

RANI RASHMONI GREEN UNIVERSITY TARAKESWAR, HOOGHLY



Syllabus
of
Master of Science (M.Sc.)
in
Nutrition and Public Health (NPH)

Under Semester System
Course Duration: 2 years, 4 Semesters
[W.e.f.: 2025-2027]

Subject Nutrition and Public Health

Programme Structure

Semester	Course Code	Course Title	Full Marks	Credit (L+T+P)	Lecture hours
I	EVS	Environmental Science	40+10*	4 (x-x-x)	40
	NPH-101	Human Nutrition	40+10*	4 (3-1-0)	40
	NPH-102	Human Physiology	40+10	4 (3-1-0)	40
	NPH-103	Chemistry of Food and Nutrients	40+10	4 (3-1-0)	40
	NPH-104	Public Health	40+10	4 (3-1-0)	40
	NPH-195	Practical: Human Physiology and Biochemistry	40+10	4 (1-0-3)	40
	Total		300	24	240
II	NPH-201	CBCS-I	40+10	4 (3-1-0)	40
	NPH-202	Nutritional Biochemistry	40+10	4 (3-1-0)	40
	NPH-203	Therapeutic Nutrition	40+10	4 (3-1-0)	40
	NPH-204	Microbes and Public Health	40+10	4 (3-1-0)	40
	NPH-205	Public Nutrition	40+10	4 (3-1-0)	40
	NPH-296	Practical: Nutritional Anthropometry	40+10	4 (1-0-3)	40
	Total		300	24	240
III	NPH-301	CBCS-II	40+10	4 (3-1-0)	40
	NPH-302	Food Science and Innovations	40+10	4 (3-1-0)	40
	NPH-303	Omics in Nutrition and Public Health	40+10	4 (3-1-0)	40
	NPH-304	Epidemiology	40+10	4 (3-1-0)	40
	NPH-305	Environment and Public Health	40+10	4 (3-1-0)	40
	NPH-396	Practical: Planning of Meal in Health and Diseases	40+10	4 (1-0-3)	40
	Total		300	24	240
IV	NPH-401	Common Paper (P): Research Methodology, Ethics and IPR	40+10	4 (3-1-0)	40
	NPH-402	Common Paper (Q): Policies and Regulatory Guidelines and Programmes related to Nutrition and Public Health	40+10	4 (3-1-0)	40
	NPH-403	Special Paper (R1): Nutrition and Public Health in Special Situations		4 (3-1-0)	
		R2: Global health and SDGs	40+10	4 (3-1-0)	40
	NPH-404	Special Paper (S1): Social Medicine		4 (3-1-0)	
		S2: Nutrition Education	40+10	4 (3-1-0)	40
	NPH-495	Project	50	4 (1-0-3)	80
	NPH-496	Internship	50	4 (1-0-3)	80
	Total		300	24	320
Grand Total			1200	96	...

Theory -50 Marks, Written - 40 Marks, Internal Assessment -10 Marks

Theory - ... Marks, Written - Marks, Internal Assessment -... Marks Practical - 100 Marks

For Theory:- X-0-X, For Practical/Project:- X-9-X

For Practical/Project, lecture hours would be twice of the theory

*Each student will obtain marks based on the plantation and growing up of a sapling that would produce fruits and attract the birds/animals.

Overview

Semester		Paper	No of Papers	Full Marks of Each Paper	Credit of Each Paper	Total Marks	Credit Points	Total Credit Point
1 st	Theoretical	1+4	40+10 = 50	4 + 4*4	300	4+16=20	24	
	Practical	1	20+30=50	4		4		
2 nd	Theoretical	1+4	40+10 = 50	4 + 4*4	300	4+16=20	24	
	Practical	1	20+30=50	4		4		
3 rd	Theoretical	1+4	40+10 = 50	4 + 4*4	300	4+16=20	24	
	Practical	1	20+30=50	4		4		
4 th	Theoretical	4	40+10 = 50	4*4	300	16	24	
	Project Internship	2	50	2*4		8		
Grand Total 96 Credit Points								

Question Pattern :

- Question of 2 marks (4 questions out of 6 questions, should be attended by the students) = 8 marks
- Questions of 4 marks (4 questions out of 6 questions, should be attended by the students) = 16 marks
- Questions of 8 marks (2 questions out of 4 questions, should be attended by the students) = 16 marks

Total = 40 marks

Program outcome (P.O):

The purpose of the postgraduate in Nutrition and Public Health at Rani Rashmoni Green University is to provide the key knowledge base to prepare students for careers as professional in the field of Nutrition and Public Health

After completion of the program students will be ready for,

- i. Working independently as a dietician
- ii. Working independently as a Public Health professional

1st Semester				
Paper	Course	Marks	Lecture hours	Credit Point
EVS	Environmental Science	50	40	4
NPH-101	Human Nutrition	50	40	4
Unit I	Principles of Nutrition: Balanced Diet, Meal Planning Scope of Nutrition Concept on food, diet and nutrients Food pyramid Nutraceuticals, bioactive compounds, and Functional Foods Dietary guidelines for Indians Food exchange list Core foods, Secondary foods and Peripheral foods balanced diet, Healthy diet and dietary practices			
Unit II	Nutrition for Infants, Children and Adolescents Nutritional requirements for infants, breast feeding, composition of breast milk, advantages of exclusive breast feeding, colostrum, basic principles and techniques of breast feeding, introduction of supplementary foods, initiation and management of weaning, bottle feeding, artificial feeding, management of preterm and low birth weight. Nutritional need of toddlers, pre-school, school going children, dietary management, food choices, complication of feeding. Nutritional needs and dietary management of adolescents, eating disorder of adolescents			
Unit III	Nutrition for Adults and Elderly Nutritional requirements of adults Aging process, physiological changes of aging, senescence, nutritional requirement, common health problems of elderly people and nutritional management.			
Unit IV	Nutrition for Pregnant and Lactating Women Role of nutrition during pregnancy, hormonal changes during pregnancy, parturition, nutritional and non-nutritional factors affecting pregnancy outcome, complication of pregnancy and their management. Role of nutrition during lactation, hormonal changes during lactation, let-down reflex,			

	effect of nutrition on composition of breast milk, galactagogue, care and preparation before and during breast feeding practices			
NPH-102	Human Physiology	50	40	4
Unit I	GI system: Gut brain axis Anatomy and physiological functions of different parts of GI tract, process of digestion and absorption of food, composition and functions of digestive juices, gastrointestinal hormones Enteric nervous system, Digestive glands Gut brain cross-talk			
Unit II	Hematology; Cardiovascular, Respiratory System and Musculo-Skeletal system Circulatory system, blood components, blood groups, hematopoiesis histocompatibility, benign and malignant blood disorders, Cardiovascular system, Structure of blood-vessels and heart, cardiac muscle tissue structure and functions of heart, Cardiac cycle, cardiac output, blood pressure and its regulation, Hypertension Structure and function of lungs, gaseous exchange, acclimatization, aeromicrobe, aeronutrient General anatomy of musculoskeletal system, Types and functions of muscles, bones Physiology of muscle contraction			
Unit III	Neuro-endocrine and reproductive system Anatomical overview of central and peripheral nervous system, brief anatomy and functions of cerebrum, cerebellum, hypothalamus and neuron Concept of synapse and synaptic transmission, Structure and function of endocrine glands Anatomical overview of human reproductive system, Fertilization, Spermatogenesis and oogenesis			
Unit IV	Excretory System Structure and function of excretory organs, Physiology of urine formation, regulation of urine formation, micturition.			
NPH-103	Chemistry of Food and Nutrients	50	40	4
Unit I	Chemistry of Food, Food Groups Food groups, food pyramid, major and minor nutrients			
Unit II	Chemistry and Structure of Proteins Definition, Classification, Structure &			

	properties of amino acids, classification, types, functions of protein, physico-chemical properties of protein			
Unit III	Chemistry and Functions of Carbohydrate, Lipid Definition, Classification, Structure and properties of carbohydrates. Classification, sources, composition, properties of dietary fibre. Definition, Classification & Properties of Fatty acids-composition, properties, types. Lipids - Definition, classification & Properties, sources, daily requirements, functions. Role&nutritional significances of PUFA, MUFA, SFA, w-3 fatty acid.			
Unit IV	Chemistry of Vitamins, Minerals and Water Structure, biochemical and physiological role of water soluble and fat soluble vitamins, minerals. Functions of water, water balance,			
NPH-104	Public Health	50	40	4
Unit I	Concept of Public Health Dimensions and determinants of health, Definition and multidisciplinary nature of public nutrition, Core functions and essential services, Concept and scope Role of Public Nutrition			
Unit II	Origin and Evolution of Public Health History of public health and its milestones, Concepts and indicators of health and wellbeing natural history of disease, Levels of prevention, globalization and its impact on health			
Unit III	Tropical and International Public Health Structure of national public health set up, their functions, roles and responsibility of state, community and private sector in health			
Unit IV	Current Challenges in Public Health Public health hazards, causes, prevention, Environmental and systemic challenges, evolving and persistent health threats, Social and technological hurdles. Preventive measures.			

NPH-195	Course title: Human Physiology and Biochemistry (Practical) 1. Detection of haemoglobin percent, 2. Determination of C.T. and B.T. 3. Estimation of blood pressure by sphygmomanometer (Auscultatory method) 4. Measurement of blood pressure during exercise 5. Study of pulse rate and breathing rate with the change of postures 6. Protein estimation of lowry method 7. Biochemical estimation of cholesterol and glucose 8. Preparation of Buffers 9. Preparation of peripheral blood film- Staining Identification of different types of WBCs 10. Identification with reasons of histological slides - Liver, Kidney, Lung, Small intestine, Stomach, Thyroid, Adrenal, Pancreas, Testis, Ovary and muscle of mammals.	50	80	4
	Total Marks	300		
	Total Credit			24

Text Books/References (Paper wise):

NPH-101

1. Srilakshmi B (2017). Nutrition Science, 6th Multicolour Ed. New Age International (P) Ltd. 2.
2. Roday S (2012). Food Science and Nutrition, 2nd Ed. Oxford University Press.
3. Mann J and Truswell S (2017). Essentials of Human Nutrition, 5th Ed. Oxford University Press.
4. Ghosh S (1997). Nutrition and child care – A practical guide. 1st ed. Jaypee Brothers; New Delhi.
5. Guthrie AH (1986). Introductory Nutrition, 6th Revised Ed., McGraw-Hill Inc., US.
3. Robinson CH and Lawler M (1990). Normal and Therapeutic Nutrition. 17th Revised Ed. Macmillan USA.
4. Swaminathan M (2007). Essentials of Food and Nutrition (Vol. I & II), 2nd Ed. Bappco
5. Gopalan C, Rama Sastri BV and Balasubramanian SC (2016). Nutritive value of Indian Foods, Indian Council of Medical Research.
6. Nutrient Requirements and Recommended Dietary Allowance for Indians, Indian Council Of Medical Research, New Delhi.
7. FAO/WHO/UNO. Technical Report Series, 724 (1985). Energy and Protein Requirement, Geneva.

NPH-102

1. Chaudhuri, S. K. (2000). Concise Medical Physiology. New Central Book Agency
 2. (P) Ltd.
 3. Ganong, W. F. (2003). Review of Medical physiology. 21st ed. McGraw Hill.
 4. Hildebrand, M. (1995). Analysis of Vertebrate Structure. John Wiley and Sons.
 5. Hill, R.W., Wyse, G.A. and Anderson, M. (2008). Animal Physiology. 2nd ed. Sinauer Associates Inc.
 6. Hoar, W. S. (1984). General and comparative Physiology. 3rd ed. Prentice-Hall of India
 7. Koppen, B. M. and Stanton, B. A. (2009). Berne and Levys' Physiology. 6th ed. Mosby.
 8. Romer, A. S. and Parsons, T. S. (1986). The vertebrate body. 6th ed. Saunders College Publishing.
 9. Bolandar, M. (2001). Molecular Endocrinology. Elsevier Science.
 10. Greenspan, F. S. and Gardener, F. G. (2003). Basic and Clinical Endocrinology. 7th ed. McGraw Hill.
 11. Ganong, W. F. (2003). Review of Medical physiology. 21st ed. McGraw Hill.
 12. Hadley, M. E. (2000). Endocrinology. 5th ed. Pearson Education.
 13. Norris, D. O. (2006). Vertebrate Endocrinology. 4th ed. Academic Press.
 14. Randall, D., Burggren, W. and French, K. (2002). Eckert's Animal Physiology – Mechanisms and Adaptation. 5th ed. W. H. Freeman.
- Sherwood, L. (2004). Human Physiology: From cells to systems. 5th ed. Thomson Brooks Cole.

NPH-103

1. Das, debajyoti (2012). Biochemistry. India: academic publisher.
2. Manay shakuntala, Shadaksharaswamy, M (2020). food: facts and principles, 4th edition. New age international publishers.
3. Pomeranz Y (Ed) (1991). Functional Properties of Food Components, (2nd edition), Publishers.

NPH-104

1. Smith, G.W. Preventive Medicine and public health. 2nd edition. McMillan Co. New York.
2. Park: Park's Textbook of preventive and Social Medicine. 23rd edition. M/s. Banarasidas Bhanot. Jabalpur.
3. Seshubabu VVR (2011). Review in Community Medicine, 2nd Ed, Paras Medical Books Pvt Ltd.
4. Mahajan BK, Roy RN, Saha I, Gupta, MC (2013). Text book of Preventive and Social Medicine, 4th Ed. Japee Brothers.
5. Vir SC (2011). Public Health Nutrition in Developing Countries, Woodhead Publishing India.
6. Willett W (2012). Nutritional Epidemiology, 3rd Ed. Oxford University Press, USA

NPH-195

1. Wilson K and Walker J (2000). Principles and Techniques of Practical Biochemistry, 5th Ed. Oxford University Press.
2. Sadasivan S and ManikamK (2007). Biochemical Methods, 3rd Ed. New Age International (P) Ltd.
3. Oser B L (1965). Hawk's Physiological Chemistry, 14th Ed. McGraw-Hill Book
4. Nath RL and NathRK (1990). Practical biochemistry in clinical medicine, 2nd Ed. Academic Publishers.
5. Ghai, CL (2013). A textbook of practical physiology, 8th Edition. Jaypee Brothers Medical Publishers (P) Ltd

2 nd Semester				
Paper	Course	Marks	Lecture hours	Credit Point
NPH-201	CBCS-I	50	40	4
NPH-202	Nutritional Biochemistry	50	40	4
Unit I	Enzymes Nomenclature and classification, general properties, coenzyme and their function, factors influencing enzyme reaction kinetic properties, Michaelis constant inhibition, purification, methods for determining activities of some important enzymes, isoenzyme, mechanism of enzyme action, regulation of enzyme activity, allostericity and feedback inhibition			
Unit II	Metabolism of Carbohydrate and Protein Aerobic and anaerobic pathways of glycolysis, glycogenesis, glycogenolysis, gluconeogenesis, HMP shunt pathway, electron transport chain, amino acid metabolism. Urea cycle and uric acid biosynthesis.			
Unit III	Metabolism Lipid and Nucleic Acid Fatty acids synthesis and breakdown, synthesis of ketone bodies, bile synthesis pathway Nucleic acids, nucleotides and nucleosides- Classification and structure, <i>de novo</i> synthesis and degradation.			
Unit IV	Vitamins and Minerals: Metabolism and function Biochemical pathways involving water soluble and fat soluble vitamins, minerals, their functions.			
NPH-203	Therapeutic Nutrition	50	40	4
Unit I	Principles of Diet Therapy Concept, significance and principles of Diet Therapy Therapeutic adaptations of normal diet, classification of therapeutic diet, Role and responsibilities of Dietitian (Administrative, Community, Hospital Interpersonal relationship with patient, Nutritional counseling),			
Unit II	Therapeutic Nutrition in non-communicable diseases Etiology, therapeutic approach in prevention and management of non- communicable diseases- CVD, Kidney diseases, diabetes, Neoplastic disorders, and liver disease.			
Unit III	Therapeutic Nutrition in infectious diseases Etiology, therapeutic approach in prevention and management of fevers and infectious diseases (Diarrheal disease, Tuberculosis, Influenza, AIDS, COVID-19)			
Unit IV	Therapeutic Nutrition in Inherited genetic			

	disorders Etiology, therapeutic approach in prevention and management of phenylketonuria, galactosemia, fructosuria, alkaptonuria, maple syrup urine disease.			
NPH-204	Microbes and Public Health	50	40	4
Unit I	Microbiology and Public Health Scope and importance of microbiology in nutrition and public health, Pathogenic microorganisms of public health importance (Bacteria; Virus; Parasites; Fungi) Infectious Disease Epidemiology, Dynamics of disease transmission.			
Unit II	Food Microbiology Fermented foods: Definition of fermented food Types of fermented foods Biological importance of fermented foods, Microbial diversity of fermented foods Milk & Dairy technology: Pasteurization, homogenization of milk Manufacture of milk products like condensed and dried milk, cream, butter, ghee, ice cream, cheese Probiotics: Taxonomy and Biology of Probiotics Role of Probiotic bacteria in human and animal health Role in lactose metabolism, Antimutagenic and antitumour activities, Stimulation of immunity, Prebiotics and Probiotics in infant formulae, Probiotics and Prebiotics in elderly individuals, Prebiotics and Probiotics in companion animal nutrition. Microbial spoilage of food.			
Unit III	Food borne Diseases Food-borne diseases and food poisoning Mode of transmission, pathogenesis and control of: <i>Staphylococcal enteritis</i> , <i>Botulism</i> <i>Bacillus cereus enteritis</i> , <i>Salmonellosis</i> <i>Shigellosis</i> , <i>Vibrio enteritis</i> <i>Listeriosis</i> , <i>Escherichia enteritis</i> <i>Campylobacteriosis</i> and <i>Perfringens enterotoxemia</i> Prevention measures for food-poisoning and spoilage Preventing the incorporation of microbes into food Preventing the survival or multiplication of microbes in food (temperature and food preservation, irradiation and chemical preservation)			
Unit IV	Immunology, Vaccination and Public Health Cells and organs of the immune system: Leucocytes, APC, Macrophage-cell and B-cell, Mast cell, Dendritic cell and APC, NK cells Structure and Function of MHC. Types of antigen and antibodies: Definition and properties of antigenic determinants of immunoglobulin (Isotype, allotype & idiotypic) Structure, classes and biological activities of antibodies. Antigenic determinants. Types of immune response: Innate and acquired			

	Immunity, Humoral and Cellular Immunity. Active, Passive, Combined passive and active, Chemoprophylaxis, Immunizing agents, WHO EPI Schedule, National immunization schedule, The cold chain, Adverse events of immunization. Surveillance.			
NPH-205	Public Nutrition	50	40	4
Unit I	Public Nutrition: Multidisciplinary concept Multiple Causes of Public Nutrition Problems. Multidisciplinary Approach to Solving Nutrition Problems, Role of Agriculture in Nutrition, Distribution and Storage of Food Products, Application of Science and Technology to Improve Food Supply. Food and Nutrition Security- Understanding the Concept of Food and Nutrition Security, Determinants of Food Security India's Food Security System. Food behaviour			
Unit II	Challenges in Public Nutrition Nutritional Problems in Public Health- Low birth weight, Under-nutrition, Vitamin-A deficiency disorder (VAD), Nutritional anaemia, Iodine Deficiency disorder, Endemic fluorosis. Cardiovascular disease, Diabetes, Obesity.			
Unit III	Strategies to Combat Public Nutrition problems Nutritional Surveillance, Food Surveillance, Action at family level, community level, National level, International level Health Planning Management- Planning cycle, Planning commission, NITI AAYOG			
Unit IV	Nutrition Education Concept, Objectives and approaches of nutrition health education. Methods, modes and barriers of communication Planning, management and organization of health education programs E-medicine, distance education and associated legal issues Role of media in health education E- health and M-health			
NPH-296	Practical Nutritional Anthropometry 1. Anthropometric Measurement of infant - Height, weight, circumference of chest, MUAC, comparison of anthropometric assessment data with standards and interpretation. 2. Anthropometric Measurement of adults- Height, Weight, BMI, WHR, comparison of anthropometric assessment data with standards and interpretation. 3. Growth charts - plotting, growth monitoring. 4. Measurement of body fat percentage, fat mass and fat free mass.	50	80	4
	Total Marks	300		
	Total Credit			24

Text Books/References (Paper wise):

NPH-202

1. Murray RK, Bender DA, Botham KA, Mayes PA and RodwellVW (2015). Harper's Biochemistry, 30th Ed. Lange Medical Book.
2. Handler P, Smith EI, Stelten DW. Principles of Biochemistry, McGraw Hill Book Co.
3. Nelson DL and Cox MM (2017). Lehninger Principles of Biochemistry. 7th Ed. WH Freeman.
4. Devlin TM (2010): Text Book of Biochemistry with Clinical Correlations. John Wiley and Sons.
5. Berg JM, Tymoczko JL, Gatto GJ and Stryer L (2015). Biochemistry, 8th Ed WH Freeman and Co.

NPH-203

1. Anderson L, Dibble MV, Turkki PR, Mitchall HS, and RynberginHJ(1983). Nutrition in Health and Disease, 17th Ed. J. B. Lipincott& Co. Philadelphia.
2. Anita FP and Abraham P. Clinical Dietetics and Nutrition, 4th Ed. Oxford University Press, Delhi.
3. Mahan LK and Escott-Stump S (2007). Krause's Food and Nutrition Therapy. 12th Ed. WB Saunders Company, London.
4. Robinson. CH, Lawler MR, Chenoweth WL and Garwick, AE (1986). Normal and Therapeutic Nutrition. 17th Ed., Macmilan Publishing Co.
5. Williams SR (1989). Nutrition & Diet Therapy, 6th Ed. Times Mirror/Mosby College Publishing, St. Louis.
6. Begum RM (2009). A textbook of Food, Nutrition and Dietetics, 3rd Ed. Sterling Publishers, New Delhi.
7. Joshi SA (2017). Nutrition and Dietetics, 4th Ed. Tata McGraw Hill Publications, New Delhi.
8. Hutchison, R (2010). Food And The Principles Of Dietetics , Kessinger Publishing, LLC

NPH-204

1. Frazier, W.C. & Westhoff, D.C. (1997). Food Microbiology. 4th Edition. McGraw-Hill Education.
2. Jay, J.M., Loessner, M.J. & Golden, D.A. (2005). Modern Food Microbiology. 7th Edition. Springer.
3. Ray, B. & Bhunia, A. (2014). Fundamental Food Microbiology. 5th Edition. CRC Press.
4. Prescott, L.M., Harley, J.P. & Klein, D.A. (2017). Microbiology. 10th Edition. McGraw-Hill Education.
5. Park, K. (2014). Park's Textbook of Preventive and Social Medicine. 23rd Edition. Banarsidas Bhanot Publishers.
6. Schneider, M.J. (2016). Introduction to Public Health. 5th Edition. Jones & Bartlett Learning.

7. Mahajan, B.K. & Taneja, D.K. (2018). Textbook of Community Medicine. 4th Edition. Jaypee Brothers Medical Publishers.
8. Kuby, J., Kindt, T.J., Osborne, B.A. & Goldsby, R.A. (2013). Kuby Immunology. 7th Edition. W.H. Freeman and Company.
9. Abbas, A.K., Lichtman, A.H. & Pillai, S. (2021). Cellular and Molecular Immunology. 10th Edition. Elsevier.
10. Murphy, K. & Weaver, C. (2016). Janeway's Immunobiology. 9th Edition. Garland Science.

NPH-205

1. Bamji, M.S., Rao, N.P. & Reddy, V. (2009). Textbook of Human Nutrition. 3rd Edition. Oxford & IBH Publishing.
2. Gopalan, C., Rama Sastri, B.V. & Balasubramanian, S.C. (2012). Nutritive Value of Indian Foods. Revised Edition. National Institute of Nutrition (ICMR).
3. Gibney, M.J., Margetts, B.M., Kearney, J.M. & Arab, L. (2013). Public Health Nutrition. 2nd Edition. Wiley-Blackwell.
4. Srivastava, R.N. & Sandhya, G. (2018). Textbook of Community Medicine: Preventive and Social Medicine. 2nd Edition. CBS Publishers.
5. Sharma, S. (2017). Nutrition and Dietetics. 3rd Edition. Elite Publishing House.
6. Srilakshmi, B. (2019). Nutrition Science. 4th Edition. New Age International Publishers.
7. Park, K. (2017). Park's Textbook of Preventive and Social Medicine. 24th Edition. Banarsidas Bhanot Publishers.
8. Contento, I.R. (2015). Nutrition Education: Linking Research, Theory and Practice. 3rd Edition. Jones & Bartlett Learning.

3rd Semester: Spl.				
Paper	Course	Marks	Lecture hours	Credit Point
NPH-301	CBCS-II	50	40	4
NPH-302	Food Science and Innovations	50	40	4
Unit I	Food Processing Techniques of food processing- frozen products, fast food, milk products. Preparation of confectionary products, fruits, fruit juice concentrates and vegetables. Safe use of preservatives. Estimation of shelf life of packaged food stuff. Water vapor of flexible packaging materials. Identification and chemical resistance of plastic film. Pre-packaging of vegetables. Familiarization of types of packaging materials. Evaluation of new food products.			
Unit II	Food Storage and Preservation Principles and factors affecting food preservation, Food preservation by cooling and heating. Role of food additives in food preservation Essential oil, antioxidants, antimicrobial agents etc. in food preservation Role of enzymes in food processing and preservation Application of enzymes in the food industry			
Unit III	Food Safety, Packaging and Labeling Introduction to food safety issues in India, quality and specification of raw material and finished products. Hygiene of food handling and surveillance system Location and layout of food premises Cleaning procedures of equipment, furniture and fixtures in food premises Personnel Hygiene			

	Sanitation Training and Education Microbial, Chemical, allergen, and Physical contamination, Food Hazards, HACCP, Food Adulteration Management and Disposal of food wastes Subjective evaluation of food quality Objective Evaluation of food quality International and national food regulatory agencies, Food laws and standards Packaging, function, classification, Materials used for packing, Laws related to packaging Labelling provision for existing food laws Some recent development on the food labelling front in India			
Unit IV	Innovation and Product Development Food needs and consumer preference: need for new products, Trends and innovation in food markets, Consumer research and the market. New technologies involved in food product development. New food product development process and activities; Planning stages, Prerequisites of a successful product development, the concept of added value.			
NPH-303	Omics in Nutrition and Public Health	50	40	4
Unit I	Human Genetics Structure of eukaryotic DNA; Histone proteins, Nucleosome Molecular organization of DNA in chromosomes. Heterochromatin and Euchromatin. Human mitochondrial DNA DNA replication, Transcription, Translation, Control of gene expression – Eukaryotic Mechanism of sex determination, Sex linked inheritance, Linkage and crossing over Genetic diseases Monogenic diseases – Thalassemia, Albinism, Haemophilia, Colour blindness Polygenic diseases- Hyperlipidemia, Diabetes mellitus Genetic basis of Bovine spongiform encephalopathy (BSE) Genetic basis of Myocardial Infarction Genetic syndromes Down syndrome, Turner syndrome, and Klinefelter syndrome Genetics, Measure of nutritional phenotype, epigenetics and nutritional epigenomics			
Unit II	Genomics, Proteomics and Metabolomics Basic idea of Genomics and Proteomics;			

	Lateral and Horizontal gene transfer; Orthologous and Paralogous Omics in nutrition, Nutrigenome, Metabolome and Metabolomics Genomics & Transcriptomics			
Unit III	Bioinformatics Concept and applications of Bioinformatics, Nucleic acid Data Bases: Gen Bank of USA, EMBL of Europe, DDBJ of Japan. Protein Data Bases: PIR, MIPS, SWISS-PROT, TrEMBL, NRL-3D and PDB Protein Data Bases: PIR, MIPS, SWISS-PROT, TrEMBL, NRL-3D and PDB Nutrient data bases Principle, Sequence alignment: Global match, Local match, Motif match Features and types of BLAST Sequence similarity searching by BLAST Significance of Multiple Sequence Alignments			
Unit IV	Nutrigenomics Nutritional regulation of gene expression. Epigenomics Role of specific nutrient in controlling gene expression Relation between food and medicine in controlling of diseases			
NPH-304	Epidemiology	50	40	4
Unit I	Epidemiology: Concept and Methods Principles of Epidemiology: Definition and concepts of epidemiology and epidemiology of diseases, Types of Epidemiology, Uses of Epidemiology. Epidemiological measures: Rates - ratio – proportions, Standardization of rates (direct/indirect). Association and causation (spurious, direct/indirect). Screening for disease (types and uses, sensitivity, specificity, positive and negative predictive values) Epidemiological Methods: Descriptive, Analytical, Experiment Studies, Association and Causation			
Unit II	Nutritional Epidemiology Epidemiologic approach to diet and disease. Food composition data sources and computation systems, 24-hour recall and diet record methods, Food frequency methods. Biochemical indicators of dietary intake. Dietary fat and breast cancer, Diet and coronary heart disease, Folic acid and neural tube defects.			

Unit III	Epidemiology for Less Developed Countries Social determinants: poverty, education, income) Environmental determinants: Sanitation, housing Health system factors. Disease Burden in Less developed countries. Strategies for improvement: Primary Health care approach, International health agencies (WHO, UNICEF, CARE, World bank)			
Unit IV	Epidemiology: Recent Challenges Communicable Diseases: Respiratory infections, intestinal infections, Arthropod borne diseases. Non communicable diseases: Hypertension, Stroke, Cancer, Diabetes, Obesity, Accidents and injury.			
NPH-305	Environment and Public Health	50	40	4
Unit I	Biodiversity and Public Health Biotic and Abiotic components. Energy flow in ecosystems, energy flow models, food chains and food webs. Biogeochemical cycles, Ecological succession. Species diversity, Concept of ecotone, edge effects, ecological habitats and niche. Ecosystem stability and factors affecting stability. Population ecology: Characteristics of population, concept of carrying capacity, population growth and regulations. Population fluctuations, dispersion and metapopulation. Concept of 'r' and 'k' species. Keystone species Community ecology: Definition, community concept, types and interaction – predation, herbivory, parasitism and allelopathy. Biological invasions.			
Unit II	Water Pollution and Public Health Sources and types of Pollutants – Natural and anthropogenic sources, primary and secondary pollutants. Impact of air pollutants on human health, plants and materials; Acid rain. Control devices for particulate matter and gaseous pollutants			
Unit III	Air, Soil Pollution and Public Health Sources and types of Pollutants – Natural and anthropogenic sources, primary and secondary pollutants. Impact of air pollutants on human health, plants and materials; Acid rain. Control devices for particulate matter and gaseous pollutants			
Unit IV	Noise and Public Health			

	Sources, weighting networks, Measurement and analysis of sound; A weighted sound level, Equivalent sound pressure level (Leq), Noise pollution level (NPL), Sound exposure level (SEL), Traffic noise index (TNI), Noise dose and Noise Pollution standards. Impact of noise and vibrations on human health. Noise control and abatement measures: Active and Passive methods.			
NPH-396	Practical Planning of Meal in Health and Diseases: 1. Preparation of diet chart for patients suffering from cardiovascular diseases. 2. Preparation of diet chart for patients suffering from cancer. 3. Preparation of diet chart for patients suffering from chronic and acute fever. 4. Preparation of diet chart for patients suffering from gastrointestinal disorders. 5. Preparation of diet chart for patients suffering from anaemia. 6. Preparation of diet chart for patients suffering from Liver diseases. 7. Preparation of diet chart for patients suffering from Renal diseases.	50	80	4
	Total Marks	300		
	Total Credit			24

Text Books/References (Paper wise):

NPH-302

1. Fellows P J (2002), Food Processing Technology- Principles and Practices, 2nd Edition. Woodhead Publishing Ltd. port.
2. Rahman M S, (2007) Handbook of Food Preservation 2nd Edition by Taylor & Francis Group, CRC Press
3. Schmidt, R. H., & Rodrick, G. E. (2005). Food safety handbook. John Wiley & Sons.
4. Lawley, R., Curtis, L., & Davis, J. (2015). The food safety hazard guidebook. Royal Society of Chemistry.
5. PF Guiné, R., CD Ramalhosa, E., & Paula Valente, L. (2016). New foods, new consumers: innovation in food product development. Current Nutrition & Food Science, 12(3), 175-189.
6. Olson, V M; Shemwell G A and Pasch, S (1998) Egg and Poultry Meat Processing, VCH P, New York
7. Winton & Winton, (1991) Techniques of Food Analysis. Allied Scientific Publishers. Matz A Samuel, Bakery Technology and Engineering.
8. Fabriani, G and Lintas C. (1988) Durum Wheat Chemistry and Technology. American Association of Cereal Chemistry Inc.
9. Kent N L. (1993) Technology of Cereals. 4th Edi. Pergamon Press.

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1. Lesk, A.M. (2009). An Introduction to Bioinformatics. Ed 2. Oxford Principles of Gene Manipulation
2. R.W. Old and S. B Primrose, An Introduction to Genetic Engineering 6th edition, Blackwell Science Inc.
3. T. A. Brown. (2006). Genomes, 2nd edition, Garland Science publisher
4. David Webster. (2000). Protein Structure prediction: Methods and Protocols, Human Press.
5. David Freifelder, George Malacinski. (2005). Essentials of Molecular Biology. - 4th edition.
6. Andreas D. Baxevanis and B.F. Francis Ouellette (2002). Bioinformatics: A practical guide to the analysis of genes and proteins 2nd edition Wiley Interscience.
7. Attwood TK et al (2007). Introduction to Bioinformatics. 1st ed. Pearson Education.

NPH-304

1. Rothman, K.J., Greenland, S. & Lash, T.L. (2008). Modern Epidemiology. 3rd Edition. Lippincott Williams & Wilkins.
2. Gordis, L. (2014). Epidemiology. 5th Edition. Elsevier Saunders.
3. Willett, W. (2013). Nutritional Epidemiology. 3rd Edition. Oxford University Press.
4. Beaglehole, R., Bonita, R. & Kjellström, T. (2006). Basic Epidemiology. 2nd Edition. World Health Organization.
5. Park, K. (2017). Park's Textbook of Preventive and Social Medicine. 24th Edition. Banarsidas Bhanot Publishers.
6. Jekel, J.F., Katz, D.L., Wild, D.M.G. & Elmore, J.G. (2014). Epidemiology, Biostatistics, Preventive Medicine and Public Health. 4th Edition. Elsevier Saunders.
7. Detels, R., Gulliford, M., Karim, Q.A. & Tan, C.C. (2015). Oxford Textbook of Global Public Health. 6th Edition. Oxford University Press.
8. Bonita, R., Beaglehole, R. & Kjellström, T. (2007). Basic Epidemiology for Public Health Practice. 2nd Edition. Oxford University Press.
9. World Health Organization (2020). World Health Statistics 2020: Monitoring Health for the SDGs. WHO.
10. World Health Organization (2021). Global Nutrition Report 2021: The State of Nutrition in the World.

NPH-305

1. Park, K. (2017). Park's Textbook of Preventive and Social Medicine. 24th Edition. Banarsidas Bhanot Publishers.

2. Misra, S.G. & Mani, D. (2017). Soil Pollution and Soil Protection. 2nd Edition. New Age International Publishers.
3. Rao, C.S. (2018). Environmental Pollution Control Engineering. 2nd Edition. New Age International Publishers.
4. Sharma, B.K. (2016). Environmental Chemistry. 16th Edition. Goel Publishing House.
5. Botkin, D.B. & Keller, E.A. (2014). Environmental Science: Earth as a Living Planet. 9th Edition. Wiley.
6. Masters, G.M. & Ela, W.P. (2015). Introduction to Environmental Engineering and Science. 3rd Edition. Pearson Education.
7. Peavy, H.S., Rowe, D.R. & Tchobanoglous, G. (2013). Environmental Engineering. 2nd Edition. McGraw-Hill Education.
8. World Health Organization (2019). Preventing Disease through Healthy Environments: A Global Assessment of the Burden of Disease from Environmental Risks. WHO.

4 th Semester: Spl.				
Paper	Course	Marks	Lecture hours	Credit Point
NPH-401	Common Paper (P): Research Methodology, Ethics and IPR	50	40	4
Unit I	Principles of Research Methodology Types of Research: Descriptive/historical, Experimental, survey, case study; Research methods: Sample selection, questionnaire construction, interviewing techniques, interpretation of data, scaling methods. Bibliography & literature survey; Conclusions and recommendations; Summary			

	techniques, Report writing Vital Statistics: Introduction to the concept of various birth rates, fecundity rates and mortality rates (Level of teaching- Elementary).			
Unit II	Statistics and Computer Application Introduction, Collection and presentation of data- Concept of continuous and dis-continuous data, Tally mark, class limit, boundary, Frequency distribution, Cumulative frequency. Graphical presentation techniques including Histogram, Bar chart, Pie chart along with the concepts of frequency polygon, o-give (Level of teaching-Intermediate) Measurement of central tendency and dispersion-Mean, median, mode, Mean absolute deviation, Mean square deviation, Root mean square deviation, Range and coefficient of variation. Correlation and regression, Elements of Sampling Statistical Inference Probability theory Basic idea of Operating System Word Processing, PICTURE: Creation, editing and import, printing. Use of other available features. Document Preparation & Presentation Spread sheet			
Unit III	Research Ethics Introduction, Principles, Approach, Confidentiality			
Unit IV	IPR: Concept Introduction, Principal, Models			
NPH-402	Common Paper (Q): Policies and Regulatory Guidelines and Programmes related to Nutrition and Public Health	50	40	4
Unit I	Policies on Nutrition and Public Health Health Committees and Development of Health Services in Independent India Constitutional Provisions, Federal Structure and Social Security National Health Policies (1983, 2002, 2017), Population Policy, Nutrition Policy Policy on Indian Systems of Medicine and Homeopathy, 2002 Important Health Legislations in India Health Infrastructure in India—Public, Private, and Charitable, Public Private Partnership (PPP) Health financing and Health insurance Civil society and Social Movements in Health Health for All approaches- Primary Health Care (1978) to Universal Health Coverage Millennium Development Goals (MDG) and Sustainable Development Goals (SDG)			

Unit II	Agencies involved in Nutrition and Public Health and their functions International Agencies- World Health Organization (WHO) Role in global health policy, nutrition surveillance, food safety, disease prevention United Nations Children's Fund (UNICEF) Child nutrition, immunization, growth monitoring Baby-Friendly Hospital Initiative, Vitamin A supplementation, child rights and protection Food and Agriculture Organization (FAO) Food security, nutrition policy, Codex Alimentarius (food standards), sustainable agriculture World Food Programme (WFP) World Bank Non-Governmental and Voluntary Agencies- CARE International Maternal and child nutrition, community-based health and nutrition programmes Rockefeller Foundation Public health research, nutrition innovation, agricultural support (Green Revolution role) International Food Policy Research Institute (IFPRI) Policy research, Global Hunger Index, evidence-based nutrition solutions National Agencies (India) Indian Council of Medical Research (ICMR–NIN) Ministry of Health and Family Welfare (MoHFW) National Health Policy, disease control, immunization programmes Ministry of Women and Child Development (MWCD) Integrated Child Development Services (ICDS), Poshan Abhiyaan, mid-day meal scheme National Nutrition Strategy, monitoring of nutrition programmes Role of NGOs in Nutrition and Public Health			
Unit III	Regulatory Guidelines on Nutrition and Public Health			
Unit IV	Programmes related to Nutrition and Public Health: Maternal and Child Health & Nutrition Programmes- Integrated Child Development Services (ICDS), Mid-Day Meal Scheme (MDMS), Poshan Abhiyaan (National Nutrition Mission), Janani Suraksha Yojana (JSY), Janani Shishu Suraksha Karyakram (JSSK), Kishori Shakti Yojana / Scheme for Adolescent Girls Micronutrient Supplementation & Fortification Programmes- National Iron Plus Initiative (NIPI) Weekly Iron and Folic Acid Supplementation (WIFS) Vitamin A Prophylaxis Programme			

	Universal Salt Iodization (USI) Food Fortification programmes (milk, wheat flour, rice, edible oil) Public Health and Disease Control Programmes- National Health Mission (NHM) National Rural Health Mission (NRHM) & Urban Health Mission (NUHM) National Programme for Prevention and Control of Cancer, Diabetes, CVD and Stroke (NPCDCS) Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+A) Recent and Emerging Programmes- Eat Right India (FSSAI initiative) Anaemia Mukh Bharat strategy POSHAN Tracker & Digital Nutrition Monitoring National Programme on Prevention of Vitamin D Deficiency (emerging focus)			
NPH- 403	Special Paper (R1): Nutrition and Public Health in Special Situations	50	40	4
Unit I	Space Nutrition Concept of micro-gravity, Physiological Changes and nutritional requirements in Micro-gravity, Classification of space food, processing of food for space craft, planning and serving food			
Unit II	Nutrition for Sportspersons Basic Concept of Bioenergetics, energy sources during exercise, Benefits of an active lifestyle, Fitness and its measurement, Difference between physical activity, exercise, fitness and sport, Health-related and sport-related components of physical fitness, Energy system in exercise, factors affecting fuel utilization, Dietary and nutritional recommendations for sports, Nutritional allowances as given by NIN to different groups of players, Pre-competition, during competition and post- competition meal			
Unit III	Nutrition in Extreme conditions Physiological changes, Nutritional requirement during extreme environmental temperature, in high altitude			
Unit IV	Nutrition and Public health during Disasters Physiological Changes, Nutrition requirement during flood and famine.			
NPH- 403	Special Paper (R2): Global health and Sustainable Developmental Goals (SDGs)			
Unit I	Global health challenges: Challenges of Global health, Causes of Global Health issues, Managements of Global health challenges. COVID-19 infection, Hidden Hunger, Childhood obesity, Depression.			
Unit II	Emporiatics: Health advice to travelers: Individual, local, National			

	and International. Travel-related Health risks, Medical kits for travelers, International Health Regulations.			
Unit III	SDGs: Concept, history and framework of SDG, Targets, Goals and Indicators. Importance of Sustainable development Goals,			
Unit IV	SDGs: Implications for India. SDGs Related to Health, Nutrition, and Well-being Poverty eradication, hunger, and food security (NFSA, POSHAN Abhiyaan, Mid-Day Meal, ICDS). Good health and well-being – National Health Mission, Ayushman Bharat, maternal and child health, disease burden. Quality education – role in health and nutrition literacy. Gender equality and women's empowerment in nutrition and health. SDGs on Environment, Sanitation, and Resources Clean water and sanitation (Swachh Bharat Abhiyan, Jal Jeevan Mission). Affordable and clean energy – rural energy access, renewable energy. Sustainable cities and communities – Smart Cities Mission, urbanization and health. Responsible consumption and production – food loss, waste management, sustainable agriculture. Climate action – impact on agriculture, nutrition, and health. Life below water and on land – biodiversity conservation, fisheries, soil health. SDGs on Social and Economic Development			
NPH- 404	Special Paper (S1): Social Medicine	50	40	4
Unit I	Social Science and Health: Definition, Scope, Concepts and Significance of Social, Economic, Cultural and Behavioral factors on Health and Disease, Social Theories of Causation of Disease, Implications of Social Structure and Socio-economic Status for Health, Political and Economic Aspects of Health, Health Perceptions and Behavior, Health Economics, Qualitative Research Methodology, Social Work Approach in Health Care.			
Unit II	Family Welfare: National Family Welfare Program, Reproductive and child Health programs, Safe motherhood and essential newborn care with related schemes and programs, Gender issues in women's health, Major health problems of children in India and related National Health Programs, Adolescent health and related schemes and programs, Rights of child and related schemes and Programs, School Health Programme			

Unit III	Demography: Definition, concepts and indicators related to demography and family planning, Demographic cycle, Size, composition and distribution of India's population, Approaches and methods of contraception, Social issues related to Family Planning, Felt need and unmet need in Family planning, Social marketing in family planning, Counseling in Family planning, PC and PNDT Act-1994 MTP Act 1971			
Unit IV	Traditional knowledge: Medicine in Antiquity, Dawn of scientific medicine, Modern medicine and social medicine. Concept of AYUSH.			
NPH- 404	Special Paper (S2): Nutrition Education			
Unit I	Nutrition Education: Concept, Objectives and approaches: Goal and Purposes of Nutrition education, Conventional approaches, modern approaches. Nutritional policies and programs, National Nutrition policy (1993), Educational Methods, Evaluation & Practice of Health Education in India. Nutrition Health Counseling Process & Techniques. Role of Public health educators, nutritionist, NGO. Research in Nutrition Health Education.			
Unit II	Communication: Models and barriers Basic Concept & Principles of Communication, Definition, Purpose, Types of Communication, Communication Process, Directions of Communication: Upward, Downward, Lateral, Factors influencing Communication, Barriers of Effective Communication, How to overcome the Barriers. Models of communication: Aristotle Model, Shannon and Weaver model, Schramm Model, Laegans Model, Fano Model, Litterer's Model, Westly Maclean's Model.			
Unit III	Role of Media including Social Media: Group approach- Panel discussion, conference, seminars, Role play. Mass communication & Role of Media in health education, Folk media, Social media platforms in health care and awareness. Telemedicine & e-health, community radio. Future trends in information and communications systems			
Unit IV	Recent advances in Nutrition Education: online techniques: Objectives of using ICT in higher education,			

	Terminology in ICT Strengths and limitations of ICT Major ICT learning in categories Digital initiative in higher education. Basic concept of computer programming, internet, e-mail account E-Government and E-Governance. WWW in nutrition education.			
NPH- 495	Project	50	80	4
NPH- 496	Internship	50	80	4
	Total Marks	300		
	Total Credit			24

Text Books/References (Paper wise):

NPH-401

1. Minium, E.W., King, B.M., & Bear, G. (1995/2004). Statistical Reasoning for Psychology and Education. New York: Wiley and Sons.
2. Mujis, D. (2004). Doing Quantitative Research in Education with SPSS. London: Sage.
3. Salkind, N. (2000). Statistics for People Who (they think) Hate Statistics. London: Sage.
4. D.N. Elhance, Veena Elhance, B.M. Fundamentals of Statistic, Aggarwal, Kitab Mahal, 22-A, Sarojini Naidu Marg, Allahabad.
5. J.N. Kapur, H.C. Saxena, Mathematical Statistics, S. Chand & Company Ltd., Ram Nagar, New Delhi-110055.
6. S. Singh, Theory and Analysis of Sample Survey Design, New Age Enterprises Ltd.
7. Medhi, J., Statistical Methods- An Introductory Text, New Age Enterprises Ltd.
8. Mukhopadhyay, P. (1999): Applied Statistics, Books and Allied (P) Ltd.
9. Goon, A.M., Gupta, M.K. and Dasgupta, B. (2008): Fundamentals of Statistics, Vol. II, 9th Edition, World Press.

NPH-402

1. Park, K. (2017). Park's Textbook of Preventive and Social Medicine. 24th Edition. Banarsidas Bhanot Publishers.
2. Gordis, L. (2014). Epidemiology. 5th Edition. Elsevier Saunders.
3. Government of India (2017). National Health Policy 2017. Ministry of Health and Family Welfare, Government of India.
4. Government of India (2018). National Nutrition Strategy: NITI Aayog Guidelines. NITI Aayog.
5. Government of India (2021). Poshan Abhiyaan: Operational Guidelines. Ministry of Women and Child Development.
6. World Health Organization (2004). Global Strategy on Diet, Physical Activity and Health. WHO.

7. World Health Organization (2008). Global Strategy for Infant and Young Child Feeding. WHO.
8. World Health Organization (2013). Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020. WHO.
9. Food and Agriculture Organization (2014). Second International Conference on Nutrition (ICN2): Framework for Action. FAO & WHO.
10. World Health Organization (2021). Global Nutrition Report 2021: The State of Nutrition in the World. WHO.

NPH-403 (Special Paper (R1): Nutrition and Public Health in Special Situations)

1. Smith, S. M., Davis-Street, J., Neasbitt, L., & Zwart, S. R. (2012). Space Nutrition. Trafford Publishing.
2. Benardot, D. (2020). Advanced sports nutrition. Human kinetics.
3. Maughan, R. J. (Ed.). (2013). Sports nutrition (Vol. 19). John Wiley & Sons.
4. Srilakshmi, B. (2006). Nutrition Science. New Age International.
5. Young, H., Jaspers, S. (1995). Nutrition matters, people food and famine. Practical Action Publishing
6. Gunga, H. C. (2020). Human physiology in extreme environments. Academic Press.
7. Piantadosi, C. A. (2003). The biology of human survival: life and death in extreme environments. Oxford University Press.

NPH-403 (Special Paper (R2): Global health and Sustainable Developmental Goals (SDGs))

1. United Nations (2015). Transforming Our World: The 2030 Agenda for Sustainable Development. United Nations.
2. United Nations Development Programme (2020). Human Development Report 2020: The Next Frontier—Human Development and the Anthropocene. UNDP.
3. Keystone Symposia (2016). Sustainable Development Goals and Public Health. Keystone Symposia on Global Health.
4. Zuckerman, J.N., Steffen, R. & DuPont, H.L. (2013). Travel Medicine. 3rd Edition. Elsevier Saunders.
5. Keystone, J.S., Kozarsky, P., Connor, B.A. & Nothdurft, H.D. (2019). Travel Medicine: Emporiatrics in Practice. 5th Edition. Elsevier.
6. Schneider, M.J. (2016). Introduction to Public Health. 5th Edition. Jones & Bartlett Learning.
7. Detels, R., Gulliford, M., Karim, Q.A. & Tan, C.C. (2015). Oxford Textbook of Global Public Health. 6th Edition. Oxford University Press.
8. Beaglehole, R., Bonita, R. & Kjellström, T. (2006). Basic Epidemiology. 2nd Edition. World Health Organization.

NPH-404 (Special Paper (S1): Social Medicine)

1. Cockerham, W.C. (2017). Medical Sociology. 14th Edition. Routledge.
2. Scambler, G. (2012). Sociology as Applied to Medicine. 6th Edition. Elsevier.
3. Bhende, A.A. & Kanitkar, T. (2010). Principles of Population Studies. 7th Edition. Himalaya Publishing House.
4. Bhatia, B.D. (2009). Demography and Population Problems. 4th Edition. Vikas Publishing House.
5. McQuail, D. (2010). McQuail's Mass Communication Theory. 6th Edition. Sage Publications.
6. Baran, S.J. & Davis, D.K. (2014). Mass Communication Theory: Foundations, Ferment, and Future. 7th Edition. Cengage Learning.
7. Singhal, A. & Rogers, E.M. (2001). India's Communication Revolution: From Bullock Carts to Cyber Marts. Sage Publications.
8. World Health Organization (2013). eHealth and Innovation in Women's and Children's Health: A Baseline Review. WHO.
9. Park, K. (2017). Park's Textbook of Preventive and Social Medicine. 24th Edition. Banarsidas Bhanot Publishers.
10. Rao, S.S. (2005). Bridging the Digital Divide in Health Care: The Role of Information and Communication Technology in Public Health. World Health & Population Journal.
11. Rice, R.E. & Atkin, C.K. (2013). Public Communication Campaigns. 4th Edition. Sage Publications.

NPH-404 (Special Paper (S2): Nutrition Education)

1. Contento, I.R. (2015): Nutrition Education: Linking Research, Theory and Practice. 3rd Edition. Jones & Bartlett Learning.
2. AG, S. Karger (2020). Nutrition Education: Strategies for Improving Nutrition and Healthy Eating in Individuals and Communities. Karger International.
3. Contento, Isobel R. (2016). Nutrition Education: Linking Research, Theory, and Practice. Jones & Bartlett Publishers.