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開課班級：碩熱農一A

授課老師：陳光堯

學分數：3

課程大綱：

本課程在教授生物物理及生物化學在植物生理及生態上之應用，同時強調環境控制在農業研究上之重要性及其相關技術之運用；主要內容包括植物體與環境間各種形式之物質及能量的交換，如水份、二氧化碳之擴散方式、平衡分析與能量運用等。

outline:

This course is designed to provide students with the basic knowledge of the applications of biophysics and biochemistry on plant physiology and ecology. The importance of a “controlled environment” and the technology of “environmental control” will also be covered. Its contents include: diffusion; chemical and energy potential gradients; solute movement in and out of plant cells; the interconnection of various energy forms; and energy and matter exchange between plant and environment (water vapor and carbon dioxide, energy budget analysis, and water movement from soil to plant to atmosphere).

教學型態：

課堂教學

成績考核方式：

平時成績：%

期中考：30%

期末考：30%

其它：Group

work/Discussion/Presentation
30%; Attendance 10% %

本科目教學目標：

1. 培育熱帶農業專業人才。 To provide professional knowledge in tropical Agriculture.
2. 提升農業專業知識與獨立研究能力。 To conduct in independent research and to contribute knowledge in agriculture-related fields.
3. 促進國際農業發展與技術移轉。 To train and educate senior level professionals to conduct research.

參考書目：

(1) Physicochemical and Environmental Plant Physiology, 5th Edition. 2020 Park S. Nobel, Academic Press,

<https://www.elsevier.com/books/physicochemical-and-environmental-plant-physiology/nobel/978-0-12-819146-0> (2) Plants and Microclimate: A Quantitative Approach to Environmental Plant Physiology, 3rd Ed., 2013 Hamlyn G. Jones, Cambridge University Press

<https://www.cambridge.org/tw/academic/subjects/life-sciences/plant-science/plants-and-microclimate-quantitative-approach-environmental-plant-physiology-3rd-edition?format=PB>



課程進度表：

週次	起訖月日	授課單元(內容)	備註
第1週	9.11~9.18	Topic 0;;General introduction	8日正式上課。8~12日課程加退選，轉學(系)生、復學生及延修生選課，雙主修、輔系申請，12日申辦抵免學分截止日
第2週	9.18~9.25	Topic Discussion: A quantitative approach (diffusion!);	
第3週	9.25~10.02	HOLIDAY;(Mid-Autumn Festival, no class!)	28日(日)孔子誕辰紀念日/教師節(放假),29日(一)補假
第4週	10.02~10.09	; Topic 1: Radiation: Duality of light; Photochemistry of photosynthesis Radiation source in controlled environment ; Topic Discussion &; Practice in Radiation Measurement ; ;	29日成績優異提前畢業者提出申請截止日
第5週	10.09~10.16	; Topic 2: Temperature and Relative Humidity: Temperature and relative humidity in controlled environment Energy budget 1;;Net radiation balance of an exposed leaf ; ;	6日(一)中秋節(放假)，10日(五)國慶日(放假)
第6週	10.16~10.23	Topic 2: Temperature and Relative Humidity: ; Energy budget 2;;Sensible Heat (Conduction/Convection) &;Latent Heat (Transpiration/Condensation)T Table 7-1!; (Physicochemical and Environmental Plant Physiology) ; ;	14日學生宿舍安全輔導暨複合式防災疏散演練。18日多益測驗
第7週	10.23~10.30	Topic 3: Water and Nutrition Management Water management and nutrient supply in controlled growing systems	24日(五)補假，25日(六)光復暨古寧頭大捷日(放假)。
第8週	10.30~11.06	Topic discussion/Practice in water management	30日校課程委員會
第9週	11.06~11.13	MIDTERM EXAM	3~9日期中考試
第10週	11.13~11.20	Topic 4: Air Movement Wind and carbon dioxide in controlled-environment systems	13日教務會議,16日教師期中成績上網登錄截止日
第11週	11.20~11.27	Topic 5;;Carbon Nutrition Carbon nutrition and it ' s fixation in micropropagated systems	
第12週	11.27~12.04	Topic Discussion/Practice in CO2 monitoring	24~28體育運動週。24日校園路跑。27日運動大會夜間開幕，28日運動大會活動，29日101週年校慶活動日，照常上班
第13週	12.04~12.11	Topic 6;;Image Analysis Evaluation of physiological processes with image analysis Automated systems for tissue culture	



第14週	12.11~12.18	Topic Discussion	12日申請停修課程截止日
第15週	12.18~12.25	Topic 7;;Data Collection (Environmental measurement and data logging)	
第16週	12.25~1.01	Field trip/Practice in measuring and data logging Greenhouse Environment Control & Automation	22日校務會議。25日行憲紀念日(放假)
第17週	1.01~1.08	Result presentation	1日(四)開國紀念日(放假)
第18週	1.08~1.15	FINAL EXAM	5~11日期末考試，10~11日學生退宿