

SIXTH SEMESTER

Course No.	Title of Course	Credit Hours
HND	Dietetics-II	3(2-1) MC
HND	Functional Foods and Nutraceuticals	3(3-0) MC
Sociology/HND	Nutrition Through Social Protection	2(2-0) GC
HND	Sports Nutrition	3(2-1) MC
HND	Infant and Young Child Feeding	3(2-1) GC
Biochem	Clinical Biochemistry	3(1-2) GC
		17 (13-4)

HND DIETETICS-II 3 (2-1)

Learning Outcomes:

- To comprehend the principles of diet therapy and therapeutic nutrition
- To understand the role of dietary management in various health disorders related to upper and lower gastrointestinal tract, hepatic, pancreas and coronary heart diseases
- To acquaint hands-on training for the dietary modification of normal diets aligned with various health disorders
- To prepare pre- and post-operative diets

Theory:

Introduction to diet therapy; Principles of diet therapy and therapeutic nutrition; Therapeutic modifications of normal diets; Dietary management in various health disorders (objective, physiology, food choices, diet plans): Diet in the diseases of the upper gastrointestinal tract – mouth, dental disease, pharynx, esophagitis; hiatal hernia; gastritis; peptic ulcer; Diet in the diseases of the lower gastrointestinal tract - constipation, diarrhoea, mal-absorption syndrome, lactose Intolerance, celiac disease, inflammatory bowel disease, Crohn's disease, ulcerative colitis, irritable bowel syndrome, diverticular disease, gastric surgery, dumping syndrome, small bowel resections, short bowel syndromes, blind loop syndrome, ileostomy or colostomy; Diet in the diseases of liver and accessory organs - hepatitis, hepatic steatosis, non-alcoholic hepatic steatosis, alcoholic liver disease, cirrhosis, hepatic encephalopathy; cholelithiasis, cholecystitis, cholangitis; Pancreatitis; Nutrition education and primary health care camp.

Practical:

Steps in nutrition care; Types of diets: regular diet, clear liquid diet, full liquid diet, soft diet, bland diet; Dietary modification for texture, energy, nutrients and fluids; Planning of energy modified diets: high calorie diet, restricted calorie diet, high fiber diet, low residue diet, modified carbohydrates diet, moderate carbohydrate diet, modified fat diet, restricted fats diet; Planning and preparation of diets for various pathological conditions; Nutrition in surgical conditions: pre-

operative and post-operative diets; Enteral and parenteral feeding; 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, 13th ed. Elsevier Saunders, St. Louis, Missouri, USA.
2. Mudambi, S.R. and M.V. Rajagopal. 2007. Fundamentals of Foods, Nutrition & Diet Therapy, 5th 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, 11th ed. Elsevier/Mosby Inc., Louis, Missouri.
6. Singh, J. 2008. Handbook of Nutrition and Dietetics. Lotus Press, India.

HND FUNCTIONAL FOODS AND NUTRACEUTICALS 3(3-0)

Learning Outcomes:

- To find out sources of functional foods & nutraceuticals and their impact on nutrition and health
- To familiarize with the standards and regulations used globally regarding regulatory issues and usage of functional foods
- To assess international trade and marketability of functional foods

Theory:

Functional foods and nutraceuticals: past, present, future and health claims; functional foods and their impact on nutrition and health obesity, diabetes, cardiovascular diseases, hypertension and cancer; Functional ingredients and bioactive molecules: Isoflavones, lycopene, polyphenols, dietary fiber, omega-3 & -6 fatty acids, conjugated linoleic acid, antioxidants, prebiotic and probiotic; Functional foods from different food groups: cereals, dairy, meat, fruits and vegetables; Regulatory systems governing the production and distribution of functional food -national and international; Standard and regulations of various agencies: FDA, EC, FAO/WHO, Health Canada; Guidelines for the assessment of functional foods; Marketing and regulatory issues; Conventional and emerging food processing technologies for functional food production; Toxicological and safety aspects of functional foods; Asian functional foods; Functional foods in international market and growth in Pakistan.

Suggested Readings:

1. FAO (Food and Agriculture Organization of the United Nations). 2007. Report on Functional Foods. Food and Agriculture Organization of the United Nations, Rome, Italy.
2. Shi, J., C.T. Ho and F. Shahidi. 2005. Asian Functional Foods. Marcel Dekker/CRC Press, New York, U.S.A.

3. Shi, J., G. Mazza and M.L. Maguer. 2002. Functional Foods: Biochemical and Processing Aspects, Vol. 2. CRC Press, Traylor & Francis Group, Boca Raton, New York, USA.
4. Wildman, R.E.C. 2006. Handbook of Nutraceuticals and Functional Foods, 2nd ed. CRC Press, Traylor & Francis Group, Boca Raton, New York, USA.

Sociology/HND

NUTRITION THROUGH SOCIAL PROTECTION 2 (2-0)

Learning Outcomes:

- To acquaint knowledge about the role of social protection programs in poverty alleviation and overall welfare of the society
- To understand the role of social protection programs in provision of financial support for scaling up nutrition
- To identify the development partners and various social protection and scale up nutrition programs

Theory:

Food insecurity and vulnerability; Food and social class differences; Food society and environment; Introduction to sociology of nutrition; Food and nutrition in culturally diverse societies; Social change and rural development; Women empowerment and nutrition; Food choices and their determinants; Behaviour change; Social construction and eating disorders; Challenges to combat malnutrition; Nutrition-sensitive and nutrition-specific interventions; Economic opportunities among the poor; Nutrition and gender sensitive policies and strategies of social protection sector; Social assistance, income generation, risk reduction and risk management; Current social protection programs in the public and private sector; Community development projects; Medical social services projects; Role of social welfare/protection sector to scale-up nutrition; Impact of individual financial assistance programs; Backyard poultry farming and backyard kitchen gardening; Social protection strategies in Pakistan and South Asia; Social safety nets for vulnerable group; Role of various development partners, (such as NGOs, INGOs, Asian Development bank, World Bank, USAID, and DFID) in social protection and scaling up nutritional status.

Suggested Readings:

1. FAO. 2015. Improving Nutrition Through Multisectoral Approaches. Food and Agriculture Organization of the United Nations, Rome Italy.
2. FAO. 2015. Nutrition and Social Protection. Food and Agriculture Organization of the United Nations, Rome Italy.
3. IFPRI. 2016. Global Nutrition Report 2016: From Promise to Impact: Ending Malnutrition by 2030. International Food Policy Research Institute, Washington, DC, USA.
4. World Bank, UNICEF, WFP, USAID, ADB and Government of Pakistan Reports

Learning Outcomes:

- To emphasize the importance of proper fueling for physical activity, pre- and post-workout
- To provide an overview about dietary supplements, how they are regulated and how to avoid use of contaminated dietary supplements
- To highlight the risks associated with performance enhancing drugs including anabolic androgenic steroids

Theory:

The principles of fitness, motivation and conditioning; Nutrition for the athletes, stress management, preventing accidents, stretching, posture and aerobics; Vitamins and minerals supplementation for fitness; High and low intensity exercise, cross training, walking for weight control and case studies; Introduction to muscle contraction, fast and slow fibres, energy storage, fuels used for exercise; Energy balance, fluid balance, fuelling cycle: Pre-exercise, during exercise and during recovery; Athletes eating plan, calorie goals, calorie values, carbohydrate goals, protein goals, fat, vitamins and mineral goals; Competition nutrition; Loosing, gaining and making weight for athletes; Eating disorder and athletes; Sports drink and supplementation; National and international regulations for supplements; Risks associated with performance enhancing drugs; Metabolic Equivalent Task; My pyramid for sportsman.

Practical:

Bioelectric impedance analysis; Sweat rate and hydration status calculation; Calculation of BMR and RMR; Diet planning for different sportsmen like body builders, athletes, swimmers, etc. Preparation of sports drinks and food products according to accelerated needs; Use of sports supplements. Visit of sports centers and fitness clubs.

Suggested Readings:

1. Antonio, J., D. Kalman, J.R. Stout, M. Greenwood, D.S. Willoughby and G.G. Haff. 2008. Essentials of Sports Nutrition and Supplements. Humana Press, New York, USA.
2. Driskell, J.A. 2007. Sports Nutrition Fats and Proteins. CRC Press, Taylor and Francis Group, Boca Raton, FL, USA.
3. Fink, H.H., A.E. Mikesky and L.A. Burgoon 2011. Practical Applications in Sports Nutrition, 3rd ed. Jones & Bartlett Learning Burlington, MA, USA.
4. Lanham-New, S.A., S.J. Stear, S.M. Shirreffs and A.L. Collins. 2011. Sports and Exercise Nutrition. Wiley-Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.
5. Maughan, R.J. 2000. Nutrition in Sport: The Encyclopedia of Sports Medicine. Wiley-Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.

Learning Outcomes

- To identify problems affecting infant and young child feeding and provide a framework of essential interventions
- To create an environment that will enable mothers, families and other caregivers to implement optimal feeding practices

Theory:

Infant young child feeding: introduction, global strategy, importance of breastfeeding, local and international scenario, breastfeeding working; Breastfeeding practices: assessing a breastfeed, taking a feeding history, common breastfeeding difficulties, expressed breast milk; Breastfeeding counselling: listening and learning, building confidence and giving support, counselling for infant feeding decisions, counselling cards tools; Complementary feeding practices: importance, cup-feeding and hygienic preparation of food, replacement feeding in the first 6 months, foods to fill energy and micronutrients gap, quantity and frequency of feeding, feeding techniques, food demonstration; Breastfeeding related topics: growth charts, maternal illnesses and breast feeding, breast conditions, health care practices, International code of marketing of breast milk substitutes, checking understanding and arranging follow-up, feeding during illness and low-birth-weight babies; Feeding guidelines of various global agencies – WHO etc.; Complex challenges to implementing the global strategy for infant and young child feeding.

Practical:

Breastfeeding counselling; Preparation of indigenous complementary foods; Therapeutic foods; Infant formulas for various needs; Growth monitoring: APGAR (Appearance, Pulse rate, Grimace, Activity and Respiration) score, Growth charts. Visits of hospitals and day care centers.

Suggested Readings:

1. Behan, E. 2008. The baby Food Bible – A Complete Guide to Feeding Your Child from Infancy On, 1st ed. Random House Publishing Group, New York, USA.
2. Dykes, F. and V.H. Moran. 2009. Infant and Young Child Feeding: Challenges to Implementing a Global Strategy. Wiley-Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.
3. Samour, P.Q. and K. King. 2010. Pediatric Nutrition, 4th ed. Jones & Bartlett Learning, Mississauga, Canada.
4. WHO. 2003. Global Strategy for Infant and Young Child Feeding. World Health Organization, Geneva, Switzerland.
5. WHO/UNICEF/GOP (World Health Organization/United Nation's Children Fund/Government of Pakistan). 2008. Infant and young child feeding counselling: an integrated course. Nutrition Wing, Ministry of Health, Government of the Pakistan, Islamabad.

Learning Outcomes:

- To understand the role and requirements of clinical laboratory and how chemical and biochemical analysis are applied to the study of disease
- To discuss the function, structure, laboratory investigation and diseases of the different body systems
- To correlate laboratory findings in clinical samples with various pathological processes

Theory:

Clinical laboratory: organization and management, safety, good lab practices, quality control and assurance, reference range and normal values, laboratory data processing; Handling and processing of clinical samples; Effect of storage on composition of samples; Commonly used instruments in clinical laboratory: Microscope, Minilab apparatus, X-ray, ECG, MRI, ELISA reader, CT scan etc.; Symptomology and case histories of various diseases. Forensic science, Molecular basis of diagnosis.

Practical:

Blood sampling techniques; Complete blood picture (CBP) like Hb, PCV, ESR, TLC, DLC, bleeding time, clotting time, prothrombin time and blood groups; Pregnancy test; Liver function tests; Kidney function test; Cardiac enzymes; Lipid profile, total proteins, albumin and serum minerals; Urine analysis for bile pigments, protein, urea, pH, ketone bodies, sugars, creatinine, pus cells, RBCs and uric acid; Sero-diagnosis of infectious diseases; Visit to clinical laboratory/concerned organization.

Suggested Readings:

1. Ahmed, N. 2011. Clinical Biochemistry. Oxford University Press, Oxford, UK.
2. Bain, B.J., I. Bates, M.A. Laffan and S.M. Lewis. 2012. Practical Haematology, 11th ed. Churchill Livingstone, Elsevier Ltd., New York, USA.
3. Burtis, C., E. Ashwood and D. Burns. 2006. Tietz Text Book of Clinical Chemistry and Molecular Diagnostics, 4th ed. Elsevier Saunders Company, Philadelphia, USA.
4. Chawala, R. 2014. Practical Clinical Biochemistry: Methods and Interpretations, 4th ed. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi, India.
5. Devlin, T. M. 2005. Textbook of biochemistry with clinical correlations, 6th ed. Wiley-Liss, Inc., U.S.A.