

## SUBJECT OUTLINE DETAILS

### 1. Subject: Aquaculture Biotechnology

- Code: CS443C
- Credits: 02
- Hours: 30 theory hours, 18 report hours, 60 self study hours.

### 2. Management Unit:

- Department: Molecular Biotechnology
- Institute: Biotechnology Research and Development Institute

**3. Prerequisites:** BS110C Cells and Molecules I, BS111C Organisms and Population I, CS302 Basic Biotechnology, BB801C Molecular biology, BB802C Molecular biology Lab., CS072 C Animal Physiology, CS073C Animal Physiology Lab.

**4. Subject objectives:** understanding chromosome, gene transfer and genetic variation and principles of biotechnology in order to apply molecular biotechnology in genetic broodstock management.

#### 4.1. Knowledge:

- 4.1.1. Understand basic knowledge of molecular genetics
- 4.1.2. Principles of breeding fish
- 4.1.3. Method broodstock management
- 4.1.4. Breeding and breeding aquatic
- 4.1.5. The knowledge of chromosome
- 4.1.6. Methods of gene transfer in fish
- 4.1.7. Assessment of genetic variation in populations and genetic differences between populations based on the following specifications: Protein Analysis and Applications in Fisheries; DNA Analysis

#### 4.2. Skills:

- 4.2.1. Training voluntarily and self-study ability.
- 4.2.2. Improving the skills of teamwork, searching document.
- 4.2.3. Training presentation skills.

#### 4.3. Attitude:

- 4.3.1. Participate fully in the class, on time provisions.
- 4.3.2. Having self-discipline in learning.
- 4.3.3. Active in discussions, comments.
- 4.3.4. Honesty in examination.

## 5. Brief description of subject content:

An overview of aquaculture, the historical development. Introduction to molecular genetics, chromosomes, spawning and broodstock management. Discussion on the application of biotechnology in genetic variation, gene transfer and broodstock management in aquaculture.

## 6. Subject content structure:

	<b>Content</b>	<b>Hours</b>	<b>Objectives</b>
<b>Chapter 1.</b>	<b>Introduction to molecular genetics</b>	<b>9</b>	
1.1.	The concepts of DNA, genes, chromosomes, RNA	1	4.1.1
1.2.	Cleavage cells	1	4.1.2; 4.1.3
1.3.	Genetics a trait	1	4.1.2; 4.1.3
1.4.	Genetic traits	1	4.1.2; 4.1.3
1.5.	Evolution	1	4.1.1
1.6	Mutations	1	4.1.1
1.7.	Natural Selection	1	4.1.1
1.8.	Genetic population structure	1	4.1.1
1.9	These terms are often used	1	4.1.1
<b>Chapter 2</b>	<b>Spawning and broodstock management</b>	<b>6</b>	...
2.1.	Principles of fish reproduction and broodstock management	2	4.1.2
2.2.	Artificial Hormone	2	4.1.1; 4.1.2
2.3.	Aquatic Breeding	2	4.1.1; 4.1.2
<b>Chapter 3</b>	<b>Chromosomes</b>	<b>5</b>	
3.1.	Principles of chromosomal drop	2	4.1.1; 4.1.5
3.2.	Diploid	1	4.1.1; 4.1.5
3.3.	Triploid	1	4.1.5
3.4.	Transsexual in fish	1	4.1.5
<b>Chapter 4</b>	<b>Transgenic fish</b>	<b>5</b>	
4.1	General Principles	2	4.1.6
4.2.	Transgenic fish anticoagulant	3	4.1.6
<b>Chapter 5</b>	<b>Genetic variation</b>	<b>5</b>	4.1.7

## 7. Teaching method:

- Communicate through lecture files, supplemented with many images, video, .. help students more receptive.
- Ask questions related to student discussion
- Consolidate knowledge for students after the end of the lecture, explained soon questions in class.
- Distribution of study groups, assignments, thematic reports, promote teamwork, improve information search skills, more information beyond lectures.

## 8. Duties of student:

Students have to do the following duties:

- Attend at least 80% of theoretical classes on time provisions.
- Perform a full range of group exercise, the thematic reports are delivered.
- Attend mid semester test.
- Attend end of semester exam
- Proactively implementing self-study.
- Seriously and honestly in the learning process, testing and implementation.

## 9. Assessment of student learning outcomes:

### 9.1. Assessment

No.	Point components	Rules and Requirement	Weights	Objectives
1	Overall attendance	Details of attendance number / total number of classes	10%	4.3
2	Group assignments	- Report / overs / ... - Grouped confirmed participation	10%	4.2.1 4.1.3; 4.3.2, 4.3.4
3	Mid-term test scores	- Quizzes (30 minutes)	20%	4.3.1 4.3.4
4	End module scores	- Quizzes (60 minutes) - Participate fully 80% more theoretical - Required contest	60%	4.1 4.3

### 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:

Material information	Code number
[1] Aquaculture and fisheries biotechnology : Genetic approaches / Rex A. Dunham. - New York : CABI Publishing, 2004	MON.020947
[2] Aquaculture biotechnology / edited by Garth L. Fletcher, Matthew L. Rise.. - Ames, Iowa : Wiley-Blackwell, 2012	MON. 045993

### 11. Self-study Guide:

Week	Content	Theory (hours)	Practice (hours)	Students' duties
<b>1</b>	<b>Chapter 1: Introduction to molecular genetics</b> 1.1. The concepts of DNA, genes, chromosomes, RNA 1.2. Cleavage cells	18	0	- Prepare: + Document [1]: item content from 1.1 to 1.2, Chapter 1
	1.3. Genetics a trait  1.4. Genetic traits			Prepare : + Document [1]: the content 1.3, Chapter 1. + Review the content learned.
	1.5. Evolution  1.6. Mutations			Prepare : + Document [1]: the content from section 1.5 to 1.6, Chapter 1. + Review the content learned.
	1.7. Natural Selection  1.8. Genetic population structure			- Prepare: + Document [1]: the content from section 1.7 to 1.8, Chapter 1 + Review the content learned. + Look virus structural content. Working-group (according to the menu sub-headings): report of the group -Teamwork: discussion questions.
<b>2</b>	1.9. These terms are often used <b>Chapter 2: Spawning and broodstock management</b> 2.1. Principles of fish reproduction and broodstock management 2.2. Artificial Hormone	12	0	-Prepare: + Document [1]: item content from 2.1 to 2.3, Chapter 2 + Review the content learned.

	2.3. Aquatic Breeding			
	<b>Chapter 3: Chromosomes</b> 3.1. Principles of chromosomal drop 3.2. Diploid	10	0	- Preparation: + Document [1]: 3.1 to 3.2 content, Chapter 3 + Review the content learned. The documents [2]: find out information in diploid.
	3.3. Triploid 3.4. Transsexual in fish			- Prepare + Document [1]: content from 3.1 to 3.4, Chapter 3 + Review the content learned.
	<b>Chapter 4: Transgenic fish</b> 4.1. General Principles  4.2. Transgenic fish anticoagulant	10	0	- Prepare + Document [1]: content 4.1 and 4.2, Chapter 4 + Review the content learned.
	<b>Chapter 5: genetic variation</b>	10	0	- Preparation: + Document [1]: Chapter 5 + Review the content learned.

**ON BEHALF OF RECTOR  
DEAN/ DIRECTOR**

Can Tho, ...../...../2014  
**HEAD OF DEPARTMENT**