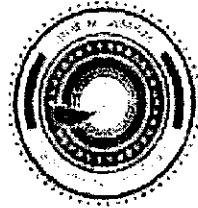


**RANCHI WOMEN'S COLLEGE**  
**RANCHI**  
**(Autonomous College)**



**Constituent Unit**  
**of**  
**Ranchi University, Ranchi**

**Department of Nutrition and Dietetics (UG & PG)**

**(M.Sc.. with Clinical Nutrition and Dietetics)**  
**Post graduate Programme: A Template**  
**2021**

**SUBMITTED BY**  
**CND DEPARTMENT(UG & PG)**



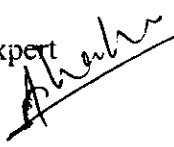
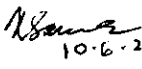
# Ranchi Women's College, Ranchi

Department of C.N.& D.

## Constitution of Board of Studies

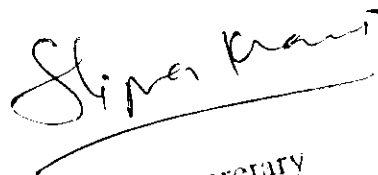
10.06.2021

Board of Studies of Department of C.N.& D has been constituted with following members under various categories for academic session 2021-22 and 2022-23 (tenure valid for two years)

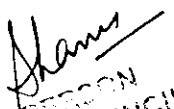
- |   |   |   |
|---|---|---|
| 1. Co-ordinator, Department of C.N.& D. | Dr. Abha Prasad   | Chairperson   |
| 2. Faculty, Department of C.N.&D        | i. Mrs. Geeta Kumari  | Member                         |
| 3. Guest Faculty, Department of C.N.&D  | Dr. Mrs. Iffat Matin<br>Mrs. Arpita Mishra<br>Mrs Ghazala Matin   | Member  |
| 4. Expert from Outside College          | i. Mrs. Dr. Asha Kumari Prasad<br>P.G. Head Department of H.Sc.<br>Ranchi University                      | Expert                         |
|   | ii. Mrs. Dr. Asha Kumari<br>P.G. Department of H.Sc.<br>Ranchi University                                 | Expert                       |
| 5. University Nominee                   | Dr. Nayani Saxena<br>Associate Professor<br>University Department of zoology<br>Ranchi University, Ranchi | V. C. Nominee<br><br>10.6.21 |
| 6. Meritorious Student                  | i. Ms. Sahista Yasmin<br>ii Ms. Sarna Neha Horo   | P.G. Sem IV<br>U.G. Sem-VI  |



Dr. Abha Prasad  
Co-ordinator  
Department of C.N.&D.



Member Secretary  
Academic Council  
Ranchi Women's College

  
CHAIRPERSON  
ACADEMIC COUNCIL -  
RANCHI WOMEN'S COLLEGE

## **M.Sc. Clinical Nutrition and Dietetics**

### **1. PREAMBLE**

Nutrition is the science and art of applying the principles of food science and human nutrition to attain and maintain human health. Dietetics & food service management is a versatile profession, which requires professionals to use their knowledge, communication and creative skills in attaining and maintaining patient's health. Dieticians and Nutritionists are paramedical healthcare professionals, who with their nutritional, food science and human nutrition knowledge help in achieving and maintaining good health.

### **2. OBJECTIVES**

1. To impart knowledge and develop capacities of the students through state of the art higher education in the area of Medical Nutrition Management
2. To develop students to become health care professionals for services in various fields such as hospitals academics, research, industry, clinical nutrition department, training, extension and community service.
3. To provide practical, field level experience in hospital administration and dietetics
4. To equip students to start their own Diet clinic unit, leading to entrepreneurship.

### **3. DURATION OF THE COURSE**

The duration of the course is for two academic years consisting of four semesters

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**DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS**  
**M. Sc. CLINICAL NUTRITION AND DIETETICS SYLLABUS**  
 Choice Based Credit system (CBCS)

**FIRST SEMESTER**

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

**SECOND SEMESTER**

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


  
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**THIRD SEMESTER**

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

**FOURTH SEMESTER**

PAPER	SUBJECT CODE	NAME	NO OF CREDITS	TEACHING HOURS PER WEEK	MINIMUM TEACHING REQUIRED
13 <sup>th</sup>	CNDE413	Food Technology	5	5	60
14 <sup>th</sup>	CNDE414	Intellectual Property Rights	5	5	60
15 <sup>th</sup>	CNDE415	Internship	5	5	120
16 <sup>th</sup>	CNDP416	Dissertation	5	5	60

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Ranchi Women's College Ranchi

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## PAPER -1 (CNDF401) FUNDATION Semester I

Pattern of Exam

Theory F.M 100 Marks

-Mid semester

30 marks

-End semester

70 marks

Pattern of Question Paper:

PART – A -Objective type; answer all questions 10 X 1 = 10 Marks

PART – B -long Questions; attempt any 4 question 4 X 15(each question)=60 marks.

### Teaching objectives

- The basic concept of nutrition.
- The importance of nutrients for the growth and maintenance of human body
- Describe the different type of nutrients absorption sources.

### Course outcome:

- Utilize knowledge from foundational sciences as a basis for understanding the role of food and nutrients in health and disease. (Domain 1)
- Integrate scientific information, research, and critical thinking into evidence- based practice.
- Apply basic principles of nutrition.

## 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,

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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.**



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- 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,andiiodine,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.MonryKintionpublishers, 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.

Department of CND  
Ranchi Women's College Ranchi

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

Pattern of Exam

Theory F.M 100 Marks

-Mid semester

30 marks

-End semester

70 marks

Pattern of Question Paper:

PART – A -Objective type; answer all questions 10 X 1 = 10 Marks

PART – B -long Questions; attempt any 4 question 4 X 15(each question)=60 marks

### **Teaching objectives**

- Understand the mechanism adopted by the human body for regulation Of metabolic pathway.
- Develop an insight Into interrelationships Between Various metabolic pathway.
- Develop skill to judge the investigation and action on techniques and nutritional survey report.

Paper name – Food microbiology

### **Course learning outcome:**

- Capable of describing biochemical pathways relevant in nutrient metabolism.
- Capable of describing biochemical techniques that are relevant for the investigation of the nutrient metabolism.
- Capable of using selected biochemical techniques relevant in nutritional biochemical research

## **BIOCHEMISTRY & METHODS OF INVESTIGATION**

### **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, Henderson-Hasselbach equation pH and its measurement using indicators.
  - c. Physio-chemical principles, involved in calorimetry, photometry, fluorometry, flame photometry, their application in the laboratory.
  - d. Chromatography-principles in absorption and ion exchanges chromatography, their application in column, paper, TLC and GLC 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 Liss Inc
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

### Pattern of Exam

Theory F.M 100 Marks

-Mid semester

30 marks

-End semester

70 marks

### Pattern of Question Paper:

PART – A -Objective type; answer all questions 10 X 1 = 10 Marks

PART – B -long Questions; attempt any 4 question 4 X 15(each question)=60 marks

### Teaching objectives

- Understanding the Physiology of Microbes and the experimental aspects.
- Understand food safety and quality of food.
- Develop the prevent them spoiling the food production chain.
- Understand the disease related to the microbes.

### Course learning outcome:

- Explain the interactions between microorganisms and the food environment, and factors influencing their growth and survival.
- Explain the significance and activities of microorganisms in food.
- Describe the characteristics of foodborne, waterborne and spoilage microorganisms, and methods for their isolation, detection and identification.
- Explain why microbiological quality control programmes are necessary in food production.
- Discuss the microbiology of different types of food commodities.

## FOOD MICROBIOLOGY

### 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, Modern 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 of serum proteins. (Demonstration only)

**c. Blood Analysis:** 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 growth of 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

### Semester -II

#### Pattern of Exam

Theory F.M 100 Marks

-Mid semester

30 marks

-End semester

70 marks

#### Pattern of Question Paper:

PART – A -Objective type; answer all questions 10 X 1 = 10 Marks

PART – B -long Questions; attempt any 4 question 4 X 15(each question)=60 marks

#### Teaching objectives

- To provides students with practical and scientific knowledge on the Computer course along with major *soft skills*.
- To impart better writing skills by sensitizing the learners to the dynamics of effective writing.

#### Course learning outcomes

- Demonstrate a basic understanding of **computer hardware and software**.
- Demonstrate problem-solving skills.
- Utilize web technologies.
- Develop the ability to speak English language with the right way of pronunciation
- Express the viewpoints with confidence in English
- Express values and skills gained through effective communication to other disciplines

### **BASIC OF COMPUTER APPLICATION & COMMUNICATIVE SKILL ENGLISH**

**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**

Pattern of Exam

Theory F.M 100 Marks

-Mid semester

30 marks

-End semester

70 marks

Pattern of Question Paper:

PART – A -Objective type; answer all questions 10 X 1 = 10 Marks

PART – B -long Questions; attempt any 4 question 4 X 15(each question)=60 marks

### **Objectives:-**

- Introduction to the practice of public health nutrition, discussion of significant public health nutrition problems today, and an overview of food and nutrition programs available to the community.
- In addition, students in the Coordinated Program in Dietetics will integrate course information with their current community clinical placement experiences.
- Discuss and understand the various nutrition monitoring and surveillance methodologies and how they are used.
- Understand beliefs, customs and food practices of various cultural groups and apply this knowledge in planning nutrition education and intervention programs.

### **Course learning outcome:**

- Gain knowledge on the national effort in combating malnutrition
- Appreciate the national and International contributor towards national improvement in alleviating nutrition problems.
- Learn about the terms related to health and fitness
- Comprehend the interaction between fitness and nutrition
- Employability scope for Government services and sanitary inspectors.

## **Public Health Nutrition**

**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. Maternal and child nutrition. Harper and Row publishers. New York

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

Pattern of Exam

Theory F.M 100 Marks

-Mid semester

30 marks

-End semester

70 marks

Pattern of Question Paper:

PART – A -Objective type; answer all questions 10 X 1 = 10 Marks

PART.– B -long Questions; attempt any 4 question 4 X 15(each question)=60 marks

### **Teaching objectives**

- Define and distinguish between populations and samples.
- Compute a population mean, population variance, and population standard deviation.
- Explain what is meant by statistical inference.
- Identify and discuss the complex issues inherent in selecting a research problem, selecting an appropriate research design, and implementing a research project.
- Identify and discuss the concepts and procedures of sampling, data collection, analysis and reporting.

### **Course Learning outcomes**

- Develop the ability to apply the methods while working on a research project work
- Describe the appropriate statistical methods required for a particular research design
- Choose the appropriate research design and develop appropriate research hypothesis for a research project
- Develop a appropriate framework for research studies

## **BIOSTATISTICS AND RESEARCH METHODS**

### **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 :**

1. Parametric-Student's "t" test ,analysis of variance(Fisher's "F" tests),regression an correlation(Pearson's product

Moment).

- II. Non-Parametric:  $\chi^2$ (CM square) test ,median test, sign test, Mann-Whitney “ 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**

Pattern of Exam

Theory F.M 100 Marks

-Mid semester

30 marks

-End semester

70 marks

Pattern of Question Paper:

PART – A -Objective type; answer all questions 10 X 1 = 10 Marks

PART – B -long Questions; attempt any 4 question 4 X 15(each question)=60 marks

**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- Thyroidism** –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, Clinical Dietetics & Nutrition Oxford University Press.
2. Passmore R., Eastwood 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. MonryKington 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

Pattern of Exam

Theory F.M 100 Marks

-Mid semester

30 marks

-End semester

70 marks

Pattern of Question Paper:

PART – A -Objective type; answer all questions 10 X 1 = 10 Marks

PART – B -long Questions; attempt any 4 question 4 X 15(each question)=60 marks

Teaching objectives

- students to use advanced knowledge about food and nutrition to help prevent as well as treat diseases and maintain human health.
- focuses on food management through proper plan, monitoring and supervision of a patient's diet.
- Students after the completion of the course will be qualified to work in the hospitals and health care establishments, academic institutions, research institutions, NGOs etc.
- To develop trained manpower in the field of nutrition and dietetics.

Course learning outcome:

- To enable students to
- understand the basic principles of diet and diet therapy.
- acquire the knowledge of modifications of normal diet for therapeutic purposes.
- acquire the skills and techniques involved in the planning and preparation of therapeutic diets for various ailments.
- develop the capacity and attitude for taking dietetics as a profession.

### APPLIED DIETETICS

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, Clinical Dietetics & Nutrition Oxford University Press.
2. Passmore R., Eastwood 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. Vijaya Khader, Foods Nutrition and Health, Kalayani Publishers, New Delhi.

## **PAPER 11(CNDC411) CORE**

## **Semester III**

Pattern of Exam

Theory F.M 100 Marks

-Mid semester

30 marks

-End semester

70 marks

Pattern of Question Paper:

PART – A -Objective type; answer all questions 10 X 1 = 10 Marks

PART – B -long Questions; attempt any 4 question 4 X 15(each question)=60 marks

### **Teaching objectives**

- students understand how the body works. State the functions of each organ system of the body, explain the mechanisms by which each functions, and relate the functions and the anatomy and histology of each organ system.
- To understand the patho physiology of different diseases.

### **Course Learning Outcomes**

- Describe the structure of major human organs and explain their role in the maintenance of healthy individuals.
- Explain the interplay between different organ systems and how organs and cells interact to maintain biological equilibria in the face of a variable and changing environment.
- Use complex electronic equipment including Powerlabs and Bioamplifiers to record human physiological data, and responses to experimental stimuli.
- Interpret and draw inferences from experimental measures of physiological function including electrocardiograms and spirometry read-outs.

## **HUMAN PHYSIOLOGY & AETIO-PATHOGENESIS IN DIFFERENT DISEASES**

**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.



## PAPER-13(CNDE413) ELECTIVE

Semesters IV

Pattern of Exam

Theory F.M 100 Marks

-Mid semester

30 marks

-End semester

70 marks

Pattern of Question Paper:

PART – A -Objective type; answer all questions 10 X 1 = 10 Marks

PART – B -long Questions; attempt any 4 question 4 X 15(each question)=60 marks

### Teaching objectives

- to provide a practical and theoretical training on the conversion of raw agricultural produce into processed, packaged, shelf-stable food products.
- students understanding of different aspects of handling, processing and quality control.
- Develop skill food quality, design and maintenance of food process machines; direct practical experience in food industries, food research laboratories.

### Course Learning Outcomes □

- Understand cold preservation ,Freezer types and functioning □
- Understand Dehydration,Dryer types and functioning □
- Understand Irradiation Plant layout,E beam and Microwave heating □
- Understand the Packaging requirements of food categories □
- Understand the material handling in food industry ,conveyer types,seperation processes by distillation, extraction,filtration,centrifugation,sieving and sedimentation □ Understand thermal processing and fundamentals of thermal process calculations

## FOOD TECHNOLOGY

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) Semesters IV**

**M.Sc. Clinical Nutrition and Dietetics**

**Course SEMESTER-IV ( Intellectual Property Right)**

**Paper -14 (CNDE414)**

#### **Pattern of Exam**

Theory F.M 100 Marks

-Mid semester

30 marks

-End semester

70 marks

#### **Pattern of Question Paper:**

PART – A -Objective type; answer all questions 10 X 1 = 10 Marks

PART – B -long Questions; attempt any 4 question 4 X 15(each question)=60 marks

Teaching objectives

to provide a practical and theoretical training on the conversion of Intellectual Property Rights) .  
This one credit course Intellectual Property Rights : An introduction Intellectual Property  
Law is a law specialisation wherein innovative as well as marketable work of individuals  
is protected. There are many types of intellectual property protection. A patent is a  
recognition for an invention that satisfies the criteria of global innovation, and industrial  
application. IPR is essential for better identification, planning, commercialization,  
rendering, and thus the preservation of inventions or creativity..

### **Course Learning Outcomes**

\* Apply intellectual property law principles (including copyright, patents, designs and trademarks) to real problems and analyse the social impact of intellectual property law and policy

\*Work in teams, solve problems and manage time

\*Analyse ethical and professional issues which arise in the intellectual property law context

\*Write reports on project work and critical reflect on your own learning.

1 . Definition & scope of Intellectual Property Rights ( IPR ) ;

2. Types of Intellectual Property Rights: copyright, patent , Geographical indication.

3 . Copyright :

3.1 concept of copyright as a protection under the IPR ;

3.2 The idea and expression Dichotomy.

3.3 Copyright in original and Derivative works.

3.4 Moral Rights.

3.5 Assignment, License and Registration.

4 . Types of plagiarism & tools to check plagiarism.

5.LOW OF Trademark

5.1 : Principles of Trademarks .

5.2 : Procedure of obtaining registration of Trademarks and rights of the owner of trademarks.

5.3 : Infringement of trademark.

### **Reference:**

\*Law Relating to Intellectual Property Rights” by V K Ahuja.

\*Intellectual Property Rights” by Neeraj Pandey and Khushdeep Dharni.

\*Law Relating to Intellectual Property, 2011 (Reprint)" by B L Wadehra.

\*Intellectual Property Rights: Text and Cases" by R Radhakrishnan and S Balasubramanian.

### **M.Sc. Clinical Nutrition and Dietetics**

#### **Course SEMESTER-IV Dietetics Internship**

##### **Paper-15(CNDE415)**

A six months internship is compulsory in the dietetic department of a recognized hospital or institution for the award of M.Sc.(CND) degree. After completed , students submitting own internship project work and received certificate .

##### **Criteria for Hospital-**

- Multispeciality hospital with all departments.
- Therapeutic kitchen is must.
- Dietician under which internship will be completed should be more than 12 years of experience in multispeciality hospital.
- More than 100 bedded hospital is needed.
- OPD services should be available for Dietician.

### **M.Sc. Clinical Nutrition and Dietetics**

#### **Course SEMESTER-IV PROJECT WORK and viva voce**

##### **Paper -16 (CNDE416)**

Topic of dissertation may be chosen from any broad area of Clinical nutrition and dietetics. It may be started during the starting of the 3rd semester and shall be completed by the end of the 4 th semester. The Dissertation to be submitted should include .

1.

Abstract

include

1. Abstract
2. Introduction
3. Objectives of the study
4. Materials and Methods employed
5. Results and Discussion
6. Summary and Conclusions and
7. Bibliography