

農園生產系 96-2 新增課程中英文摘要

一、大學部和碩士班

生技產業校外實習

1 選

黃卓治、陳幼光、許岩得

先修科目：生物技術

為強化學生生技方面的專業能力，使能理論與實務相結合，特開設此課程。修課學生得選擇本課程所擇定之廠商或研究機構於暑假期間前往實習一個月(160小時)。

Course Biotechnology industry internship

1 S

T. C. Huang、Y. K. Chen
Yan-Der Sheu

Prerequisite : Biotechnology

This course is designed to strengthen students' professional capability in biotechnology by combining theoretical and practical aspects. Students taking this course are required to do a summer internship for a month (160 hours) in a selected company or research institute.

植物代謝體學技術

2 選修

黃卓治、賴宏亮、張誌益、
郭嘉信

先修科目：生物化學

本課程的目的在介紹植物生化、基本的代謝路徑及分析植物代謝產物變化及活性的方法，不同天然化合物及草本藥用作物等在農業、林學或醫藥上的應用也將被探討。特別的主題包括植物次級代謝產物及其分析儀器、代謝體學常用之分析技術及資料分析、植物代謝路徑之基因調控、代謝體學在天然化合物及中草藥之應用，以及植物代謝之遺傳工程等。

Plant metabonomics techniques

2S

T. C. Huang、H. L. Lay、
C. I. Chang、J. H. Guo

Prerequisite : Biochemistry

The purpose of this course is to introduce plant biochemistry, basic metabolic pathways, and the methodology of analyzing changes in plant metabolites and their activities. The use of various natural compounds and medicinal herb crops in agriculture, forestry or medicine will also be discussed. Special topics include plant secondary metabolites and the instruments used for their analysis, commonly used

analytical techniques and data analysis in metabonomics, gene regulation in plant metabolic pathways, the application of metabonomics in natural compounds and Chinese herbal medicines, and genetic engineering in plant metabolism.

植物代謝體學技術實驗 **1 選** **黃卓治、賴宏亮、郭嘉信、張誌益**

先修科目：無

本課程之目的在訓練學生植物天然化合物分離、純化與結構鑑定相關之實驗設計、操作方法與技術，內容將包含樣品之前處理、萃取、濃縮、分配萃取、管柱層析、高效能液相層析、氣相層析、核磁共振光譜、質譜、紅外線光譜與紫外/可見光光譜等主題。

Experiments in plant **1S** **T. C. Huang、H. L. Lay**
metabonomics techniques **C. I. Chang、J. H. Guo**

Prerequisite : none

The purpose of this course is designed to train students to understand the experimental designs, general methodologies and techniques in related to the isolation, purification and structure elucidation of natural products from plants. Subjects include preparation of materials, extraction, concentration, partition, column chromatography, high performance liquid chromatography, gas chromatography, and nuclear magnetic resonance spectrometer (NMR).

二、碩士班

植物功能性基因體學之應用 **2 選** **徐志宏、江友中、周映孜**
陳福旗、陳幼光

先修科目：植物學或植物解剖學、植物生理學

植物功能基因體學的課程主要是應用植物分子生物學及植物生物技術的方法，系統性的探討參與植物生長、發育、適應環境與代謝過程中所有相關基因群的表現、調控及其功能，藉由包括 mRNA、蛋白質及代謝產物量的偵測、突變篩選及生物資訊資料庫的整合等策略，以了解整個植物轉錄體、蛋白質體及代謝體等隨著基因表現活性而產生的變化，並可對各種植物基因體的序列進行比較及分析，對作物在質及量上的品種改良、中草藥代謝產物、林木生理及環境保護的研究亦深具重要性。

Plant Functional Genomics **2S** **J. H. Shyu、Y. C. Chiang**

and Applications

**Y. T. Jou、F. C. Chen、
Y. K. Chen**

Prerequisite(s) : Plant Biology or Plant Anatomy, Plant Physiology

This is a course in the application of plant molecular biology and plant biotechnology approaches to systematically investigate the expression, regulation, and function of related gene clusters involved in plant growth, development, environmental adaptation, and metabolism. Strategies used to examine the changes of transcriptome, proteome, and metabolome in response to gene expression include the detection of mRNA, protein, and metabolites, mutant selection, and integration of bioinformatic databases. Plant comparative genomics provides important information for researches in plant improvement and breeding, medicinal plant secondary metabolites, woody plant physiology, and environmental protection.

**植物功能性基因體學之
應用實驗**

2 選

徐志宏、江友中、周映孜

先修科目：植物學或植物解剖學、植物生理學

利用植物功能基因體學課程中所學習到的原理、技術與方法，實際應用於目標植物基因體的研究上；實驗課程內容包括基因庫的構築、功能基因的篩選、生物資訊探勘及基因表現分析等，用以探討參與植物特定生長發育時期的過程中所有相關基因群的表現、調控及其功能。使用的實驗方法包括 RNA 的製備、cDNA 基因庫的構築、蛋白質水解酵素基因的篩選、基因表現差異的分析與基因鑑定等。

**Experiments in Plant
Functional Genomics and Applications**

2S

**J. H. Shyu、Y.C. Chiang
Y. T. Jou**

Prerequisite(s) : Plant Biology or Plant Anatomy, Plant Physiology

This course is designed to utilize the principles, techniques, and approaches learned from the lecture for plant genomics studies. The content includes the construction of gene libraries, selection of functional genes, database mining and bioinformatics, and the analysis of gene expression. Methods such as RNA preparation, cDNA library construction, proteolytic enzyme gene screening, differential gene expression and analysis, and gene identification will be applied to investigate the expression, regulation, and function of related gene clusters involved in certain growth and developmental stages.