SYLLABUS FOR FOUR YEARS

BACHELERS PROGRAMME IN
FOOD AND NUTRITION (MAJOR & MINOR)
Based on the guidelines of NEP 2020

UNIVERSITY OF KALYANI
KALYANI – 741235
NADIA,
WEST BENGAL, INDIA
(www.klyuniv.ac.in)

SEMESTER I

Course Structure

SEMESTER I

Course Code	Course Title	Nature of Course	Credit of Course	Evaluation		Total
				Internal	Semester End	
FNT-M-1	Concept of Nutritional Physiology & Food Science	Major	6	15	60	75
FNT-MI-1	Nutritional Chemistry and Food Science-I	Minor	4	10	40	50
FNT-MDC-1	Basics of Food and Nutrition	Multi-disciplinary Course	3	10	35	45
FNT-SEC- 1 (Any one)	A. Nutritional Assessment and Diet Survey	Skill Enhancement Course	3	10	35	45
	B. Computer Application in Nutrition					
FNT-VA-1	Environ-mental Education	Value Added Course	4	10	40	50
			20	**55**	**210**	**265**

MAJOR COURSE

Course Code: FNT-M-T-1

Course Name: CONCEPT OF NUTRITIONAL PHYSIOLOGY & FOOD SCIENCE (THEORY)

Total Credit: 6 [Theory: 4 + Practical: 2]

FM: 50 [Theory: 40 (Term End) + 10 (Internal)], [Practical: 20 (Term End) + 5 (Internal)]

No. of Lectures: 60

- **Basic Concept of Cell Biology:**

✓ Structure and functions of cell with special reference to Plasma membrane (Fluid Mosaic Model), Mitochondria, Ribosome, Endoplasmic reticulum, Nucleus.

- **Brief Overview of Different Physiological Systems**:

✓ Blood- composition and functions, Blood groups

✓ Circulatory System: Structure of heart and heart valves, cardiac cycle

✓ Digestive System: Structure and functions of G.I. tract, Liver, Gallbladder and Pancreas. Process of Digestion and Absorption of food**.**

- **Food Science: Elementary concept**

✓ Basic concepts of nutritional science: Food, Nutrition, Health, Primary Health Care and Nutritional Status (Definition, Interrelationship in maintaining good health and well-being),

✓ Food (Functions and Constituents of food –Nutrient and Food Groups: Basic concepts)

✓ Nutrients (Macro & Micro Nutraceutical): Functions, Sources and Requirements

✓ Recommended Dietary allowances (RDA), RDA for Indians (ICMR 2010 & 2020) and their uses in planning diets.

✓ Food, Food Groups, Food Pyramid, Functions of food.

✓ Nutrient and Nutritive value, Concept of Balanced Diet

✓ Uses and Nutritional Aspects of Cereals & Pulses, Milk & Milk Products, Meat & Meat Products, Vegetables & Fruits, Fats & Oils.

- **Nutritional Chemistry: Elementary Concept**

✓ Classification, properties & functions of

Carbohydrates (Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides).

Protein (Primary, Secondary, Tertiary and Quaternary)

Lipids, Fatty Acid (PUFA, MUFA, SFA, Ω-3 Fatty Acid, TFA).

✓ Enzyme: Concept, Classifications, Mechanism of Action, Kinetics (Michaelis Menten Equation and Hill Equation), Enzyme Inhibition

✓ Elementary Concept of Metabolism: Glycolysis, TCA Cycle, HMP Shunt, Glycogenesis, Gluconeogenesis, Electron Transport Chain and Oxidative Phosphorylation.

✓ Deamination, Transamination, Urea Cycle, β-Oxidation (Process Outlines and Name of Enzymes, ATP Production Only).

- **Reference Books:**

1. Essentials Of Medical Physiology by A B S Mahapatra And G S Mahapatra
2. Essentials Of Medical Physiology by K Sembulingam, P Sembulingam
3. C.C.Chatterjees Human Physiology by Chatterjee C.C
4. Guyton and Hall Textbook of Medical Physiology (Guyton Physiology) by John E. Hall
5. Karp's Cell Biology by Gerald Karp, Janet Iwasa, Wallace Marshall
6. Food Science by B Srilakshmi
7. Food Science and Nutrition by Sunetra Roday
8. Textbook of Food Science and Technology by Sharma A
9. Biochemistry by Debajyoti Das
10. Harper's Illustrated Biochemistry By Victor W. Rodwell, David Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil
11. Lehninger Principles Of Biochemistry By David L. Nelson, Michael Cox

Course Code: FNT-M-P-1

Course Name: CONCEPT OF NUTRITIONAL PHYSIOLOGY & FOOD SCIENCE (PRACTICAL)

FM: 25 [20 (Term End) + 5 (Internal)], Total Credit: 2

1. Estimation of Hemoglobin, TC, DC, ESR, Determination of Blood Group, Determination of Bleeding Time & Clotting Time
2. Determination of Pulse Rate (30 Beats/10 Beats Method) and Measurement of Blood Pressure During Rest and in Exercise Conditions
3. Qualitative Detection of Carbohydrate (Molisch Test, Benedict`s Test, Iodine Test, Fehling's Test, Tollen's Test, Bial's Test, Seliwanoff's Test, Barfoed's Test, Phenyl Hydrazine Test), Non-Reducing Sugar (Hydrolysis Test or Inversion Test).
4. Quantitative Measurement of Carbohydrate (Benedict's Test, Glucose-Oxidase Test)
5. Qualitative Detection of Protein (Biuret, Ninhydrin, Xanthoproteic Test, Millons Test).
6. Qualitative Detection of Fat (Solubility Test, Translucent Spot, Acrolein Test, Baudouin Test, Huble's Test)

- **Reference Books:**

1. Ghai's A Textbook of Practical Physiology by V.P. Varshney, Mona Bedi
2. Practical Textbook of Biochemistry for Medical Students by DM Vasudevan, Subir Kumar Das

MINOR COURSE

Course Code: FNT-MI-1

Course Name: NUTRITIONAL CHEMISTRY AND FOOD SCIENCE (THEORY)

Total Credit: 4

FM: 50 [Theory: 40 (Term End) + 10 (Internal)]

No. of Lectures:

- **Basic Concept Of Nutritional Chemistry:**

  Role of carbohydrates, protein, lipids, vitamins and minerals in nutrition

- **Basic Concept of Enzyme and Metabolism:**

✓ Enzyme: Concept, Classifications, Mechanism of Action

✓ Elementary Concept of Metabolism: Glycolysis, TCA Cycle, Deamination, Transamination, Beta Oxidation (Process Outlines and Name of Enzymes, ATP Production Only)

- **Basic Concept of Food Science:**

✓ Basic Concepts of Nutritional Science: Food, Nutrition, Health, Primary Health Care And Nutritional Status (Definition, Interrelationship In Maintaining Good Health and Well-Being),

Food Groups, Food Pyramid, Functions of Food.

✓ Recommended Dietary Allowances and RDA for Indians (ICMR 2010 & 2020) and Their Uses

✓ Energy in Human Nutrition: Energy and Its Unit, Energy Assessment and Balance, Factors of Energy Requirement, BMR and Its Regulation, SDA of Food

✓ Nutrient And Nutritive Value, Concept Of Balanced Diet

✓ Uses And Nutritional Aspects Of Cereals & Pulses, Milk & Milk Products, Meat & Meat Products, Vegetables & Fruits, Fats & Oils.

- **Reference Book:**

1. Food Science by B Srilakshmi
2. Food Science and Nutrition by Sunetra Roday
3. Textbook of Food Science and Technology by Sharma A
4. Biochemistry by Debajyoti Das
5. Harper's Illustrated Biochemistry By Victor W. Rodwell, David Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil
6. Lehninger Principles Of Biochemistry By David L. Nelson, Michael Cox

MULTI-DISCIPLINARY COURSE

Course Code: FNT-MDC-1

Course Name: CONCEPTS OF FOOD SCIENCE AND NUTRITION (THEORY)

Total Credit: 3

FM: 45 [Theory: 35 (Term End) + 10 (Internal)]

No. of Lectures: 45

- **Basic Concept Of Cell & Tissues:**

✓ Structure and Functions of Cell with Special Reference to Different Cellular Organelles (Outline of Pro and Eukaryotic Cell and Elementary Idea of Different Organelles, Detail Structure and Functions are Not Required)

- **Brief Overview of Different Physiological Systems**:

✓ Blood-Composition and Functions, Circulatory System: Structure of Heart and Heart Valves,

✓ Digestive System: Structure and Functions of G.I. Tract, Process of Digestion and Absorption of Food**,** Functions of Liver, Gallbladder and Pancreas.

- **Basics of Nutrition:**

✓ Growth, Development, Nutrition, Malnutrition and Health, Scope of Nutrition, Elementary Concept of Nutrients-Macro, Micro Nutrients and Their Functions, Dietary Fibres. Elementary Concept of Carbohydrate, Protein and Fat and Their Sources, Concept of Digestion and Metabolism.

- **Basics of Food Science**:

✓ Food, Food Groups, Food Pyramid, Functions of food. Nutrient and Nutritive value, Concept of Balanced Diet.

- **Reference Books:**

1. Essentials of Medical Physiology by A B S Mahapatra And G S Mahapatra
2. Essentials of Medical Physiology by K Sembulingam, P Sembulingam
3. C.C.Chatterjees Human Physiology by Chatterjee C.C
4. Guyton and Hall Textbook of Medical Physiology (Guyton Physiology) By John E. Hall
5. Karp's Cell Biology by Gerald Karp, Janet Iwasa, Wallace Marshall
6. Food Science by B Srilakshmi
7. Food Science and Nutrition by Sunetra Roday
8. Textbook of Food Science and Technology by Sharma A

Skill Enhancement Course-IA

Course Code: FNT-SEC-1A

Course Name: NUTRITIONAL ASSESMENT AND DIET SURVEY

FM: 45 [35 (Term End) +10 (Internal)], Total Credit: 3

Theoretical Background

- ✓ Growth, Development, Nutrition, Malnutrition and Health, Scope Of Nutrition
- ✓ Nutritional Aspect in Different Occupation: Manual Workers, Shift Workers, Sedentary Workers, Dietary Guidelines for Indians.
- ✓ Formulation of RDA, Dietary Guidelines with Reference to Man and Woman
- ✓ Concept of BMR and SDA and their Implications in Nutrition
- ✓ Concept of Diet Survey and Diet Chart Preparation (ICMR Method)

- **Reference Books:**

1. Anthropometric and Nutritional Assessment by Mohammad Nasir Ahmad
2. Assessment of Nutritional Status by Anupama Rani
3. Nutrition Assessment: Basics of Nutritional Assessment by Spencer Garrett
4. Nutritional Assessment by Robert Lee, David Nieman
5. Principles of Nutritional Assessment by Rosalind S. Gibson

Practical assessment

- ✓ Nutritional Anthropometry

  Anthropometric assessment of adults (Weight, Height, Circumferences, Breadths, Skinfold thickness, Derived formulas)

  Anthropometric assessment of infants and children (Introduction of Growth charts, Anthropometric measurements of children, Age calculation, Interpretation of growth charts)
- ✓ Visit to old age home / ICDS Centre / Nutrition Rehabilitation Centre (NRC) / Slum area / Any public place and Report Preparation on nutritional status and health concern (In any area at least 8-10 case studies to be done).
- ✓ Visit To A Rural Technology Centre/Community Welfare Centre and Field Report Preparation
- ✓ Diet Survey and Report Preparation to Any Family and Community

- **Reference Books:**

1. Community Medicine: Practical Manua by Rajkumar Patil
2. Anthropometric and Nutritional Assessment by Mohammad Nasir Ahmad

3. Nutrient Requirements for Indians Recommended Dietary Allowances Estimated Average Requirements - A Report of the Expert Group by Ministry of Health and Family Welfare, ICMR, NIN
4. Dietary Guidelines For Indians A Manual by NIN
5. Nutritive Value of Indian Foods(2021) with Fruits by ICMR and C Gopalan

OR

Skill Enhancement Course-IB

Course Code: FNT-SEC-1B (Skill Enhancement Course)

Course Name: COMPUTER APPLICATION IN NUTRITION (THEORY)

FM: 45[35(Term End) +10(Internal)], Total Credit: 3

Theoretical Background

- ✓ Basic Structure of Computer–Hardware and Software Its Types, Concepts and Applications, Input-Output Storage Devices
- ✓ Computer Memory Concept & Types (ROM-BIOS,RAM) And Its Functions
- ✓ Concept. Types & Functions of Computer Networks Internet And Its Applications Web Browsers & Search Engines
- ✓ Concept of Viruses. Malware, Spyware Legal & Ethical Issues of Uses of Aforesaid Programme
- ✓ MS Word. Main Features and Applications In Food and Nutritions
- ✓ MS Excel Main Features & Its Applications In Food and Nutrition (Making of Chart, Bar, Graphs and Mathematical Calculation)
- ✓ MS Power Point: Preparation and Presentation of Slides and Salient Features.

- **Reference Books:**

1. Microsoft Office 365 2022 Beginners Manual: The All-In-One Microsoft Office Guide To Mastering Word, Excel, Powerpoint, Outlook, Sharepoint by Eddie S. Erhart
2. Basic Computer Course by Soumya Ranjan Behera
3. Computer Basics by G. Manjunath B.E
4. Computer Fundamentals by Priti Sinha, Pradeep K., Sinha

Practical assessment

- ✓ Data Entry, Formatting, Mathematical Calculations, Idea of Different Operations In Excel
- ✓ Introduction of MS Word: Formatting, Paragraph Alignment, Font Size, Article Writing and Report Preparation.
- ✓ Making of a Power Point Slide and Presentation, Introduction of Different Features of Power Point Slide.

- **Reference Books:**

1. Microsoft Office 365 2022 Beginners Manual: The All-In-One Microsoft Office Guide To Mastering Word, Excel, Powerpoint, Outlook, Sharepoint by Eddie S. Erhart

SEMESTER II

Course Structure

SEMESTER II

Course Code	Course title	Nature of Course	Credit of Course	Class Hour/week	Evaluation		Total
					Internal	Semester End	
FNT-M-2	Therapeutic Nutrition-I	Major	6	6	15	60	75
FNT-MI-1	Nutritional Chemistry and Food Science	Minor	4	4	10	40	50
FNT-MDC-2	Concept of Digestion & Nutrient Utilization	Multi-disciplinary Course	3	3	10	35	45
AECC-1	Communicative English	Ability Enhancement Course	4	4	10	40	50
FNT-SEC-2 (any one)	A. Quality management & Food Laws	Skill Enhan-cement Course	3	3	10	35	45
	B. Food Analysis & Laboratory Technology						
FNT-SI-1	Summer Internship (Additional for Certificate/Diploma)	Summer Internship	4	4			
			20	**20**	**55**	**210**	**265**

MAJOR COURSE

Course Code: FNT-M-2

Course Name: THERAPEUTIC NUTRITION-I (THEORY)

Total Credit: 6 [Theory: 4 + Practical: 2]

FM: 50 [Theory: 40 (Term End) + 10 (Internal)], [Practical: 20 (Term End) + 5 (Internal)]

No. of Lectures: 60

- ✓ Nutritional Assessment in Clinical Care- Goals and Methods (SGA). Modification of Normal Diets (Normal, Soft and Fluid Diets), Types and Factors to be considered in Planning Therapeutic Diets, General Principles of Dietary Calculation.
- ✓ Enteral Nutrition vs. Parenteral Nutrition. Clinical Parameter to Monitor During Nutrition Support, Complications Associated with Parenteral Nutrition, Enteral Tube Feeding in Clinical Nutrition, Enteral Tube Feeding Formulas, Enteral Tube Feeding Delivery System, Monitoring the Tube-Fed Patients, Indication and Contradictions for Parenteral Nutrition, Parenteral Feeding in Clinical Nutrition, Parenteral Nutrition Delivery System.
- ✓ Therapeutic Adaptations of Normal Diet, Classification of Therapeutic Diets (Progressive Diets- Normal, Soft, Clear and Full Fluid). Types of Dietitians and Role of Dietitian.
- ✓ Pathophysiology, Risk Factors, Sign and Symptom, Diagnosis and Dietary Management: Underweight, Overweight and Obesity, Ischemic Heart Disease, Diabetes, Diarrhea. Dysphagia, GERD, IBS, IBD, Peptic Ulcer, Colorectal Cancer

- **Reference Books:**

1. Dietetics by B Srilakshmi
2. Fundamentals of Foods, Nutrition and Diet Therapy by Sumati R
3. Advances In Diet Therapy: Practical Manual by V. Vimala
4. Williams' Basic Nutrition and Diet Therapy by Staci Nix
5. Diet Planning Through the Life Cycle Part 2- Diet Therapy A Practical Manual by Veenu Seth. Kalyani Singh. Pulkit Mathur
6. Nutrition and Diet Therapy by Linda Debruyne, Kathryn Pinna, Eleanor Whitney

Course Name: THERAPEUTIC NUTRITION-I (PRACTICAL)

FM: 25 [20 (Term End) + 5 (Internal)], Total Credit: 2

- ✓ Therapeutic Diet Chart Preparation for Diabetes Mellitus, Peptic Ulcer, IBD, GERD, IBS, Colorectal Cancer, Obesity, Ischemic Heart Disease, Diarrhea and Constipation patients (Case Specific).
- ✓ Training/Workshop/Short-Term Course From Nutrition and Dietetics/Nutrition and Public Health Department of any University/Research Institute/Community Science Centre/Rural Technology Department/Hospital Visit and Documentation of the work followed by Report Preparation.

- **Reference Books:**

1. Advances In Diet Therapy: Practical Manual by V. Vimala
2. Diet Planning Through the Life Cycle Part 2- Diet Therapy A Practical Manual by Veenu Seth. Kalyani Singh. Pulkit Mathur

MINOR COURSE

Course Code: FNT-MI-1

Course Name: NUTRITIONAL CHEMISTRY AND FOOD SCIENCE-I (THEORY)

Total Credit: 4

FM: 50 [Theory: 40 (Term End) + 10 (Internal)]

No. of Lectures: 60

- **Basic Concept Of Nutritional Chemistry:**

Role of carbohydrates, protein, lipids, vitamins and minerals in nutrition

- **Basic Concept of Enzyme and Metabolism:**

- ✓ Enzyme: Concept, Classifications, Mechanism of Action, Kinetics(M.M Equation And Hill Equation)
- ✓ Elementary Concept of Metabolism: Glycolysis, TCA Cycle, Deamination, Transamination, Beta Oxidation (Process Outlines and Name of Enzymes, ATP Production Only)

- **Basic Concept of Food Science:**

- ✓ Basic Concepts of Nutritional Science: Food, Nutrition, Health, Primary Health Care And Nutritional Status (Definition, Interrelationship In Maintaining Good Health and Well-Being),

Food Groups, Food Pyramid, Functions of Food.

- ✓ Recommended Dietary Allowances and RDA for Indians (ICMR 2010 & 2020) and Their Uses
- ✓ Energy in Human Nutrition: Energy and Its Unit, Energy Assessment and Balance, Factors of Energy Requirement, BMR and Its Regulation, SDA of Food
- ✓ Nutrient And Nutritive Value, Concept Of Balanced Diet
- ✓ Uses And Nutritional Aspects Of Cereals & Pulses, Milk & Milk Products, Meat & Meat Products, Vegetables & Fruits, Fats & Oils.

- **Reference Book:**

1. 1.Food Science by B Srilakshmi

2. Food Science and Nutrition by Sunetra Roday
3. Textbook of Food Science and Technology by Sharma A
4. Biochemistry by Debajyoti Das
5. Harper's Illustrated Biochemistry By Victor W. Rodwell, David Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil
6. Lehninger Principles Of Biochemistry By David L. Nelson, Michael Cox

Skill Enhancement Course 2

Course Code: FNT-SEC-2A

Course Name: Quality Management and Food Laws

FM: 45 [35 (Term End) +10 (Internal)], Total Credit: 3 No of Lectures 90

Theoretical Background

- ✓ ~~Food Sanitation,~~ Microbiological Criteria and Food Safety, Food Safety Objectives (FSO), Bacteriology of Water Supplies, Sewage in Waste Treatment and Disposal, Indicators of Food Microbial Quality and Safety, Some Indicators of Product Quality- Coliforms, Enterococci, Bifidobacterium, Coliphages.
- ✓ Microbiological Quality Standards of Food, Control and Inspection, Enforcement and Govt. Regulatory Practices and Policies. FDA, EPA, HACCP, ISI; Handling of Recombinant Product; Detection of Various Methods of Food Toxicity, Hazard Analysis Criteria Control Points (HACCP) System For Food Safety, HACCP Principles, Application of HACCP Principles.
- ✓ Food Quality Protection Act (FQPA); FQPA Requirement, Impact; Food Safety Standards Act (FSSA)-The Prevention Of Food Adulteration Act, 1954, The Fruit Products Order, 1955, The Meat Food Products Order, 1973, The Vegetable Oil Products (Control) Order, 1947, The Edible Oils Packaging (Regulation) Order, 1998, The Solvent Extracted Oil, De Oiled Meal, And Edible Flour (Control) Order, 1967, The Milk And Milk Products Order, 1992, Essential Commodities Act, 1955 (In Relation To Food); Different Regulations, Codex, Food Export Control And Certification.
- ✓ Good Practices in Food Quality Management, Introduction Of Good Laboratory Practices (GLP) And Its Applications, Elements Of GLP, OECD Guidelines For GLP, National Accreditation Board For Testing And Calibration Laboratories (NABL).

- **Reference Books:**

1. Food Safety and Standards Act, 2006 by Virag Gupta
2. Principles of Good Laboratory Practice by Pradeep Deshmukh
3. Good Laboratory Practices and Compliance Monitoring by Trupti Patil-Dongare

Practical Assessment

- ✓ Procedures of Different Types of Food safety AUDITS

- ✓ Practical demonstration of Standard Operating Procedure (SOP)
- ✓ General Procedures for data evaluation
- ✓ Instrumentation Validation (Demonstration)
- ✓ Analyst Certification
- ✓ Laboratories Facility Certification
- ✓ Specimen/Sample Tracking Procedures (Overview)

- **Reference Books:**

1. Food Safety and Standards Act, 2006 by Virag Gupta
2. Principles of Good Laboratory Practice by Pradeep Deshmukh
3. Good Laboratory Practices and Compliance Monitoring by Trupti Patil-Dongare
4. Auditing in the Food Industry: From Safety and Quality to Environmental and Other Audits by M Dillon, C Griffith

OR

Skill Enhancement Course 2B

Course Code:SEC2 B

Course Name: FOOD ANALYSIS & LABORATORY TECHNOLOGY (THEORY)

FM: 45 [35 (Term End) +10 (Internal)], Total Credit=3 No of Lectures 90

Theoretical background

- ✓ Definitions of Standards of Quality, Assessment of Quality Using Routine and Official Methods of Analysis and Interpretation of Analytical Results: General Methods for The Determination of Components: Carbohydrates, Proteins, Amino Acids, Fats, Mineral Matter, Moisture, Crude Fibre, Synthetic Dyes.
- ✓ Principles of Proximate Analysis- Moisture, Ash, Crude Fat, Crude Fibre, Crude Protein and Carbohydrates by Difference.
- ✓ Methods for the Determination of Water-Soluble Vitamins: (B1, B2, B3, B6, B12, C and Folic Acid) (Visible Spectrophotometric Technique Only). Methods of Determination of Fat-Soluble Vitamins: (A, D, E and K), Principles and Methods for Estimation of Minerals: Titrimetric and Gravimetric Methods.
- ✓ Inorganic Components (Minerals): Arsenic, Cadmium, Copper, Lead, Mercury, Zinc, Fluorine, Sodium, Potassium, Calcium, Phosphorous. Pesticides: Thin Layer Chromatography and Gas Liquid Chromatography as Tools for Organophosphorus and Organo Chlorine Pesticides.

- **Reference Books:**

1. Food Analysis Laboratory Manual by S. Suzanne Nielsen
2. Introduction to the Chemical Analysis of Foods by Nielsen S. S
3. Food Analysis: Theory and Practice by Pomeranz Y

4. A First Course in Food Analysis by A.Y. Sathe
5.

Practical Assessment

- ✓ Determination of Carbohydrate, Protein, and Fat Content from Different Food Samples
- ✓ Measurement of Proximate Analysis (Moisture, Ash, Crude Fat, Crude Fibre) of Different Food Samples.
- ✓ Measurement of Vitamin Contents (Water Soluble/Fat Soluble) of Different Food Product.
- ✓ Determination of Minerals of Food Samples
- ✓ Practical Demonstration of Thin Layer Chromatography (TLC)

- **Reference Books:**

1. Laboratory Manual For Food Canners And Processors: Analysis Sanitation And Statistics by NCA
2. General Laboratory Manual: Food, Water, Drug, Flour, Oil And Fruit Juice Analysis by Dutse Irimiya

MULTI-DISCIPLINARY COURSE

Course Code: FNT-MDC-2

Course Name: Concept of Digestion & Nutrient Utilization

FM: 45[35(Term End) +10(Internal)], Total Credit=3 No of lectures 45

- ✓ Classfication of Carbohydrates, proteins and Fats
- ✓ Enzymes-Classifications and functions, brief concept of mechanism of action
- ✓ Vitamins and minerals - different types, food sources and functions
- ✓ Digestion and absorption of Carbohydrates
- ✓ Digestion and absorption of Proteins
- ✓ Digestion and absorption of Fats
- ✓ Metabolism of Carbohydrate, Protein and Fat: Outline and elementary concept of Glycolysis, TCA cycle, Deamination, transamination, beta oxidation.

- **Reference Books:**

1. Biochemistry by Debajyoti Das
2. Textbook of Medical Biochemistry by MN Chatterjea, Rana Shinde
3. Harper's Illustrated Biochemistry By Victor W. Rodwell, David Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil
4. Lehninger Principles of Biochemistry By David L. Nelson, Michael Cox