

# MACRONUTRIENTS

4 Cr (Th)

Objectives:

This course will enable the students to:

1. Gain in-depth knowledge of the physiological and metabolic role of macronutrients, fat soluble vitamins and electrolytes and their importance in human nutrition.
2. Enable the understanding of basis of human nutritional requirements and recommendations through the life cycle and translate the knowledge into practical guidelines for dietary needs.
3. Familiarize with the recent advances in nutrition and apply this knowledge in planning for public health programmes.

Contents:

Module No	Topics and Details	No of Credits
1	<b>Human Nutritional Requirements – Development and Recent Concepts.</b> a.Methods of determining human nutrient needs b.Description of basic terms and concepts in relation to human nutritional requirements. c.Guidelines and Recommendations - Development of International and National Nutritional Requirements - Translation of nutritional requirements into Dietary Guidelines  <b>Body Composition</b> a. Significance of body composition and changes through the life cycle b. Methods for assessing body composition (both classical and recent) and their applications.  <b>Nutrition in Special Conditions: Space Travel, High Altitudes, Low Temperature, Submarines.</b>  <b>Energy</b> a.Components of energy requirements: BMR, RMR, thermic effect of feeding, physical activity. Factors affecting energy requirements, methods of measuring energy expenditure.	1

	<p>b. Estimating energy requirements of individuals and groups.</p> <p>c. Regulation of energy metabolism and body weight: Control of food intake – role of leptin and other hormones.</p>	
2	<p><b>Carbohydrates</b></p> <p>a. Review of nutritional significance of carbohydrates and changing trends in dietary intake of different types of carbohydrates and their implications</p> <p>b. Dietary fibre: Types, sources, role and mechanism of action</p> <p>c. Resistant starch, fructo-oligosaccharides, other oligosaccharides: Chemical composition and physiological significance</p> <p>d. Glycemic Index and glycemic load</p> <p>e. Carbohydrates and gene expression</p> <p><b>Proteins</b></p> <p>a. Overview of role of muscle, liver and G.I. tract in protein metabolism</p> <p>b. Amino acid and peptide transporters</p> <p>c. Therapeutic applications of specific amino acids</p> <p>d. Peptides of physiological significance</p> <p>e. Proteins, amino acids and gene expression</p>	2
3	<p><b>Lipids</b></p> <p>a. Nutritional significance of fatty acids – SFA, MUFA, PUFA: functions and deficiency</p> <p>b. Role of n-3 and n-6 fatty acids</p> <p>c. Prostaglandins</p> <p>d. Trans Fatty Acids</p> <p>e. Conjugated linoleic acid</p> <p>f. Nutritional Requirements and dietary guidelines (International &amp; National) for visible and invisible fats in diets.</p> <p>g. Lipids and gene expression</p>	1

**References:**

1. Annual Reviews of Nutrition. Annual Review Inc, California, USA.
2. Shils, M.E.; Olson, J.; Shike, M. and Roos, C. (1998): Modern Nutrition in Health and Disease. 9<sup>th</sup> edition. Williams and Williams. A Beverly Co. London.
3. Bodwell, C.E. and Erdman, J.W. (1988) Nutrient Interactions. Marcel Dekker Inc. New York
4. World Reviews of Nutrition and Dietetics.
5. WHO Technical Report Series.

6. Indian Council of Medical Research. Recommended Dietary Intakes for Indians - Latest Recommendations.
7. Indian Council of Medical Research. Nutritive Value of Indian Foods - Latest Publication.
8. Berdanier, C.D. and Haargrove, J.L. (ed) (1996): Nutrients and Gene Expression: Clinical Aspects. Boca Raton, FL CRC Press.
9. Baeurle, P.A. (ed) (1994) Inducible Gene Expression. Part I: Environmental Stresses and Nutrients. Boston: Birkhauser.
10. Chandra, R.K. (ed) (1992): Nutrition and Immunology. ARTS Biomedical. St. John's Newfoundland.
11. International Life Sciences Institute Present Knowledge in Nutrition – latest edition

*Journals:*

1. Nutrition Reviews
2. Journal of Nutrition
3. American Journal of Clinical Nutrition
4. British Journal of Nutrition
5. European Journal of Clinical Nutrition
6. International Journal of Vitamin and Nutrition Research
7. International Journal of Food Science and Nutrition
8. Nutrition Research
9. Annals of Nutrition and Metabolism