4268 - BIOCHEMISTRY & NUTRITION

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
					Theory		Practical Ex.	Total
Lectures	Practical	Credits						
2	2	4	25	25	3 Hrs	100	50	200

Pre-requisite	Source
Nil	FOD

Semester	Theory	Test	Total	TW	PR	Gr Total
	75	25	100	50	50	200

Rationale- This course emphasises the importance of enzymes in food, their application in food processing industries and the changes brought about in various foods due to their action. These changes are very important as they affect directly the consumer acceptability of the raw materials or the products. Examples are changes due to enzymatic browning, post mortem changes occurring in meat and fish and the degree of ripening of fruits. The course also covers the basic nutritional aspects such as nutritional quality of different foods, importance of vitamins and minerals as nutrients, effects of their deficiency and the importance of balanced diets. The effect of processing methods on various constituents of foods is also covered with reference to the changes in their nutritive value.

COURSE CONTENTS	Hrs	Mks
1. ENZYMES Definition, nomenclature, classification, properties, mechanism of action, effect of temperature, pH, substrate and enzyme concentration, significance of coenzyme, cofactors, activators and inhibitors. Method of estimation: Biuret and Lowry method.	3	10
2. ROLE OF ENZYMES IN FOOD Enzymes in food: Milk, milk products, meat, fish, cereal products, fruits and vegetables	1	4
3. RIPENING IN FRUITS AND VEGETABLES Ripening: Definition, rate, measurement, effect on ripening, climatic pattern, factors affecting ripening. Production of ethylene, various pathways, its effect on ripening. How ripening takes place, changes in ripening, inhibitors and activators of ripening, artificial ripening.	3	8
4. ENZYMIC BROWNING Mechanisms of enzymic browning, control of browning by thermal in-activators, use of acids, ascorbic acid, sulphur dioxide, use of salts, prevention of contact with oxygen.	2	8
5. APPLICATION OF ENZYMES IN FOOD PROCESSING Carbohydrates – Amylases, invertases, pectinases and cellulases. Proteolytic enzymes, lipases, oxido-reductases – glucose oxidose, catalase, peroxidase. New developments in enzyme technology. Use of enzymes in food analysis. Commercialisation of industrially important enzymes. Concept of biotechnology.	3	8
6. ENZYMES AND DIGESTION Alimentary canal – Enzymes and breakdown of carbohydrates, protein and fats. Absorption processes.	1	5
7. VITAMINS Definitions, classification, water soluble, fat soluble, properties, functions and Recommended Dietary Allowances (R D A) distribution in foods. Effect of deficiency / excesses and their prevention. Estimation of vitamin A, C and B complex.	3	10
8. MINERALS Sources, functions, deficiencies, RDA of sodium, calcium, iron, phosphorous, potassium, iodine and fluorine. Methods of estimation of calcium, phosphate, iron, fluorine and iodine.	3	8
9. FOOD AND ENERGY Food: Functional, classification and essential constituents. Function of essential constituents. Factors affecting dietary protein, digestibility coefficient, biological value of protein, protein efficiency ratio, net protein utilisation, energy – units used in the body. Determination of fuel value of foods.	3	8
10. NUTRITIVE VALUE OF DIFFERENT FOODS Energy value changes during storage, anti nutritional factors. Sources of essential nutrients.	1	5
11. EFFECT OF PROCESSING Effect of heat processing – Blanching, pasteurisation, sterilisation and baking; Freeze preservation; Removal of moisture; Fermentation. Processing with additives, salting curing, smoking, high sugar, chemical additives; Ionising radiation; Packaging.	4	8

12. DIETS	2	10
RDA of different nutrient, balanced diets, under-nutrition. Protein- calorie malnutrition. Disorders of malnutrition. Prevention of under nutrition / malnutrition, modification of diets for specific conditions-obesity, hypertension and coronary heart diseases.		
. Infant nutrition and infant foods	1	3
. Nutrition of pregnant and lactating mothers	1	3
. Applied nutrition programmes	1	2
Total	32	100

PRACTICALS:

(Any 12 of mentioned practical to be conducted)

1) Estimation of protein by: Biuret's method, Lowry's method.
2) Determination of amylase activity of saliva
3) Estimation of glucose by Fdin – Wu method
4) Determination of the effect of incubation time, temperature and pH on amylase activity
5) Demonstration of respiration process in sprouted seeds.
6) Determination of the effects of substrate concentration and enzyme concentration on amylase ac
7) Estimation of Vitamin C in lime using 2, 6 – dichloroindo-phenol method
8) Estimation of Vitamin A in carrots by the calorimetric method
9) Estimation of phosphate from food samples by calorimetric or volumetric method
10) Estimation of fluorine in water
11) Estimation of iodine in salt by volumetric methods
12) Estimation of iron by the calorimetric method
13) Estimation of Serum Cholesterol and Blood Haemoglobin
14) Estimation of Calcium from food samples by volumetric method
15) Determination of Blood Pressure

REFERENCE BOOKS:

1. Bravermen's Introduction to the Biochemistry by Food Berk Z.
2. Biochemistry of Foods by Eskin etal
3. Nutrition of Foods by Swaminathan M
4. Nutritional Evaluation of Food Processing by Harris R & Kramer E
5. Official Method of Analysis of the association of Official Analytical Chemists
6. The Science Methods of Foods by Gamanet al
7. Standard Methods of Chemical Analysis by N. H. Furman
7. Analysis of Fruit and Vegetable Product by S. Rangana

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