

PRINCIPLES OF FOOD SCIENCE AND NUTRITION

UNIT CODE: 0915 551 07A

TVET CDACC UNIT CODE: HOSCU/FBO/CC/01/5/MA

UNIT DURATION: 80 Hours

Relationship to Occupational Standards

This unit addresses the unit of learning: **apply principles of human nutrition**

UNIT DESCRIPTION

This unit of learning covers the learning outcomes, content, assessment methods, methods of delivery and resources required to apply principles of human nutrition. It involves applying knowledge of food composition, nutritional deficiency and disorders, organic chemistry in food production and food micro-biology.

Summary of learning outcomes

S/No	Learning Outcomes	Duration (Hours)
1.	Apply knowledge of food composition	20
2.	Apply knowledge of nutritional deficiency and disorders	20
3.	Apply knowledge of organic chemistry in food production	20
4.	Apply knowledge of food micro-biology	20
Total		80

Learning outcomes, Content and Suggested Assessment Methods

Learning outcome	Content	Suggested Assessment Methods
1. Apply knowledge of food composition	1.1 Definition of terms <ul style="list-style-type: none">• Food• Food composition• Nutrients• Nutritional requirements• Macronutrients• Micronutrients• Balanced diet 1.2 Components of balance diet	<ul style="list-style-type: none">• Written.• Third party report• Oral questioning• Interviews

Learning outcome	Content	Suggested Assessment Methods
	<ul style="list-style-type: none"> • Carbohydrates • Proteins • Fats • Vitamins • Minerals • Fibres • Water <p>1.3 Interpretation of food composition tables.</p> <p>1.3.1 Macronutrients</p> <p>Energy(kcl/kj) Total energy provided by food</p> <ul style="list-style-type: none"> • Carbohydrate • Proteins • Fats <p>1.3.2 Micronutrients</p> <ul style="list-style-type: none"> • Vitamins • Minerals <p>1.3.3 Other components</p> <ul style="list-style-type: none"> • Water content • fibre • Ash • Phytochemicals <p>1.3.4 Serving information (nutritional content per 100gms or standard serving size)</p> <p>1.3.5 Uses of food composition tables</p> <ul style="list-style-type: none"> • Nutritional assessment • Meal planning • Research <p>1.3.6 Examples of food composition tables</p> <ul style="list-style-type: none"> • FAO/INFOODS Global Food Composition table • USDA National Nutrient Database • Nutrients <p>1.3.1 Types</p> <ul style="list-style-type: none"> • Carbohydrates • Proteins • Fats 	

Learning outcome	Content	Suggested Assessment Methods
	<ul style="list-style-type: none"> • Vitamins • Minerals <p>1.3.2 Sources</p> <p>1.3.3 Functions.</p> <p>1.4 Nutritional daily requirement</p> <p>1.4.1 Recommended intake</p> <p>1.4.2 Daily amount</p> <p>1.4.3 Purpose</p> <ul style="list-style-type: none"> • Macro –nutrients <ul style="list-style-type: none"> • Carbohydrates • Proteins • Fats • Water • Dietary fibre • Micro nutrients <ul style="list-style-type: none"> • Vitamins • Minerals <p>1.5 Specific requirements for special groups</p> <p>1.5.1 Children and adolescents</p> <p>1.5.2 Pregnant and lactating mothers</p> <p>1.5.3 Older adults</p> <p>1.5.4 Athletes</p> <p>1.6 Balanced meal plan</p> <p>1.6.1 Daily nutritional goals</p> <p>1.6.2 Portion control</p> <p>1.6.3 Colour diversity</p> <p>1.6.4 Limited processed foods</p> <p>Special needs</p>	
2 Apply knowledge of nutritional deficiency and disorders	<p>2. 1Digestion of foods</p> <p>2.1.1 Definition of terms</p> <ul style="list-style-type: none"> • Digestion • Mastication • Deglutination • Indigestion • Egestion • Absorption • Peristalsis <p>2.1.2 Human digestive system</p> <p>2.1.3 Food absorption and metabolism</p>	<ul style="list-style-type: none"> • Written. • Third party report • Oral questioning • Interviews

Learning outcome	Content	Suggested Assessment Methods
	2.2 Nutritional deficiency diseases 2.2.1 common nutritional deficiency/ disorders Causes, signs, symptoms and prevention	
3. Apply knowledge of organic chemistry in food production	3.1 Functional groups 3.1.1 Definition 3.1.2 Common functional groups <ul style="list-style-type: none"> • Hydroxyl group (-OH) • Carboxyl group (-COOH) • Amine group (-NH₂) • Carbonyl group (C=O) • Phosphate group (-PO₄) • Ester group (-COO-) 3.1.3 Role of functional groups Chemical properties, <ul style="list-style-type: none"> • Taste texture, • Nutritional value of food 3.2. Hydrocarbons in foods 3.2.1 Types of hydrocarbons <ul style="list-style-type: none"> • Alkanes • Alkenes • Alkynes • Aromatic hydrocarbons • Terpenes • Food additives 3.2.2 Effects of hydrocarbons reactions in food preparation and production. <ul style="list-style-type: none"> • Hydrocarbon in fats and oils • Hydrocarbons in Maillard reaction • Hydrocarbons in caramelization • Hydrocarbons in smocking and grilling • Hydrocarbons in frying • Hydrocarbons in baking and roasting Hydrocarbons in food preservation.	<ul style="list-style-type: none"> • Written. • Third party report • Oral questioning • Interviews
4. Apply knowledge of food micro-biology	4.1. Food Microbiology 4.1.1 Definition of terms <ul style="list-style-type: none"> • Microbiology 	<ul style="list-style-type: none"> • Written. • Observation

Learning outcome	Content	Suggested Assessment Methods
	<ul style="list-style-type: none"> • Microorganisms • Food contamination • Food spoilage • Food poisoning/illness <p>4.1.1 Introduction to food microbiology</p> <p>4.2 Understanding microorganism in food.</p> <p>4.2.1 Beneficial microorganism</p> <ul style="list-style-type: none"> • Lactic acid bacteria • Yeasts • Moulds • Probiotics <p>4.2.2 Harmful microorganism</p> <ul style="list-style-type: none"> • Bacteria (salmonella, Escherichia coli, clostridium, etc) • Viruses (norovirus, hepatitis A, Rotavirus) • Parasites (tapeworms, Giardia intestinalis) • Fungi (Aspergillus flavus, Penicillium moulds) <p>4.3. Food contamination.</p> <p>4.3.1 Types of food contaminants</p> <ul style="list-style-type: none"> • Microbial contamination • Chemical contamination • Physical contamination <p>4.2.2 Common sources of food Contamination</p> <ul style="list-style-type: none"> • Food handlers • Raw ingredients • Equipment and surfaces • Storage issues <p>4.2.3 Key practices to prevent food contamination</p> <ul style="list-style-type: none"> • Personal hygiene • Food storage • Cooking and preparation • Sanitation <p>4.2.4 Factors influencing microbial growth in food.</p> <p>4.4 Food spoilage</p>	<ul style="list-style-type: none"> • Third party report • Oral questioning • Interviews • Role playing

Learning outcome	Content	Suggested Assessment Methods
	<p>4.4.1 Types of food spoilage</p> <ul style="list-style-type: none"> • Microbial spoilage • Enzymatic spoilage • Chemical spoilage • Physical spoilage • Natural spoilage <p>4.4.2 Causes of food spoilage</p> <ul style="list-style-type: none"> • Microbial growth • Enzymatic activity • Physical damage of food • Environmental factors • Chemical reactions • Improper food handling • Microbial toxins • Use of spoiled or expired ingredients <p>4.4.3 Characteristics of spoilt food.</p> <ul style="list-style-type: none"> • Off-odours • Discolouration • Change in texture • Formation of mold • Off-taste • Presence of excessive liquids • Sticky or slippery surface • Fermentation • Softening or melting • <p>4.4.4 Preventive measures</p> <ul style="list-style-type: none"> • Proper storage • Use of preservatives • Correct temperature • Hygiene and cleanliness <p>4.5 Food poisoning</p> <p>4.5.1 Types of food poisoning</p> <ul style="list-style-type: none"> • Bacterial food poisoning • Viral food poisoning • Parasitic food poisoning • Food bone toxins • Chemical food poisoning <p>4.5.2 Causes of food poisoning</p> <ul style="list-style-type: none"> • Bacteria contamination 	

Learning outcome	Content	Suggested Assessment Methods
	<ul style="list-style-type: none"> • Viral contamination • Parasitic contamination • Chemical contamination • Cross contamination • Improper food storage • Poor hygiene practices • Food allergens and intolerances <p>4.5.3 Preventive measures of food poisoning.</p> <ul style="list-style-type: none"> • Proper food handling • Cook food properly • Store food correctly • Avoid cross contamination • Maintain cleanliness <p>4.6 Legal requirements in prevention of food poisoning.</p> <ul style="list-style-type: none"> • Food safety and hygiene regulations • Food service standards • Licensing and inspection requirement • Hazard analysis and critical control points. <p>Environmental healthy and waste management</p>	

Suggested Methods of Instruction

- Projects
- Demonstration by trainer
- Practice by the trainee
- Discussions
- Direct instruction
- Role playing

RECOMMENDED RESOURCES FOR 30 TRAINEES

S/No.	Category/Item	Description/Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	Learning materials			

S/No.	Category/Item	Description/Specifications	Quantity	Recommended Ratio (Item: Trainee)
	Textbooks	Comprehensive texts books on Entrepreneurial Skills	30 pcs	1:1
	PowerPoint Presentations	For trainer's use, covering course content and practical applications	1	1:30
	Projector	Functional projector for displaying content during presentations	1	1:30
	Media Resources	These include but are not limited to: Video Clips Audio Clips TV Sets Radio Sets Newspapers Business Journals Case studies		
	Templates	Templates for creating various documents e.g. business plan, invoices etc.	30	1:1
	White board	Quality whiteboard of approximately 6 ft by 3 ft for writing during theory instruction	1	1:30
B	Learning facilities & Infrastructure			
	Lecture/Theory Room /Learning resource Area*	Spacious, equipped with projectors and Seats for 30 trainees, approximately 45 sqm (5 m x 9 m)	1	1:30
	Computer Laboratory	Equipped with at least 15 functional computers with internet connectivity and the following software: Windows/ Linux/ Macintosh Operating System Microsoft Office Software Google Workspace Account	1	1:1

S/No.	Category/Item	Description/Specifications	Quantity	Recommended Ratio (Item: Trainee)
		Antivirus Software		
C	Consumable Materials			
	Writing Materials	Writing materials for note taking	Enough	
	Flashcards	For carrying out various activities by trainees	Enough	
	Charts	Sufficient for group work activities and displaying	Enough	
	Whiteboard Marker Pens	Dry-erase markers for trainers use. Assorted colors	Enough	

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