲得生產管理之理論及實務之相關知識內容包括：商業計劃、預測、產品發展、資源需求規劃、設備位置與分銷系統設計、過程分析、過程設計與設備佈置、工作設計與工作衡量、集體生產計劃與主排程、存貨政策、投資分析、物料需求規劃、作業排程與生產控制、物料管理、品質管制。

Production Management 3 E F

The objective of this course is designed to teach the related knowledge of the theory and practice of Production Management. The main subjects are summarized as Follows: Business Planning、Forecasting、Product Development、Resource Requirement Planning、Facility Location and Distribution System Design、Process Analysis、Process Design and Facility Layout、Job Design and Work Measurement、Aggregate Production Planning and Master Scheduling、Inventory policy、Investment Analysis、Material Requirements Planning、Operational Scheduling and Production

Control、Materials Management、Quality Control。

食品機械 2 選 上

本課程將介紹食品與相關機械之原理與應用。課程內容包括工廠電力系統、工程圖學、機械原理、電動機械、量測與控制、流體機械、加熱機具、殺菌機具、冷凍機具、乾燥機械、擠壓機、包裝機械及其他食品自動化機械。

Food Machinery 2 E F

Objectives of this course are to introduce the principles and applications of food machinery. Scope of this course includes factory electricity, engineering drawing, the principles of machinery, electrical machines, measurement and control, fluid machinery, heating equipments, pasteurization and sterilization equipments, freezing equipments, dehydration equipments, extruders, packaging systems and other food process automatic machinery.

測量學 2 選 上

本課程主要介紹測量學相關原理，課程大綱包括：測量學概論，距離測量，水準測量，經緯儀測量，羅盤儀測量，導線測量，平板儀測量，地形測量，三角測量。

Surveying 2 E F

This course contents the following subjects: Introduction of surveying, measurement of distance, measurement of difference of elevation, transit surveys, compass surveys, traverse surveys and computations, plane table surveys, topographic surveys, triangulation.

測量學實習 1 選 上

本課程主要讓學生瞭解測量相關技術，課程大綱包括：平地與坡地卷尺距離測量，水準儀測量，經緯儀測量，羅盤儀測量，經緯儀閉合導線測量，平板儀測量，平面圖測繪，地形圖測繪，三角測量平差計算。

Surveying Practice 1 E F

This course contents the following subjects: Distance measurement of plane and slope land by tape, direct level surveys, transit surveys, compass surveys, closed traverse surveys by transit, plane table surveys, surveying and drawing of planimetric map, surveying and drawing of topographic map, adjustments of triangulation.

流體力學 3 選 上

本課程主要介紹流體力學之基本原理，內容包括：1.流體基本性質 2.流體靜力學 3.系統與控制體 4.流體運動基本定律—積分型 5.理想流體運動基本定律—積分型。

Fluid Mechanics 3 E F

The course presents the basic theories of fluid mechanics. The course includes basic principles of fluid mechanics, fluid statics, system and control volume, basic laws of fluid flow.

流體學實習 1 選 上

本課程在加強學生在流體力學之運用能力，內容包括：1.流體基本性質 2.流體靜力學 3.系統與控制體 4.流體運動基本定律—積分型 5.理想流體運動基本定律—積分型。

Practice of Fluid Mechanics 1 E F

The course is to enhance the student's application ability on the fluid mechanics. The course includes basic principles of fluid mechanics, fluid statics, system and control volume, basic laws of fluid flow.

地理資訊系統概論

2 選 下

這當然是引進農業資源管理和研究，其中包括遙感，數據的基礎管理和 GPS 的地理信息系統和相對應用的理論。學生將學到的地理信息系統的知識，以及如何它的功能和自己的實際用途。同學們也都在不同的機會熟悉的 GPS 系統和它的局限性的操作。

Introduction of GIS

2 E S

This course is to introduce the theory of GIS and relative applications in agriculture resource management and research including remote sensing, data base management and GPS. Students will learn the knowledge of GIS and how it functions and the their practical uses. Students were also have the chance to familiar the operation of GPS system and its limitations in different.

人力資源管理

3 選 下

本課程旨在教導學生人力資源管理的概念、程序、工具、模型、及技巧，使熟悉選才、育才、用才、留才的理論與實務觀念。現今，人力資源管理對組織的成功扮演著關鍵性的重要角色，它是組織為保有競爭力、生產力、及效率所必須主動參與的課程。本課程從當今人力資源管理現況與趨勢談起，接續介紹人力資源管理規劃、甄選、教育訓練、績效考核、發展、薪資報酬、員工福利等基礎人力資源議題。另外，加入勞資關係、全球化人力資源管理、與創造高績效組織等相關重要議題；並融入人力資源案例及台灣勞動基準法，使學生更能體會理論意義及實務運用。

Human Resource Management

3 E S

This course provides students with foundations of Human Resource Management. Human Resource Management (HRM) means the policies, practices, and systems the influence employees' behavior, attitudes and performance. This course discusses the practices of HRM which include the analysis and design of work, recruiting, selection, training and development, performance management, compensation, employee relations, and strategic support for organizational strategy. HRM does not exist in a vacuum; it should be integrated into all strata of the organization. This course discusses a variety of internal and external considerations of HRM, including the responsibilities of an HRM Department, the skills of HRM professionals, and the ethics of HRM.

農場企業經營

3 選 下

本課程旨在探討如何有效經營農場企業。課程內容涵蓋管理的三項基本層面：規劃、執行與控管，以幫助學生了解與使用決策工具進行管理，學習並應用經濟原則和預算方法，以及控管農場企業活動。

Farm Business Management

3 E S

The aim of this course is to introduce students to the key concepts on how to effectively manage a farm business. The syllabus of this course includes the three basic functions of management – planning, implementation, and control.

食品企業經營

3 選 下

中國人將西方的 Management 譯為「經營管理」，「經營」是跨部門及全方位的管理學，也是企業界十分模糊不清之處，所以高階主管在經營方面，常常會感到束手無策，「高級管理學」主要即是談此「經營」部分；「管理功能」已被研究得相當透徹，在管理學上有充分的論述，到處可見的管理學課本或書本，基本上已有共識，說明基本的管理原則(Fundamental Management)或一般管理(General Management)。「經營」部分，其主軸在縱橫全公司的「跨功能方面」，尤其是在品質、成本、及時送貨速度方面，將企業功能以 PDS 循環的方式納入，是高階經理人瞭解整體企業運作的「帝王學」基礎；使全公司能上下一心的「命運共同體」，努力學習 10 年以上才能成為「運轉核心」的經營者。一定要全公司各部門及上下全員合作，才能達成經營目標，故經營上比較偏向於合「理」，相對於管理上偏向「法」，二者是有些許的差異。

Food Business Management

3 E S

The purpose of this book is to introduce the reader to improve their competitiveness and profitability. Competitiveness is the relative position of one person, company, firm, organization or country compared to others. A manager must find methods for success instead of find excuses for failure. Without learning management, you can be success. However, you can become a more successful manager sooner by the help of this book. In this book, you'll learn other people's successful experience and management theories.

電腦輔助製圖

2 選 下

本課程主要介紹電腦繪圖之基本概念，並配合 Auto CAD 電腦輔助繪圖軟體、教授基本繪圖指令、繪圖編修指令、標準底圖之建立與設定、尺寸之標註、圖層之觀念、聚合模組與屬性、圖形之輸出、使用者介面控制、Auto CAD 概念簡介。

Computer Aided Drafting

2 E S

The objective of this course is introduce the basic concept of computer aided drawing and to practice with Auto CAD software package. Through the class, the student will familiar with (1) drawing command,(2)Edit command,(3) standard configuration setup,(4)dimensioning,(5)concept of layer,(6)Block and attribute,(7)output device,(8)user define menu,(9) AutoLISP concept.

土壤物理學

3 選 下

本課程旨在講授土壤物理學之基礎原理，其中包括基礎土壤物理特性、土壤膠體特性、土壤間水分靜力與傳導、飽和與未飽和土壤中之水分流動以及土壤中空氣與溫度傳輸之特性。

Soil Physics

3 E S

This course aims to introduce the basic principle of soil physics, including soil physical properties, soil colloids, soil water potential, saturated and unsaturated water flow and soil temperature.

土壤物理學實習

1 選 下

本實習課程為配合土壤學與土壤物理教學，使學習者能確實瞭解土壤性質及如何操作各項試驗，其內容編排由土壤樣品採取技術及實驗室儀器介紹開始，依序進行土壤基本化學及物理性質之測定分析，包括以下 4 單元。第 1 單元包括篩分析、機械分析、容重、土粒密度、孔隙率等基本土壤性質之測定；第 2 單元包括土壤有機質含量、凱氏氮、有效性磷及土壤反應等土壤基本化學性質之測定；第 3 單元包括交換性陽離子、團粒安定度及團粒分析；第 4 單元則包括田間含水量、水分特性曲線及水力傳導度之測定。

Soil Physics Lab.**1 E S**

This course aims to teach basic soil physical experiments for undergraduate students.

水文學**3 選 下**

本課程主要授課內容包括：1.氣象因子概述 2.降水成因及降雨量資料分析 3.蒸發散量之估計 4.入滲因子、入滲分析 5.河川水流 6.逕流歷線、單位歷線洪水演算 8.暴雨、洪水頻率分析。

Hydrology**3 E S**

This course contents the following subjects: 1. Climatological factor introduction. 2. Types of precipitation and analysis Rain. 3. Estimating evaporation. 4. Infiltration and methods of determining infiltration. 5. Stream flow. 6. Runoff and unit hydrographic. 7. Flood routing. 8. Flood frequency probability and stochastic methods.

財務管理**3 選 上**

本課程之目的在於探討農企業財務管理之程序、實務及政策。課程內容包含公司財務領域中幾個重要部分，包括進行財務決策時面臨之環境、財務計畫與資本預算、如何在不確定下作決策、風波與報酬、營運資金管理策略及長期資金管理策略等。課程中亦將輔以個案研討以協助學生更進一步了解農企業之財務決策。

Financial Management**3 E S**

This course is to provide students with the procedures, practices, and policies of financial management for the better performance of agribusinesses. Its contents include: the environment of financial decisions; the basic financial planning and investment; decision making under uncertainty; and risk and return. Several case studies will be given and discussed to facilitate the learning by students.

灌溉學**3 選 上**

現今存在糧食短缺問題及有限水資源分配等情事，對於灌溉系統分配及應用效率化之評估更極為重要。常用灌溉方法有三種（地表、噴灑、滴水灌溉）如當特別設計將可得到較高灌溉效率。地表灌溉（如畦溝田埂灌溉）由地表高往低流動，有較低施灌效率，但是如採最佳長度設計選擇特別流率控制灌溉時間及斷水流量或多進水口等設計，將可提高灌溉效率。滴水灌溉是在作物根係範圍內進行濕潤灌溉，其施灌效率高於噴灑灌溉。土壤水分收支決策管理決定灌溉方法之效率及成本，土壤水分張力變化對作物產量有不同敏感度，其關係對灌溉方法所需設計管理參數有其相關影響。

Irrigation**3 E F**

With the increasing world food shortage problems and the limited water resource situation, the evaluation of irrigation system efficiency (distribution and application efficiency) is increasingly important. All three types of irrigation systems (surface, sprinkler and drip) can achieve high distribution efficiency with proper design. Surface irrigation, which usually means border or furrow, has low application irrigation efficiency. When water is applied from the upstream end, it takes time to travel to the downstream end. The irrigation application efficiency can be increased by designing the optimal length, selecting proper flow rate, controlling irrigation time and using cutoff inflow

or multiple inlet system. Drip irrigation which irrigates only in the root zone can achieve even better irrigation efficiencies than that of sprinkler irrigation. Depth of daily water application is a management decision that depends on water availability and cost. This study relates the effect of the design and management parameters to yield for crops with different sensitivity to moisture stress.

灌溉方法

3 選 上

現今存在糧食短缺問題及有限水資源分配等情事，對於灌溉系統分配及應用效率化之評估更極為重要。常用灌溉方法有三種（地表、噴灑、滴水灌溉）如當特別設計將可得到較高灌溉效率。地表灌溉（如畦溝田埂灌溉）由地表高往低流動，有較低施灌效率，但是如採最佳長度設計選擇特別流率控制灌溉時間及斷水流量或多進水口等設計，將可提高灌溉效率。滴水灌溉是在作物根係範圍內進行濕潤灌溉，其施灌效率高於噴灑灌溉。土壤水分收支決策管理決定灌溉方法之效率及成本，土壤水分張力變化對作物產量有不同敏感度，其關係對灌溉方法所需設計管理參數有其相關影響。

Irrigation Methods

3 E F

With the increasing world food shortage problems and the limited water resource situation, the evaluation of irrigation system efficiency (distribution and application efficiency) is increasingly important. All three types of irrigation systems (surface, sprinkler and drip) can achieve high distribution efficiency with proper design. Surface irrigation, which usually means border or furrow, has low application irrigation efficiency. When water is applied from the upstream end, it takes time to travel to the downstream end. The irrigation application efficiency can be increased by designing the optimal length, selecting proper flow rate, controlling irrigation time and using cutoff inflow or multiple inlet system. Drip irrigation which irrigates only in the root zone can achieve even better irrigation efficiencies than that of sprinkler irrigation. Depth of daily water application is a management decision that depends on water availability and cost. This study relates the effect of the design and management parameters to yield for crops with different sensitivity to moisture stress.

生物產業機械

2 選 上

生物生產機械主要以機械之手段與方法，將農業上有關各項作業之過程與成果，以合理有效的提高，從而減輕勞力降低成本及增加產量。

Biological Industry's Machinery

2 E F

生物產業機械實習

1 選 上

本實習首先針對生物生產機械 - 內燃機、曳引機、馬達等，利用模型與實體解說，從操作中體會操控技術與安全重要性，並配合播種、移植、收穫、調製、畜產、病蟲害防治機具等常用生物產業機械之實作實習，使學生了解生物生產與機械之關係，以應未來機械選擇與應用之需。

Biological Industry's Machinery Lab.

1 E F

The main purpose of this course is to introduce the Biological industry's machine including internal combustion engine, tractor, motor etc. The prototype model was used to demonstrate the operation of safety for machinery. The practice of seeding, transplanting, harvesting, livestock, and plant disease and pest control are used to train students have the ability to operate the machinery

correctly for future application.

農業金融市場

3 選 下

本課程旨在使學生對國內外之金融市場與金融機構有基本認識，本課程分成五部分；第一部分淺談金融市場與金融機構。第二部分各種證券市場的簡介；第三部分商業銀行介紹、財務報表分析；第四、五部分其他金融機構的管理與發展以及金融機構的風險管理。

Agricultural Financial Markets

3 E S

The course provides an introduction of domestic and foreign financial markets and institutions, including an overview of financial markets and institutions, an overview of the various securities markets, summarizes the operations of commercial banks, describe the key characteristics and regulatory features of the financial services industry, and examines the risks facing the financial institutions.

策略管理

3 選 下

本課程旨在使學生了解，管理者在面臨快速變遷及競爭劇烈的環境中，如何採取有效的管理策略。內容包括：(1)策略管理概論(2)內外部環境分析(3)競爭策略(4)策略的執行與控制(5)農企業經營策略管理。

Strategic Management

3 E S

This course gives students the knowledge of business strategic management. It includes: (1) the concept and structure of strategic management, (2) the analysis of internal and external environments, (3) competitive strategy, (4) strategic implementation and control, and (5) agribusiness strategic management.

基礎工程數學

2 選 下

本課程基本之數學方法以解決工程問題，例如：電路系統、控制工程、以及一些其他之物理系統。內容包含了微積分、微分方程式、拉普拉斯轉換、矩陣定理、以及基礎偏微分方程式。除了數學工具之應用外，本課程內容亦將會對一些實際之物理系統做一些概念性介紹。

Fundamental Engineering Mathematics

2 E S

This course is to provide students with fundamental methods to solve engineering problems such as electrical circuit systems, control engineering and some other physical problems. The contents include calculus, differential equations, Laplace transforms, matrix theory, and basic partial differential equations. In addition to analyze the solving methods, the course lecture also conceptually explain the physical meanings of practical systems.

電工學

2 選 下

本課程介紹現代電機工程的基本原理，內容包括電子元件、電路學理論和電工機械與控制的基本原理。目的在建立在學生電工學上的基礎知識，並期能培養其在電子學、機電整合和儀器感測領域的應用和探討能力。

Electrical Engineering

2 E S

Electrical Engineering introduce a circuit consists of electrical elements connected together. Engineers use electric circuits to solve problems that are important to modern society.

In particular:

1. Electric circuits are used in the generation, transmission, and consumption of electric power and energy.
2. Electric circuits are used in the encoding, decoding, storage, retrieval, transmission, and processing of information.

電工學實習

1 選 下

實習包括三用電錶之認識及應用；交直流電壓測試；電阻及歐姆定律、串並聯電路及克希荷夫定律；重疊原理；直流功率及最大功率輸出測試；RLC 串聯諧振；RLC 並聯諧振；LC 濾波實習；變壓器特性實習；熱敏電阻及熱控電路；示波器的認識；整流實習；馬達轉速與輸出功率；發電機之認識；基礎供電設計。

Practice of Electrical Engineering

1 E S

The main topics of this course includes: Use of meters (AV) ; DC. AC. Voltage ; Resistor and Ohm's Law ; Serial and Parallel circuit and Kirchhoff's law ; Super position theory ; DC power testing and maximum power output testing ; RLC in Series (resonance) ; RLC in parallel ; LC pass-filter testing ; Characteristics of Transformer Testing ; Thermal Resistor and Thermo-control circuit testing ; Oscilloscope Training ; AC-DC Testing ; Speed and power of a motor ; Generator ; Fundamental Design of Transmission and Distribution system.

渠道水力學

3 選 下

水可依管路系統或渠道系統輸送。本課程主要依講述水在渠道中流動時之各種渠流類型及其水理以作為渠道輸水系統水理設計之基礎。內容包括：渠道分類及性質，能量與動量原理及其應用，臨界渠流之計算與應用，等速渠流，定量續變速渠流等。

Open-Channel Hydraulics

3 E S

This course contents the following subjects : Basic concepts of open channel flow; The energy principle in open channel flow; The momentum principle in open channel flow; Flow resistance; Channel controls; Channel transitions; Unsteady flow; The dam-break problems.

排水

3 選 下

本課程主要授課內容包括：排水之意義與目的，機械排水，排水之效果，排水系統維護與管理，排水規劃所需資料，效益評估與經濟分析，排水原理與計算公式，排水法規與制度，滲透率觀測。

Drainage Engineering

3 E S

This course contain the following subjects: Types of drainage problems and drainage enterprises; Difference in drainage in humid and arid areas; Design criteria; Required capacities and design procedure; Methods of determining infiltration; Pumping drainage; Construction, maintain and operation; Economy studies for drainage works and cost allocation; Drainage laws and codes.

水土保持概論

2 選 下

為研究土地之利用，並保護土地，防止劣化，重建被沖蝕及貧瘠之土地，而且使土壤能保持適當之水分供作物利用，以維持農地之永續生產及收益。其內容包括：沖蝕之原因及沖蝕之過程，再介紹合理利用土地為基礎之水土保持方法，諸如覆蓋、敷蓋、綠肥、等高耕作、輪作、間作、平台階段、山邊溝等農地水土保持方法。

Introduction to Soil and Water Conservation 2 E S

This course is study the proper land use, protecting the land against all forms of soil deterioration, rebuilding eroded and depleted soil, conserving moisture for crop use, proper agricultural drainage and irrigation where needed and increasing yield and farm income. The contents are: Principle of soil erosion, erosion process, practices of soil and water conservation, excovering, mulching, green manure, contour farming, rotation, interplanting, terrace and hillside ditch etc.

內燃機 2 選 下

針對內燃機之基本原理、元件構造、作動原理詳加分析及說明。以及近期出現的新技術、新結構和電子系統的一般性介紹。

Internal Combustion Engine 2 E S

Explanation and analysis detailed aiming to the internal combustion engines basic principle, component structure, motion principle. General introduction of the electrical system and combine with the contemporary new technology, new structure development progress.

內燃機實習 1 選 下

藉由實習中，對內燃機之基本原理、元件構造、作動原理能深入了解。由內燃機試驗中，可了解影響內燃機的性能因素。並利用電腦新技術，作為內燃機故障排除的分析判斷。

Internal Combustion Engine Lab. 1 E S

To understand the internal combustion engine basic principle, component structure, motion principle by repair practice. Knowing the engine performance factors by the dynamometer test operation. Combine computer technology for troubleshoot analysis solution.

文獻選讀與寫作 2 必 上

發展在三個關鍵領域取得成功的技能：

- 1 了解編輯想刊出什麼樣文章，以及為什麼；
- 2 了解是什麼使研究文章在某一學科領域令人信服；
- 3 增強清晰和有效的英語溝通能力。

Scientific Reading and Writing 2 R F

To scientists' skills in three key areas necessary for success:

1. understanding what editors and referees want to publish, and why;
2. understanding what makes a compelling research article in a particular discipline area;
3. developing techniques to enhance clear and effective communication with readers in English.

農企業投資管理 3 選 上

本課程主要包括實質資本投資與證券投資，授課內容有：1.農企業投資概說 2.企業投資計畫形成之過程 3.投資可行性分析 4.資本預算 5.投資規畫 6.證券與市場 7.風險與報酬 8.投資組合概念 9.資本資產訂價模式 10.證券報價 11.國際投資管理概念。

Agribusiness Investment Management 3 E F

This course contains both real capital investment and security investment. The major contents are as follows: 1. introduction to agribusiness investment; 2. the formation of investment plan; 3. investment feasibility analysis; 4. capital budgeting; 5. investment plan; 6. securities and security markets; 7. risks and returns; 8. the concept of portfolio management; 9. capital asset pricing models; 10. security evaluation; and 11. the introduction to international investment management.

灌溉工程設計與實習 3 選 上

概述：課程重點在於灌溉系統之規劃與設計。

授課項目包含：

- | | |
|--------------|--------------|
| 1.作物需水量推估 | 5.灌溉系統規劃 |
| 2.灌溉需水量推估 | 6.成本分析(經濟效益) |
| 3.灌溉系統管路水力計算 | 7.工程施工管理 |
| 4.各類噴嘴特性討論 | |

Irrigation Design and Practice 3 E F

The purpose of this course is to introduce the design of Irrigation. The course contents include:

1. Crop water requirement, 2. Irrigation water requirement, 3. Irrigation systems, 4. hydraulics of pipes, 5. characteristics of nozzles, 6. irrigation system planning, 7. construction and management

油氣壓學 2 選 上

針對油氣壓之基本原理、元件構造、作動原理詳加分析及說明。以及近期出現的新技術、新結構和電子系統的一般性介紹。

Hydraulics and Pneumatics 2 E F

Explanation and analysis detailed aiming to the hydraulic and pneumatic basic principle, component structure, motion principle. General introduction of the electrical system and combine with the contemporary new technology, new structure development progress.

油氣壓學實習 1 選 上

本課程內容以實務與理論配合，從油、氣壓零組件之內部構造，瞭解其控制閥之各機件，再經由各種控制閥之特性實驗中加以印證。“油、氣壓是如何工作”，是“為何故障”，與，“如何處理故障”使學生有系統的逐漸獲得油、氣壓方面之知識。

Hydraulics and Pneumatics Lab. 1 E F

Students will be required practice on piping, installation of control valves and other parts of hydraulics and pneumatics, it let students to know how is it to work, why is it to breakdown, and how to solve the problem.

田間灌溉實習(1) 1 選 上

本課程主要目的在提供學生田間土壤水份含量觀測實習的機會，利用本校灌溉試驗場各項土壤水份監測系統之設備學習取得土壤中含水量資料供作灌溉管理之用

Field Irrigation Practice (I) 1 E F

The main objective of this course is to give an opportunity to the students on the methods of soil moisture measuring. By using the soil moisture monitoring facility equipped in the irrigation and drainage experimental field in the campus, the students will learn various techniques of obtaining soil moisture data for the use in irrigation management and research.

田間灌溉實習(1)

1 選 下

本課程主要目的在提供學生田間土壤水份含量觀測實習的機會，利用本校灌溉試驗場各項土壤水份監測系統之設備學習取得土壤中含水量資料供作灌溉管理之用

Field Irrigation Practice (II)

1 E S

The main objective of this course is to give an opportunity to the students on the methods of soil moisture measuring. By using the soil moisture monitoring facility equipped in the irrigation and drainage experimental field in the campus, the students will learn various techniques of obtaining soil moisture data for the use in irrigation management and research.

休閒農場經營

3 選 下

本課程目的在讓學生了解休閒農場的規劃和經營管理實務。內容包括：1.休閒農場的規劃 2.生產管理 3.行銷管理 4.人力資源管理 5.財務管理 6.教育宣導 7.民宿經營 8.田園餐飲管理 9.環境管理 10.安全管理 11.經營診斷 12.觀摩休閒農場實務。

Leisure Farm Management

3 E S

The purpose of this course is to let students understand the planning and Management of leisure farm. The contents include:1.The planning of leisure farm; 2.Production management; 3.Marketing management; 4.Human resource management; 5.Finance management; 6.Education; 7.Housing management; 8.Restaurant management; 9.Environmental management; 10.Safety management; 11.Managerial diagnosis; 12.Visiting leisure farms.

地下水

3 選 下

地下水為水資源利用之另一替代水源，本課程主要介紹有關地下水之基本性質及抽水試驗之分析方法與相關鑿井技術。授課內容有：地下水與水文循環，水井之鑿設與保養，含水層之物理性質，海水入侵，化學性質與原理，地盤下陷，地下水流況，地下水經濟分析，抽水試驗分析。

Ground water

3 E S

Groundwater is more than a resource. It is an important feature of the natural environment; it leads to environmental problems, and may in some cases offer a medium for environmental solutions. It is part of the hydrologic cycle, and an understanding of its role in this cycle is mandatory if integrated analyses are to be promoted in the context, groundwater contributes to such geotechnical problem as slope stability and land subsidence. Groundwater is also a key to understanding a wide variety of geological processes, among them the generation of earthquakes, the migration and accumulation of petroleum.

水資源工程與規劃

3 選 下

本課程主要將水資源工程作概括性介紹，授課內容包括：定量水文學概述，灌溉工程，水庫，給水系統，壩工，排水工程，排洪道，出水工，汙水及廢水處理，壓力管路，洪災消滅。

Water Resources Engineering**3 E S**

This course contents the following subjects: Quantitative hydrology introduction; Reservoirs; Dams; Spillways gates and outlet works; Pressure conduits; Irrigation system; Water supply systems; Drainage system; Sewerage and wastewater treatment; Flood-damage mitigation.

國際農業發展**2 選 上**

1. 培育熱帶農業研發管理高階人才。 2. 養成技術研發與解決問題之獨立思考邏輯。 3. 研發整合農業生產及管理技術，促成國際合作與發展。

International Agriculture Development**2 E F**

This course is to introduce agricultural policies and economics in Taiwan. Its contents include: policies on economics, agricultural development, current problems and policies on agriculture, policies on farmland, policies on irrigation, marketing of agricultural products, agricultural finance, farmers' organizations, agricultural extension, agricultural technology, and impacts and responses of Taiwan's agriculture after its accession to WTO.

農業自動化概論**2 選 下**

本門課介紹農業自動化的基本架構與其應用，主題包括農業搬運機器人、農業資訊系統、精準農業系統、田間生產自動化、果園與葡萄園生產自動化、畜禽飼養管理自動化、養液管理自動化、病蟲害防治自動化、灌溉自動化、環控自動化、收穫後處理自動化、漁菜共生自動化。

Introductory Agricultural Automation**2 E S**

This course provides a comprehensive introduction of automation technologies for agriculture, from basics to applications such as Agricultural vehicle robot, Agricultural infotronic systems, Precision agricultural systems, Field crop production automation, Orchard and vineyard production automation, Automation in animal housing and production, Nutrition management and automation, Automation of pesticide application systems, Automated irrigation management with soil and canopy sensing, Surrounding awareness for automated agricultural production, Postharvest automation and Aquaponics automation.

農業自動化概論實習**1 選 下**

1. 參觀校內農業自動化技術與設備 2. 微控制器的基本功能實習及其在農業自動化應用實習 3. 程式控制器基本功能實習及其在農業自動化的應用實習 4. 製作小專題運用自動化技術於農業生產

Practice of Introductory Agricultural Automation**1 ES**

This course provides a comprehensive introduction of automation technologies for agriculture, from basics to applications such as Agricultural vehicle robot, Agricultural infotronic systems, Precision agricultural systems, Field crop production automation, Orchard and vineyard production automation, Automation in animal housing and production, Nutrition management and automation, Automation of pesticide application systems, Automated irrigation management with soil and canopy sensing, Surrounding awareness for automated agricultural production, Postharvest automation and Aquaponics automation.

肉品原料與利用**2 選 下**

本課程介紹畜產品原料的種類與特性，使學生對乳、肉、蛋及禽肉與副產物的特性有概括認識，並可提供往後研習肉品、乳品與蛋品加工之參考。主要內容包括各種畜產食品原料之構造、特性、組成營養價值、影響產品原料之因素以及原料之貯存與處理等。

Raw Material Quality and Utilization of Meat 2 E S

This course will discuss the types and characteristics of animal product materials, in order to give students a basic insight into the materials of meat, milk, egg, and poultry meat and their by-products, and for the further study of meat, dairy and egg processing technique. The major contents conclude structure, characteristics, and composition of materials, functional properties of raw materials of animal products quality influencing factors, storage and handling of materials, and etc.

熱帶蟲害管理 2 選 下

本課程以重要熱帶作物為主軸，講述其上主要昆蟲之為害、發生、生活史、經濟影響與防治現況，提供足夠之生物學資訊，作為學生規劃熱帶害蟲管理系統的思考與設計。

Tropical Insect Pests Management 2 E S

This course is to discuss the key insect pests of the major crops in tropics. Their damage, economic importance, occurrence, life history and state of control for these pests are emphasized.

熱帶農業栽培系統 2 選 下

本課程重點介紹有關熱帶國家，包括南美，非洲和亞洲的不同農業實務的廣闊視野。雖然許多國家都在熱帶地區，但他們有不同的農業實務。學生將學到在不同國家有那些不同農業實務以及其理由。本課程採用互動式教學，過程中每個學生將被依照討論目的分在不同小組討論，學期末，依主題挑選一個熱帶國家，做該國的農業實務的研究報告，編寫一份書面報告和上台演示。

Agricultural Tropical regions 2 E S

This course will give a broad vision for students about the different agricultural practices and cropping process of tropical nations in South America, Africa and Asia. Although many nations are in the same tropical zone, they have different agricultural practices. Students will know how and why different agriculture practices are practiced in different nations. This course will be an interactive course and each student will discuss in-group, select a tropical nation and do research on that nation's agricultural practices, prepare a report and a presentation.

醱酵生產技術與實習 3 選 下

講授以應用微生物的醱酵技術製造各種發酵產品之生產技術，如酒類工業、有機酸工業、發酵食品工業、胺基酸工業、酵素工業、菌體生產工業、抗生物質工業、核酸關連物質工業、微生物轉換醱酵工業、生理活性物質生產工業等，以及利用微生物之醱酵技術於培養植物細胞生產有用物質與生產細胞的方法。使學生練習生產單細胞蛋白質之培養技術、酒精醱酵技術、有機酸醱酵技術、胺基酸醱酵技術、酵素生產醱酵技術、抗生物質生產技術、醱酵食品製造之技術以及培養植物細胞生產有用物質與大量生產有用細胞之培養技術等。

Fermented Food Processing and Practice 3 E S

The course based on the knowledge of applied microbiology to discuss the related fermentation industry: brewing, organic acids, food fermentation, amino acids, enzymes, antibiotic, etc. The course also covered the technique of cell

production. The lab covers the single cell protein, technique in alcohol fermentation, amino acids, enzymes, antibiotics production and food fermentation, and the cell production technique..