BIOCHEMISTRY PRINCIPLES

ISCED UNIT CODE: 0512 551 18A

TVETCDACC UNIT CODE: HO/CU/HP/CC/02/6/MA

Unit duration: 80 Hours

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Apply biochemistry principles

Unit Description

This unit specifies the competencies required by a Dairy Plant Technician level 6 to apply biochemistry principles. It involves measuring Enzyme kinetics, analyzing carbohydrates, proteins, lipids, vitamins and minerals.

Summary of Learning Outcomes

SNO	Learning Outcome	Duration (Hours)
1.	Measure Enzyme kinetics	15
2.	Analyze carbohydrates	15
3.	Analyze proteins	15
4.	Analyze lipids	15
5.	Analyze Minerals and vitamins	20
	TOTAL	**80**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcomes	Content	Suggested Assessment Methods
1. Measure Enzyme kinetics	**Theory** 1.1 Enzymes 1.1.1 Definition of terms 1.1.1.1 Enzymes 1.1.1.2 Substrate	• Practicals • Written tests • Projects • Interviews/ Oral questions

	1.1.2 Preparation of enzyme and substrate 1.1.3 Sources of enzyme and substrate 1.1.3.1 Natural sources (plant, animal, microbial) 1.1.3.2 Recombinant enzyme production 1.1.3.3 Synthetic or analog substrates 1.2 Setting enzyme essay 1.3 Measurement of enzyme reaction rate **Practice** 1.4 Prepare enzyme and substate 1.5 Set enzyme essay 1.6 Measure enzyme reaction rate	• Individual/group assignments • Third party report
2. Analyze carbohydrates	**Theory** 2.1 Carbohydrates 2.1.1 Definition of carbohydrates 2.1.2 Identification of carbohydrates 2.1.3 Importance of carbohydrates 2.2 Classification of carbohydrates 2.2.1 Monosaccharide's 2.2.2 Disaccharides 2.2.3 Polysaccharides 2.2.4 Oligosaccharides 2.3 Application of carbohydrates **Practice** 2.4 Apply carbohydrates functions	• Practicals • Written tests • Projects • Interviews/ Oral questions • Individual/group assignments • Third party report
3. Analyze proteins	**Theory** 3.1 Proteins 3.1.1 Definition of proteins 3.1.2 Identification of Proteins 3.1.3 Importance of Proteins 3.2 Classification of Proteins 3.2.1 Simple	• Practicals • Written tests • Projects • Interviews/ Oral questions • Individual/group assignments

	3.2.2 Conjugated 3.2.3 Derived 3.3 Application of Proteins **Practice** Apply Proteins functions	• Third party report
4. Analyze lipids	**Theory** 4.1 Lipids 4.1.1 Definition of lipids 4.1.2 Identification of lipids 4.1.3 Importance of lipids 4.2 Classification of lipids 4.2.1 Phospholipids 4.2.2 Triglycerides 4.2.3 Sphingolipids 4.2.4 Steroids 4.3 Application of lipids **Practice** Apply lipids functions	• Practicals • Written tests • Projects • Interviews/ Oral questions • Individual/group assignments • Third party report
5. Analyze Minerals and vitamins	**Theory** 5.1 Minerals and vitamins 5.1.1 Definition of terms 5.1.1.1 Minerals 5.1.1.2 Vitamins 5.1.2 Identification of Minerals and vitamins 5.1.3 Importance of Minerals and vitamins 5.2 Classification of Minerals and vitamins 5.2.1 Macro elements 5.2.2 Micro elements 5.2.3 Water soluble vitamins 5.2.4 Fat soluble vitamins 5.3 Application of Minerals and vitamins **Practice**	• Practicals • Written tests • Projects • Interviews/ Oral questions • Individual/group assignments • Third party report

	Apply Minerals and vitamins functions	

Suggested Methods of Instruction

- Demonstration
- Role playing
- Group discussion
- Direct instruction

Recommended Resources for 30 Trainees

Tools and equipment's

- 30 Pipettes
- 30 Beakers and Flasks
- 30 Centrifuge
- 30 pH Meter
- 30 Spectrophotometer
- 30 Vortex Mixer**:**
- 30 Thermocycler/Incubator/Water Bath**:**
- 30 Ice Bath
- 30 Refrigerator/Freezer
- 30 Glassware **(test tubes, conical tubes, Erlenmeyer flasks)**

Materials

- Enzyme
- Substrate
- Buffers
- Distilled/Deionized Water
- Salts **(e.g., NaCl, KCl)**
- Cofactors and Coenzymes
- Detergents **(optional)**

- Substrate
- Plates