

## CP02005: GENERAL BIOCHEMISTRY

### 1. General information

- Term: 1
- Credits: **Total credits 2 (Lecture: 1,5 – Practice: 0,5) - Self-study: 6 credits**
- Credit hours for teaching and learning activities: 30 teaching hours
  - Lectures: 22 teaching hours (1 sections/week, 3 teaching hours/section, 50 minutes/teaching hour. Total in 7 weeks)
  - Lab- work : 8 teaching hours (1 section/week, 3 lab-work hours/section, 50 minutes/ labwork hour)
- Self-study: 90 teaching hours (50 minutes each)
- Department conducting the course:
  - Department: Biochemistry and food Biotechnology
  - Faculty: Food Science and Technology
- Kind of the course:

Foundation <input type="checkbox"/>		Fundamental <input checked="" type="checkbox"/>		Option 1 <input type="checkbox"/>		Option 2 <input type="checkbox"/>	
Compulsory <input type="checkbox"/>	Elective <input type="checkbox"/>	Compulsory <input checked="" type="checkbox"/>	Elective <input type="checkbox"/>	Compulsory <input type="checkbox"/>	Elective <input type="checkbox"/>	Compulsory <input type="checkbox"/>	Elective <input type="checkbox"/>

- Prerequisite course(s): non

### 2. Course objectives and expected learning outcomes

**\* Course objectives:**

- Knowledge: the course provides students with knowledge of basic biochemistry components and chemical processes within and relating to living organisms.
- Skills: the course trains students in skills on the main analysis techniques for determination of biochemistry components such as protein, sugar, vitamin C, organic acid.
- Attitude: the course gives students a hard - working, positive learning attitude, care about environmental protection

**\* Course expected learning outcomes**

Program learning outcomes After successfully completing this program, students are able to	Program Learning outcome's performance criteria
<b>PLO1.</b> Apply structures and functions properties of substances that make up cells and the body (proteins, enzymes, vitamins, nucleic acids, carbohydrates, lipids) in design the bacis researchs for fruit and vegetable plant	1.1. Apply natural science knowledge in Horticulture and Landscape Design (P)

<b>Program learning outcomes</b> After successfully completing this program, students are able to	<b>Program Learning outcome's performance criteria</b>
<b>PLO2.</b> Apply the biosynthesis and degradation of protein, carbohydrate, nucleic acid, lipid compounds with the correlation between the role of macronutrients and micronutrients in metabolism to design field experiments for fruit and vegetable plant	1.2. Apply environmental science knowledge in the Horticulture and Landscape Design (P)
<b>PLO6.</b> Doing the protocols for determination of protein, sugar, vitamin C and organic acid independently and in groups	6.1. Survey for identifying problems those need to be researched. (I)
<b>PLO9.</b> Show respect for regulations on safety in agricultural production; Honest and responsible in handling and reporting experimental results	9.2. Take responsibility for environmental protection.(I)

### 3. Course description

CP02005. **General biochemistry.** (2TC: 1.5 - 0.5 - 6)

This module includes contents of the general introduction of the subject; protein, enzyme, vitamin, nucleic acid, carbohydrate, lipid. Practice exercise 1: determination of protein; practice exercise 2: determination of sugar and practice exercise 3: determination of vitamin C and total organic acid.

### 4. Teaching and learning & assessment methods

<b>CELOs</b>	<b>CELO1</b>	<b>CELO2</b>	<b>CELO3</b>	<b>CELO4</b>
<b>Teaching and learning</b>				
Lecturing	x	x		
Practice			x	x
<b>Assessment</b>				
Rubric 1. Process (20%)	x	x		
Rubric 2. Practice (20%)			x	x
Rubric 3. Final exam (60%)	x	x		x

### 5. Student tasks

- Attendance and attitude: students have to attend 17.5 teaching hours minimum of lectures
- Practice/Lab- works: students have to complete all of practice lesson .
- Prepare materials before going class (self-study): students must read or prepare materials related to the lesson in class following guidance of teacher.
- Assignment: All students attending this module must complete an individual assignment (process, practice report, practice test)
- Final exam: All students taking this course must take the final exam.

### 6. Text books and references

**\* Text Books/Lecture Notes:**

- Pham Thi Tran Chau, Tran Thi Ang (2016). Biochemistry. Education publishing house, edit 12<sup>th</sup>
- Ngo Xuan Manh, Lai Thi Ngoc Hà, Vu Thi Hang (2020). Food chemistry. Agriculture publishing house.
- Ngo Xuan Manh, Lai Thi Ngoc Ha, Dang Thai Hai, Nguyen Van Kiem (2010). Basic Biochemistry. Agriculture publishing house.

**\*Other reference:**

- [Garrett, Reginald H.](#); [Grisham, Charles M.](#), (2017). Biochemistry.
- Ngo Xuan Manh, Nguyen Hoang Anh, Nguyen Thi Lam Doan, Nguyen Van Lam (2013). Food biotechnology. Agriculture publishing house.
- Cambell, M.K và Farrell, S.O (2009). Biochemistry. 6<sup>th</sup> edn Thomson Brooks.
- Nguyen Xuan Canh (2018). protein – enzyme technology. Agriculture publishing house.

**7. Course outline**

Week	Content	Course expected learning outcomes
	<b><i>Introduction</i></b>	
	<b>A/ Main contents:</b> (1 hour) <b>1. Theories:</b> (1 hour) The role of biochemistry components in human life <b>2. Practice:</b> (0 hour)	CELO 1,2
1	<b><i>Chapter 1: Protein</i></b>	
	<b>A/ Main contents:</b> ( 4.5 hours) <b>1. Theories:</b> (2 hours) - Structure, functions, classification of protein - Biosynthesis of protein <b>2. Practice:</b> (2.5 hours) Practical exercise 1: detemination of protein	CELO 1,2,3,4.
	<b>B/ Self-study contents:</b> (10.5 hours) - Protein: amino acid structure - Chemical composition of fruits and vegetables - Methods for determination of protein (HPLC, Spectrophotometer ....) - Role of nitrogen for plant development	CELO 1,2
2	<b><i>Chapter 2: Enzyme</i></b>	
	<b>A/ Main contents:</b> ( 2.5 hours) <b>1. Theories:</b> (8 hours) 2.1. General principles of fruit and vegetable canning 2.2. Classification of canned fruits &vegetables 2.3. Genneral processing processes in canned fruit &vegetables <b>2. Practice:</b> (2.5 hours)	CELO 1,2,3,4.

	<b>Practical exercise 2: Producing canned fruit in sirup/ Producing canned fruit vegetable juice</b>	
	<p><b>B/ Self-study contents: (31.5 hours)</b></p> <ul style="list-style-type: none"> <li>- Production techniques of some types of canned fruit and vegetables</li> <li>- Production process of single/mixed canned fruit in syrup</li> <li>- Production process of canned fruit and vegetable juice</li> </ul> <p>Exercise</p> <ul style="list-style-type: none"> <li>- Calculate the amount of sugar/water/syrup to increase or decrease the concentration of sugar solution;</li> <li>- Calculate the amount of sugar, acid, water, raw material (pineapple) needed to process 1/ 10/100 units of canned pineapple in syrup</li> </ul>	CELO 1,2
	<b>Chapter 3: Fermentation Technique For Fruit and Vegetable</b>	
3	<p><b>A/ Main contents: ( 10 hours)</b></p> <p><b>1. Theories: (7.5 hours)</b></p> <p>3.1 Concepts, classifications</p> <p>3.2. The role of fermented products in human life</p> <p>3.3. Lactic acid fermentation technology (pickle)</p> <p>3.4. Alcohol/ Wine fermentation technology</p> <p><b>2. Practice: (2.5 hours)</b></p> <ul style="list-style-type: none"> <li>- Practical exercise 3: Latic acid fermentation and asesment this process.</li> </ul>	CELO1, 2,3,4,5.
	<p><b>B/ Self-study contents: (30 hours)</b></p> <ul style="list-style-type: none"> <li>- General Technological process of pickling and pickling process of specific type of vegetables (cabbage/ cucumbers/eggplants/ vegies mixture including carrots, cabbage, radishes....)</li> <li>- General Technological process of wine fermentation and acohol fermentation for each specific type/group of fruit (grape,domestic apple, lychee, fruit mixture juice...)</li> <li>- Sensory evaluation/ assessment of product quality (pickled vegetables) by scoring method (color, smell, taste, texture)</li> </ul>	CELO 1,2,
	<b>Chapter 4: Drying technique For Fruit and Vegetable</b>	
4	<p><b>A/ Main contents: ( 4 hours)</b></p> <p><b>1. Theories: (4 hours)</b></p> <p>4.1.The concept, classification of methods, drying products</p> <p>4.2. The role of dried products in human life</p> <p>4.3 . Fruit and vegetable drying technology</p> <p><b>2. Practice: (0 hour)</b></p>	CELO 1,2,3,4
	<p><b>B/ Self-study contents: (12 hours)</b></p> <ul style="list-style-type: none"> <li>- Advantages and disadvantages, proper object (kind Fruits and vegies) of each drying method</li> <li>- The technological process of drying specific type of Fruits and vegetables (carrots, radishes, mangoes, plums, litchi longans....)</li> <li>- Equipment used to dry fruits and vegetables</li> </ul>	CELO 1,2

7	<i>Final exam</i>	CELO 1,2
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