MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES
(Deemed to be University under section 3 of the UGC Act 1956)

Ph.D ADMISSION TEST (MR-PAT)

Ph.D. in Nutrition & Dietics

Module 1: Biochemistry for Nutrition
- 1.1 Cell structure and organization
- 1.2 Biomolecules: types and functions
- 1.3 Metabolic pathways of carbohydrates, proteins, and fats
- 1.4 Structure and synthesis of nucleic acids (DNA/RNA)
- 1.5 Protein synthesis and its regulation
- 1.6 Mutations and nutritional consequences
- 1.7 Classification and nomenclature of enzymes: Enzyme structure and catalytic mechanisms

Module 2: Food Microbiology
- 2.1 Classification and taxonomy of microorganisms
- 2.2 Microbial growth and physiology
- 2.3 Microbiology of fermented foods
- 2.4 Pathogenic and toxigenic microorganisms
- 2.5 Microorganisms involved in food spoilage
- 2.6 Industrial applications of microbes

Module 3: Human Nutrition
- 3.1 Energy value of foods and proximate composition
- 3.2 Energy expenditure: BMR, physical activity, thermogenesis
- 3.3 Energy balance and body mass index (BMI)
- 3.4 Carbohydrates, Dietary fiber, resistant starch, glycemic index in human nutrition
- 3.5 Prebiotics and oligosaccharides
- 3.6 Proteins: essential amino acids and protein quality
- 3.7 Fats: Saturated fats, MCTs, PUFAs, omega-3 & omega-6 fats
- 3.8 Micronutrients: vitamins and minerals
- 3.9 Water and electrolytes, rehydration therapy
- 3.10 Nutrition across the life cycle

Module 4: Sports Nutrition
- 4.1 Body Composition, Performance, and Weight Management in Sport
- 4.2 Nutritional Strategies for Endurance Performance
- 4.3 Nutritional Strategies for Strength, Power, and Speed
- 4.4 Nutrition for Team-Based and Intermittent Sports
- 4.5 Ergogenic Aids and Supplements in Sport: Evidence and Application
- 4.6 Advanced Nutrition Assessment and Individualized Planning for Athletes
- 4.7 Nutrition for Specific Athlete Populations
- 4.8 Macronutrient Metabolism and Exercise
- 4.9 Micronutrients, Antioxidants, and the Athlete

Module 5: Dietary Management of Diseases
- 5.1 Principles of Medical Nutrition Therapy (MNT)
- 5.2 Nutritional status assessment
- 5.3 Nutrition support systems: enteral and parenteral nutrition
- 5.4 Diet therapy in GI disorders, liver and biliary tract disorders
- 5.5 Nutrition in Cardio vascular disorder and weight management

5.6 Nutrition in metabolic disorders
5.7 Nutrition in febrile conditions
5.8 Nutrition in Renal Disorders
5.9 Nutrition in critical care
5.10 Nutrition in lactose intolerance, galactosemia

Module 6: Public Health Nutrition

6.1 Scope and aims of public health nutrition
6.2 Indian demographic and developmental transition
6.3 Role in primary prevention of diseases
6.4 Nutritional epidemiology
6.5 Health promotion through nutrition
6.6 Programmes and policies on Nutrition
6.7 Prevalence, determinants and nutritional management of NCDs
6.8 Nutrition transition and chronic diseases
6.9 Community and policy-level interventions

Module 7: Food Science and Advances in Nutrition

7.1 Water, ice, and food dispersions
7.2 Carbohydrates: polysaccharides, sugars, sweeteners
7.3 Chemistry of amino acids, peptides, and proteins
7.4 Lipids: fats, oils, and related products
7.5 Enzymes in food processing
7.6 Dairy: milk and milk products
7.7 Meat, poultry, eggs, and seafood
7.8 Pulses and legumes
7.9 Nuts and oilseeds
7.10 Fruits, vegetables, and processed products
7.11 7.13 Functional foods and nutraceuticals
7.12 Genetically modified foods
7.13 Emerging food processing technologies

Suggested Readings:

1 A.K. Jain, 2001, Textbook of Physiology, New Delhi: Avichal Publishing Co.
2 M.S. Bamji, N.P Rao, V. Reddy, 1996, Textbook of Human Nutrition. (11th ed.). New Delhi (India): Oxford and IBH Publishing Co Pvt Ltd.
3 M. Swaminathan, 1974, Essentials of Foods and Nutrition. (1st ed.) Madras (India): Ganesh and co
4 L.K Mahan and S.S. Escott, 2000, Krause's Food Nutrition and Diet Therapy, 11th edition, W.B Saunders Ltd.
5 K. Park, 2007, Park's Textbook of Preventive & Social Medicine, 19th ed., Jabalpur: Banarsidas Bhanot Publishers.
6 Harper's Illustrated Biochemistry, 2011, 28th Edition, McGraw Hill.
7 Ira, W. 1997. Nutrition in Exercise and Sports. 3rd Edition. CRC press publishing.
8 Cooper, C. E. (2008). Drugs and ergogenic aids to improve sport performance. Essays in biochemistry, 44, 1-10.
9 https://www.wada-ama.org/en
10 https://ndtlindia.com