

HORT 7006 PLANT-CLIMATE INTERACTIONS IN CONTROLLED ENVIRONMENTS

Credit Points 10

Legacy Code 301357

Coordinator Jay Bose ([https://directory.westernsydney.edu.au/search/name/Jay Bose/](https://directory.westernsydney.edu.au/search/name/Jay%20Bose/))

Description This unit aims to provide knowledge of relationships between plant growth, controlled environment and crop physiological aspects relevant to protected crop production. The unit will provide students with relevant knowledge to explain and develop concepts that are key to understanding various areas of environmental plant physiology. The unit will also stimulate students to conceptualise interactions between the physical environment and plant functioning. The unit will compare the important parameters and concepts (e.g. plant growth, plant and fruit development, light interception, light use efficiency, biomass partitioning, and water use efficiency) in horticultural crop growth in the controlled systems.

School Science

Student Contribution Band HECS Band 1 10cp

Level Postgraduate Coursework Level 7 subject

Assumed Knowledge

Students entering this subject should have knowledge of one of the following subject areas: horticultural production systems; environmental sustainability analytics; computing and technological applications; marketing principles and business management.

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Explain physical and chemical factors that control plant growth.
2. Measure, analyse and explain advantages and disadvantages of the light environments.
3. Dissect the fundamental processes of photosynthesis and understand how leaf photosynthesis can
4. Explain the principles of leaf gas exchange and important parameters and concepts underlying
5. Explain the potential and importance of physical-physiological measurements for plant phenotyping
6. Synthesise experimental results to reach valid conclusions.
7. Appraise the interactions between the physical environment and plant function with a focus on crop
8. Communicate the findings of scientific investigations and literature reviews relating to contemporary issues in plant-climate interactions.

Subject Content

1. Plant microclimates such as air and tissue temperature, light, and air humidity.
2. Common methods for measuring soil and plant nutrition controlling crop growth and development

3. Lighting sources and the effects of the light environment (natural versus artificial light, including intensity, spectrum and duration) on crop production
4. Concepts and measurements of crop primary production for horticultural crops grown in controlled systems and the open field
5. Crop gas exchange, growth analysis and biomass allocation to estimate photosynthesis, stomatal conductance and dark respiration
6. Latest advances in plant phenotyping
7. Environmental impacts on crop growth and production under protected cropping

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Item	Length	Percent	Threshold	Individual/Group Task
Quiz	3 x online quizzes (60 min. each, multiple choice and short answer questions)	30	N	Individual
Report and presentation	One practical report (15%, 1,000 words) and one 15-min. presentation (15%)	30	N	Group
Report	2,000 words	40	N	Individual
Participation	3 day workshop	S/U	Y	Individual

Teaching Periods

2022 Semester 2

Hawkesbury

Day

Subject Contact Jay Bose ([https://directory.westernsydney.edu.au/search/name/Jay Bose/](https://directory.westernsydney.edu.au/search/name/Jay%20Bose/))

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=HORT7006_22-SPR_HW_D#subjects)