JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Faculty of Agriculture and Veterinary Science

Department of Food and Biotechnology

SYLLABUS

DURATION –3 YEARS/6 SEMESTER

BACHELOR OF SCIENCE - FOOD NUTRITION & DIETETICS(B. SC. F N & D)

SYLLABUS FOR:

1-3 YEARS

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

PROGRAM DETAIL

Name of Program	-	Bachelor of Science (B.Sc.)
Program Code	-	B. Sc. FN&D
Mode of Program	-	Semester
Duration of Program	-	3 yrs/ 6 Semester
Total Credits of Program	-	155
Curriculum Type and Medium Choice	-	English

Program Outcomes	Graduates will gain and apply knowledge of Food nutrition and Dietetics concepts to solve problems related to field of Food nutrition and Dietetics. Graduates will be able to decide and apply appropriate tools of Food nutrition and Dietetics for making new food products specific to diets.
Specific Program Outcomes	Apply the knowledge of New emerging Food nutrition and Dietetics world. Student will recognize the importance of Nutrition through life cycles, Public Health nutrition, Community Nutrition and Clinical Nutrition skills so they can be next generation of Indian Food nutrition and Dietetics.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

I SEMESTER

S. No.	Credit	Name of Course
1	4	Food & Nutrition
2	3	Fundamentals of nutrition
3	1	Fundamentals of nutrition Lab
4	3	Basics of Biosciences
5	1	Basics of Biosciences Lab
6	3	Introduction to food technology
7	3	Fundamentals of Biological Chemistry
8	1	Fundamentals of Biological Chemistry Lab
9	3	Biomolecules
10	1	Biomolecules Lab
Total	23	

II SEMESTER

S. No.	Credit	Name of Course
1	3	Fundamentals of microbiology
2	1	Fundamentals of microbiology Lab
3	3	Public Health nutrition(T)
4	3	Cell biology
5	1	Cell biology Lab
6	2	Unit operations in Food Industry
7	1	Unit operations in Food Industry Lab
8	3	Nutrition through life cycles
9	1	Nutrition through life cycles Lab
10	3	Fundamentals of Food Science & Technology
11	1	Fundamentals of Food Science & Technology Lab
12	1	Industrial Visit
Total	23	

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

III SEMESTER

S. No.	Credit	Name of Course
1	3	Metabolism and Bioenergetics
2	1	Metabolism and Bioenergetics Lab
3	3	Basic Dietics
4	1	Basic Dietics**Lab**
5	3	Technology of Milk & Milk Products
6	1	Technology of Milk & Milk Products lab
7	3	Principles of Food Preservation
8	1	Principles of Food Preservation **lab**
9	2	Biostatistics
10	1	Biostatistics **lab**
11	3	Food Microbiology & Safety
12	1	Food Microbiology & Safety **lab**
13	10	Industrial Training (60 Days, after II Sem, during Summer vacation)
Total	33	

IV SEMESTER

S. No.	Credit	Name of Course
1	3	Food Packaging Technology
2	1	Food Packaging Technology Lab
3	3	Food service management
4	3	Human physiology(T)
5	3	Nutritional Biochemistry(T)
6	3	Fruits and Vegetable Processing Technology
7	1	Fruits and Vegetable Processing Technology**lab**
8	4	Minor Project
9	1	Industrial Visit
Total	22	

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

V SEMESTER

S. No.	Credit	Name of Course
1	3	Food additives and ingredients
2	1	Food additives and ingredients Lab
3	3	Cereal, Pulse & oilseed Technology
4	1	Cereal, Pulse & oilseed Technology **lab**
5	3	Community Nutrition
6	1	Community Nutrition Lab
7	2	Food Storage and Transport
8	3	Food Laws**.** Standards & Regulations
9	3	Modern Baking & Confectionary Technology
10	1	Modern Baking & Confectionary Technology **lab**
11	10	Industrial Training **(**60 Days, after IV Sem, during Summer vacation**)**
Total	31	

VI SEMESTER

S. No.	Credit	Name of Course
1	3	Food Process Technology
2	1	Food Process Technology Lab
3	3	Sensory Evaluation
4	3	Dietetics and Counseling
5	3	Research Methodology
6	3	Food Business Management
7	3	Food Project Planning and Entrepreneurship
8	3	Clinical Nutrition
9	1	Clinical Nutrition Lab
Total	23	

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

I SEMESTER

Foods & NutritionCredits-4

Objective: To enable students to 1. Understand the importance of food and meaning of nutrition 2. Understand the role of nutrition in human life 3. Increase the ability to overcome deficiency.

UNIT – I Relationship of Food, Nutrition &Health Definitions of food, nutrition and health and inter-relationship between them.Description of basic terms and concepts.Functions of Nutrients, Guidelines for Good Health, RDA, Reference Man and Woman, Factors affecting RDA, Methods for Deriving RDA, Uses of RDA, BMR, Factors affecting BMR.
(1.3 Credit)

UNIT –II Functions of Foods, Nutrient & Source Functions of food.Nutritional aspects of carbohydrates (including glycemic index and load), proteins and fats.Functions of energy and minerals and vitamins and water. Food sources of nutrients. Concept of a balanced diet.Dietaryfibre, its sources and importance.
(1.3 Credit)

UNIT – III RDA & Enhancement of Nutritional Quality Overview of human nutrition requirements (RDA) through the life cycle. Factors affecting bio-availability of nutrients example, nutrient interactions, food components like antinutrients etc. Principles of meal planning. Ways to increase nutritional quality of food such as enrichment, fortification, fermentation and mutual supplementation. Best cooking and processing procedures to reduce cooking losses of nutrients. Common nutritional deficiencies such as PEM, iron, vitamin A, iodine, calcium and vitamin D, zinc etc. Emerging common degenerated disorders.

(1.3 Credit)

Reference Books:

1. Food Science N N. Potter & J Hotchkiss
2. Food Processing and Preservation G Subbalakshmi
3. Food Packaging Technology Handbook NIIR
4. A practical Guide for Implementation of ISO HACCP Sohrab

Fundamentals of NutritionCredits-4

Objective: The enable the students to 1. Gain knowledge about basics in nutrition. 2. Acquire knowledge about their functions, RDA, food sources of nutrients.

UNIT-I Introduction to Nutrition Nutritional Status: The relation of good nutrition to normal physical development and sound health. Definitions of the terms –Nutrition, Health, Nutrients, Nutritional status, Malnutrition, RDA, Food Groups, Methods of assessing nutritional status –Population sampling,

collection of data on the nutritional adequacy of diet consumes, anthropometric measurements, clinical examination, biochemical assessment. Diet surveysmethods
Energy -Definition of health and nutrition, Definition of calorie and joule, Measurement of calorific values of foods.BasalMetabolicRate(BMR), Energy needs of the body, Measurement of energy balance of the body. Direct and indirect calorimetry.Calculation of energy requirements.The ideal proportion of calories from protein, carbohydrates and fats.
(1 Credit)

Practical (0.4 Credits)

Sr. no.	Name of practical	Nature
1	Controlling techniques - Weights and measures standard, household measures for raw and cooked food	Practical
2	To develop the concept of portion sizes	Practical
3	To impart basic cooking skills and healthy cooking practices	Practical

UNIT-II Introduction to Nutrients (1-0.3) Functions, dietary sources and clinical manifestations of deficiency/ excess of the following nutrients- Carbohydrates, lipids and proteins, Fat soluble vitamins-A, D, E and K, Water soluble vitamins –thiamin, riboflavin, niacin, pyridoxine, folate, vitamin B12 and vitamin C, Minerals –calcium, iron and iodineMethod of Cooking and Prevent Nutrient Loss-Dry, moist, frying and microwave cooking, Advantages, disadvantages and the effect of various methods of cooking on nutrients, Minimizing nutrient losses.

(1 Credit)

Practical (0.4 credits)

Sr. no.	Name of practical	Nature
1	Food preparation and classifying recipes as good, moderate or poor, sources of specific nutrients	Practical
2	Estimation of calorific value of food	Practical
3	Introduction to meal planning	Practical
4	Use of food exchange list	Practical

UNIT-III Overview of Food Groups Selection, nutritional contribution and changes during cooking of the following food groups- Cereals, Pulses, Fruits and vegetables, Milk & milk products, Eggs, Meat, poultry and fish, Fats and Oils, Processed supplementary foods, Food sanitation in hygiene.

(1 Credit)

Practical (0.2 credits)

Sr. no.	Name of practical	Nature
1	Survey of Amount of Ingredients and Portion Size of the standard Beverages and Milk Based products available in the market	Practical
2	Survey of Amount of Ingredients and Portion Size of the standard cereals and meat preparations available in the market	Practical

Reference Books:

1. PassmoneR.and Eastwood M.A,(1986), "Human Nutrition and Dietetics",English language book Society/Churchill Livingstone,Eigth edition, Hong Kong.
2. Neiman N. Catherine, (1990), "Nutrition",Wm.C. Brown Publishers. USA.

References/Correlation with Ancient Indian Literature:

1. Chhandogya Upanishad (VII. 9)
2. Maitrayani Upanishad (VI. 9)

Basics of Biosciences **Credits-4**

Objective: Student will learn concept wise knowledge about diversity in biological systems. This course will describe student about classification, morphology and physiology of Plant and Animal Kingdom. This course helps to buildup concept wise knowledge to understand advanced courses of Food and Biotechnology.

UNIT-I Introduction to biology (1.0-0.4) Diversity in biological systems, Cell biology and cell structure, difference between Prokaryotes & Eukaryotes systems, Five-kingdom classification and General characters, Brief account on Ecology, Morphology, Nutrition, osmosis, Locomotion and Reproduction, useful and harmful effects of Bacteria, Viruses, Algae, Fungi and Protozoans.

(1 Credit)

Practical (0.4 credit)

Sr. no.	Name of practical	Nature
1	To perform gram staining. (i) To prepare gram stain (ii) Staining and observation of bacteria	Practical
2	To study different types of Algae by making their slides. (i) To prepare slide of Algae (ii) Observation of slide	Practical
4	To study slides of Protozoans. (i) To set up of microscope and collection of slides (ii) Observation of protozoan slides -	Practical
5	Study of osmosis by potato osmoscope. (i) Setting up of potato osmoscope (ii) Observation of osmosis -	Practical

UNIT-II Classification and Physiology of Plants (1-0.4) Classification of Plant Kingdom, Concepts of Growth, Meristems, Plant growth regulators, Bacterial & Plant photosynthesis; oxygenic and anoxygenic photosynthesis; chlorophyll as trapper of solar energy, photosynthetic reaction centres, Hill reaction, PS I & PS II, Photophosphorylation - cyclic & non-cyclic; Dark reaction & CO2 fixation.

(1 Credit)

Practical (0.4 credits)

Sr. no.	Name of practical	Nature

1	To isolate chloroplast from plants. (i) Preparation of reagents (ii) Isolation of chloroplast	Practical Practical Practical
2	Separation of plant pigments through paper chromatography. (i) Preparation of solvents (ii) Separation of pigments	Practical Practical Practical
3	Demonstration of O_2 evolution during photosynthesis. (i) Set up of apparatus (ii) Demonstration of O_2 evolution	Practical Practical Practical
4	Study of distribution of stomata in the upper and lower surface of leaves.	Practical

UNIT-III Classification and Physiology of Animals(1-0.2) Classification of Animal Kingdom, Functions, morphology, growth and Reproduction, economic importance.Phylogeny of Invertebrate & Vertebrate Phyla, Concepts of Species &Ecosystem.Introduction of cell cycle, cell division, Electrolytes, Body fluids.
(1 Credit)

Practical **(0.2 credits)**

Sr. no.	Name of practical	Nature
1	To study mitosis in onion root tip. (i) Squash preparation (ii) Observation of chromosomes	Practical
2	To study meiosis in grasshopper testis (i) Separation of testis (ii) Making slide and observation	Practical
3	To test the presence of urea in urine. (i) Reagents preparation (ii) Perform test	Practical
4	To detect the presence of sugar in urine/blood sample (i) Reagents preparation (ii) Perform test	Practical
5	To detect the presence of albumin in urine. (i) Reagents preparation (ii) Perform test	Practical

Recommended Text Books:

1. NCERT Textbook for Class 11 Biology
2. NCERT Textbook for Class 12 Biology

Reference Books:

1. Cell and Molecular biology – P.K. Gupta

2. Plant Physiology- H.S. Srivastav
3. Animal Physiology- A.K. Berry

Introduction to Food Technology **Credits-3**

Objective: Students will understand about origin of life, unicellular organisms' development, biomolecule structure, molecular interaction and electrophilic reaction. Students will also learn about structure of carbohydrates, classification of carbohydrates, lipid's structure, lipids classification and role of lipids in biological composition.

Unit- I Introduction to food composition Introduction , Food composition & Food group, Introduction Introduction to food science and technology, Food composition Food composition – Carbohydrates, protein, fat, vitamins and minerals water, Food groups Composition and nutritive value of Cereals, Pulses, Legumes, Oil seeds, Fruits, Vegetables, Meat, Fish, Poultry and Milk.

(1 Credit)

Unit –IIIntroduction to food preservation Food preservation -High temperature, low temperature and chemical preservations. Concept of nutrition, Digestion and absorption of nutrients, balanced diet, malnutrition, Packaging-Functions of packaging, types of food packaging materials.
(1 Credit)

Unit IIIIntroduction to role of microbes in food technology Microbiology- Microorganisms important in foods, food contamination, food spoilage, food born diseases, Engineering -Unit operation, principles of heat exchangers, Pasteurizer, refrigerator, freezer and drier.
(1 Credit)

References:

1. Food Science N N. Potter & J Hotchkiss
2. Food Processing and Preservation G Subbalakshmi
3. Food Packaging Technology Handbook NIIR
4. A practical Guide for Implementation of ISO HACCP Sohrab

Fundamentals of Biological Chemistry **Credits-4**

Objective: Students will understand about origin of life, unicellular organisms' development, biomolecule structure, molecular interaction and electrophilic reaction. Students will also learn about structure of carbohydrates, classification of carbohydrates, lipid's structure, lipids classification and role of lipids in biological composition.

UNIT-I Origin of life, Origin of amino acids, nucleotides, Urey Miller's expt., Unicellular organism, multicellular organisms. Concept of biomolecules, polymerisation, formation of polymers i.e. proteins, nucleic acids, Molecular interactions, biological functions.Chiral interactions, pH, pK, buffers.Reactionmechanism.Nucleophile, electrophile, Acid base reaction, nucleophilic addition, nucleophilic substitution, electrophilic addition, electrophilic substitution reaction.

(1 Credit)

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

UNIT-II Carbohydrates: Introduction, biological importance. Definition, Classification, {glyceraldehydes, Simple Aldose, Simple Ketose, D-glucose, Conformation of D glucose], Monosaccharides other than glucose, glyocosidic, bond, disaccharides, polysaccharides [starch, glycogen, peptidoglycan, proteoglycan matrix.
(1 Credit)

Practical (1 credits)

Sr. no.	Name of practical	Nature
1	Test for Carbohydrates	Practical
2	Test for proteins	Practical
3	Test for Lipids	Practical

UNIT-III Lipids: Introduction, Classes, Fatty acids [Physical prop. Chemical prop, Sap value, acid value, iodine number,rancidity. Glycerolipid, Sphingolipid, Lipid derived from isoprene, Behavior of lipid in water, Bile acids, bile salts, plasma lipoproteins, Vesicles, membrane transport.
(1 Credit)

Recommended Text books:

1. Outlines of Biochemistry: Conn and Stumpf
2. Principles of Biochemistry: JefforyZubey

Suggested Readings:

1. Biochemistry: Stryer

Bio-molecules **Credits-4**

Objective: Student will learn general account of the chemical nature of living cells including Carbohydrates, Lipids, Protein and Vitamins. These are basic concept wise knowledge from this course will make student able to learn advance knowledge related to Food and Biotechnology.

Unit-I Carbohydrates General account of the chemical nature of living cells. Carbohydrates: Classification (Monosachharides, Di- sachharides and Polysachharides), configurations and conformations, sugar derivatives, structural and storage polysaccharides.
(1 Credit)

Practical (0.3credit)

Sr. no.	Name of practical	Nature
1	To perform Molish test for the qualitative estimation of carbohydrate. (i) Preparation of Molish reagent (ii) Estimation and observation of carbohydrate	Practical
2	To perform Benedict test for the qualitative estimation of carbohydrate. (i) Preparation of Benedict's reagent (ii) Estimation and observation of carbohydrate	Practical

3	To perform Fehling's test for the qualitative estimation of reducing sugar's (i) Preparation of Fehling's reagent (ii) Estimation and observation of carbohydrate	Practical
3	To perform Fehling's test for the qualitative estimation of reducing sugar's (i) Preparation of Fehling's reagent (ii) Estimation and observation of carbohydrate	Practical
4	To perform Barfoed's test for the qualitative estimation of reducing sugar's (i) Preparation of Barfoed's reagent (ii) Estimation and observation of carbohydrate	Practical
5	To perform Inversion of Sucrose: (i) Preparation of reagents for inversion (ii) Estimation of converted sugar by Fehling's reagent.	Practical

Unit-II Proteins Amino acids: General properties, peptide bond, essential and non-essential amino acids. Classification, different levels of protein structure, forces stabilizing protein structure, protein folding, protein modification.
(1 Credit)

Practical (0.3 Credit)

Sr. no.	Name of practical	Nature
1	To perform Ninhydrintest for the qualitative estimation of amino acids. (i) Preparation of Ninhydrin reagent (ii) Estimation and observation of amino acids.	Practical
2	To perform Xanthoproteictestfor the qualitative estimation of amino acids. (i) Preparation of Xanthoproteic reagent (ii) Estimation and observation of amino acids.	Practical
3	To perform Millon'stestfor the qualitative estimation of amino acids (Tyrosine, Phenylalanine & Glycine). (i) Preparation of Millon's reagent (ii) Estimation and observation of amino acids.	Practical
4	To perform Lead-Sulfide test for the qualitative estimation of Cysteine and Cystine. (i) Preparation of Lead sulfite reagent (ii) Estimation and observation of amino acids.	Practical
5	To perform Sakaguchitestfor the qualitative estimation of Arginine. (i) Preparation of Sakaguchi reagent (ii) Estimation and observation of amino acids	Practical

Unit- III Lipids and Vitamins Lipids: Classification, properties of lipid aggregates and biological significance. Vitamins: Water and fat soluble vitamins and their deficiency diseases.
(1 Credit)

Practicals (0.4 credit)

Sr. no.	Name of practical	Nature
1	To Estimate the Saponification value of oils. (i) Preparation of reagents. (ii) Determination of Saponification number.	Practical

2	To Estimate the acid value of oils. (i) Preparation of reagents. (ii) Determination of acid value by titration	Practical
3	Determination of Total Lipid Concentration. (i) The preparation of a sample for solvent extraction (ii) Extraction of lipids and its determination.	Practical

Recommended Text Books:

1. Fundamentals of Biochemistry - J.L. Jain , S. Chand publication
2. Fundamentals of Biochemistry - Dr A C Deb

Reference Books:

- Biochemistry- U. Satyanarayana, U. Chakrapani , BOOKS AND ALLIED (P) LTD. (2008)

II SEMESTER

Fundamentals of Microbiology **Credits-4**

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Objective: Student will learn about the basics of microbes; physiology of microbes and their role in agriculture, public health, medicine and industry. With the help of this course, student will able to think and apply microbes with new innovative ideas for betterment in Food and Biotechnology.

Unit- I Introduction-aims and scope Introduction-aims and scope, Role of microbes in agriculture, public health, medicine and industry, Organization of prokaryotic and eukaryotic cells: Structure and function of cell organelles and surface structure and cellular reserve materials; Distinguishing features of various groups of microorganisms: actinomycetes, bacteria, molds, yeasts and algae and their broad classification.

(1 Credit)

Practicals(0.4 credit)

Sr. no.	Name of practical	Nature
1	Purify the given bacterial sample by serial dilution method (iii) To prepare culture media for microorganisms (iv) Growth study of Microorganisms	practical
2	Perform Gram's staining in given bacterial sample (i) Preparation of staining solutions (ii) Microscopic observation and identification	Practical
3	Identify the fungal flora of soil and their microscopic view (i) To prepare culture media for microorganisms (ii) Microscopic examination and identification	Practical
4	Preparation of culture media for algae (i) Media preparation and standard stock preparation (ii) Autoclaving and finalization of media for inoculation	Practical
5	Perform antagonistic activity of micro organisms (i) Culture media preparation, inoculation of 2 different organisms (ii) Observation of result	Practical

Unit-II Characteristics of micro-organisms Characteristics of selected groups of microorganisms including microorganisms of extreme environment, Microbial nutrition and growth-principles of nutrition, growth measurement techniques, effect of environmental and culture parameters on growth, assimilation of nitrogen and sulphur, Isolation and preservation of cultures.

(1 Credit)

Practicals (0.4 credit)

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Sr. no.	Name of practical	Nature
1	Isolate the microorganism of extreme environmental condition (i) To prepare culture media for microorganisms (ii) Streaking	practical
2	Study the bacterial growth curve with complete phases (i) Preparation of culture media for microorganisms (ii) Microscopic observation and identification of density of MO	Practical
3	Isolate nitrogen fixating bacteria and their identification (i) To prepare culture media for microorganisms (ii) Staining, Microscopic examination and identification	Practical
4	Effect of environmental conditions on bacterial growth (i) Media preparation and standard stock preparation (ii) Effect of unusual condition on MO	Practical
5	Perform the preservation process for bacterial culture (i) Culture media preparation, inoculation (ii) Observation of result after complete duration	Practical

Unit-III Energy transduction in microbial systems Energy transduction in microbial systems: fermentation, aerobic and anaerobic respiration. Phototrophic microorganisms, Phosphoketolase, Entner-Doudoroff and glyoxalate pathways, Control of microbial growth effect of heat, disinfectants and therapeutic agents, Microbial pathogenicity, Bioassays.

(1 Credit)

Practicals(0.2 credit)

Sr. no.	Name of practical	Nature
1	Study the batch and fed batch culture condition on bacterial growth (i) To prepare culture media for microorganisms (ii) Observation of different density and growth of MO	practical
2	Isolate the bacterial pigments form cyanobacteria (i) Preparation of culture media for microorganisms (ii) Microscopic observation and identification and isolation of Chl pigment	Practical
3	Chromatographic evaluation of bacterial pigments (i) To prepare culture media for microorganisms (ii) Chromatographic identification of pigment	Practical
4	To determine the ability of Microorganisms to degrade and ferment carbohydrates with the production of acid or acid and gas (i) Media preparation and standard stock preparation (ii) Microbial production	Practical
5	To detect the antibiotic sensitivity on the given culture sample (Antibiotic Sensitivity Test) (i) Culture media preparation, inoculation (ii) Observation of result after complete antimicrobial activity	Practical

Recommended Text Books:

1. Microbiology – L. M. Prescott
2. A Textbook Of Basic And Applied Microbiology - Aneja K.R.

Recommended Reference Books:

1. Pelczar Microbiology
2. Practical microbiology by SatishGupte
3. Basic practical microbiology a manual – Cuteri

Public Health Nutrition **Credits-3**

Objective: To enable students to 1. Understand the causes and consequences of nutrition problems in the society. Be familiar with various approaches nutrition and health. 2. Interventions, programmes and policies.

UNIT – I Introduction to Nutritional deficiency diseases (1-0-0) Etiology, prevalence, clinical features and preventive strategies of—Under-nutrition, Protein energy malnutrition, nutritional anaemias, vitamin A deficiency, iodine deficiency disorders-Over-nutrition –obesity, coronary heart disease, diabetes, Zinc Deficiency, Flurosis.
National Nutrition Policy and Programme -Integrated Child Development Services (ICDS) Scheme, Mid-day Meal Programme (MDMP), National program for prevention of Anaemia, Vitamin A deficiency, Iodine Deficiency Disorders.

(1 Credit)

UNIT – II Assessment of Nutritional Status (1-0-0) Assessment of Nutritional Status- Objectives and importance, Methods of Assessment-a. Direct –clinical signs, nutritional anthropometry, biochemical tests, biophysical tests b. Indirect –Diet surveys, vital statistics.
Nutrition Education- Objectives, principles and scope of nutrition and health education and promotion,Behavior Change Communication.
(1 Credit)

UNIT – III Nutrition for Special Condition (1.0) -Introduction to Nutrition for physical fitness and sport, Feeding problems in children with special needs, Considerations during natural and man-made disasters e.g.-floods, war.-basic guidelines in disaster management
Food Security- Key terms, factors affecting food security, recent concernsTechnologies for food and nutrition security.

(1 Credit)

TEXT BOOKS

1. Agarval, A.N.1981: Indian Economy problems of development and planning
2. Shukla, P.K.(1982): Nutritional Problems in India
3.

REFERENCE BOOKS

- Jelliffle, D.B(1968): Child Health in the tropics.
- Ghosh, S(1989): You and your child.
- Misra, S.K. and puri, V.K(1992): Indian Economy
- Thankamma Jacob (1976): Food Adulteration.
- Park, J.E. and Park, K(1994): Text book of Preventive and Social Medicine. 6.Prevention of Food Adulteration Act (1994): Govt of India.

Cell Biology **Credits-4**

Objective: This course develops the concepts of Cell biology is about the cell, cell division and its functions. Every living species are composed of a cell. The human body comprises around a billion to trillion cells, which are mainly involved in different specialized functions.

Unit-I Ultra-structure of Plant and animal cell Cell – Shapes, morphology, Cell theory, Cells , Structure-function relationship including organelles and their Biogenesis (e.g., Endoplasmic reticulum, Mitochondria, Chloroplast, Golgi body, nucleus, lysosomes, vacuoles), Membrane structure , Membrane transport, Cytoskeleton, Extracellular matrix , Cell junctions.
(1 Credit)

Practicals (0.5 credit)

Sr. no.	Name of practical	Nature
1	Study of Microscopy: - Simple, Compound, & Phase Contrast Microscope (i) Learn about simple microscope (ii) Learn about compound microscope (iii) Learn about phase contrast microscope	Practical
2	Study of cell organelles by using Models, Charts and Slides. (i) Study of models (ii) Study of charts (iii)Study of slides	Practical
3	To demonstrate osmosis by using potato osmoscope. (i) Setting up of potato osmoscope (ii) Demonstration of osmosis	Practical

Unit-II Brief Idea about cell cycle Cell cycle: different phases of cell cycle (G_1, S- phase, G_2 and M-phase). Regulation of cell cycle: role of cyclins and CDKs, Check points. Mitosis: phases of mitosis (prophase, metaphase, anaphase, telophase and cytokinesis). Significance of mitosis. Meiosis: phases of meiosis and gametogenesis.
(1 Credit)

Practicals(0.5 credit)

Sr. no.	Name of practical	Nature
1	Squash preparation of Onion root tip to study Mitosis. (i) Squash preparation (ii) Making slide (iii) Observation of mitosis	Practical
2	Preparation of polytene chromosome in chironomous larva/fruit fly. (i) Separation of chromosome (ii) Making slide (iii) Observation of chromosomes	Practical

3	Study of meiosis in Grasshopper testis. (i) Separation of testis (ii) Making slide (iii) Observation of meiosis	Practical
4	Learn about cell cycle and Gametogenesis through charts and models	Practice

Unit- III Cell signaling Cell Signaling: different pathways (G-protein mediated, cAMP mediated and tyrosine kinase mediated), secondary messengers. Cell differentiation, program cell death, techniques in Cell biology (microscopy, chromatography, centrifugation and spectroscopy).

(1 Credit)

Recommended Books:

1. Cell and molecular biology by P.K. Gupta
2. Cell biology by C. B. Panwar, Rastogi publication.

Reference books:

1. Molecular Biology of the Cell- Bruce Alberts, Alexander Johnson, Julian Lewis and Martin Raff.
2. The Cell: A Molecular Approach, Sixth Edition by Geoffrey M. Cooper and Robert E. Hausman

Unit Operations in food Industry **Credits-3**

Objective: Upon successful completion of this course, students should be able to:
1. Explain basic principles of unit operations and also waste treatment in food industry.
2. Explain the methods and effects of preservation and processing on food product quality.
3. Apply numerical solution to solve problems involved in unit operations of food processing.

UNIT – I Flow, Heat Transfer Principles of fluid flow, heat transfer, heat exchanger, EMC & Water activity, Evaporation, Distillation, Drying, Dehydration; Types of dryers, Material handling equipment; Size reduction, Energy requirement in Size Reduction.

(1 Credit)

Practical **(1 Credit)**

S. No.	Name of practical	Nature
1	Solvent Extraction (Extraction)	Practice
2	Distilled Water Preparation (Distillation)	Practice
3	Study & Demonstration of Spiral & Planetary Mixers (Mixing)	Practice
4	Sieve Analysis (Sieving)	Practice
5	Study & Demonstration of Ball Mill (Size Reduction)	Practice
6.	Study & Demonstration of Refrigeration System (Refrigeration)	Practice

UNIT – II Separation, Mixing Sieve analysis, Mixing, Kneading, Blending, Homogenization, Size Separation, Sedimentation, Extraction, Leaching, Crystallization, Thermal Processing, Refrigeration principles, Cooling, freezing, thawing of food materials.

(1 Credit)

UNIT – III Mechanical Separation, Grading &Emulsification Absorption and adsorption, Mechanical Cleaning, Grading, Sorting, Filtration, Membranic Separation, Emulsification

(1 Credit)

Recommended Books:

1. Albert Ibarz, Gustavo V. Barbosa-Canovas, Unit Operations in Food Engineering, CRC Press 2010
2. Norman N. Potter, Joseph H. Hotchkiss. Food Science, Springer, 1998
3. R.L. Earle and M.D. Earle, Food Engineering, 1978

Nutrition through Life Cycles **Credits-4**

Objective: To enable students to 1.Gain better understanding on the physiological changes and nutrient demands during life cycle. 2. Understand the nutritional requirements and adaptations by the human body through various stages of life cycle. 3. Gain knowledge on the nutritional requirements and planning diets for vulnerable group and special group in the society

Unit- I Basic Concept of Meal Planning Nutrition - Fitness, Athletics & Sports, Food guide - Basic five food groups How to use food guide (according to R.D.A.), Interrelationship between nutrition &health Visible symptoms of goods health, Use of food in body - Digestion, Absorption, transport & utilization. Food groups and concept of balanced diet, Food exchange list, Concept of Dietary Reference Intakes, Factors effecting meal planning and food related behavior, Dietary guidelines for Indians and food pyramid. (1 Credit)

Unit- II Nutrition during the Adult Years Meal planning for the family, Indian meal patterns - vegetarian & non-vegetarian, Food faddism & the faulty food habits, Nutritive value of common Indian recipes

Nutrition in Pregnancy- Physiological stages of pregnancy, nutritional requirements.food selection, complication of pregnancy, Nutrition during Lactation - Physiology of lactation, nutritional requirements, Nutrition during Adulthood - Nutritional requirements, feeding pattern, Geriatric Nutrition : Factors affecting food intake and nutrient use, nutrient needs, nutrition related problems.

(1 Credit)

Practical (0.5credit)

Sr. no.	Name of practical	Nature
1	Planning and Preparation of One Time Meal for Young adult	Practical
2	Planning and Preparation of One Time Meal for Pregnant and Lactating Women	Practical
3	Planning and Preparation of One Time Meal for Elderly and Old People	Practical

Unit-III Nutrition during Childhood (1.0-0.5) Growth & development, nutritional requirements, breastfeeding, infant formula, introduction of supplementary foods, Nutrition during Early Childhood

(Toddler/Preschool)- Growth & nutrient need, nutrition related problems, feeding patterns, Nutrition of School Children- Nutritional requirement, importance of snacks, school lunch, Nutrition during Adolescence - Growth & nutrient needs, food choices, eating habits, factor influencing needs.

(1 Credit)

Practical (0.5credit)

Sr. no.	Name of practical	Nature
1	Planning and Preparation of One Time Meal for Pre-School Child	Practical
2	Planning and Preparation of One Time Meal for School age child	Practical
3	Planning and Preparation of One Time Meal for adolescents	Practical

TEXTBOOKS-

1. Shubangini A Joshi, (1998): Nutrition and Dietetics, Tata McGraw Hill Pub. Co. Ltd., New Delhi.
2. National Institute of Nutrition, (2005): Dietary Guidelines for Indians – A Manual, Hyderabad.
3. Srilakshmi. B, (2005): Dietetics, V Edition, New Age International (P) Ltd, Publishers, Chennai.

REFERENCE BOOKS-

1. Mahan, L.K. and Escott-Stump, S. (2000) Krause's Food, Nutrition and Diet Therapy, 10th Ed.W.B.Saunders Company, London.
2. Williams S.R. (1993): Nutrition and Diet Therapy, 7th Ed. Times Mirror / Mosby College Publishing, St. Louis.
3. Antia F.P, Clinical Dietetics and Nutrition, Oxford University Press.
4. Shills, M.E, Oslon, J.A, Shike, M and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9th Edition.

Fundamentals of Food Science & Technology Credits-4

Objective: Students would be able to understand Scope of food processing in India and different areas of food processing. They would be able to understand the processing of different food products like meat and meat products, Fruit and vegetable, milk and milk products and marine products.

UNIT I Food Processing & Packaging and Food Industries Scope of food processing in India; Introduction to food processing, food preservation, food packaging, food drying and dehydration.Important food industries in India; role of Food Science & Technology in national economy.

(1 Credit)

Practical (0.4Credit)

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

S. No.	Name of practical	Nature
1	Study of Various Processed foods available in the market	Practical
2	Study of Different Methods of Food Preservation	Practical
3	Study of Different types of Drying Techniques	Practical
4	Study of Different types of Packaging Materials	Practical
5	Study of Different Food Industries in India	Practical

UNIT – II Processing of food products Fruit and vegetable processing, processing of meat and meat products, processing of milk and milk products, processing of marine products.

(1 Credit)

Practical (0.4 Credit)

S. No.	Name of practical	Nature
1	Processing of Fruits	Practical
2	Processing of Vegetables	Practical
3	Processing of Milk & Milk Products	Practical
4	Processing of Meat Products	Practical
5	Processing of Marine Products	Practical

UNIT – III Unit operations and Food Engineering Unit operations in food industry. Rheology of food.Basic principles of food engineering.Introduction to various food processing equipments.

(1 Credit)

Practical (0.2 Credits)

S. No.	Name of practical	Nature
1	Study of Various Food Processing Equipments	Practical
2	Study of Unit operations in Food Industry	Practical
3	Study of Food Rheology	Practical

Recommended Books:

1. Norman N. Potter, Joseph H. Hotchkiss. Food Science, Springer, 1998
2. Vickie A. Vaclavik, Elizabeth W. Christian, Essentials of Food Science, Springer, 2008
3. B. Srilakshmi, Food Science, New Age International, 2007

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

III SEMESTER

Metabolism and Bioenergetics **Credits-4**

Objective: This course deals with characteristics, properties and biological significance of the biomolecules of life. In depth knowledge of the energetic and regulation of different metabolic processes in microorganisms.

UNIT – I Bioenergetics and Carbohydrate metabolism Molecular basis of life, proteins, classification, structure, function, dynamics, specificity and techniques; Protein configuration, conformation, conformational analysis, Ramachandran's map and energy calculations; Helix to coil transition of proteins. Carbohydrates and lipids,classification, structure and function, membrane fluidity. Structural proteins, actin, myosin and muscle contraction.

(1 Credit)

Practicals(0.4 credits)

Sr. no.	Name of practical	Nature
1.	To understand the principle and operation of Spectrophotometer	Practical
2.	Determination of reducing sugars by Nelson- Somogyi's method 1. Preparation of reagents 2. To perform the assay 3. Observation and Calculations	practical
3.	Determination of starch in plant Tissue 1. Preparation of reagents 2. To perform the assay 3. Observation and Calculations	Practical
4.	Determination of Glycogen in Liver 1. Preparation of reagents 2. To perform the assay **3.** Observation and calculations	Practical

UNIT – II Lipid Metabolism Nucleic acids, nomenclature, properties and techniques, backbone torsional angle and sugar conformation. Enzymes, introduction, classification, kinetics and Catalysis.Metabolism, basic concepts and design.

(1 Credit)

Practical (0.4 credit)

Sr. no.	Name of practical	Nature
1	Extraction and estimation of total lipid content in the given sample of oilseed 1. Preparation of reagents and extraction of total lipids 2. Estimation of total lipids	Practical
2	Separation and identification of various lipids by Column Chromatography 1. Preparation of reagents 2. Separation of Lipids 3. Identification of lipids	Practical

3	Separation of various Components in different lipid fractions by thin layer chromatography 1. Preparation of reagents 2. Separation of various components	Practical
4	Estimation of Cholesterol content by Liebermann- Burchard method 1. Preparation of reagents 2. To perform the assay 3. Observation and Calculations	Practical

UNIT – III Protein and Nucleic acid metabolism Carbohydrates and lipids,classification, structure and function.Metabolism of carbohydrates, glycolysis, citric acid cycle and oxidative phosphorylation, lipid, amino acid and nucleotide metabolism..Integration of metabolism, coordinated control and regulation.Photosynthesis, chloroplast, dark and light reactions.

(1 Credit)

Practical (0.2 credit)

Sr. no.	Name of practical	Nature
1.	Estimation of protein by Lowry's method 1. Preparation of reagents 2. To Perform the assay 3. Observation and Calculations	Practical
2.	Determination of Protein by Bradford method 1. Preparation of reagents 2. To perform the assay and calculation for the concentration of protein	Practical

Recommended text Books:

1. A.L. Lehninger, D.L. Nelson, M.M. Cox, " Principles of Boichemistry", 3rd Edn., Worth Publishers.

Reference Books:

1. Biochemistry by Voet and Voet
2. Biochemistry by U. Staynarayan
3. Biochemistry by LubertStryer. W. H. Freeman & Company, NY.
4. G. Zubay, "Biochemistry", 4th Edn.,McGrawhill Publishers.

References/Correlation with Ancient Indian Literature:

- AsvalayanaGrhya Sutra II 7 https://www.australiancouncilofhinduclergy.com/uploads/5/5/4/9/5549439/asvalayana-eng.pdf
- Atharvedahttp://www.sacred-texts.com/hin/av.htm
- Yajurvedahttp://vedicheritage.gov.in/science/

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Basic Dietetics **Credits-4**

Objective: To enables the students to 1. Know the metabolic condition of the life style related diseases. 2. Explain the risk factors for degenerative diseases and toward the management of the several disease conditions.

UNIT I Introduction to Dietetics (1 -0.5) Role of dietician-The hospital & community, Basic concepts of diet therapy, Principles of diet therapy & therapeutic nutrition for changing needs, Adaptation of normal diet for changing needs, Routine Hospital Diets - Regular diet, light diet, full liquid and tube feeding, Modification of Diet - Febrile conditions, infections and surgical conditions, Feeding the Patients - Psychology of feeding the patient, assessment of patient needs, Feeding Infants & children - problems in feeding children in hospitals.

(1 Credit)

Practical **(0.5credit)**

S. No.	Name of Practical	Nature
1	Standardization of common food preparations	Practical
2	Planning and Calculation of Normal Diet	Practical
3	Preparation of Normal Diet	Practical
4	Planning and Calculation of Liquid Diet	Practical
5	Preparation of Liquid Diet	Practical
6	Planning and Calculation of Soft Diet	Practical
7	Preparation of Soft Diet	Practical
8	High and low Calorie Diet	Practical

UNIT II Nutritional Management for Disorders (1-0.5) Diets for Gastro - Intestinal Disorders-Constipation, Diarrhoea, Peptic ulcer, Diet for Renal Diseases - Nephritis, Nephrotic Syndrome and Renal Failure, Diet for Obesity and Cardiovascular Disorders, Diet for Diabetes Mellitus, Diet & Nutrition in Kidney Diseases, Nutrition in Cancer.

(1 Credit)

Practical **(0.5 Credits)**

S. No.	Name of practical	Nature
1.	Bland diet for peptic ulcer	Practical
2.	Diet for Diabetes mellitus	Practical
3.	Diet for Hypertension and Atherosclerosis	Practical
4.	Diet for Nephritis and Nephrotic syndrome	Practical
5.	Low and medium cost diets for P.E.M., Anemia & vitamin A	Practical

UNIT III Nutritional Management for Disorders Nutrition in Immune system Dysfunction- AIDS & Allergy, Nutrition Support in Metabolic Disorders, Nutrition in Burns and Surgery, Nutrition - Addictive Behavior in Annorexia Nervosa, Bulimia and alcoholism, Nutrient drug interaction, Nutrition & Diet Clinics - Patients Checkup and Dietary Counseling, Educating the Patient and follow up .

(1 Credit)

Recommended Text Books:

1. Mahan LK, Escott-Stump S (2000). Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
2. Shils ME, Olson, JA, Shike, M, Ross, AC (1999). Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.

Reference Books:

1. Escott-Stump S (1998). Nutrition and Diagnosis Related Care, 4th Edition, Williams and Wilkins.
2. Garrow JS, James WPT, Ralph A (2000). Human Nutrition and Dietetics, 10th, Edition, Churchill Livingstone.
3. Williams SR (1993). Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby College Publishing.

Technology of Milk & Milk Products **Credits-4**

Objective: Students would be able to understand the basics of milk and milk processing. Understand the importance of dairy, the techniques that can be used for preservation and manufacturing of various value added milk products. Understand the processing of various milk products like butter, ghee, flavored milk, yoghurt and shrikhand, ice cream, cheese, channa, paneer, condensed milk and milk powder.

UNIT – I Composition of Milk Milk: Definition, composition, and Present milk industry scenario and its future, Physical and chemical properties, Nutritive value of milk and milk products and its national and international standards. Practices related to procurement and transportation of milk, soy milk manufacturing and processing, Types of Milk- standardized milk, recombined milk, toned milk and double toned milk.

(1 Credit)

Practical **(0.4 Credit)**

S. No.	Name of practical	Nature
1	To determine the titratable acidity of milk	Practical
2	Determination of Physico- chemical properties of Milk	Practical
3	To test the quality of milk using COB test	Practical

UNIT – II Testing & Microbiology of Milk Testing the authenticity of Milk & Milk Products: Detection of foreign fats, milk of other species, microbiology of milk, Spoilage of Milk, Good Hygeine Practices in Milk Processing: Principal Hazards, cleaning and disinfection agents and processes. Reception, cream separation.

(1 Credit)

Practical **(0.4Credit)**

S. No.	Name of practical	Nature
1	To conduct the platform test of milk sampling of dairy products	Practical

2	Detection of common adulterants in Milk	Practical
3	Separation and standardization of Milk	Practical

UNIT – III Processing of Milk & Milk Products Milk Processing: Clarification,Homogenization, Pasteurization, Sterilization of Milk, UHT Milk, Aseptic Packaging and Storage. Technology of Traditional Indian Dairy products, Technology of fat rich dairy products like Cream, Butter, ghee and margarine, Technology of fermented milk and probiotic milk based products, flavored milk.

(1 Credit)

Practical (0.2 Credits)

S. No.	Name of practical	Nature
1	Preparation of Flavored Milk	Practical
2	Preparation of traditional Indian dairy products	Practical
3	Preparation of white and salted butter and ghee	Practical

Recommended Text Books:

1. Many N.S. Shadakshasawamy M, Food Facts and Principles, New Age International, 2004.

Reference Books:

1. Norman N. Potter, Joseph H. Hotchkiss. Food Science, Springer, 1998
2. Vickie A. Vaclavik, Elizabeth W. Christian, Essentials of Food Science, Springer, 2008

References/Correlation with Ancient Indian Literature:

- Prasna Upanishad 1-5https://esamskriti.com/Prasnopanishad-TNS-Complete.pdf
- Brihadaranyaka Upanishad (V.12)https://www.swami-krishnananda.org/brdup-audio.html
- Chhandogya Upanishad (VII. 26)https://www.chinfo.org/images/useruploa d/Reflections/16_Bhumaiva_Sukham_Chand_7.pdf
- Chhandogya Upanishad (VII. 9)https://www.chinfo.org/images/useruploa d/Reflections/16_Bhumaiva_Sukham_Chand_7.pdf

Principles of Food Preservation **Credits-4**

Objective: This course deals with the techniques and principles involved in processing and preserving the various food products. The student will be able to apply the principles and methods involved in the processing of different foods and discuss their processing. They would understand important application of various preservation methods in food industries.

UNIT – I Water Activity & Moisture Removal Principles of food preservation, Asepsis, removal of microorganisms, Maintenance of anaerobic conditions, Methods of food preservation. Water Activity and Food Preservation, Free and Bound water, Effect of water activity on quality of food constituents during storage (proteins, lipids and carbohydrates) Effect on physical and nutritional quality, Water activity and food stability, Effect of packaging material on water activity.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

(1 Credit)

Practical (0.4Credit)

S. No.	Name of practical	Nature
1	Measurement of water activity in Fresh fruits	Practical
2	Measurement of water activity in dehydrated fruits - Raisins, figs (dry), dried vegetable	Practical
3	Measurement of water activity in milk powder/instant coffee powder	Practical
4	Effect of packaging material on water activity	Practical
5	To see Osmosis in Raisins	Practical

UNIT – II Controlled Atmospheric Storage & Freezing (1-0.7) Preservation through temperature reduction, Storage of food at chilling temperature - behaviour, Refrigeration Controlled Atmosphere Storage (CAS), Modified Atmosphere Storage (MAS), Chilling defects Freezing-principles, fundamental aspects of freezing Freezing process-technological spects Freezing damage-osmotic damage, solute Structural damage Preservation by use of High Temperatures, Concentration of food Evaporation Freeze concentration, Membrane process for concentration.
(1 Credit)

Practical (0.4 Credit)

S. No.	Name of practical	Nature
1	Low Temperature processing (i) Processed food / fruits / vegetables Banana, Sapota, Potato, Leafy Vegetables (ii) Processing of fruits and vegetables and storage at low temperature using various packaging material (after giving appropriate pre-treatment)	Practical
2	Frozen food Processing (i) Fruit pulp processing, packaging and freezing (using various packaging material and methods)	Practical
3	High Temperature processing (i) Experiments on Blanching of vegetables (ii) Experiments on sterilization	Practical
4	Experiments on concentration	Practical
5	Quality analysis of the products during storage, storage studies	Practical

UNIT – III Dehydration of foods & Preservation Techniques Dehydration of food (Food Preservation through water removal), Transport of water in foods, Different methods of dehydration, Cabinet drying, sun / solar drying, Osmo drying, Osmo-vac drying, micro-vac drying, vacuum drying,. Recent advances in dehydration of food. Freeze drying: Introduction, principles, process and preservation. Preservation using high Sugar-Jam, Jellies, Squashes, syrups, marmalades, cordials, concentrate etc. Salting preservation Use of common salt, principle, process Fish salting Pickling Pickle salting (sauerkraut, cucumber, Kim chi) Vegetable salting Acidified - brined pickles (vegetables-onion, garlic).

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

(1 Credit)

Practical (0.2 Credit)

S. No.	Name of practical	Nature
1	Dehydration : Cereal/Pulse based products (including comparative studies on packaging) Banana powder, Potato and Sweet Potato powder appropriate pre-treatment)	Practical
2	Sugar based products: Jam making	Practical
3	Sugar based products – Jelly making	Practical
4	Salting: Salting of vegetables, Brining / preservation of vegetables in brine using variouscontainers	Practical
5	Effect of chemical preservatives (Benzoate, So2, salts (KMS, NaMs)	Practical

Recommended Text Books:

1. GiridhariLal, G.S. Siddappa and G.L. Tondon Preservation of Fruits and Vegetables, CFTRI, ICAR, New Delhi -12.
2. Diane M. Barrett, LaszloSomogyi, HoshahalliRamaswamyProcessingFruits,IIedition,ScienceandTechnology,CRCPress

Reference Books:

1. B. Sivasankar, Food Processing & Preservation, PHI Learning Private Limited, 2002
2. Norman N. Potter, Joseph H. Hotchkiss. Food Science, Springer, 1998

References/Correlation with Ancient Indian Literature:

- Maitrayani Upanishad (VI. 9)https://www.yousigma.com/religionandphilosophy/maitrayani.html
- Arunika Upanishad (Taitt. Up. II. 2)https://archive.org/stream/EssentialsOfUpanishadsKashyapR.L.SAKSI/Essentials%20of%20Upanishads%20%20Kashyap%20R.L.%20SAKSI_djvu.txt
- (MahabharathaAnu.65-46)https://sanskritdocuments.org/mirrors/mahabharata/mbhK/mahabharata-k-01-sa.html
- Atharva Veda (2-13-1).http://www.sacred-texts.com/hin/av/index.htm

Biostatistics **Credits-4**

Objective: Students will learn about basic of biostatistics, classification of data, tabulatin of data, correlation coefficient, regression, measures of dispersion and measures of central tendancy. This course will give students knowledge about vital statistics, life tables, sampling techniques, hypothesis testing, large sample test, small sample test and analysis of variance.

UNIT-I Classification and Tabulation of Data Classification and tabulation of data ,Frequency distribution Histogram , Frequency polygon and frequency curve ,Cumulative frequency curves, Measures of central tendency:arithmetic mean geometric mean harmonic mean median, mode;Measures of dispersion:range, quartile deviation, mean deviation, variance and standard deviation; Correlation:karl Pearson's correlation coefficient, Spearman's rank correlation coefficient, Spearman's rank correlation coefficient, Regression: Lines of regression and regression coefficient.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

(1 Credit)

Practical (0.5 Credit)

Sr. no.	Name of practical	Nature
1.	To find out Mean	Practical
2.	To find out Median	Practical
3.	To find out Mode	Practical
4.	To draw Bar Graph	Practical
5.	To draw Pie diagram	Practical

UNIT-II Vital Statistics Vital statistics: Concept, importance, Vitalindex,Birthrates:CBR,GFR,SFR,TFR,Deathrates:CDR,SDR,STDR,Lifetables:introduction,Description and uses, Sampling: concept of population and sample, Sampling distribution and standard error of sample mean and sample proportion, Hypothesis testing, type I& II errors, Level of significance, Critical region, acceptance region, p-values of the statistics, confidence limits.

(1 Credit)

Practical (0.5 Credit)

Sr. no.	Name of practical	Nature
1.	To draw Histogram	Practical
2.	To draw line graph	Practical
3.	To find out correlation	Practical
4.	To find out rank correlation	Practical
5.	To draw Histogram	Practical

UNIT-III ANOVA and Sampling Large sample tests (normal test): Test for one sample proportion and two sample proportion test, Small sample tests : t-test (test for one and two sample means): F-test, Chi square test (goodness of fit test, test of independence, homogeneity of samples), Analysis of variance (ANOVA);One way and two way analysis of variance, Application of these tests to analyze the biological data.

(0.5 Credit)

Recommended Text Books:

1. Elements of Biostatistics; S. Prasad; Rastogi Publications, Merrut
2. Elements of Mathematical Statistics; S.C.Gupta and V.K. Kapur; Sulatanchand& Sons, New Delhi

Reference books:

1. Statical methods in Biology; T.I. Norman; Bailey,3rd edition
2. Fundamentals of Mathematics; S.C. Gupta and V.k. kapur; Sultan Chand& sons , New Delhi

References/Correlation with Ancient Indian Literature:

1. Sankhyā: The Indian Journal of Statistics Published by: Indian Statistical Institute https://www.springer.com/statistics/journal/13171

2. The Sulba Sutras http://www-history.mcs.st-and.ac.uk/Projects/Pearce/Chapters/Ch4_2.html
3. "History of Hindu Mathematics, Asia Publishing House, Bombay, 1962"https://link.springer.com/article/10.1007/BF02836134

Food Microbiology & Safety **Credits-4**

Objective: Students would be able to acquaint the knowledge of the important genera of microorganisms associated with food and their characteristics. They would be able to explain the role of microbes in fermentation, spoilage and food borne diseases. Gain Knowledge of Food safety and hygiene, types of hazards associated with food and understand the current Food Regulations**.**

UNIT – I Introduction to food microbiology & food Borne Diseases Introduction to Food Microbiology, History of food Microbiology, Scope of Food Microbiology, and Types of organisms associated with food: Bacteria, Fungi, Yeast, and Mold. Growth Kinetics and factors affecting growth of microorganisms.Sources of Microbial contamination on foods, Sources of Microbial contamination in food and its control .Food Microbiology and Public Health- Food Poisoning, Food Poisonings due to pathogens, important features. Bacterial Agents of food borne illness- a brief account of various organisms related with food poisoning. Food Borne Diseases.

(1 Credit)

UNIT – IIRole of Microorganisms & Techniques in Microbiology Beneficial Role of microorganisms in foods. Introduction to Biotics& Probiotics. Screening, Detection and enumeration techniques including rapid detection techniques for food micro flora including pathogens, Requirement of Microbiology laboratory for food analysis, preparation & maintenance of cultures, media, sterilization techniques, disposal of used cultures and media detection and detection techniques of microorganisms in foods: culture, microscopic examinations, physical, chemical and immunological methods of microbial detection.

(1 Credit)

Practical (0.5Credits)

S. No.	Name of practical	Nature
1	Preparation of common laboratory & Special media for cultivation of bacteria, yeast & molds	Practical
2	Staining of bacteria: Gram's Staining, Acid- Fast, Spore, Capsule and Flagellar Staining, Motility of Bacteria	Practical
3	Study of environment around us as sources of transmission of microorganisms in foods- assessment of surface sanitation of food preparation units- swab and rinse techniques	Practical
4	Isolation of Microorganisms- different methods & maintenance of cultures of microorganisms	Practical
5	Bacteriological analysis of foods	Practical
6	Bacteriological Analysis of water: MPN	Practical
7	Bacteriological Analysis of Milk: MBRT	Practical
8	To perform various tests used in Identification of commonly found bacteria in foods: IMVIC, Urease	Practical
9	To perform various tests used in Identification of commonly found bacteria in foods: H2S, Catalase	Practical
10	To perform various tests used in Identification of commonly found bacteria in foods: Coagulase, Gelatin & Fermentation (Acid/ Gas)	Practical

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

UNIT – III Quality Control &Assurance Quality Control/Quality Assurance, Legislation for food safety- national & International criteria, sampling Schemes. Records, risk analysis, risk management. CC-Microbial source, code indicators of food safety and quality: Microbiological criteria of foods and their significance. The HACCP system and Food Safety Management Systems used in controlling microbiological hazards.

Practical (0.5 Credits) (1 Credit)

S. No.	Name of practical	Nature
1	To study the implications of HACCP in relation to a food industry	Practical
2	To study the available rapid methods & diagnostic kits used in identification of microorganisms or their products.	Practical
3	To study a food processing unit dealing with advanced methods in food microbiology	Practical

Recommended Books:

1. James M.J. (2000) Modern Food Microbiology, 5th edition, CBS Publishers.

Reference Books:

1. Adams M. R. & Moss, M.O (1995) Food Microbiology, New age International Pvt. Ltd Publishers.

References/Correlation with Ancient Indian Literature:

- Gita14.17http://en.krishnakosh.org/krishna/Gita_14:17
- Chandogya Upanishad VI.6.5https://www.chinfo.org/images/userupload/Reflections/14_Chandogya_Chap_6-Tat_Twam_Asi.pdf
- Taittiriya Upanishad, III.vii.1https://www.hinduwebsite.com/taittiriya-upanishad.asp

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

IV SEMESTER

Food Packaging Technology **Credits-4**

Objective: On successful completion of the course students will be able to: 1. Describe the role and function of packaging materials used for a range of consumer food needs and wants. 2. Relate the properties of food packages to conversion technologies, processing and packaging technologies and user requirements including safety, convenience and environmental issues. 3. Describe the technology involved in the production, shaping and printing of various packaging materials and packages.

UNIT – IPackaging Machineries &Materials Packaging Machineries, Systems and Regulations, Introduction to Food Packaging: History, Definitions, Importance and scope functions of packaging, package components. Packaging Materials and Properties: Manufacturing process, types, properties, advantages and disadvantages. Primary Packaging Materials: Paper and paper based packaging materials, Plastic as packaging materials: Brief history, processing, classification, mechanical, optical and barrier properties like WVTR, GTR, additives in plastics. Aluminum foil, Metal packaging materials: Manufacture of tin plate, TFS, fabrication, corrosion and remedial measures. Glass packaging materials: Composition, structure, properties, manufacture, design and closure.
Seminar (0.5Credits): Seminar based on Unit I is recommended (1 Credit)

UNIT – II Packaging Requirement of different foods Secondary Packaging Material: Folding carton. Transport packaging materials- corrugated fiber board boxes, properties of corrugated fiber board boxes; drop strength, compression strength and puncture resistance strength, wooden boxes. Ancillary Packaging Materials: Printing inks, varnishes, lacquers and adhesives. Packaging Requirements of Different Types of Foods : fruits and vegetables, meat, fish, poultry, dairy products, edible oils and spice products, bakery products, confectioneries, Instant foods, extruded foods, snack foods, alcoholic and non-alcoholic carbonated beverages.

(1 Credit)

Practical (0.3Credit)

S. No.	Name of practical	Nature
1	Determination of Puncture Resistance Strength of CFB boxes.	Practical
2	Determination of Compression Strength of CFB boxes	Practical
3	Determination of Drop Strength of CFB boxes.	Practical

Group Discussion (0.2 Credits): Group Discussion based on Unit II is recommended

UNIT – III Packaging Machineries, Systems and Regulations Packaging Machineries, Systems and Regulations:- Packaging, Machineries: Bottling, canning, capping, labeling, form- fill sealing, strapping, cartonning machineries. Packaging Systems:, Vacuum and gas packaging, aseptic packaging, retort packaging, CAP & MAP, active packaging, shrink packaging, lined cartonning, system. Packaging Standards and Regulations: Laws, regulations, specifications and quality control, recycling of plastic packaging materials: Collection, separation and disposal.

(1 Credit)

Recommended Text Books:

1. Roberston G.L. (2006) Food Packaging: Principles and Practice. 2nd edition, Taylor and Francis Group.
2. Mattsoon B. and Sonesson U. (2000) Environmentally-friendly food processing. Woodhead publishing ltd.

Reference Books:

1. Ahevenainen R. (2003). Noval food packaging techniques. Woodhead publishing ltd.

Food Service Management **Credits-3**

Objective: To enable students to 1.This subject equips the students for skill development, academic, understanding entreneurship. 2. Employment in various field of food industry, health clinic, NGO's etc 3.Perform training and communication skills relevant to the restaurant, food industry etc.

UNIT – I Food Service Establishment & Management Type of food service establishment: Commercial, Non Commercial, Street, mobile food unit Temporary food service establishment, vending machine, food court, High risk food Catering management- Principles of management (basic guidelines) Principle of Management (continued)Function of management: Managing, Planning, Organizing Directing, Coordinating, Controlling and Evaluating Tools of management Tangible. Tools of management, Intangible tools Management of resources Natural environment, Work environment.

(1 Credit)

UNIT – II Organization of Space & Equipment in Food Services establishment Kitchen Space – Size and types, Developing kitchen plan, Work simplification, Features to be considered in kitchen designing Storage Space – Types of storage, Factors to be considered while planning storage spaces Service Area – Location, Structural designing and planning storage spacesEquipment – Classification of equipment Selection of equipment, Designing, installation and operation purchasing equipment Care and maintenance of equipment.

(1 Credit)

UNIT – III Food Management Characteristic of food, Types of food, quality of food – quantity. Sensory quality and nutritional quality, Food purchasing – Importance Types – open market, formal, negotiated and wholesale. Receiving and Food storage – Delivery methods General guidelines for storing perishable and non perishable foods Menu Planning – Importance of menu planning Types of menus – Al a carte, table d'hôte and combination Food service Style of service, Waiter service, self service and vending.

(1 Credit)

Recommended Text Books:

1. Catering Management – An Integrated Approach – MohiniSethi, SurjeetMalhan, 2nd edition, New Age International Publishers.

Reference Books:

1. Food Hygiene and Sanitation – S Roday, Tata McGraw Hill Publishing Co. Ltd., 3rd reprint
2. Institutional Food Management –MohiniSethi

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Human Physiology **Credits-3**

Objective: To enable students to 1.Explain the basic knowledge of human anatomy and physiology 2.Describe and explain the normal function of the cells, tissues, organs and organ systems of the human body.

UNIT I Osseous, Haemopoietic& Cardiovascular system Cell - Structure and function, Blood - Blood cells, Haemoglobin, Blood groups, Coagulation Factors, Anaemia, Skeletal System -Bones, joints & bone deformities in brief, Cardiovascular system- Heart rate, Cardiac cycle, cardiac output, blood pressure, hypertension, radial pulse.

(1 Credit)

UNIT-II Lymphatic, Respiratory, GIT and Endocrine SystemLymphatic system -Lymph glands and its function, spleen -structure and functions, Respiratory System -Ventilation , Functions , Lungs volumes and capacities, Gastrointestinal System -Process of digestion in various parts, Endocrinology- List of Endocrine glands, Hormones- Their secretion and functions (in brief), Excretion system -Structure of nephron, Urine formation.

(1 Credit)

UNIT III Central Nervous System, Skin, Reproductive System, Special Senses Central Nervous System- Parts, Sliding Filament Theory , Neuro-Muscular Junction , Wallerian Degeneration, Motor Nervous system - Upper motor neuron system & lower motor neuron system, Sensory nervous system, Sympathetic Nervous system & Parasympathetic nervous system, **Skin** - Structure and functions, **Reproductive system**-Structure and functions of male & female reproductive organs, menstruation, puberty, menopause, fertilization and development of fertilized ovum, placenta and its function, **Special Senses**-Structure and function of eye and ear, common diseases of eye and ear (in brief).

(1 Credit)

Recommended Text Books:

1. Gandhi TP. Elements for Human anatomy, physisology& health education, B. S Shah Prakashan.
2. Kale SR & Kale RR. Practice Human anatomy, Physisology, NiraliPrakashan.

Reference Books

- Rizzo DC. Fundamentals Of Anatomy & Physiology , Delmar Cengage
- Tortora GJ, Anagnodokos NP. Principles of Anatomy and Physiology, Harper & Row Publishers N. Y.

References/Correlation with Ancient Indian Literature:

- **Rig-Veda 1-163 1,2,3,4 Figure 7**http://www.sacred-texts.com/hin/rigveda/index.htm
- **The Rigveda, A Historical Analysis, by Shrikant G. Talageri, AdityaPrakashan, New Delhi.** http://www.sacred-texts.com/hin/rigveda/index.htm

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Nutritional Biochemistry **Credits-3**

Objective : To enable students to 1. Describe the major metabolic pathways involved in the metabolism of nutrients in the human body. 2. Understand the principles of biochemical methods and be able to use them with appropriate instruction. 3. Understand the basis of reactivity of biologically relevant molecules and their interactions.

Unit I Basics of Energy Metabolism, Nutrition & Dietetics Unit of measuring energy, calorific value of food, BMR & factors affecting it, SDA of food, calculation of energy requirement, balanced diet, nutrition in health & diseases (protein energy malnutrition).Chemistry of Carbohydrates & their related Metabolism- Introduction, definition, classification, biomedical importance Brief outline of metabolism : Glycogenesis &glycogenolysis (in brief), Glycolysis, citric acid cycle & its significance, HMP shunt & Gluconeogenesis (in brief), regulation of blood glucose level.Chemistry of Proteins & their related Metabolism- Amino acids - Definition, classification, essential & non-essential amino acidsProtein- Introduction, definition, classification, biomedical importance Metabolism- Transformation, Decarboxylation, Ammonia formation & transport, Urea cycle.

(1 Credit)

Unit II Chemistry of Lipid, Enzyme and Acid Base Balance Chemistry of Lipids & their related Metabolism - Introduction, Definition, Classification, Essential Fatty Acids, Identification of Fats & Oils (Saponification No, Acid No, Iodine No, Acetyl No, Reichert-Miesel no etc) Brief out line of Metabolism : Beta Oxidation of Fatty Acids, Ketosis, Cholesterol & it's Clinical significance, Lipoproteins in the blood composition & their functions in brief, Atherosclerosis, Enzymes - Introduction, definition, classification, Acid Base Balance Concepts & Disorders - pH, Buffers, Acidosis, Alkalosis.

(1 Credit)

Unit III Vitamins and Minerals Vitamins -Water & fat soluble vitamins, sources, requirement, deficiency disorders & biochemical functions, Minerals- sources, requirement, deficiency disorders & biochemical functions of Macro-minerals (Calcium and phosphorus, Magnesium) and Micro-minerals (Iron, Copper, Manganese, Iodine, Fluoride, Zinc, Selenium, Cobalt, Chromium, Molybdneum).

(1 Credit)

Recommended Text Books:

1. Satyanarayana U &Chakrapani U(2006), Textbook of Biochemistry, 3rd Edition
2. Talwar GP, Textbook of Human Biochemistry by G.P. Talwar

Reference Books:

1. Harcot (2001). Text book of Medical Physiology Gayton, 10th edition.
2. Murray and Granner. Harper's book of Biochemistry edited by, Appleton and Lange.

Fruits & Vegetable Processing Technology **Credits-4**

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Objective: The course would furnish and acquaint a student with knowledge and understanding of the basic post harvest biological, chemical, physiological and metabolic processes and changes in fruits and vegetables. They would even learn the basic steps, application and operation of selected technologies and principles used to process, preserve and extend shelf life and value addition.

UNIT – I Post Harvest Technology Fruits and vegetables as living products: Current status of production and processing of fruits and vegetables. Chemical composition; pre and post harvest changes, harvesting and maturity standards for storage, and desirable characteristics of fruits and vegetables of processing. Post harvest treatments to enhance shelf-life, conditions for transportation and storage.

(1 Credit)

UNIT – II Types of Processing Treatments Cold chain & low temperature preservation: Types of cold preservation; Types of freezers and freeze concentrators, Cooling above freezing point, Cooling below freezing point. Control & modified atmosphere storage. Thermal processing: Canning and bottling, effect of canning and bottling on nutritive value, spoilage of canned foods, detection and control. Dehydration of Fruits & Vegetable: Thermal, Osmotic. Products processing: Juice extraction and preparation of syrups, squashes, cordials, nectars; Jam, jelly, marmalade, preserves and candies; ketchup, pickles, chutneys and sauces; fruit juice concentrates and powders; fortified soft drinks, tomato product, vinegar; cut fruits and vegetable, fruit toffee; fruit flavors and essences.

(1 Credit)

Practical (1 Credit)

S. No.	Name of practical	Nature
1	Estimation of benzoic acid	Practical
2	Estimation of So2 in processed fruit products	Practical
3	Pectin determination in fruits and vegetable products	Practical
4	Preparation fruit juices and its concentrate	Practical
5	Preparation of tomato products- ketchup	Practical

UNIT – III Packaging & By- Products Basics of Packaging materials & containers: Tin, glass, plastic and other packaging materials used in fruits and vegetables preservations. Modified atmosphere and active packaging, By-products utilization: Fruit & vegetable processing industry waste treatment, disposal and reuse. Emerging technologies for fruit and vegetable processing.

(1 Credit)

Recommended Books:

1. Fruits and Vegetables. A.K Thompson. Blackwell publishing S. Ranganna, Hand Book of Analysis and Quality Control for Fruits and Vegetable Products, Tata McGraw Hill, 2002.
2. L. Somogyi, Processing Fruits: Science and Technology, Vol I: Biology Principles and Applications, Woodhead Publishing, 1996.

References/Correlation with Ancient Indian Literature:

- Mantra (4-21-6) of the Atharva vedahttp://www.sacred-texts.com/hin/av.htm
- Atharva Veda's Mantra 18-4-16http://dahd.nic.in/hi/related-links/annex-v-ii-2-superiority-cow-milk-paper-sh-ik-narang
- Rigveda (10-179-3) http://www.gatewayforindia.com/vedas/rigveda/rigveda10.shtml

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

V SEMESTER

Food Additives & Ingredients **Credits-4**

Objective : Students would be able to acquire knowledge tools of the most important classes of chemical food additives, their technological use for the adding in certain food preparations and for a sustainable use. In addition students will have notions on food contaminants, their presence or delivery in food approaches to limit and control them.

UNIT – I Additives in Food Processing & Preservation(1.0-0.3) Additives in food processing and preservation - classification and their functions, Safety and quality evaluation of additives and contaminants, acute and chronic studies, NOAEL, ADI, Ld50. Indirect food additives.Various additives such as preservatives, antioxidants, antimicrobials, colors, flavor, emulsifiers, sequesterants, humectants, hydrocolloids, sweeteners, acidulants, anticaking, agents, buffering salts etc. with respect to chemistry, food uses and functions in food formulations Acids, bases and buffers.

(1 Credit)

Practical (0.3 credit)

S. No.	Name of practical	Nature
1	Techniques of quality assessment of fruits & vegetables	Practical
2	Techniques of quality assessment of cereals & pulses	Practical
3	Techniques of quality assessment of dairy products	Practical
4	Identification of food preservatives	Practical
5	Ingredient study of food product label	Practical

UNIT – II Flavor Technology (1-0.3) Flavor Technology: Types of flavors, flavors generated during processing - reaction flavors, flavor composites, stability of flavors during food processing, analysis of flavors, extraction techniques of flavors, flavor emulsions, essential oils and oleoresins, authentication of flavors etc.

(1 Credit)

Practical (0.3 Credit)

S. No.	Name of practical	Nature
1	Sensory evaluation of food attributes	Practical
2	Effect of processing on sensory evaluation of food attributes	Practical
3	Identification of various food flavors	Practical
4	Effect of flavor on sensory evaluation of food products	Practical

UNIT – III Food Ingredients (1.0-0.4) Ingredients used in food production e.g. sugar, starches/modified starches, fibres, proteins/protein hydrolysates and fats etc and their technology of production and application. Sugars and Sweeteners: Sugars, syrups, sugar alcohols, potent sweeteners, sugar products, caramelization. Sweetener chemistry related tousage in food Products Food Colors: Food colours - Types and properties, regulatory aspects, safety issues - natural food colours - heme pigments, chlorophylls, carotenoids, anthocyanins and flavonoids, tannins, caramel and others Artificial food colours.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

(1 Credit)

Practical (0.4 credit)

S. No.	Name of practical	Nature
1	Collection of various food ingredients	Practical
2	Preparation of caramelized products	Practical
3	Food safety in food ingredients	Practical
4	Effect of artificial color on sensory quality of food	Practical
5	Identification and collection of various food colors	Practical

Recommended Text Books:

1. Branen, A. F. et al (2001). Food Additive s, 2nd Edition, Marcel Dekker.
2. George, A. B. (1991). Encyclopedia of food and color additives, Vol III, CRC Press.

Reference Books:

1. Nakai, S. and Modler, H. W (2000). Food proteins. Processing Applications, Wiley
2. Food Quality Assurance-Principles and Practices - Inteaz Ali, CHIPS, Texas.

Cereal, Pulse & Oilseed Technology **Credits-4**

Objective : Students would be able to understand basic composition & structure of food grain and understand the basics of milling operations. They would learn processing of food grains into value added products and how to manage production, distribution & storage of grains and even understand the principle of alcoholic beverage preparation.

UNIT – I Cereals Processing Wheat Processing: Wheat classification, wheat grain structure quality and milling Functionality of wheat flour components and bakery ingredients. Rice Processing: Classification, paddy Processing and treatment for quality improvement, Milling and sorting, By product utilization e.g. Bran: Novel product development – Instant Rice, puffed products etc. Coarse Cereals Products: Maize, sorghum, pearl millet and small millets processing and value addition.

(1 Credit)

Practicals(0.4 credit)

Sr No.	Name of practical	Nature
1	Milling of wheat with emphasis on quality and recovery.	Practical
2	Milling of rice with emphasis on quality and recovery.	Practical
3	Milling of sorghum with emphasis on quality and recovery.	Practical
4	Milling of maize with emphasis on quality and recovery.	Practical
5	Milling of pearl millet with emphasis on quality and recovery.	Practical

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

UNIT – II Pulse Processing Pulses: Pretreatment of pulses for milling, Methods of pulse milling, milling of major pulses. Methods to improve recovery. Oil seeds Processing: Groundnut, Mustard, Soybean, Sunflower, Safflower, Sesame and other oil bearing materials, By products of oil milling.

(1 Credit)

Practicals(0.4 credits)

Sr No.	Name of practical	Nature
1	Pulses: Milling characteristics and effect of treatments on recovery.	Practical
2	Determination of triglyceride composition of oils	Practical
3	Milling of oilseeds	Practical
4	Pretreatment of pulses for milling	Practical

UNIT – III Soyabean& Extrusion Technology Special Topics: Processing & Utilization of Soya bean for value added products, Innovative products fromcereals, pulses and oilseeds. Extrusion technology for cereals.

(1 Credit)

Practicals(0.2 credit)

Sr No.	Name of practical	Nature
1	Preparation of Soy-Milk	Practical
2	Preparation of tofu	Practical
4	Preparation of soy-snacks	Practical
5	Preparation of Soy-Milk based products	Practical
6	Development of Bakery and other products	Practical

Recommended Text Books:

1. Wheat Chemistry and Technology by Y. Pomeranz

Reference Books:

1. Post Harvest Technology of Cereals by Chakraborty AC

References/Correlation with Ancient Indian Literature:

1. Arthasastrahttps://sanskritdocuments.org/doc_z_misc_sociology_astrology/artha.html?lang=sa
2. Manusmrtihttps://sanskritdocuments.org/sanskrit/samajashastra/
3. Kasyapasamhitahttps://sanskritdocuments.org/sanskrit/vedanta/

Community Nutrition **Credits-4**

Objective : To enables the students to

1. Gain knowledge on the current nutritional scenario.
2. Implement policies towards nutrition security.
3. Make improvements in developing the current public health programmes.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

UNIT – I Nutrition and Health (1.0-0) Nutrition and health in National development, Malnutrition-meaning. factors contributing to malnutrition, over nutrition, Nutritional disorders- Epidemiology, clinical features, prevention and dietary treatmentfor Protein Energy malnutrition, nutritional anaemias&vitmain deficiency disorders, Methods of assessing nutritional status:a) Sampling techniques , Identifications of risk groups,b) Direct assessment - Diet surveys, anthropometric, clinical and biochemical estimation.c) Indirect assessment- Food balance sheet, ecological parameters and vital statistics.

(1 Credit)

UNIT – II Nutrition for Community (1-0.5) Improvement of nutrition of a community: a) Modern methods of improvement or nutritional quality of food, food fortification enrichment and nutrient supplementations. b) Nutrition education themes and messages in nutrition and health, Antenatal andpostnatal care, Nutritional and infection relationship : Immunization and its importance, Food borne infection and intoxication diseases, foods involved, methods of prevention, Infestation of food borne diseases , Outbreak, Prevention signs and control of infection.

(1 Credit)

Practical (0.5 Credit)

S. No.	Name of practical	Nature
1	Diet and nutrition surveys: • Identification of vulnerable and risk groups. • Diet survey for breast-feeding and weaning practices of specific groups. • Use of anthropometric measurement in children.	Practical
2	Preparation of visual aids.	Practical

UNIT – III Community nutrition program planning (1-0.5) National and International agencies in uplifting the nutritional status -WHO, UNICEF, CARE, ICMR, ICAR, CSIR, CFTRI, Various nutrition related welfare programs, ICDS, SLP, MOM, and others (in brief), Community nutrition program planning - Identification of problem, analysis of causes, resources constraints, selection of interventions, setting a strategy, implementations and evaluation of the program.

(1 Credit)

Practical (0.5 Credit)

S. No.	Name of practical	Nature
1	Field visit to • Observe the working of nutrition and health oriented programs (survey based result). • Hospitals to observe nutritional deficiencies.	Practical

TEXT BOOKS

- Agarval, A.N.1981: Indian Economy problems of development and planning
- Shukla, P.K.(1982): Nutritional Problems in India

REFERENCE BOOKS

1. Jelliffle, D.B(1968): Child Health in the tropics.
2. Ghosh, S(1989): You and your child.
3. Misra, S.K. and puri, V.K(1992): Indian Economy
4. Thankamma Jacob (1976): Food Adulteration.
5. Park, J.E. and Park, K(1994): Text book of Preventive and Social Medicine. 6.Prevention of Food Adulteration Act (1994): Govt of India.

Food Storage & Transport Engineering **Credits-2**

Objective : The course would help students in acquiring and applying basic knowledge of Food storage and transport technologies. Course will emphasize on the characteristics of fresh produce, important environmental factors affecting produce quality, optimum storage conditions and harvesting.

UNIT – I Food Science & Transport of Foods Food science and the transport of food: Composition of food, Chemical reactions in foods, Physical changes in foods: crystallization phenomena, Microbiology and food transportation. Food Transport: Controlled Atmosphere: The Biology of Controlled Atmospheres, Techniques in Controlled Atmosphere Storage, Modified Atmosphere Packaging. Food Storage, Handling & Transportation: Bulk storage system: Metallic bins, silos.

(0.5 Credit)

UNIT – II Modes of Transport of Foods Transport of food stuffs by sea: Cooling of cargo in transit, Conventional refrigerated ships, Container ships, Need for refrigeration. Air transport of perishables: Cargo space, Unit load, devices: containers and pallets, Transport of fruit and vegetables : Post-harvest behavior of fruit and vegetables, Pre-cooling and the cold chain, Product requirements during transport, Storage temperature management. Product deterioration, Land transport, Shipping, Air freight. Insurance.

(1 Credit)

UNIT – III Legislation & Hygiene (1.5-0) Hygiene in food transport : Basic hygiene requirements, Shipping container loading, Inspection of incoming carriers, Quality systems in food transportation, Quality and safety in food transportation, History of quality management in food transportation, Standards for quality systems, Benefits of implementing a quality management system, Clauses of ISO9002,HACCP: A food safety management system.

(0.5 Credit)

Recommended Books:

1. IGNOU-2006 Food Processing and Engineering -II, Practical Manual, www.ignou.ac.in.
2. Norman N. Potter, Joseph H. Hotchkiss. Food Science, Springer, 1998

Reference Books:

1. MarcusKarel,OwenR.FernnemaPhysicalprinciplesFoodScience,PartIand IIMarcelDekkerinc

References/Correlation with Ancient Indian Literature:

- Matsyapuranahttps://sanskritdocuments.org/sanskrit/purana/
- Markandeypuranahttps://sanskritdocuments.org/sanskrit/purana/
- Agnipuranahttps://sanskritdocuments.org/sanskrit/purana/

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Food Laws Standards & Regulations **Credits-3**

Objective : Students would be able to understand the concept of food safety, types of hazards and their control measures. They would be able to identify and prevent potential sources of food contamination. Understand the need of hygiene and sanitation for ensuring food safety, knowledge of Food Safety Management tools and understand National and International Food Safety Laws and Regulations.

UNIT – I Food Hazards & Contamination and their prevention Introduction, concept of food safety and standards, food safety strategies.Food hazards and contaminations - biological (bacteria, viruses and parasites), chemical (toxic constituents / hazardous materials) pesticides residues / environmental pollution /chemicals) and physical factors.Preventive food safety systems - monitoring of safety, wholesomeness and nutritional quality of food.Prevention and control of microbiological and chemical hazards.Food safety aspects of novel methods of food processing such as PEF, high pressure processing, thermal and non thermal processing, irradiation of foods.

(1 Credit)

UNIT – II Different Acts of Food Safety Indian and Food Regulatory Regime (Existing and new), PFA Act and Rules, Food Safety and Quality Requirements, Additives, Contaminants and Pesticide Residue.Food Safety and Standards Act, 2006, Essential Commodities Act, 1955, Global Scenario, Codex Alimentarius, WHO/FAO Expert Bodies (JECFA/ JEMRA/JMPR) WHO/FAO Expert Bodies (JECFA/ JEMRA/JMPR). Food safety inspection services (FSIS) and their utilization.

(1 Credit)

UNIT – III Quality Marks & Standards Introduction to OIE & IPPC, Other International Food Standards (e.g. European Commission, USFDA etc). WTO: Introduction to WTO Agreements: SPS and TBT Agreement, Export & Import Laws and Regulations, Export (Quality Control and Inspection) Act, 1963. Customs Act and Import Control Regulations, Other Voluntary and mandatory product specific regulations, Other Voluntary National Food Standards: BIS Other product specific standards; AGMARK. Nutritional Labeling, Health claims Voluntary Quality Standards and Certification: GMP, GHP, HACCP, GAP, Good Animal Husbandry Practices, Good Aquaculture Practices ISO 9000, ISO 22000, ISO 14000, ISO 17025, PAS 22000, FSSC 22000, BRC, BRCIOP, IFS, SQF 1000, SQF 2000. Role of NABL, CFLS.

(1 Credit)

Recommended Text Books:

1. Singal RS (1997). Handbook of indices of food quality and authenticity.Woodhead Publ. Cambridge, UK.
2. Shapton DA (1994). Principles and practices of safe processing of foods.Butterworth Publication, 3. London. Winton AL (1999). Techniques of food analysis, Allied Science Publications NewDelhi.

Reference Books:

- Pomeranze Y (2004). Food analysis - Theory and Practice CBS, Publications, New Delhi.

References/Correlation with Ancient Indian Literature:

- MaitrayaniyasamhitaHttps://sanskritdocuments.org/sanskrit/purana/
- Rasa-]ala-Nidhi or Ocean of Indian chemistry and alchemy/vol.vIEd.1984/AvaniPrakashan,Ahmedabad,India;CharakSamhitahttp://www.carakasamhitaonline.com/mediawiki-1.28.2/index.php?title=Main_Page

- AvS'5/23/5;Medicine in the Veda Ikenneth Zyskhttp://www.new.dli.ernet.in/handle/2015/201547

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Modern Baking & Confectionary TechnologyCredits-4

Objective : Upon successful completion of the course, the student will be able to identify and explain baking terms, ingredients, equipment and tools and employ safe food handling practices using contemporary guidelines. They would acquire the knowledge of the technologies behind bakery products and understand trends in bakery industry.

Unit-I Traditional Bakery Products Introduction: Status of bakery and confectionery industries in India- Raw materials for bakery and confectionery products-Essential and optional. PFA Specification of raw materials. Bakery products technology: Dough rheology – Bread making- methods process-specification for various types of breads- Biscuit manufacturing process-Cookies- Crackers- Cakes- Buns-Petties preservation of bakery products.

(1 Credit)

Practical (0.4 Credit)

S. No.	Name of practical	Nature
1	Production of bread in pilot plant.	Practical
2	Production of biscuits in pilot plant.	Practical
3	Production of cookies in pilot plant	Practical
4	Production of cake in pilot plant	Practical
5	Production of petties in pilot plant	Practical

Unit – II Bakery Machinery & Equipment Bakery machinery and equipment: Weighing Equipment-Manual scale, Automatic weigh, liquid measuring. Mixing- blenders, Horizontal and vertical planetary, continuous. Make up equipment-Divider, Rounder, Proofer, Moulder. Baking equipment – different oven, slicer.

(1 Credit)

Practical (0.4 Credit)

S. No.	Name of practical	Nature
1	Visit & Study of Bakery pilot plant of the University.	Practical

Unit – III Confectionary products Confectionery products: chocolate, fondant, caramels, fudge and toffee. Equipment and process. Safety and sanitation: Health and safety- safety rules- safe practices in the work places- sanitationduties of the sanitation equipments- Code for hygiene condition in bakery and biscuitmanufacturing unit.

(1 Credit)

Practical (0.2 Credit)

S. No.	Name of practical	Nature
1	Production of toffee.	Practical
2	Production of chocolate.	Practical

Recommended text books

1. Textbook of Bakery and Confectionery, by Ashokkumar Y Prentice Hall India Learning Private Limited; 2 edition (2012)

Reference Books:

1. Theory of Cookery,Oxford University Press,1st Ed, by Parvinder S. Bali 2017
2. A Professional Text To Bakery And Confectionary, John Kingslee, New Age International, 2006

References/Correlation with Ancient Indian Literature:

1. Atharvedahttp://www.sacred-texts.com/hin/sbe42/index.htm
2. Taittiriyasamhitahttp://www.sacred-texts.com/hin/#other
3. V¡jasaneyisamhitahttp://www.sacred-texts.com/hin/#other
4. Maitrayaniyasamhitahttp://www.sacred-texts.com/hin/#other

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

VI SEMESTER

Food Process Technology **Credits-4**

Objective : To enables students to
1. Understand the basic concepts in food science and will get knowledge of the different food preparation methods.
2. They will understand the requirement of food with respect to energy, food and consumer safety, nutrients and their impact on health.
3. They will get the knowledge of nutritive value of cereals, pulses, nuts, fruits and vegetables, ant nutritional factors, germination of pulses, factors affecting cooking**.**

Unit I Processing of Cereals & Millets (1.0-0.5) Storage of cereals, Infestation control; Drying of grains, Processing of rice and rice products.Milling of wheat and production of wheat products, including flour and semolina.Milling of corn, barley, oat, coarse grains including sorghum, ragi and millets; Processing of tea, coffee and cocoa.

(1 Credit)

Practical **(0.5 Credit)**

S. No.	Name of practical	Nature
1	Preparation of orange squash.	Practical
2	Preparation of mango jam.	Practical
3	Preparation of guava jelly	Practical
4	Preparation of sponge cake	Practical
5	Preparation of sponge bread.	Practical

Unit II Processing of Fruits and Vegetables (1-0.5) Storage and handling of fresh fruits and vegetables, Preservation of fruits and vegetable by heat treatment.Production and preservation of fruits and vegetable juices, preservation of fruit juice by hurdle technology.
(1 Credit)

Practical **(0.5 Credit)**

S. No.	Name of practical	Nature
1	Preparation of dry onion, chilli& garlic.	Practical
2	Manufacture of potato powder.	Practical
3	Manufacture of ice cream.	Practical
4	Manufacture of candid fruits.	Practical

Unit III (Food Laws & Quality Control) (1-0-0) Non-alcoholic beverages; Food Laws, food rules and standards, Statistical Quality Control ; Various types of packaging.

(1 Credit)

Recommended Books:

1. Fruits and Vegetables. A.K Thompson. Blackwell publishing S. Ranganna, Hand Book of Analysis and Quality Control for Fruits and Vegetable Products, Tata McGraw Hill, 2002.

Suggested Readings:

- L. Somogyi, Processing Fruits: Science and Technology, Vol I: Biology Principles and Applications, Woodhead Publishing, 1996.

SENSORY EVALUATION **Credits-3**

Objective : To enables the students to1. understand the basic principles of sensory evaluation 2..Perform training and communication skills relevant to the sensory evaluation food industry etc.

UNIT – I Packaging and Labelling Packaging and Labelling of the product, Packaging design, graphics and labeling nutritional evaluation (estimation of relevant parameters), Shelf life testing of the product (testing for appropriate quality parameters- chemical, microbiological and nutrient content, acceptability studies).

(1 Credit)

UNIT – II Overview of Sensory evaluation Subjective & Objective evaluation, Overview of sensory principles and practices: General consideration in sensory testing, flowcharts of sensory evaluation. Psychological methods Selection and screening of panel: Types of panel (Trained panel, discriminative and communicative panel).

(1 Credit)

UNIT – III Methodology for sensory evaluation Methodology for sensory evaluation: Discriminative test - difference test: paired comparison, Duo-trio, triangle, ranking, Sensitivity Test, Descriptive test - category scaling, ratio scaling, flavor profile analysis, texture profile analysis, quantitative descriptive analysis

Effective Tests: paired performance test, ranking test, rating scale: hedonic rating, food action scale rating. Maintaining suitable environmental conditions: laboratory setup and equipments.

(1 Credit)

Recommended Text Books:

1. Lyon, D.H.; Francombe, M.A.; Hasdell, T.A.; Lawson, K. (eds) (1992): Guidelines for Sensory Analysis in Food Product Development and Quality Control. Chapman and Hall, London.
2. Amerine, M.A.; Pangborn, R.M.; Roessler, E.B. (1965): Principles of Sensory Evaluation. Academic Press, New York.

Reference Books:

1. Kapsalis, J.G. (1987): Objective Methods in Food Quality Assessment. CRC Press, Florida.
2. Martens, M.; Dalen, G.A.; Russwurm, H. (eds) (1987): Flavour Science and Technology. John Wiley and Sons, Chichester

References/Correlation with Ancient Indian Literature:

- Rasa-]ala-Nidhi or Ocean of Indian chemistry and alchemy/vol.vIEd.1984/AvaniPrakashan,Ahmedabad,India;CharakSamhitahttp://www.carakasamhitaonline.com/mediawiki-1.28.2/index.php?title=Main_Page
- Rigveda1/191/9http://www.sacred-texts.com/hin/rigveda/index.htm
- Atharva Veda. X. 3http://www.sacred-texts.com/hin/sbe42/index.htm

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Dietetics and Counseling **Credits-3**

Objective : To enables the students to 1. Understand the principles and methods of counselling. 2. Apply counselling methods to patients with different diseases.

Unit-I General approach of Counseling (1-0) Practical consideration in giving dietary advice and counseling

I. Factors affecting and individual food choice,
II. Communication of dietary advice,
III. Consideration of behavior modification,
IV. Motivation.

(1 Credit)

Unit-II Counseling for Educating Patients (1-0) Counseling and educating patient-

I. Introduction to nutrition counseling,
II. Determining the role of nutrition counselor,
III. Responsibilities of the nutrition counselor,
IV. Practitioner v/s client managed care,
V. Conceptualizing entrepreneur skills and behavior,
VI. Communication and negotiation skills.

Teaching aids used by dietitians- charts, leaflets, posters etc., preparation of teaching material for patients suffering from Digestive disorders, Hypertension, Diabetes, Atherosclerosis & Hepatitis and cirrhosis.

(1 Credit)

Unit-III Role of Computer Application in Dietary Counseling (1-0) Computer Application

a) Use of computers by dietitian,
b) Dietary computations,
c) Dietetic management,
d) Education/ training,
e) Information storage,
f) Administrations,
g) Research,

Computer application-
a) Execution of software packages,
b) Straight line, frequency table, bar diagram, pie chart, Preparation of dietary charts for patients,
c) Statistical computation- mean, median, standard deviation, conclusion and regression test.

(1 Credit)

Recommended Text Books:

1. Lyon, D.H.; Francombe, M.A.; Hasdell, T.A.; Lawson, K. (eds) (1992): Guidelines for Sensory Analysis in Food Product Development and Quality Control. Chapman and Hall, London.
2. Amerine, M.A.; Pangborn, R.M.; Roessler, E.B. (1965): Principles of Sensory Evaluation. Academic Press, New York.

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Reference Books:

- Kapsalis, J.G. (1987): Objective Methods in Food Quality Assessment. CRC Press, Florida.
- Martens, M.; Dalen, G.A.; Russwurm, H. (eds) (1987): Flavour Science and Technology. John Wiley and Sons, Chichester

RESEARCH METHODOLOGY **Credits-3**

Objective : To enables thestudents to understand the basic concepts of research methodology including meaning and objectives of research, types of research, various research criteria, research problem, research design, measurement and scaling techniques in research, various scaling techniques in research, methods of data collection in research and report writing of research.

UNIT – I Introduction & Types of research Research methodology: Introduction & meaning of research, Objectives of research, motivation in research. Types of research & research approaches. Research methods vs. methodology, Criteria for good research.
Research problem: Statement of research problem, Statement of purpose and objectives of research problem, Necessity of defining the problem.

(1 Credit)

UNIT – II Research design Research design: Meaning of research design, Need for research design, Features for good design, Different research designs, Basic principles of research design.
Measurement & scaling techniques: Measurement in research- Measurement scales, sources of error in measurement, Technique of developing measurement tools, Meaning of scaling, its classification, important scaling techniques.

(1 Credit)

UNIT – III Methods of data collection Methods of data collection: collection of primary data, collection data through questionnaires& schedules, Difference between questionnaires & schedules Report Writing.

(1 Credit)

Recommended Text Books:

1. Kothari CR (2004). Research Methodology: Methods and Techniques, New Age International.
2. Bhattacharya DK (2009). Research Methodology, Excel Books.

Reference Text

1. Annals of Food Science & Technology
2. Journal of Nutrition
3. Journal of Food Science & Technology

References/Correlation with Ancient Indian Literature:

- V¡jasaneyisamhitahttp://www.sacred-texts.com/hin/#other
- Vishnu Puranahttps://sanskritdocuments.org/sanskrit/purana/
- 3.Shabdhakalpadrumahttp://www.sacred-texts.com/hin/#other

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Food Business Management **Credits-3**

Objective : To enables the Students to understand theories and functions of Business Management, food industry management; marketing management and human resource development, personal management.

UNIT – I Business Management Business management; introduction, theories and functions, food industry management; marketing management and human resource development, personal management.Sectors in food industry and scale of operations in India. Human Resource Management Study the basics about HR and related policies and capacity mapping approaches for better management. Consumer Behavior towards Food Consumption, Consumer Surveys by various Institutes and Agencies, Various Journals on Consumer Behavior and Market Research, Internet based data search.

(1 Credit)

UNIT – II International trade International trade; basics, classical theory, theory of absolute advantage. theory of comparative, modern theory, free trade- protection, methods of protection, quotas, bounties, exchange control, devaluation, commercial treaties, terms of trade, balance of payments, EXIM policy, foreign exchange, mechanics of foreign exchange, GATT, WTO, role of WTO, International Trade in agriculture. World trade agreements related with food business, export trends and prospects of food products in India.

(1 Credit)

UNIT – III World consumption of food World consumption of food; patterns and types of food consumption across the globe. Ethnic food habits of different regions. Govt. institutions related to international ad trade; APEDA, Tea board, spice board, wine board, MOFPI etc. management of export import organization, registration, documentation, export import logistics, case studies. Export and import policies relevant to horticultural sector.
Project: Consumer Survey on one identified product -both qualitative and quantitative analysis (say, Consumer behavior towards Pickles and Chutneys).
(1 Credit)

Recommended Text Books:

1. Principles of Agri Business Management - D. David and S Erickson 1987. McGraw Hill Book Co., New Delhi.
2. Agricultural Marketing in India - Acharya S S and Agarwal N L 1987. Oxford & ISH Publishing Co., New Delhi.

Reference Books:

- Marketing in the International Environment - CundiffHigler 1993, Prentice Hall of India, New Delhi.
- GAD implications of Denkel proposals - G S Batra&Narindevkumar (1994) Azmol Publications Pvt., New Delhi.
- Marketing Management - PhillKottler. 1994. Prentice Hall of India, New Delhi

References/Correlation with Ancient Indian Literature:

1. Atharvavedahttp://www.sacred-texts.com/hin/sbe42/index.htm
2. V¡jasaneyisamhitahttp://www.sacred-texts.com/hin/#other
3. Vishnu Puranahttps://sanskritdocuments.org/sanskrit/purana/

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

FOOD PROJECT PLANNING AND ENTREPRENEURSHIP **Credits-3**

Objective : To enables the students to
1. Develop an insight of Entrepreneurs and Entrepreneurship development and understand the basics of Business project report and SWOT analysis.
2. Develop insight for different types of Fund raising. Understand the different support system for business development.

UNIT – I Indian Economy Indian Economy and contribution of various sub-sectors in the economy.Structural base of Indian economic Life. Contribution of MSME sectors in the national economy. Impact of globalization and liberalization on MSME sectors.Agricultural sector and food processing industry-problems and opportunity.Self employment need and various mode open in Food Processing and Agri- sector.

(1 Credit)

UNIT – II Fundamentals of marketing principles and marketing Fundamentals of marketing principles and marketing mix, Sales and distribution management, Costing and cost management, pricing methods, fundamentals of operations and supply chain management, organization structure and human resource management , capital structure and methods of raising fund. Opportunity identification andfeasibility studies, financial analysis, technical entrepreneurship.Project sizing, fund management and enterprise management issues.Problem solving, decision making processes and tools, conflict and change management in a new industrial enterprise, Systems approach and consideration in an entrepreneurial venture. Management reporting and information system for monitoring and control of the new enterprise, managing Innovation. Marketing challenges and approaches for new productsand services. Sustaining in a competitive environment.
(1 Credit)

UNIT – III Entrepreneurship Development Entrepreneurship Development: Assessing overall business environment in the Indian economy. Overview of Indian social, political and economic systems and their implications for decision making by Individual entrepreneurs.Globalization and the emerging business/entrepreneurial environment. Concept of entrepreneurship: entrepreneurial and managerial characteristics managing an enterprise; motivation and entrepreneurship development; importance of planning, Budgeting monitoring, evaluation and follow up; managing competition.
Entrepreneurship Development Programs (EDP). SWOT analysis; Generation, incubation and commercialization of ideas and innovations. Government schemes and incentives for promotion of entrepreneurship.Government policy on small and Medium Enterprises (SMEs)/ Small Scale industries (SSls).Export and Import Policies relevant to Food Processing Sector.Venture capital, contract farming and joint ventures.Public-private partnership (PPP).Over view of Food Process Industry.Characteristics of Indian Food Processing Industry.Social Responsibility of Food Processing Business.
(1 Credit)

Recommended Text Books:

1. Entrepreneurship - Thomas W Zimmer and Norman M Scarborough 1996. Prentice Hall, New Jersey, USA.
2. Entrepreneurship Strategies and Resources - Mark J Dollinger 1999. Prentice hall, Upper Saddal River, New Jersey, USA.

Reference Books:

1. Entrepreneurial Development - Khanks SS 1999. S. Chand and company New Delhi.

References/Correlation with Ancient Indian Literature:

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

- Atharvavedahttp://www.sacred-texts.com/hin/sbe42/index.htm
- Taittiriyasamhitahttps://sanskritdocuments.org/sanskrit/purana/
- V¡jasaneyisamhitahttps://sanskritdocuments.org/sanskrit/purana/

Clinical Nutrition **Credits-4**

Objective : To enables the students to 1. Understand the etiology, Physiologic and Metabolic Anomalies of acute and chronic diseases and patient needs. Know the effect of the various diseases on nutritional status 2. Nutritional and dietary requirements. Be able to recommend and provide appropriate nutritional care 3. Prevention / and treatment of the various diseases.

UNIT I (Concept of Diet Therapy) (1-0.4) Concept of Diet therapy- Growth and source of dietetics, purpose and principles of therapeutic diets, modification of normal diet, classification of therapeutic diets, Role of Dietician- Definition of nutritional care, interpersonal relationship with patient, planning and implementary dietary care, Team approach to nutritional care.Routine hospital diets: Preoperative and postoperative diets, study and review of hospital diet. Basic concepts and methods of (a) Oral feeding (b) Tube feeding (c) Parental nutrition (d) Intravenous feeding, Diet in surgical conditions, burns and cancerObesity and leanness- causes, complication and health effects, dietary treatment and other recommendation.

(1 Credit)

Practical (0.4 credit)

S. no.	Name of practical	Nature
1	Planning, preparations and calculations of diets with modified- (a) Consistency (b) Fibre and residue (c) Diet for Diarrhoea and constipation (d) Diet for peptic ulcer. (e) Diet tor liver disease.	Practical
2	Planning, preparation and calculation of diets in fever and infections.	Practical

UNIT II (Diet in Disorders) (1-0.3) Diet in fever and infections- Types- metabolism in fever, general dietary consideration diet in influenza, typhoid fever, recurrent malaria and Tuberculosis, Diet in Gastritits-peptic ulcer- symptoms, clinical findings, treatment, dietary modification, adequate nutrition, amount of food, and intervals of feeding, Chemically and mechanically irrigating foods, four stage diet (Liquid, soft, convalescent, liberalized diet).Diet in disturbances of small intestine and color- Diarrhoea- (child and adult)- classification, modification of diet , fibre, residue. Fluids & nutritional adequacy, Constipation-flatulence - dietary considerations, (Ulcerative colitis adults)- symptoms, dietary treatment, Spruce, coeliac disease- disaccharide intolerance, dietary treatment, Diet in diseases of the liver, gall bladder and pancreas-Etiology, symptoms and dietary treatment in - Jaundice, hepatitis, cirrhosis andhepatic coma, b) Role of alcohol in liver diseases c) Dietary treatment in cholecystitis, cholelithiasis and pancreatitis, Gout- Nature and occurrence of uric acid, causes, symptoms and diet.

(1 Credit)

Practical (0.3 credit)

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Sr. no.	Name of practical	Nature
1	• Planning, preparation and calculation of diets for insulin dependent Diabetes mellitus, • Planning, snacks. deserts and beverages for diabetes.	Practical
2	• Planning. Preparation and calculation of diet in cardiovascular diseases.	Practical

UNIT-III (Nutritional Management of Disorders) (1-0.3) Diet in allergy and skin disturbances: Definition, classification, manifestations, common food allergies and test and dietetic treatment, Diet in Diabetes mellitus: a) Incidence and predisposing factors, b) Symptoms-types and tests for detection c) Metabolism in diabetes, d) Dietary treatment & meal management, e) Hypoglycemic agent, insulin and its types., f) Complication of diabetes, Diet in Renal diseases- Basic renal function, symptoms and dietary treatment in acute and chronic glomerulonephritis, Nephrosis, renal failure, dialysis. urinary calculi-causes & treatment, acid and alkali producing and neutral foods and dietary treatment, Diet in Cardiovascular diseases- Role of nutrition in cardiac efficiency, incidence of Atherosclerosis, dietary principles, Hyperlipidenmia, Hypertension- causes and dietary treatment, Sodium restricted diet, level of sodium restriction, sources of sodium, danger of severe sodium restriction.

(1 Credit)

Practical (0.3 credit)

S. No.	Name of practical	Nature
1	Planning, preparations and calculation of diet in Kidney failure, Kidney transplant, Renal complication & Kidney stones.	Practical
2	Planning, preparations and calculation of diet in Cancer, Trauma (burns) & Surgery	Practical

Recommended Text Books:

1. Mahan LK, Escott-Stump S (2000). Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd
2. Shils ME, Olson, JA, Shike, M, Ross, AC (1999). Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins

Reference Books

- Escott-Stump S (1998). Nutrition and Diagnosis Related Care, 4th Edition, Williams and Wilkins.
- Garrow JS, James WPT, Ralph A (2000). Human Nutrition and Dietetics, 10th, Edition, Churchill Livingstone
- Williams SR (1993). Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby College Publishing.