COURSE CURRICULUM
OF

UNIVERSITY DEPARTMENT OF CLINICAL NUTRITION & DIETETICS

VINOBA BHAVE UNIVERSITY
HAZARIBAG

COURSE STRUCTURE BASED ON CBCS SYSTEM

UNIVERSITY DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

FIRST SEMESTER

PAPER	SUBJECT CODE	NAME	NO OF CREDITS	TEACHING HOURS PER WEEK	MINIMUM TEACHING REQUIRED
1st	CNDF401	Macro & Micro Nutrients in Human Nutrition	5	5	60
2nd	CNDC402	Biochemistry & Methods of Investigation in Nutrition	5	5	60
3rd	CNDC403	Food Microbiology	5	5	60
4th	CNDP404	Practical from paper 2nd & 3rd	5	5	120

SECOND SEMESTER

PAPER	SUBJECT CODE	NAME	NO OF CREDITS	TEACHING HOURS PER WEEK	MINIMUM TEACHING REQUIRED
5th	CNDS405	Basics of Computer application & Communicative English	5	5	60
6th	CNDC406	Public Health Nutrition	5	5	60
7th	CNDC407	Biostatistics & Research Methods	5	5	60
8th	CNDP408	Practical from paper 5th & 6th	5	5	120

THIRD SEMESTER

PAPER	SUBJECT CODE	NAME	NO OF CREDITS	TEACHING HOURS PER WEEK	MINIMUM TEACHING REQUIRED
9th	CNDA409	Principles of food Science and Nutrition and Diet Counselling **OR** Dietary Management of life style Diseases **OR** Institutional Food Administration	5	5	60
10th	CNDC410	Applied Dietetics	5	5	60
11th	CNDC411	Aetio – Patho Genesis of Different Diseases & Human Physiology	5	5	60
12th	CNDP412	Practical from paper 9th & 10th	5	5	120

FOURTH SEMESTER

PAPER	SUBJECT CODE	NAME	NO OF CREDITS	TEACHING HOURS PER WEEK	MINIMUM TEACHING REQUIRED
13th	CNDE413	Food Technology	5	5	60
14th	CNDE414	Seminar	5	5	60
15th	CNDE415	Internship	5	5	120
16th	CNDP416	Dissertation	5	5	60

PAPER -1 (CNDF401) FUNDATION Semester I

FULL MARKS: 100

MACRO AND MICRONURIENTS IN HUMAN NUTRITION

UNIT -1 **a. Body composition**: Tissue and composition-Methods of determining body composition

b. Body water: Distribution of water in various tissues, function of water ,maintenance of water and electrolyte balance and maintenance of acid base balance at cellular level.

UNIT -2. **a. Energy:** Energy requirement for different ages –methods of determining energy requirements .Factors influencing energy requirements - measurement of energy output.

b. Energy value of foods –method of determining energy value.

c. Energy balance.

UNIT -3. **a**. **Proteins**- (i)amino acids,vegetable and animal protein,reference protein.

(ii).Methods of assessing protein quality-chemical biochemical methods.

(iii). Protein efficiency ratio TD,BV,NPU-methods limitations, interpretation.

(iv).Methods of determining protein requirement, factors influencing the requirements.

(v).Amino acid deficiency , imbalance and its consequence.

(vi).Protein energy interrelationship

b. Lipids-fatty acids requirement and biological function.

UNIT -4. **a. Calcium:-** Calcium requirement-basis of determining requirement-availability-assessing calcium nutritional status.

b. Iron:- Iron requirement, availability, nutritional status.

c. **Importance of micro minerals-**zinc ,copper,fluoride,andiodine,in human nutrition.

d. **Vitamin "A":-**Vitamin "A"requirement –availability-methods of assessing. Vitamin A adequacy and nutritional Status.

e. **Vitamin "C":-**Vitamin C -availability-methods of assessing vitamin C adequacy and nutritional status.

f. **Complex vitamins**-Thiamine, Riboflavin, Niacin-requirement and availability, methods of assessing B vitamin adequacy and nutritional status.

g. Vitamin - E.

f. Vitamin- K.

UNIT -5. Nutrient inter-relationship in biological functions.

References:

1. Beaton,G,H,andMchenery E.W .Nutrition Vol I & II ,Academic Press New York.
2. Goodhart R.S. and Maurice C.Shilla ,Modern Nutrition in Health and Disease Ed.MonryKinptionpublishers, London.
3. Porter J.W.C. and Rolls BA..Proteins and Human Nutrition, Acadeinic Press, London & New York.
4. Davidson S. And passmoreR ,Human Nutrition and Dietetics.

PAPER -2 (CNDC402) CORE **Semester I**

BIOCHEMISTRY & METHODS OF INVESTIGATION

Full Marks: 100

UNIT -1. a. **Membrane structure, composition and Transport of metabolites across membranes**.

b.Carbohydrates: Structure and classification – digestion and absorption, glycolysis and fermentation, citric acid cycle, pentose phosphate pathway, glycogenesis, glycogenolysis and gluconeogenesis. Metabolism of alcohol.

c. Fiber: Structure and classification ,role in nutrient metabolism and energy availability

UNIT -2. **a. Lipids:** Structure and classification, digestion and absorption, cholesterol metabolism and disturbances in lipid metabolism, oxidation of fatty acids, synthesis of fatty acids. synthesis of triglycerides and phospholipids. Metabolism of bile pigments.

UNIT -3. **a. Protein:**Structure and classification, digestion and absorption, Metabolism. Special function of amino acids, urea cycle.Inborn errors of amino acid metabolism.

b. Nucleic Acid: Structure of nucleic acid, repair of DNA, recombinant DNA,Protein Synthesis.

c. Interrelationship of carbohydrate lipid and protein metabolism.

UNIT -4. **a. Surveys-** Nutrition survey, Techniques and Interpretation

UNIT -5. **a.** Theoretical bases of laboratory techniques used in nutrition research:

b.Electrolytic:dissociation,acids,bases,salts,buffers,indicators,HendersenHasselbach equation pH and its measurement using indicators.

c. Physio-chemical principles, involved in calorimatry,photometry,flurometry,flame photometry,their application in the laboratory .

d. Chromatography-principles in absorption and ion exchanges chromatography, their application in column,paper, TCL and GL Chromatography.

e. Electrophoresis-Principles,its application in separation and purification of amino acids and proteins.

References:-

1. Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2000): 25th Ed. Harpers Biochemistry. Macmillan Worth Publishers.

2. Nelson, D.L. and Cox, M.M. (2000): 3rd Ed. Lehninger's Principles of Biochemistry, Macmillan Worth Publishers.

3. Devlin, T.M. (1997): 4th Ed. Text book of Biochemistry with Clinical Correlations, Wiley LissInc

4. Stryer, L. (1998): 4th Ed. Biochemistry, WH Freeman and Co.

5. Conn, E.E., Stumpf, P.K., Bruening, G. and Doi, R.H. (2001): 5th Ed. Outlines of Biochemistry, John Wiley and Sons.

6. Voet, D. Voet, J.G. and Pratt, C.W. (1999). Fundamentals of Biochemistry.

7. Tietz, N.W. (1976) Fundamentals of Clinical Chemistry. WB Saunders Co.

8. King, E.J. and Wootton, I.D.P. (1956). 3rd ed. Micro-Analysis in Medical Biochemistry.J and A Churchill Ltd.

PAPER -3(CNDC403) CORE Semester I

FOOD MICROBIOLOGY FULL MARKS: 100

Unit -1. **a.** Micro-organism important in foods(bacteria, fungi and viruses):Their classifications.

b. Cultivation of Micro-organisms

c. Control of Micro-organisms,physicalmeans and chemical means.

UNIT -2. **a.** Food spoilage: Source of contamination, factors responsible for spoilage and chemical changes due to spoilage.

b. Prevention of spoilage-principles of common techniques applied to above mentioned group of foods.

UNIT -3. Contamination and Micro-organisms in spoilage of different kinds of foods-cereal and cereal products,sugar and its products,vegetables and fruits,fish and other sea foods,eggs and poultry ,milk and milk products,canned foods and meats and meats products.

UNIT -4. **a.** Food safety and hazards- Types of hazards (chemical, physical and biological) food borne infections, food intoxication symptoms and methods of prevention,investigation of food borne diseases outbreak / HACCP.

b. Food sanitation :-Microbiology in food sanitation and food control.

UNIT -5. Food fermentation

References:-

1. M.R. Adams M.O. Moss, Food microbiology**,** New Age International(p)Ltd. Publishers.
2. James M. Jay, Modem Food microbiology, Chapman & Hall Inc New York
3. William C Frazier, Dennis C Westhoff, Food Microbiology, TataMcGraw Hill.

PAPER:4 (CNDP404)PRACTICAL Semester I

PRACTICAL from PAPER 1 & 2 **FULL MARKS:100**

PRACTICAL From paper 1

UNIT -1. **a. Titrimetric**

Determination of strength of acids and alkali solutions.

Preparation of buffers and determination of their pH by the use of indicator and pH meters.

Estimation of calcium, iron in food.

b. Colorimetric and spectrophotometric: Glucose, total and free cholesterol, protein, urea, Creatinine.

UNIT -2. **a. Chromatography:** Paper separation of amino acid,column separation of Beta Carotene,Thin layer separation of lipids. (Demonstration only)

b. Electrophoresis: separation ofserumproteins**.(**Demonstration only**)**

c. BloodAnalysis: Blood count and D.L.C. v Haemoglobin(haemoglobinometric), Blood indices.

d. Dietary survey Report.

UNIT -3. **a.** Preparation of potato dextrose agar media

b. Preparation of nutrient agar slant for bacteria

c. Inoculation of bacteria in nutrient agar slant.

d. Staining of bacteria.

e. Simple staining

f. Gram staining

UNIT -4. **a.** Preparation of czapeckdox media for fungi.

b. Inoculation of fungi.

c. Staining of fungi.

d. Preparation of yeast extracts agar media for growthof yeast.

e. Inoculation of yeast

f. Staining of yeasts

UNIT -5. **a.** Gradation of milk by methylene blue reduction test

b. Isolation of pure culture of bacteria from infected fruit

c. Isolation of pure culture of yeast from infected fruit

d. Isolation of pure culture of fungi from infected fruit

e. Microbial examination of water

f. Determination of colony present in samples.

Paper -5(CNDS405)Skill development

BASIC OF COMPUTER APPLICATION & COMMUNICATIVE SKILL ENGLISH

Semester -II

Unit 1 – **a. Fundamental of computers-** Data information, computer architecture, Number system, generation and Computer History**.**

b. operating system- DOS, Windows**.**

Unit 2 – **a. M.S. office-** word, excel, power point presentation

b. Internet and HTML- Fundamentals, browsing, creating an E-mail account, sending an E- Mail.

Unit 3- Computer application in clinical nutrition and diet counselling**.**

Unit 4- **a.** Definition of listening, Reading writing and communicating.

b. Writing skill- Writing letter, Memo, Circular, Notice, Cover letter, Resume.

Unit 5- **a.** Synopsis, Thesis and summery writing.

b. Speaking- How to Converse with people.

c. How to communicate effectively.

Paper -6(CNDC406) CORE semesters II

Public Health Nutrition Full Marks – 100

UNIT -1. **a.** Concept of health, nutritional aid, public health nutrition and health care programmes.

b. Combating some of the public health nutrition problems by

- **i.** Immunization
- **ii.** Supplementary feeding programs
- **iii.** Improving the quality of food products by genetic approach and fortification.
- **iv.** Supplementation

UNIT -2. Major nutritional problems

a. Etiology, prevalence, clinical signs, preventive and therapeutic measures of the following:

b. Protein energy malnutrition, Vit. A deficiency, nutritional anemia, rickets,

c. osteomalacia, pellagra, beri-beri, goiter, fluorosis and lathyrism.

d. Malnutrition in developing countries.

UNIT -3. Role and responsibility of health sectors in nutrition. Health planning in India and National Health Committees.

UNIT -4. Maternal and child health, their morbidity and mortality and related health services.

UNIT -5. **a.** Assessment of nutritional status of community using dietary, clinical, anthropometric and biochemical parameters.

b. Nutritional education, designing, implementation and following of the nutrition education programmes.

References :

1. Mc. Lara, D.S., Nutrition in the community, John Willay and sons.
2. Ebrahim G. J. Nutrition in mother and child health. Mc. Millan London.
3. Ritchoy, S.J. and J. Taper.Maternaland child nytrition. Harper and Row publishers. New York

PAPER: 7(CNDC407) CORE **Semesters II**

BIOSTATISTICS AND RESEARCH METHODS **Full Marks:100**

UNIT -1. a. Descriptive statistics :

Concept of population &sample ,Procedure for preparation of the tool, administration of tools for data collection sources and presentation of data, measures of central tendencies and percentiles, measures of variations, analysis of proportion, coincidences procedures for one and two population variance ,measures of population and vital statistics ,life table.

b. Introduction to SPSS, Data entry

UNIT -2. Inferential statistics :

Probability and probability distribution, sampling theory , methods of sampling ,sampling errors.

UNIT -3. Tests of significance :

I. Parametric-Student's "t" test ,analysis of variance(Fisher's "F" tests),regression an correlation(Pearson's product Moment).
II. Non-Parametric: **X2**(CM square) test ,median test, sign test, Mann-Whiteny " U" test.

UNIT -4. Scientific approach to research :

a. Types of research-descriptive , experimental
b. Research format : problems statements, objective hypothesis, variables,assessment of available data, execution, evaluation.
c. Research methods in community health : sample selection, questionnaire construction interviewing techniques ,interperation of data.

UNIT -5. statistical methods in experimental research:

Research design ,treatment allocation ,randomization and stratification ,data management and quality control, sample size requirements, planning.

References:

1. Biostatistics : K. Visheswar Rao,B.K. Mahajan, and S.Prasad .
2. Jain, G. (1998): Research Methodology: Methods and Techniques, Mangal Deep, Jaipur.
3. Kothari, C.R. (2000): Research Methodology: Methods and Techniques, WishwaPrakashan, New Delhi.
4. Kumar, A. (1997): Social Research Method (The Art of Scientific Investigation), Anmol Publication, New Delhi
5. Gupta, S. (2001) "Research Methodology and Statistical Techniques",Deep and Deep, New Delhi,
6. Hooda, R.P. (2003) "Statistics for Business and Economics", 3rd ed.,Macmillan India Ltd., Delhi,.
7. Dey, B.R. (2005) "Textbook of Managerial Statistics", Macmillan India Ltd., Delhi,
8. Fleming, M.C. &Nellis, Joseph G. (1997) "The Essence of Statistics for Business", Prentice-Hall of India, New Delhi,
9. Sarma, K.V.S. (2001) "Statistics made Simple: Do it yourself on PC", Prentice-Hall, New Delhi.
10. Chakravorti I, S.R. &Giri, N. (1997) "Basic Statistics", South Asian Pub., New Delhi,
11. Das, M.N. (1989) "Statistical Methods and Concepts", New Age, New Delhi,
12. Elhance, D.N. (2000) "Fundamentals of Statistics [containing more than 750 solved and 1250 problems for review exercise]", KitabMahal, Allahabad,
13. Goon, A. & Gupta, M. &Dasgupta, B. (2001) "Fundamentals of Statistics", Vol.I& II, The World Press, Calcutta,
14. Gupta, S.P. (1996) "Practical Statistics", 37th ed., S. Chand,New Delhi,.
15. Gupta, S.C. (2000) "Fundamentals of Statistics", Himalaya Pub., Mumbai,
16. Gupta, S.P. (2000) "Statistical Methods", Sultan Chand & Sons, New Delhi,
17. Nagar, A.L. & Das, R.K. (1997) "Basic Statistics", 2nd ed., OUP, Delhi,

PAPER- 8(CNDP408) PRACTICAL Semesters II

PRACTICAL from PAPER -6 Full Marks:100

UNIT -1. Development of low cost nutritive recipes suitable for various vulnerable Section of population.

UNIT -2. Development use & evaluation of methods and material for teaching health & Nutrition to different groups.

UNIT -3. Utilization of conceptual models in applied nutrition, programmes synthesis and analysis of casual, environmental systems applicable to nutrition programmes in the country.

UNIT -4. Accuracy of house hold measurement

UNIT -5. Experiment in product development

Paper -9 (CNDA409) CHOICE BASED Semester III

PRINCIPLES OF FOOD SCIENCE & DIET COUNSELLING/OR DIETARY MANAGEMENT OF LIFE STYLE DISEASES/ OR INSTITUTIONAL FOOD ADMINISTRATION

Full Marks: 100

UNIT-1. **a.** Introduction to food science

b. Food quality evaluation and techniques.

c. Chemical, physical and nutritional alteration occurring in food products during the freezing, thermal processing, dehydration, irradiation and environmental control

UNIT-2. **a.** Nature and chemical behavior of food constituent, proteins, lipids carbohydrates, water, enzymes, pigments and flavours.

b. Physico-chemical & colloidal properties of food. properties of sols, gels, foams & emulsion.

c. Fruits and vegetables

- **i.** Classification, structure, composition and nutritive values.
- **ii.** Changes in fruits during ripening, food enzymes and colouring agents.
- **iii.** Change in vegetables flavour, texture and colour during cooking.
- **iv.** Pectins, pectic substances, chemistry, properties and its role in food processing.
- **v.** Browning reactions.

UNIT -3. **a.** Food adulteration.

b. Food additives and regulation.

c. Nutraceuticals and organic foods

UNIT -4. **a.** Factors in patient care, their counseling of coordinated nutritional services, feeding them, their psychological aspects. and assessment of their need.

b. Nutritional care plans and steps.

c. Dietary counseling:

i. Steps in counseling process
ii. Dietary counseling in different diseases.
iii. Techniques in dietary counseling.

UNIT – 5 **a.** Medical terminology/ abbreviations, medical records.

b. Case studies in different diseases.

c. Nutritional (and dietary) care Process: in health - Depending on the state of growth & development of the individual - at various activity levels and socioeconomic status

References:

1. MagmisPyke, Food Science and technology, John Murray publishers Ltd .
2. Heimann W, Fundamentals of food chemistry, Meyer L.H. Food chemistry. East West Pvt. Ltd. New Delhi.
3. Birch A.G.andSpencer,M.FoodScience,Pegamon Press.
4. Stewart G.F.andAmerineM.A.Introduction to Food Science and Technology.
5. Swaminathan M.,Hand book of Food Science and experimental foods.
6. EskinNAM,HendersonH.M.and Townsend R.J.,Biochemistry of Foods.
7. ShakuntalaManay and SudakharaSwamy,Food Facts and Principles,Wiley Eastern Ltd.,New Delhi.
8. Robinson, C.H., and Willey E.S. : Basic nutrition and diet therapy. Mc. Millanpublication , New York.
9. F.P. Antia and Phillip Abraham, Clinical dietetics and nutrition.Oxford University Press

OR

DIETARY MANAGEMENT OF LIFE STYLE DISEASES

Unit 1- Heart Diseases –Hypertension, Hypotension, Heart attack, Atherosclerosis.

Unit 2- Diabetes –Type-I, Type-II Diabetes mellitus.

Unit 3- Thyrodism –Hyper thyroidism, Hypo thyroidism

Unit 4- Obesity –Over weight, Grade –I, Grade –II, Grade –III Obesity.

Unit 5- Under- Weight

References:-

1. F.P. Antia& Philip Abraham, Clincial Dietetics &Nutrition Oxford University Press.
2. Passmore R., Eastwod M.A. Human Nutrition and Dietetics E L B S Publication.
3. Robinson C.H.& Wiley E.S. Basis Nutrition and Diet Therapy Mc. Millan Publication, New York.
4. Anderson L. & others, Nutrition in Health and Diseases. VijayaKhader,Foods Nutrition and Health, Kalayani Publishers, New Delhi.

OR

INSTITUTIONAL FOOD ADMINISTRATION

UNIT -1. Food Service Planning and Management

UNIT -2. Catering management of equipments:

a. Principles and functions of catering management
b. Tools of management.
c. Management of resources.

UNIT -3. Organization of space and equipments:

a. Kitchen space and storage space.
b. Service Area.
c. Classification and selection of equipments.
d. Equipment design installation and operation.
e. Purchasing care and maintenance.

UNIT -4. Food service systems – Operations:

a. Food management
   i. Menu planning
   ii. Food purchasing
   iii. Financial management
   iv. Quality control
   v. a Cost concept and food cost control and pricing.

b. Service management – Food & beverage services.

c. Personal management
   i. Development and policies.
   ii. Recruitment, selection and induction.
   iii. Facilities and Benefits.
   iv. Training and Development

UNIT -5. Hygiene, sanitation and safety

i. Sanitation and Hygiene
ii. Safety and security
iii. Laws

References:

1. Goodhart RS. and Maurice C. Shilla, Modern Nutrition in health and disease

   Ed. MonryKinpton Publishers, London Maurice E, Shils James A.

2. Olson Masha Shike, Modern Nutrition in Health and disease. Sue Rodwell Williams, Nutrition and Diet Therapy Davidson,
3. Principles and Practice in medicine: Dr. O.P. Ghai, Textbook of Paedeatrics.

4. Gerard J. Tortora& S.R. Grabowski, Principles of Anatomy and Physiology, John Wiley & Sons Inc.Arthur C. Guyton.
5. Textbook of Medical Physiology W.B. Saunders Company.
6. Keele Neil and Joels, Samson Wright s Applied Physiology, Oxford's Press.

PAPER-10. (CNDC410)CORE **Semester III**

APPLIED DIETETICS **Full Marks:100**

UNIT -1. a. Role of dietitian in hospital and community

b. Routine hospital diet: feeding methods

c. Basic concepts of diet therapy

i) Enteral tube feeding

ii) Different Enteral feeding access

iii) Practical Aspects d) Parenteral nutrition

iv) Exchange list as a tool in planning diets

d. Therapeutic adaptation of normal diet

UNIT -2. a. Diet in fevers and infections

c. Diet in gastro intestinal disorder

d. Diet in liver, gall bladder and pancreatic disorder

UNIT -3. a. Diet in diabetes

b. Diet in metabolic disorder

c. Diet in allergy and skin disturbances

d. Diet in inborn error of metabolism

e. Nutrients and drug interaction

UNIT -4. a. Diet in renal diseases

b. Diet in cardiovascular diseases

c. Nutrition in Exercise

d. Sports Nutrition

e. Special Nutrition [Army, Space, Sea voyages]

UNIT -5. a. Nutrition in Emergencies

b. Exchange list as a tool in planning diets

c. Delivery of Nutritional Support – Meeting nutritional needs

References:-

1. F.P. Antia& Philip Abraham, Clincial Dietetics &Nutrition Oxford University Press.
2. Passmore R., Eastwod M.A. Human Nutrition and Dietetics E L B S Publication.
3. Robinson C.H.& Wiley E.S. Basis Nutrition and Diet Therapy Mc. Millan Publication, New York.
4. Anderson L. & others, Nutrition in Health and Diseases. VijayaKhader,Foods Nutrition and Health, Kalayani Publishers, New Delhi.

PAPER 11(CNDC411) CORE **Semester III**

HUMAN PHYSIOLOGY & AETIO-PATHOGENESIS IN DIFFERENT DISEASES

Full Marks: 100

UNIT -1. **a.** Cell structure and function of inclusion bodies.

b.Cardio-vascular system: Basic properties of heart, cardiac output, cardiac cycle, blood pressure and factors affecting it and hypertension.

c.Blood: Composition of blood (only introduction) haemoglobin erythropoiesis, proteins and co-agulation of blood.

UNIT -2. **a.** Physiology of respiration: Uptake and delivery of respiration gases and regulations & breathing.

b. Physiology of kidney: Mechanism of urine formation and the role of the kidneys in water and electrolyte balance.

UNIT -3. **a.** Physiology of the digestive system: Secretary and digestive functions of the salivary glands, the stomach, the pancreas. The liver and intestines and mechanism of absorption of carbohydrate, proteins and fats.

b. Physiology of Endocrine system: Functions and the different syndromes resulting from hypo or hyperactivity of the following glands. Thyroid, parathyroid, adrenal cortex, adrenal medulla endocrine part of pancreas, pituitary, and gonads.

UNIT -4. **a**. **Etio-Pathogenesis, clinical features & Investigation of diseases.**

- **i.** Peptic ulcer
- **ii.** Diarrhoea

b. Acute and chronic diseases of the pancreas

- **i.** Pancreatitis
- **ii.** Diabetes mellitus

iii. Acute and chronic diseases of liver.

a) Hepatitis
b) Cirrhosis

iv . Gall stone

c. Acute and chronic diseases of Kidney

i. Glomerulo nephritis
ii. Nephrosis/ nephrotic syndrome
iii. Urinary calculi
iv. Renal failure

d. Acute and chronic diseases of cardiovascular system

i. Hypertension
ii. Hyperlipidemia
iii. Atherosclerosis
iv. Myocardial Infarction

UNIT -5. a. Obesity

b. Cancer

c. Burn

d. Inborn errors of metabolism of nutrition

i. Phenylketonuria
ii. Galactosemia
iii.Tyrosinemia
iv. Familial hypercholesterolemia

e. Haemophilia

f. Gout

PAPER-12(CNDP412)PRACTICAL Semester III

PRACTICAL from PAPER 9 & 10 Full Marks: 100

UNIT -1. **a.** Accuracy of household measurements.

b. Preparation and evaluation of solutions-taste threshold test preparation of Score, card, selection of the taste panel.

UNIT -2. **a.** Preparation and stability of emulsion.

b. Preparation and stability of foam.

UNIT -3. **a.** Gel formation –factors affecting the gel formation.

b. Roti making quality of different flours.

UNIT -4. **a.** factors affecting Dough making

b. Vegetables cooking—effect of cooking on flavour, colour texture and Palatability.

UNIT -5. **a.** Changes due to fermentation and germination of legumes.

b .Fats and oils determination of smoking point, fat absorption by different Foods.

OR

INSTITUTIONAL FOOD ADMINISTRATION

Laboratory in Quality food production:

a. Principles and techniques in quality food production.

b. Planning and organization of meals for various occasions.

PRACTICAL from Paper 10

UNIT -1. **a** Planning and preparation of full or normal diets.

b. Planning and preparation of liquid diets.

c. Planning and preparation of soft diets.

UNIT -2. **a.** Planning and preparation of high and low calorie diet.

b. Planning and preparation of bland diet for peptic ulcer.

c. Planning of diet or viral hepatitis and cirrhosis of liver.

UNIT -3. **a.** Planning and preparation of diet of diabetes mellitus.

b. Planning and preparation of diet for hypertension, atherosclerosis and Heart Attack or failure.

c. Planning and preparation of low and medium cost for PEM anemia and Vitamin 'A' deficiency.

UNIT -4. a. Planning and preparation of pre and post operative diet.

b. Planning and preparation of diet with modified fibre

(a) constipation (b) diet for diarrhoea.

c. Planning and preparation of diet in fevers and infection.

UNIT-5. **a.** Planning and preparation of diet in (a) Kidney failure, (b) Kidney transplant,

(c) Kidney stones,(d) Nephrotic syndrome(e) Nephritis

b. Planning and preparation of diet in cancer.

Semester IV

PAPER-13(CNDE413) ELECTIVE Semesters IV

FOOD TECHNOLOGY Full marks : 100

UNIT -1. Food preservation , Food deterioration , methods of preservation and processing.

a. Preservation and processing by Heat
b. Preservation and processing by Cold
c. Preservation and processing by Fermentation
d. Preservation and processing by Radiation

UNIT -2. Food additives and Food preservatives.

UNIT -3. Food preparation

a. Method of cooking
b. Cooking Media
c. Microwave cooking

UNIT -4. Changes in cooking -Changes in Protein , Fat, Carbohydrates, Lipid, Vitamin, Minerals and Colors.

UNIT -5. Processing of Foods - Processed products of Cereals , Pulses (Soyabean) oil, Milk products, eggs, Sugar and Confectionary.

References :-

1. S.K.Kulshrestha, Food Preservation.
2. Norman W. Desrosier, James N. Desrosier, Food preservation CounersT.J.. Preservation of fresh food.
3. Normal N. Potter, Joseph H. Hotchkiss, Food Science, CSB Publishers and Distributers, New Delhi.

Paper -14(CNDE414) ELECTIVE Seminar Full Marks :100

Paper-15(CNDE415) ELECTIVE Dietetics Internship Full Marks :100

Paper -16 (CNDE416) ELECTIVE Project Work Full Marks :100