SEMESTER –II

PRINCIPLES OF FOODS

1. Course Description:

Programme: M.Sc **Max. Hours: 60**

Course Code: P26/NUT/DSC/201 **Hours per week:4**

Course Type: Discipline Specific Core **Max. Marks: 100**

No. of credits: 4

2. Course objectives:

1. To provide an understanding of composition of various food stuffs.
2. To familiarize students with changes occurring in various food stuffs because of processing and cooking.

3. Course outcomes:

After the successful completion of the course, the student will be able to:

CO 1: Understand structural composition and the effect of cooking on cereals and pulses(L II)

CO 2: Remember the structure and composition of milk and fleshy foods (L I)

CO 3: Understand the role of fats and sugar in the food composition table (L II)

CO 4: Understand the principle involved in the selection of fruits and vegetables.(LII).

Expected Level of Output: Conceptual level

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4. Course Inputs:

MODULE 1: CEREALS AND PULSES **(15 Hours)**

1.1. Cereals: Starch: functions and properties, Gelatinization, factors affecting gelatinization Changes in cooked starches – gel formation, retrogradation, syneresis, Cereal protein – gluten, factors affecting gluten formation, Nutrient changes during different treatment methods of cereal grains. Role of natural leavening agents, Role of yeast

1.2. Pulses: Decortication, Soaking and germination of pulses, Fermentation of pulses , Roasting and Puffing ,Effect of cooking treatments on the nutrient composition, quality and quantity of legumes .

1.3 Food toxins, Food Additives Naturally occurring toxins (cyanogenic glycosides, solanine, mycotoxins), additives (colorants, flavor enhancers, stabilizers, emulsifiers, sweeteners), functions, safety evaluations.

MODULE 2: ANIMAL PROTEINS **(15 Hours)**

2.1 Milk: Composition and Nutritive Value of Milk, Types of milk, Properties of milk proteins – effect of heat, acid and phenolic compounds on milk.

2.2. Egg: Composition and Nutritive Value of egg, Egg as a binding, foaming and emulsifying agent, Quality and Grading of Eggs

2.3. Meat: Post mortem changes in meat – rigor mortis, curing, ageing and tenderization, Changes during cooking of meat. Poultry: Advantages of white meat.Fish: Classification, Characteristics of fresh fish, Spoilage, Nutritional importance of fish.

MODULE 3: FATS AND OILS, SUGARS **(15 Hours)**

3.1. Fats: Properties of fats and oils, Emulsions, Fat as emulsifying agent, Fat as leavening and shortening agent.

3.2. Rancidity: Types, mechanism and prevention, Factors affecting amount of fat absorbed during cooking, Fat replacers.

3.3. Sugar: Types of sugar, Sugar crystallization and caramelization, Factors affecting crystallization, Stages of sugar cookery, preparation of candies – crystalline and non-crystalline.

MODULE 4: VEGETABLES, FRUITS AND SENSORY EVALUATION

(15 Hours)

4.1 Plant pigments: Water insoluble and Water solublepigments , Factors affecting plant pigments on cooking: acid, alkali, metals, heat ,Flavour compounds: terpenoids, flavonoids, Sulphur compounds and other volatile flavor compounds , Enzymatic Browning and its

prevention , Physio – Chemical changes in Fruits and Vegetables- Ripening, Respiration and Textural changes.

4.2 Sensory Evaluation: Subjective evaluation techniques: Difference tests: paired comparison test, duo-trio test, triangle test. Rating tests – Ranking, single sample, Two samples, Hedonic scaling, Numerical scoring, Composite scoring . Sensitivity tests and Descriptive tests.

4.3 Food toxins, Food Additives, Preservatives. Naturally occurring toxins (cyanogenic glycosides, solanine, mycotoxins), additives (colorants, flavor enhancers, stabilizers, emulsifiers, sweeteners), functions, safety evaluations, sources, types of preservatives (chemical, natural, biological) health effects, and preventive measures.

5. Recommended books

1. Food Science – Norman N Potter, Joseph H. Hotchkiss, 5th edition, CBS Publishers & Distributors, New Delhi.
2. Food Facts and Principles – ShakuntalaManay, New Age International Publishers.
3. Food Science – B Sri Lakshmi, New Age International Publishers.
4. Fruit and Vegetable Preservation – Principles & Practices – R P Srivastava, Sanjeev Kumar. 3rd edition, international Book Distributing Co., Lucknow.
5. Food Science, Chemistry and Experimental Foods – Dr.M.Swaminathan, The Bangalore Printing & Publishing Co. Ltd., Mysore
6. Food Chemistry: The Role of Additives, Preservatives and Adulteration — Edited by Mousumi Sen, John Wiley & Sons, 2022.

6. Syllabus Focus:

a. RelevancetoLocal,Regional,NationalandGlobalDevelopmentNeeds

Local/Regional/National /Global Development Needs	Relevance
Regional	Helps to preserve traditional cooking methods while improving nutritional retention. Helps small-scale farmers and food processors in producing visually appealing, flavorful, and safe foods.

b. ComponentsonSkillDevelopment/Entrepreneurship Development/Employability

Skill Development / Entrepreneurship Development / Employability	Syllabus Content	Descriptionof Activity
Employability (NSQF Level 5 or 6)	Module I, II, III, IV	Readiness for roles in food industries, quality control labs, and regulatory agencies.

c. IKS components

IKS	Syllabus Content	Module
IKS	Decortication, soaking, germination, fermentation, roasting, and puffing are age-old Indian household and community practices. Preservation, tenderization.	I, II, IV

d. Alligned with SDG 2, 3 (zero hunger, Good Health and well- being) and SDG 4 (Quality Education).

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Interactive Classroom quiz	Experiential learning
2.	Presentations	Participative learning

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7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Interactive Classroom quiz	Experiential learning
2.	Presentation	Participative learning

8. Course Assessment Plan

a. Weightage of Marks in Continuous Internal Assessments andEnd Semester Examination

Maximum Marks: 20M		**Maximum Marks: 20M**	
CIA 1 **Subjective**	**CIA 1** **Subjective**	**CIA 2** **Skill Based Test: 10M**	**CIA 2** **Assignment: 10M**
Section A: 1x10=10M Essay question: Answer any 1 out of 2 **Section B: 2x5=10M** Short questions: Answer any 2 out of 3	**Section A: 1x10=10M** Essay question: Answer any 1 out of 2 **Section B: 2x5=10M** Short questions: Answer any 2 out of 3	Discretion of the faculty	Discretion of the faculty

External QP Pattern		
4 Credits 4 Modules **(CORE)**	SECTION A - Internal Choice	**4 Q X 10 M = 40M**
	SECTION B – Answer any 5 out of 8 (To compulsorily have ONE question from each module)	**5 Q X 4 M = 20M**

b) Aligning COs with Continuous Internal Assessments

COs	Continuous Internal Assessments - CIA (40%)	End Semester Examination - (60%)
CO1	CIA-1	End Semester examination
CO2	CIA-1	
CO3	CIA-2 Presentation, Quiz	
CO4	CIA-2 Assignment	

b. Question Paper Pattern:

PRINCIPLES OF FOODS

Model Question Paper – Theory

Subject Code: P26 /NUT/DSC/201
Time: 2½ h **Max marks: 60**

Section – A

Answer all questions **(4X10=40 M)**

1.

(or)

2.
3.

(or)

4.
5.

(or)

6.

(or)

7.

(or)

8.

Section - B

Answer any 5 of the following questions **(5X4 =20 M)**

9.
10.
11.
12.
13.
14.
15.
16.

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Question Paper Format- Blooms Taxonomy Level

SECTION A - INTERNAL CHOICE			4Q X 10 M = 40M	
Question Number	**Module**	**Question (Model Questions)**	**CO**	**BTL (Blooms Taxonomy Level)**
1	Module 1	Describe Gelatinization, factors affecting gelatinization	CO1	Level II
2	Module 1	Discuss the Effect of cookingtreatments on the nutrient composition, quality and quantity of legumes	CO1	Level IV
3	Module 2	Write a note on the structure, composition and nutritive value of an egg.	CO2	Level II
4	Module 2	Write in detail about the post mortem changes occurring in meat. Write a note on curing, aging and tenderization	CO2	Level IV
5	Module 3	Explain the mechanism of Rancidity, types, and its prevention.	CO3	Level II
6	Module 3	Explain the factors affecting crystallization. Write a note on the different stages of sugar cookery	CO3	Level IV
7	Module 4	Write about the post-harvest changes that occur in fruits. What are the different artificial methods of ripening.	CO4	Level II
8	Module 4	What are the different tests that can be used for the sensory evaluation of foods	CO4	Level IV
SECTION B - ANSWER ANY 5 OUT OF 85 Q X 4M = 20M (To compulsorily have **ONE** question from **each** module)				
9	Module 1	Define decortication of pulses	CO 1	Level I
10	Module 1	Describe the properties and functions of starch	CO 1	Level II
11	Module 2	Explain tests for grading of eggs	CO 2	Level II
12	Module 2	Describe the types of fish and how to select them	CO 2	Level II
13	Module 3	Classify the types of candies	CO 3	Level II
14	Module 3	Explain what is an emulsion and emulsifying agent.	CO 3	Level II
15	Module 4	What are flavour compounds	CO4	Level I
16	Module 4	What arethe water soluble pigments	CO4	Level I

d)QuestionPaper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
1	15	CO-1	2	10	2	4
2	15	CO-2	2	10	2	4
3	15	CO-3	2	10	2	4
4	15	CO – 4	2	10	2	4

8. CO-POMapping

CO	PO	Cognitive Level	Classroomsessions (hrs)
1	1	Understand	15
2	2	Understand	15
3	1	Apply	15
4	1	Apply	15

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SEMESTER – II

PRINCIPLES OF FOODS PRACTICAL

1. Course Description:

Course Code: P26/NUT/DSC/201/P **Max. Hours: 60**
Type of course: DSC **Hours per week: 4**
No. of credits: 2 **Max. Marks: 50**

Course Objectives

- To familiarize students with changes occurring in various foodstuffs because of processing and cooking

Course Outcomes

1. **CO 1:** Apply experimental techniques to evaluate the functional properties of food components.
2. **CO 2:** Analyze the sensory and chemical characteristics of foods through practical tests.

List of practical sessions

1. Gelatinization and factors affecting gelatinization
2. Estimating the gluten formation in wheat flour (dry and wet)
3. Estimation of alkaline phosphates in milk. Effect of heat, acid on milk protein.
4. Egg- Foaming stages of egg white. Preparation of stable emulsion- Mayonnaise
5. Stages of Sugar cookery - Any two Preparations
6. Test for free fatty acid in oil samples, smoking point of oils
7. Testing pectin strength in fruits and vegetable extracts and effect of heat and acid
8. Sensitivity test : Threshold test for salt, sugar, bitter and sour tastes
9. Identification of food pigments using paper chromatography

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SEMESTER – II CORE COURSE 4
PRINCIPLES OF FOODS

Course Code: P26/NUT/DSC/201/P **Max. Marks: 50**
No. of Credits: 2 **Time: 3h**

1. Record the factors affecting gelatinization and present your observations. **20M**

OR

2. Write and display the different stages of sugar cookery **20M**

3. Rank the given solutions (sweet, sour, salt) according to their concentration and identify their threshold. **25M**

4. Record **5 M**

Prepared by Course Teacher [Name &Signature]	Checked &Verified by HoD/ Programme Coordinator [Name &Signature]	Approved by the Principal
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SEMESTER - II

NUTRITIONAL BIOCHEMISTRY - II

1. Course Description

Programme: M. Sc | **Max. Hours: 60**
Course Code: P26/ NUT/ DSC/202 | **Hours per week: 4**
Course Type: Discipline Specific Core | **Max. Marks: 100**
No. of Credits: 4

2. Course Objectives

1. To enable students to understand the role of nutrients in the body.
2. To know the classification, functions and metabolism of lipids, vitamins, and minerals.

3. Course Outcomes

After the successful completion of the course, the student will be able to:

CO1: Remember lipid, fatty acid and cholesterol synthesis and metabolism in human body. (L1)

CO2: Understand the abnormalities of lipids and functions fat soluble vitamins.(L2)

CO3: Understand the role of vitamins and water regulation ((L2)

CO4: Remember the physiological importance of minerals and trace elements in human body.(L1)

Expected Level of Output: Conceptual level

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4. **Course content**

MODULEI: LIPIDS AND THEIR METABOLISM **(15 Hours)**

1.1. Lipids: Classification, sources, functions and requirements, Digestion and absorption, Transport- Types of transporters and their mechanism, utilization and storage.

1.2. Fatty Acids: Classification and functions of fatty acids, lipoproteins, and triglycerides in body.

1.3.Metabolism: Oxidation of fatty acids, Biosynthesis of triglycerides and phosphatides, synthesis of lipoproteins.Ketogenesis and Ketoacidosis, Lipotropic factors.

MODULE II:NUTRITIONALIMBALANCES OF LIPIDS AND FAT-SOLUBLE VITAMINS **(15 Hours)**

2.1. Imbalances of Lipids: Obesity, Cachexia, Gaucher's, Niemann's picks, Tay-sach's, Fabry's disease, Hypolipoproteinemia.

2.2.Metabolic Interconnections: Interrelationship between carbohydrate, fat and protein metabolism, Metabolic Changes during starvation,Hormonal regulation of metabolism, Metabolism during exercise.

2.3. Fat Soluble Vitamins: Physiological action, transport, utilization, storage, sources, functions and deficiency of: Vitamin A, Vitamin D, Vitamin E, Vitamin K.

MODULE III:WATER AND WATER SOLUBLE VITAMINS **(15 Hours)**

3.1. Water: Functions, Distribution, Requirements, Electrolyte Balance, Disturbances in Fluid Balance- Dehydration and Oedema. Role of solutes (Sodium and Potassium) in maintaining the volume of the fluid compartments.

3.2. Homeostatic Regulation of Fluid Balance: Regulation of water balance: role of kidneys and hormones (ADH, aldosterone, renin–angiotensin system), Hydration requirements in special physiological conditions

3.3. Water Soluble Vitamins: Physiological action, transport, utilization, storage, sources, functions and deficiency of: Thiamin, Riboflavin, Vitamin B12, Pantothenic acid, Folic Acid, Pyridoxine,Niacin, Ascorbic acid .

MODULE IVMINERALS AND TRACE ELEMENTS **(15 Hours)**

4.1.Macro Minerals: Calcium,Phosphorous, Magnesium, Sodium, Potassium and Chloride - absorption, utilization, sources, functions and deficiency. Factors affecting calcium absorption -interrelationship between parathormone and vitamin D in the regulation of calcium and phosphorous metabolism.

4.2.Micro Minerals: Iron, Zinc, Copper, Iodine, Manganese, Fluoride - Functions, sources, absorption, transport, utilization and storage of iron. Role of iron in prevention of anemia.

4.3.Trace Minerals: Physiology, sources, functions and deficiency of Selenium, Chromium, Molybdenum, Cobalt.

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5. Reference Books

1) Nutritional Biochemistry – Tom Brody, 2nd edition, Academic Press.
2) Text Book of Human Nutrition – Mahtab S. Bamji, N Prahlad Rao, Vinodini Reddy, 2nd edition, Oxford & IBH Publishing Co. Pvt. Ltd.
3) Textbook of Medical Biochemistry – S Ramakrishnan, K G Prasannan, R Rajan, 3rd edition, Orient Longman, Harper's Illustrated Biochemistry – Robert K. Murray, Daryl K. Granner,Peter A. Mayes, Victor W. Rodwell, 26th edition, Mc Graw Hills.
4) Experimental Biochemistry – A Student Companion – B Sashidhar Rao, Vijay Deshpande, IK, International Pvt. Ltd.
5) Biochemistry – U Satyanarayana, U Chakrapani, Books & Allied (P) Ltd.
6) Clinical Biochemistry – Nagini
7) Principles of Biochemistry – Leihninger A L, CBS Publishers and Distributors.
8) Textbook of Biochemistry (for Medical students) – DM Vasudevan and S Sreekumari, 4th edition, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.

6. Syllabus Focus

a)Relevance to Local, Regional, National and Global Development Needs

S. No	Student Centric Methods Adopted	Type/Description of Activity
1.	National	The syllabus equips students with biochemical knowledge to support national nutrition programs such as: Poshan Abhiyaan, National Nutrition Mission.
2.	Global	Globally, understanding nutrient metabolism is essential for addressing: Non-communicable diseases, Nutritional deficiencies, Metabolic disorders

b) ComponentsonSkillDevelopment/Entrepreneurship Development/Employability

Skill Development /Entrepreneurship Development / Employability	Syllabus Content	Descriptionof Activity
Employability Opportunities (NSQF Level 3 or 4)	Biochemical estimation methods	Hands on practicals and field visits

c) IKS components

IKS	Syllabus Content	Module
IKS	Indian dietary practices traditionally include natural sources of micronutrients	II,III,IV

d) Aligned with SDG 2(Zero Hunger), SDG 3 (Good Health and well- being), SDG 4 (Quality Education) and SDG12 (Responsible Consumption and Production).

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Interactive Classroom quiz	Experiential learning
2.	Presentation	Participative learning

8. Course Assessment Plan

a. Weightage of Marks in Continuous Internal Assessments andEnd Semester Examination

Maximum Marks: 20M		**Maximum Marks: 20M**	
CIA 1 **Subjective**	**CIA 1** **Subjective**	**CIA 2** **Skill Based Test: 10M**	**CIA 2** **Assignment: 10M**
Section A: 1x10=10M Essay question: Answer any 1 out of 2 **Section B: 2x5=10M** Short questions: Answer any 2 out of 3	**Section A: 1x10=10M** Essay question: Answer any 1 out of 2 **Section B: 2x5=10M** Short questions: Answer any 2 out of 3	Discretion of the faculty	Discretion of the faculty

External QP Pattern		
4 Credits 4 Modules (CORE)	SECTION A - Internal Choice	**4 Q X 10 M = 40M**
	SECTION B – Answer any 5 out of 8 (To compulsorily have ONE question from each module)	**5 Q X 4 M = 20M**

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b) Aligning COs with Continuous Internal Assessments

Cos	Continuous Internal Assessments - CIA (40%)	End Semester Examination - (60%)
CO1	CIA-1	End Semester examination
CO2	CIA-1	
CO3	CIA-2 Presentation, Quiz, Crosswords,	
CO4	CIA-2 Assignment	

c) Question Paper Pattern:

Nutritional Biochemistry – I
Model Question Paper – Theory

Subject Code: P26 /NUT/DSC/202 **Max marks: 60**
Time: 2½ h

Section – A

Answer all questions **(4X10=40 M)**

1.

(or)

2.
3.

(or)

4.
5.

(or)

6.
7. (or)

8.

Section - B

Answer any 5 of the following questions **(5X4 =20 M)**

9.
10.
11.
12.
13.
14.
15.
16.

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Question Paper format – Blooms Taxonomy Level

SECTION A - INTERNAL CHOICE 4Q X 10 M = 40M				
Question Number	**Module**	**Question (Model Questions)**	**CO**	**BTL (Blooms Taxonomy Level)**
1	Module 1	Write in detail the classification, sources and functions of the lipids	CO1	Level I
2	Module 1	Explain in detail the process of Fat Oxidation, along with the energetic	CO1	Level II
3	Module 2	Describe theInborn errors of Lipid Metabolism	CO2	Level II
4	Module 2	Describe the various sources Vitamin A, mention its functions and deficiencies.	CO2	Level I, II
5	Module 3	Write an essaythe role of solutes in maintaining the volume of the fluid compartments	CO3	Level IV
6	Module 3	Describethe various sources Thiamin, mention its functions and deficiencies	CO3	Level II
7	Module 4	Explain in detail factors affecting calcium absorption& role of calcium in ossification and bone growth	CO4	Level II
8	Module 4	Explain the role of iodine in human nutrition	CO4	Level II
SECTION B - ANSWER ANY 5 OUT OF 8 5 Q X 4M = 20M (To compulsorily have **ONE** question from **each** module)				
9	Module 1	Describe classification of lipids	CO 1	Level II
10	Module 1	Describe Ketosis	CO 1	Level II
11	Module 2	Explain Cachexia	CO 2	Level II
12	Module 2	Describe metabolic changes during starvation	CO 2	Level II
13	Module 3	Describe Vitamin B12 functions	CO 3	Level II
14	Module 3	Explain Fluid and electrolyte balance	CO 3	Level II

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15	**Module 4**	Differentiate between the role of PTH in calcium and phosphorus absorption	**CO4**	**Level IV**
16	**Module 4**	Explain role of iron in RBC synthesis	**CO4**	**Level II**

d) QuestionPaper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
1	15	CO-1	2	10	2	4
2	15	CO-2	2	10	2	4
3	15	CO-3	2	10	2	4
4	15	CO - 4	2	10	2	4

9. CO-POMapping

CO	PO	Cognitive Level	Classroomsessions (hrs)
1	1	Understand	15
2	2	Understand	15
3	1	Apply	15
4	1	Apply	15

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SEMESTER – II
NUTRITIONAL BIOCHEMISTRY-II
PRACTICAL

1. Course Description:

Course Code: P26/NUT/DSC/202/P
Type of course: DSC -6
No. of credits: 2

Max. Hours: 60
Hours per week: 4
Max. Marks: 50

Course Objectives

1. To enable students to understand techniques involved in estimation of minerals and vitamins

Course Outcomes

CO1: To apply the protocol of chemistry to asses macronutrients

List of practicals

1. Preparation of the sample
2. Estimation the following
3. Iron
4. Calcium
5. Phosphorous
6. Vitamin -C
7. Qualitative analysis of Amino Acids

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SEMESTER – II CORE COURSE 6–NUTRITIONAL BIOCHMEISTRY

Model Paper

Subject Code: P26/NUT/DSC/202/P

Time: 3h **Max.Marks:50**

I. Write down the principles, procedure involved in major experiments	[10 M]
II. MAJOR	[20M]
III. MINOR	[10 M]
IV. Record	[05 M]
V. Viva	[05 M]

Prepared by Course Teacher [Name &Signature]	Checked &Verified by HoD/ Programme Coordinator [Name &Signature]	Approved by the Principal
Indu Bhargavi K	Dr. Tabitha Ramona	Prof. Uma Joseph

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SEMESTER –II
COMMUNITY NUTRITION

1. Course details:

Programme: M.Sc. **Max.Hours: 60**

Course Code: P26/NUT/DSC/203 **Hours per week: 4**

Course Type: Discipline Specific Core **Max.Marks: 100**

No. of credits: 4

2. Course Objectives:

1. To understand the causes / determinants and consequences of nutritional problems in community.
2. To familiarize students with various approaches to nutrition and health interventions, programmes and policies.

3. Course Outcomes:

After the successful completion of the course, the student will beable to:

CO 1: Create skills to conduct Nutritional assessments. (L III)

CO 2: Evaluate and prevent common nutritional problems in India (LV)

CO 3: Analyse the role of various government and non-government agencies in combating malnutrition. (L IV)

CO 4: Understand different nutritional tools in educating the community. (L II)

Expected Level of Output: Conceptual level

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4. Course Content

MODULE1: ASSESSMENT OF NUTRITIONAL STATUS **(15 Hours)**

1.1Anthropometry: Weight, height, mid arm circumference, head and chest circumference, Skin fold thickness, BMI – uses and limitations. Weight / Height, Weight / Age, Height / Age – ICMR, NCHS standards, Gomez and Waterloo's classification, WHO standards.

1.2 Diet Surveys: Individual, Institutional and National, Uses and limitations of diet surveys, Biochemical methods: uses and limitations.Clinical assessment: uses and limitations.

1.3 Biomarkers – Definition, Classification – Genetic and biochemical, Examples of biomarkers – RBC, folate, calcium, LDL receptors in CVD, vitamin A.

MODULE 2: NUTRITION EDUCATION AND HEALTH ADMINISTRATION(15 Hours)

2.1 Nutrition Education: Importance of Nutrition and Health Education Tools and techniques of health education. Audio aids, Visual aids, Audiovisual aids, advantages and disadvantages. Types of approaches: personal, group and mass, advantages and disadvantages.

2.2 Health administration: Central level, State level, Village level, Primary Health Care.

2.3 Measures to combat malnutrition: ICDS, IDDCP, Vitamin A Prophylaxis Programme, Anaemia Prophylaxis Programme, Nutrition and Health Policies.

MODULE 3: NUTRITION AND HEALTH INTERVENTIONS **(15 Hours)**

3.1 Introduction: Magnitude of malnutrition in India, Consequences of malnutrition in India.

3.2 Nutritional problems in India: PEM, Anaemia, Iodine Deficiency Disorder and Vitamin A Deficiency, Dental caries, Fluorosis.

3.3Role of National and International organizations in combating malnutrition: ICMR, ICAR, NIN, CARE, UNICEF, WHO.

MODULE 4 : VITAL STATISTICS AND OCCUPATIONAL HAZARDS **(15 Hours)**

4.1 Vital statistics: Mortality, Morbidity Occupational hazards: Physical, chemical and Biological.

4.2 Protection of health and nutritional status of workers: Women employees in industries and establishments, medical measures, Infrastructure measures and legislation.

4.3Management during calamities and emergencies: Nutritional relief and rehabilitation - assessment of food needs, food distribution strategy, Mass and supplementary feeding, Sanitation

and hygiene, Evaluation of feeding programmes, public nutrition approach to tackle nutritional problems in emergencies.

5. Reference Books:

1. Public Health Nutrition – Michale J. Gibney, Barrie M. Margetts, John M. Kearney and Lenore Arab (Eds.) – Nutrition Society Textbook Series, Blackwell Publishing.
2. Nutritional Science – B. Sri Lakshmi, New Age International Publ;ishers, 2nd edition.
3. Text Book of Human Nutrition – Mahtab S Bamji, N PrahladRao, Vinodini Reddy,2nd editon, Oxford & IBH Publishing Co. Pvt. Ltd.
4. Social and Preventive Medicine – Part & Park. L Goyet, Fish.V.Seaman,J and Geijer.U.(1978) The management of Nutrition Emergencies in Large Population, WHO, Geneva.
5. The Management of Nutrition in Major emergencies, WHO in collaboration with UNHCR, International Federation of Red Cross and Red Crescent societies and WFP.
6. Owen. A. Y. and Frankle, R. T. (1986) Nutrition in the Community. The Art of delivering Services, 2nded. Times Mirror/ Mosby
7. WFP/ UNHCR (1998) WEP/ UNHCR Guidelines for Selective Feeding Programmes in Emergency Situations. Rome and Geneva: WEP & UNHCR.
8. Goyet, Fish. V. Seaman, J. and Geijer, U. (1978) The Management of Nutritional emergencies in Large Populations, World Health Organization, Geneva

6. Syllabus Focus

a) Relevance to Local, Regional, National and Global Development Needs

Local /Regional/National /Global Development Needs	Relevance
National	Focuses on assessment of nutritional status, major nutritional problems in India (PEM, anemia, IDD, Vitamin A deficiency) and national nutrition programmes such as ICDS, IDDCP and anemia prophylaxis.
Regional	Helps address region-specific nutritional issues through nutrition education, community health approaches and primary health care services.

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Global	Links with global health goals by addressing malnutrition, disaster nutrition management and the role of international organizations like WHO, FAO and UNICEF.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
SD **(NSQF Level 3 to 4)**	Nutritional assessment, diet surveys, nutrition education, community nutrition programmes	Students practice anthropometric measurements, conduct diet surveys, prepare nutrition education materials and analyse public health nutrition programmes to develop practical and employability skills.

c) IKS component

IKS	Syllabus Content	Module
	Use of traditional diets, community nutrition practices and preventive health approaches	2 & 3

d)Aligned with SDG 2 (Zero Hunger), SDG 3 (Good Health and well- being) and SDG 4 (Quality Education).

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7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Seminar Presentation	Participative Learning
2.	Quiz/ case studies	Experiential Learning
3.	Group Discussion	Participative Learning

8. Course Assessment Plan

a) Weightage of Marks in Continuous Internal Assessments andEnd Semester Examination

Maximum Marks: 20M		**Maximum Marks: 20M**	
CIA 1 **Subjective**	**CIA 1** **Subjective**	**CIA 2** **Skill Based Test: 10M**	**CIA 2** **Assignment: 10M**
Section A: 1x10=10M Essay question: Answer any 1 out of 2 **Section B: 2x5=10M** Short questions: Answer any 2 out of 3	**Section A: 1x10=10M** Essay question: Answer any 1 out of 2 **Section B: 2x5=10M** Short questions: Answer any 2 out of 3	Discretion of the faculty	Discretion of the faculty

External QP Pattern		
4 Credits 4 Modules (CORE)	SECTION A - Internal Choice	**4 Q X 10 M = 40M**
	SECTION B – Answer any 5 out of 8 (To compulsorily have ONE question from each module)	**5 Q X 4 M = 20M**

b) Aligning COs with Continuous Internal Assessments

Cos	Continuous Internal Assessments - CIA (40%)	End Semester Examination - (60%)
CO1	CIA-1	End Semester examination
CO2	CIA-1	
CO3	CIA-2 Presentation, Quiz, Crosswords,	
CO4	CIA-2 Assignment	

c) Model Question Paper – End Semester Exam Theory

COMMUNITY NUTRITION

Course Code: P26/NUT/DSC/203 **Max Marks: 60**
Credits:4 **Time:2 1/2 Hrs**

Note: This question paper consists of Section A and B. The answer to Section A & B must be written in the answer book given.

SECTION – A(Long Essay Type)

Answer ALL questions: **Marks: 4 x 10 =40**

1.

OR

2.
3.

OR

4.
5.

OR

6.
7.

OR

8.

SECTION – B

II. Answer any FIVE of the following **5x4 =20 M**

9.
10.
11.
12.
13.
14.
15.
16.

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Question Paper format – Blooms Taxonomy Level

SECTION A - INTERNAL CHOICE				4Q X 10 M = 40 M
Question Number	**Module Covered**	**Question**	**CO**	**BTL (Blooms Taxonomy Level)**
1	Module 1	Explain the concept of biomarkers in nutritional assessment and discuss their significance.	CO 1	Level II
2	Module 1	Design a comprehensive nutritional assessment using anthropometric measurements and discuss their limitations.	CO 1	Level VI
3	Module 2	Explain the tools and techniques used in nutrition and health education.	CO 2	Level II
4	Module 2	Define health administration and list its levels.	CO 2	Level I
5	Module 3	Evaluate the major nutritional problems in India and their consequences on public health.	CO 3	Level V
6	Module 3	Develop a strategy explaining the implementation of Vitamin A and Anemia Prophylaxis Programmes to combat malnutrition.	CO 3	Level VI
7	Module 4	Apply the concept of nutritional relief and rehabilitation in managing emergencies and calamities.	CO 4	Level III
8	Module 4	Design a public nutrition approach to tackle nutritional problems during emergencies.	CO 4	Level VI
SECTION B - ANSWER ANY 5 OUT OF 8 (To compulsorily have ONE question from each module)				**5Q X 4M = 20 M**
9	Module 1	Evaluate the significance of Waterloo's classification in assessing malnutrition.	CO 1	Level V
10	Module 1	List examples of biomarkers used in nutritional assessment.	CO 1	Level II
11	Module 2	Explain audio-visual aids used in nutrition education.	CO 2	Level II
12	Module 2	Define Primary Health Care.	CO 2	Level I
13	Module 3	Explain the causes and effects of fluorosis.	CO 3	Level II

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14	Module 3	Describe the role of NIN in improving nutritional status in India.	CO 3	Level II
15	Module 4	Evaluate the importance of food distribution strategies during emergencies.	CO 4	Level IV
16	Module 4	Apply measures to protect the health and nutrition of women employees in industries.	CO 4	Level III

d) Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
1	15	CO-1	2	10	2	4
2	15	CO-2	2	10	2	4
3	15	CO-3	2	10	2	4
4	15	CO-4	2	10	2	4

9. CO - PO Mapping:

CO	PO	Cognitive Level	Class room sessions (hrs)
1	2	Create	15
2	4	Evaluate	15
3	4	Analyze	15
4	1	Understand	15

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SEMESTER-IV
COMMUNITY NUTRITION
PRACTICAL

Programme : M.Sc. **Max.Hours : 30**

Course Code: P26/NUT/DSC/203/P **Hours per week: 3**

Type of course: DSC **Max.Marks: 50**

Course Objectives:

1. To give an insight into the various low-cost ingredients available in the market and develop low-cost nutritious recipes for vulnerable segments of the community.
2. To develop teaching aids for Nutrition and Health Education.

Practical Sessions

1. Conducting surveys for dietary patterns of different deficiency disorders and comparison of the same based on economic, socio-cultural and rural urban variances.
2. Planning and Preparation of low-cost recipes for
   a. Protein Calorie Malnutrition
   b. Iron and Folic acid Deficiency
   c. Vitamin A deficiency
   d. Complementary Foods (emphases of premixes and ARF)
   e. Pregnant and lactating women
3. Plotting of growth charts of Infants and Pre-school children
4. Planning a nutrition Health Education activity using various teaching aids.
5. Estimation of food and nutrient intake:
   a. 24 hrs food recall
   b. Food diaries
   c. Food frequency data.
6. Visit to ICDS Centre and preparation of report
7. Visit to Government School for assessing Mid-day Meal Scheme

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MODEL QUESTION PAPER PRACTICAL

Course Code: P26/NUT/DSC/203/P **Time: 3 Hrs**

No. of credits: 2 **Max Marks :50**

Answer the following

1. Plan a standardized low- cost recipe and calculate the nutritive value for two servings	**10M**
2. Visual Aid (Internal)	**20 M**
3. Visual aid (external)	**10 M**
4. Viva	**5 M**
5. Record	**5 M**

Prepared by	Checked &verified by	Approved by
Dr.Durga Nandini Teaching faculty	Dr.Tabitha Ramona	Prof. Uma Joseph Principal

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SEMESTER - II

MEDICAL NUTRITION THERAPY-II

1. Course Description:

Programme: M.Sc **Max. Hours: 60**

Course Code: P26/NUT/DSC/204 **Hours per week:4**

Course Type: Discipline Specific Core **Max. Marks: 100**

No. of credits: 4

2. Course objectives:

1. To impart in depth knowledge regarding prevalence, etiology, diagnosis, diet and life style management in acute and chronic diseases.
2. To gain knowledge to recommend and provide appropriate nutritional care for prevention or and treatment of various diseases.

3. Course outcomes:

After the successful completion of course, the student will be able to:

CO 1: Evaluate liver and gallbladder function and design appropriate therapeutic diets for common hepatic and biliary diseases.(L V)

CO 2: Gain skills to identify renal disorders, interpret diagnostic tests, and implement evidence-based dietary management.(L VI)

CO 3. Assess and manage diet for pancreatic, diabetes, and thyroid disorders.(L II,VI)

CO 4: Apply clinical knowledge to design and modify diets for cardiovascular, metabolic, and oncological conditions.(L III, VI)

Expected Level of Output: Conceptual level

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4. Course Inputs:

MODULE1: DIET FOR HEPATIC DISORDERS (15 Hours)

1.1 Liver: Structure and functions, Etiology, symptoms, diagnosis/functional test and dietary management of: Jaundice – Types – hemolytic, obstructive and infective. Viral Hepatitis - Types – A, B, C, D, E and G. Fatty liver.

1.2 Cirrhosis: Alcoholic liver disease, Hepatic Coma, Liver Transplant - Causes, Symptoms, Dietary Management.

1.3 Gallbladder: Structure, functions and composition of bile, Etiology, symptoms, diagnosis and dietary management of: Cholecystitis and Cholelithiasis.

MODULE2: DIET FOR RENAL DISORDERS (15 Hours)

2.1Kidney: Structure and functions. Etiology, symptoms, diagnosis and dietary managementof: Acute and Chronic Glomerulonephritis, Nephrosis.

2.2Renal Failure: Etiology, symptoms, diagnosis and dietary management ofAcute RenalFailure, Chronic Renal Failure, Urinary calculi – Types – Calcium oxalate, uric acid and struvite.

2.3 Dialysis: Hemodialysis - Advantages,disadvantages and Dietary management, Peritoneal dialysis- Advantages, disadvantages and Dietary management, Kidney Transplant

MODULE3: DIET FOR ENDOCRINE AND HORMONAL DISTURBANCES (15Hours)

3.1Disease of Pancreas: Etiology, symptoms, diagnosis and dietary management of Acute Pancreatitis, Chronic Pancreatitis

3.2 Diabetes Mellitus: Types, metabolic changes, Etiology, symptoms, diagnosis, Complications, Treatment – exercise, hypoglycemic drugs, insulin and diet, DietaryManagement – Role of fibre, glycemic index, food exchange list.

3.3 Diseases of Thyroid Gland: Dietary management in Hypothyroidism, management in Hyperthyroidism.

MODULE4: DIET FORCHRONIC AND METABOLIC DISORDERS (15 Hours)

4.1 Disorders of circulatory system : Dietary management of Hypotension, Hypertension,Dietary management of Cardio Vascular Diseases, Ischemic Heart Disease- Arteriosclerosis, Atherosclerosis, Coronary Artery Disease, Myocardial Infarction,Angina, Heart Failure, Non- Ischemic heart disease-Cardiac Myopathy, Congenital Heart Disease,

4.2 Metabolic Disorders: Gout – etiology, symptoms and dietary management. PCOS – Causes, pathophysiology, dietary management.Metabolic Syndrome

4.3 Cancer: Types, Pathophysiology, Etiology, metabolic changes, treatment (drugs, chemotherapy and radiotherapy), Modifications of diet during treatment, Nutritional management of cancer, Role of food in the prevention of Cancer.

5.Recommended books

1. Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10thEdition, W.B. Saunders Ltd.
2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (1999): Modern Nutrition in Health andDisease, 9th Edition, Williams and Wilkins
3. Escott-Stump, S. (1998): Nutrition and Diagnosis Related Care, 4th Edition, Williams andWilkins.
4. Garrow,J.S.,James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietetics, 10th Edition,Churchill Livingstone.
5. Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby CollegePublishing.
6. Davis, J. and Sherer, K. (1994): Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, 7. W.B. Saunders Co. Walker, W.A. and Watkins, J.B. (Ed) (1985): Nutrition in Pediatrics, Boston, Little, Brown &Co..
7. Foods – Nutrition and Health – Dr.VijayaKhader, Kalyani Publishers.
8. Clinical Dietetics and Nutrition – F P Antia and Philip Abraham.
9. Kumud Khanna (1997): Textbook of Nutrition and Dietetics, 2nd Edition, Elite Publishing House

Reference Textbooks:

1. Krause's Food, Nutrition, and Diet Therapy – L. Kathleen Mahan & Janice L. Raymond.
2. Clinical Dietetics and Nutrition – F. P. Antia & Philip Abraham.
3. Dietetics – B. Srilakshmi
4. Nutrition and Diet Therapy – Linda Kelley DeBruyne, Kathryn Pinna & Eleanor Noss Whitney.
5. Medical Nutrition Therapy: A Case-Study Approach – Marcia Nelms et al.
6. Williams' Basic Nutrition and Diet Therapy – Staci Nix.
7. Human Nutrition and Dietetics – Stanley Davidson & R. Passmore.
8. Handbook of Food and Nutrition – M. Swaminathan.

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6.Syllabus Focus:

a. RelevancetoLocal,Regional,NationalandGlobalDevelopmentNeeds

Local/Regional/National /Global Development Needs	Relevance
Global	Equips students to meet international healthcare and nutrition standards, contributing to global efforts in combating chronic diseases, obesity, malnutrition, and promoting evidence-based therapeutic diets.

b. ComponentsonSkillDevelopment/Entrepreneurship Development/Employability

Skill Development /Entrepreneurship Development / Employability	**Syllabus Content**	**Descriptionof Activity**
Employability (NSQF Level 4)	Module I,II,III,IV	Practical activities to apply clinical nutrition knowledge and skills.

c. IKS components

IKS	**Syllabus Content**	**Module**
IKS	Use of traditional therapeutic foods (rice gruel, fermented foods, herbal preparations) in liver, renal, and metabolic disorders.	I,II

d.Alligned with SDG 2 (Zero Hunger), SDG 3 (Good Health and well- being), SDG 4 (Quality Education) and SDG 12 Responsible Consumption and Production)

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7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Interactive Classroom quiz	Experiential learning
2.	Presentation	Participative learning

8.Course Assessment Plan

a. Weightage of Marks in Continuous Internal Assessments andEnd Semester Examination

Maximum Marks: 20M		**Maximum Marks: 20M**	
CIA 1 **Subjective**	**CIA 1** **Subjective**	**CIA 2** **Skill Based Test: 10M**	**CIA 2** **Assignment: 10M**
Section A: 1x10=10M Essay question: Answer any 1 out of 2 **Section B: 2x5=10M** Short questions: Answer any 2 out of 3	**Section A: 1x10=10M** Essay question: Answer any 1 out of 2 **Section B: 2x5=10M** Short questions: Answer any 2 out of 3	Discretion of the faculty	Discretion of the faculty

External QP Pattern		
4 Credits 4 Modules **(CORE)**	SECTION A - Internal Choice	**4 Q X 10 M = 40M**
	SECTION B – Answer any 5 out of 8 (To compulsorily have ONE question from each module)	**5 Q X 4 M = 20M**

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b. Aligning COs with Continuous Internal Assessments

Cos	Continuous Internal Assessments - CIA (40%)	End Semester Examination - (60%)
CO1	CIA-1	End Semester examination
CO2	CIA-1	
CO3	CIA-2 Presentation, Quiz	
CO4	CIA-2 Assignment	

c. Question Paper Pattern:

MEDICAL NUTRITION THERAPY-II
Model Question Paper – Theory

Subject Code: P26 /NUT/DSC/204
Time: 2½ h **Max marks: 60**

Section – A

Answer all questions **(4X10=40 M)**

1.

(or)

2.

(or)

3.

(or)

4.

(or)

5.

(or)

6.

(or)

7.

(or)

8.

Section - B

Answer any 5 of the following questions **(5X4 =20 M)**

9.
10.
11.
12.
13.
14.
15.
16.

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d. Question Paper Format -Blooms Taxonomy Level

SECTION A - INTERNAL CHOICE				4 Q X 10 M = 40 M
Question Number	**Question**	**Question**	**CO**	**BTL(Blooms Taxonomy Level)**
1	**Module 1**	What are the types of Jaundice? Mention the diagnostic tests and dietary management of the same.	**CO 1**	**I**
2	**Module 1**	What are Cholecystitis and Cholelithiasis? What are the symptoms? What kind of diet would you suggest for the condition?	**CO 1**	**I**
3	**Module 2**	Write about the structure and function of the kidney. What is the etiology, symptoms, and diagnosis of Acute and Chronic Glomerulonephritis?	**CO 2**	**II**
4	**Module 2**	When is Kidney transplant necessary?What diet would you suggest to a patient with Acute Renal Failure?	**CO 2**	**III**
5	**Module 3**	Define Glycemic Index. Write about the treatment for Diabetic Mellitus.	**CO 3**	**I**
6	**Module 3**	What are the clinical symptoms of hypothyroidism? Write about the dietary management.	**CO 3**	**I**
7	**Module 4**	What is Atherosclerosis? What dietary measures can be taken against it?	**CO 4**	**I**
8	**Module 4**	What are the different types and metabolic changes that occurs in Cancer? Elaborate about the treatment including nutritional requirements of Cancer.	**CO 4**	**II**
SECTION B - ANSWER ANY 5 OUT OF 85Q X4 M = 20 M (To compulsorily have **ONE** question from **each** module)				
9	**Module 1**	Liver Cirrhosis	**CO 1**	**I**
10	**Module 1**	Viral Hepatitis	**CO 1**	**I**
11	**Module 2**	Kidney stone	**CO 2**	**II**

12	**Module 2**	Hemodialysis	**CO 2**	**IV**
13	**Module 3**	Pancreatitis	**CO 3**	**III**
14	**Module 3**	GTT	**CO 3**	**IV**
15	**Module 4**	Hyperlipidemia	**CO4**	**IV**
16	**Module 4**	Role of Food in prevention of Cancer	**CO4**	**III**

e. QuestionPaper Blueprint

Modules	Hours Allotted in the Syllabus	COs Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
1	15	CO-1	2	10	2	4
2	15	CO-2	2	10	2	4
3	15	CO-3	2	10	2	4
4	15	CO - 4	2	10	2	4

9. CO-POMapping

CO	PO	Cognitive Level	Classroom sessions (hrs)
1	1	Understand	15
2	2	Understand	15
3	1	Apply	15
4	1	Apply	15

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SEMESTER – II

MEDICAL NUTRITION THERAPY-II
PRACTICAL SYLLABUS

1. Course Description:

Course Code: P26/NUT/DSC/204/P **Max. Hours: 60**

Type of course: DSC **Hours per week: 4**

No. of credits: 2 **Max. Marks: 50**

Course Objectives

1. To develop students' ability to apply updated dietary interventions in the management of diverse medical disorders.

2. To develop competency in designing therapeutic diets in accordance with dietary prescriptions

Course Outcomes

After the successful completion of the course the student will be able to

CO 1: Apply concepts of therapeutic condition to plan and calculate nutritive value

CO2: Create and prepare a menu based on various dietary disorder.

List of practicals

1. Plan a day's diet , Calculate Nutritive value for Viral Hepatitis
2. Preparation of the planned diet for Viral Hepatitis
3. Plan a day's diet , Calculate Nutritive value for Cirrhosis of Liver
4. Preparation of the planned diet for Cirrhosis of Liver
5. Plan a day's diet , Calculate Nutritive value for Nephritis
6. Preparation of the planned diet for Nephritis
7. Plan a day's diet, Calculate Nutritive value for Nephrosis
8. Preparation of the planned diet for Nephrosis
9. Plan a day's diet , Calculate Nutritive value for Renal Failure
10. Preparation of the planned diet for Renal Failure
11. Plan a day's diet, Calculate Nutritive value for Renal calculi
12. Preparation of the planned diet for Renal calculi
13. Plan a day's diet, Calculate Nutritive value for Cancer

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14. Preparation of the planned diet for Cancer

15. Plan a day's diet and Calculate Nutritive value for Diabetes with Hypertension / Nephropathy / Atherosclerosis

16. Preparation of the planned diet for Diabetes with Hypertension / Nephropathy / Atherosclerosis

Model Question paper – End Semester Exam Practical

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(An Autonomous College of Osmania University)
FACULTY OF SCIENCE-NUTRITION
SEMESTER – II CORE COURSE 4
MEDICAL NUTRITION THERAPY- II

Course Code: P26/NUT/DSC/204/P **Marks:50**
No. of credits : 2 **Time:3 Hrs**

Answer the following

1. Plan a therapeutic diet with dietary prescription for the condition (A, B,C) **(15 M)**

A. Renal failure (2000 kcal)

B. Viral hepatitis (1800 kcal)

C Diabetes with hypertension (1600 kcal)

2. Calculate the nutritive value for the planned diet **(20M)**

3. Viva **(10M)**

4. Record **(05 M)**

Prepared by Course Teacher [Name &Signature]	Checked &Verified by HOD [Name &Signature]	Approved by the Principal
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