

SEMESTER I
LSM3258 COMPARATIVE BOTANY

Prerequisite: LSM1103 Biodiversity AND LSM1104 General Physiology

Preclusion: LSM3261 Life Form and Function

Workload: 26 lecture hours + 18 practical hours + 6 tutorial hours

This module explores the basic relationships between the diverse forms and functions in plants which support almost all life on earth and are completely essential to human well-being as food, the oxygen source, for CO₂ removal, water purification, aesthetics, cooling (through shade and transpiration), phytoremediation, noise reduction, medicines, and many other functions. Emphasis is placed on the angiosperms which are economically and ecologically the most important plants. Plants share a common basic structural plan but many species deviate from the basic plan in response to selection pressures from the environment. Knowledge of organismal plant biology is enhanced through selected topics in morpho-anatomical designs and functional adaptations, e.g., Why cannot trees grow taller than the recorded height of about 130 m? Can leaves capture more light energy than a photovoltaic cell (solar panel)? What is the structure of the pitcher in the leaf of a pitcher plant and what is its functions? How can species that will grow into large trees under natural conditions be trained into bonsai plants only a few cm tall?

S/N	Topics	Lecture hours
1.	A meaningful learning experience—the NUS Honour Code; module overview; land plant phylogeny; morphology, structure, form, function; the plant body; cell; meristems; tissues	2 Hugh Tan
2.	Root structure and function; modifications	2 Hugh Tan
3.	Stem structure and function; modifications	2 Hugh Tan
4.	Leaf structure and function; modifications	2 Hugh Tan
5.	Inflorescence, flower, fruit, and seed structure and function; modifications	2 Hugh Tan
6.	Plant-water relations	2 Hugh Tan
7.	Plant nutrition	2 Hugh Tan
8.	Photosynthesis	2 Amy Choong
9.	Macromolecules	2 Amy Choong
10.	Respiration	2 Amy Choong
11.	Environmental regulation of plant development	2 Amy Choong
12.	Hormonal regulation of plant development	2 Amy Choong
13.	Secondary plant products	2 Amy Choong
Total lectures:		26 h
Tutorials:		6 h
Practicals:		18 h
Total hours:		50 h

TEXT BOOKS (Reference Books):

- MacAdam, J. W., 2009. *Structure and Function of Plants*. Wiley-Blackwell, Ames, Iowa, USA. 287 pp. [QK641 Mac 2009](#).
- Solomon, E. P., C. E. Martin, D. W. Martin & L. R. Berg, 2015. *Biology. 10th Edition*. Cengage Learning, Stamford, Connecticut, USA. 1253 pp. [QH308.2 Sol 2015](#).
- Mauseth, J. D., 2014. *Botany: An Introduction to Plant Biology. 5th Edition*. Jones & Bartlett Learning, Burlington, Massachusetts, USA. 696 pp. [QK47 Mau 2014](#).

4. Taiz, L., E. Zeiger, I. M. Møller & A. S. Murphy (editors). 2015. *Plant Physiology and Development*. 6th Edition. Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, U.S.A. 761 pp. [QK711.2 Tai 2015](#)
5. Simpson, B. B. & M. Conner-Ogorzaly, 2013. *Plants in Our World: Economic Botany*. 4th Edition. McGraw-Hill, New York. 529 pp. [SB108 Uni.S 2013](#).
6. Hoefnagels, M., 2014. *Biology: Concepts and Investigations*. 3rd Edition. McGraw-Hill, Boston. 826 pp. [QH307.2 Hoe 2014](#).
7. Crozier, A., H. Ashihara & F. A. Tomas-Barberan, 2012. *Teas, Cocoa and Coffee: Plant Secondary Metabolites and Health*. Wiley-Blackwell, Chichester, West Sussex. Electronic Book.

MODE OF ASSESSMENT:

1. **Continuous assessment: 100%**
 - a. MCQ or short question quizzes after lectures: 40%
 - b. Report on mini-project on plant structure to function: 30%
 - c. Poster and presentation on plants: 18%
 - d. Essay on a vegetable: 12%
2. **Semestral examination: 0%**

MODULE CO-ORDINATOR AND TEACHER: Assoc. Prof. Tan Tiang Wah, Hugh

TEACHER: Dr. Choong Mei Fun, Amy