

Module Information

Module Code	Module Title	Semester	Mod. Credits
LSM3258	Comparative Botany	1	4

Module Description

This module examines the diverse forms and functions of mainly angiosperms plants. Are the common crops that we eat belong to a leaf, an inflorescence, a fruit, an underground stem or a root? How do the forms of plants help to increase rates of photosynthesis, respiration and yield of secondary metabolites? Can we manipulate flowering times and fruit sizes? All these properties and manipulations have commercial, seasonal and festive implications. This module is useful for LSM3233, LSM3255, LSM3256, LSM4251 and LSM4351 (pre-requisite).

Eligibility and requirements

Prerequisites (prior knowledge required): LSM2231 or LSM2252 or LSM2254

Corequisites: NIL

Precluded modules (if any): NIL

Instructional methods

The following instructional methods will be employed:

- 1) Lecture
- 2) Tutorial
- 3) Laboratory (Dry/Wet)
- 4) Expedition/Site/Field visit

Assessment modes

The following assessments will be employed:

- 1) Group CA1: 25%
- 2) CA2: 20%
- 3) Quizzes: 65%

Contact information for Module Coordinator and other instructors

Dr. Amy Choong Mei Fun (Module Coordinator)

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Course content and syllabus

- land plant phylogeny; morphology, structure, form, function; the plant body; the plant cell; meristems; tissues
- Root structure and function; modifications
- Stem structure and function; modifications
- Leaf structure and function; modifications

- Reproductive structures and function; modifications
- Plant-water relations (flipped classroom: notes provided only)
- Plant nutrition
- Photosynthesis
- Macromolecules such as starch, oils, lipids, cellulose
- Respiration and thermogenesis (heat and aroma)
- Environmental regulation of plant development: gravity, light, temperature, touch, water
- Hormonal regulation of plant development and commercial applications
- Secondary plant products: terpenes, phenolics, alkaloids, flower colour, tea, coffee, chocolates, plant poisons

Learning activities

The following learning activities will be employed to achieve the learning outcomes of knowledge, cognitive skills, generic skills and/or attributes development stated in the 'Intended Learning Outcomes' below:

- | | |
|---------------------|------------------------------------|
| 1) Concept Mapping | 5) Group/Individual Project |
| 2) Expedition/Field | 6) Hands-on Technology |
| 3) Trip/Site Visit | 7) Laboratory Activities (Wet/Dry) |
| 4) Games | 8) Self-Assessment or Quiz |

- concept mapping: students generate mind-map to link different aspects of each lecture to the module.

- field trip: learn to be observant, relate to concepts learnt during lectures and practical sessions.

- laboratory: learn to relate what had been taught in lecture and make inferences to the forms and explain the physiology of plants.

- group project: design a board game with a plant theme, gain collaborative skills, time-management, research and communication skills.

- hands-on technology: learn how to make floral arrangement, sectioning of plant organs.

- Quiz: learn concepts and answer application questions.

Intended Learning Outcomes

Knowledge development

After taking this module, students will

- have the foundation knowledge for the other modules

- be able to take care of or manipulate their plants better if they have home gardens or would like to join an agricultural firm in future.
- have the ability to interpret plant forms or unusual traits of plants.
- have the foundation to identify plants.
- be able to describe the origins of different plant products, which part of the plant, functions and medicinal properties.
- describe how plant forms affect photosynthesis and how plant physiologies help plants with pollination, plant-animal interactions.

This module will provide the opportunities to develop the following cognitive skills, generic skills and attributes:

Very Good Opportunities	Good/Average Opportunities
1) Written Communication 2) Creative Thinking 3) Problem-solving & Decision-making 4) Collaboration & Teamwork 5) Planning, Organizing & Management skills 6) Adaptability & Learnability 7) Resilience	1) Verbal/Oral Communication 2) Analytical & Critical Thinking 3) Interdisciplinary Thinking 4) Ethics Awareness 5) Self-Efficacy

Required and/or recommended readings

Required readings:

1. Structure and function of plants

Author: Jennifer W. MacAdam 2009 Wiley-Blackwell

2. Botany: An Introduction to Plant Biology

Author: James D. Mauseth 2017 Jones & Bartlett Learning

Recommended readings:

1. Plants in Our World: Economic Botany

Author: Simpson, Beryl Brintnall., Conner-Ogorzaly, Molly. 2013 McGraw-Hill Education

2. Plant physiology and development

Author: Taiz, Lincoln, editor., Zeiger, Eduardo, editor., Møller, I. M. (Ian Max), 1950- editor., Murphy, Angus S., editor. 2015 Sinauer Associates, Inc., Publishers