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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	9.14~9.21	General introduction	19日正式上課。19~23日加退選，復(轉)學生及延修生選課，雙主修、輔系申請，23日申辦抵免學分截止日
第2週	9.21~9.28	Physicochemical and Environmental Plant Physiology Plants and Microclimate: A Quantitative Approach to Environmental Plant Physiology	28日和平紀念日(放假)
第3週	9.28~10.05	Radiation: Duality of light; Photochemistry of photosynthesis Radiation source in controlled environment	
第4週	10.05~10.12	Topic discussion/Practice in radiation measurement	11日成績優異提前畢業者提出申請截止日,14日第1次校教評會
第5週	10.12~10.19	Temperature and humidity in controlled environment Preview: Chapter 7 Temperature and Energy Budgets, Physicochemical and Environmental Plant Physiology,;Park S. Nobel.	
第6週	10.19~10.26	(Completion of Table 7-1) Topic discussion/Practice in temperature and humidity measuring	
第7週	10.26~11.02	Water and Nutrition Management: Water management and nutrient supply in controlled system	3日(三)校慶補假(112年11月25(六)日校慶活動日)。4日(四)兒童節、民族掃墓節(放假)，5日(五)民族掃墓節補假
第8週	11.02~11.09	Topic discussion/Practice in water management	10日校課程委員會。11日第2次校教評會
第9週	11.09~11.16	MIDTERM EXAM	15~21日期中考試
第10週	11.16~11.23	Air Movement: Wind and carbon dioxide in controlled-environment systems	22~26日學士班申請轉系,27~28日四技二專統一入學測驗,28日教師期中成績上網登錄截止日
第11週	11.23~11.30	Carbon Nutrition: Carbon nutrition and it ' s fixation in micropropagated systems	
第12週	11.30~12.07	Topic Discussion/Practice in CO2 monitoring	11日多益測驗(暫定)
第13週	12.07~12.14	Data Collection: Environmental measurement and data logging	16日第3次校教評會。19日博士班招生(暫定)
第14週	12.14~12.21	Topic Discussion/Practice in measuring and data logging	20~24日體育運動週，22日水上運動會(暫定),24日申請停修課程截止



第15週	12.21~12.28	Image Analysis: Evaluation of physiological processes with image analysis Automated systems for tissue culture	27~ 31日藥物濫用防制宣導週
第16週	12.28~1.04	Topic Discussion/Field trip	3日校務會議。3~9日畢業班(學士)期末考試。
第17週	1.04~1.11	Greenhouse Environemt Control & Automation Environmental control & applications in a greenhouse ; ; Automated systems for tissue culture	10日端午節(放假)，12日畢業班授課教師送交學期成績截止
第18週	1.11~1.18	FINAL EXAM	17~23日期末考試