

## RQ02005: BOTANY

### 1. General information

- Term: 2
- Credits: **Total credits 02 (Lecture: 1.5 – Practice: 0.5)**
- Self-study: 6 credits
- Credit hours for teaching and learning activities: 9 hrs
- Self-study: 90 hrs.
- Department conducting the course:
  - Department: Botany
  - Faculty: Agronomy
- Kind of the course:

Foundation <input type="checkbox"/>		Fundamental <input type="checkbox"/>		Option 1 <input type="checkbox"/>		Option 2 <input type="checkbox"/>	
Compulsory	Elective	Compulsory	Elective	Compulsory	Elective	Compulsory	Elective
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 2. Course objectives and expected learning outcomes

#### \* *Course objectives:*

- Knowledge: Course provides for students with a basic knowledge of plant morphology, anatomy and plant taxonomy
- Skills: Course provides students with skills in comparative morphology method in plant classification and can identify specific characteristics of each taxon in the Takhtajan system
- Attitude: Course provides students with attitudes in taking initiative in updating and accumulating knowledge and experiences to improve professional qualifications

#### \* *Course expected learning outcomes*

Notation	Course expected learning outcomes After successfully completing this course, students are able to	PLO performance criteria
<b>Knowledge</b>		
CELO1	Apply botanical knowledge in production of vegetables, flowers and fruits.	1.1
CELO 2	Apply botanical knowledge to select plants to find ideas for landscape design	3.1
CELO 3	Apply knowledge of botany to the selection of suitable plants according to the customer's requirements in landscape design.	3.2
<b>Skills</b>		
CELO 4	Infer based on botanical knowledge to describe morphology of a plant and look up the classification position of major agricultural crops	6.4
<b>Attitude</b>		
CELO 5	Be willing to participate theoretical and practical sessions as prescribed, actively participate in the learning lessons	10.2

### 3. Course description

*This course consists of 2 parts:* Plant anatomy and morphology (Plant cells and tissues; Vegetative organ of angiosperm; Reproduction in angiosperm) and Plant classification (Methods of classifying plants; Plant taxonomy and nomenclature, Brief in plant classification, Classification of Dicots plants; Classification of Monocots plants).

*This course also consists of 5 practices:* Plant cells and tissues; Anatomy of root, stem and leaf; Morphology of Leaves, Flower and Fruit; Classification of Dicots plants; Classification of Monocots plants

### 4. Teaching and learning & assessment methods

CELOs	CELO1	CELO2	CELO3	CELO4	CELO5
<b>Teaching and learning</b>					
Lecturing	x	x	x		
Teaching through practical work	x	x	x	x	x
Group-based learning	x	x	x	x	x
<b>Assessment</b>					
Rubric 1. Assignments (5%)					x
Rubric 2. Practical (30%)	x	x	x	x	x
Rubric 3. Mid-term exam (5%)	x	x	x		
Rubric 4. Final exam (60%)	x	x	x		

### 5. Student tasks

- Attendance: All students taking this course must attend following University rules
- Preparation for the lecture: All students must read the relevant book chapter and handout before the class
- All students taking this course must attend 9 hrs of practices, one mid-term test and one final exam

### 6. Text books and references

\* *Text Books/Lecture Notes:*

- Phung Thi Thu Ha, Nguyen Huu Cuong, Tran Binh Đa, Nguyen Thi Hoa, Pham Phu Long, Pham Thi Huyen Trang (2021). Botany, The Agricultural Academy Publishing House.

- Nguyen Ba (2010). Plant morphology, Vietnam Education publishing House.

### 7. Course outline

Week	Content	Course expected learning outcome
1	<b>PART 1: PLANT ANATOMY AND MORPHOLOGY (9 hours)</b> <i>Chapter 1: Plant tissues</i>	

	<p><b>A/ Main contents: (1 hours)</b></p> <p><b>Theory:</b></p> <p>1.1. Meristematic tissue</p> <p>1.2. Dermal tissue: Primary and secondary dermal tissue</p> <p>1.3. Vascular tissue: Xylem, Phloem, vascular bundle</p> <p>1.4. Ground tissues: Parenchyma, Collenchyma, Sclerenchyma</p> <p>1.5. Secretory structure</p>	CELO 1, 2, 3, 4
	<p><b>B/ Self- study contents: (3 hours)</b></p> <p>Students study at home followed above mentioned content</p>	CELO 5
	<p><b>Chapter 2: Vegetative organs</b></p>	
1, 2	<p><b>A/ Main contents: (4 hours)</b></p> <p><b>Theory:</b></p> <p>2.1. Root</p> <p>2.1.1 Definition and function of root</p> <p>2.1.2. Morphology and Modification of root</p> <ul style="list-style-type: none"> <li>➤ Parts of root</li> <li>➤ Types of roots and root systems</li> <li>➤ Root modifications</li> </ul> <p>2.1.3. Anatomy of root</p> <ul style="list-style-type: none"> <li>➤ Primary structure</li> <li>➤ Secondary structure</li> <li>➤ Anatomy of tube root</li> </ul> <p>2.2. Stem</p> <p>2.2.1 Definition and function of stem</p> <p>2.2.2. Morphology and Modification of stem</p> <ul style="list-style-type: none"> <li>➤ Parts of stem</li> <li>➤ Types of bud</li> <li>➤ Types of stem and branching</li> <li>➤ Stem modifications</li> </ul> <p>2.2.3. Anatomy of stem</p> <ul style="list-style-type: none"> <li>➤ Anatomy of dicots stem <ul style="list-style-type: none"> <li>• Primary structure</li> <li>• Secondary structure</li> </ul> </li> <li>➤ Anatomy of monocots stem <ul style="list-style-type: none"> <li>• Primary structure</li> <li>• Secondary growth</li> </ul> </li> </ul> <p>2.3. Leaf</p> <p>2.3.1 Definition and function of leaf</p> <p>2.3.2. Morphology and Modification of leaf</p> <ul style="list-style-type: none"> <li>➤ Parts of leaf</li> <li>➤ Types of leaf</li> <li>➤ Leaf modifications</li> <li>➤ Leaf arrangements</li> </ul> <p>2.3.3. Anatomy of leaf</p> <ul style="list-style-type: none"> <li>➤ Anatomy of dicots leaf</li> </ul>	CELO 1, 2, 3, 4

	<ul style="list-style-type: none"> <li>➤ Anatomy of monocots leaf</li> </ul> <p><b>Practice/ experiment contents: (8 hours)</b>          -Anatomy of root, stem and leaf (6 hours)          - Morphology of leaf (2 hours)</p>	
	<p><b>B/ Self- study contents: (24 hours)</b>          Students study at home followed above mentioned content</p>	CELO 5
2, 3	<p><b>Chapter 3: Reproduction in angiosperms</b></p>	
	<p><b>A/ Main contents: (4 hours)</b>  <b>Theory:</b>          3.1. Reproductive organs          3.1.1. Flower  <ul style="list-style-type: none"> <li>➤ Definition and function of flower</li> <li>➤ Flower parts</li> <li>➤ Floral fomular and diagram</li> <li>➤ Types of inflorescence</li> </ul>         3.1.2. Fertilization in angiosperms  <ul style="list-style-type: none"> <li>➤ Blooming</li> <li>➤ Pollination</li> <li>➤ Double fertilization</li> </ul>         3.2. Fruit  <ul style="list-style-type: none"> <li>➤ Definition and fruit formation</li> <li>➤ Classification</li> </ul>         3.3. Seed  <ul style="list-style-type: none"> <li>➤ Definition and seed formation</li> <li>➤ Types of seed</li> </ul> <b>Practice/Experiment: (4 hours)</b>          Morphology of Flower and Fruit</p>	CELO 1, 2, 3, 4
	<p><b>B/ Self- study contents: (18 hours)</b>          Students study at home followed above mentioned content</p>	CELO 5
	<p><b>PART 2 : PLANT CLASSIFICATION (12 hours)</b></p> <p><b>Chapter 1: Methods of classifying plants, taxonomy and nomenclature</b></p>	
3,4	<p><b>A/ Main contents: (2 hours)</b>  <b>Theory:</b>          1.1. Methods of classifying plants          1.2. Taxonomy          1.3. Plant nomenclature</p>	CELO 1, 2, 3
	<p><b>B/ Self- stusy contents: (6 hours)</b>          Students study at home followed above mentioned content</p>	CELO 5
4, 5	<p><b>Chapter 2: Angiosperms</b></p>	

	<p><b>A/ Main contents: (2 hours)</b></p> <p><b>Theory:</b></p> <p>2.1. Common characteristics of angiosperms</p> <p>2.2. Evolutionary trend in angiosperms</p> <p>2.3. The basic characteristics of Dicots and Monocots plants</p>	CELO 1, 2, 3
	<p><b>B/ Self- study contents: (6 hours)</b></p> <p>Students study at home followed above mentioned content</p>	CELO 5
	<p><b>Chapter 3: Classification of Dicots plants</b></p>	
2	<p><b>A/ Main contents: (6 hours)</b></p> <p><b>Theory:</b></p> <p>3.1. Common characteristics of Magnoliidae</p> <p>3.2. Ranunculidae</p> <p>3.2.1. Common characteristics</p> <p>3.2.2. Characteristics of Papaveraceae</p> <p>3.3. Hamamelididae</p> <p>3.3.1. Common characteristics</p> <p>3.3.2. Characteristics of Moraceae</p> <p>3.3.3. Characteristics of Urticaceae</p> <p>3.4. Caryophyllidae</p> <p>3.4.1. Common characteristics</p> <p>3.4.2. Characteristics of Polygonaceae</p> <p>3.5. Dilleniidae</p> <p>3.5.1. Common characteristics</p> <p>3.5.2. Characteristics of Theaceae</p> <p>3.5.3. Characteristics of Caricaceae</p> <p>3.5.4. Characteristics of Cucurbitaceae</p> <p>3.5.5. Characteristics of Brassicaceae</p> <p>3.5.6. Characteristics of Tiliaceae</p> <p>3.5.7. Characteristics of Malvaceae</p> <p>3.5.8. Characteristics of Phorbiaceae</p> <p>3.6. Rosidae</p> <p>3.6.1. Common characteristics</p> <p>3.6.2. Characteristics of Rosaceae</p> <p>3.6.3. Characteristics of Mimosaceae</p> <p>3.6.4. Characteristics of Caesalpiniaceae</p> <p>3.6.5. Characteristics of Fabaceae</p> <p>3.6.6. Characteristics of Rutaceae</p> <p>3.6.7. Characteristics of Apiaceae</p> <p>3.7. Asteridae</p> <p>3.7.1. Common characteristics</p>	CELO 1, 2, 3, 4

	3.7.2. Characteristics of Rubiaceae 3.7.3. Characteristics of Convolvulaceae 3.7.4. Characteristics of Solanaceae 3.7.5. Characteristics of Lamiaceae 3.7.6. Characteristics of Asteraceae <b>Practice/Experiment: (3 hours)</b> Classification of Dicots plants	
3	<b>B/ Self- study contents: (22.5 hours)</b> Students study at home followed above mentioned content	CELO 5
4	<b>Chapter 4: Classification of Monocots plants (Liliopsida)</b>	
5	<b>A/ Main contents: (2 hours)</b> <b>Theory:</b> 4.1. Common characteristics of Alismatidae 4.2. Lilidae 4.2.1. Common characteristics 4.2.2. Characteristics of Liliaceae 4.2.3. Characteristics of Musaceae 4.2.4. Characteristics of Zingiberaceae 4.3. Commelinidae 4.3.1. Common characteristics 4.3.2. Characteristics of Cyperaceae 4.3.2. Characteristics of Poaceae 4.4. Arecidae 4.4.1. Common characteristics 4.4.2. Characteristics of Aracaceae 4.4.3. Characteristics of Araceae <b>Practice/Experiment: (3 hours)</b> Classification of Monocots plants	CELO 1, 2, 3, 4
6	<b>B/ Self- study contents: (10.5 hours)</b> Students study at home followed above mentioned content	CELO 5