

# **CLINICAL NUTRITION & DIETETICS**

3 Year Degree Course ( SEMESTER SYSTEM )

## **VOCATIONAL EDUCATION**

### **SYLLABUS**

### **PART – I, II, & III**

## Syllabus of C.N.D.: Course outline

Semester	Paper	Subject	Teach. hrs. per week credit	Total Marks		Mid Sem. Exam.		End Sem. Exam.	
				FM	PM	FM	PM	FM	PM
Sem.-1	CC – 1T	Basic Nutrition	4	75	38	15	08	60	30
	CC-2 T	Nutritional Biochemistry	4	75	38	15	08	60	30
	CC 1 & 2 P	Practical Based on CC 1 & 2	4	50	25	10	05	40	20
	GE -1 T	Bot./Zoo/Chem./Phy./Maths (Sub)	4	75	38	15	08	60	30
	GE – 1 P		2	25	13	05	02	20	10
	AECC-1	English	2	50	25	10	05	40	20
Sem.-2	CC – 3 T	Human Physiology	4	75	38	15	08	60	30
	CC-4 T	Food Microbiology	4	75	38	15	08	60	30
	CC 3 & 4 P	Practical Based on CC 3 & 4	4	50	25	10	05	40	20
	GE -2 T		4	75	38	15	08	60	30
	GE – 2 P		2	25	13	05	02	20	10
	AECC-2	Environmental Science	2	50	25	10	05	40	20
Sem.-3	CC – 5 T	Clinical Nutrition	4	75	38	15	08	60	30
	CC-6 T	Sanitation & Hygiene	4	75	38	15	08	60	30
	CC-7 T	Meal Management	4	75	38	15	08	60	30
	CC-5,6 & 7 P	Practical based on paper 5,6 & 7	6	75	38	15	08	60	30
	GE -3 T		4	75	38	15	08	60	30
	GE – 3 P		2	25	13	05	02	20	10
	SEC-1	Entrepreneurship Development	2	50	25	10	05	40	20
Sem.- 4	CC – 8 T	Basic Dietetics	4	75	38	15	08	60	30
	CC-9 T	Community Nutrition	4	75	38	15	08	60	30
	CC-10 T	Food Commodities	4	75	38	15	08	60	30
	CC-8,9 & 10 P	Practical based on paper 8,9 & 10	6	75	38	15	08	60	30
	GE -4 T		4	75	38	15	08	60	30
	GE – 4 P		2	25	13	05	02	20	10
	SEC-2	Basic Computer Science	2	50	25	10	05	40	20
Sem.-5	CC –11 T	Book keeping and cost accountancy	4	75	38	15	08	60	30
	CC-12 T	Food service equipment	4	75	38	15	08	60	30
	CC 11& 12P	Practical based on Paper 11&12	4	50	25	10	05	40	20
	DSE-1T	Advance Dietetics	4	75	38	15	08	60	30
	DSE-2	Job Training	4	75	38	15	08	60	30
	DSE-1&2P	Practical based on DSE-1&2	4	50	25	10	05	40	20
Sem.-6	CC –13 T	Quality Food Production and Services	4	75	38	15	08	60	30
	CC-14 T	Neutraceuticals and functional food	4	75	38	15	08	60	30
	CC 13&14P	Practical based on Paper 13&14	4	50	25	10	05	40	20
	DSE-3T	Catering Management	4	75	38	15	08	60	30
	DSE-4	Job Training	4	75	38	15	08	60	30
	DSE-3&4P	Practical based on DSE-3&4	4	50	25	10	05	40	20
		Total	140	2400					

# Semester – I

**CC-1**

**Basic Nutrition**

**Credit -4**

Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

1. Introduction to nutrition, Food as a source of Nutrients, functions of food, definition of nutrition, adequate, optimum and good Nutrition, Malnutrition – PCM
2. Interrelationship between Nutrition and Health, visible signs of good health.
3. Food Guide – Basic five food groups – How to use food guide.
4. Water and electrolyte Balance – As a nutrient – Function, source, Requirement, water Balance effect of deficiency.
5. Acid base balance
6. Carbohydrates – composition, Food sources, functions, storage in the body, RDA.
7. Fat and oil – composition, saturated & unsaturated fatty acids, essential fatty acids classification, food sources, functions of fats, RDA.
8. Protein – composition, food sources, essential, non – essential amino acid functions of protein, RDA.
9. Energy – Unit of Energy, food as a source of energy, determination of energy value of food, Direct and indirect calorimetry, Energy metabolism, BMR, Food sources and body's need food energy, factors affecting - BMR.
10. Minerals – Functions, sources, Bioavailability, RDA and deficiency of following minerals ---- Calcium, Phosphorus and potassium. Iron, Iodine, Fluorine, Sodium
11. Vitamins – Classifications , sources, requirements, units of measurement, functions, deficiency about following vitamins
  - a) Fat soluble Vitamins – (i) Vitamin A (ii) D (iii) E (iv) K.
  - b) Water Soluble (i) Vitamin B Complex – Thiamine, Riboflavin, Niacin, Pyridoxine, Folic Acid, Vitamin- B<sub>12</sub> (ii) Ascorbic Acid

## Practicals

Credit - 2

1. Qualitative test for carbohydrates.
2. Estimation of Protein from milk
3. Estimation of calcium in milk.
4. Determination of ash content of food stuffs
5. Determination of moisture content of food stuffs.

# Semester –I

**CC – 2**

**Nutritional Biochemistry (Theory)**

**Credit -4**

Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

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1. Molecular aspect of transport, passive diffusion, facilitated diffusion active transport, nutrients and energy needs. Coupled reactions.
2. Genetic control of metabolism : Nucleic acids components, structure, RNA components, types, structures, replication
  - i. Genetic repair mechanisms
  - ii. Genetic code – protein biosynthesis
3. Major metabolic pathways :
  - a. Carbohydrate metabolism : classification of carbohydrate, Glucose, transport, Biological oxidation, glycolysis metabolism of lactate and pyruvate, citric-acid cycle biological oxidation gluconeogenesis pentose phosphate pathway
  - b. Lipid metabolism: classification of lipids. Intestinal resynthesis of triglycerides transport , B- oxidation of fatty acids, biosynthesis of fatty acids, mobilization of fat, ketogenesis, metabolism of phospholipids, glycolipids and cholesterol [ in brief]
  - c. Amino acid metabolism: classification of proteins, general pathways biochemical transformation and metabolism.

## Practicals

- Benedicts test for sugars.
- Biuret test for protein.
- Iodine test for starch

## Semester - II

<b>CC – 3 HUMAN PHYSIOLOGY [THEORY] Credits -4</b>
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Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

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1. **Blood and blood circulation** : Blood composition – functions, clotting, blood groups – Blood Vessel Artery, Vein, capillary, structure of heart , cardiac cycle, ECG and its significance, blood pressure – pulse, systolic, diastolic, anaemia, leukemia, varicose veins, atherosclerosis, Angina pectoris
2. **Respiratory system**: Organs of respiration – Nose, larynx, Trachea, bronchi, lungs and its capacity – structures and functions, mechanism of respiration – chemical respiration – Tissue respiration. Common disease like TB, Asthma, Pleurisy, cough, hiccups.
3. **Digestive System** : Organs, structures, functions– Teeth, tongue, salivary glands, saliva, composition and function. Oesophagus, Stomach, Small intestine, Large intestine, Pancreas, Liver, Gallbladder. Diabetes Mellitus, diarrhoea, peptic & duodenal ulcers
4. **Excretory system**: Organs, structure and functions of kidney, Ureter, Urinary bladder. Formation of Urine, composition of normal urine
5. **Skin** – Structure and function. Disorders of Skin - burns.
6. **Nervous system** – structure of a nerve cell, nerve fibres & an outline classification of nervous system. Conduction of nerve impulse, synapse, Reflex action,
7. **Muscular system**:- types of muscles – striated, non-striated, cardiac - similarities differences. Muscular contraction.
8. **Endocrine System**: Hormones – Endocrine glands – their structure and functions

(a) Pituitary (b) Thyroid (c) Parathyroid (d) Adrenal

(e) Hormones of reproduction.

Endocrine system – disorders of over and under secretion.

1. Study of Human (manekin) : - Abodminal cavity of Human observe & draw liver, kidney, appendix, spleen, Pancreas, stomach, gall bladder, large and small intestines, ureter, bladder, diaphragm.
2. Types of Cells: Microscopic examination of prepared slides.
  - a) Epithelium – stratified squamous, ciliated, columnar
  - b) Connective tissue – Adipose, Bone, areolar, connective tissue
  - c) Muscle – smooth, cardiac, stratified.
  - d) Nerve – medullated, neuron.
  - e) Cell division – Resting stage, prophase, metaphase, anaphase, telophase. Examine and draw the tissues.
3. Blood : a) Microscopic examination of prepared slides –
  - i) Stained blood smear.
  - a) Testing of blood groups using typed sera.
4. c) Haemoglobin estimation using haemometer. Artery and Vein.
  - d) R.B.C. count & W.B.C. count.
5. Histology of Artery and Vein.
6. a) Lung Section. b) Trachea.

Pulse and respiration rate – at rest and after exercise.
7. Arterial Blood pressure: Determination using a sphygmomanometer

## Semester - II

**CC – 4**

**FOOD MICROBIOLOGY**

**Credit -4**

Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

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1. Introduction to microbiology and its relevance to everyday life. General characteristics of bacteria, fungi, virus, protozoa, algae.
2. Growth curve- effect of environmental factors on growth of micro organisms – pH, water activity, oxygen availability, temps & others.
3. Microbiology of different foods – Spoilage and contamination – sources, types, effects on the following:
  - a) Cereals and cereal products    b)      Sugar and sugar products.
  - c) Vegetables and fruits.              d)      Meat and meat products.
  - e) Fish and other sea foods.        f)      Eggs and poultry
  - g) Milk and milk products.        h)      Canned foods
4. Microbial intoxications and infections sources of contamination of foods, toxin production and physiological action, sources of infection of foods by pathogenic organisms, symptoms and method of control.
5. Beneficial effect of micro – organisms.

## SEMESTER – III

**CC – 5**

**CLINICAL NUTRITION (THEORY)**

**Credit -4**

Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

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1. Water and electrolyte balance: water and electrolyte losses and their replenishment, affect of dehydration.
2. Nutrient and drug interactions: Effect of drug therapy on intake absorption and utilization of nutrients.
3. Diseases of the gastrointestinal tract: effect on digestion, absorption and nutritional status.
4. Liver, Gallbladder and Pancreas:  
Etiology, symptoms, metabolic and nutritional implications: - Hepatitis, Cirrhosis, Hepatic Coma, Pancreatitis, Cholecystitis, Cholelithiasis.
5. Renal System: Etiology, symptoms, metabolic and Nutritional implications – Nephritis, Nephrotic Syndrome, Renal failure, renal calculi.
6. Disorders of Metabolism: Diabetes mellitus, inborn errors of Metabolism, Gout.
7. Cardiovascular system:- Etiology, symptoms: Role of specific nutrients. Clinical findings related to nutritional care – Hypertension, Atherosclerosis.



## Semester - III

**CC – 6**

**SANITATION & HYGIENE**

**Credit -4**

Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

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1. Other food hazards – chemicals, antibiotics, hormones, metal contamination – poisonous foods.
2. Importance of personal hygiene of handler habits clothes illness education, of food handler in handling and serving food.
3. Safety in food procurement – storage, handling and preparation control of spoilage – safety of leftover food.
4. Cleaning methods – sterilization and disinfection products and methods – use of detergents, heat, and chemicals test for sanitizer strength.
5. Sanitation – kitchen design equipment and systems – structure and layout of food maintaining clean environment selecting, cleaning equipment.
6. Waste product handling – planning for waste disposal solid wastes and liquid wastes.
7. Control of infestation – Rodent control rat destruction.
8. Vector control – use of pesticides.

## Semester - III

CC – 7

MEAL MANAGEMENT

Credit -4

Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

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1. Introduction to meal management – Balanced diet – food guide- basic 5 food groups. Food Exchange list.
2. Basic principles of meal planning- objectives – steps in meal planning – food cost.
3. **Nutrition in Pregnancy** – Physiological stages of pregnancy nutritional requirements – food selection. Complications of pregnancy.
4. **Nutrition in lactation** - Physiology of lactation – Nutritional requirements, special foods given during lactation
5. **Nutrition during infancy** – growth and developments – nutritional requirements – Breast feeding – infant formula – introduction of supplementary foods.
6. **Nutrition during Early Childhood (Toddler / Pre – School) growth and nutrient needs** – Nutrition related problems- Feeding patterns.
7. **Nutrition of school children** – nutritional requirement importance of snacks – school lunch.
8. **Nutrition during Adolescence** - growth and nutrient needs, food choice, eating habits - factors influencing them.
9. **Nutrition in adults** – Calorie requirements of sedentary moderate & heavy workers.
10. **Geriatric nutrition** – factors affecting food intake and nutrient use – nutrient needs – nutrition related problems.

CC – 7

PRACTICAL

Credit -2

1. Planning for adult man and woman during different physical activities – Sedentary, moderate, heavy worker, preparation of above diet.
2. Planning and preparation of a balanced diet for nursing mother lactation
3. Planning and preparation of a balanced diet for pregnant women
4. Supplementary feeding – preparation of weaning foods.
5. Planning and preparation of diet for a toddler, Pre – School child.
6. Planning and preparation of meal/packed lunch for school children.
7. Planning preparation of meal for Adolescents.
8. Planning a diet for senior citizen preparation of meals.
9. Planning of meals for middle income family.
10. Nutritional survey for various age groups.

## **SEMESTER – III**

<b>SEC – 1      ENTREPRENEURSHIP DEVELOPMENT      Credit -4</b>
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Time – 3 Hours

Full Marks – 50

In All Eight questions are to be set, of which a student shall have to answer four questions.

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1. Unit I

Element in enterprise Management: Basic Management concepts, personnel, production, Materials, financing and marketing managements, problem solving and innovation, industrial and business law. Entrepreneurial motivation.

2. Unit II

Environmental analysis, project selection, project appraisal, modification/ finalization of project, collaborations, preparations for launching, trial run and test marketing.

3. Unit III

- a. Choice of Technology, Plant and Equipment.
- b. Institutions, Financing Procedure and Financial Incentives.
- c. Financial Ratio and their Significance.

4. Unit IV

- a. Energy Requirements and Utilization.
- b. Critical Path method (cpm). Project Evaluation Review Techniques (PERT) as planning tools for establishing SSI.
- c. (i) Creativity and Innovation. (ii) Problem Solving Approach. (iii) Strength Weakness Opportunity. (iv) Introduction of CPM & SWOT Analysis.
- d. Techno – Economic Feasibility of the Project.
- e. Plant Layout and Process Planning for the Product.
- f. Quality Control/Quality Assurance and Testing of Product.

5. Unit V

- a. Elements of Marketing and sales Management.
- b. (i) Nature of Product and Market Strategy. (ii) Packaging and Advertising after Sales Service.
- c. Costing and Pricing.
- d. Management of self and understanding human behaviour.

## SEMESTER – IV

CC – 8

**BASIC DIETETICS [THEORY]**

Credit -4

Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

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1. Growth and source of Dietetics.
2. Role of Dietician – The Hospital and community
3. Basic concepts of Diet therapy
  - a.) Therapeutic Adaptation of Normal Diet.
  - b.) Routine Hospital Diet

Enteral Nutrition – Normal diet, Soft diet, liquid diet and Tube feeding.

Parenteral Nutrition – Peripheral Nutrition and Total Parenteral Nutrition (TPN).

**4. Diet in Gastro – intestinal disorders –**

Etiology, Symptoms, Dietary modifications and feeding pattern.

- a) Diarrhoea (Child and Adult) – Classification.
  - b) Constipation
  - c) Gastritis and peptic ulcer (gastric and duodenal ulcer).
- 5. Diet in Liver diseases –** Etiology, symptoms, Dietary modifications and feeding pattern.
- a) Jaundice
  - b) Hepatitis
  - c) Cirrhosis of Liver
  - d) Hepatic coma
  - e) Role of alcohol in liver diseases
- 6. Diet in Cardiovascular diseases –** Etiology, Symptoms, Dietary modifications and feeding pattern.
- a) Atherosclerosis
  - b) Hypertension
  - c) Hyperlipidemia
  - d) Acute and chronic diseases of Heart.
  - e) Sodium Restricted diet – level of sodium restriction, source of sodium, danger of sodium restriction.
- 7. Diet in Disorder of metabolism**
- a) Diabetes Mellitus.
    1. Incidence and predisposing factors
    2. Symptoms, types and test for detection.

3. Metabolism in diabetes.
4. Dietary treatment and meal management.
5. Hypoglycaemic agent, insulin and its types.
6. Complications of Diabetes.
  - b) Gout – Nature and occurrence of Uric acid, causes, symptom, dietary modifications.

## **CC – 8**

## **PRACTICAL**

## **Credit -2**

1. Standardization of common food preparation.
2. Planning and preparation of full or normal diet.
3. Planning and preparation of liquid diet
4. Planning and preparation of soft diet
5. Planning and preparation of bland diet for peptic ulcer
6. Planning of diet for viral hepatitis and cirrhosis of liver
7. Planning and preparation of diet for Diabetes mellitus.
8. Planning and preparation of liquid diets for hypertension and atherosclerosis.

## SEMESTER – IV

**CC – 9**

**Community Nutrition (Theory)**

**Credit -4**

Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

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1. a) Nutrition and health in national development  
b) Nutritional problems confronting our country the causes of malnutrition in India – balance between food production and population growth.
2. Methods of assessment of nutritional status.
  - sampling techniques.
  - Identification of risk groups.
  - Direct assessment diet surveys
  - Anthropometry, Clinical and Biochemical estimation.
  - Indirect assessment food balance sheets and agricultural data. Ecological parameters and vita statistics
  - Use of growth charts.
3. National and international agencies in community nutrition – ICDS, SNP, ANP, Midday meal programme, FAO, WHO, UNICEF, CARE, ICMR, ICAR, CSIR, NIN.
4. Breast feeding and its implications, Hazards of bottle feeding.
5. Weaning foods – Planning, formulating and preparing.
6. Importance of correct and timely weaning.
7. Nutrition and infection – relationship, immunisation and its importance.
8. Recent advances in Community Nutrition research – Fortification & food adulteration.

The objective of this practical course are to enable the students to learn and prepare deferent types visual aid for the community to gain practice experience in giving demonstrations and conducting survey and other methods of assessments.

1. Diet and nutrition surveys :
  - a) Identifying vulnerable and risk groups
  - b) Diet surveys and breast feeding and weaning practices of specific groups.
  - c) Use of anthropometric measurements in children.
2. Methods of extension used in community:
  - a) Preparation of visual aids – charts, posters models etc. for exhibition.
  - b) Lecture and method demonstrations to target groups.
3. Field visits to :
  - a) Observe the working of nutrition and health oriented programme.
  - b) Hospitals to observe nutritional deficiencies.

## Semester – IV

<b>CC – 10</b>	<b>Food Commodities (Theory)</b>	<b>Credit -4</b>
<u>Time – 3 Hours</u>		<u>Full Marks – 60</u>

In All Eight questions are to be set, of which a student shall have to answer four questions.

1. Cereals and Pulses : Cereals and millets, breakfast cereals, cereal products, fast foods – structure, processing, use in variety of preparations, selection, variety, storage, nutritional aspects and dextrinisation , gelatinisation, gluten , formation. Pulses and legumes – productions (in brief) selection and variety, storage, processing, use in variety of preparations, nutritional aspect and toxic substances.
2. Milk and milk products: (Introduction), Composition, classification, quality processing, storage, spoilage, uses, nutritional aspects, milk, curds, butter milk, paneer, khoa, cheese, ice – cream, kulfi and various kinds of processing milk.
3. Eggs: Production, grade, quality, selection storage, spoilage, uses, and nutritional aspects.
4. Fish Poultry and Meat: Selection, purchase, storage, uses, and Nutritional aspects spoilage of fish, poultry and meat.
5. Vegetables and Fruits: Classification, Selection, purchase, storage and availability, use and nutritional aspects of raw and processed vegetables and fruits.
6. Sugar and Sugar Products: Different forms, of sugar (sugar, Jaggery, Honey Syrup), manufacture selection storage and use as preventives.
7. Fats and Oils: Types and sources of fats and oils (animal and vegetables) processing, uses, storage, and nutritional aspects.
8. Raising Agents: Types, Constituents, use in cookery and bakery.
9. Food Adjuncts: Spices, condiments, herbs, extracts conscription, uses, specifications procurements and storage.
10. Convenience Foods: Role, types advantages, uses, cost and contribution to diet.
11. Salt: Types, uses in the diet.
12. Tea, Coffee, Chocolate and Cocoa Powder: Growth, Cultivation, processing, and nutritional aspects.
13. Organic food, Nutraceutical (Introduction)

### CC- 10

### Practical

### credit-2

- a. **Cookery:** Different preparations of rice, pulses, Vegetables, fruits, fleshy foods eggs etc.
- b. **Experimental foods :**
  - i. Microscopic study of different starches
  - ii. Study of effects of moist heat on starch.
  - iii. Gluten formation.
  - iv. Comparison of smoking temperature of some fats and oils.



## **Semester – IV**

**SEC – 2**

**BASIC COMPUTER SCIENCE**

**Credit -2**

Time – 3 Hours

Full Marks – 50

In All Eight questions are to be set, of which a student shall have to answer four questions.

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Module 1: Introduction to the Computer

Parts of a computer, I/O devices – memories – RAM and ROM. Networking – LAN, WAN,

MAN (only basic ideas)

Module 2: Introduction to Microsoft Word

Typing text in MS word, manipulating text, formatting the text & using different font sizes, bold, italics. Using Bullets and numbering, insertion of pictures, & file insertion. Aligning of the text and justify.

Module 3: Microsoft PowerPoint

Preparing new slides using MS-PowerPoint. Inserting slides, slide transition and animation. Using templates, different text and font sizes. Inserting slides with sounds, inserting clip arts, pictures, tables and graphs. Presentation using wizards

Module 4: Introduction to the Internet

Definition about the World Wide Web & brief history. Using search engine and beginning Google search – Exploring the next using Internet Explorer and Navigator – Uploading and Download of files and images – E-mail ID creation – Sending messages – Attaching files in E-mail

Module 5: Introduction to the Hospital Information System

Definition of Hospital Information system, Architecture of a HIS, aim and uses of HIS, types of HIS Benefits of using a hospital information system.

Basics of Computer (Practical)

Module 1: Introduction to Microsoft Word

Type a text document, save the document. Align the text with different formats using

Microsoft Word. Inserting a table ensuring proper alignment of the table using MS word

## Module 2: Microsoft PowerPoint

Preparing a slide show with transition, animation and sound effect using MS – PowerPoint.

Customizing the slide show by inserting pictures and tables in the slides using MS –

PowerPoint.

## Module 3: Introduction to the Internet

Create an e – mail account. Use the internet to search for a subject of interest.

### REFERENCES:

1. Murray H., (2003) Teach yourself basic computer skills, Trans Atlantic publishers.
2. Bennet A., (1996) Computers: Technology, Electronics and Internet, Holy Hail Publishers
3. Prokosh H. U., Dudeck, J., (1995) Hospital Information Systems: Design and Development

## **Semester – V**

<b>CC-11 BOOKEEPING AND FOOD COST ACCOUNTANCY</b>	<b>Credit -4</b>
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Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

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### **Book Keeping**

1. Introduction, objective , Principles and Advantages of Double Entry, Book Keeping , elements of Transactions, Identifying Debit and Credit effects. Double effect of transaction on accounts grouping of accounts. Book keeping as science and arts.
2. Journal, Source of journal entry like bills, cash memos receipts, vouchers etc. Journaling a transaction, Narration to a journal entry.
3. Ledger, indexing Accounts, opening accounts classification of ledger and ledger, transferring journal entries into ledger – ledger rising Balancing of ledger accounts, preparing a trial balance.
4. Introduction and advantage of subsidiary books, sales book, Purchase book, Return inwards books, out word book. Layout of subsidiary books, Recording transactions in subsidiary books and posting them to ledger accounts. Debit & Credit Notes.
5. Introductions to cash book, layout of cash book, recording of transaction in cash book, bank and discount column, entries, totalling, balancing & posting of cash book for ledger, bank accounts bank overdraft. Deposit in bank and payment by cheques, importance of cash book
6. Introduction to petty cash book, purpose and Advantages duties and responsibilities of petty cashier, interest and fixed instalment systems of petty cash recording totalling, balancing and posting of ledger of petty cash book.
7. Trial Balance, introduction to a trading manufacturing, profit and loss account and balance sheet method for preparing , net profit and gross profit concept assets & liabilities. ( in case of sole proprietor only)
8. Final A/C, Trading, P/L and Balance sheet.
9. I] Gross profit ratio. II] Profit ratio III] Current ratio IV] Liquid ratio V] Proprietary ratio VI] Return on Investment ratio.
10. Book of Accounts, Financial statement and funds flow analysis.

## **FOOD COST ACCOUNTANCY:**

11. **Management:** Elementary principles, process and objectives of management ‘planning organization, co – ordinating , controlling scientific menu planning.
12. **Cost Accounting :** Introduction, Definition , objectives, Scope, advantage, limitations, introduction to method and techniques, cost classification, cost cent cost unit, cost classifications by function by elements, by behaviour direct & indirect cost, the build up of total cost. Cost sheet and cost statement, calculation of profit on cost or on selling price, fixing selling price, concept of cost benefit analysis ( cost accounting shall have reference to food cost accountancy)
13. **Stores:** Organization, layout management and control, control procedures – stores, requisition, issue note, bin card, condex system, daily stock balance, daily issue statement and cost thereof order and Recorder level, economic recorder level, minimum & max level, store ledger, LIFO, FIFO, HIFO, longer level, stock inventory, valuation of inventory, stores control, cost of carrying and not carrying stores.
14. **Techniques of Costing :**
  - I] **Budgets and budgetary control:** Definition, meaning, purpose, advantages, key factor in budgeting – short and long term, fixed and flexible various functions budgets like sales purchases, production on , stores, personnel, expense, master budget.
  - II] **Standard Costing: -** Definition, meaning, types of standards, built up standard costs. Advantages and limitations.
  - III] **Marginal Costing:** Cost classification by behaviour definition margin costing, features, assumptions, applicability advantages and limitation, break – even and breakeven point margin of safety, profit or volume ratio opportunity cost.

## Semester – V

<b>CC –12</b>	<b>Food Service Equipment</b>	<b>Credit -4</b>
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Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

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### **1. Equipment in food service :-**

- a) Classification of Equipment, Types of Equipment, for food storage, preparation, Food Serving and Dish Washing and Material Used.
- b) Laundry :-
- c) Basic electrical consideration for operation of equipments

### **2. Organisation of Space :-**

- a) Kitchen space – size and types of kitchen, developing kitchen plans, work simplification, Designing kitchen, designing for safety, layout of kitchen work centre in kitchen layout, storage in kitchens, Maintenance of kitchens.
- b) Storage space – location of storage space, Types of storage planning storage space, layout, Sanitation, Safety and security of stores.
- c) Service area – Location, Planning service area, some dimensions for service area, decore of service and dining area.

### **3. Hygiene, sanitation and safety**

- a) Hygiene and sanitation – Environmental Hygiene and sanitation, Hygiene in food, Handling and personnel Hygiene.
- b) Safety
- c) Laws governing food service establishment – labour laws, working conditions, welfare, Health and safety, Harmonious working relation, payments, Food Laws, Food Standards in India and Role of Consumers in maintaining standards.

### **4. Different Food and Beverage & outlet.**

- a) Five types of Services of food & beverage outlets.
- b) Staff organisation of different outlet (a'la carte and table d'hôte). Manager, Hostess, supervisor, steward, Waiter.

### **5. Menu Planning – Sequence of Course – Indian (Regional i.e., North Indian, South Indian, West Indian, and Gujarathis, Western and others.) Techniques of writing menu.**

### **6. Types of meals and styles of service - Breakfast, Lunch , Dinner, afternoon tea, Snacks ( table d'hôte and a'la carte menu)**

### **7. Beverages – alcoholic and non – alcoholic, hot and cold, classification of beverages, use and importance in meals and snacks, suitable glassware for beverage service.**

### **8. Use of bills and checks in control system outlets.**

### **9. Project report on names of different organizations.**

# Semester – V

**DSE-1**

**Advanced Dietetics ( Theory )**

**Credit -4**

Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

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1. Nutritional Care – Nutrition and dietary counselling and following up.
    7. Nutritional Assessment of patient
    8. Interpersonal relationship with patient.
    9. Planning and implementing dietary care.
    10. Team approach to nutritional care.
    11. Patient education.
  2. A) Fever – Type, metabolism, General dietary consideration.
    12. Typhoid
    13. Influenza
    14. Tuberculosis
    15. Malaria

B) Cancer and Burns.
  3. Diet in Gastro – intestinal disorders – etiology, symptoms and Dietary modification.
    - Flatulence
    - Malabsorption syndrome – Sprue, celiac disease, Lactose intolerance.
    - Ulcerative colitis – symptoms, dietary treatment.
  4. Diet in disease of Gall bladder, Pancreas and kidney.
    - cholelithiasis
    - cholecystitis
    - Pancreatitis
  4. **Renal disease** – Etiology, symptoms, dietary modifications and feeding pattern.
    - a) Acute and chronic glomerulonephritis
    - b) Nephrotic syndrome
    - c) Acute and chronic renal failure
    - d) Dialysis
    - e) - Renal calculi / Urolithiasis.
  5. Obesity and leanness – Cause, complication and health effect, Dietary treatment and other recommendation.
  6. Allergy and skin disturbances – Definition, classification, Manifestation, common food allergy, tests and dietetic treatment.
  7. Diet and drug interaction – Effect of drug therapy on intake, absorption and utilisation of nutrient.
  8. Feeding infants and children – problem of feeding children.
  9. Modified Diets – Prudent diet, Bland diet, Atkin diet, DASH diet, Ketogenic diet, Blenderised diet.

**DSE- 1****PRACTICAL****Credit -2**

1. Planning and preparation of high and low calorie diet with modified fat and carbohydrate level.
2. Planning and preparation diet in fever and infection.
3. Planning and preparation of diet for Nephritis and nephrotic syndrome, Kidney Failure
4. Planning and preparation for (i) Cholelithiasis (ii) Renal Calculi
5. Planning and preparation of modified diets
6. Planning and preparation of diet for an obese person.
7. Planning and preparation of diet in (i) Cancer (ii) Trauma ( Burns)

**DSE – 2****JOB TRAINING****Credit -4**

Job training at the Hospital including interaction with patients, diagnosing diseases, Diet counselling and preparation of Diet chart.

## Semester – VI

**CC – 13    QUALITY FOOD PRODUCTION & SERVICES (THEORY)**

**Credit -4**

Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

1. **Aims and objectives of different food service outlets.**  
a) Industrial (b) Institutional (c) Hospitals - Different food and beverage outlet
2. **Menu planning** – sequence of course – Indian (regional i.e., North India, South Indian, West Indian and Gujarat is, Western and others). Techniques of writing menu (give exercises for planning menu).
3. **Type of meals** – and styles of service, breakfast lunch, dinner, afternoon tea, snacks table d’hôte and a’al carte menu (1) BF (2) Ala Carte (3) TDH
4. Introduction to basic and special equipment for food production and service care and use of equipments.
5. Types of services of food and beverage outlet
6. **Staff organization of different outlets** - (a’la carte and table d’hôte), manager, Hostess, Supervisor Steward, Waiter).
7. Beverages, alcoholic and non – alcoholic, hot and cold. Classification of beverages, use and importance in meals and snacks, suitable glassware for beverage service.
8. Use of bills and caotee and checks as simple control system.
9. Project report on names of different organizations.

**CC-13**

**Paper – 20 PRATICAL**

**Credit -2**

1. Organizing, preparing and serving food for three different meals for 50 members or more (list attached).
  2. Setting up the restaurant – lying of table cloth changing, setting up the silvers and other table appointments. Folding of serviettes correct use of waiter’s cloth. Preparing for customers.
  3. Serving and clearing practice, French and English service.
  4. Service of beverages tea, coffee, juices and alcoholic beverages.
  5. Laying for breakfast
  6. Tray service
  7. Order taking, making out checks bills presentation of bills.
  8. Up keep and cleaning of cutlery, crockery other, equipment.
- I) **Rice Preparation:** Plain & fried rice, pulao, masala rice, tomato rice, vegetable biryani, mogalai biryani, mutton biryani, chicken biryani, yakhani pulao. ( any four)
- II) **Wheat preparation:** Chapati, paratha plain, paratha stuffed, puris, bhatura, nan.
- III) **Pulse preparations:** Punjabi dal, sambar, Dal Makhani, Dalfry, sprouted pulses, Alu – chhole, Masala rajman, ohanshak ( any four)



- IV) **Vegetable preparations:** Alu matar, alu palak, dum alu, fried veg., palak panaar, vegetable kofta, vegetable korma (any four)
- V) **Salads:** Tossed Salad, Russian salad, moulded salad, decorative salad.
- VI) **Meat preparations:** Kofta curry, Roghan josh, mutton chilli fry, mutton palak, vindaloo, murg masala, brain masala, tanduri chicken, chicken curry, prawns curry, fish curry, ( any four)
- VII) **Snacks:** Variety of sandwiches, vegetable puffs, fried snacks, fermented and steamed snacks.
- VIII) **Sweets:** Laddu, Gujiya burfi, Shrikhand, gulabjaroun, puranpoli, kheer, halwas. ( any four)
- IX) **Western Cookery:**

**Soups:** Mixed Veg., Tomato Cream Soup, Carrot cream soup, mulligatawny soup, minestrone soup, chicken soup and corn soup.

**Sauces:** White sauce, cheese sauce, mayonnaise sauce, curry sauce.

**Entrees:** Vegetables Pie, Hollandaise, vegetables burgers, (any four)

**Vegetables:** Vegetables au gratin, Baked,. Cauliflower, savory vegetables, baked stuffed capsicum.

**Sweets:** Bread pudding, soufflés, trifle, coffee mousse, gateaux.

**Bakery Products:**

**Short crust pastries:** Different types of tarts, pies and turn over.

**Vegetable and mutton patties:**

**Cakes and cookies:** Plain cake, fruit cake, banana bread, date and walnut cake and varieties of cookies.

**Breads:** Breads, different kinds of rolls, doughnuts.

**Icing:** Different types of icing

**Evaluation:** Continuous assessment will be done.

## **Semester – VI**

### **CC-14 Nutraceuticals and Functional Foods (THEORY)**

**Credit -4**

Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

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#### Unit – I

Concept on Nutraceuticals: Nutraceuticals and functional foods, Nutraceuticals as new dietary ingredients, biological significance of Nutraceuticals, Nutraceuticals and dietary supplement word market for Nutraceuticals, regularly issues.

Nutraceuticals: Nutrigenomics an introduction and its relation to Nutraceuticals.

#### Unit – II

The role of Nutraceuticals/ functional food in disease prevention: angiogenesis and cardiovascular diseases, Cancer, diabetes, cholesterol management, obesity and inflammation dosage levels.

#### Unit – III

Health benefits of Nutraceuticals, natural pigments (chlorophyll, Chlorophyllin, Carotenoids) anthocyanins, glucosinolates, isoflavonoids, phytoestrogens, omega-3 and omega-6 fatty acids, antioxidants, phytosterols; dosage for effective control of disease or health benefit with adequate safety.

#### Unit – IV

Definition, development of functional foods, isolation, storage, processing and stability of phytochemicals/ bioactive compounds.

Prebiotics and Probiotics: usefulness of Probiotics and prebiotics in gastro intestinal health and other benefits, beneficial microbes: prebiotic ingredients in foods: types of prebiotics and their effects on gut microbes, resistant starch, fructo-oligosaccharides as probiotic food components.

## **Semester – VI**

### **DSE – 3 CATERING MANAGEMENT [THEORY]**

**Credit -4**

Time – 3 Hours

Full Marks – 60

In All Eight questions are to be set, of which a student shall have to answer four questions.

#### **1. ORGANISATION AND MANAGEMENT**

- Definition & types of organization
- Definition, functions and tools of management
- Techniques of effective management
- Energy and time management and its application to food preparation.

#### **2. FOOD MATERIAL MANAGEMENT**

- Meaning , definition , importance
- Food selection, purchasing, receiving and store room management.
- Control in selection to the above operations ( material planning, budgeting, material identification, store keeping, definition, objectives, functions, factors underlying successful storekeeping, duties & responsibilities of a storekeeper, purchasing, organization principles, procedure, systems and quality control ) .

#### **3. PERSONNEL MANAGEMENT :**

- Recruitment, selection & training of personnel, performance appraisal, motivation.
- Labour policies and legislation

#### **4. LAWS AFFECTING FOOD SERVICE OPERATIONS:**

- Union and contract negotiations. Lists to different types of food service institutions to study the following:-
- Eg. Hospitals, Flight Kitchen, Hotel Restaurant, Canteen ( Industrial )
  - (a) Organization (b) Physical Plan & Layout
  - (c) Food Service Equipment (d) Sanitation & Hygiene.

#### **5. Management of self and understanding human behaviour.**

#### **6. Coping with uncertainties, Stress Management and Positive Reinforcement.**

**DSE – 4**

**JOB TRAINING**

**CREDIT – 4**

Job training regarding catering management at a recognised Hotel.

