ZOH502- NUTRITION AND METABOLISM

Teaching Hours 10 /Unit

COURSE OUTCOME

1. Basic training includes types of nutrients and their importance.
2. Evaluation of nutrient quality and quantity of nutrients, their balancing in animal nutrition.
3. Concept of human nutrition with balanced nutrition and their importance with reference to health and in chronic diseases.
4. Students are groomed to understand different energy currencies, regulation of metabolic pathways.
5. They learn energy metabolism and related disorders. Importance of minerals and vitamins in nutrition.
6. Course initiates interested students to become an entrepreneur as a nutritionist and dietician.

UNIT I

Concepts of nutrition: Nutrients and nourishment, Basic concepts, Nutrients and their functions, The feed nutrients their classification. Nutrients analysis and energy concepts: Methods of analysis of nutrients and feed stuff and its merits and demerits, Van Soest analysis, Specialized analytical methods, total digestible nutrients, apparent and true digestibility, energy utilization. Feed and nutrient requirements in animals: Methods for determining utilization and requirements in animals, merits and demerits.

UNIT II

Applied animal nutrition: Principles of animal nutrition, Animal husbandry and nutrition requirements, Feeding standards and productivity, Factors affecting feed consumption

Feed preparation and processing: Hot and cold processing methods, feed processing for ruminants and non-ruminants, feed mixing, Chemical treatment, Cubed forges.

Diet formulation- Pearson square method and algebraic method.

Nutrition of dairy: Nutrient requirements in dairy cow and cyclic changes.

Nutrition of laboratory animals: Requirements of mice rat and rabbits.

Nutrition of wild animals: Concept of wildlife nutrition, dietary husbandry of herbivores, Underutilized sources of feed, feeding animal wastes.

UNIT III

Human nutrition: Nutritional basis of health, BMR, balanced nutrition, Nutrients and their importance, Dietary fibre, Antioxidants and phyto-chemicals.

Eating disorders: Anorexia nervosa, Binge eating disorder, Protein energy malnutrition, under- nutrition and over-nutrition

Nutrition and chronic diseases: Hypertension, Diabetes mellitus, Osteoporosis

Food safety: Food processing, Harmful substances in food, Food borne illness and genetically modified foods.

UNIT IV

Energy metabolism:Metabolic pathways and their regulation, Types of metabolic pathways, Regulation of pathways, Signal transduction and role of second messengers in regulation. High energy phosphate compounds. Overview of metabolism and the provision of metabolic fuels. Glycolysis and oxidation o pyruvate: Pathway, regulation and energetics of pathway. Citric acid cycle: Importance, pathway regulation and energetics, Glyoxylate cycle, amphibolic role. Respiratory Chain and oxidative phosphorylation: Respiratory chain, Chemiosmotic theory, ATP synthesis, inhibitors and uncouplers of respiratory chain, clinical aspects.

UNIT V

Carbohydrate, mineral and vitamin metabolism: Glycogen metabolism, Importance of glycogen, formation and breakdown of glycogen, Role of Glucagon and insulin in glycogen metabolism, Glycogen storage diseases. Gluconeogenesis: Glucose homeostasis, Precursors, pathway, regulation and energetics, Pentose phosphate pathway: importance, pathway, regulation and energetics, Role of NADPH

Water and minerals: Water the essential ingredient for life, Major minerals (Sodium, potassium, chloride, calcium, phosphorus and magnesium). Trace minerals (Zinc, iron, Selenium, Iodine, Copper, Manganese, Fluoride, Chromium, Molybdenum).

Vitamins: Water and fat soluble vitamins, functions, dietary recommendations, sources, and deficiency symptoms. Role of vitamins and minerals in intermediary metabolism.

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2. Gillespie, J. R. (1987) Animal nutrition and feeding Delmar Publishers Inc., New York.
3. Insel, P., Turner R. E. and Ross D. (2002) Nutrition, Jones and Bartlett Publishers Massachusetts
4. Mathews, C. K., van Holde K.E. and Ahern K. G. (2005) Biochemistry, 3rd edition, Pearson Education Pvt. Ltd., New Delhi.
5. McArdel, W. D., Katch F. I. and Katch V. L. (2005) Sports and Exercise Nutrition Second edn., Lippincot Williams & Wilkins, Philadelphia.
6. Murray, R. K., Granner D. K. Mayes P. A. and Rodwell V. W. (2003) Harper's Illustrated Biochemistry, 26thedition, Mcgraw Hill Companies, Boston.
7. Perry, T. W., Cullison A. E. and Lowrey R. S. (2004) Feeds and feeding 6th edition., Prentice Hall, New Jersey
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