



Subject Module  
 Department of Agrotechnology  
 Faculty of Agriculture  
 University of Islam Malang

## Module Handbook

<b>Module Title</b>	Agricultural Biology
<b>Module Level, if available</b>	Undergraduate Study Program of Agrotechnology
<b>Subject Code</b>	MKD 60601
<b>Headings, if available</b>	-
<b>Subject (MK)</b>	-
<b>Semester</b>	1
<b>Course Coordinator</b>	Dr. Ir. Istirochah Pujiwati, MP.
<b>Teaching Team</b>	-
<b>Language of instruction</b>	Indonesian language/English
<b>Linkages with the Curriculum</b>	Study Program : Agrotechnology Specialization: Agrotechnology Type: Compulsory/elective
<b>Learning Methods and Duration</b>	<ol style="list-style-type: none"> <li>1. Lecture: 100 minutes/meeting (14 meetings)</li> <li>2. Research Based Learning through Practicum greenhouse experiment : 170 minutes/meeting (8 meetings)</li> <li>3. Structured Assignments/individual and group Assignments Presentation</li> </ol>
<b>Student Study Load</b>	<ol style="list-style-type: none"> <li>1. Lecture: 100 minutes/meeting (14 meetings)</li> <li>2. Practicum: 170 minutes/meeting (8 meetings)</li> <li>3. Structured Assignments/quiz/group presentation</li> <li>4. Attendance: 75% of total attendance</li> </ol>
<b>Credit Weight</b>	2 credits or 5.1 ECTS
<b>Requirements for Passing the Course</b>	<ul style="list-style-type: none"> <li>• Attendance &gt;75%</li> <li>• The final score of all the components of the learning evaluation &gt;44</li> </ul> <p>The final score component:</p> <ul style="list-style-type: none"> <li>• 20% Midterm Exam</li> <li>• 20% Final Exam</li> <li>• 30% Practicum</li> <li>• 20% Structured Assignments (individual and group)</li> <li>• 10% Presence</li> </ul>
<b>Prerequisite Courses</b>	-
<b>Learning Outcomes</b>	<p>The expected learning outcomes are:</p> <ol style="list-style-type: none"> <li>1. Have a good and deep knowledge in the field of basic agricultural sciences that support agrotechnology (ILO 3)</li> <li>2. Able to work independently or in a team, and use various methods of communication (ILO 4)</li> <li>3. Able to solve problems that arise in the field of agrotechnology and related fields of science (ILO 5)</li> </ol>

## Learning Content

After completing this course students are able to:

1. understand the general structure of the higher plant body and its organizational levels starting from cells, tissues, organs, organisms, populations, communities, ecosystems, and the biosphere.
2. explain the morphological structure of roots, stems, leaves, flowers, fruits, and seeds and understand the function of each of these organs
3. identify plants according to plant taxonomy and can make its classification in 6 main taxon: division-class-order-family-genus-species
4. analyze plant growth problems related to the anatomical structure, morphology, and taxonomy of plants
5. provide solutions to plant growth problems related to the anatomical structure, morphology, and taxonomy of plants

The topics include:

### 1. Introduction

- Scope and concept of agricultural biology
- Principles for level of organization of living things

### 2. Structure and Function of Plant Cells

- Cell Wall
- Protoplasm (Cytoplasm with Organelles, Nucleus, and Plastids)
- Vacuoles and Ergastic Substances

### 3. Structure and Organizing Tissues of Roots, Leaves, and Stems

- Leaf tissue structure, Isilateral, and Dorsiventral Leaves
- Tissue Structure of Monocotyledonae and Dicotyledonae Stem
- Differences in the Anatomical Structure of Root and Stem Tissue

### 4. Morphological structure of plants

- Leaf Morphology (Function, Characteristics, Shape, Base, and Tip of Leaf, Surface, Leaf Flesh)
- Stem Morphology (Function and Characteristics, Shape, Surface, Branching System of Stems and Modification of Stems)
- Root Morphology (Parts of Root, Function and Characteristics of Root, Root System and Root Modification)

### 5. Flowers, Pollination and Fertilization

- Flowers Structure
- Pollination and Germination of Pollen
- Formation of the Nucleus in the Embryo Sac
- Double Fertilization and Changes in the Ovaries

### 6. Structure and Classification of Fruit and Seeds

- Fruit Classification
- the structure and parts of the seed

### 7. Plant Taxonomy

- Definition and Principles of Plant Taxonomy
- Taxonomic Benefits in Plant Cultivation Techniques

### 8. Schizophyta

- The characteristics of Schizophyta
- Classification of Schizophyta and Their Role for Plants, Animals and Humans

### 9. Thallophyta

- The characteristics of *Thallophyta*

- Classification of *Thallophyta* and Their Role for Plants, Animals and Humans

#### **10. Bryophyta**

- The Characteristics of the Moss Plant
- Schematic of Moss Plant Metagenesis
- Classification of Moss Plants and Species Examples and Their Role for Human Life

#### **11. Pteridophyta**

- Characteristics of *Pteridophyta*
- Schematic of Homosporous, Heterospor & Transitional Metagenesis of *Pteridophyta*
- Classification of *Pteridophyta* and Their Role in Human Life

#### **12. Spermatophyta**

- Characteristics of Seed Plants
- Schematic of Seed Plant Metagenesis
- Classification of Seed Plants: Gymnosperms and Angiosperms (*Monocotyledoneae* and *Dicotyledoneae*)

<b>Test Terms and Forms</b>	<p>Examination requirements: A minimum of 75 % attendance to attend the final exam</p> <p>Forms of examination: Essay</p>
<b>Learning Media</b>	<p>Projector and screen, Zoom application, daring.unisma.ac.id, e-book, WA Group</p>
<b>References</b>	<p><b>Main References :</b></p> <ol style="list-style-type: none"> <li>1. Hasanuddin, Muhibbudin, Wardiah dan Mulyadi. 2017. Anatomi Tumbuhan. Syiah Kuala University Press. BandaAceh. 211 hal.</li> <li>2. Mulyani, S.E.S. 2006. Anatomi Tumbuhan. Cetakan ke-5. Penerbit Kanisius. Yogyakarta. 371 hal.</li> <li>3. Pujiwati, I. 2017. Biologi Tumbuhan. Intimedia. Malang. 85 hal.</li> <li>4. Silalahi, M. 2015. Morfologi Tumbuhan. Prodi Pendidikan Biologi, FKIP, Universitas Kristen Indonesia. Jakarta. 99 hal.</li> <li>5. Tjitrosoepomo, G. 1994. Taksonomi Tumbuhan Schizophyta, Thallophyta, Bryophyta dan Pteridophyta. Gadjhamada University Press. Yogyakarta.</li> <li>6. Tjitrosoepomo, G. 1994. Taksonomi Tumbuhan Spermatophyta. Gadjhamada University Press. Yogyakarta.</li> </ol> <p><b>Supporting References :</b></p> <ol style="list-style-type: none"> <li>1. Link <a href="https://google scholar.com">https://google scholar.com</a> untuk artikel-artikel jurnaldan buku elektronik</li> <li>2. Struktur sel : <a href="https://www.youtube.com/watch?v=V7NH57ZX4pU">https://www.youtube.com/watch?v=V7NH57ZX4pU</a></li> <li>3. Anatomi jaringan batang : <a href="https://www.youtube.com/watch?v=j6RfG7bksMw">https://www.youtube.com/watch?v=j6RfG7bksMw</a></li> <li>4. Anatomi jaringan daun : <a href="https://www.youtube.com/watch?v=20f1F1RNleE">https://www.youtube.com/watch?v=20f1F1RNleE</a></li> <li>5. Anatomi jaringan akar : <a href="https://www.youtube.com/watch?v=w5rRlky3I4Q">https://www.youtube.com/watch?v=w5rRlky3I4Q</a></li> <li>6. Schizophyta : <a href="https://www.youtube.com/watch?v=LSDfR5lm-Zo">https://www.youtube.com/watch?v=LSDfR5lm-Zo</a></li> <li>7. Thallophyta : <a href="https://www.youtube.com/watch?v=IEbrICFp914">https://www.youtube.com/watch?v=IEbrICFp914</a></li> </ol>