

SYLLABUS FOR
M.Sc. COURSE IN NUTRITION AND PUBLIC HEALTH
(With effect from the session 2021–2023)
[CHOICE BASED CREDIT SYSTEM]



DEPARTMENT OF NUTRITION AND PUBLIC HEALTH
THE UNIVERSITY OF BURDWAN
BURDWAN, WEST BENGAL
713104, INDIA

Annexure-I

POST GRADUATE SYLLABUS
Department of NUTRITION AND PUBLIC HEALTH
Summary of the course and credits

Semester I [Credits – 24]

Course				Lect. /week	Dur. of Exam (in hr)	Marks			Credit
Course code	Type	T/P	Name			I.A.	E.T.	Total	
MSNP101	Core	T	Concept of Food, Nutrition and Public Health	4T	2h	10	40	50	4
MSNP102	Core	T	Nutritional Biochemistry and Physiology	4T	2h	10	40	50	4
MSNP103	Core	T	Nutrition and Human Development	4T	2h	10	40	50	4
MSNP104	Core	T	Epidemiology and Microbiology	4T	2h	10	40	50	4
MSNP105	Core	P	Nutritional Physiology and Biochemistry	4P	4h	10	40	50	4
MSNP106	Core	P	Microbiology	4P	4h	10	40	50	4
Total credit									24

T/P: Theory/Practical

Semester II [Credits – 24]

Course				Lect. /week	Dur. of Exam (in hr)	Marks			Credit
Course code	Type	T/P	Name			I.A.	E.T.	Total	
MSNP 201	Core	T	Pathophysiology and Dietetics	4T	2h	10	40	50	4
MSNP 202	Core	T	Nutritional Assessment and Community Nutrition Management	4T	2h	10	40	50	4
MSNP 203	Core	T	Parasitology and Medical Entomology	4T	2h	10	40	50	4
MSNP 204	Core	T	Public Health and Environment	4T	2h	10	40	50	4
MSNP 205	Core	P	Anthropometry and Diet Therapy	4P	4h	10	40	50	4
MSNP 206	Core	P	Eco-toxicology, Parasitology and Medical Entomology	4P	4h	10	40	50	4
Total credit									24

T/P: Theory/Practical

Semester III [Credits – 24]

Course				Lect. /week	Dur. of Exam (in hr)	Marks			Credit
Course code	Type	T/P	Name			I.A.	E.T.	Total	
MSNP 301	Core	T	Food Sanitation and Food Hygiene	4T	2h	10	40	50	4
MSNP 302	Core	T	Food-Commodities and Food Technology	4T	2h	10	40	50	4
MSNP 303	Core	P	Food preparation and Food technology	4P	4h	20	40	50	4
MSNP 304	GE	T	Choice Based	2T	1h	5	20	25	2
MSNP 305*	DE	T	Discipline-centric Elective	4T	2h	10	40	50	4
MSNP 306**	DE	P	Discipline-centric Elective	4P	4h	10	40	50	4
MSNP 307	CE	T/P	Community Engagement ##	N.A.	N.A.	5	20	25	2
Total credit									24

T/P: Theory/Practical

CE: Community Engagement Activities; DE: Discipline-centric Elective; GE: Generic elective

Discipline-centric Elective (Students need to take any one of these Discipline-centric Electives)*1. EPIDEMIOLOGY AND COMMUNITY HEALTH(COURSE CODE: MSNT 305-DE1)****Generic Elective (To be offered for other departments)**

1. Communicable diseases and their management
2. Food technology and Food preservation

****COURSE CODE: MSNP 306-DE1****##Community Engagement:** Based on Discipline-centric Elective**Semester IV [Credits – 24]**

Course				Lect. /week	Dur. of Exam (in hr)	Marks			Credit
Course code	Type	T/P	Name			I.A.	E.T.	Total	
MSNP 401	Core	T	Food Toxicology, Food-Preservation and Immunology	4T	2h	10	40	50	4
MSNP 402	Core	T	Biostatistics, Bioinformatics and Nutrigenomics	2T	1h	5	20	25	2
MSNP 403	Core	P	Food Toxicology, Immunology and Bioinformatics	4P	2h	05	20	25	2
MSNP 404#	DE	T	Discipline-centric Elective*	4T	2h	10	40	50	4
MSNP 405##	DE	T	Discipline-centric Elective*	4T	2h	10	40	50	4
MSNP 406###	DE	P	Discipline-centric Elective*	8P	4h	10	40	50	4
MSNP 407	Project	T /P	Dissertation\$\$ (Empirical or Non empirical)	NA	–	–	50	50	4
Total credit									24

*Based on Discipline-centric Elective taken in Semester -III

\$\$Based on Discipline-centric Elective

#DE Course Code: MSNP 404-DE1 ##DE Course Code: MSNP 405-DE1

###DE Course Code: MSNP 406-DE1

SEMESTER – I

MSNP-101: CORE COURSE (CONCEPT OF FOOD, NUTRITION AND PUBLIC HEALTH) (CREDIT 4)

Time: 2hrs

Full Marks: 50

Concept of Food and Nutrition:

12L

Definition of Nutrition, Public Health Nutrition, Community Nutrition, Malnutrition and Under-nutrition, Importance of Nutrition, Different levels of studying Nutrition, Services and activities of Public Health Nutrition.

Definition of Food, Basic Food Groups, Functional Foods

Comparison among Core foods, Secondary foods and Peripheral foods Features of a Healthy diet and dietary practices, Balanced diet, Food Pyramid.

Nutritional profiling of Principal foods:

12L

Plant foods: Cereals, Rice, Wheat, Maize, Millets, Jowar, Bajra, Raji, Pulses, Vegetables, Nuts and oil seeds, Fruits, Sugar and jiggery, Condiments and spices and Beverages

Animal foods:

Milk and milk products, Egg, Fish and Meat.

Concept of Public Health:

8L

Definition and concept of Public Health, Core functions and essential services, Important Public Health Acts, Health problems of developed and developing countries Health problems in India.

Concept of Population and Community:

8L

Population dynamics - Natality, Mortality, Survivorship and age distribution. Community structure, Major and Minor community,

Relationship between species and number (Abundance, Density, Frequency, Relative abundance, Dominance, Dominance index, Species diversity)

Community boundary.

Food safety, standards and regulating authority:

10L

Concept of food safety, safety measures-basic concept of HACCP, Safe food handling practices and storing. Food additives-various types and their effects on health. Food security-Concept, factors affecting food security. Prevention of Food Adulteration (PFA) Act. Regulating authority- Fruit Products Order (FPO), Meat Products Order (MPO), Bureau of Indian Standards (BIS), MMPO, FSSAI, ISI, Agmark.

References:

- ✓ Ghosh S (1997). Nutrition and child care – A practical guide. 1st ed. Jaypee Brothers;New Delhi.
- ✓ Gopalan C (1992). Growth charts in Primary Health Care – Time For Reassessment.
- ✓ Hughes O, Bennion M (1970). Introductory Foods, Macmillan & Co. New York.
- ✓ Jelliffe DB and Jelliffe EFP (1989). Community Nutritional Assessment, Oxford University Press WHO. The growth chart: A tool for use in infant and child health care. Geneva: WHO; 1986.
- ✓ NFI Bulletin.
- ✓ Pomeranz Y (Ed) (1991). Functional Properties of Food Components, (2nd edition), Publishers.
- ✓ Tindall HD (1983). Vegetables in the Tropics, MacMillan Press, London.
- ✓ Winton AL, Winton KB (1999). Techniques of Food Analysis. Allied Scientific

**MSNP-102: CORE COURSE
(NUTRITIONAL BIOCHEMISTRY AND PHYSIOLOGY)
(Credit 4)**

Time:2 hrs**Full Marks: 50****Carbohydrates, Proteins and Fats:**

10L

Carbohydrates in the human diet and their relative importance, Carbohydrate metabolism (digestion, absorption, glucose transport, glycolysis, metabolism of lactate and pyruvate, citric acid cycle, gluconeogenesis, pentose phosphate pathway), Health implications of dietary carbohydrates, Health aspects of sugar and non-starch polysaccharides.

Composition and nature of proteins and identification of protein-providing foods in the diet, Basic structure of proteins and their alteration by cooking, Digestion and absorption of proteins, Amino-acid metabolism, Control of Protein metabolism, Role of proteins in the body, The role of proteins and amino acids in the body, in health and disease.

Metabolic changes and clinical features of Protein Energy Malnutrition (Marasmus and Kwashiorkor).

Nature and characteristics of fats important in human nutrition, Digestion and absorption of fats, Importance of the essential fatty acids, Role of fats in the diet and trends in fat consumption, Advantages and disadvantages of fat in the diet, Importance of omega-3 fatty acids in the body, Role of adipose tissue

Enzymes:

8L

General properties, nutritional classification and functions of digestive enzymes; Enzyme kinetics - Factors affecting enzyme action; Mechanism of enzyme action; Enzyme regulation.

Dietary fibres:

8L

Components of dietary fibre, Physiological and metabolic effects of dietary fibre, Role of fibres in prevention of diseases (Coronary heart disease, Diabetes Mellitus, Constipation, colon dysfunction and weight control).

Disadvantages of Dietary fibre.

Minerals and Trace elements:

8L

Absorption, utilization, sources, functions and deficiency of calcium and phosphorous. Factors affecting calcium absorption, Role of calcium in ossification and bone growth Functions, sources, absorption, utilization and storage of iron, Role of iron in prevention of anemia

Physiology and source and role of iodine, Fluorine, Zinc, Copper, Manganese, Selenium and Chromium in human nutrition.

Vitamins:

8L

Physiological action, sources, functions and deficiency of: Vitamin A, D, E and K, Thiamin, Riboflavin, Vitamin B12, Pantothenic acid, Folic Acid, Pyridoxine, Niacin, Ascorbic acid

The Blood:

8L

Cellular content of blood, Plasma and plasma proteins, Structure and function of Haemoglobin and role in oxygen transport. Blood groups (The ABO system, The Rhesus system). Structure and function of Leucocytes and platelets; Erythrocyte disorders:

Anaemias (Iron deficiency anaemia, Megaloblastic anaemia, Aplastic anaemia, Haemolytic anaemias, Acquired haemolytic anaemia, Normocytic Normochromic anaemia), Polycythemia; Leucocytic disorders (Leucopenia, Leucocytosis, Leukaemia); Haemorrhagic diseases (Thrombocytopenia, Vitamin K deficiency, Congenital disorders)

References:

- ✓ Boyer R (2000). 3rd Ed. Modern Experimental Biochemistry. Person Education, Asia.
- ✓ Devlin TM (Ed) (2002). Textbook of Biochemistry with clinical correlations. 5th ed. Wiley-Liss.
- ✓ Ganong, W. F. (2003). Review of Medical physiology. 21st ed. McGraw Hill.
- ✓ Ganong, W. F. (2003). Review of Medical physiology. 21st ed. McGraw Hill.
- ✓ Hadley, M. E. (2000). Endocrinology. 5th ed. Pearson Education.
- ✓ Hildebrand, M. (1995). Analysis of Vertebrate Structure. John Wiley and Sons.
- ✓ Hill, R.W., Wyse, G.A. and Anderson, M. (2008). Animal Physiology. 2nd ed. Sinauer Associates Inc.
- ✓ Murray RK, Granner P, Mayes A, Rodwell VW (2003). Harper's Illustrated Biochemistry. McGraw-Hill.
- ✓ Nelson DL & Cox MM (2004). Lehinger's Principles of Biochemistry. 2nd ed., Macmillanworth Publishers.
- ✓ Norris, D. O. (2006). Vertebrate Endocrinology. 4th ed. Academic Press.
- ✓ Switzer RL, Garrity LF (1999). Experimental Biochemistry. WH. Freeman & Company.
- ✓ Voet D, Voet JG & Pratt CW (1999). Fundamentals of Biochemistry. Upgrade edition. John Wiley & Sons

**MSNP-103: CORE COURSE
(NUTRITION AND HUMAN DEVELOPMENT)
(CREDIT 4)**

Time: 2hrs**Full Marks: 50****Nutritional requirements of adult man and adult woman.**

2L

Nutrition in Pregnancy, lactation and infancy:

18L

Nutritional status of Indian pregnant women

Complications of pregnancy and nutritional requirements, Physiology of lactation, Factors affecting lactation

Nutritional requirements during lactation, Lactogogues, physiology of lactation Growth and development during infancy

Nutritional component of colostrum and mature milk

Composition of different types of milk – cow, buffalo, goat and camel formula milk, breast feeding Vs bottle feeding

Feeding of low birth weight and premature infants

Weaning: Homemade foods Vs commercial foods

Nutrition for Pre-schoolers, school-going children and adolescents:

15L

Nutritional requirements of Preschoolers

Factors to be considered while planning diet for the preschool children Nutritional requirements of School going children

Factors to be considered while planning diet for school going children Role of hormones on growth, development and maturation

Nutritional requirements during adolescence.

Nutrition for Geriatric and athletes:

15L

Physiological changes in aging

Common disabilities and common diseases affecting geriatric groups Nutritional requirements of athletes

Types, Source of energy – Creatinine phosphate, glucose and glycogen, fats, proteins

Meal Management – pre, during and post event, supplements.

References:

- ✓ Anderson L, Dibble MV, Tukki PR, Mitchall HS, and Rynbergin HJ.: Nutrition in
- ✓ Anita FP. Clinical Dietetics and Nutrition. 2nd Edition, Oxford University Press, Delhi.
- ✓ Davis J and Sherer K (1994). Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, W.B. Saunders Co.
- ✓ Escott-Stump S (1998): Nutrition and Diagnosis Related Care, 4th Edition,
- ✓ Fabriani, G and Lintas C. (1988) Durum Wheat Chemistry and Technology. American Association of Cereal Chemistry Inc.
- ✓ Garrow JS, James WPT and Ralph A (2000). Human Nutrition and Diabetics, 10th Edition, Churchill Livingstone.
- ✓ Health and Disease. 17th edition, J.B. Lipincott& Co. Philadelphia.
- ✓ Kent N L.(1993) Technology of Cereals. 4th Edi. Pergamon Press.
- ✓ Olson, V M; Shemwell G A and Pasch, S (1998) Egg and Poultry Meat Processing, Publishers. Matz A Samuel, Bakery Technology and Engineering.
- ✓ Srilakshmi B (2016). Dietetics. New Age International.
- ✓ VCH P, New York.
- ✓ Williams and Wilkinson.
- ✓ Winton & Winton, (1991) Techniques of Food Analysis. Allied Scientific

**MSNP-104: CORE COURSE
(EPIDEMIOLOGY AND MICROBIOLOGY)
(CREDIT 4)**

Time:2hrs**Full Marks: 50****Principles of Epidemiology:**

6L

Definition and concepts of epidemiology and epidemiology of diseases, Types of Epidemiology, Uses of Epidemiology. Epidemiological measures: Rates - ratio - proportions (incidence, prevalence, risk and risk factors, relative risk, odds ratio, attributable risk). Standardization of rates (direct/indirect). Association and causation (spurious, direct/indirect). Screening for disease (types and uses, sensitivity, specificity, positive and negative predictive values).

Koch Postulates, Endemic, epidemic and pandemic disease, Acute and chronic disease, Communicable and non-communicable disease, Zoonosis, Epizootic and enzootic disease, Vector-borne and Nosocomial diseases.

History and development of Microbiology:

2L

Milestones in Microbiology, Contributions of Leeuwenhoek, Koch, Pasteur, Jenner and Flemmi

Sterilization:

6L

Principles and mode of action of dry heat, moist heat, filtration, tyndalisation, pasteurization and radiation; Source, classification and mode of action of Antibiotics; Antimicrobial resistance; Tests for sensitivity to antimicrobial agents and its quality control.

Bacteriology:

10L

Structure and function of capsule, pili, flagella, cell wall, cell membrane, outer membrane, reserve materials and cytoplasmic inclusions; Bacterial endospore: Structure and properties; Spore – formation and germination; Plasmid and bacterial chromosome

Types of culture media; Pure culture techniques, Batch culture, continuous culture and synchronous culture; Phases of growth, Kinetics of growth, generation time; Environmental factors influencing growth (Temperature, pH, salt concentration, oxygen, osmotic concentration)

Virology:

8L

Structural organization of viruses; Prions and Viroids; Lytic cycle of bacteriophages with reference to E. coli and T4; Structure and life-cycle of λ Phage virus and control, Mechanism of lysogeny; Lysogenic conversion, induction and significance

Medical Microbiology:

10L

Microbial virulence, Mode of transmission, pathogenicity and prevention of bacterial diseases (Tuberculosis, Cholera, Typhoid, Tetanus, Diphtheria and Anthrax) and viral diseases: (Dengue, Influenza, JE and Yellow fever, Measles, COVID-19 disease)

Environmental Microbiology

8L

Inter-relationship of microorganisms in natural ecosystems; Soil as a microbial habitat; Microbial diversity in soil and water; Microorganisms as indicators of water quality; Significance of biofilm; Bacteriological examination of water for potability

References:

- ✓ Bonita R, Beaglehole R, Kjellstrom(2006) Basic Epidemiology. Second Edition.
- ✓ Dimmock, N. J. and Primrose, S. B. (1994). Introduction to Modern Virology. 4th ed. Blackwell Scientific Publications. London.
- ✓ Frank G.C. (2008) Community Nutrition-Appling epidemiology to contemporary practice. Second Edition. Jones and Bartlett Publishers.
- ✓ Maloy, S. R., Cronan, E. J. and Freifelder, D. (1994). Microbial Genetics. 2nd ed. Jones and Bartlett.
- ✓ Menlo Park Calif. Voyleys, B. A. (2002). Benjamin/Cummings Publishing. The biology of viruses. 2nd ed. McGraw-Hill.
- ✓ Michael T. Madigan, John M. Brock Biology of Microorganisms, 13th edition (2010), Pearson Publishers.
- ✓ Norell SE (1998): Workbook of Epidemiology. Oxford: University Press, New York.
- ✓ Pelczar, Chan and Krieg; Microbiology, 6th edition (1993), McGraw Hill International, ISBN-13: 978-0070492585.
- ✓ Prescott, L. M., Harley, J. P. and Klein, D. A. (2011). Microbiology. 8th ed. McGraw-Hill, New York.
- ✓ Saha A, Shattock F, Mustafa T. Epidemology in Primary Health Care. The McGrawHill Companies.
- ✓ Tortora, G. J., Funke, B. R., and Case. C. L. (2008). Microbiology. An Introduction. 9th ed.
- ✓ Williams and Wilkins. Bergey's Manual of Determinative Bacteriology. 9th ed. Baltimore (MD)

**MSNP- 105: CORE COURSE [PRACTICAL]
(NUTRITIONAL PHYSIOLOGY AND BIOCHEMISTRY)
(CREDIT 4)**

Time: 4hrs**Full Marks: 50**

1. Detection of haemoglobin percent, C.T. and B.T.
2. Estimation of Blood Pressure by Sphygmomanometer (Auscultatory method)
3. Measurement of blood pressure, sweat rate during exercise
4. Study of pulse rate and breathing rate with the change of postures
5. Protein estimation of Lowry method
6. Biochemical estimation of Cholesterol and Sugar
7. Total count of RBC and WBC
8. Differential count of W.B.C
9. Agglutination reactions: Direct and indirect agglutination tests.
10. Identification of patients with reason (photographs): Ricketts, Marasmus, Kwashiorkor,
11. Identification with reasons of histological slides (Liver, Kidney, Lung, Small intestine, Stomach, Thyroid, Adrenal, Pancreas, Testis, Ovary and Muscle of mammals)
12. Submission of Laboratory Records
13. Viva-voce

**MSNP- 106: CORE COURSE [PRACTICAL]
(MICROBIOLOGY)
(CREDIT 4)**

Time: 4hrs**Full Marks: 50**

1. Preparation of liquid media (broth) and solid media for routine cultivation of bacteria
2. Preparation of slant and stab
3. Pure culture techniques: Spread plate, pour plate and streak plate
4. Isolation and enumeration of bacteria from natural sources: water, soil, air and food samples.
5. Determination of bacterial load of different food sources by standard plate count method
6. Simple staining of bacteria and study of cell types; differential staining: Gram staining, endospore staining and acid-fast staining
7. Biochemical tests for characterization: Catalase, Nitrate reduction, Indole production, Methyl red and Voges-Proskauer test
8. Sugar fermentation test
9. Submission of slides and laboratory notebook
10. Viva-voce

SEMESTER – II

MSNP-201: CORE COURSE (PATHOPHYSIOLOGY AND DIETETICS) (CREDIT 4)

Time: 2 hrs

Full Marks: 50

Dietitian and Diet Therapy:	4L
Concept of Diet Therapy	
Role and responsibilities of Dietitian (Administrative, Community, Hospital Interpersonal relationship with patient, Nutritional counseling)	
Routine hospital diet, Regular diet, Light diet, Soft Diet, Full liquid diet	
Gastrointestinal diseases and disorders and their management:	10L
Basic structure and function of human digestive system and enzymes.	
Gastrointestinal diseases and disorders: Diarrhoea, Constipation, Peptic ulcer, Irritable bowel syndrome, Malabsorption Syndrome, Lactose intolerance, Protein-losing enteropathy. Diagnostic Tests for the G.I. diseases and Medical Nutrition Therapy (MNT) for gastrointestinal tract diseases/disorders	
Liver-diseases and diet-therapy:	6L
Liver diseases: Viral Hepatitis, Cirrhosis of liver, Hepatic encephalopathy, Wilson's disease; Liver-function Test. Dietary care and management in liver-diseases	
Diabetes:	6L
Types of Diabetes (Type 1, Type 2, Impaired Glucose regulation, Gestational diabetes); Symptoms, Diagnosis (OGTT, Urinary sugar, Blood glucose, Glycosylated Hemoglobin); Complications (Hypoglycemia, Ketoacidosis, Infections, Heart disease and Kidney disease). Diet In Diabetes, Recommended Calorie intake and intake of carbohydrates, proteins, fats, vitamins/minerals, Role of fruits and vegetables, dietary fibre, fenugreek seeds for Diabetics. Dietary Guidelines, Glycemic Index, Role of other factors (Exercise, Drugs, Education)	
Heart-Disease:	8L
Cardiovascular diseases (Atherosclerosis, Arteriosclerosis, Myocardial ischemia, Myocardial infarction, Hypertension, Dyslipidemia)	
Kidney diseases	8L
Kidney diseases (Urinary tract obstruction, Kidney stones, Glomerulonephritis, Nephrotic syndrome and Renal failure)	
Medical Nutrition Therapy (MNT) of cardiovascular and kidney diseases	
Nutrition in critical care:	8L
Short term feeding methods (Nasogastric, Nasoduodenal, Nasojejunal methods of delivery – Bolus, gravity, pump, Formula feed) and Long term feeding methods (Gastrostomy, Percutaneous Endoscopic Gastrostomy, Percutaneous Endoscopic Jejunostomy) of Enteral Nutrition. Advantages and disadvantages and complications of enteral nutrition. Types of Total Parenteral Nutrition and Peripheral Parenteral Nutrition Composition of parenteral nutrition solutions. Advantages, Disadvantages and Complications of parenteral nutrition	
Nutritional support in burns	

References:

- ✓ Dietetics. 10th ed. Churchill Livingstone. Vinay Kumar, Abul K. Abbas, Nelson Fausto and Jon Aster; Robbins & Cotran Pathologic Basis of Disease. 8th Edition. Publisher: Elsevier.
- ✓ Gibney MJ, Elia M, Ljungqvist & Dowsett J. (2005) Clinical Nutrition. The Nutrition Society Textbook Series. Blackwell Publishing Company Garrow, J.S., James, W.P.T. and Ralph, A. (2000) Human Nutrition and
- ✓ Jo Ann Zerwekh, AZ Jo Carol Claborn, Tom Gaglione; Mosby's Pathophysiology Memory Note Cards: Visual, Mnemonic, and Memory Aids for Nurses, 2nd Edition. Publisher: Elsevier.
- ✓ Kathryn L. McCance & Sue E. Huether; Pathophysiology: The Biologic Basis for Disease in Adults and Children. Publisher: Elsevier.
- ✓ Mahan, L. K. and Escott Stump. S. (2008) Krause's Food & Nutrition Therapy 12th ed. Saunders-Elsevier
- ✓ Richard Mitchell, Vinay Kumar, Abul K. Abbas, Nelson Fausto and Jon Aste; Pocket Companion to Robins & Cortan Pathological Basis of Disease. 8th Edition. Publisher: Elsevier.
- ✓ Shils, M.E., Shike, M, Ross, A.C., Caballero B and Cousins RJ (2005) Modern Nutrition in Health and Disease. 10th ed. Lipincott, William and Wilkins.
- ✓ Sue E Huether, Kathryn RN; Understanding Pathophysiology. 5th Edition. Publisher: Elsevier.

MSNP-202: CORE COURSE
(NUTRITIONAL ASSESSMENT AND COMMUNITY NUTRITION MANAGEMENT)
(CREDIT 4)

Time: 2hrs**Full Marks: 50****Anthropometry:****8L**

Anthropometry: Weight for age, height for age, weight for height of different age groups BMI, Mid upper circumference, head circumference, chest circumference of different age groups Body fat assessment in different zone, skin fold thickness in different age group Resting energy expenditure from height, weight and others parameters

Biochemical Assessment:**8L**

Indicators of protein-energy status, Anemia, Immune function, CVD risk and oxidative stress, Urine and stool analyses.

Community Nutrition Management:**8L**

Mid-Day Meal for school children, Special Nutrition Programme (SWP), Integrated Child Development Services (ICDS), National Nutritional Anaemia Control Programmes, Vit-A Prophylaxis Programme, National Iodine Deficiency Disorder Control Programme, Public Distribution System, Targeted Public Distribution.

National and International agencies in community nutrition:**4L**

Role of WHO, UNICEF, UNDP, FAO, UNESCO, ILO, WORLD BANK, Red Cross, CARE

Nutrition Education:**6L**

Importance of nutrition education

Nutrition education methods: Posters, Charts, Audio visual aids, Lectures

Nutrition for weight management:**8L**

Components of body weight, Adipose tissue-structure, regional distribution and storage
 Regulation of body weight

Management of obesity**8L**

Types of obesity, Assessment of obesity, Health risks

Causes of obesity: neural, hormonal, and psychological

Dietary Modification, Psychology of weight reduction: psychotherapy and behavior modification, Physical activity and exercise, Pharmacological treatment- Surgical treatment effect on satiety and other factors- Maintenance of Reduced weight

References:

- ✓ Bogin, Barry (1999). Patterns of human growth, Cambridge University Press.
- ✓ Cameron Noel (2002). Human growth and development, St. Louis, Academic Press.
- ✓ Curry KA & Jaffe A (1998) Nutrition Counseling Skills & Communication Skills.WB Saunders & Co.
- ✓ Gibney MJ, Elia M, Ljungqvist & Dowsett J. (2005) Clinical Nutrition. The Nutrition Society Textbook Series. Blackwell Publishing Company
- ✓ Gibson R S. (2005). Principles of Nutritional Assessment. 2nd ed. Oxford University Press.
- ✓ Harrison, GA; Tanner, JM; Pilbeam, DR; Baker PT (1988). Human biology: An introduction to human evolution, variation, growth & adaptability, Oxford, England, Oxford University Press.
- ✓ Hickson JH (2000) Nutrition for Exercise & Sport. CRC Press. 2nd Edition
- ✓ Johnson, FE, Roche, AF, Susanne, C, (1980). Proceeding on Human Physical Growth and Maturation, Plenum Publishing Corporation.
- ✓ Mahan, L. K. and Escott Stump. S. (2008) Krause's Food & Nutrition Therapy 12th ed. Saunders-Elsevier
- ✓ Shils, M.E., Shike, M, Ross, A.C., Caballero B and Cousins RJ (2005) Modern Nutrition in Health and Disease. 10th ed. Lipincott, William and Wilkins.
- ✓ Snetselaar LG (2009) Nutrition Counseling Skills for the Nutrition Care Process. James & Bartlett Pub.
- ✓ WHO (2009). WHO Child growth standards: Growth velocity based on weight, length and head circumference Available at <http://www.who.int>

**MSNP-203: CORE COURSE
(PARASITOLOGY AND MEDICAL ENTOMOLOGY)
(CREDIT 4)**

Time: 2hrs**Full Marks: 50****General idea on parasitism:****4L**

Parasites, vectors, hosts, carriers, mechanical transmitters

Proto-zoology:**12L**

Malaria and Malarial Parasites: History and geographic distribution of human malaria (Global and India)

Taxonomic position of different malaria parasites – Distinguishing characters of different species of human malarial parasites, Life cycle and host-parasite interactions, Brief description of zoonotic malarial parasites. General account, structure, life cycle, pathogenicity and control of *Plasmodium vivax* and *P. falciparum*General account, structure, life cycle, pathogenicity and control of *Entamoeba histolytica* and *Giardia lamblia*

Haemoflagellates : Morphological stages, life cycle, clinical features and control of *Trypanosoma cruzi* and *Leishmania donovani*

Helminthology:

14L

General characteristics of the Trematoda, Cestoda and Nematoda

Morphology, life history, pathogenicity and control: *Paragonimus westermani*, *Schistosoma haematobium*, *Taenia saginata*, *Trichinella spiralis*, *Ancylostoma duodenale*.

Lymphatic Filarial Parasites: History and geographic distribution of lymphatic filariasis (Global and India), Taxonomic position of different human filarial parasites, Distinguishing characters of different species/strains, Life cycle and host-parasite interactions, General account, structure, life cycle, pathogenicity and control of *Wuchereria bancrofti* and *Brugia Malayi*

Endosymbionts and their significance – Brief description of zoonotic parasites and animal models.

Arthropods of public health importance:

12L

Mosquitoes: Salient features and distribution and medical importance of mosquito-vectors (*Anopheles*, *Culex* and *Aedes*), Salient features and significance of *Culicoides*

Sand flies: Salient features and distribution and medical importance of *Phlebotomus*

Medical importance: Fleas, Blackfly, Bedbugs, Headlouse, Bodylouse, Ticks and Mites

Arboviral pathogens: Classification of Arboviruses, Dengue, Chikungunya, Japanese encephalitis, Kyasanur Forest Disease (KFD), West Nile, and Yellow fever viruses, Geographic distribution, Viral structure and replication, Transmission and maintenance cycle.

Bacterial and rickettsial pathogens: Bacterial pathogens, Leptospirosis, plague, rickettsial pathogens, scrub typhus, endemic typhus – vectors and animal reservoirs.

Vector Control:

8L

Vector control: Principle, Aims and objectives, advantages, History and background, Alternatives to the use of insecticides, Vector control at individual or at community or at both levels, Selection of appropriate control measures, Personal protection measures

Types of vector control, Selective, integrated and comprehensive vector control, Recent trends in control of vectors of public health importance, Role of Bio-insecticides: *Bacillus thuringiensis*, *Bacillus sphaericus*, *Nuclear polyhedrosis virus* and Plant extracts

References:

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**MSNP-204: CORE COURSE
(PUBLIC HEALTH AND ENVIRONMENT)
(CREDIT 4)**

Time: 2 hrs

Full Marks: 50

Ecosystem:	12L
Concept of ecosystem, Structure and function of ecosystem, Food chain and food web, Natural and Man-made ecosystem, with examples	
Eco-toxicology and Environmental Health:	18L
Principles of environmental health and human ecology	
Water pollution: Water-borne diseases (Biological and Chemical)	
Water purification, Water quality–criteria and standards: Physical parameters, Inorganic constituents, Microbiological aspects	
Airpollution: Sources of airpollution, Airpollutants: Carbonmonoxide, sulphur dioxide, lead, carbon dioxide, hydrogen sulphide, hydrocarbons, cadmium, ozone, oxides of nitrogen, polycyclic aromatic hydrocarbon, particulate matter	
Effects of air pollution (Health aspects and Social and economic aspects); Prevention and control of air pollution.	
Waste disposal and waste management:	8L
Biomedical wastes and waste management Housing sanitation, Fair sanitation	
Sewage:	6L
Definition, Health aspects, composition of sewage, Aim of sewage purification, Modern sewage treatment	
Pesticides in public health	
Isolation and development of pesticides of plant and animal origin, Use of pesticides – History of Insecticides– Definition of various terms – Advantages of chemical control and its utility in vector control, Classification of insecticides, Chemical Pesticides, Biolarvicides, Insect growth regulators,	

Mode of action of pesticides

Managing Health, Environmental Linkages & Health Policy

6L

Environmental and health impact assessment

Current practice and problems in Health Impact Assessment (HIA) and Environmental Impact Assessment (EIA)

Healthy public policy in practice.

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MSNP- 205: CORE COURSE [PRACTICAL] (ANTHROPOMETRYANDDIET-THERAPY) (CREDIT 4)

Time: 4hrs

Full Marks:50

1. Anthropometry: Height, weight, circumference of chest, Mid–upper-arm-circumference.
2. Comparison with norms and interpretation of the nutritional assessment data and its significance-Weight for age, height for age, weight for height,
3. Body Mass Index (BMI), Waist-Hip Ratio (WHR).
4. Diet Chart preparation of a person suffering from Protein Energy Malnutrition.
5. Diet Chart preparation for fevers and infections.
6. Diet Chart preparation of a person suffering from Gastrointestinal disease, Liver-disease, Diabetes, Heart-disease, Kidney disease
7. Submission of Laboratory Records
8. Viva-voce

**MSNP- 206: CORE COURSE [PRACTICAL]
(ECO-TOXICOLOGY, PARASITOLOGY AND MEDICAL ENTOMOLOGY)
(CREDIT 4)**

Time: 4hrs**Full Marks:50**

1. Determination of pH of water and soil suspension
2. Determination of Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD)
3. Quantitative analysis of Estimation of total hardness of water.
4. Estimation of heavy metals like Pb, Hg in water by spectrophotometric method
5. Quantitative analysis of Organic Matter (OM)/Organic carbon (OC) in the soil/sediment
6. Determination of LC₅₀ and LD₅₀
7. Isolation, fixation, staining and mounting of Protozoan and Helminth Parasites
8. Drawing and staining of blood film for parasitic protozoan and microfilaria
9. Mounting of mouth parts and whole mount preparation and identification of mosquito vectors (*Anopheles*, *Culex* and *Aedes*)
10. Submission of Laboratory Records
11. Viva-voce

**MSNP-301: CORE COURSE
(FOOD SANITATION AND FOOD HYGIENE)
(CREDIT 4)**

Time: 2hrs**Full Marks: 50****Food sanitation:**

6L

Importance of sanitation and hygiene in food, kitchen hygiene, employee's health, food plant hygiene

Food contamination and Control:

6L

Sources and transmissions, Water, air, sewage and soil as reservoirs of infection and ways of spread.

Other agents of contamination- Humans, domestic animals, vermins, birds.

Importance of personal hygiene of food handler - habits -clothes, illness.

Education of food handler in handling and serving food.

Safety in food procurement, storage, handling and preparation

Control of spoilage – safety of left over foods.

Cleaning methods – sterilization, and disinfection –products and methods –use of detergents, heat, chemicals, and tests for sanitizer strength.

Control of infestation: Rodent control- rats, mice; Vector control- use of pesticides

Food sanitation

Control and inspection-planning and implementation of training programme for health personnel.

Food Hygiene:

10L

Basic Concept of food hygiene

Introduction, need of food additives in food processing and preservation.

Characteristics and classification of food additives.

Indices of food, milk and water: 6L

Sanitary quality, Microbiological criteria of foods

Water and milk testing (Bacteriological analysis)	
Milk hygiene:	6L
Sources of infection, Milk-borne diseases	
Clean and safe milk, Pasteurization of milk, Tests for pasteurized milk)	
Meat and Fish hygiene:	6L
Meat inspection, slaughterhouses), Fish hygiene (Sign of a fresh fish, Fish Poisoning)	
Fruits and vegetables and disease contamination	6L
Hygienic handling of Food:	4L
Precaution to be taken while handling pesticides	
Food Laws and Standards: i) Codex Alimentarius ii) Prevention of Food Adulteration (PFA) Act iii) Agmark iv) Fruit Products Order (FPO) v) Meat Products Order (MPO) vi) Bureau of Indian Standards (BIS) vii) Food Standards and Safety Authority of India (FSSAI)	

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**MSNP-302: CORE COURSE
(FOOD-COMMODITIES AND FOOD-TECHNOLOGY)
(CREDIT 4)**

Time: 2hrs**Full Marks: 50**

Food-commodities	5L
Cereals and cereal products, pulses, vegetables, Fruits, meat, fish and eggs, Spices and condiments Fats oils, Beverages, sweetening agents, Dietary fiber: Classification and nutritional significance	
Milk & Dairy technology:	10L
Pasteurization, homogenization of milk Manufacture of milk products like condensed and dried milk, cream, butter, ghee, ice cream, cheese, Fortification of milk products	
Probiotics : Nutritional significance	
Fruits & Vegetables processing:	10L
Beverages, soft drinks, fruit juice, wine, bear, vinegar, jam, jelly, marmalade, pickles, sauce, fermented food products.	
Fish, Meat & Poultry processing technology: Fish sauce, fish liver oil, fish meat, fish flour, meat sausage, ram, bacon, etc., egg processing	
Baking technology:	10L
Types of bakery products, nutritional quality and safety of products, pertinent standards & regulations Bread, cakes, biscuits /crackers: Role of ingredients & processes, equipment used, product quality characteristics, scoring of quality parameters, faults and corrective measures.	
Microbial Technology:	10L
Microbial production of alcohol, glycerol, beer, lactic acid, sorbitol, citric acid, vitamins Amino acid fermentation, cocoa and coffee fermentation Isolation and use of microbial enzymes, steroids, antibiotics Antifungal antibiotics; production of algal protein.	
Genetically Modified Food:	5L
Principles, techniques, problem, prospects, and ethics action, uses of radiation processing in food industry, concept of cold sterilization.	

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**MSNP- 303: CORE COURSE [PRACTICAL]
(FOOD PREPARATION AND FOOD TECHNOLOGY)
(CREDIT 4)**

Time:4hrs

Full Marks:50

1. Preparation of pickles, tomato sauce, chili sauce, jelli, tomato squash and Dairy products
2. Development of low-cost nutritious recipes for infants, preschoolers, adolescents, pregnant and lactating mothers
3. Preparation of diet/ dishes for Protein Energy Malnutrition (PEM)
4. Preparation of diet/ dishes for Vitamin A Deficiency (VAD), Iron Deficiency Anaemia (IDA)
5. Preparation of diet/ dishes for obesity, hypertension, diabetes
6. Preparation of paneer, chhanna and chhanna product, casein, Ghee, Khoa
7. Preparation of cheese and Yogurt
8. Platform test of milk Test of adulteration
9. Preparation of Lassi and Srikhand
10. Manufacture of ice cream
11. Submission of laboratory note-book
12. Viva-voce

**MSNP 304: GENERIC ELECTIVE
(Credit 2)**

Time: 2 hrs

Full Marks:25

GE:

Lectures: 25

1. Communicable diseases and their management
2. **Food technology and Food preservation**

**MSNP 305: DISCIPLINE-CENTRIC ELECTIVE:
[EPIDEMIOLOGY AND COMMUNITY HEALTH]
(CREDIT 4)**

TIME: 2hrs

Full Marks: 50

Disease Epidemiology:	6L
Nature of infectious and communicable diseases	
Factors that influence the epidemiology of a disease and re-emergence of a disease	
Rate of a disease in a population (attack rate, morbidity rate, mortality rate, incidence and prevalence)	
Epidemiological Methods:	4L
Descriptive, Analytical, Experiment Studies, Association and Causation	
Epidemiology of communicable diseases:	10L
Malaria: Prevalent major epidemiological types of malaria. Factors responsible for malaria transmission. Basic reproduction rate, vectorial capacity, vector competence, inoculation rate, stability index, Human Blood Index (HBI), Annual Parasite Incidence (API), Slide Positivity Rate (SPR), Slide Falciparum Rate (SFR), Annual Blood Examination Rate (ABER), Acute Encephalitis Syndrome (AES), endemicity. Immunopathogenesis of Malaria: Host cell-parasite interactions; Factors affecting natural immunity in host's body against malaria (Glucose-6-Phosphate-Dehydrogenase deficiency, Sickle-cell-trait, HBE, Duffy-negativity, ovalocytosis)	
Amoebiasis: Agent factors (agent, reservoir of infection, period of communicability), host factors and environmental factors of amoebiasis. Primary prevention (sanitation, water supply, food hygiene and health education) and secondary prevention (early diagnosis and treatment) of amoebiasis	
Filariasis: Factors responsible for the transmission of lymphatic filariasis. Infection and infectivity, Microfilaria (Mf) prevalence, Annual Transmission Potential (ATP), Risk of Infection Index (RII).	
Epidemiology of Ascariasis, Taeniasis and Schistosomiasis.	22L
Dengue: Agent factors and environmental factors for Dengue transmission. Vector indices (dusk index, house Index, container Index, Breteau Index, pupal Index), Minimum Infection Rate (MIR). Epidemiology and risk factors of Classical dengue fever, Dengue haemorrhagic fever (DHF) and Dengue shock syndrome	
Tuberculosis: Epidemiological indices of tuberculosis (Agent factors, host factors, social factors of tuberculosis) Risk factors (malnutrition and tuberculosis, HIV and tuberculosis, diabetes and tuberculosis, drug resistance). Aims and objectives of RNTCP, BCG vaccination, DOTS strategy	
Cholera: Epidemiological determinants of cholera (agent factors, carriers, host-factors and environmental factors), Chemoprophylaxis and Diarrhoeal Diseases Control Programme	
Typhoid: Epidemiological determinants and social factors of typhoid, Management of typhoid (control of reservoir, control of sanitation and immunization)	
Viral Hepatitis: Epidemiological determinants of Hepatitis A, B & C (agent factors, host factors and environmental factors, High risk groups). Prevention and containment	
AIDS: Epidemiological features of AIDS (agent factors, host factors, high-risk groups, immunological disorders), Opportunistic infections (Tuberculosis and Kaposi sarcoma, candidiasis, toxoplasmosis, herpes zoster, herpes simplex, coccidiomycosis, cryptosporidiosis). WHO case definition for AIDS surveillance and control strategies.	
Epidemiology of Food Borne Diseases:	8L
Bacterial food infections-Salmonellosis, Shigellosis and Listeriosis. Food poisoning (Staphylococcal & Botulism)-Symptoms, mode of transmission and prevention	

References:

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**MSNP 306: DISCIPLINE-CENTRIC ELECTIVE PRACTICAL:
[EPIDEMIOLOGY AND COMMUNITY HEALTH]
(Credit 4)**

Time: 4hrs

Full Marks:50

1. Preparation of sanitizer
2. Determination of bacterial load of water /soil /food samples by standard plate count method
3. Determination of potability of water (presumptive test)
4. Microbiological examination of curd sample
5. Enrichment culture of spore formers
6. Antibiotic sensitivity test
7. Microbiological Examination of milk(MBRT Test)
8. Study on physiological and bio-chemical characteristics: starch hydrolysis, gelatin hydrolysis, fat hydrolysis, tryptophan hydrolysis, urea hydrolysis, citrate utilization
9. Identification of disease-causing parasites and vectors
10. Field -Visit
 - a. Methods of bacteria isolation and preservation
 - b. Study of bacterial diversity of soil/water / air/ food samples
11. Laboratory records
12. Viva-voce

SEMESTER – IV

MSNP 401: CORE COURSE (FOOD TOXICOLOGY, FOOD-PRESERVATION AND IMMUNOLOGY) (CREDIT 4)

Time: 2hrs

Full Marks: 50

Food toxicants:	2L
Neurotoxicity, Aflatoxins, Ergot, Epidemic dropsy, Endemic ascites, Fusarium toxins.	
Food adulteration:	4L
Adulterants in commonly consumed food items, Common adulterants in food and their effects on health, household methods to detect adulterants in food.	
Food allergies:	4L
Clinical Manifestations of Food Allergy: Gastrointestinal manifestations, Cutaneous manifestations, Respiratory manifestations, Neurologic manifestations, Endocrine manifestation, Renal manifestations, Hematologic manifestations, Rheumatic manifestation	
Food Preservation Technology:	24L
Freezing and Refrigeration:	
Introduction to refrigeration, cool storage and freezing, definition, principle of freezing, freezing curve, changes occurring during freezing, types of freezing i.e. slow freezing, quick freezing, introduction to thawing, changes during thawing and its effect on food.	
Food Preservation by high temperature:	
Thermal Processing- Commercial heat preservation methods: Sterilization, commercial sterilization, Pasteurization, and blanching.	
Food Preservation by Moisture control:	
Drying and Dehydration: Definition, drying as a means of preservation, differences between sun drying and dehydration (i.e. mechanical drying), heat and mass transfer, factors affecting rate of drying, normal drying curve, names of types of driers used in the food industry.	
Food Preservation by Irradiation:	
Introduction, units of radiation, kinds of ionizing radiations used in food irradiation, mechanism of food items	
Immunology:	12L
Cells and organs of the immune system: Leucocytes, APC, Macrophage, T-cell and B-cell, Mast cell, Dendritic cell and APC, NK cells Structure and Function of MHC.	
Types of immune response:	
Innate and acquired Immunity, Humoral and Cellular Immunity	
Types of antigen and antibodies:	
Definition and properties of antigenic determinants of immunoglobulin (Isotype, allotype & idiotype) Structure, classes and biological activities of antibodies Antigenic determinants Antigen - antibody interaction	
Vaccination and Immunization schedule	4L

References:

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**MSNP 402: CORE COURSE
(BIOSTATISTICS, BIOINFORMATICS AND NUTRIGENOMICS)
(CREDIT 2)**

Time: 1hr**Full Marks: 25****Biostatistics:****5L**

Types of Sampling, Data types: qualitative-quantitative Sources of Health data
Measurement of Central tendency : Mean, Median, Mode
Dispersions: Range - Mean deviation - Variance - Standard deviation - Standard Error
Chi-square test, Correlation and Regression.

Bioinformatics:**4L**

Concept and applications of Bioinformatics

Genomics and Proteomics**3L**

Central dogma, DNA replication, Transcription and Translation
Basic idea of Genomics and Proteomics; Lateral and
Horizontal gene transfer; Orthologous and Paralogous

Nutrigenomics**4L**

Nutritional regulation of gene expression. Epigenomics.
Role of specific nutrient in controlling gene expression. Relation between food and medicine in
controlling of diseases.

Data bases:**4L**

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 Nutrient data bases

Sequence alignments:**5L**

Principle, Sequence alignment: Global match, Local match, Motif match Features and types of

BLAST

Sequence similarity searching by BLAST

Significance of Multiple Sequence Alignments

References:

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- ✓ Bailey, N. T. J. (1995). *Statistical Methods in Biology*. 1st ELBS ed.
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- ✓ Das S.(2006). *Unix – Concepts and Applications*. Tata McGraw-Hill.
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**MSNP- 403: CORE COURSE [PRACTICAL]:
[FOOD TOXICOLOGY, IMMUNOLOGY AND BIOINFORMATICS]
(CREDIT 2)**

Time: 2hrs**Full Marks: 25**

1. Detection of Vanaspitiin Ghee/Butter, Khesari flour in besan and Metanil yellow in turmeric/coloured sweet products.
2. Detection of Argemone oil in edible oil and artificial colour/foreign matter in tea (dust/leaves)
3. Determination of Antibody Titer by immunodiffusion methods
4. Agglutination and precipitation techniques
5. Demonstration of Sandwich ELISA method
6. Isolation of plasmid DNA from bacteria
7. Agarose gel Electrophoretic separation of DNA
8. Sequence retrieval from Data Bases
9. Sequence alignment: Pair-wise and Multiple sequence alignment
10. Protein structure visualization
11. Submission of Laboratory Records
12. Viva-voce

**MSNP 404: DISCIPLINE-CENTRIC ELECTIVE:
[EPIDEMIOLOGY AND COMMUNITY HEALTH]
(CREDIT 4)**

Time: 2hrs**Full Marks 50****Epidemiology of Non-Communicable diseases:****Diabetes:****8L**

Epidemiological determinants of Diabetes. Host factors (age, sex, genetic factors, genetic markers, immune mechanisms, obesity, maternal diabetes), environmental risk factors (secondary life-style, diet, dietary fibre, malnutrition, alcohol, viral infections, chemical agents, stress, social factors).

Primary prevention (population strategy, high-risk strategy), secondary prevention and tertiary prevention of diabetes.

10L**Hypertension and Stroke**

Epidemiological factors of hypertension. Non-modifiable risk factors of hypertension (age, sex, genetic factors, ethnicity); modifiable risk factors (obesity, salt-intake, saturated fat, alcohol, heart rate, physical activity, environmental stress, socio-economic factors), Risk factors of stroke and stroke control programme.

Obesity : Epidemiological determinants (age, sex, genetic factors, physical activity, socio-economic status, eating habits, psychological factors, familial tendency, endocrine factors, alcohol, education, smoking, ethnicity, drugs). Assessment of obesity: Body weight (Body mass index, Ponderal index, Brocca index, Lorentz `s formula, Corpulence index); Skinfold thickness, Wrist circumference and waist: hip ratio). Prevention and management of obesity

Kidney Diseases:**10L**

Epidemiology and risk-factors of Kidney diseases

Food Microbiology:**12L**

Classification of microorganisms based on temperature, pH, water activity, nutrient and oxygen requirements, Typical growth curve of micro-organisms

Bacteriology of milk and water

Concept of aflatoxin intoxication

Classification of food based on pH, Food infection, food intoxication, definition of shelf life, perishable foods, semi perishable foods, shelf stable food

Molecular techniques used in public health**10L**

Basic techniques for molecular analysis of parasitic and microbial systems: Isolation of DNA and RNA from bacteria, protozoan and helminth parasites, Hybridization, ELISA, DNA sequencing, Blotting techniques, Amplification of DNA by Polymerase Chain Reaction

References:

- ✓ By Porth, Carol; Essentials of Pathophysiology; Concepts of Altered Health States. Publisher Lippincott Williams & Wilkins. Sue E Huether, Kathryn RN; Understanding Pathophysiology. 5th Edition. Publisher: Elsevier.
- ✓ Garrow, J.S., James, W.P.T. and Ralph, A. (2000) Human Nutrition and Dietetics. 10th ed. Churchill Livingstone.
- ✓ Gibney MJ, Elia M, Ljungqvist & Dowsett J. (2005) Clinical Nutrition. The Nutrition Society Textbook Series. Blackwell Publishing Company.
- ✓ Humphrey P. Rang, Maureen M. Dale, James M. Ritter, Rod J. Flower, Graeme Henderson; Rang & Dale's Pharmacology, 7th Edition. Publisher, Elsevier.
- ✓ Jo Ann Zerwekh, AZ Jo Carol Claborn, Tom Gaglione; Mosby's Pathophysiology MemoryNote Cards: Visual, Mnemonic, and Memory Aids for Nurses, 2nd Edition. Publisher: Elsevier.
- ✓ K D Tripathi; Essentials of Medical Pharmacology. 6th edition Publisher Jaypee.
- ✓ Kathryn L. McCance & Sue E. Huether; Pathophysiology: The Biologic Basis for Disease in Adults and Children. Publisher: Elsevier.
- ✓ Mahan, L. K. and Escott Stump. S. (2008) Krause's Food & Nutrition Therapy 12th ed. Saunders-Elsevier.
- ✓ Marian M, Russel M, Shikora SA. (2008) Clinical Nutrition for Surgical Patients. Jones and Bartlett Publishers.
- ✓ Pocket Companion to Robbins & Cortan Pathological Basis of Disease. 8th Edition. Publisher: Elsevier.
- ✓ Richard Mitchell, Vinay Kumar, Abul K. Abbas, Nelson Fausto and Jon Aste;
- ✓ Shils, M.E., Shike, M, Ross, A.C., Caballero B and Cousins RJ (2005) Modern Nutrition in Health and Disease. 10th ed. Lippincott, William and Wilkins.
- ✓ Vinay Kumar, Abul K. Abbas, Nelson Fausto and Jon Aster; Robbins & Cotran Pathologic Basis of Disease. 8th Edition. Publisher: Elsevier.

**MSNP 405: DISCIPLINE-CENTRIC ELECTIVE:
[EPIDEMIOLOGY AND COMMUNITY HEALTH]
(CREDIT 4)**

Time: 2hrs

Full Marks: 50

Social Health:	8L
Basic concept of social and behavioural sciences in Health	
Scope of social and behavioural sciences in Health	
Culture and behavior related to Health and disease	
Political and Economic aspects of Health	
Fundamental techniques of counseling methodology	
Occupational disorders:	6L
Pneumo-coniosis, hearing loss, accidents, dermatosis	
Snake bite and its management	6L
Features of poisonous snakes, snake venoms, signs and symptoms of snake-bites, First-Aid management of snake-bites	
Objectives and role of organizations and important agencies:	8L
WHO, UNICEF, FAO, ILO	
Indian Red Cross Society, UNFPA World Bank, Asia Development Bank, Ford Foundation CARE, Rockefeller Foundation	
Health planning:	10L
Health panning in India including various committees	
National Health Policy and Health goals	
Organized sector with reference to centre State, District, Block level structure, local bodies, Panchayati Raj	
Organization and role of community health centres and Primary health centres	
Health Manpower, Primary Health care	
Alternative systems of medicine	8L
Ayurveda and Homeopathy; Holistic Approach	
Role of Non-Governmental organizations (NGO)	
Role of Private Voluntary Organisation(PVOs)	
Family welfare:	4L
Fundamental concept on Family welfare and planning	

References:

- ✓ G.K. Ghosh, Water of Inida (Quality and Quantity), APH Publishing, New Delhi.
- ✓ M. Dinesh Kumar, Water Management in India, Gyan Publishing House, New Delhi.
- ✓ Rajiv K. Sinha, Er. Ambuj K. Sinha, Waste Management, INA Shri Publisher, Jaypur.
- ✓ S.B Verma, S.K. Jiloka, A.C. Pathak, Rural Health Care and Housing, Deep & Deep Pub. New Delhi.
- ✓ Suresh Sharma, Health Problems of Rural Population in India, APH Publishing corporation N. Delhi
- ✓ U.S. Sree Ramulu, Management of Water Resources in Agriculture, New Age International Publisher, N. Delhi.
- ✓

**MSNP 406: DISCIPLINE-CENTRIC ELECTIVE COURSE [PRACTICAL]
(Credit 4)**

Time: 4hrs

Full Marks: 50

1. Comparison with norms and interpretation of the nutritional assessment data and its significance. Weight for age, height for age, weight for height, Z scores, standard deviations, percentiles
2. Estimation of food and nutrient intake: Household food consumption data, adult consumption unit, 24 hours dietary recall 24 hours record, Weighment method, food diaries, food frequency data, use of each of the above, information available through each individual, collection of data, estimation of intakes.
3. Characterization of bacteria in foods (e.g. bread, vegetables, cheese).
4. Identification of water borne organism like coliform, *Salmonella* etc by biochemical tests.
5. Study of personal and environmental hygiene habits of street food handlers. Intervention and result analysis. Project submission and presentation.
6. Preservation of fruits and vegetables for later use-peas, carrots, cauliflower, chutney, soup, pickle, jam, jelly, marmalade, squash.
7. Visit to any Community centre/ Old-age home/ institution related to special need children/ Child Guidance Counselling Centre. Report preparation & submission
OR
Participation to “One Week Internship Programme” of any hospital / Laboratory / Institute on Medical Nutrition Therapy/ Public Health / Vector Management
8. Submission of Laboratory Note Book
9. Viva voce

**MSNP- 407
DISSERTATION (CREDIT 4)**

Time- 4hrs

Full Marks: 50

DISSERTATION (EMPIRICAL OR NON EMPIRICAL, BASED ON DISCIPLINE-CENTRIC ELECTIVES):

**[Submission (not less than 10,000 words excluding references): 25;
Seminar Presentation and Discussion: 15+10]**