

## SUBJECT OUTLINE DETAILS

### 1. Subject: Biochemistry Laboratory II

- Code: BT209/BC472C
- Credits: 01
- Hours: 30 practice hours

### 2. Management Unit:

- Department: Molecular Biotechnology
- Faculty/School/Institute/Center/Department: Biotechnology Research and Development Institute

3. Prerequisites: BT109 (General Chemistry Lab. 1), BT111 (General & Inorganic Chemistry Lab. 2), BT114 (Organic Chemistry Lab.), BT207 (Biochemistry Lab. 1).

### 4. Subject objectives:

#### 4.1. Knowledge:

- 4.1.1. Principles in a process of ion exchange chromatography (IEC) will be applied to purify several kinds of enzymes.
- 4.1.2. Specific activity of enzymes and molecular weight (MW) will be studied.

#### 4.2. Skill:

- 4.2.1. Training liquid chromatography technique.
- 4.2.2. Developing co-operation of students in each group.
- 4.2.3. Background for the unit of graduate thesis (BT418).

#### 4.3. Attitude:

- 4.3.1. Self-awareness, laborious, favorite with biochemistry.

### 5. Brief description of subject content:

Enzymes will be purified by IEC first; and then discovered their specific activity and molecular weight.

### 6. Subject content structure:

#### 6.1. Practice

	Content	Hours	Objectives
Unit 1.	<b>Ion exchange chromatography</b> 1.1. Extraction of enzymes 1.2. Ion exchange chromatography	10	4.1.1, 4.2.1, 4.3.1
Unit 2.	<b>Analysis of protein amount</b> 2.1. Building a standard curve of protein 2.2. Testing amount of protein in solution	5	4.2.1, 4.2.2, 4.3.1
Unit 3.	<b>Determining specific activity of enzyme</b>	5	4.2.1, 4.2.2,

3.1. Building a standard curve of amino acid or glucose		4.3.1
3.2. Testing activity and specific activity of an enzyme		
<b>Unit 4. Determining molecular weight of protein</b>	10	4.2.1, 4.2.2, 4.3.1
4.1. Preparation of sample and electrophoresis gel		
4.2. Analyzing molecular weight of protein by SDS-PAGE		

### 7. Teaching method:

- Presentating about conducting and steps of an experiment.
- Giving question – Answer (oral) to make clear a process of the experiment.

### 8. Duties of student:

Students have to do the following duties:

- Following full (100%) time for a practical course at a lab. and reporting results of the experiment.
- Attending a final examination.

### 9. Assessment of student learning outcomes:

#### 9.1. Assessment

No.	Point components	Rules and Requirement	Weights	Objectives
1.	Laborious mark	Lab. hours/total hours of a course	10%	4.3
2.	Mark of a writing report	Writing a report about result of each unit (group: 3-4 students)	40%	4.1.2., 4.2.1., 4.2.2., 4.2.3., 4.3
3.	Mark of a final examination	- Multiple choice - Obligatory	50%	4.2.2., 4.2.3

#### 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] Dương Thị Hương Giang và Võ Văn Song Toàn. <i>Thực hành protein/enzyme học</i> . Tài liệu lưu hành nội bộ.	Enzyme Technology lab.
[2] Janson, Jan-Christer ; Rydén Lars. 1998. Protein Purification, 2 <sup>nd</sup> edition. <i>John Wiley &amp; Sons Inc</i> . New York.	Enzyme Technology lab.
[3] Scopes, Robert. K. 1994. Protein Purification: Principle and practice, 3 <sup>rd</sup> . Springer-Verlag, New York.	Enzyme Technology lab.

[4] Hame, B. D. 1998. Gel Electrophoresis of protein: A Practical Approach, 3<sup>rd</sup>. Oxford University Press, New York.

Enzyme  
Technology lab.

### 11. Self-study Guide:

	Content	Theory (hours)	Practice (hours)	Students' duties
1	<b>Unit 1: Ion exchange chromatography</b> 1.1. Extraction of enzymes 1.2. Liquiq chromatography	0	10	- Group working (following a list of students) with the unit 1 ( <i>from p1 to p4</i> ) guided in the reference [1]. - Writing the report 1 - Self-studying methods and steps of an experiment in the unit 2.
2	<b>Unit 2: Determining amount of protein</b> 2.1. Building a standard curve of protein 2.2. Testing amount of protein in solution	0	5	- Group working (following a list of students) with the unit 2 ( <i>from p5 to p7</i> ) guided in the reference [1,2,3]. - Writing the report 2 - Self-studying methods and steps of an experiment in the unit 3.
3	<b>Unit 3: Determining specific activity of enzymes</b> 3.1. Building a standard curve of amino acid 3.2. Testing activity and specific activity of an enzyme	0	5	- Group working (following a list of students) with the unit 3 ( <i>from p8 to p11</i> ) guided in the reference [1,2,3]. - Writing the report 3 - Self-studying methods and steps of an experiment in the unit 4.
4	<b>Unit 4: Determining molecular weight of protein</b> 4.1. Preparation of sample and electrophoresis gel 4.2. Analyzing molecular weight of protein by SDS-PAGE	0	10	- Group working (following a list of students) with the unit 4 ( <i>from p12 to p15</i> ) guided in the reference [1, 4]. - Writing the report 4 - Taking the final examination after the last unit about 7-15 days.

Can Tho, 28 / 5 /2014

**ON BEHALF OF RECTOR  
DEAN/ DIRECTOR**

**HEAD OF DEPARTMENT**