

# 食品科學國際碩士學位學程

## International Master's Degree Program in Food Science

### 必修科目 Compulsory Courses

<b>001 專題討論</b>	<b>4</b>	<b>必</b>	一上、一下、 二上、二下
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本課程將指導學生進行專題研究，報告題目由學生自行選擇。本課程主要訓練學生彙集文獻資料、撰寫摘要、製作海報及口頭報告用的輔助投影片、及上台報告技巧。同學們將輪流在課堂上報告整理的結果，並參與討論其他同學們的題目。最後學生將模擬研討會，上台以口頭方式發表所選的研究結果。

<b>001 Seminar</b>	<b>4</b>	<b>R</b>	<b>1<sup>st</sup> F, 1<sup>st</sup> S, 2<sup>nd</sup> F, 2<sup>nd</sup> S</b>
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In this course each student will select their own research subject; they will collect and summarize literature concerning the chosen subject, write abstracts, design posters for conferences, as well as the power-points slides for oral presentation. All students will participate in the discussion and acquire skills for an effective oral presentation. During the last sessions of the course, the students will simulate a conference situation, where each one will present their research work on stage.

<b>002 食品科技研究法</b>	<b>3</b>	<b>必</b>	一上
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探討和食品研究相關之方法與技術、包含實驗的設計、結果的闡釋及論文寫作技巧等一系列的課程。其主要目的在於使學習者在食品領域中熟悉一般的研究方法與技術，並學得基本實驗設計原理應用到實際的食品問題。同時也可深入了解目前食品研究領域中的最新動向。從適當的實驗設計到資料的分析與解釋並將成果發表作一貫式的養成訓練，乃此課程安排的終極目標。

<b>002 Methodology for Food Research</b>	<b>3</b>	<b>R</b>	<b>1<sup>st</sup> F</b>
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Describe experimental designs, general techniques and methodologies in related to food researches. To understand the basic principles of experimental design and apply them to realistic food problems. Also to have a familiarity of general techniques and methodologies in a specific field. To have a knowledge of the state of the art of current research efforts relating to carbohydrates, lipids, proteins, and other components in foods. To be able to design an appropriate experiment to solve the problems we proposed. To be able to collect, analyze and interpret the data and able to organize the results and have a paper publication.

<b>003 全球食品科技與產業特論</b>	<b>2</b>	<b>必</b>	一下
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本課程將會邀請產官學界在食品生物技術、應用微生物、食品化學、儀器分析、食品加工及技術研發的專家擔任講員，分享其學識與工作經驗，本課程的目標之一是提供學生深入了解國際上目前最受矚目的生物、化學、物理、加工、食物保存、食品品質評估、公共衛生、食物運用等議題。

**003 Special Topics in Global Food  
Technology and Industry**

**2 R 1<sup>st</sup> S**

Speakers specialized in Food Biotechnology/Applied Microbiology, Food Chemistry/Instrumental Analysis, and Food Processing/Technology Development from industry, government or university will be invited to share their knowledge and working experiences. One of the objectives is to give students an in-depth understanding of the most global concerns in biological, chemical, and physical sciences to the processing, preservation, quality evaluation, public health aspects, and utilization of foods.

**004 碩士論文**

**6 必 二上、二下**

利用完整執行之試驗、觀察或實務操作，使學生能徹底了解並應用修課之知識、練習口頭報告、與科學論文之寫作。老師則藉由討論，提供改進之意見。

**004 Thesis**

**6 R 2<sup>nd</sup> F, 2<sup>nd</sup> S**

After a well-designed project being properly conducted by students, he/she will be asked to give a oral presentation and submit the thesis before a deadline. Knowledge acquired during the study should be made use of sufficiently in the preparation of the thesis. Frequent and intensive discussions among teachers and students will be arranged to improve the quality of his/her research.

## 選修科目 **Optional Courses**

**005 食品加工特論與實習**

**3 選 一上**

本課程聘請不同食品加工專長之學者專家，講授食品產業之最新研究與發展，其中包括微生物醱酵、保健食品、乳品加工、肉品加工等，並依照授課內容，提供學生實作實習或業界參訪之活動，讓學生能將課堂所習之食品加工知識與技術，實際動手應用於產品製作或親身體驗食品產業的運作。

**005 Special Topics and Practice of Food  
Processing**

**3 E 1<sup>st</sup> F**

This course will invite various scholars or specialists with different specialties of food processing to teach the most recent research and development of food processing. The topics may include, but not limit to, microbial fermentation, health foods, dairy processing, meat processing, etc. In addition to lecture in the classroom, the lecturer will also provide students with hand-on practice in the lab or field trip to visit food industry. This course will allow students to utilize the knowledges and techniques learned in classroom for actually hand-on application of food manufacturing in the lab or to visit food industry personally to observe and experience different technologies in food factories.

**006 食品生物技術**

**3 選 一上**

本課程提供學生有關現代食品生物技術學的基本概念。其內容包括與食品生物技術相關的重組 DNA 技術、酵素及蛋白質工程、生物感測器(DNA 探針及單株抗體)以



**009 Special Topics in Food Chemistry****3****E****1<sup>st</sup> F**

Food is composed of carbohydrates, lipids and proteins and the major resources are derived from animal, plant, fungi, algae, and even microbial. The functional properties of carbohydrates, lipids and proteins such as viscosity, gelation, emulsification, foaming, gelatinization and water holding capacity are dependent upon their structures which in related to the composition, linkages, degree of polymerization, intensity of branching, shape, conformation, functional group and degree of substitution of themselves and exhibit various functional properties change during processing, handling and storage. This course deals with the connection between the shape, building unit, linkages, conformation and structure of carbohydrates, lipids and proteins produced from various resources and their functions. Furthermore, understanding the physiological function of food components is critical and will be discussed in the current course.

**010 全球食品行銷特論****3****選****一上**

本課程目標是透過重要的觀念、工具及理論，讓學生獲得知識及了解全球市場行銷的環境，本課程將啟發學生判斷思考有關全球競爭的議題，提供學生(a)了解及透視國際間市場行銷的問題(b)認識國際間消費者的異同(c)分析及決策市場行銷的能力(包括:產品、品牌、促銷、訂價、販售等)(d)研究不同行銷市場貿易法規的能力(e)全球市場行銷架構及工具的知識(f)了解目前主要全球食品公司的行銷策略。

**010 Special Topics in Global Food Marketing****3****E****1<sup>st</sup> F**

The objective of the course is to develop students' knowledge and understanding of the global marketing environment through key concepts, and tools, and theory. The course challenges students to think critically about global competition. Specifically, the course is designed to provide students with (a) familiarity with the problems and perspectives of marketing across national boundaries and within foreign countries; (b) an understanding of consumer similarities and differences outside the home country; (c) the analytical ability to make marketing decisions concerning all parts of the marketing mix (product development, branding, promotion, pricing, and distribution); (d) competence in researching trade laws and regulations in other markets; (e) knowledge of global analytical frameworks and tools; and (f) an understanding of the current strategies of major global food firms.

**011 糧食安全****3****選****一上**

本課程目的在增進學生對全球之糧食供應及人口問題的了解，進一步探討這些議題對國家發展政策及國際合作的意涵。課程中鼓勵學生應用各種量化及質化研究工具探討此一議題。

**011 Food Security****3****E****1<sup>st</sup> F**

The goal of this course is to increase student's knowledge and understanding the global food and population issues and its relevance for national development policy as well as international cooperation. Both qualitative and quantitative methods would be encouraged to be used as the research tools in investigating the issues.

**012 機能性食品****2 選 一上**

此課程包含特殊營養食品、機能性食品、計劃性食物及藥劑營養食品之加工、生理功能介紹。由於男人、女人和小孩之特異生理構造不同，因此所需之營養要求也不大相同。而針對老年人所開發之機能性食品強調抗老化之作用及免疫系統之建立。在西方國家植物化學食品包含天然生理活性等物質較普遍化，而中國之藥用植物在未來健康食品市場扮演一重要的角色。此課程將說明這些功能特性食品之物理(身體)的及化學的功能。

**012 Functional Foods****2 E 1<sup>st</sup> F**

The course comprise the physiological function and process of nutritional supplements、functional foods、designers foods and pharmacy foods. Men women and children are different in nutritional requirements due to their distinct physiological structure. The functional foods for aged people emphasize the effect of anti-aging and building the immune system. Physiochemical which contain natural physiological active ingredients are more popular in western countries. The Chinese herb should play an important role for the future healthy food market. This course will illustrate their physical and chemical functions.

**013 食品免疫學****2 選 一下**

利用保健食品提昇免疫功能為目前熱門的研究主題，本課程首先介紹生物體免疫系統防禦機制，進而介紹如何利用免疫反應進行食品免疫分析，再以保健食品為例，介紹免疫功能提昇之評估方法。

**013 Practical Immunology in Food Science****2 E 1<sup>st</sup> F**

To improve immune function by healthy food is a popular topic. The objectives of this course are to introduce the immune system in living organisms and the application of immunoassay in food science. Furthermore, the evaluation method of immune function of healthy food will also be included in this course.

**014 個別指導研習(1)(2)(3)(4)****8 選 一上、一下、  
二上、二下**

個別指導研習是在本國際學位學程教師的督導下，提供學生獨力規劃及草擬課程的經驗，個別指導研習是針對本學程未規劃的課程內容，基於學生的特殊研究需求或雖然本學程已有相關課程內容，但個別學生需要更深入研習，所設立的課程，個別指導研習可供學生從事論文寫作的準備或其他高階的學術研習。

**014 Independent Study****8 E 1<sup>st</sup> F, 1<sup>st</sup> S, 2<sup>nd</sup> F, 2<sup>nd</sup> S**

Independent Study is offered to give the student experience in planning and outlining a course of study on the student's own initiative under the International Master's Degree Program in Food Science supervision. Independent Study should deal with a special interest not covered in a regular course or with exploration in greater depth of a subject presented in a regular course. Independent study may be desirable preparation for the thesis

or other advanced study.

**015 永續發展趨勢** 2 選 一上

本課程介紹環境政策與管理對經濟發展與開發建設之影響，可達到永續發展之效能。從自然經濟資源、氣候、環境、能源、交通運輸、產業與人口結構等作整體性的政策思考與規劃，以達環境保護與經濟發展兼顧之永續發展目標。

**015 Trends in Sustainable Development** 2 E 1<sup>st</sup> F

The objective of this course is to provide students to understand the environmental management, domestic environmental policy and global environmental protection topic. The subjects of the course will include : Environmental management and policy ; Environmental economics ; Risk assessment ; Ecological balance ; National environmental policy ; Environmental impact assessment ; Sustainable development ; The issue on environmental protection and International Conventions... etc. This course introduces environmental policy management for the enterprise development process, to prevent environmental pollution. From climate, transportation, industrial structure, and diverse environment in which the integrity of reference for thinking and planning.

**016 談判與溝通** 2 選 一上

本課程之目的，在於透過與商務談判有關的各項概念、程序、策略、與論理等事項的教學與演練，引領學員能夠習得談判的正確觀念與技巧。

**016 Negotiation Strategies and Tactics for Business** 2 E 1<sup>st</sup> F

The course employs instructions, discussions, and case studies to examine the concepts, processes, strategies, and ethical issues related to business negotiation.

**017 食品檢驗技術特論** 3 選 一下

本課程特色為加強微量成分之檢驗技術，重點包括：維生素、礦物質(含主要元素及微量金屬元素)及水質之陰離子分析等。針對微量成分檢驗所需使用之精密儀器，諸如：氣、液相層析儀、藕合電漿原子激發光譜儀及毛細管電泳層析儀等，其儀器單元介紹、測定原理及應用發展等，均在此課程中做一詳述。

**017 Special Topics in Food Analysis** 3 E 1<sup>st</sup> S

Instrumental analytical methods widely used to measure micro/trace nutrients of food products were presented in this course. Emphasis is on the basic introduction and practical operation of gas/liq chromatography, atomic absorption spectrometer, inductive coupled plasma spectrometer and capillary electrophoresis system.

**018 食品工程特論** 3 選 一下

本課程將介紹現代食品工程新技術，包括微波加熱、脈衝殺菌、高壓殺菌、新乾燥技術、薄膜分離技術、生化工程技術等理論設備及應用。

**018 Special Topics in Food Engineering**                      **3**                      **E**                      **1<sup>st</sup> S**

Objectives of this course are to introduce modern technologies of food engineering. The scope includes microwave heating, impulse sterilization, high pressure sterilization, membrane separation technology, new dehydration technology, biochemical engineering technology, with theories, equipment and applications.

**019 食品酵素應用特論**    **3**                      **選**                      **一下**

本課程主要介紹酵素特性、命名、活性分析及分離純化等基本知識，進而介紹食品內生酵素與品質變化的關係及酵素在食品產業的應用。

**019 Special Topics in Applications of Food Enzymes**                      **3**                      **E**                      **1<sup>st</sup> S**

Overview of characteristics, nomenclature, activity assay and purification of enzymes. Quality changes related to the endogenous enzymes in foods. Applications of enzymes currently used in food industry.

**020 精密儀器分析特論**    **3**                      **選**                      **一下**

本課程主要是討論有關食品分析所使用儀器之基本原理及功能。重點著重在了解儀器之結構、分析原理及應用範疇。討論之儀器包括光度計及層析儀二大類，其中光度計包括紫外--可見光光度計、螢光光度計及原子吸收光譜儀等；層析儀包括薄層色層分析儀、氣相層析儀及高效率液相層析儀等。

**020 Special Topics in Instrumental Analyses**                      **3**                      **E**                      **1<sup>st</sup> S**

Designed to acquaint the students with the advanced knowledge and fundamental principles of analytical instruments commonly used by food analysts. Emphasis is on understanding the theoretical and practical aspects of spectroscopy (UV Visible, fluorescence, and atomic absorption spectrophotometer) and chromatography (TLC, GC, and HPLC).

**021 高等分子生物學**    **3**                      **選**                      **一下**

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。

**021 Advanced Molecular Biology**    **3**                      **E**                      **1<sup>st</sup> S**

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.

**022 乳品加工特論**    **2**                      **選**                      **一下**

本課程討論乳製品加工及儲存方法與條件對乳與乳製品品質之影響。課程內容包括





本課程為美國密西西比大學、國立台灣大學、國立台灣師範大學及國立屏東科技大學以網路連線聯合教學之課程。授課時以單元講授之方式介紹近期分子營養學之發展。主要內容涵蓋日糧及營養分對基因調節、生理代謝及人類健康之影響。

**026 Molecular Nutrition** 2 E 1<sup>st</sup> S

This is a team-taught course between Mississippi State University, National Taiwan University and National Pingtung University of Science and Technology supported by MOUs between the parties. Faculty and students will participate in the course via videoconferencing. The emerging discipline of molecular nutrition encompasses nutritional biochemistry, nutritional genomics, nutritional metabolomics, and epigenetics. The course focuses on the effects of diet and nutrients on an individual's genome and metabolism, and how the molecular events affect human health. This course is a lecture course designed to graduate students with current concepts, knowledge and strategies for understanding molecular nutrition.

**027 食品產業經營管理特論** 2 選 一下

本課程主要係培養學生食品經營之能力，以提升產業之競爭力和應付社會之多元化，其內容如下：1.總論：包括食品產業經濟、文化與環境、政策及相關法規、企業管理。2.農業：農業概況與發展、農業的經營管理。3.食品工業：食品工業概況與發展、食品工業的經營管理。4.食品流通：食品流通概況與發展、食品流通的經營管理。5.食品服務業：食品服務業的概況與發展、食品服務業的經營管理。

**027 Special Topics in Management and Administration of Food Industry** 2 E 1<sup>st</sup> S

The objective of this course is to train the student getting the ability to manage the food business. The efficiency of the food business will be increased under their management. The contents of this course are as following : 1. Introduction: It includes the economics of food business, the culture and environment of the food, business management. 2. Agriculture: The general situation and the development of agriculture, agriculture management will be included in this sector. 3. Food industry: This sector contains the general situation and the development of food industry, the management of food industry. 4. Food distribution: The general situation and development of food distribution, the management of food distribution will be talked in this sector. 5. Food Service: It includes the general situation of food service.

**028 食品經營特論** 2 選 一下

課程內容首先介紹食品工廠或經營之主要因素一人之相關問題，如員工、顧客心理、人際關係、溝通技巧、領導統御。進而說明企業單位人事組織、架構與運作方式。另外涵概產品行銷策略、食品市場特色、市場調查技巧及生產管理，讓學生培養未來在管理階層中，應據具備之決策能力、財務報表、成本會計之基礎理論與運作方法，了解企業之財務狀況、經營成果，建立成本概念。

**028 Special Topics in Management and Administration of Food** 2 E 1<sup>st</sup> S

This course is to teach management concepts and skills in food industry. Its contents include: organization; communication; sales and marketing; financial and accounting; human resource management; and production management.

**029 食品科學專技英文(1) 2 選 一下**

此為研究所以英文撰寫科技報告的課程，食品科學專技英文(1)專注在寫作的基礎，包括文章的組織與流暢，以及如何維持適當的科技英文寫作格式。此外食品科學專技英文(1)主要側重在對即將進行研究內容之科學寫作的說明技術，例如：文獻回顧、研究計畫、經費提案及相關發表用的材料。

**029 Scientific English in Writing (1) 2 E 1<sup>st</sup> S**

This is a graduate course for scientific writing in English. Session I focuses on fundamentals of writing, including organization and flow, guidelines for maintaining an appropriate technical writing style. Additionally, session I focuses mainly on application of expository techniques to scientific writing in prospective contexts such as paper review, research proposal, grant proposal, and presentation materials.

**030 食品科學專技英文(2) 2 選 二上**

食品科學專技英文(2)是建立在食品科學專技英文(1)的基礎上，將焦點擴展到已完成研究的科學寫作內容，包括：發表論文的撰寫、研究報告、碩士論文、發明專利等。

**030 Scientific English in Writing(2) 2 E 2<sup>nd</sup> F**

Session II builds on session I, expanding the focus to retrospective contexts, including the writing of publication, research report, thesis, inventive patent, etc.

**031 最適化在食品科技之應用 2 選 二上**

由於能源成本的增加及環保意識的覺醒，造成食品工業在食品製造及加工程序的顯著改變，以適應相對帶來的限制；為了得到最佳的生產環境和最大的生產利潤，及配合這些食品製造及加工程序的改變，使得工廠設計、操作方法及條件得做必要的修正。本課程將針對最適化背景的介紹(什麼是最適化、為什麼要最適化及最適化基本的特色)、運用的原理(方程式介紹、數值方法應用)以及作個案研究以練習實際問題等方式來了解最適化對食品科技的重要性。

**031 Optimization in Food Science and Technology 2 E 2<sup>nd</sup> F**

Due to the increasing cost of energy and the significant awareness of environmental protection, food manufacturing processes have been changed dramatically. In order to achieve optimal production conditions and maximize profits, factors such as plant design, operation methods and conditions have to comply with the constraints caused by these changes. This course will focus on the following subjects: (1) Introduction of optimization (what is it? why is it necessary? its fundamental features); (2) Theory of optimization (basic functions and numerical methods); (3) Case studies of practical applications. Objectives are thus to implement students with the concepts and applications of optimization on food science and technology.

### 032 實驗設計

2 選 二上

本課程之教學目標為教授食品科技研究上所需之實驗設計與實驗數據之統計分析理論與實例。課程內容包含：1. 簡單實驗數據分析比較：數據常態分佈、t分佈與檢定、F分佈與檢定、卡方分佈與檢定、數據信賴區間、假設檢定。2. 單因子變異數分析：平方和之分割、統計模型適用性驗證、樣本採樣需求。3. 群組與配對實驗設計：一般迴歸分析、拉丁正方設計、平衡群組設計。4. 多變數階層設計：一般階層設計、統計曲線或區面、群組化之階層設計。5. 反應曲面法：一階及二階反應曲面設計、最大斜率法、最佳化實驗設計。

### 032 Experimental Design

2 E 2<sup>nd</sup> F

The objective of this course is to offer the assorted subjects concerning experimental design and data analysis used in the research fields of food science. Topics include: 1. Simple Comparative Experiments: normal distribution, t distribution and t-test, F distribution and F-test, Chi-Square distribution and Chi-Square test, confidence interval, hypothesis testing. 2. ANOVA (Analysis of Variance): partition of sum of squares, model adequacy checking and sample size determining. 3. Block and Paired Design: general regression analysis, Latin Square design, balanced block design. 4. Factorial Designs: definitions and principles of general factorial design, statistical response curves and surfaces, blocking in factorial design. 5. Response Surface Methodology: first and second order RSM, steepest ascent method, optimal experimental design.

### 033 食品產業校外實習

2 選 二上

本課程藉由暑期到食品相關產業或研究機構去實習工作，可以了解食品相關領域的實務工作內容。學生能由做的過程當中，認識與了解正確的實習工作態度、需要那些專業知識、如何在團體工作、提升自我解決問題的能力等。修習本課程，可以使學生體認食品產業中的實務工作，回到學校後能自我要求加強專業知識的學習。

### 033 Food Industry Internship

2 E 2<sup>nd</sup> F

This course offers students to work in food industry or research institute during Summer break. So, they can understand the true working contents of food related fields. Students will learn and realize the correct working mentality, profession knowledges required, how to work independently in a team, increasing the ability of problems self-resolving. When finishing this course, students may apprehend the requirements to work in the food related industry, and will push themselves to strengthen their professional knowledges when returning to school.

### 034 食品產業海外校外實習

2 選 二上

本課程藉由暑期到海外食品相關產業或研究機構去實習工作，可以了解國際食品相關領域的實務工作內容。學生能從參與海外企業實習的過程當中，認識與了解不同國家的實習工作態度、需要那些專業知識、如何在團體工作、提升自我解決問題的能力等。修習本課程，可以使學生體認國際食品產業中的實務工作，回到學校後能自我要求加強專業知識的學習及增加全球移動能力。

**034 Food Industry Internship Oversea                    2                    E                    2<sup>nd</sup> F**

This course offers students to work in food industry or research institute overseas during Summer break. They can understand the international true working contents of food-related fields. Through participating in the internship at overseas enterprises, students will learn and realize the correct working mentality, professional knowledge required, how to work independently in a team, increasing the ability of problems self-resolving. When finishing this course, students may apprehend the requirements to work in the international food-related industry, and will push themselves to strengthen their professional knowledge and global mobility when returning to school.

**035 食品經營專題    2                    選                    二下**

本課程之目的，在使學生獲得食品業經營之理論與實務的相關知識，課程主要內容包括食品產業之介紹，食品保存方法，決策，溝通，食品品質，成本分析，人際關係處理技巧、說明、激勵、與領導，企業功能，以及食品公司之規劃、執行與控制。

**035 Seminar on Food Business Management                    2                    E                    2<sup>nd</sup> S**

The objective of this course is designed to teach the related knowledge of the theory and practice of food company management. The major contents include introduction to food industry, the methods of food preservation, decision, communication, food quality, cost analysis, the skills of the human relationship, business functions and food company planning, execution, and controlling.