

## SUBJECT OUTLINE DETAILS

### 1. Subject: Fundamental Genetics Lab.

- **Code:** ZO342C
- **Credits:** 01
- **Hours:** 30 practice hours, 30 self-study hours.

### 2. Management Unit:

- **Department:** Molecular Biotechnology
- **Faculty/School/Institute/Center/Department:**  
Biotechnology Research and Development Institute, Can Tho university

**3. Prerequisites:** General Biology Lab. I (BS210C); General Biology Lab. II (BS211C).

### 4. Subject objectives:

The purpose of this subject is to provide students (i) some experience in fundamental genetics (ii) to observe and compare cell division in Mitosis and Meiosis; (iii) to understand the mechanism of recombinant DNA procedure and gamatogenesis in plant and animal, (iv) to analyse data by using the Chi-Square test.

#### 4.1. Knowledge:

Students will develop knowledge and understanding of:

- 4.1.1. The principles of reproduction in living organisms;
- 4.1.2. Mechanism of recombination DNA in living organisms;
- 4.1.3. Using Chi-square test for analyzing data.

#### 4.2. Skill:

- 4.2.1. increases awareness of different levels of thinking: comprehension, application, and evaluation.
- 4.2.2. apply investigative and problem-solving skills.

#### 4.3. Attitude:

- 4.3.1. Students are encouraged to develop positive values and informed critical attitudes.
- 4.3.2. Students must have a positively sense in the self-learning

### 5. Brief description of subject content:

- ✍ Prepare the Temporate samples of Mitosis and Meiosis in Plant or animal
- ✍ Analyse genetic data by using the Chi-square test.

### 6. Subject content structure:

## 6.1. Theory

Contents	Hours	Objectives
<p><b>Lecture 1. Mitosis</b></p> <ol style="list-style-type: none"> <li>1. Prerequisites for students               <ol style="list-style-type: none"> <li>1.1. Mitosis in plant</li> <li>1.2. The Cell's Cycle</li> <li>1.3. The stages of Mitosis</li> </ol> </li> <li>2. Materials and Sample preparation               <ol style="list-style-type: none"> <li>2.1. Sample preparation</li> <li>2.2. Chemical agents</li> <li>2.3. Making temporary samples</li> </ol> </li> <li>3. Observing stages of Mitosis by using Inflowescence microscope</li> <li>4. Writing report and replying some questions</li> </ol>	<b>8</b>	<p><b>4.1.1</b></p> <p><b>4.1.2</b></p> <p><b>4.2.1</b></p> <p><b>4.2.2</b></p> <p><b>4.3.1</b></p> <p><b>4.3.2</b></p>
<p><b>Lecture 2. Meiosis</b></p> <ol style="list-style-type: none"> <li>2.1. Prerequisites for students</li> <li>2.2. Meiosis in pollen grain of maize               <ol style="list-style-type: none"> <li>2.2.1. Sexual Reproduction</li> <li>2.2.2. Significant of Meiosis Genetic</li> <li>2.2.3. Meiosis</li> <li>2.2.4. Locations of Meiosis in the Life Cycle</li> </ol> </li> <li>2.3. Materials and Method               <ol style="list-style-type: none"> <li>2.3.1. Sample Preparation</li> <li>2.3.2. Chemical and Equipments.</li> <li>2.3.3. Preparing temporary samples</li> </ol> </li> <li>2.4. Observing stages of Meiosis by using Inflowescence Microscope</li> <li>2.5. Writing report and replying some questions</li> </ol>	<b>8</b>	<p><b>4.1.1</b></p> <p><b>4.1.2</b></p> <p><b>4.2.1</b></p> <p><b>4.2.2</b></p> <p><b>4.3.1</b></p> <p><b>4.3.2</b></p>
<p><b>Lecture 3. Gametogenesis</b></p> <ol style="list-style-type: none"> <li>3.1. Prerequisite for students</li> <li>3.2. Materials : using paper pieces with different color and size</li> <li>3.3. Methods               <ol style="list-style-type: none"> <li>3.3.1. Meiosis and Gamatogenesis Designs</li> <li>3.3.2. The Nature of Chromosomes in Meiosis</li> </ol> </li> <li>3.4. Writing report and replying some questions</li> </ol>	<b>6</b>	<p><b>4.1.1</b></p> <p><b>4.1.2</b></p>
<p><b>Lecture 4. Statistical Analysis of gentic data: the Chi-Square</b></p> <ol style="list-style-type: none"> <li>4.1. Prerequisite for students</li> <li>4.2. Materials: pocket computer; old cooper coins; Chi-square table</li> <li>4.3. Method               <ol style="list-style-type: none"> <li>4.3.1. Chi-squares for Goodness-of-fit test                   <ul style="list-style-type: none"> <li>* Test for monohybrid segregation</li> <li>* Test for dihybrid cross independent assortment</li> <li>* Test for complete linkage</li> </ul> </li> <li>4.3.2. Incomplete Linkage-Recombination frequency</li> <li>4.3.3. Homogeneity Chi-square Test</li> </ol> </li> <li>4.4. Writing report and explaining data analysis results</li> </ol>	<b>8</b>	<p><b>4.1.3</b></p> <p><b>4.2.1</b></p> <p><b>4.2.2</b></p> <p><b>4.3.1</b></p> <p><b>4.3.2</b></p>

## 7. Teaching method:

- Introducing and explaining.
- Providing supplements, media resources.

## 8. Duties of student:

Students have to do the following duties:

- Lecture/Class attendance: not allow to be absent more than 20% of lectures.
- Laboratory Attendance: mandatory.

## 9. Assessment of student learning outcomes:

### 9.1. Assessment

No.	Point components	Rules and Requirement	Weights	Objectives
1	Reports	Each group include 2-3 students write a report at the end of class	40%	Evaluating skill of carrying out samples and experiments
2	Final exam	Observing samples to determine stages of Mitosis and Meiosis and replying some questions.	60%	Evaluating whole course

### 9.2. Grading

- Grading components and final test scores will be marked on a scale of 10 (0 to 10), rounded to one decimal place.
- Subject score is the sum of all the components of the evaluation multiplied by the corresponding weight. The subject score is marked on a scale of 10 and rounded to one decimal place, then is converted to A-B-C-D score and score on a scale of 4 under the academic provisions of the University.

## 10. Materials:

### Materials information

### Code number

[1]. Fundamentals Genetics Syllabus

File-BiRDI website

[2]. Pierce, B.A., 2002. Genetics A Conceptual Approach.

BiRDI Library

[3]. Hyde, D.R., 2009. Introduction to Genetic Principles. McGraw-Hill Higher Education.

BiRDI Library

## 11. Self-study Guide:

Week	Content	Theory (hours)	Practice (hours)	Students' duties
1	<b>Chapter 1. Mitosis</b> 1. Mitosis in plant 2. The Cell's Cycle 3. The stages of Mitosis	8	...	Reading Chapter 1, Chapter 2 and Chapter 3 [Material 2]; Part I-Chapter 3 [Material 3]
2	<b>Chapter 2. Meiosis</b> 1. Meiosis process 2. Cell cycle 2. The stages of Meiosis	8	...	Reading Chapter 1, Chapter 2, and Chapter 3 [Material 2]; Part I-Chapter 3 [Material 3]

3	<b>Chapter 3. Gametogenesis</b> 1. Meiosis and Gamatogenesis 2. The Nature of Chromosomes in Meiosis	6		Reading Chapter 5, Chapter 6, and Chapter 12 [Material 2]; Part I-Chapter 3; Part II-Chapter 7 [Material 3];
4	<b>Chapter 4. Statistical Analysis of genics data: the Chi-Square</b> 1. Chi-squares test 2. Chi-squares for Goodness-of-fit test * Test for monohybrid segregation * Test for dihybrid cross independent assorment * Test for complete linkage 3. Incomplete Linkage-Recombination frequenc	.8		Reading Chapter 2, Chapter 3, Chapter 22, and Chapter 23 [Material 2]; Part VI-Chapter 24 [Material 3];

**ON BEHALF OF RECTOR  
DEAN/ DIRECTOR**

**HEAD OF DEPARTMENT**