BANKURA UNIVERSITY

(West Bengal Act XIX of 2013- Bankura University Act, 2013)

Main Campus, Bankura Block-II, P.O.: Purandarpur, Dist.: Bankura, Pin- 722155, West Bengal

Office of the Secretary

Faculty Council for Undergraduate Studies

Ref: BKU/FCUG/155/2024 Date: 22/06/2024

NOTIFICATION

As directed, the undersigned is pleased to inform all concerned that Bankura University has initiated the process to implement New Curriculum and Credit Framework for Undergraduate Programme, UGC 2022 (as per NEP 2020) for 4-years Undergraduate programme with Nutrition as Major, Minor etc. from the academic session 2023-2024. The Syllabus for the purpose will be framed and finalized as per the guidelines of appropriate authority. As an important corollary to the process, the workshop through online mode will be organized on the date mentioned herewith to get the feedback from the stakeholders. Present Students, Alumni, Guardians, Academicians and other stakeholders related to the specific programme/course are requested for their kind participation in the workshop and to present their views/ observations etc. The stakeholders may go through the draft syllabus attached herewith and convey their observations to the office of the undersigned on ugsecretaryoffice@bankurauniv.ac.in within seven days from the date of publication of notice.

Date: 28th June, 2024.

Time: 11:30 AM onwards

Google Meet joining info

Video call link: https://meet.google.com/nno-cksf-rpy

Sd/-
Dr. Arindam Chakraborty
Secretary
Faculty Council for Undergraduate Studies

SYLLABUS FOR

FOUR YEARS UNDER-GRADUATE COURSE

WITH SINGLE MAJOR IN NUTRITION

(*w.e.f. 2023*)

BANKURA UNIVERSITY

BANKURA

WEST BENGAL

PIN 722155

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO	Description
PSO 1	The core courses will help the student to develop knowledge on human physiology, nutritive value of different food, role of food and nutrients on human nutrition, role of nutrition in maintaining health and diseases.
PSO 2	The courses will add additional knowledge about applied aspects of the program as well as its applicability in maintaining good health and nutritional status.
PSO 3	The skill enhancement courses would further add additional skills related to the subject.
PSO 4	Students become highly cognizant of the expansion of the learning in their respective field which enables them to get admitted to the premier institutes of the country. An aptitude to research is also stimulated in the minds of this budding generation which prompts them to take up some projects in good laboratories of the country after completing the programme.
PSO 5	Students will be able to analyze and solve the nutrition related problems.
PSO 6	Students will be able to prepare diet chart for normal person as well as for the person in diseased condition
PSO 7	Students will be able to the functions of different nutrients at molecular level, the nutrient gene inter action and modulation of gene expression by nutrients.
PSO 8	The programme will strengthen the students to understand the structure and function of the gene, cell, tissue, organ and organ-system.
PSO 9	Research Motivation is also another significant outcome that the students are endowed with on the completion of the programme.

SEMESTER- III

Course Type	CourseCode	Course Title	Credit	Marks			No. of Hours		
				I.A	ESE	Total	Lec	Tu.	Pr.
Major	S/NUT/301/MJC-3	Human Nutrition	4 (3+1)	10	40 (25+15)	50	3	NA	2
Major	S/NUT/302/MJC-4	Human Physiology I	4 (3+1)	10	40 (25+15)	50	3	NA	2
Minor	S/NUT/303/MN-3	Human Nutrition	4 (3+1)	10	40 (25+15)	50	3	NA	2
Multidisciplinary	S/NUT/304/MD-3	Nutrition through lifespan	4	10	40	50	3	NA	NA
Skill Enhancement Course	S/NUT305//SEC-3	Management of Malnutrition in Community	3	10	40	50	-	NA	6
Value Added Course	As offered by the Institution								
Ability Enhancement Course	As offered by the Institution								

SEMESTER - IV

Course Type	CourseCode	Course Title	Credit	Marks			No. of Hours		
				I.A.	ESE	Total	Lec.	Tu.	Pr.
Major	S/NUT/401/MJC-5	Human Physiology II	4 (3+1)	10	40 (25+15)	50	3	NA	2
Major	S/NUT/402/MJC-6	Food Commodities	4	10	40	50	3	NA	NA
Major	S/NUT/403/MJC-7	Community Nutrition	4 (3+1)	10	40 (25+15)	50	3	NA	2
Major	S/NUT/404/MJC-8	Food Safety & Sustainable Nutrition	4 (3+1)	10	40 (25+15)	50	3	NA	2
Minor	S/NUT/405/MN-4	Community Nutrition	3	10	40 (25+15)	50	3	NA	2

Detailed Syllabus

Semester III

Course Code: S/NUT/301/MJC-3
Course Category: Major
Course Title: Human Nutrition
Course Type: Theory & Practical

Course Outcomes:

- Understanding the different phases of growth and development of human
- Gaining knowledge on nutritional requirements of humans during different stages of life.
- Understanding the concepts of Recommended Dietary Allowances and energy in human nutrition.
- Developing skills for planning diet charts and menu for providing recommended nutrition.

Human Nutrition (Theory)

1. **Fundamentals of nutrition:** Concept and definition of terms, ACU, RDA – definition and formulation; general dietary recommendations.
2. **Growth & Development:** Growth and development from infancy to adulthood; Factors affecting growth and development.
3. **Body Composition:** Changes through lifecycle.
4. **Energy in human nutrition:** Units, bomb calorimeter, physiological fuel value, energy balance, SDA, BMR, REE.
5. **Nutrition during different stages of life:**
   - Nutrition during pregnancy: Nutritional requirements; Common problems & complications of pregnancy; Impact of nutritional deficiency on the outcome of pregnancy.
   - Nutrition during lactation: Nutritional requirements; Factors affecting the volume and composition of breast milk
   - Nutrition during infancy: Nutritional requirements; breastfeeding, formula feeding and weaning.
   - Nutrition during preschool age: Nutritional requirements; Nutrition related problems of preschoolers;
   - Nutrition during school age: Nutritional requirements; school lunch.
   - Nutrition during adolescence: Nutritional requirements; nutritional problems of adolescence.
   - Nutrition during adulthood: Nutritional requirements based on different activity level; Reference Man and Woman.

- Geriatric nutrition: Physiological and metabolic changes in ageing; Nutritional requirements; Nutrition related problems of old age.

Human Nutrition (Practical)

1. Planning of normal diet for infants.
2. Planning of normal diet for preschool child.
3. Planning of normal diet for school child.
4. Planning of normal diet for college student.
5. Planning of normal diet for adult.
6. Planning of normal diet for elderly.
7. Planning of normal diet for pregnant woman and lactating mother.

Suggested reading:

1. B. Srilakshmi. Dietetics. New Age International Publisher
2. B. Srilakshmi. Nutrition Science. New Age International Publisher
3. Kumud Khanna. Sharda Gupta. Santosh Jain Passi. Rama Seth. Ranjana Mahna. Seema Puri. Textbook of Nutrition and Dietetics. Elite Publishing House Pvt Ltd
4. Suryatapa Das. Textbook of Human Nutrition. Academic Publishers
5. Anjana Agarwal, Shobla A Udipi. Textbook of Human Nutrition. JAYPEE
6. Ravinder Chadha. Pulkit Mathur. Nutrition. Orient BlackSwan

Course Code: S/NUT/302/MJC-4
Course Category: Major
Course Title: Human Physiology I
Course Type: Theory & Practical

Course Outcomes:

- Acquiring knowledge about the anatomy and physiology of different systems of human body
- Understanding the basic homeostatic mechanism.
- Gaining fundamental knowledge about the composition, function of various body fluids like blood and lymph, their significance and related disorders.
- Performing the haematological test like blood cell count, blood group determination, bleeding/clotting time, etc.
- Recording the blood pressure, heart rate, pulse rate etc.

Human Physiology I (Theory)

1. **Eukaryotic cell:** Structure and functions cell membrane, nucleus, endoplasmic reticulum, mitochondria, ribosomes, centromere; Cellular transport.
2. **Blood and Cardiovascular System:** Composition of blood; Abnormal constituents of blood; Clotting time and Bleeding time, Blood groups, Blood coagulation. Structure and function of heart, Heart rate, Cardiac cycle, Cardiac output, Systemic, portal and cerebral circulation; Blood pressure and its regulation.

3. **Alimentary System:** Structure and functions of various organs of the GI Tract; Digestive juices; Digestion and absorption of food.
4. **Respiratory System:** Structure and functions of lungs and gaseous exchange (Oxygen and carbon dioxide transport); Lung volumes and capacities; Acclimatization.
5. **Excretory System:** Structure and Function of Kidney; Structure of nephron; Glomerular filtration and tubular functions; Formation of Urine; Role of kidney in homeostasis.

Human Physiology I (Practical)

1. Preparation of blood film and blood analysis: T.C., D.C.
2. Determination of bleeding time and clotting time of blood.
3. Detection of Blood group.
4. Estimation of blood pressure by Sphygmomanometer.

Suggested reading:

1. C. C. Chatterjee. Human Physiology, Volume I, CBS publishers
2. Anil Baran Sighamahapatra, Gargi Sighamahapatra. Essentials of Medical Physiology. Current Book International
3. K. Sembulingam, Prema Sembulingam. Essentials of Medical Physiology. JAYPEE
4. Indu Khurana, Arushi Khurana. Textbook of Medical Physiology. ELSEVIER
5. G. K. Pal. Textbook of Medical Physiology. ELSEVIER
6. L. Prakasam Reddy. Practical Physiology. Paras Medical Publisher

Course Code: S/NUT/303/MN-3
Course Category: Minor
Course Title: Human Nutrition
Course Type: Theory & Practical

Course Outcomes:

- Understanding the different phases of growth and development of human
- Gaining knowledge on nutritional requirements of humans during different stages of life.
- Understanding the concepts of Recommended Dietary Allowances and energy in human nutrition.
- Developing skills for planning diet charts and menu for providing recommended nutrition.

Human Nutrition (Theory)

1. **Fundamentals of nutrition:** Concept and definition of terms, ACU, RDA – definition and formulation; general dietary recommendations.
2. **Growth & Development:** Growth and development from infancy to adulthood; Factors affecting growth and development.
3. **Body Composition:** Changes through lifecycle.
4. **Energy in human nutrition:** Units, bomb calorimeter, physiological fuel value, energy balance, SDA, BMR, REE.

5. **Nutrition during different stages of life:**
   - Nutrition during pregnancy: Nutritional requirements; Common problems & complications of pregnancy; Impact of nutritional deficiency on the outcome of pregnancy.
   - Nutrition during lactation: Nutritional requirements; Factors affecting the volume and composition of breast milk
   - Nutrition during infancy: Nutritional requirements; breastfeeding, formula feeding and weaning.
   - Nutrition during preschool age: Nutritional requirements; Nutrition related problems of preschoolers;
   - Nutrition during school age: Nutritional requirements; school lunch.
   - Nutrition during adolescence: Nutritional requirements; nutritional problems of adolescence.
   - Nutrition during adulthood: Nutritional requirements based on different activity level; Reference Man and Woman.
   - Geriatric nutrition: Physiological and metabolic changes in ageing; Nutritional requirements; Nutrition related problems of old age.

Human Nutrition (Practical)

1. Planning of normal diet for infants.
2. Planning of normal diet for preschool child.
3. Planning of normal diet for school child.
4. Planning of normal diet for college student.
5. Planning of normal diet for adult.
6. Planning of normal diet for elderly.
7. Planning of normal diet for pregnant woman and lactating mother.

Suggested reading:

1. B. Srilakshmi. Dietetics. New Age International Publisher
2. B. Srilakshmi. Nutrition Science. New Age International Publisher
3. Kumud Khanna. Sharda Gupta. Santosh Jain Passi. Rama Seth. Ranjana Mahna. Seema Puri. Textbook of Nutrition and Dietetics. Elite Publishing House Pvt Ltd
4. Suryatapa Das. Textbook of Human Nutrition. Academic Publishers
5. Anjana Agarwal, Shobha A Udipi. Textbook of Human Nutrition. JAYPEE
6. Ravinder Chadha. Pulkit Mathur. Nutrition. Orient BlackSwan

Course Code: S/NUT/304/MD-3
Course Category: Multidisciplinary
Course Title: Nutrition through Lifespan
Course Type: Theory

Course Outcomes:

- Understanding the different phases of growth and development of human
- Gaining knowledge on nutritional requirements of humans during different stages of life.
- Understanding the concepts of Recommended Dietary Allowances and energy in human nutrition.

1. **Physiological changes, RDA, nutritional guidelines, nutritional concerns and healthy food choices for:**
   - Adult man and woman
   - Pregnant woman, Lactating mother
   - Elderly
2. **Growth and development, RDA, nutritional guidelines, nutritional concerns and healthy food choices for:**
   - Infants
   - Preschool children
3. **RDA, nutritional guidelines, nutritional concerns and healthy food choices for:**
   - School children
   - Adolescents
4. **Undernutrition –** Protein energy malnutrition, nutritional anaemias, Vitamin A deficiency, Iodine deficiency disorders

Suggested reading:

1. B. Srilakshmi. Dietetics. New Age International Publisher
2. Kumud Khanna. Sharda Gupta. Santosh Jain Passi. Rama Seth. Ranjana Mahna. Seema Puri. Textbook of Nutrition and Dietetics. Elite Publishing House Pvt Ltd
3. Suryatapa Das. Textbook of Human Nutrition. Academic Publishers
4. Ravinder Chadha. Pulkit Mathur. Nutrition. Orient BlackSwan

Course Code: S/NUT/305/SEC-3
Course Category: Skill Enhancement Course (SEC)
Course Title: Nutritional Management of Malnutrition in Community
Course Type: Practical

Course Outcomes:

- Applying the theoretical knowledge for developing community awareness
- Developing skills for preparation and demonstration of teaching aids for nutrition education.
- Gaining exposure to national nutrition programmes(s) through field visit.

1. Preparation of educational tools like chart/poster/model/flash cards etc. for nutrition awareness and management of nutrient deficiency diseases in the community; demonstration with prepared tools:
    - Deficiencies of macronutrients
    - Deficiencies of micronutrients
2. Visit to any National Nutrition Programme/PHC/Anganwadi and Preparation of Project Report.

Semester IV

Course Code: S/NUT/401/MJC-5
Course Category: Major
Course Title: Human Physiology II
Course Type: Theory & Practical

Course Outcomes:

- Explaining the morphology, physiology of skeletal system along with the physiology of muscle contraction in co-ordination with the joints.
- Gaining fundamental knowledge about the functions of various endocrine glands and effects of hormones on metabolism.
- Understanding the classification of the morphology and functions of nervous system.
- Identifying different tissues and organs of different systems of human body and performing the haematological test like haemoglobin estimation etc.

Human Physiology II (Theory)

1. **Endocrine System:** Structure of pituitary, thyroid and adrenal gland and endocrine pancreas. Functions, deficiency and excess of hormones releasing from pituitary – GH, TSH, prolactin, LH, gonadotrophins, ADH, oxytocin; hormones of the thyroid gland – thyroxine and tri-iodothyronine, calcitonin; hormones of adrenal cortex and adrenal medulla, endocrine pancreas- insulin and glucagon, somatostatin.
2. **Reproductive System:** Structure and functions of gonads, male and female sex hormones; gametogenesis, menstrual cycle, brief idea of implantation, pregnancy, parturition, lactation and menopause.
3. **Musculoskeletal System:** Structure and function of voluntary muscles (skeletal muscles) and involuntary muscles (smooth and cardiac muscles); properties of skeletal muscles; muscle contraction and relaxation.
4. **Nervous System:** Neuron and neuromuscular junction, the CNS and PNS, sympathetic and parasympathetic nervous system, cerebrospinal fluid, blood brain barrier. Brief anatomy and functions of cerebrum, cerebellum, hypothalamus; general idea of reflex arc.
5. **Immune system:** Basic concept on lymphoid organs and cells of the immune system; Types of immunity.

Human Physiology II (Practical)

1. Identification with reasons of histological slides: lung, liver, kidney, small intestine, stomach, thyroid, adrenal, pancreas, testis, ovary and muscle of mammals, blood corpuscles of human.
2. Haemoglobin estimation (Cyanomethaemoglobin Method).

Suggested reading:

1. C. C. Chatterjee. Human Physiology, Volume II, CBS Publisher
2. Veena V Kulkami, Rakesh Kumar. Practical Manual and workbook of Histology. CBS Publisher
3. Dr. Seema Prakash, Dr. Parveena Ojha. Histology Manual. Himanshu Publication
4. Anil Baran Sighamahapatra, Gargi Sighamahapatra. Essentials of Medical Physiology. Current Book International
5. K. Sembulingam, Prema Sembulingam. Essentials of Medical Physiology. JAYPEE
6. Indu Khurana, Arushi Khurana. Textbook of Medical Physiology. ELSEVIER
7. G. K. Pal. Textbook of Medical Physiology. ELSEVIER

Course Code: S/NUT/402/MJC-6
Course Category: Major
Course Title: Food Commodities
Course Type: Theory

Course Outcomes:

- Developing the skills for identifying the structural, compositional and nutritional importance of various foods and their processed products.
- Understanding thoroughly various cereals, legumes and other commodities including dairy and meat along with their value-added products after processing.

1. **Basic concept on food science:** Food groups, food guide pyramid, Food exchange list.
2. **Cereals:** General structure of cereal grains. Nutritional aspects. cereal cookery; breakfast cereals – ready-to-eat & ready-to-cook, fermented and non-fermented cereals and cereal products.
3. **Pulses & Legumes:** Nutritional contribution. Toxic constituents.
4. **Milk & Milk products:** Nutritive value, composition. Milk products -- butter, curd, cheese, paneer.
5. **Eggs:** Different parts; Nutritional aspects and uses; Quality of eggs; Egg white foam.
6. **Meat, Fish and Poultry:** Nutritional contribution, post-mortem changes, ageing, tenderisation, curing of meat, spoilage of meat. Classification of fish, nutritive value, selection, spoilage.
7. **Vegetables & Fruits:** Nutritional contribution, spoilage.
8. **Sugar:** Properties and nutritional aspects; Crystallisation and factor regulating sugar crystallisation; sugar cookery. Types of natural sweeteners; artificial sweeteners.

9. **Fats and Oils:** Classification and types, sources, uses and nutritional aspects.
10. **Beverages:** tea - types, processing and gradation, coffee – composition and processing, alcoholic beverages, aerated beverages.
11. **Spices:** Chillies, turmeric, garlic, ginger, fenugreek, cumin, ajwain, cloves – active principle, medicinal properties, culinary uses.

Suggested reading:

1. B. Srilakshmi. Food science. New Age International Publisher
2. H. K. Chopra, P.S. Panesar. Food Chemistry. Narosa
3. T. P. Coultate. Food- the chemistry of its components. Royal Society of Chemistry
4. N. Shakuntala Manay, M. Shadaksharaswamy. Foods, Facts and Principles. New Age International Publisher
5. Prasanta Mukherjee. Textbook of Food Commodities. Aman Publications

Course Code: S/NUT/403/MJC-7
Course Category: Major
Course Title: Community Nutrition
Course Type: Theory & Practical

Course Outcome:

- Learning about the tools of Nutritional assessment, screening, surveillance and monitoring etc. and the role of different nutritional agencies.
- Gaining knowledge about the various agencies working in the field of nutrition and the programmes implemented thereof for uplifting health and nutritional status in the community setting.

Community Nutrition (Theory)

Community: Concept of community, factors affecting community health, Secondary Sources of Community Health data: vital statistics, infant, child and maternal mortality rates

1. **Nutritional Status Assessment:** Direct and indirect methods of assessment
    - Nutritional Anthropometry
    - Biochemical and biophysical methods of Nutritional status assessment
    - Clinical Assessment of Nutritional deficiencies
    - Diet Survey
2. **Nutrition Monitoring and Nutrition Surveillance:** Meaning, objectives and processes; Growth monitoring and growth chart.
3. **Malnutrition:** Causes, consequences and preventive measures.
4. **International and National Agencies:** Role of WHO, FAO, UNICEF, CARE, NIN, ICMR, ICAR and CFTRI to combat malnutrition.

5. **National Nutrition Intervention Programmes:** Objectives, beneficiaries and activities of ICDS, Midday meal and Public Distribution System. Current intervention programmes to combat malnutrition in India.

Community Nutrition (Practical)

1. Anthropometric measurement – height, weight, BMI circumference of head and chest, MUAC, Waist-Hip ratio, measurement of fat using skin fold thickness.
2. Clinical assessment and sign of nutrient deficiency: PEM, vitamin A, Anaemia, Rickets, vitamin B complex
3. Growth chart: plotting and interpretation
4. Family Diet Survey by 3-day recall method

Suggested reading:

1. Suryatapa Das. Textbook of Community Nutrition. Academic Publishers
2. B. Srilakshmi. Nutrition Science. New Age International Publisher
3. Rajvir Bhalwar. Textbook of Community Medicine. Wolters Kluwer
4. K. Park. Park's textbook of preventive and social medicine. M/s Banarsidas Bhanot publishers
5. Roy, R and Saha, Mahajan & Gupta Textbook of Preventive and Social Medicine. Jaypee Brothers Medical Publishers

Course Code: S/NUT/404/MJC-8

Course Category: Major

Course Title: Food Safety & Sustainable Nutrition

Course Type: Theory & Practical

Course Outcome:

- Identifying common key food safety issues and their prevalence
- Learning about tools for mitigating the risks of food safety and food scarcity issues
- Describing and identifying relevant nutritional challenges
- Familiarizing with current research into developing sustainable and innovative approaches to meet global nutrient needs

Food Safety & Sustainable Nutrition (Theory)

1. **Food Standards:** ISI, Agmark, PFA, FPO, MPO, Codex Alimentarius, HACCP, FSSAI.
2. **Post-harvest Processing and Storage:** storage and processing of wheat, rice and oats, pulses, milk, meat, fish, eggs, vegetables.
3. **Food preservation:** General idea of food preservation and processing. Uses of high and low temperature, dehydration, freezing, freeze drying, irradiation and preservatives in food preservation. Convenience foods.

4. **Preserved products:** Jams, jellies, pickles, syrup, squash – uses and nutritional aspects.
5. **Nutrient losses and enhancing nutritional quality of foods**: Nutrient losses in cooking; Enhancing nutritional quality by supplementation, germination, fermentation, fortification, enrichment.
6. **Organic and genetically modified foods:** Basic concept; Advantages and disadvantages.
7. **Functional foods:** Prebiotics and probiotics, nutraceuticals.

Food safety and sustainable nutrition (Practical)

1. Visit to any food processing industry and submission of report.
2. Preparation of preserved food products: jam, jelly, squash, pickle.

Suggested reading:

1. G. Subbulakshmi, Shoba A Udipi. Food Processing and Preservation. New Age International Publishers
2. B. Srilakshmi. Food science. New Age International Publisher
3. Robert E. C. Wildman. Handbook of Nutraceuticals and Functional foods. CRC Press

Course Code: S/NUT/405/MN-4
Course Category: Minor
Course Title: Community Nutrition
Course Type: Theory & Practical

Course Outcome:

- Learning about the tools of Nutritional assessment, screening, surveillance and monitoring etc. and the role of different nutritional agencies.
- Gaining knowledge about the various agencies working in the field of nutrition and the programmes implemented thereof for uplifting health and nutritional status in the community setting.

Community Nutrition (Theory)

1. **Community:** Concept of community, factors affecting community health, Secondary Sources of Community Health data: vital statistics, infant, child and maternal mortality rates
2. **Nutritional Status Assessment:** Direct and indirect methods of assessment
    - Nutritional Anthropometry
    - Biochemical and biophysical methods of Nutritional status assessment
    - Clinical Assessment of Nutritional deficiencies
    - Diet Survey
3. **Nutrition Monitoring and Nutrition Surveillance:** Meaning, objectives and processes; Growth monitoring and growth chart.
4. **Malnutrition:** Causes, consequences and preventive measures.

5. **International and National Agencies:** Role of WHO, FAO, UNICEF, CARE, NIN, ICMR, ICAR and CFTRI to combat malnutrition.
6. **National Nutrition Intervention Programmes:** Objectives, beneficiaries and activities of ICDS, Midday meal and Public Distribution System. Current intervention programmes to combat malnutrition in India.

Community Nutrition (Practical)

1. Anthropometric measurement – height, weight, BMI circumference of head and chest, MUAC, Waist-Hip ratio, measurement of fat using skin fold thickness.
2. Clinical assessment and sign of nutrient deficiency: PEM, vitamin A, Anaemia, Rickets, vitamin B complex
3. Growth chart: plotting and interpretation

Suggested reading:

1. Suryatapa Das. Textbook of Community Nutrition. Academic Publishers
2. B. Srilakshmi. Nutrition Science. New Age International Publisher
3. Rajvir Bhalwar. Textbook of Community Medicine. Wolters Kluwer
4. K. Park. Park's textbook of preventive and social medicine. M/s Banarsidas Bhanot publishers
5. Roy, R and Saha, Mahajan & Gupta Textbook of Preventive and Social Medicine. Jaypee Brothers Medical Publishers