SYLLABUS FOR UG COURSE BACHELOR OF SCIENCE IN FOOD AND NUTRITION (Semester-V & VI)

Major Core/Discipline Specific Course

[AS PER NEP, 2020]

[DRAFT]

(With effect from - Session 2023-24 onwards)

UNIVERSITY OF GOUR BANGA

MALDA

WEST BENGAL, INDIA

Evaluation details.

Course type	Full marks	Cont. Evaluation.	Semester End Examination	
Major Core	**50**	**25**	**Theory**	**Practical**
			30 **(2×4=8, out of 6 questions)** **(4×3=12, out of 6)** **[10×1= out of 2, {at least 2 parts, maximum 3 parts, but a single part of question should not exceed 6 marks.}]**	**20**
Minor Core	**50**	**25**	**30** **(2×4=8, out of 6 questions)** **(4×3=12, out of 6)** **[10×1= out of 2, {at least 2 parts, maximum 3 parts, but a single part of question should not exceed 6 marks.}]**	**20**
Skill Enhancement Course	**50**		**No theoretical examinations.**	
MDC	**50**	**10** **Attendance: 05, Class performance:05.**	**40**	**-------**
VAC/AEC	**25**		**25 MCQ**	**-------**

- **Continuous evaluation for Major and Minor courses:**
  Attendance: 05, Class performance: 05, Presentation/ Project: 10, Viva: 05.

Parameters of evaluation of class performance:

- Class performance: Regularity, Punctuality, Interactive, Cooperative, Carefulness, Timely assignment submission, Endorsement of Practical note book.
- Participation in the cleanliness of the laboratory.
- Departmental involvement: Cleanliness, Wall magazine, Science exhibition; Health awareness camp; community study, participation in departmental seminar and workshop.
- Co-curricular activity; Blood donation camp, participation in cultural and sports activities. Essay and quiz competition.

❖ **Continuous evaluation for MDC courses:**

Attendance: 05, Class performance: 05.

- Class performance: Regularity, Punctuality, Interactive, Cooperative, Carefulness, Timely assignment submission.

❖ **Practical Examination:**

Direction from Board of Studies and Controller of Examination department will be followed.

4 YEAR BACHELAR OF SCIENCE COURSE IN FOOD & NUTRITION

SEMESTER WISE BREAKUP

SEMESTER-V

SEMESTER	Title of the Course	Credits	Full Marks	Marks Division		
		L-P		Th.	Pr	Cont. evaluation
SEMESTER-V	Course Code: FNTMJ MC-08 Course Name: Nutrition in Human Life Stages.	4 (3-1)	75	30	20	25
	Course Code: FNTMJ MC-09 Course Name:Nutritional Physiology-II	4 (3-1)	75	30	20	25
	Course Code: FNTMJ MC- 10 Course Name: Community Nutrition	4 (3-1)	75	30	20	25
	Course Code: FNTMJ MC- 11 Course Name: Food Microbiology	4 (3-1)	75	30	20	25
SEMESTER-VI	Course Code: FNTMJ MC-12 Course Name: Pathophysiology and Therapeutic diet	4 (3-1)	75	30	20	25
	Course Code: FNTMJ MC-13 Course Name: Food Toxicology and Immunology	4 (3-1)	75	30	20	25
	Course Code: FNTMJ MC-14 Course Name: Food Standard and Safety	4 (3-1)	75	30	20	25
	Course Code: FNTMJ MC-15 Course Name: Nutritional Epidemiology and Biostatistics	4 (3-1)	75	30	20	25

SEMESTER-V

Course Code- FNTMJ MC-08

Course Name- Nutrition in Human Life Stages

Course Objectives:

1. To gain knowledge about the nutritional requirement during different age groups and physical condition.
2. To know about RDA, meal planning and the effect of age on food choices.

Learning Outcome:

This course deals with actual requirement of an individual throughout the normal life span. Students obtain knowledge about the importance of breast feeding and weaning in infancy, childhood, adolescence and adulthood. Understanding the importance of additional nutritional demand during pregnancy and lactation and dietary management of Athletes and old aged people is essential for formulating an adequate diet for them.

Module-1: Nutrition for infant and children:

- Breast feeding, Formula feeding, Weaning, Supplementary foods, Nutritional management of Preterm baby.
- Diet in early childhood, elementary school age, high school age.

Module-2: Nutrition for adolescents and athletes:

- Nutritional requirement and dietary management.
- Nutritional problems and eating disorder.
- Nutritional requirements and dietary management for sportsman and athletes, Meal planning for athletes, Carbohydrate loading.

Module-3: Nutrition during pregnancy, lactation and geriatric nutrition:

- Nutritional demands of Pregnancy, Food selection during Pregnancy, Complications of pregnancy and dietary management, Diet during Lactation.
- Planning of meals for older people, Nutrition of aged persons, Physiological complications in geriatric group and dietary modifications required, Oxidative stress and aging and role of antioxidative nutrients for preventing aging.

Module-4: PRACTICAL:

- Growth chart: Plotting and Interpretation using primary or secondary data in accordance with both ICMR and WHO Chart.
- ICDS centre visit and report preparation.

Suggested Readings:

- Hoar WS (1984). General and comparative Physiology. 3rd ed. Prentice-Hall of India.
- Indian Council of Medical Research (2003). Nutrient Requirements andRecommended-Dietary Allowance for Indians. New Delhi.
- Sherwood L (2004). Human Physiology: From cells to systems. 5th ed. Thomson Brooks Cole.
- Swaminathan M (2009). Essentials of Foods and Nutrition, Vols -1 and II. Ganesh and Co. Madras.
- Walker WA and Watkins JB (Ed.) (1985). Nutrition in Pediatrics, Boston, LittleBrown & Co.
- WHO (1979). A growth chart for international use in Material and Children Health Care. Geneva.
- Wilson(1989). Anatomy and Physiology in Health and Illness. Edinburgh, Churchill Livingstone.

Course Code- FNTMJ MC-09

Course Name- Nutritional Physiology- II

Course Objectives:

1. To gain knowledge about various systems of human body.
2. To know about the role of nervous system, endocrine system, reproductive system and excretory system.

Learning Outcome:

Student will be able to understand the current state of knowledge about the functional organization (Excretory system, Reproductive system, Nervous system and Endocrine system) of the human body. They will be able to develop insight of normal functioning of all the organ systems of the body and their interactions.

Module-1: Nervous System and Endocrine system:

- Concept on sympathetic, parasympathetic nervous system and vagus nerve.
- Brief anatomy and functions of cerebrum, cerebellum, hypothalamus and neuron.
- Concept on synapse and synaptic transmission.
- Location, anatomy, functional morphology and hormones of pituitary, thyroidand adrenal gland.
- Structure and functions of pancreas.

Module-2: Reproductive system:

- Structure and functions of gonads, concept on menstrual cycle.
- Brief idea of pregnancy, parturition, lactation and menopause.
- Brief concept on spermatogenesis and Oogenesis process.

Module-3: Excretory system:

- Structure and function of skin.
- Regulation of temperature of the body.
- Structure and functions of kidney in special reference to nephron.
- Physiology of urine formation.

Module-4: Practical:

- Identification of histological slides / photography (Liver, Pancreas, Kidney, Testis, Thyroid gland, Pituitary, Adrenal and Ovary).
- Determination of ESR (Westergreen method)
- Detection of hCG in urine sample. (Strip method)
- Differential count of blood cell (Leishman stain/ others)

Suggested Readings:

- Chatterjee CC (1988). Text Book of Physiology – Vol I& II.
- Chaudhuri SK (2000). Concise Medical Physiology. New Central Book Agency (P) Ltd.
- GanongW.F.(2003)-Review of Medical Physiology.21st ed. McGraw Hill.
- Guyton AC, Hall JE (2000). Text book of Medical Physiology. 9th Ed. Prism Books (Pvt.) Ltd. Bangalore.
- Guyton AC (1985). Function of the Human Body, 4th Edition, W.B. Sanders Company, Philadelphia.
- Hadley ME (2000). Endocrinology. 5th ed. Pearson Education.
- Hoar WS (1984). General and comparative Physiology. 3rd ed. Prentice-Hall of India.
- Jain A. K (2014) Human Physiology for BDS(5th Edition), Publisher: Avichal Publishing Company; ISBN: 9788177394337

Course Code- FNTMJ MC-10
Course Name- Community Nutrition

Course Objectives:

1. To provide knowledge about community and health education.
2. To know about various nutrition intervention programme**.**

Learning Outcome:

On completion of the course, students are expected to be able to understand the concept and purpose of nutritional status assessment in community setting. They will be able to explain nutritional concerns among vulnerable sections of the community and strategies to combat them. They will gain knowledge with regard to standard methods and techniques for assessing nutritional status. Students' will be familiar with the use of indices and indicators for screening and consequent identification of malnutrition in the community.

Module-1: Community, Communication in Nutrition and Health Education:

- Community and its types – Rural and Urban
- Characteristics of Community and population
- Demography: Concept, Factors affecting demography, Demographic cycle, Indian demographic history
- Factors affecting health of the Community (Social, economical, political).
- Importance and relevance of Information, Education and communication (IEC) in Nutrition and Public Health.

Module-2: Assessment of Nutritional Status and Surveillance:

- Nutrition Monitoring and Surveillance: Objectives, Components, Process and Uses.
- Direct Nutritional status assessment of human groups - Anthropometric, Biochemical, Biophysical, Clinical and Diet survey methods.
- Nutritional anthropometry: Need and importance, standard for reference techniques of measuring height, weight, head, chest and arm circumference, interpretation of these measurements. Use of growth chart.
- Indirect assessment: Secondary sources of community health data.
- Clinical Signs: Identifying signs of PEM, vitamin A deficiency and iodine deficiency, Interpretation of descriptive list of clinical signs.

Module-3: National Nutritional Intervention Programmes and Role of Agencies:

- Objective, Target group, Scheme details - Integrated Child Development Services (ICDS), Mid-Day Meal Programme (MDMP), Vit A prophylaxis programme, Anemia prophylaxis programme, Iodine deficiency disorders control programme.
- Concept on public distribution system.
- Role of international and national organizations and agencies (WHO, F A O , UNICEF, CARE, CFTRI, ICMR, ICAR).

Module-4: Practical:

- Nutritional Anthropometric measurement:
- Anthropometric measurement of Weight for age, height for age, weight for height andits comparison with reference value. Upper arm,.
- Determination of BMI, waist - hip ratio and comments on results.
- Measurements of fat using skin fold thickness.
- Clinical assessment and sign of nutrient deficiency disorders: Protein energy malnutrition (PEM), Anaemia, Rickets, Goiter, Vitamin A, Vitamin C and Vitamin B complex (Slide/Photography).

Suggested Readings:

- Park K (2009). Park's Textbook of Preventive and Social Medicine, 20th Edition, M/s BanarasidasBhanot, Jabalpur.
- Gordis L (1996). Epidemiology, Saunders, Pennsylvania.
- Norell SE (1998): Workbook of Epidemiology. Oxford: University Press, New York.
- Owen AY and Frankle RT (1986). Nutrition in the Community, The Art of Delivering Services, 2nd Edition, Times Mirror/Mosby.
- Roday, S. (1999) Food Hygiene and Sanitation. 1st Edition, Tata McGraw Hill, New Delhi.
- Saha A, Shattock F, Mustafa T. Epidemology in Primary Health Care. The McGraw-Hill Companies.

Course Code- FNTMJ MC-11
Course Name- Food Microbiology

Course Objectives:

1. To provide knowledge about microorganism structure and their culture.
2. To know about food borne diseases.

Learning Outcome:

Students will have a basic idea about microorganisms, their nature and the culture techniques of microbes. Student will be able to understand the nature of microorganisms involved in food spoilage, food infections and intoxications. They will also have knowledge on the beneficial role of microbes.

Module-1: Microorganism in food fermentation, food contamination and control of microorganisms:

- Microorganisms involved in food fermentation and their role.
- Primary sources of food contamination
- Physical and chemical methods used in sterilization and disinfection.

Module-2: Nutrient media and Microbial culture, ultra-structure of microbial cell:

- Microbial nutrition-Types of culture media, Methods of pure culture and sub culture. Composition and principles of: Nutrient Agar, MacConkey Agar, Triple-Sugar-Iron Agar.
- Structure and function of Bacterial cell wall, Capsule, Peptidoglycan, Endospore, Flagella, Fimbriae, Pili and Plasmid.
- Bacterial growth curve, Extrinsic and intrinsic factors affecting growth.

Module-3: Food infections and Food-borne diseases:

- Agents, symptoms, mode of transmission, mode of action, prevention and management: Staphylococcal intoxication, Botulism, Salmonellosis, Shigellosis.

Module-4: Practical:

- Preparation of liquid (broth) and solid media.
- Culture techniques: Spread plate, Pour plate and Streak plate.
- Staining-Simple stain, Differential stain (Gram stain).
- Microbiological examination of milk (Methylene blue reduction test).
- Pictorial identification of bacterial capsule, endospore, flagella, fimbriae, pili.

Suggested Readings:

- Frazier, W.C. (1988) Food Microbiology, Mc Graw Hill Inc. 4th Edition
- Prescott, Harley, and Klein's Microbiology, 8th edition, (2011), Joanne M. Willey, Linda M. Sherwood, Christopher J. Woolverton, McGraw Hill International. ISBN-13:978 0071313674.
- Bailey and Scott's Diagnostic Microbiology, 12th edition (2007), Betty A. Forbes, Daniel F. Sahm and Alice S. Weissfeld; Mosby Elsevier Publishers, ISBN-13: 978-0808923640.
- Microbiology, 6th edition (1993), Pelczar, Chan and Krieg; McGraw Hill International, ISBN-13: 978-0070492585.
- Brock Biology of Microorganisms, 13th edition (2010), Michael T. Madigan, John M. Martinko, David Stahl and David P. Clark, Pearsons, Benjamin Cummings, ISBN-13: 978- 0321649638..
- YasmineMotarjemi and Martin Adams (2006), Emerging Food borne pathogen-Wood Head Publishing England.

SEMESTER-VI

Course Code- FNTMJ MC-12

Course Name- Pathophysiology and Therapeutic Diet

Course Objectives:

1. **To give knowledge about pathophysiology of various diseases.**
2. **To know about dietary management of diabetes,** cardiovascular diseases and renal diseases.

Learning Outcome:

Students will be able to comprehend the pathophysiology and diet therapy of various types of diabetes, cardiovascular diseases and renal diseases, Students will be able to correlate physiology with these disorders, their pathogenesis and dietary management.

Module-I: Pathophysiology, clinical symptoms, risk factors, diagnostic tests and dietary management of Diabetes:

- Types of Diabetes (Type 1, Type 2, Gestational), complications.
- Diagnosis (Oral glucose tolerance test, Urinary sugar, Blood glucose test, Glycosylated hemoglobin test).
- Diet in Diabetes and management.

Module-II: Pathophysiology, clinical symptoms, diagnostic tests and dietary management ofcardiovascular diseases:

- Brief review of lipoproteins (TC, TG, LDL, HDL, VLDL)
- Hypertension
- Atherosclerosis–etiology and risk factor.
- Dietary care: ischemic heart disease and hyperlipidemia.

Module-III: Pathophysiology, risk factors, clinical features, diagnosis and dietary management of Renal diseases:

- Renal diseases (Nephritis, Glomeurlonehiritis, Uremia, Kidney failure, Nephrosis, Nephrolithiasis).

Module-IV: Practical: Planning and preparation of Diet chart and menu for the following diseases (Case specific):

- Hypertension
- Diabetes
- Atherosclerosis
- Renal Disease

Suggested Readings:

- Anderson L, Dibble MV, Tukki PR, Mitchall HS, and Rynbergin HJ. Nutrition in Health and Disease. 17th edition, JB Lipincott& Co. Philadelphia.
- Anita FP. Clinical Dietetics and Nutrition. Second Edition, Oxford University Press, Delhi.
- Davis J and Sherer K (1994). Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, WB Saunders Co.
- Escott-Stump S (1998). Nutrition and Diagnosis Related Care, 4th Edition, Williams andWilkinson
- Garrow JS, James WPT and Ralph A (2000). Human Nutrition and Diabetics, 10th Edition, Churchill Livingstone.
- Gibney MJ, Elia M, Ljungqvist&Dowsett J. (2005) Clinical Nutrition. The Nutrition Society Textbook Series. Blackwell Publishing Company
- Gibson SR. (2005). Principles of Nutritional Assessment. 2nd Edition. Oxford University press · Joshi YK. Basics of Clinical Nutrition. 2nd Edition. Jaypee Brothers Medical Publishers.
- Lee RD & Neiman DC. (2009). Nutritional Assessment. 5th Edition. Brown & Benchmark.
- Mahan, L. K. and Escott Stump. S. (2016) Krause's Food & Nutrition Therapy 14th 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.
- Williams, S.R. (2001) Basic Nutrition and Diet Therapy. 11th ed. Times Mirror Mosby College Publishing
- World Cancer Research Fund & American Institute for Cancer Research (2007) Food, Nutrition, Physical Activity and the Prevention of Cancer- A Global Perspective. Washington E.D. WCRF.

Course Code- FNTMJ MC-13
Course Name- FOOD TOXICOLOGY AND IMMUNOLOGY

Course Objectives:

1. To give knowledge about food toxicity.
2. To know about immunology.

Learning Outcome:

This course deals with fundamentals of immunity and various types of immunity. It helps student to understand both humoral immunity, cell mediated immunity and their interaction. Toxicology deals with various types of toxic agents, their mechanism of action, resultant toxicities and their effect on environment as well as on human health. This course also ensures understanding the importance of vaccination and immunization schedule.

Module-1: Introduction to Toxicology, Food toxicity, Toxic agents:

- Classification of toxic substances
- Neuro lathyrism, Aflatoxins, Ergot, Epidemic dropsy
- Endemic ascites, Fusarium toxins
- Metals, Pesticides and Bacterial toxins.

Module-2: Cells and organs of the immune system and antigen and antibodies:

- Leucocytes, APC, Macrophage-cell and B-cell
- Mast cell, Dendritic cell and APC
- NK cells, Structure and Function of MHC.
- Definition and properties of antigenic determinants on immunoglobulin (Isotype, allotype & idiotype)
- Structure and classes of antibodies, Monoclonal and Polyclonal antibodies.
- Principle and application of ELISA.

Module-3: Immune response, Vaccination and Immunization schedule:

- Humoral and Cellular Immunity
- Innate Immunity: Types of innate immunity, Factors affecting innate immunity, External defence system of the body, Internal defence system (Humoral factors and Cellular factors)
- Acquired immunity: Types of acquired immunity (Active and Passive immunity) Naturally acquired and artificially acquired active and passive immunity
- Herd immunity
- Types of vaccines (Live, Killed, Attenuated, Recombinant)
- National immunization schedule.

Module-4: Practical:

- Immunological reactions. (Floculation and Precipitation)
- Bacterial isolation from rotten food items.
- Demonstration of colorimeter, spectrophotometer, centrifuge.
- Demonstration of ELISA method.
- Demonstration of MTT assay.

Suggested Readings:

- Immunology, 8th edition, (2012), Male, D., Brostoff, J., Roth, D.B. and Roitt, I., Elseivier-Sauders. ISBN-13: 978-0323080583.
- An Introduction to Immunology, Immunochemistry and Immunobiology, 5th edition, (1988), Barrett, James T., Mosby Company, St. Louis. ISBN-13: 978-0801605307.
- Immunology: An Introduction, 4th edition, (1994), Tizard, I.R., Saunders College
- Publishing, Philadelphia. ISBN-13: 978-0030041983.
- Cassarett and Doull's "Essentials of Toxicology" 2nd edition (2010), Klaassen and Whatkins,McGraw Hill Publisher. ISBN-13: 978-0071622400.
- Introduction to Toxicology, 3rd edition (2001), John Timbrell, Taylor and Francis Publishers.ISBN 13: 9780415247627.
- Principles of Toxicology, 2nd edition (2006), Stine Karen and Thomas M Brown, CRC press.ISBN-13: 978-0849328565.
- Immunology, 8th edition, (2012), Male, D., Brostoff, J., Roth, D.B. and Roitt, I., Elseivier-Sauders. ISBN-13: 978-0323080583.

Course Code- FNTMJ MC-14

Course Name: FOOD STANDARD AND SAFETY

Course Objectives:

1. To gain knowledge about food safety.
2. To know about food laws and regulatory authority.

Course Outcome:

Through this course students acquire knowledge about various types of Food additives, food adulterants and their health hazards. Understanding the concept of Food security and Food safety is essential for ensuring safe food handling practices and safe food storage. Information on various Food laws and regulatory authority is also imparted.

Module-1: Food safety and Food security:

- Concept of food safety, factors affecting food safety.
- Food safety measures: basic concept of HACCP
- Safe food handling practices and storing food safely.
- Concept of food security**,** factors affecting food security.
- Technologies for food and nutrition security.

Module-2: Food Hazard, Risk Analysis and Hygiene in food service establishments.

- Concept and types (Physical, Chemical and Biological hazards).
- Food additives-various types and their effects on health.
- Risk assessment, Risk management.
- Risk communication, Cleaning agent, disinfectants, waste disposal, pest and rodent control, Importance of sanitation and hygiene in food, Kitchen hygiene, Employee's health, Food plant hygiene.

Module-3: Food Adulteration, Food laws and Regulatory authority:

- Food adulteration, Prevention of Food Adulteration (PFA) Act.
- Common adulterants in food and their effects on health.
- Common household methods to detect adulterants in food,
- Regulating authority- FSSAI, Codex Alimentarius, Agmark, Fruit Products Order (FPO), Meat Products Order (MPO), MMPO**.**
- Importance of food labels in processed foods and nutritional labeling.

Module-4: Practical:

- Detection of vanaspati in Ghee.
- Detection of vanaspati in Butter.
- Detection of Khesari flour in Besan.
- Detection of Argemone oil in Edible oil.
- Detection of Metanil yellow in Turmeric.

Suggested Readings:

- Gopalan C and Kaur S (Eds.) (1993). Towards Better Nutrition, Problems and Policies, Nutrition Foundation of India.
- Tovel AP (1984). Standardising Food Service for Quality and Efficiency. AVI Publishing Company INC.
- Dept. of WCD, Govt. of India. (1993): National Nutrition Policy.
- Food and Nutrition Board, Dept. of WCD, Govt. of India (1995): National Plan of Action on Nutrition.
- Roday S (1999). Food Hygiene and Sanitation, 1st Edition, Tata McGraw Hill, New Delhi.
- Diehl JF (1995). Safety of Irradiated Foods Marcel Dekker Inc, New York.
- Raheena Begum: A textbook of food, nutrition and dietetics Sterling Publishers, New Delhi.

Course Code- FNTMJ MC-15

Course Name: NUTRITIONAL EPIDEMIOLOGY AND BIOSTATISTICS

Course Objectives:

1. **To provide knowledge about principles of epidemiology.**
2. **To know about the basics of biostatistics.**

Learning Outcome: Understanding the basic principles of Epidemiology with special reference to the prevalence and incidence of a disease, mortality and morbidity rate, factors influencing epidemiology of a disease. Understanding basic of biostatistic and statistic test.

Module 1: Concept of Public Health, Disease and Principles of Epidemiology:

- Basic concept on Public Health, Hygiene, Preventive medicine, Social medicine, Community medicine
- Iceberg Phenomenon of a disease, Endemic, Epidemic and Pandemic, Acute and Chronic, Communicable and Non-Communicable; Infectious, Contagious, Sporadic and Zoonotic disease
- Rate of Disease in a Population-Attack rate, Mortality and Morbidity rate,Prevalence and Incidence of a disease
- Definition and aims of Epidemiology, Factors that influence the epidemiology of a disease and re-emergence of a disease.
- Epidemiological study-Descriptive and Analytical (Case-Control, Cohort, Longitudinal and Cross-sectional).

Module-2: Introduction to statistics:

- Basic concepts in descriptive and inferential statistics.
- Types of sampling, Design of Sampling, Characteristics of good sampling.
- Data and Data Types: Primary data and Secondary Data, Methods of datacollection, presentation of data-diagrammatic and graphical, Frequency distribution.
- Scales of measurement: Nominal, ordinal, interval and ratio.
- Characteristics of distributions: Skewness, Kurtosis; Percentage, percentile ranking and frequencies.

Module-3: Statistical Test:

- Measures of Central Tendency: Mean, Median, Mode.
- Dispersion: Range, Standard Deviation, Standard Error.
- Hypothesis Testing: Chi-square Test, Student‘t’ test, Analysis of Variance(ANOVA).

Module-4: Practical:

- Presentation of bar diagram, histogram, line diagram, pie chart using various data.
- Mean Median, Mode, Standard Deviation, and Standard Error.
- Chi-square Test.
- Epidemiological Measurement: Rate, Ratio, Proportion, Incidence and Prevalence.

Suggested Readings:

- Debjyoti Das (2012). Biostatistics.
- E. Batschelet : Introduction to Mathematics for Life Scientists,SpringerVerlag,International Student Edition, Narosa Publishing House, New Delhi (1971, 1975).
- A. Edmondson and D. Druce: Advanced Biology Statistics, Oxford University Press;1996.
- Park K (2009). Park's Textbook of Preventive and Social Medicine, 20th Edition, M/s Banarasidas Bhanot, Jabalpur.
- Gordis L (1996). Epidemiology, Saunders, Pennsylvania.
- Norell SE (1998): Workbook of Epidemiology. Oxford: University Press, New York.