

## SEVENTH SEMESTER

Course No.	Title of Course	Credit Hours
HND	Dietetics-III	3(2-1) MC
HND	Global Food Issues	3(3-0) MC
HND	Research Methods in Nutrition	3(3-0) MC
HND	Nutritional Practices in Clinical Care	3(2-1) MC
		12 (10-2)
Elective Courses (2 courses equal to 5 credit hours)		
Elective	Nutritional Immunology	3(3-0) EC
Elective	Drug-Nutrient Interactions	2(2-0) EC
Elective	Food Chemistry	2(2-0) EC
Elective	Preventive Nutrition	3(3-0) EC
Elective	Nutrition in Emergencies	3(3-0) EC

### **HND-403    DIETETICS–III                    3 (2-1)**

#### **Learning Outcomes:**

- To understand the role of nutrition and dietetics in managing disease and preventing complications
- To get hands-on training for the dietary modification of normal diets aligned with various health disorders
- To comprehend the role of nutrition education and policies towards nutrition security

#### **Theory:**

Diet based regimen to improve the public health; Diet supplementation for diseased patients; Malabsorption and mineral deficiency; Health diets and lifestyles; Preventing diet related diseases; Nutritional implications of various diets; Managing disease and avoiding complications through diet diversification; Dietary management in various health disorders (objective, physiology, food choices, diet plans): obesity, leanness and underweight; coronary heart disease: dyslipidemia, hypertension, ischemic heart disease, heart failure; fevers and infections; diabetes mellitus; diseases of respiratory system: cystic fibrosis, asthma; rheumatic diseases: rheumatoid arthritis, osteoarthritis & gout; inborn errors of metabolism: Phenylketonuria, Maple syrup urine disease, galactosemia, glycogen storage disease; renal diseases; burn; surgical conditions; bacterial overgrowth; infections; AIDS; food allergy; protein energy malnutrition; micronutrient deficiencies; Policy principles for promotion of healthy diets; Incorporating nutrition objectives into development policies; Strategic actions and for promoting healthy diets; Drawing up of nutrition education programs; Role of specialist in dietetics and diseases.

#### **Practical:**

Planning of modified diet: consistent carbohydrate diet, moderate carbohydrate diet; Modified proteins diet: high protein diet, restricted protein diet; Modified fats

diet: restricted fats diet; Modified micronutrients diet; Controlled sodium, potassium and phosphorus diet; Dietary management in various health disorders; Hospital visits and nutrition camps.

### **Suggested Readings:**

1. Mahan, L.K., S. Escott-Stump and J.L. Raymond. 2012. Krause's Food, Nutrition & Diet Therapy, 13<sup>th</sup> ed. Elsevier Saunders, St. Louis, Missouri, USA.
2. Mudambi, S.R. and M.V. Rajagopal. 2007. Fundamentals of Foods, Nutrition & Diet Therapy, 5<sup>th</sup>ed. New Age International Pvt. Ltd. Publishers, New Delhi.
3. Punekar, M. and J. D'Souza. 2010. Handbook of Applied Nutrition, Dietotherapy and Diet Management. SBS Publishers & Distributors Pvt. Ltd., New Delhi.
4. Rawat, S. 2015. Applied Nutrition. Random Publication, New Delhi.
5. Schlenker, E. and J.A. Gilbert. 2015. Williams' Essentials of Nutrition and Diet Therapy, 11<sup>th</sup> ed. Elsevier/Mosby Inc., Louis, Missouri.
6. Singh, J. 2008. Handbook of Nutrition and Dietetics. Lotus Press, India.

## **HND-104 GLOBAL FOOD ISSUES 3 (3-0)**

### **Learning Outcomes:**

- To acquaint knowledge about global food issues having impact on food and nutrition security
- To understand the role of global organizations in food production, consumption and trade
- To study the impact of climate change and other threats on global food availability

### **Theory:**

World food situation; Food and nutrition security; The green revolution: Worldwide post-harvest losses; Global malnutrition: protein energy malnutrition and hidden hunger; Overweight & obesity; Worldwide food price fluctuations; Importance of per capita earning, consumption and purchase power; Irrational food consumption behaviour; Contribution of cereals, legumes, roots, tubers and animal products; World food policy; WTO's trade regulations; Food bioterrorism; International food laws: European and American; Potentials of modern biotechnology to combat food insecurity; Genetically modified foods. Organic, Kosher and Halal Foods; Millennium development goals to sustainable development goals. Global Trends. Climate change.

### **Suggested Readings:**

1. Barbosa-Canovas, G., A. Mortimer, D. Lineback, W. Spices, K. Buckle and P. Colonna. 2009. Global Issues in Food Science and Technology. Academic Press, Elsevier Inc., Burlington, MA, USA.
2. Barrientos, S. and C. Dolan. 2006. Ethical Sourcing in the Global Food System. Earthscan, New York, USA.
3. Hajra, M.A. 2013. Global Food Security: Emerging Issues and Economic Implications. Nova Science Publishers, New York, USA.

4. Oosterveer, P. 2007. Global Governance of Food Production and Consumption: Issues & challenges. Edward Elgar Publishing Inc., Massachusetts, USA.
5. Phoenix, L.E. and L. Walter. 2009. Critical Food Issues: Problems and State of the Art Solutions Worldwide, Vol. 1 & 2. ABC-CLIO, LLC, Santa Barbara, California, USA.

## **HND RESEARCH METHODS IN NUTRITION 3(3-0)**

### **Learning Outcomes:**

- To apply tools and skills required to understand published research
- To identify the types of methods best suited for investigating different types of problems and questions
- To get hands-on training of writing successful research proposals for thesis and projects
- To abreast ethical consideration in research and publications

### **Theory:**

Research methods in nutrition: Introduction, objectives, types of research: basic and applied, quantitative and qualitative, clinical and diagnostic; Types of sampling: probability and non-probability; Collection of literature: printed and electronic sources, managing literature; Methods of data collection; Writing scientific documents: synopsis, research proposal, articles, references, internship report. Research designs: observational studies, cross-sectional, case-control, cohort (prospective, retrospective, time-series); Experimental studies: observational studies, clinical studies. Experimental data analysis: incidence/ prevalence rate; Research ethics.

### **Suggested Readings:**

1. Awan, J.A. 2015. Scientific Presentations. Unitech Communications, Faisalabad, Pakistan.
2. Lovegrove, J.A., L. Hodson, S. Sharma and S.A. Lanham-New. 2015. Nutrition Research Methodologies. Wiley-Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.
3. Lowe, M. 2007. Beginning Research: A Guide for Foundation Degree Students, 1<sup>st</sup> ed. Routledge Publications, New York, USA.
4. Starks, T.P. 2006. Trends in Nutrition Research. Nova Science Publishers, Inc., New York, USA.
5. Walliman, N. 2005. Your Research Project, A Step by Step Guide for The First-time Researcher, 2<sup>nd</sup> ed. Sage Publications, Thousand Oaks, CA, USA.

## **HND NUTRITIONAL PRACTICES IN CLINICAL CARE 3 (2-1)**

### **Learning Outcomes:**

- To understand and create a patient-centered nutrition care plan based on sound nutrition principles, scientific evidence and biomedical reasoning

- To assess various physiological conditions and prepare diet plans accordingly
- To acquaint hands-on training in the field of enteral and parenteral nutrition

### **Theory:**

Importance of clinical care nutrition support; Nutritional screening and assessment; The therapeutic process, stress of the therapeutic encounter, focus of care, phases of the care process; Quality patient care and collaborative roles of nutritionists and nurses; Modified diets for various physiological needs; Enteral nutritional: composition, nutritional prescription (dose), strategies to optimize delivery and minimize risks, pediatric enteral feeding; Total parenteral nutrition; composition, intravenous nutritional prescription (dose) for specific conditions; Percutaneous endoscopic gastrostomy and radiologically inserted gastrostomy; Complications in enteral and parenteral nutrition; Nutritional therapy in diseases of infancy and childhood; Drug-nutrient interactions: drug effects on food and nutrients, food effects on drug absorption, food effects on drug; Dietary supplements.

### **Practical:**

Nutritional assessment of patients: selection, nutritional requirements; Tube feeding: types, feeding equipment, preparation and application of enteral/nasogastric diets, monitoring the tube-fed patient; Total parenteral nutrition: basic rules, techniques, prescription, preparation of total parenteral solution; Preparation of pre- and post-operative diets; Case studies and logbooks; Hospital visits.

### **Suggested Readings:**

1. Block, A.S., J. Maillet, W.H. Howell and M.F. Winkler. 2007. Issues and Choices in Clinical Nutrition Practice. Lippincott Williams & Wilkins, Philadelphia, PA, USA.
2. Katsilambros, N., C. Dimosthenopoulos, M.D. Kontogianni, E. Manglana and K.A. Poulia. 2010. Clinical Nutrition in Practice, 1<sup>st</sup> ed. Wiley-Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.
3. Katz, D.L. 2008. Nutrition in Clinical Practice, 2<sup>nd</sup> ed. Lippincott Williams & Wilkins, Philadelphia, PA, USA.
4. Rolandelli, R.H., R. Bankhead, J. I. Boullate and C.W. Compher. 2005. Clinical Nutrition; Enteral and Tube Feeding. 4<sup>th</sup> ed. Elsevier Saunders Publishers, USA.
5. Rolfes, S.R., K. Pinna and E. Whitney. 2015. Understanding Normal and Clinical Nutrition, 10<sup>th</sup> ed. Thomson and Wadsworth Publishers, USA.

**Elective HND                      NUTRITIONAL IMMUNOLOGY                      3 (3-0)**

### **Learning Outcomes:**

- To understand relationship between nutrition and immunity
- To evaluate, summarize and apply current research in the field of nutrition

- To determine and assess factors impacting nutritional and immunological status
- To grasp knowledge about the interactions among the nutrients and immune responses

### **Theory:**

Nutritional immunology: overview, principles; Immune system; Psychoneuroimmunology; Effective detoxification protocols: anti-inflammatory, immune boosting, alkalinizing, detoxification; Mechanisms of immune dysfunction in autoimmune conditions and cancer; Gerson therapy; Harmful effects of vaccinations and antibiotics and nutritional support; Supplementation requirements to treat immune dysfunctions, colds, flus, pandemics. Opportunistic infections. Genetic and immunity; Functional foods and Immunology; Immune boosters; Food Allergies; Cognitive function of nutrients; Immunization and its impacts.

### **Suggested Readings:**

1. Calder, P.C., C.J. Field and H.S. Gill. 2002. Nutrition and Immune Function. CABI Publishing, New York, USA.
2. Gershwin, M.E., J.B. German and C.L. Keen. 2000. Nutrition and Immunology Principles and Practice. Humana Press, New York, USA.
3. Gershwin. ME., P. Nestel and C.L. Keen.2004. Handbook of Nutrition and Immunology. Humana Press, New York, USA.
4. Schat, K.A., B. Kaspers and P. Kaiser. 2014. Avian Immunology, 2<sup>nd</sup> ed. Academic Press, San Diego, CA, USA.

## **Elective      DRUG-NUTRIENT INTERACTIONS                      2 (2-0)**

### **Learning Outcomes:**

- To raise the awareness of potential drug-nutrient interactions and influence on clinical outcomes
- To understand complex underlying mechanisms responsible for drug-nutrient interactions
- To identify factors that can promote drug-nutrient interactions and contribute to nutrition and/or therapeutic failure
- To integrate knowledge of pharmacology, nutrient-nutrient and drug-nutrient interactions into the nutrition care process

### **Theory:**

Basic definitions and concepts: Role of nutrition therapy in pharmacotherapy; Pharmacologic aspects of food and drug interactions; Routes of drug administration; Pharmacodynamics; Pharmacokinetics, absorption, distribution, metabolism, elimination; Effects of food on drug therapy, drug absorption, drug distribution, drug metabolism and drug excretion; Effects of drugs on food and nutrition, nutrient absorption, metabolism and excretion; Effects of drugs on the nutritional status of patients e.g. taste, smell and type of intake; Enteral feeding: drug/nutrient interaction; Gastrointestinal effects, appetite changes; Nutrient

assessment of drug-nutrient interactions; Dietary counselling for the prevention of food drug interactions.

### **Suggested Readings:**

1. Boullata, J.I. and V.T. Armenti. 2010. Handbook of Drug-Nutrient Interactions, 2<sup>nd</sup> ed. Humana Press, New York, USA.
2. Mahan, L.K. and S. Escott-Stump. 2007. Krause's Food & Nutrition Therapy. Elsevier – Health Sciences Division. Philadelphia, USA.
3. McCabe-Sellers, B., E.H. Frankel and J.J. Wolfe. 2003. Handbook of Food-Drug Interactions, CRC Press, Taylor & Francis Group, Boca Raton, FL., USA.
4. Nelms, M.N. and K.P. Sucher. 2016. Nutrition Therapy and Pathophysiology, 3<sup>rd</sup> Ed. Cengage Learning, Belmont, CA, USA.

### **Elective      FOOD CHEMISTRY                      2 (2-0)**

#### **Learning Outcomes:**

- To acquire knowledge and skills for understanding the main physical, chemical and functional properties of food
- To understand and be able to control the major chemical and biochemical reactions that influence food quality with emphasis on food industry applications
- To acquaint information about different food components and interactions among them to modulate the specific quality attributes of food systems

#### **Theory:**

Cellular basis of foods; Water: properties, types, water activity and its effect on shelf life of food; Carbohydrates: roles of in food structure, color, flavor and texture; Lipids: roles in food structure, color, flavor and texture, rancidity, emulsifiers; Proteins: roles in food structure, color, flavor and texture; Enzymes: enzymatic & non-enzymatic browning reactions, influences on color, flavor and texture; Technologies in minerals and vitamins fortification of foods, stability of vitamins; Food colors: natural & artificial colors, pigments; Flavors: characteristics, taste, odor and astringency, off-flavor, aromatic compounds, Chemistry involved in ripening processes of fruits and vegetables; Food additives.

#### **Suggested Readings:**

1. Belitz, H.D, W. Groschm and P. Schieberle. 2009. Food Chemistry. Springer Verlag, Germany.
2. Coultate, T. 2009. Food: The Chemistry of Its Components. The Royal Society of Chemistry, Thomas Graham House, Science Park, UK.
3. Damodaran, S., K. Parkin and O.R. Fennema. 2007. Fennema's Food Chemistry, 4<sup>th</sup> ed. CRC Press, Taylor & Francis Group, Boca Raton, FL, USA.
4. DeMan, J.M. 2007. Principles of Food Chemistry. Springer Verlag, Germany.

5. Velisek, J. 2014. The Chemistry of Food. John Wiley & Sons Inc., New York, USA.

**HND                      PREVENTIVE NUTRITION                      3 (3-0)**

**Learning Outcomes:**

- To acquaint knowledge about the preventive nutrition with special reference to historical perspective, public health benefits, ethnic and socioeconomic issues and its role throughout the life cycle
- To understand the role of dietary components in the prevention and management of various health disorders

**Theory:**

Preventive nutrition: a historical perspective, public health benefits, ethnic and socioeconomic issues, nutrition in the age of polypharmacy, preventive nutrition throughout the life cycle; Cancer prevention: upper GIT cancer, prostate cancer, dietary supplements and cancer risks, soy and cancer prevention, micronutrients as intermediate biomarkers in chemotherapy; Cardiovascular disease prevention: omega-3 fatty acids from fish and plants, cardiovascular effects of trans fatty acids, antioxidants and B-vitamins and atherosclerosis, Prevention and nutritional management - TLC dietary patterns, AHA dietary patterns, DASH dietary patterns, weight reduction, increased dietary fiber, Omega-3 fatty acids, soy proteins, fruits and vegetables as antioxidant role, reduce dietary cholesterol; Diabetes and obesity: role of nutrition in pathophysiology, prevention and treatment, Adipokines, nutrition and obesity, obesity and insulin resistance in childhood and adolescence, obesity and chronic disease, meal replacement products and fat substitutes, prevention and treatment (dietary changes, calories restricted diet and other dietary regimens, exercise, behavioural modification); Growth, Immunity and Infection: Role of long chain fatty acids, polyunsaturated fatty acids and autoimmune diseases; Prevention and treatment for hypertension: weight reduction, adaptation of DASH diet, nutrition education for behavioural modification; Bone density: Osteoarthritis - role of nutrition and dietary supplements, calcium requirement during treatment of osteoporosis, Prevention and treatment - adequate calcium intake, adequate vitamin D intake, avoidance of excess phosphorous, lifestyle dietary modifications, exercise; Role of dietary fiber in preventing diseases (colon cancer, diabetes, constipation, diverticular disease, obesity, cardiovascular diseases); Health claims for foods and dietary supplements; Micronutrient and immunity in older people.

**Suggested Readings:**

1. Bendich, A. and R.J. Deckelbaum. 2001. Primary and Secondary Preventive Nutrition. Springer Science+Business Media, New York, USA.
2. Bendich, A. and R.J. Deckelbaum. 2010. Preventive Nutrition: The Comprehensive Guide for Health Professional, 4<sup>th</sup> ed. Humana Press, New York, USA.

3. Coulston, A.M. and C.J. Boushey. 2008. Nutrition in the Prevention and Treatment of Diseases, 2<sup>nd</sup> ed. Academic Press, Elsevier Inc., San Diego, CA, USA.
4. Gerber, J.M. 2007. Handbook of Preventive and Therapeutic Nutrition. Aspen Publications, Silver Spring, MD, USA.
5. Thomson, C. 1996. Preventive and Therapeutic Nutrition Handbook. Chapman & Hall, UK.

**Elective      NUTRITION IN EMERGENCY                      3 (3-0)**

**Learning Outcomes:**

- To understand the context in which emergencies occur and nutritional assessment of the individuals and populations
- To design and implement interventions for prevent and treatment of malnutrition
- To familiarize with the role of national and international agencies in the management of emergencies

**Theory:**

Introduction and concepts: understanding malnutrition, micronutrient malnutrition, causes of malnutrition; Nutrition needs assessment and analysis: individual and population assessment, health assessment and the link with nutrition, food security assessment and the link with nutrition, nutrition information and surveillance systems; Interventions to prevent and treat malnutrition: general food distribution, supplementary feeding, therapeutic care, micronutrient interventions, health and livelihood interventions, infant and young child feeding, HIV and AIDS nutrition; Nutrition information, education and communication; Monitoring and evaluation, standards and accountability; Role of national and international agencies: UNHCR, WFP, NDMA (National disaster management authority), Civil defence; Hygiene and sanitation; Emergency foods.

**Suggested Readings:**

1. ENN (Emergency Nutrition Network). 2011. The harmonized training package (HTP): resource material for training on nutrition in emergencies, version 2. Nutrition Works, Emergency Nutrition Network, Global Nutrition Cluster. Oxford, U.K.
2. FAO. 2005. Protecting and Promoting Good Nutrition in Crisis and Recovery: Resource Guide. Food and Agriculture Organization of the United Nations, Rome, Italy.
3. SC (Save the Children Fund UK). 2004. Emergency nutrition assessment: guidelines for field workers. Save the Children, Westport, U.K.
4. WHO (World Health Organization). 2000. The management of nutrition in major emergencies. World Health Organization, Geneva, Switzerland.