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	9.13~9.20	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	9.20~9.27	Physicochemical and Environmental Plant Physiology Plants and Microclimate: A Quantitative Approach to Environmental Plant Physiology	
第3週	9.27~10.04	Radiation: Duality of light; Photochemistry of photosynthesis Radiation source in controlled environment	28日(日)孔子誕辰紀念日/教師節(放假),29日(一)補假
第4週	10.04~10.11	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	10.11~10.18	Temperature and humidity in controlled environment: Energy budget	6日(一)中秋節(放假)，10日(五)國慶日(放假)
第6週	10.18~10.25	Topic discussion/Practice in temperature and humidity measuring;(Completion of Table 7-1)	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	10.25~11.01	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	11.01~11.08	Topic discussion/Practice in water management	30日校課程委員會
第9週	11.08~11.15	MIDTERM EXAM	3~9日期中考試
第10週	11.15~11.22	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	11.22~11.29	Carbon Nutrition: Carbon nutrition and it ’ s fixation in micropropagated systems	
第12週	11.29~12.06	Data Collection: Environmental measurement and data logging	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	12.06~12.13	Topic Discussion/Practice in CO2 monitoring	
第14週	12.13~12.20	Topic Discussion/Practice in measuring and data logging	12日申請停修課程截止日
第15週	12.20~12.27	Image Analysis: Evaluation of physiological processes with image analysis Automated systems for tissue culture	
第16週	12.27~1.03	Topic Discussion/Field trip	22日校務會議。25日行憲紀念日(放假)

第17週	**1.03~1.10**	Field trip Greenhouse Environment Control & Automation	**1日(四)開國紀念日(放假)**
第18週	**1.10~1.17**	FINAL EXAM	**5~11日期末考試，10~11日學生退宿**