

Course Specification

Name of Institution	Mahidol University
Campus/faculty/department	Salaya campus Mahidol University International College Science Division

Section 1: General Information

1. Course Code and course Description

(Thai)	ICBI 231	ชีววิทยาของพืช
(English)	ICBI 231	Plant Biology

This course surveys the biology of the plant kingdom. Topics include the evolution of the major groups and a comparative analysis of the anatomy (form), physiology (function), and life history of plants. Examples from the local flora are emphasized. Lectures and laboratory.

2. **Number of Credits** 4 (3-2-7) (Lecture/Lab/Self-study)

3. Curriculum and type of subject

3.1 Curriculum Bachelor of Science (Biological Science)

3.2 Type of subject Required course

4. Responsible faculty member

Dr. Hayat Ullah

5. Trimester / year of study

5.1 Trimester 2nd / year of study 2nd, 3rd or 4th year

5.2 Number of students: Up to 40

6. **Pre-requisite(s)** ICBI 121 Biology I

7. **Co-requisite(s)** none

8. **Venue of study** Mahidol University, Salaya campus

9. **Date of latest revision** November 2021

Section 2: Goals and Objectives

1. Goal

At the end of this course students should be able; to explain the diversity of plants and their growth and adaptation enabling a plant to handle a variety of habitats; to explain the basic anatomy and morphology of plant organs; to understand plants life cycle from seed germination, growth, assimilation of mineral nutrition, transport mechanisms to blooming; to explain the physiological processes in plants.

2. Objective of development revision

To up-date the knowledge content of the course

Section 3: Course Management

1. Credit hours / trimester

Lecture (hours)	Additional Class (hours)	Laboratory/field trip/internship (hours)	Self-study (hours)
36 (3 hours x 12 weeks)	-	24 hours (2 hours x 12 weeks)	84 hours (7 hours x 12 weeks)

2. Numbers of hours that the lecturer provides individual counseling and guidance

1 hour/week

Section 4: Development of Students' Learning Outcome

1. Expected outcomes on students' skill and knowledge

- i) To introduce students to the world of plants and to the fundamental concepts and processes that underlies their forms and functions
- ii) To provide students with an opportunity to understand the complexity and the relationships among living systems
- iii) To improve the understanding of students about the important role of plants in the environment and the use of plants by humans
- iv) To enhance understanding of the complex role of plants in the environment and our society in order to make informed decisions as global citizens

2. Teaching Methods

- Lecture
- Self-study
- Practical laboratory exercises.

3. Evaluation methods

1. Morality and Ethics

1.1 *Expected outcome on morality and ethics:*

- (1 To possess morality and ethics
)
- (2 To have self-discipline, honesty, kindness, self-responsible and social
) responsibility
- (3 To demonstrate academic ethical behavior
)
- (4 To respect others' rights and be a good listener
)
- (5 To respect rules and regulations
)
- (6 To have good attitude toward professors/career
)
- (7 To demonstrate Leadership, team player
)

1.2 *Teaching method:*

Learning Centered Education: Emphasis on knowledge development, important skills in career development and living, encourage students to use their full potentials

- Lecture
- Case studies with past experiences and current events
- Emphasis on morality and ethics
- Group discussion
- Group assignment

1.3 *Evaluation methods:*

- Written examination
- Presentation
- Class attendance, class participation and behavior in class
- On-time submission of reports and assignments and their quality

2. Knowledge development

2.1 *Expected outcome on knowledge development:*

- (1) To possess basic knowledge, theories and concepts towards the understanding of self, society, surrounding in order to be well-rounded person
- (2) To process the knowledge related to principles, theories and practice in the course
- (3) To integrate the knowledge to other related subjects
- (4) To remain current in research and new knowledge

2.2 Teaching method:

Learning Centered Education: Emphasis on knowledge development, important skills in career development and living, encourage students to use their full potentials

- Lecture
- Case studies with past experiences and current events
- Emphasis on morality and ethics
- Group discussion
- Group assignment

2.3 Evaluation methods:

- Written examination
- Presentation
- Class attendance, class participation and behavior in class
- On-time submission of reports and assignments and their quality

3. Intellectual development

3.1 Expected outcome on intellectual development:

- (1) To have systematic and analytical thinking
- (2) To be able to search, consolidate and evaluate ideas and evidence for problem solving
- (3) To be able to apply knowledge and experience to analyze and creatively solve problems both in general and academic

3.2 Teaching method:

- Lecture
- Case studies with past experiences and current events
- Group discussion
- Group assignment

3.3 Evaluation methods:

- Written examination
- Presentation
- Class attendance, class participation and behavior in class
- On-time submission of reports and assignments and their quality

4. Interpersonal relationship and responsibility

4.1 Expected outcome on interpersonal relationship and responsibility:

- (1) To possess good interpersonal relationship skills (self esteem and dignity) and have respect for the rights and value of others
- (2) To possess leadership and initiative in problem solving
- (3) To be constructive team member (in various roles) and be responsible for assignment tasks, professional and society

4.2 Teaching method:

- Group discussion in case studies
- Group discussion
- Group assignment

4.3 Evaluation methods:

- Presentation
- Class attendance, class participation and behavior in class
- On-time submission of reports and assignments and their quality

5. Mathematical analytical thinking, communication skills and information technology skills

5.1 Expected outcome on mathematical analytical thinking, communication skills and information technology skills:

- (1) To be able to select and apply appropriate statistical and mathematical methods to research problems
- (2) To be able to apply information technology for data gathering, processing, interpreting and presenting information/results
- (3) To have the ability to communicate effectively and select appropriate methods of presentation

5.2 Teaching method:

- Lecture
- Case studies with past experiences and current events
- Group discussion
- Group assignment

5.3 Evaluation methods:

- Written examination
- Presentation
- Class attendance, class participation and behavior in class
- On-time submission of reports and assignments and their quality

Section 5: Teaching and Evaluation Plans

Instructor: Dr. Hayat Ullah

1. Teaching plan

week	Topics	Hours	Teaching methods/multimedia
1	Biodiversity: Different approaches to classify living organisms	3	Interactive online/hybrid lecture & group discussion
	Lab: Introduction	2	Practical experiment
2	Kingdom Protista: An insight into Algae being the closest relatives of plants	3	Interactive online/hybrid lecture & group discussion
	Lab: Characteristics of algae	2	Practical experiment
3	Kingdom Fungi: characteristics, classification and economic importance	3	Interactive online/hybrid lecture & group discussion
	Lab: Characteristics of fungi	2	Practical experiment
4	Kingdom Plantae: classification, structure, growth and development	3	Interactive online/hybrid lecture & group discussion
	Lab: Characteristics of plant	2	Practical experiment
5	An Insight into the Flowering Plants (Angiosperms)	3	Interactive online/hybrid lecture & group discussion
	Lab: Demonstration about differences in Monocot and Dicot	2	Practical experiment
6	Midterm Exam	3	
6	Root, stem, and leaves: primary structure, development, and role in plant life	3	Interactive online/hybrid lecture & group discussion
	Lab: Plant roots, stem and leaves	2	Practical experiment

7	Flower and Fruit: structure, types and importance	3	Interactive online/hybrid lecture & group discussion
	Lab: Demonstration about flower and fruits	2	Practical experiment
8	Plant Water Relation: the movement of water and solutes in plants, photosynthesis	3	Interactive online/hybrid lecture & group discussion
	Lab: Practical demonstration of Osmosis	2	Practical experiment
9	Cellular respiration in plants	3	Interactive online/hybrid lecture & group discussion
	Lab: Explanation and demonstration of apoplast and symplast pathways	2	Practical experiment
10	Plant response to internal and external stimuli	3	Interactive online/hybrid lecture & group discussion
	Lab: Demonstration of plant movements	2	Practical experiment
11	Plant growth regulators	3	Interactive online/hybrid lecture & group discussion
	Lab: Demonstration of auxin role in apical dominance	2	Practical experiment
12	Plant response to biotic stresses	3	Interactive online/hybrid lecture & group discussion
	Lab: Visual observation of plant insects interaction	2	Practical experiment
12	Final Examination	3	
	Total	66	

2. Evaluation plan

Expected outcomes	Methods / activities	Week	Percentage
1. (1) to (4)	Attendance	1-12	10
2. (1) to (5)	Group report	1-12	10
3. (2) to (3)	Examination	12	80

			(Midterm: lecture 35 Final: lecture 45)
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Section 6: Teaching Materials and Resources

1.Required Textbook and Online Tutorial:

- i). Urry, Lisa A. et al. Campbell Biology. Pearson Publisher, 12th Edition, 2020
- ii). Berg, L.R. Introduction botany. Plants, people, and the environment. USA. Saunders Colleges Publishing. 1997.

1. Documents and important information

Laboratory manual

Hand-outs

2. Documents and recommended information

Example research papers

Section 7: Evaluation and Improvement of Course Management

1. Strategies for effective course evaluation by students

1.1 Evaluation of peers by students

1.2 Student evaluation

1.2.1 Course content

1.2.2 Course management

1.2.3 Suggestions

1.2.4 Overall opinion

2. Evaluation strategies in teaching methods

2.1 Student evaluation

2.2 Presentation

3. Improvement of teaching methods

Workshop on course improvement with the participation of all instructors in the course

4. Evaluation of students' learning outcome

Analysis of students' learning outcomes using scores from class attendance, group activity and presentation of project and poster presentation

5. Review and improvement for better outcome

Review the course before trimester starts and before each teaching period