

生物科技系 碩士班 中英文摘要

Department of Biological Science and Technology

一、必修科目 Required Courses

30039 專題討論 2 必 輪授、上下

本課程擬指導學生由最新生物技術相關期刊中，挑選最新而重要的論文提出報告，並由全體教師、學生共同研討，讓學生學習到如何尋找資料、論文寫作、實驗設計與結果討論等實驗研究工作相關的技術。

30039 Seminar 2R Rotation, F S

This course is designed to advise students to search for update papers from Biotech related journals, to make a presentation in class, and to discuss with teachers and classmates.

30090 生物技術與產業實務 3 必 輪授、上

本課程旨在加強學生對生物技術的瞭解，其範圍涵蓋遺傳工程技術、細胞融合技術和蛋白質工程技術等三大領域的理論和臨床上應用。

30090 Biotechnology and Bioindustry 3R Rotation, F

The course will emphasize three major areas, including genetic engineering, hybridoma techniques and protein engineering. This class is going to train students to understand the concepts and applications of biotechnology.

40480 活性天然物特論 3 必 輪授、上

本課程將介紹生物鹼、類黃酮、萜類等重要活性天然物之生合成、純化技術、構造決定與生物活性資訊，內容亦配合期刊論文等資料，對這些天然資源在保健食品與新藥開發之應用進行討論。

40480 Special Topics in Bioactive Natural Products 3R Rotation, F

The course will introduce the biosynthesis, purification, structural determination and biological activities of some important bioactive natural products, including alkaloids, flavonoids and terpenoids. The topics also discuss the applications of healthy food in human diet and new drugs derived from natural resource using recent scientific literature.(journals, reviews, books, etc)

30032 高等分子生物學 3 必 輪授、上

本課程主要介紹核酸(DNA、RNA)和蛋白質的構造與功能，及基因工程與重組 DNA。內容包括載體的介紹、重組 DNA 的構築、基因表現和重組蛋白質的純化及其應用。

30032 Advanced Molecular Biology 3R Rotation, F

The course introduces the nucleic acids (DNA、RNA), structure and function of proteins, genetic engineering and recombinant DNA technology. The course contents include: vectors of introduction, construction of recombinant DNA, gene expression, and purification and application of recombinant proteins.

30091 人體生理學特論 **3 必** **輪授、上**

利用授課及書報討論的方式，針對人體生理學中的心血管循環系統、腸胃道消化系統及泌尿系統深入探討。

30091 Advanced human physiology **3R** **Rotation, F**

We will discuss the cardiovascular system, digestive system, urinary system in this course. Students taken this course will also do the presentation about these systems.

30057 碩士論文 **6 必** **各教師**

每位碩士班研究生選定論文題目，再指導教授指導下進行實驗、研究、依據實驗研究結果完成論文。

30057 Thesis **6R** **All Teachers**

Graduate students propose their research project, complete experiments and write a thesis under advisors supervision.

二、選修科目 Elective Courses

20813 植物功能性基因體學之應用 **2選** **徐志宏、上**

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。

20813 Plant Functional Genomics and Applications **2 E** **D. J. H. Shyu, F**

This course is an application of approaches of plant molecular biology and plant biotechnology 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 patterns include the detection of mRNA, protein and metabolite production, mutant selection, and integration of bioinformatic databases. Analysis of plant comparative genomics also provides important information for researches in plant improvement and breeding, medicinal plant and secondary metabolites, woody plant physiology and environment protection.

20814 植物功能性基因體學之應用實驗 **1 選** **徐志宏、上**

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。

20814 Plant Functional Genomics and Applications Lab. 1 E

D. J. H. Shyu, F

This course is designed to utilize the principles, techniques, and approaches learned from lecture for applying on plant genomics studies. The contents include the construction of gene library, the selection of functional genes, the mining of bioinformatics, and the analysis of gene expression. For the investigation of expression, regulation, and function of related gene clusters involved in certain growth and development stages, methods such as RNA preparation, cDNA library construction, proteolytic enzyme genes screening, differential gene expression and analysis, and gene identification will be applied.

20691 基因體學 2 選 徐志宏、上

本課程主要為分子生物學之進階課程，目的在利用分子生物學之技術以達到探生物體基因體序列及其功能的目的，亦為基因體科學研究之基礎課程。課程內容包括分子生物技術、圖譜分析、定序策略及方法、基因表現分析、序列分析方法、高通量遺傳學、蛋白質體學、結構基因體學、基因體結構、微生物基因體學、比較基因體學、人類基因體、訊息傳遞、醫藥應用、藥物基因體學、疾病診斷、農業應用及道德與規範等。

20691 Genomics 2 E D. J. H. Shyu, F

This course is the advanced course of molecular biology. It is designed to introduce the genome sequences and their functions of certain organisms, so it is also the basic course of genomic science research. The content includes techniques of molecular biology, mapping techniques, sequencing strategy and methods, gene expression analysis, sequence analysis methods, high-throughput genetics, proteomics, structural genomics, genome structure, microbial genomics, comparative genomics, human genome, signal transduction, pharmaceutical applications, pharmacogenomics, disease diagnosis, agriculture applications, and ethical issues and regulations.

20190 生物資訊學 2 選 陳又嘉、上

本課程討論以電腦及網路資源來分析生物巨分子，例如蛋白質及核酸。重要議題包括文獻資料庫、序列資料庫、序列分析工具、實驗方法資源、基因拼圖資料庫、資料庫搜尋、核酸比對、微陣列晶片及蛋白質體學之分析等。

20190 Bioinformatics 2 E Y. C. Chen, F

The course discusses application of computer and internet resources to analyze biological macromolecules, such as protein and DNA. Important topics include literature database, sequence database, sequence analysis tools, protocol resource, genome mapping database, database search, nucleotide alignments, microarray chips,

and proteomics.

40560 消化道微生物 3 選 陳又嘉、上

本課程內容主要介紹動物消化道生理環境、消化道微生物與宿主和微生物間營養關係，其中，包含瘤胃微生物、腸道益生菌(例如乳酸菌)、白蟻腸道菌等都將在課程中介紹，而這些腸道微生物的應用潛力也將在課堂中進行討論。

40560 Gastrointestinal Microbiology 3 E Y. C. Chen, F

The contents of this course focus on the description of digestive trace environment, gastrointestinal microorganisms and the interaction of microorganisms and hosts. In this course, rumen microorganisms, probiotics (eg. lactic acid bacteria) and termite gut microbes will be introduced. The applications of gastrointestinal microorganisms will also be discussed.

41032 應用微生物特論 2 選 陳又嘉、下

本課程為提供學生學習應用微生物學中的進階技術與學理，課程中將介紹特殊環境微生物、真菌交配模式、微生物重組酵素表達、微生物代謝物產生與分析、發酵理論等內容。

41032 Special Topics on Applied Microbiology 2 E Y. C. Chen, S

The course is designed to offer students advanced techniques and theories of applied microbiology. The course includes extremely environmental microorganisms, fungal mating types, recombinant enzymes production, the analysis and production of microorganism metabolites and fermentation theories.

40657 高等微生物生理與遺傳 3 選 陳又嘉、上

課程內容講述微生物營養物質及環境因子對微生物其生理與遺傳之影響、微生物細胞之物質代謝(好氣、嫌氣)、代謝系之連系(分解系、素材合成系、構成的合成系)以、代謝抑制與發酵生產(酒精、有機酸、胺基酸、酵素、核酸關聯物質、生理活性物質)及微生物的遺傳模式與影響因子。

40657 Advanced in Microbial Physiology and Genetics 3 E Y. C. Chen, F

The scope of this course is to illustrate the effects of nutrients and environmental factors on microbial physiology and genetics, including substance metabolism (aerobic and anaerobic) of microbial cells, connection of metabolic systems (catalytic system, stuff biosynthetic system, constitutive biosynthetic system.) In addition, the course also cover metabolic control, ferments production (alcohols, organic acids, amino acids, enzymes, nucleic acid, related compounds and active substances) and the models and factors about microbial genetics.

23540 兩生爬行動物學 2 選 蔡添順、上

脊椎動物可分為主要適應水域生活的魚類與陸域生活的四足類，亦可分為具有外溫及內溫生理的二十大類群。具有外溫生理的四足動物是地球上適應多樣

性最高的動物類群之一。這些動物包含在一般所謂的兩生爬行動物類群中，但是不包含廣義爬行動物中的鳥類。本課程講授的內容將包括兩生爬行動物的形態、生理、生殖、攝食、行為、生態等方面的多樣性以及寵物繁養介紹。課程並將引導學生將所得知識融會貫通並予以應用。

23540 Herpetology **2 E** **T. S. Tsai , F**

Vertebrates can be classified as ectotherms and endotherms, as well as fish and tetrapods. Ectothermic tetrapods exhibit an amazing diversity of adaptations to varied habitats. The herpetology features the diversified morphology, physiology, reproduction, feeding, behavior, and ecology, as well as the raising and breeding of pets. Students will learn and apply the knowledge in the lecture.

40026 天然物化學 **3 選** **張誌益、上**

植物製造並蓄積不同的化學物質，譬如生物鹼、類胡蘿蔔與類黃酮，人們已長久使用這些化合物作為醫藥與營養素用途，本課程將經由生合成推導介紹這些植物的二次代謝產物，內容將由 shikimic acid pathway, polyketide pathway 及 mevalonic acid pathway 等生合成途徑觀察多樣性的天然物。

40026 Natural Products Chemistry **3 E** **C. I. Chang , F**

Plants produce and accumulate a wide variety of chemicals, such as alkaloids, carotenoids, and flavonoids. Human beings have benefited from these compounds for many years in both medical and nutritional context. This course will introduce those secondary metabolism of plant through biosynthetic approach. The immense variety of natural products could be surveyed by biosynthetic schemes such as shikimic acid pathway, polyketide pathway and mevalonic acid pathway etc.

20659 動物基因轉殖 **2 選** **胡紹揚、上**

水生動物為人類重要蛋白質來源之一，也是研究人類疾病的新興實驗動物之一。本課程內容以魚類為主體，介紹目前基因轉殖的技術與應用範疇，培養學生對水生動物應用發展的興趣。

20659 Animal Transgenics **2 E** **S. Y. Hu , F**

Marine animals are important protein sources for human, and also an emerging animal model for studying human diseases. The objective of this course is to make students understand applied aspect of transgenic biotechnology in marine animals and culture students to expand the development of marine biotechnology.

23056 動物基因轉殖實習 **1 選** **胡紹揚、上**

本課程內容以魚類為主體，介紹水生觀賞魚種之基因改造育種技術，透過讓學生實務操作顯微注射等轉殖技術，培育新品系之水生觀賞品種，使學生具備觀賞水族動物繁養與育種之技術。

23056 Animal Transgenics Practice **1S** **S. Y. Hu , F**

The course use fish as subject to introduce genetically modified breeding technology. The objective of this course is to make students practically manipulate microinjection

and culture a new breed, and make students with culture and breeding skill of ornamental marine animals.

40760 蛋白質工程學 **3 選** **鄭雪玲、上**

本課程介紹常用於生物科技酵素之種類及功能，以及探討蛋白質之純化、結構、功能及其應用。

40760 Protein Engineering **3 E** **H. L. Cheng , F**

The course will introduce the classification and function of enzymes used in biotech, with special focus on the purification, structure, function and application of proteins.

40249 有機分析 **3 選** **徐睿良、上**

本課程將介紹分析有機分子常用的分離方法、分析技術及分析儀器，包括：各式分離方法與分析技術的原理、分析儀器及圖譜解析。讓同學對於分析有機分子，不管是原理還是實際操作上，有更進一步的瞭解，並使同學在這些分析方法的應用上更有效率。

40249 Organic Analysis **3 E** **J. L. Hsu , F**

This course will be focused on the introduction of separation methods, analytical technologies and related instruments commonly used in organic molecule analysis. The contents include principles, instrumentations and data analysis of the separation methods and analytical technologies.

40761 蛋白質體學 **2 選** **徐睿良、上**

本課程將對蛋白質體學進行通盤性的介紹，從蛋白質體學的入門介紹、蛋白質體學所需的方法與工具、到蛋白質體學的應用範疇，包括大規模的蛋白質身份鑑定、結構蛋白質體學、蛋白質轉譯後修飾鑑定、蛋白表現量分析及蛋白—蛋白作用網絡分析等。

40761 Proteomics **2 E** **J. L. Hsu , F**

In this course, principles of proteomics will be comprehensively introduced from the basic definition, tools for proteomics and their further applications. Subjects will be focused on protein mining, structural proteomics, post-translation modifications, protein expression profiling and protein-protein interaction mapping.

21854 蛋白質體學實習 **1 選** **陳又嘉&徐睿良、上**

本課程將介紹蛋白質體學常用的一些實驗方法，從樣品的前處理、蛋白質的分離純化、酵素水解、質譜分析、資料庫輔助的蛋白質鑑定、大規模蛋白表現差異分析至蛋白質轉譯後修飾鑑定等。藉由連貫式實驗的設計，不只使同學熟悉這些基本實驗技術的操作，同時也使同學瞭解蛋白質體研究主要的分析流程及其在生物科技領域的應用。

21854 Proteomics experimental course **1 E** **Y. C. Chen & J. L. Hsu, F**

In this course, the main experimental methods involved in current proteomics including sample preparations, protein separations, enzymatic digestions, mass

spectrometric analysis, database-assisted protein identifications, large-scale protein expression profiling and characterization of protein post-translational modifications will be widely introduced. Through the integrated experimental design, students will be not only familiar with experimental techniques but will be clear about the main analytical pipeline for proteome research and its applications in biotechnology.

22355 幹細胞生物學

3 選

張格東、上

本課程將介紹成體幹細胞如血液幹細胞、間葉幹細胞、神經幹細胞、肝臟幹細胞等之細胞生理學與生化特性，並針對臨床醫學與生物製藥的未來發展性進行探討。

22355 Stem cell biology

3 E

K.T. Chang, F

An up-to date discussion of somatic stem cell biology, mainly focusing on the physiology and biochemistry of hematopoietic stem cells, mesenchymal stem cells, neuron stem cells and hepatic oval cells etc, for clinical and pharmaceutical application.

40743 細胞凋亡

3 選

施玟玲、上

介紹細胞凋亡機制與生物體的關係並加強學生與最新發表論文的認識與剖析，講解疾病的發生與細胞凋亡訊息傳遞路徑的相關性，以及當今利用調控凋亡訊息傳遞路徑於疾病治療之策略。並講解各種細胞凋亡的分析方法與原理，包括流式細胞分析的原理及應用。利用對於細胞凋亡機制的探討，幫助學生融合現階段已知的分子生物學或細胞生物學技術及觀念，並培養其在生命科學基礎方面的思考能力。

40743 Apoptosis

3 E

W. L. Shih, F

The course will introduce the molecular mechanisms of apoptosis, the apoptosis related disease and how to cure this disease base upon the control of apoptosis, the principle and rationale of apoptosis analysis techniques

40684 動物細胞培養

2 選

施玟玲、上

本課程的目的是讓學生了解動物細胞培養的原理、操作和應用，內容包括初代細胞培養、繼代細胞培養、細胞株培養，各種細胞株之特性及細胞分析技術。

40684 Animal Cell Culture

2 E

W. L. Shih, F

The objective of this course is to introduce the principles, manipulation and practical applications of animal cell culture. Course contents include primary cell culture, passage cell culture, cell line culture, the specific characteristics of cells and the techniques of cell analysis.

40022 分子診斷技術學

2 選

蘇郁涵、上

本課程將介紹分子生物技術檢測及鑑別微生物、遺傳疾病及複雜疾病。

40022 Molecular-Based Diagnostic Technique

2 E

SU, Yu Han, F

The course introduces the applications of molecular-based techniques to detect and differentiate microbial, as well as the diagnosis of genetic and complex disease.

30096 光合作用特論**2 選****周映孜、下**

從生物物理學、生物化學、分子生物學、生態生理學等不同觀點討論光合作用。光合作用是植物學最廣泛被討論的題目，無論是作物生長、產量提升、環境適應、基因表現、蛋白結構等，關於光合作用的研究遍及植物生態生理到分子生化，原核到真核，本課程將透過光合作用色素系統說明植物如何去除光合作用中的過氧化自由基、光的捕獲將如何將光能轉變成化學能，利用生化代謝路徑說明二氧化碳轉變成糖類的步驟、光合作用酵素或相關蛋白的結構、植物如何改變型態結構生理特性以利光合作用進行適應環境。

30096 Special Topics in Photosynthesis**2 E****Y.T. Jou, S**

Learning Photosynthesis from biological physics, biochemistry, Molecular biology and physiology plant ecology. Living organisms interact with the others and environment, photosynthesis is about the biochemistry and metabolism. Sunlight provides the energy that operates the light and carbon reactions. Lots of photosynthesis studies were used molecular evidence and ecology physiology, such as pigment systems to understand the functions of superoxide, molecular and biochemistry studies the structure of the photosynthetic apparatus.

40853 植物逆境生理學**2 選****周映孜、下**

植物逆境生理學在全球暖化與環境的過度開發議題中越顯重要，課程目的在讓學生明白環境因子對植物造成的傷害，與植物適應環境的原理，課程中將會利用教科書、期刊論文等資料說明，包含數種常見的環境逆境，如：(1)植物的耐高溫機制、細胞組織的熱休克；(2) 低溫寒害與凍害；(3)鹽分逆境；(4)乾旱缺水逆境；(5)機械傷害逆境等。

40853 Stress Physiology of Plants**2 E****Y. T. Jou, S**

Plant stress physiology is a global issues related to the environment. To gain knowledge about environmental stresses on whole plant, several sections will be introduced: (1) heat shock/thermo-tolerance, (2) chilling injury and freezing, (3) salt stress, (4) drought stress, (5) wound stress. The research approaches being used to study environmental stresses by examining recent publications from scientific journals.

40837 植物生物化學**2 選****徐志宏、下**

本課程的目的在使學生對植物特有的生化反應有基本的了解。個別的主題包括光合作用、呼吸作用、氮同化作用、脂質代謝、細胞壁形成、植物荷爾蒙和次及代謝物的生合成。

40837 Plant Biochemistry**2 E****D. J. H. Shyu, S**

The purpose of this course is to provide students with a fundamental understanding of biochemistry unique to plants. Individual topics include photosynthesis, respiration, nitrogen assimilation, lipid metabolism, cell wall

40027 天然物化學實驗 **2 選** **張誌益、下**

本課程之目的將訓練研究生熟悉天然物分離、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、再結晶、高效能液相層析、核磁共振光譜、質譜、紅外線光譜與紫外/可見光光譜等主題。

40027 Natural Products Chemistry Lab. **2 E** **C. I. Chang , S**

The purpose of this course is designed to train graduate students to understand the experimental designs, general methodologies and techniques in related to the isolation, purification and structure elucidation of natural products. Subjects included preparation of materials, extraction, concentration, partition, column chromatography, recrystallization, high performance liquid chromatography, nuclear magnetic resonance spectrometer (NMR), infrared spectrometer (IR), and ultraviolet/visible spectrophotometer (UV-vis).

40255 有機光譜學 **3 選** **張誌益、下**

本課程的目的在介紹決定有機化合物結構的方法，使學生具備決定結構研究所需工具，課程中我們將探討核磁共振光譜、質譜、紅外線光譜與紫外/可見光光譜等技術。

40255 Organic Spectroscopy **3 E** **C. I. Chang , S**

This course is designed to provide an introduction to the structural elucidation of organic compounds. In the class we will discuss nuclear magnetic resonance spectroscopy (NMR), mass spectroscopy (MS), infrared spectroscopy (IR) and ultraviolet/visible spectroscopy (UV-vis).

20690 基因重組及表現 **2 選** **陳又嘉&鄭雪玲、下**

本課程將著重於 DNA 重組技術的介紹並介紹常用之原核基因及真核基因表達系統。

20690 Gene Recombination and Expression **2 E** **Y. C. Chen & H. L. Cheng, S**

This course emphasize the technologies of recombinant DNA, and introduce the prokaryotic and eukaryotic expression systems.

40643 高等細胞生物學 **3 選** **鄭雪玲、下**

本課程主要探討目前細胞生物學領域中幾個主要研究課題，包括細胞凋亡、蛋白激酶及其訊息傳遞路徑、癌症分子細胞學、幹細胞研究等，並配合相關期刊論文之研讀。

40643 Advanced Cell Biology **3 E** **H. L. Cheng , S**

The course will discuss several topics in the field of cell biology, including apoptosis, protein kinases and the related signaling pathways, molecular and cellular biology of cancers, stem cells, etc. Related scientific papers will be discussed in the class.

40019 分子病毒學**3 選****施玟玲、下**

內容介紹重要觀念之介紹與掌握，非常適合初學者與已修過一般病毒學、但重要觀念掌握不清楚之學生。瞭解如何來研究病毒，包括主要之研究方法與技術，能夠使修課之學生，對於如何開始研究病毒有一完整之概念。使修課之學生能夠掌握病毒之一般共同特性與瞭解病毒基因表現之多樣性並強調重要病毒(如禽流感病毒)之如何致病與其為何難以預防之理由。

40019 Molecular Virology**3 E****W. L. Shih , S**

The contents of this course including (1) The structure and classification of virus (2) The replication and gene expression of viral genetic materials (3)How interaction and disease progression in virus-infected cells (4) The traditional and new methods in preventing and treating virus infection (5) The analysis and research techniques of virology.

202058 訊息傳遞**3 選****施玟玲、下**

本課程將介紹細胞外之分子與細胞膜上之接受體之交互作用，使細胞膜之接受體活化，將胞外之訊號擴大後傳遞到胞內，以及細胞如何整合外來訊息導致最後的生物反應。

202058 Signal Transduction**3S****W. L. Shih , S**

This course will introduce the interaction of an extracellular ligand with a transmembrane receptor and then activation of receptor. Subsequently, a signal being amplified and transduced across the membrane. And, how cell integrate the extracellular signals result in the final cellular response.

30734 生物資源創新應用**3 選****上、下**

鄭雪玲、徐睿良、施玟玲、陳與國、張誌益、徐志宏、陳又嘉、蔡文田、蔡添順

本課程以機能性產品開發，循環經濟-生物材料利用，及仿生科技三大主題為主軸，介紹如何應用生物相關技術與知識，開發生物材料成為各種用途。機能性產品開發包含皮膚保養、降血糖、抗發炎及提升免疫力、活性胜肽、抗癌、抗病毒、保護胃黏膜、調節血脂等產品的開發，及天然物開發技術、腸道菌相分析與益生菌產品開發等單元。循環經濟-生物材料利用包含生物材料酵素開發與利用、生物材料發酵再利用、生質能源、活性碳的特性及其在醫藥上的應用等單元。仿生科技將介紹仿生科技實例。

30734 Innovative Application of Bioresources**3E****F/S**

H. L. Cheng; J. L. Hsu; W. L. Shih; Y. K. Chen; C. I. Chang; J. H. Shyu; Y. C. Chen; W. T. Tsai; T. S. Tsai

There are three topics in this class, i.e. functional product development, circular economy- the reuse of biomaterials, and Bionic Technology. The goal is to exemplify

the application of biological knowledge in exploring biomaterials for product development. The units in the topic of functional product development include product development for skin care, anti-diabetes, anti-inflammation and immune modulation, bioactive peptides, anti-cancer, anti-virus, stomach protection and anti-hyperlipidemia, natural product exploration, microbiota analysis and probiotic products. The units in circular economy- the reuse of biomaterials include the exploration of enzymes from biomaterials, fermentation of biomaterials for reuse, bioenergy, and the characteristics and medical application of active charcoal. In the topic of Bionic Technology, examples of biomimicry will be introduced and discussed.

20584 校外實習

3 選

輪授

本課程的目的為使學校課程內容與企業需求間更加緊密結合，透過校外實習之過程，讓學生熟悉研發、生產、品管及行銷等企業運作流程並瞭解企業制度與產業趨勢。進一步地，協助學生從實習經驗中充實專業技能、培養獨立思考、協調溝通的能力及敬業態度。

20584 Practice of Industrial Training 3 E

Rotation

This course aims to establish close correlation between course contents in this department and industrial needs. Through the industry internship, students will be more familiar with business trends and key industrial components such as research and development, manufacturing, quality assurance, marketing, and so on. In addition, this course also aims to help students not only enrich job skills, but develop independent thinking, coordinating and communication ability, and professional attitude.

21914 專題討論(1)

1 選

輪授、上

本課程擬指導學生由最新生物技術相關期刊中，挑選最新而重要的論文提出報告，並由全體教師、學生共同研討，讓學生學習到如何尋找資料、論文寫作、實驗設計與結果討論等實驗研究工作相關的技術。

21914 Seminar I

1 E

Rotation, F

This course is designed to advise students to search for update papers from Biotech related journals, to make a presentation in class, and to discuss with teachers and classmates.

21749 專題討論(2)

1 選

輪授、下

本課程擬指導學生由最新生物技術相關期刊中，挑選最新而重要的論文提出報告，並由全體教師、學生共同研討，讓學生學習到如何尋找資料、論文寫作、實驗設計與結果討論等實驗研究工作相關的技術。

21749 Seminar II

1 E

Rotation, S

This course is designed to advise students to search for update papers from Biotech related journals, to make a presentation in class, and to discuss with teachers and classmates.

40717 專題研究(1) 2 選 輪授、上

本課程由教師輔導學生選定其有興趣之研究題目，進行文獻收集、討論及實驗或設計，並將研究結果撰寫報告。

40717Independent study (1) 2S assigned , F

Each student will select his/her research topic of interest and be requested to search literatures, discuss with faculty members, and design experiment. Finally, a report of research results will be required.

40718 專題研究(2) 2 選 輪授、下

本課程由教師根據研究主題，輔導學生進行特定文獻收集、討論及方法設計，並將研究結果撰寫報告。

40718Independent study (2) 2S assigned , S

Student will be requested to study advisory reference , discuss with faculty members, and design methods. Each student is required to submit a final report of research results.

23541 蛇毒科技 2 選 蔡添順、下

蛇毒成分複雜且多樣化，不同蛇毒的毒性、藥理及臨床症狀各有特點，可分成神經毒、血循毒、壞死毒、心臟毒、腎臟毒、肌肉毒及其他類型。蛇毒學研究包含毒理學、基因體學、轉錄體學、蛋白質體學及抗血清蛋白質體學、以及醣類體學等層面。依據藥理特性，分離純化特殊蛇毒蛋白，再結合分子生物學及結構化學的方法，可應用於製藥、檢驗和抗蛇毒血清的製造。蛇毒成份目前已被應用於治療糖尿病、高血壓、慢性疼痛及腦中風等病症，以及抗凝血與消炎作用。本課程主要介紹蛇毒多樣性以及蛇毒研究方法、成果、發展及蛇毒科技應用，修課學生也會進行文獻研讀與口頭報告。

23541 Snake Venom Technology 2 E T. S. Tsai , S

Snake venom is complex and diverse in composition and varied in the toxicity, pharmacology, and clinical symptoms, which can be divided into neurotoxin, hemostasis toxin, necrotoxin, cardiotoxin, nephrotoxin, myotoxin, and other types. Snake venom researches include toxicology, genomics, transcriptomics, proteomics, antiveomics, and glycomics. According to the pharmacological properties, the separation and purification of specific venom proteins, combined with the approaches of molecular biology and structural chemistry, can be used in the pharmaceutical, examination, and antivenom manufacture. Snake venom compositions have been used in treating diabetes, hypertension, chronic pain, and stroke, as well as displaying anticoagulant and anti-inflammatory effects. This course mainly aims to present the diversity of snake venoms as well as the method, achievement, development, and application of snake venom technology. Students in the course will also read literatures and make oral presentations.