MINISTRY OF EDUCATION AND TRAINING
CAN THO UNIVERSITY

SOCIALIST REPUBLIC OF VIETNAM
Independence - Freedom - Happiness

SUBJECT OUTLINE DETAILS

1. Subject: Biotechnology & Seed selection in Aquatic Breeding

- **Code:** CS444C
- **Credits:** 02
- **Hours:** 30 theory hours

2. Management Unit:

- **Department:** …
- **Faculty/School/Institute/Center/Department:** Biotechnology Research anh Development Institute

3. Prerequisites: General Biology

4. Subject objectives: : Subjects for discussion on the application of biotechnology in aquaculture such genetic broodstock management, chromosome, gene transfer and genetic variation

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. Skill:

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:

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6. Subject content structure:

6.1. Theory

	Content	Hours	Objectives
Chapter 1.	**Chapter 1:** **Introduction to molecular genetics**	**9**	
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
Chapter 2	**Spawning and broodstock management**	6	...
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
Chapter 3	**Chromosomes**	**5**	
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
Chapter 4	**Transgenic fish**	**5**	
4.1	General Principles	2	4.1.6
4.2.	Transgenic fish anticoagulant	2	4.1.6
Chapter 5	**Genetic variation**	**5**	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 participatior	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:

Materials information	Code number

[1] 1. B.K. Padhi and R.K. Mandal, 2000. Applied fish genetics. …

A publication of fishing Chimes. 190p.

[2] Benjamin Lewin, 2004. Gene VIII. International Edition. … 1027p.

[3] Gustavo Caetano-Anollés and Peter M. Gresshoff. DNA … markers: Protocols, Applications, and Overviews. Wiley-VCH. 364p.

11. Self-study Guide:

Week	Content	Theory (hours)	Practice (hours)	Students' duties
1	**Chapter 1: Introduction to molecular genetics** 1.1. The concepts of DNA, genes, chromosomes, RNA 1.2. Cleavage cells	9	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.
2	1.9. These terms are often used **Chapter 2: Spawning and broodstock management** 2.1. Principles of fish	6	0	-Prepare: + Document [1]: item content from 2.1 to 2.3, Chapter 2 + Review the content learned.

	reproduction and broodstock management 2.2. Artificial Hormone 2.3. Aquatic Breeding			
	Chapter 3: Chromosomes 3.1. Principles of chromosomal drop 3.2. Diploid	5	0	- Preparation: + Document [1]: 3.1 to 3.2 content, Chapter 3 + Review the content learned. The documents [2]: find out information in dipoloid.
	3.3. Triploid 3.4. Transsexual in fish			- Prepare + Document [1]: content from 3.1 to 3.4, Chapter 3 + Review the content learned.
	Chapter 4: Transgenic fish 4.1. General Principles 4.2. Transgenic fish anticoagulant	5	...	- Prepare + Document [1]: content 4.1 and 4.2, Chapter 4 + Review the content learned.
	Chapter 5: genetic variation	5		- Preparation: + Document [1]: Chapter 5 + Review the content learned.

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ON BEHALF OF RECTOR
DEAN/ DIRECTOR

HEAD OF DEPARTMENT