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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	9.12~9.19	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	9.19~9.26	Topic discussion 1 A quantitative approach to plant – environment interactions;(Plants and Microclimate)1.2. Diffusion (Chapter 1 Cells and Diffusion,Physicochemical and Environmental Plant Physiology)	28日和平紀念日(放假)
第3週	9.26~10.03	Radiation: Duality of light; Photochemistry of photosynthesis Radiation source in controlled environment	
第4週	10.03~10.10	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	10.10~10.17	Temperature and relative humidity in controlled environment:Energy budget 1;;Net radiation balance of an exposed leaf	
第6週	10.17~10.24	Energy budget 2;;Sensible Heat (Conduction/Convection) &;Latent Heat (Transpiration/Condensation)Table 7-1!	
第7週	10.24~10.31	Water and Nutrition Management: Water management and nutrient supply in controlled growing systems	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	10.31~11.07	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	11.07~11.14	MIDTERM EXAM	15~21日期中考試
第10週	11.14~11.21	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	11.21~11.28	Carbon Nutrition: Carbon nutrition and it ' s fixation in micropropagated systems	
第12週	11.28~12.05	Topic Discussion/Practice in CO2 monitoring	11日多益測驗(暫定)
第13週	12.05~12.12	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	12.12~12.19	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	12.19~12.26	Instrument Operating & Preliminary Results 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	12.26~1.02	Topic Discussion	3日校務會議。3~9日畢業班(學士)期末考試。
第17週	1.02~1.09	Field trip Greenhouse Environment Control & Automation ;	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	1.09~1.16	FINAL EXAM	17~23日期末考試