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BE BOUNDLESS

BENGALURU CITY UNIVERSITY

Syllabus for B.Sc. Clinical Nutrition and Dietetics

**CHOICE BASED CREDIT SYSTEM
(SEMESTER SCHEME)**

2020-2021

Date: 09.10.2020

From,
Dr.K.S.Roopa,
BOS Chairperson in Home Science (UG and PG)
Bangalore City University (BCU)
and
Principal
Smt. V.H.D. Central Institute of Home Science,
Seshadri Road, Bangalore - 560001.

To,
The Registrar (Evaluation),
Bangalore City University (BCU),
Central College Campus, Bangalore - 560 001.

Respected Sir,

Sub: Submission of the Proceedings of the BOS meeting in Home Science held on 09.10.2020 to approve the following:

1. Constitution of BOE for UG and PG courses in Home Science for the academic year 2020-21.
2. Approval of Panel of Examiners for the UG and PG courses in Home Science for the academic year 2020-21.
3. Approval of syllabus for BSc in Clinical Nutrition and Dietetics (CND).
4. Approval of syllabus of Human Development subject as an optional for BSc in Nutrition and Dietetics, Chemistry, (NDCHD) combination.
5. Approval of Ph D Research Guides.

With reference to the above mentioned subject, please find the enclosed proceedings of the BOS meeting in Home Science held on 09.10.2020. The constitution of BOE and finalized list of panel of examiners, syllabus of CND and NDCHD courses and approval of Ph.D. research guide has been enclosed for your kind perusal.

I thank you.

K.S.R
09/10/2020

RE)

Yours Sincerely,

(K.S.Roopa)

**Proceedings of the BOS in Home Science (UG , PG and PhD) meeting, Bengaluru City
University held on 9th October 2020.**

Date: 09.10.2020

A BOS meeting in Home Science (UG, PG and Ph.D.) was held on 9th October 2020 as a Circulation and Table Agenda due to the ongoing COVID-19 pandemic situation to approve the following.

1. Constitution of BOE for UG and PG courses in Home Science for the academic year 2020-21.
2. Approval of Panel of Examiners for the UG and PG courses in Home Science for the academic year 2020-21.
3. Approval of syllabus for BSc in Clinical Nutrition and Dietetics (CND).
4. Approval of syllabus of Human Development subject as an optional for BSc in Nutrition and Dietetics, Chemistry, (NDCHD) combination .
5. Approval of Ph D Research Guides.

The board also approved the syllabus of Human Development subject as an optional for for BSc in Nutrition and Dietetics, Chemistry, (NDCHD) combination

Members of BOS:

1. Dr.K.S Roopa

BOS Chairperson UG & PG (BCU)
Bengaluru Central University (BCU)
Central College Campus, Bengaluru-560 001
Associate Professor & HOD,
Department of Human Development
Smt. V.H.D. Central Institute of Home Science,
Seshadri Road, Bengaluru – 560001.

K.S. Roopa
9/10/2020

2. Dr. Mamatha B

Member
Associate Professor
Department of Resource Management
Smt. V.H.D. Central Institute of Home Science,
Seshadri Road, Bengaluru – 560001.

Mamatha B
9/10/2020

3. Dr.Usha Devi

Member
Associate Professor & HOD,
Department of Food & Nutrition,
Smt.VHD Central Institute of Home Science,
Seshadri Road, Bengaluru-560 001

Usha Devi
9/10/2020

4. **Dr. Srilakshmi R**
Member
Assistant Professor
Department of Extension Education and Communication
Smt. V.H.D. Central Institute of Home Science,
Seshadri Road, Bengaluru – 560001.
5. **Dr. Rajalakshmi M. S**
Member
Associate Professor
Department of Early Childhood Education and Administration
Smt. V.H.D. Central Institute of Home Science,
Seshadri Road, Bengaluru – 560001
6. **Dr. Devaraj V.R**
Member
Professor
Department of Biochemistry,
Bangalore University Central College Campus,
Palace Road, Bangalore-560 001.
7. **Dr. Asna Urooz**
Member
Professor
Department of Studies in Food Science & Nutrition,
Manasagangotri,
University of Mysore,
Mysore- 570 006.
8. **Dr. Sudhakar R**
Member
Assistant Professor & Coordinator,
Department of Apparel Technology Management,
Bangalore University Central College Campus,
Palace Road, Bangalore - 560 001.

Srilakshmi R
9/10/2020

Rajalakshmi M
9/10/2020

R. Devaraj

Dr. Asna Urooz
has approved by
email.

Dr. Sudhakar
has approved by
email.

- The board constituted BOE for UG and PG courses in Home Science for the colleges which come under Bengaluru City University.
- The board also approved and recommended the panel of examiners for UG, PG courses in Home Science.
- The board approved the syllabus for BSc in Clinical Nutrition and Dietetics (CND).
- The board also approved the syllabus of Human Development subject as an optional for for BSc in Nutrition and Dietetics, Chemistry, (NDCHD) combination.

- The board approved and recommended Dr. Sujatha Gupta, Associate Professor, Department of Human Development, Mount Carmel College Bangalore as a Research Guide in the subject Human Development under Bengaluru City University .

The proceedings of the meeting was circulated and approval obtained by the members.

Dr. K.S. Roopa
Dr.K.S.Roopa 9/10/2020
Chairperson

Dr. K.S. ROOPA M.Sc.,Ph.D.,FISCA.
Chairperson
BOS in Home Science (UG & PG)
Bengaluru Central University
Central College Campus
Bengaluru - 560 001

Smt.VHD Central Institute of Home Science
Seshadri Road,Bangalore-560 001
3 Year B.Sc Clinical Nutrition and Dietetics (Autonomous)

I Semester B Sc CND Syllabus Framework

Parts	Subjects	Paper	Instruction Hours/Week	Duration of Exam (Hours)	Marks			Credits	Total Credits
					IA	Exam	Total		
Part 1	2 Languages	2 T	2x4	2x3	2x30	2x70	100	2x2	4
Part 2	Optional 1 Human Nutrition CND103 Introduction to Food and Nutrition	1T	1x4	1x3	1x30	1x70	100	1x2	2
		1P	1x3	1x3	1x15	1x35	1x50	1x3	1
	Optional 2 Clinical Nutrition and Dietetics CND104 Human Physiology	1T	1x4	1x3	1x30	1x70	100	1x2	2
		1P	1x3	1x3	1x15	1x35	1x50	1x3	1
	Optional 3 Public Health Nutrition CND105 Food Sanitation and Hygiene	1T	1x4	1x3	1x30	1x70	100	1x2	2
		1P	1x3	1x3	1x15	1x35	1x50	1x3	1
Part 3	Foundation Course/SDC	1T	3	3	30	70	100	2	2
	CC & EC	-	-	-	50	-	50	1	1
Total Credits per Semester Per Program									16

II Semester B Sc CND Syllabus Framework

Parts	Subjects	Paper	Instruction Hours/Week	Duration of Exam (Hours)	Marks			Credits	Total Credits
					IA	Exam	Total		
Part 1	2 Languages	2 T	2x4	2x3	2x30	2x70	100	2x2	4
Part 2	Optional 1 Human Nutrition CND203 Macro and Micro Nutrients	1T	1x4	1x3	1x30	1x70	100	1x2	2
		1P	1x3	1x3	1x15	1x35	1x50	1x3	1
	Optional 2 Clinical Nutrition and Dietetics CND204 Dietetics I	1T	1x4	1x3	1x30	1x70	100	1x2	2
		1P	1x3	1x3	1x15	1x35	1x50	1x3	1
	Optional 3 Public Health Nutrition CND205 Lifecycle Nutrition	1T	1x4	1x3	1x30	1x70	100	1x2	2
		1P	1x3	1x3	1x15	1x35	1x50	1x3	1
Part 3	Foundation Course/SDC	1T	3	3	30	70	100	2	2
	CC & EC	-	-	-	50	-	50	1	1
Total Credits per Semester Per Program									16

III Semester B Sc CND Syllabus Framework

Parts	Subjects	Paper	Instruction Hours/Week	Duration of Exam (Hours)	Marks			Credits	Total Credits
					IA	Exam	Total		
Part 1	2 Languages	2 T	2x4	2x3	2x30	2x70	100	2x2	4
Part 2	Optional 1 Human Nutrition CND303 Intermediary Metabolism	1T	1x4	1x3	1x30	1x70	100	1x2	2
		1P	1x3	1x3	1x15	1x35	1x50	1x3	1
	Optional 2 Clinical Nutrition and Dietetics CND 304 Dietetics II	1T	1x4	1x3	1x30	1x70	100	1x2	2
		1P	1x3	1x3	1x15	1x35	1x50	1x3	1
	Optional 3 Public Health Nutrition CND305 Food Safety	1T	1x4	1x3	1x30	1x70	100	1x2	2
		1P	1x3	1x3	1x15	1x35	1x50	1x3	1
Part 3	Foundation Course/SDC	1T	3	3	30	70	100	2	2
	CC & EC	-	-	-	50	-	50	1	1
Total Credits per Semester Per Program									16

IV Semester B Sc CND Syllabus Framework

Parts	Subjects	Paper	Instruction Hours/Week	Duration of Exam (Hours)	Marks			Credits	Total Credits
					IA	Exam	Total		
Part 1	2 Languages	2 T	2x4	2x3	2x30	2x70	100	2x2	4
Part 2	Optional 1 Human Nutrition CND403 Food Commodities	1T	1x4	1x3	1x30	1x70	100	1x2	2
		1P	1x3	1x3	1x15	1x35	1x50	1x3	1
	Optional 2 Clinical Nutrition and Dietetics 404 Physiologic and Metabolic changes in diseases	1T	1x4	1x3	1x30	1x70	100	1x2	2
		1P	1x3	1x3	1x15	1x35	1x50	1x3	1
	Optional 3 Public Health Nutrition CND405 Public Health Nutrition I	1T	1x4	1x3	1x30	1x70	100	1x2	2
		1P	1x3	1x3	1x15	1x35	1x50	1x3	1
Part 3	Foundation Course/SDC	1T	3	3	30	70	100	2	2
	CC & EC	-	-	-	50	-	50	1	1
Total Credits per Semester Per Program									16

21 days hospital internship is mandatory for the completion of the course to obtain the degree

V Semester B Sc CND Syllabus Framework

Part	Subjects	Paper	Instruction Hrs/ Week	Duration of Exams (Hrs)	Marks			Credits	Total Credits	
					IA	Exam	Total			
Part - 2	Optional 1 Human Nutrition									
	CND 501 Nutrition and Physical Fitness	1T 1P	1X3 1X3	1X3 1X3	1X30 1X15	1X70 1X35	1X100 1X50	1X2 1X1	2 1	
	CND 502 Culinary Science	1 T 1 P	1x3 1x3	1X3 1X3	1X30 1X15	1X70 1X35	1X100 1X50	1X2 1X1	2 1	
	Optional 2 Clinical Nutrition and Dietetics									
	CND 503 Dietetics III	1T 1P	1X3 1X3	1X3 1X3	1X30 1X15	1X70 1X35	1X100 1X50	1X2 1X1	2 1	
	CND 504 Diet Counseling	1 T 1 P	1x3 1x3	1X3 1X3	1X30 1X15	1X70 1X35	1X100 1X50	1X2 1X1	2 1	
	Optional 3 Public Health Nutrition									
	CND 505 Food Service Management	1T 1P	1X3 1X3	1X3 1X3	1X30 1X15	1X70 1X35	1X100 1X50	1X2 1X1	2 1	
	CND 506 Public Health Nutrition II	1 T 1 P	1X3 1X3	1X3 1X3	1X30 1X15	1X70 1X35	1X100 1X50	1X2 1X1	2 1	
	Part - 3	ISDC	1 T	1X3	1X3	1X30	1X70	1X100	1X2	2
	Total Credits per Semester									20

VI Semester B Sc CND Syllabus Framework

Part	Subjects	Paper	Instruction Hrs/ Week	Duration of Exams (Hrs)	Marks			Credits	Total Credits	
					IA	Exam	Total			
Part -2	Optional 1 Human Nutrition									
	CND 601 Functional foods	1T 1P	1X3 1X3	1X3 1X3	1X30 1X15	1X70 1X35	1X100 1X50	1X2 1X1	2 1	
	CND 602 Information and Communication Technology	1 T 1 P	1x3 1x3	1X3 1X3	1X30 1X15	1X70 1X35	1X100 1X50	1X2 1X1	2 1	
	Optional 2 Clinical Nutrition and Dietetics									
	CND 603 Dietetics IV	1T 1P	1X3 1X3	1X3 1X3	1X30 1X15	1X70 1X35	1X100 1X50	1X2 1X1	2 1	
	CND 604 Nutrition Counseling	1 T 1 P	1x3 1x3	1X3 1X3	1X30 1X15	1X70 1X35	1X100 1X50	1X2 1X1	2 1	
	Optional 3 Public Health Nutrition									
	CND 605 Foods in Indian Tradition	1T 1P	1X3 1X3	1X3 1X3	1X30 1X15	1X70 1X35	1X100 1X50	1X2 1X1	2 1	
	CND 606 Entrepreneurship Development	1 T 1 P	1X3 1X3	1X3 1X3	1X30 1X15	1X70 1X35	1X100 1X50	1X2 1X1	2 1	
	Part -3	ISDC	1 T	1X3	1X3	1X30	1X70	1X100	1X2	2
	Total Credits per Semester									20

I Semester B Sc. CND
Optional I Human Nutrition
INTRODUCTION TO FOOD AND NUTRITION

Code: CND 103

Hours: 52

Instruction hours /week: 4

Total marks: 100

Theory: 70

Internal Assessment: 30

Objectives:

1. To understand the basic concepts of food and nutrition
2. To gain elementary knowledge of food preparation

Unit I

08 hrs

Terminologies- food, nutrition, health, nutrients, nutritional status, malnutrition-under nutrition and over nutrition, Diet, Kilocalorie.

Unit II

10 hrs

Functions of food-Physiological, Psychological and Social factors affecting food intake and food habits.

Unit III

12hrs

Food preparation: Selection of foods, Preliminary preparation of food, Principles of cooking, methods of cooking: advantages and disadvantages. Effect of cooking on nutritive value, methods of enhancing nutritive value.

Unit IV

10hrs

Recommended Dietary Allowance (RDA), Balanced diet, Four food group system, Food exchange list, Food composition data base, Food Pyramid, My plate.

Unit V

12hrs

Concept of energy: Definition, units of energy, energy value of food - calorimetric , proximate composition, Components of energy requirement, B.M.R, Determination of BMR by calculation(Harris Benedict) Energy needs of the body(reference man and reference woman) , Energy requirement during work, thermic effect of food, Factors affecting B.M.R.

PRACTICAL

Code: CND103-P

Number of weeks: 16

Hours per week: 3

Total marks: 50

Internal Assessment: 15

Practical exam: 35

- Identification of foods under four food groups. (3 classes)
- Weights and measures of common foods (Raw and Cooked weight) (3 classes)
- Preparing a recipe by Boiling, Steaming, Pressure cooking (4 classes)
- Preparing a recipe by Frying (shallow, deep fat) Combination method (3 classes)
- Calculation of energy requirement for an adult man and a woman (3 classes)

References:

- Mudambi S R and Rajagopal M V, (2008), Fundamentals of Foods, Nutrition & Diet therapy by New Age International Publishers, New Delhi
- Srilakshmi B, (2002), Nutrition Science. New Age International publishers. New Delhi.

**I Semester B.Sc. CND
Optional I Human Nutrition
CND 103 Introduction to Food and Nutrition
Blueprint**

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	8	14	1	2	0	1
II	10	19	2	2	0	3
III	12	22	2	1	1	1
IV	10	19	1	1	1	1
V	12	22	1	1	1	4
Total	52	96 (inclusive of choice)	21	35	30	10

I Semester B Sc. CND
Optional II Clinical Nutrition and Dietetics
HUMAN PHYSIOLOGY

Code: CND 104

Hours: 52

Instruction hours /week: 4

Total marks: 100

Theory: 70

Internal Assessment: 30

Objectives:

1. To study the structure of different organs of the body.
2. To understand the functions of different organs of the body.

Unit: I

7 hrs

Basic tissues

- Structure and function of a cell
- Structure, Classification and functions of basic tissues

Unit: II

Digestive system

10 hrs

- Organs of the Gastrointestinal Intestinal Tract
- Digestion and absorption of food

Unit: III

11hrs

a) Circulatory system

- Blood- composition, coagulation and blood groups
- Structure of heart and types of blood circulation

b) Respiratory system-Structure and functions of Respiratory organs
Mechanism of respiration

Unit: IV

12hrs

a) Excretory system

- Structure and functions of excretory organs
- Composition of urine and Urine formation

b) Nervous system

- Central nervous system: Structure and Function of brain and Spinal cord
- Sympathetic and Parasympathetic nervous system

Unit V

12hrs

a) Reproductive system- Structure and function of reproductive organs

b) Endocrine system- Functions and types of endocrine glands.
Effect of hypo and hyper secretions

c) Sense organs – structure and functions of eye, ear, nose, skin and tongue

PRACTICAL

Code: CND104-P

Number of weeks: 16

Hours per week: 3

Total marks: 50

Internal Assessment: 15

Practical exam: 35

- Microscopic examination of basic tissues (5 classes)
- Hemoglobin estimation using hemometer (3 classes)
- Blood Groups and RBC count (demonstration) (4 classes)
- Pulse, B.P and respiratory rate at rest and after exercises (4 classes)

References:

- Guyton A.C. (1985), Functions of the human body. 4th Edition. W.B. Sanders Company. Philadelphia.
- Jain A.K. (1992), Text book of Physiology. Volume I and II. Avichal publishing co., New Delhi.
- Sherwood L (2008), Principles of Human Physiology.

I Semester B Sc. CND
Optional II Clinical Nutrition and Dietetics
CND 104 Human Physiology
Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	7	14	1	2	0	1
II	10	19	2	2	0	3
III	11	21	1	1	1	3
IV	12	21	2	1	1	0
V	12	21	1	1	1	3
Total	52	96 (inclusive of choice)	21	35	30	10

I Semester B Sc. CND
Optional III Public Health Nutrition
FOOD SANITATION AND HYGIENE

Code: CND 105

Hours: 52

Instruction hours /week: 04

Total marks: 100

Theory: 70

Internal Assessment: 30

Objectives:

1. To know the importance of sanitation and hygiene in food catering
2. To understand personal hygiene, cleaning procedures and pest control in food catering

Unit: I

8 hrs

Food sanitation: Terminologies-sanitation, hygiene, food sanitation, contamination, danger zone. Significance of sanitation in food catering industry

Unit: II

8 hrs

Hygiene in purchase and storage of food- receiving, food storage, general guidelines for storage, dry food storage, refrigerated storage, freezer storage.

Unit: III

12hrs

Hygiene in preparing, holding, serving and display of food. Hygienic procedures in food preparation, Hot holding of food, safe use of leftover food, Hygiene in food service, protective display of food.

Unit: IV

12hrs

- a) Personal hygiene-Importance, sanitary habits and practices, protective clothing.
- b) Storage and disposal of waste -classification of waste, solid waste (collection and storage of garbage), methods of disposal of garbage.

Unit: V

12hrs

Cleaning procedures-cleaning and sanitising, significance of cleaning programme, cleaning agents, types of cleaning equipment-manual, mechanical, post cleaning storage. Pest control-Importance, control of housefly, cockroaches, rodents.

PRACTICAL

Code: CND 105-P

Number of weeks: 16

Hours per week: 3

Total marks: 50

Internal Assessment: 15

Practical exam: 35

- Market survey of cleaning and sanitizing agents (3 classes)
- Hand washing technique (2 classes)
- Visit to food catering unit to study hygiene and sanitary practices.(2 classes)
- Use of food sanitation checklist-food preparation and handling practices, personal practices, service.(4 classes)
- Preparation of module and training of Group D staff in hygiene and sanitation (5 classes)

References:

- Food Sanitation and Hygiene(Latest edition) by Sunetra Roday
- Frazier W. C. and Westhoff D. C. Food Microbiology, 4th ed., 1988 New York.

**I Semester B.Sc. CND
Optional III Clinical Nutrition and Dietetics
CND105 Food Sanitation and Hygiene
Blueprint**

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	8	15	1	2	0	2
II	8	15	1	2	0	2
III	12	22	2	1	1	1
IV	12	22	2	1	1	1
V	12	22	1	1	1	3
Total	52	96 (inclusive of choice)	21	35	30	10

II Semester B Sc.CND
Optional I Human Nutrition
MACRO AND MICRO NUTRIENTS

Code: CND 203

Hours: 52

Instruction hours/week: 04

Total marks: 100

Theory: 70

Internal Assessment: 30

Objectives:

1. To understand the relation between nutrients and health
2. To learn the role of macro and micro nutrients in human nutrition

Unit I

12hrs

- Introduction: History of nutrition, relation between nutrition and health, classification of nutrients
- Carbohydrates: Composition, classification, functions, food sources, RDA, clinical problems, deficiency
- Dietary fibre: Classification, functions, food sources, requirements, clinical problems, deficiency and excess. Role of fibre in health and disease
- Water: Body composition, functions, water balance, sources, requirement, dehydration, edema

Unit II

10hrs

Proteins: Composition, structure, classification of protein and amino acids, functions, food sources, RDA, clinical problems
Protein quality: Biological value, NPU, PER, Chemical score

Unit III

10hrs

Lipids: Composition, classification of lipids and fatty acids, functions, RDA, deficiency and excess intake food sources

Unit IV

10hrs

Vitamins: Definition, classification, functions, food sources, RDA, deficiency of fat soluble and water soluble vitamins

Unit V

10hrs

Minerals (Calcium, Phosphorous, Iron, Iodine, Zinc): Composition, General functions, classification, food sources, deficiency
Electrolytes (Sodium, Potassium): Functions, requirement, deficiency, acid- base balance

PRACTICAL

Code: CND 203 -P
Number of weeks: 16
Hours/week: 03

Total marks: 50
Internal Assessment: 15
Practical exam: 35

- Planning and preparation of energy rich recipes (3 classes)
- Planning and preparation of protein rich recipes (3 classes)
- Planning and preparation of vitamin A and Vitamin C rich recipes (3 classes)
- Planning and preparation of calcium and iron rich recipes (3 classes)
- Planning and preparation of high and low fibre recipes (4 classes)

References:

- Srilakshmi B. (2013) Human Nutrition for B.Sc. Nursing students, New Age International Publications, New Delhi.
- Mudambi S. R. and Rajgopal M. V. (2008) Fundamentals of Foods, Nutrition, and Diet Therapy, 6th revised edition, New Age International Publications, New Delhi
- Swaminathan M S (2012) Fundamentals of Food Nutrition Bappcco Publication
- Longvah T., Ananthan R., Bhaskarachary K., and Venkaiah K. (2017) Indian Food Composition Table, NIN.ICMR. Hyderabad.

II Semester B Sc. CND Optional I Clinical Nutrition and Dietetics CND203 Macro and micro nutrients Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	12	22	2	1	1	1
II	10	19	1	1	1	1
III	10	18	2	2	0	2
IV	10	18	1	2	0	5
V	10	19	1	1	1	1
Total	52	96 (inclusive of choice)	21	35	30	10

II Semester B.Sc.CND
Optional II Clinical Nutrition and Dietetics
DIETETICS I

Code: CND 204

Hours: 52

Instruction hours/week: 04

Total marks: 100

Theory: 70

Internal Assessment: 30

Objectives:

1. To understand the basics of dietetics
2. To know the diet therapy for infections, fever, gastrointestinal disorders and weight management

Unit I:

12hrs

Introduction: Definition, objectives of diet therapy, factors to be considered in planning therapeutic diets

Nutritional Assessment in clinical setting

Planning of therapeutic diet

The dietician: Classification, code of ethics, responsibilities, the dietician in India, Indian Dietetic Association

Unit II

10hrs

Types of hospital diet:

- normal hospital diet
- modification of normal diet: a) liquid diet (clear fluid diet and full fluid diet)
b) soft diet and c) bland diet

Tube feeding: composition, osmolarity, types of formulas, mode of feeding, parenteral nutrition, Total Parenteral Nutrition (TPN), Home care of patients

Unit III

10hrs

Diet in infections and fevers: host defence mechanisms, causes, types, general dietary considerations, typhoid, malaria, tuberculosis, Acquired Immuno Deficiency Syndrome (AIDS)

Unit IV

10hrs

Diet in Obesity and Underweight: Aetiology, theories, assessment, types, treatment, complications, weight management guide lines for a dietician, nutritional and food requirements

Unit V

10hrs

Diet in Gastro Intestinal diseases: Indigestion, peptic ulcer, constipation, diarrhoea, lactose intolerance, irritable bowel syndrome, inflammatory bowel disease, intestinal gas and flatulence.

PRACTICAL

Code: CND 204 -P

Number of weeks: 16

Hours/week:03

Total marks 50

Internal Assessment:15

Practical exam:35

- Planning and preparation of hospital diet Clear fluid, Full fluid, Soft diet, Bland diet (4 classes)
- Planning and preparation of a day's diet for Typhoid and Tuberculosis (4 classes)
- Planning and preparation of a day's diet for Obesity and Underweight (4 classes)
- Planning and preparation of hospital diet for Peptic ulcer , Constipation and Diarrhoea (4 classes)

References:

- Srilakshmi, B. (2014) Dietetics, 4th and 7th edition, New Age International Publications, New Delhi
- Shubhangini A Joshi (2011) Nutrition and Dietetics, with Indian Case Studies, 3rd edn Tata McGraw Hill Publication, New Delhi
- Mahan, L.K. & Ecott-Stump, S. (2000): Krause's Food, Nutrition and Diet Therapy, 12th Edition, W.B. Saunders Ltd.
- Whitney, E.N. & Rolfes, S.R. (1999): Understanding Nutrition, 8th Edition, West Wadsworth, An International Thomson Publishing Co.

II Semester B Sc.CND Optional II Clinical Nutrition and Dietetics CND204 DIETETICS I

Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	12	22	2	1	1	1
II	10	19	1	1	1	1
III	10	18	2	2	0	2
IV	10	18	1	2	0	5
V	10	19	1	1	1	1
Total	52	96 (inclusive of choice)	21	35	30	10

II Semester B Sc. CND
Optional III Public Health Nutrition
LIFECYCLE NUTRITION

Code: CND 205

Hours:52

Instruction hours/week:04

Total marks:100

Theory: 70

Internal Assessment:30

Objectives:

1. To know nutritional requirements during different stages of lifecycle
2. To learn menu planning.

Unit I

6hrs

Nutritional and dietary guidelines during infancy: Growth and development, nutritional requirements, food requirements dietary guidelines, Low Birth Weight, weaning

Unit II

13hrs

Nutritional and dietary guidelines during

- Preschool years (1-6 years): Growth and development, nutritional requirements, food requirements, dietary guidelines, nutrition related problems
- School children (6-12 years): Growth and development, nutritional requirements, food requirements, dietary guidelines, packed lunch
- Adolescence: Growth and development, nutritional requirements, food requirements, dietary guidelines, nutritional problems

Unit III

15hrs

Nutritional and dietary guidelines during

- Adulthood: Adult male and Adult female
- Expectant mother- physiological changes, pre-conceptual nutrition, nutritional requirements, general dietary problems
- Lactating mothers: Physiology of milk production, nutritional requirement, food requirements, dietary guidelines

Unit IV

8hrs

Nutritional and dietary guidelines during old age: process of ageing, nutritional requirement, food requirements, dietary guidelines, nutrition related problems

Unit V

10hrs

Meal planning: definition, principles of planning diets, points to be considered in planning diet, steps involved in planning diet (using food composition tables and food exchange list), planning low cost balanced diet.

PRACTICAL

Code: CND 205 -P

Number of weeks: 16

Hours/week: 03

Total marks 50

Internal Assessment: 15

Practical exam: 35

- Planning and preparation of weaning foods. (3 classes)
- Planning and preparation of attractive snacks for preschool child. (3 classes)
- Planning and preparation of packed lunch for school going child.(3 classes)
- Planning and preparation of a day's diet for (7 classes)
 - Adolescent girl
 - Adult man
 - Elderly woman
 - Low cost diet for a pregnant woman

References:

- Srilakshmi, B. (2014) Dietetics, 4th and 7th edition, New Age International Publications, New Delhi
- Shubhangini A Joshi (2011) Nutrition and Dietetics, with Indian Case Studies, 3rd edn Tata McGraw Hill Publication, New Delhi
- Mahan, L.K. & Ecott-Stump, S. (2000): Krause's Food, Nutrition and Diet Therapy, 12th Edition, W.B. Saunders Ltd.

I Semester B.Sc. CND Optional III Public Health Nutrition CND205 Lifecycle Nutrition Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	6	11	1	1	0	3
II	13	24	1	2	1	1
III	15	27	2	2	1	1
IV	8	15	2	1	0	4
V	10	19	1	1	1	1
Total	52	96 (inclusive of choice)	21	35	30	10

III Semester B.Sc.CND
Optional I Human Nutrition
INTERMEDIARY METABOLISM

Code: CND 303

Hours: 52

Instruction hours /week: 04

Total marks:100

Theory: 70

Internal Assessment: 30

Objectives:

1. To know the principles of biochemistry (as applicable to human nutrition)
2. To understand the biological processes and systems as applicable to human nutrition

Unit I

10 hrs

- Introduction to metabolism
- Carbohydrates: Glycolysis, glycogenesis, gluconeogenesis, TCA cycle, Pentose phosphate pathway, blood sugar regulation

Unit II

12 hrs

- Proteins : General reactions of amino acid metabolism, Synthesis of non- essential amino acids from essential amino acids, Urea cycle, Elementary knowledge of biosynthesis of proteins
- Nucleic Acids - Composition, Functions, Classification, Structure and properties of DNA and RNA, Replication and transcription, translation. Genetic code, their biological importance.

Unit III

10 hrs

- Lipids: β -oxidation of fatty acids and their energetics. Synthesis of ketone bodies, ketosis
- Cholesterol- Structure, types and biological importance
- Lipoproteins: Types, composition, fate of lipoproteins, role and significance in diseases

Unit IV

10 hrs

- Energy metabolism Biological oxidation- citric acid cycle, electron transport chain , oxidative phosphorylation, energy conservation, high energy phosphate bond

Unit V

10 hrs

- Biochemical tests: need for biochemical tests, interpretation of biochemical tests, types of tests for protein energy malnutrition(PEM), Vitamin A, Iron, Calcium, Vitamin D and B₁₂

PRACTICAL

Code: CND 303 -P

Number of weeks: 16

Hours/week:03

Total marks: 50

Internal Assessment: 15

Practical exam: 35

- Preparation of phosphate and citrate buffers (3 classes)
- Qualitative tests for carbohydrates (3 classes)
- Qualitative tests for amino acids-Calculation of chemical score (3 classes)
- Estimation of Blood sugar level: RBS, FBS,GTT (4 classes)
- Estimation of Hb level (3 classes)

References:

- Biochemistry for B.Sc students, Bangalore University Publication
- Dasgupta, S. K., Biochemistry Vol. I; n & III, McMillan Co. of India Limited
- Das, Debajyoti, Biochemistry 2nd ed., 1980, Academic Publishers, India.
- Harper, H. A. *et al*, A review of physiological chemistry, Los Altos,Lange medical publications, 1985.
- Lehninger, A. L., Principles of Biochemistry
- Chatterjea. Textbook of Medical Biochemistry

**III Semester B. Sc. CND
Optional I Human Nutrition
CND 303 Intermediary Metabolism
Blueprint**

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	10	18	2	2	0	2
II	12	22	1	1	1	4
III	10	19	1	1	1	1
IV	10	19	1	1	1	1
V	10	18	2	2	0	2
Total	52	96 (inclusive of choice)	21	35	30	10

III Semester B Sc.CND
Optional II Clinical Nutrition and Dietetics
DIETETICS II

Code: CND 304

Total marks:100

Hours: 52

Theory:70

Instruction hours/week:04

Internal Assessment:30

Objectives:

1. To understand the role of dietetics in preventive, promotive and curative health care
2. To make appropriate dietary modifications in various disease conditions.

Unit I: Diabetes mellitus

15hrs

- a) Definition, Prevalence , Types (IDDM, NIDDM, GDM) etiological classification (WHO), Etiology, Symptoms, Diagnosis- GTT, HbA1C (normal and abnormal values) Complications
- b) Dietary and non dietary management of IDDM, NIDDM and GDM, Food exchanges, Glycemic index of food, Carbohydrate load, count, Hypoglycemic drugs, Insulin- Long acting and short acting

Unit II

05hrs

Etiology, risk factors, dietary and non dietary management of Hypertension

Unit III

12hrs

- Cardiovascular disorders: Etiology, risk factors, dietary management
- Atherosclerosis- role of fat in the development of atherosclerosis
- Congestive Heart Failure (CHF)
- Hypercholesterolemia
- Functional foods for CHD
- Physical activity and heart disease

Unit IV

10 hrs

- Liver disorders
 - Etiology, types, symptoms, dietary management of viral hepatitis and cirrhosis
- Gall bladder disorders
 - Etiology, types, symptoms, dietary management of cholecystitis and choledithiasis
- Pancreatic disorders
 - Etiology, types, symptoms, dietary management of acute and chronic pancreatitis

Unit V:

10 hrs

Renal disorders- Etiology, symptoms, dietary management of Glomerulonephritis, Nephrosis, Renal failure (acute and chronic) Renal calculi, Dialysis

PRACTICAL

Code: CND 304 P

No.of weeks: 16

Instruction hours/week: 03

Total marks:50

Practical exam:35

Internal Assessment:15

- Planning and preparation of (5 classes)
 - a) A days diet for NIDDM and GDM
 - b) Case study of IDDM, NIDDM ,GDM
- Planning and preparation of (4 classes)
 - a) A days diet for atherosclerosis and hypertension
 - b) Case study of atherosclerosis and hypertension
- Planning and preparation of (4 classes)
 - a) A days diet for cirrhosis and hepatitis b) Case study of cirrhosis and hepatitis
- Planning and preparation of (3 classes)
 - a) A days diet for nephrotic syndrome b) Case study of nephrotic syndrome

References:

- Srilakshmi, B. (2014) Dietetics, 4th and 7th edition, New Age International Publications, New Delhi
- Shubhangini A Joshi (2011) Nutrition and Dietetics, with Indian Case Studies, 3rd edn Tata McGraw Hill Publication, New Delhi
- Mahan, L.K. & Ecott-Stump, S. (2000): Krause's Food, Nutrition and Diet Therapy, 12th Edition, W.B. Saunders Ltd

III Semester B. Sc. CND Optional II Clinical Nutrition and Dietetics CND 305 Dietetics II Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	15	28	2	2	1	2
II	5	9	1	1	0	1
III	12	23	2	1	1	2
IV	10	18	1	2	0	5
V	10	18	1	1	1	0
Total	52	96 (inclusive of choice)	21	35	30	10

III Semester B Sc. CND
Optional III Public Health Nutrition
FOOD SAFETY

Code: CND 305

Hours:52

Instruction hours/week:04

Objectives:

1. To acquire an elementary knowledge on microorganisms, food borne diseases and their prevention
2. To develop an understanding of food additives, food adulteration and control of food quality

Total marks:100

Theory:70

Internal Assessment:30

Unit I:Microorganisms

12 hrs

Types and characteristics of micro organisms (bacteria, fungi, virus, protozoa, algae).
Beneficial effect of micro organisms, Probiotics
Microbial spoilage of food, Growth curve, Effect of environmental factors on growth

Unit II

13 hrs

Food borne diseases and prevention

Food poisoning
Food infection
Food toxins

Unit III: Role of additives in food safety

10 hrs

Food additives-Meaning, types.
Contamination of Food
Non nutritional constituents and food safety- naturally occurring, microbial, farm processing, radioactive fallout
Animal food additives
Additives and food safety

Unit IV: Food adulteration

05 hrs

Types of adulterants: Intentional and Incidental adulterants
Simple methods for detection of adulterants in foods
Prevention of food adulteration

Unit V: Control of food quality

12hrs

Food laws: Codex Alimentarius and Indian Food standards
Compulsory Indian food standards
Food standardization and regulation agencies in India
Food safety system-HACCP,
Nutritional labelling

PRACTICAL

Code:CND 305-P

Number of weeks: 16

Hours/week:03

Total marks 50

Internal Assessment:15

Practical exam:35

- Detection of adulteration of in common foods a) physical methods b) chemical methods (4 classes)
- Preparation of a resource file on food additives and food toxins: (4 classes)
- Nutritional labeling: Collection and Interpretation (4 classes)
- HACCP for the preparation of any food (3 classes)
- Visit to food quality control laboratory (1 class)

References:

- Willium.C. Frazier, Dennis C Westhoff and Vanitha N M Food microbiology,(2013) 5th edition Mc Graw Hill Publications (India)
- Foods- Facts and Principles, 3rd revised edition (2008) New Age Publishers, India. N Shakuntala Manay and M.Shadakshara Swamy.
- Food sanitation and Hygiene with case studies Sunetra Roday 2nd edition 2011, Tata Mc Graw Hill Publications (India)
- Mahatab S. Bamji et al., 3rd edition(2013) Textbook of Human Nutrition, Oxford and IBH publishing company Pvt.ltd.

III Semester B. Sc.CND Optional III Public Health Nutrition CND 306 Food Safety Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	12	23	2	1	1	2
II	13	24	1	2	1	1
III	10	18	2	2	0	2
IV	5	9	1	1	0	1
V	12	22	1	1	1	4
Total	52	96 (inclusive of choice)	21	35	30	10

IV Semester B Sc.CND
Optional I Human Nutrition
FOOD COMMODITIES

Code: CND403

Hours: 52

Instruction hours/week: 04

Total marks: 100

Theory: 70

Internal Assessment: 30

Objectives:

1. To know the various food commodities with respect to their composition and nutritive value
2. To learn processed products of common food commodities

Unit I

12hrs

Cereals and Pulses: Rice- Composition, milling, parboiling-advantages and disadvantages, rice products, Ageing. Wheat: composition, milling, products of wheat-fermented and unfermented. Maize: Nutritive value, processing and products. Composition of oats, Rye, Barley. Composition, milling and products of Millets-Jowar, Ragi, Bajra. Breakfast cereals, Pulses: Composition, Processing, Toxic constituents

Unit II

10 hrs

Fats and Oils-Types, sources, Refining and processing and storage, unconventional oils, fat substitutes.
Nuts and Oil seeds-Nutritive value

Unit III

10 hrs

Milk, Eggs and Flesh foods
Milk: Composition, properties and processing of common milk products
Egg: Composition, quality of egg, Buying and handling
Flesh foods: Nutritive value of meat, poultry and fish

Unit IV

10 hrs

Vegetables and fruits: Classification, composition, selection and products of fruits and vegetables. Enzymatic browning in fruits and its prevention
Sugar: Sugar related products, composition and properties

Unit V

10 hrs

- Beverages: Alcoholic – Wines, Beer and distilled spirits
- Non alcoholic- Carbonated-Composition and health effects
Non carbonated- Tea, coffee - Brief manufacturing process, composition and types
Cocoa- Brief manufacturing process and composition
- Spices: Composition and uses of pepper, cardamom, chillies, ginger, turmeric, tamarind, garlic and onion

PRACTICAL

Code: CND403-P

Total marks: 50

Number of weeks: 16

Internal Assessment:15

Hours/week:03

Practical exam:35

- Microscopic observation of different starch granules: Rice flour, wheat flour, potato, ragi (3 class)
- Gelatinization of starch (1 class)
- Preparation of gluten and a bakery product (1 class)
- Preparation of selection and purchasing guide for fresh vegetables and fruits (1 class)
- Prevention of enzymatic browning in fruits (1 class)
- Determination of smoking point, measuring oil absorption in deep fried foods (dry and wet product: Fried Avalakki (poha) and (baji) (2 class)
- Preparation of paneer, Characteristics of curd set at different temperatures (2 classes)
- Haugh's Test, Albumin Index for assessing quality of egg, Foaming properties of egg, Ferrous sulphide formation in boiled eggs (2 classes)
- Stages of sugar cookery, Preparation of sugar and jaggery based Indian sweets at different stages of sugar cookery (2 classes)
- Sensory evaluation of tea and coffee prepared using different methods (1 class)

References:

- Shakuntala Manay N and Shadaksharaswamy M (2008) Foods Facts and Principles 3rd edition New Age International Publication, New Delhi
- B Srilakshmi (2015) Food Science 6thEdn, New Age Publication, N Delhi

IV Semester B.Sc. CND

Optional I: Human Nutrition

CND 403 Food Commodities

Blueprint

Unit	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	12	23	1	2	1	0
II	08	15	2	1	0	4
III	12	22	2	1	1	1
IV	10	18	1	1	1	0
V	10	18	1	2	0	5
Total	52	96 (inclusive of choice)	21	35	30	10

IV Semester B Sc.CND
Optional II Public Health Nutrition
PHYSIOLOGICAL AND METABOLIC CHANGES IN DISEASES

Code: CND 404

Total marks:100

Hours: 52

Theory: 70

Instruction hours/week: 04

Internal Assessment: 30

Objectives:

1. To study the common disorders of digestive, excretory and circulatory system
2. To learn the associated physiologic and metabolic changes during these disorders

Unit I

12 hrs

- Introduction – Objectives and Scope and importance. 01 hrs
- Infection – Fever and metabolic changes. 01 hrs
- Common disorders of Digestive tract and associated glands 10 hrs
 - a) Peptic and Duodenal Ulcers
 - b) Diverticulosis, Diarrhoea, Irritable bowel syndrome, Malabsorption
 - c) Hepatitis, Liver Cirrhosis
 - d) Acute and Chronic Pancreatitis

Unit II Circulatory System

10 hrs

- Hypertension, Arterio and Artherosclerosis, Variation of HDL & LDL in blood, Angina pectoris and Myocardial Infarction.
- Anaemia – Types and Remedial measures.

Unit III Excretory System

06 hrs

Acute and Chronic Nephritis, Nephrosclerosis, Renal stones, Urinary calculi, Renal failure, Diabetes Insipidus.

Unit IV

16 hrs

- Diabetes Mellitus – Types, Causes, Symptoms, Remedial measures 03 hrs
- Hypo and hyper Vitaminosis 03 hrs
- Endocrine Disorders - Thyroid, Adrenal and Growth hormones 03 hrs
- Stress – Physiological effects, Neuro-endocrine control of stress 03 hrs
- Malnutrition, under and over nutrition 02 hrs
- Obesity – Types, Causes and risks 02 hrs

Unit V

08 hrs

- Cancer biology – Types, Properties of cancer cells, Prevention and Regulation. 04 hrs
- Inborn errors of Metabolism – AKU, PKU, Cystic fibrosis, Galactosemia, Albinism 04 hrs

PRACTICAL

Code: CND P404

Hours: 16

Instruction hours/week: 03

Total marks – 50

Internal Assessment - 15

Practical exam– 35

- To study the composition of ORS preparations (1 class)
- Preparation of ORS (1 class)
- Urinalysis to detect the presence of protein using dipstick method (1 class)
- Urinalysis to detect the presence of glucose using dipstick method (1 class)
- Observation of slides of (3 classes)
 - a) Peptic ulcer and duodenal ulcer
 - b) Liver cirrhosis
 - c) Renal calculi
- To study the elements of basic life support (2 class)
- Assessment of stress. (2 class)
- To study the normal and abnormal biochemical parameters in Diabetes, CVD and Hypertension (4 class)
- Visit to a diagnostic laboratory (1 class)

References:

- Guyton A.C.(1985), Functions of the human body. 4th Edition. W.B. Sanders Company. Philadelphia.
- Eckhard Lammert (Editor), Martin Zeeb (Editor)Metabolism of Human Diseases: Organ Physiology and Pathophysiology 2014th Edition

IV Semester BSc CND

Optional II Clinical Nutrition and Dietetics

CND 404 Physiological and Metabolic Changes in Diseases Blueprint

Unit	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	12	22	2	1	1	1
II	10	18	1	1	1	0
III	06	12	1	1	0	4
IV	16	29	2	2	1	3
V	08	15	1	2	0	2
Total	52	96 (inclusive of choice)	21	35	30	10

IV Semester B Sc.CND
Optional III Public Health Nutrition
PUBLIC HEALTH NUTRITION I

Code: CND 405

Hours: 52

Instruction hours/week: 04

Total marks:100

Theory:70

Internal Assessment: 30

Objectives:

1. To study the basic concept of public health nutrition
2. To learn the major nutritional problems, their prevention and control

Unit I

7 hrs

Introduction: Meaning and scope of public health nutrition, Multidisciplinary approach of public health nutrition, Concept of food security, nutrition monitoring, nutrition surveillance, Health economics

Unit II

10 hrs

Assessment of Nutritional Status in the community setting: Methods: Anthropometric methods, Biochemical methods, Clinical methods: Dietary methods

Unit III

08 hrs

Malnutrition: Etiology, prevalence, vicious cycle of malnutrition, Economics of malnutrition

Unit IV:

15 hrs

Major Nutritional problems: Prevalence at national and international level, Epidemiological factors, prevention and control of Vitamin A deficiency, IDD, Anemia, Coronary heart disease, Hypertension, Diabetes Mellitus, Diarrhoea. Prevalence of Zn and Cu deficiency

Unit V

12 hrs

Communication to reach community: Concept of communication, elements of communication, Channels of communication, functions of communication. Methods of communication: Demonstration, exhibition. Preparation of Audiovisual aids, Concept of IEC(Information, Education and Communication) and BCC(Behaviour Change Communication)

PRACTICAL

Code: CND 405 -P

Number of weeks: 16

Hours/week:03

Total marks: 50

Internal Assessment:15

Practical exam:35

- Preparation of audiovisual aids: Poster, Chart, Flash card, power point presentation and one video clipping (6 classes)
- Assessment of nutritional status by anthropometric methods (4 classes)
- Assessment of nutritional status by dietary methods (3 classes)
- Planning and organizing a demonstration /Exhibition (3 classes)

References:

- Park and Park (2015) Preventive and Social Medicine 23 edition Bhanot Publisher
- Shubhangini A Joshi (2011) Nutrition and Dietetics, with Indian Case Studies, 3rdedn Tata McGraw Hill Publication, New Delhi
- Edited by Michael J. Gibney , Barrie M. Margetts , John M. Kearney, Lenore Arab (2004)Public Health Nutrition, Wiley-Blackwell publication.

IV Semester BSc CND Optional III Public Health Nutrition CND 405 Public Health Nutrition I Blueprint

Unit	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	07	13	2	1	0	2
II	10	18	1	1	1	0
III	08	15	1	2	0	2
IV	15	28	2	2	1	2
V	12	22	1	1	1	4
Total	52	96 (inclusive of choice)	21	35	30	10

V Semester B Sc.CND
Optional I Human Nutrition
NUTRITION AND PHYSICAL FITNESS

Code: CND 501

Hours: 48

Instruction hours/week: 03

Total marks:100

Theory:70

Internal Assessment: 30

Objectives:

1. To learn the benefits of physical fitness
2. To study the nutritional requirements of sports persons

Unit I

8 hrs

Definition of physical fitness, Benefits of Fitness, Components of fitness. Conditioning by training – overload principle. Body's response to physical activity- Weight training, cardiorespiratory conditioning, muscle conditioning, Physical activity pyramid
Balanced fitness program.

Unit II

12 hrs

Human Body Composition: Significance of studying body composition. Two compartment and multiple compartment models
Methods of Assessment: Nutritional Anthropometry, BOD POD, Bioelectric impedance, DEXA, Whole body K counter. Factors affecting body composition: Age, Body weight, physical activity

Unit III

8 hrs

Energy systems of physical activity. Energy yielding nutrients-Glucose use during physical activity, Glucose after activity and Fat use during physical activity, protein use during physical activity

Unit IV:

8 hrs

Nutritional requirements, Female Athlete triad, Sports anemia, water and electrolytes, pre-game meals, during, post-game meals. Nutritional needs of sports persons. Fluid balance in sports, importance, symptoms and prevention of dehydration,

Unit V

12 hrs

Energy cost of various physical activities including sports and exercise. Nutrition, exercise and weight management, Body weight components, Regulation of body weight- Set point theory, Factors regulating energy intake and body weight, Weight Imbalance- overweight and obesity. Lifestyle modification strategies for weight management-
Nutrition and Exercise

PRACTICAL

Code: CND 501 -P

Number of weeks: 16

Hours/week:03

Total marks: 50

Internal Assessment:15

Practical exam:35

- A survey (online) on types of Exercise including Aerobics, spinning, Tai Chi, Yoga, Power Yoga , Pillati, weight training, strength training, Circuit training, etc (3 classes)
- Determination of physiological age of a person. (4 classes)
- A study of equipment commonly used in Fitness Industry, their advantages and limitation (Visit to a fitness centre). (2 classes)
- Plan and prepare a (day's diet, pre game and post game) for (3 classes)
 - a) athlete b) marathon runner
- Plan energy bar/sports drink for a sports person to be consumed during the game. (1 class)
- To study the body composition of obese and normal person (1 class)
- Plan a diet and exercise chart for a obese adolescent girl. (2 classes)

References:

- Mahan, L. K. and Escott Stump. S. (2008) Krause's Food & Nutrition Therapy 12th ed. Saunders-Elsevier
- Recommended Dietary Intakes for Indian Sportsman and Women. Satyanarayan, K; Nageshwar Rao. C; Narsinga Rao, B.S.; Malhotra, M.S. (1985), Hyderabad, National Institute of Nutrition.

**V Semester B. Sc. CND
Optional I Human Nutrition
CND 501 Nutrition and Physical Fitness
Blue Print**

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	8	15	0	2	0	2
II	12	22	2	1	1	1
III	8	15	1	2	0	3
IV	8	15	1	1	1	2
V	12	22	2	1	1	2
Total	48	96 (inclusive of choice)	21	35	30	10

V Semester B Sc.CND
Optional I Human Nutrition
CULINARY SCIENCE

Code: CND 502

Hours: 48

Instruction hours/week: 03

Total marks:100

Theory:70

Internal Assessment: 30

Objectives:

1. Learn the basic concepts of culinary science
2. Gain knowledge in quantity food production and food costing

Unit I

Introduction

10 hrs

Aims and objectives of cooking, Methods of cooking food: Moist methods, Dry heat methods, combination methods, microwave cooking and solar cooking, Loss of nutrients during cooking, Concept of molecular gastronomy.

Unit II:

8 hrs

Food Evaluation: Sensory evaluation: Selection of panel of judges, preparation of samples, Types of tests
Objective methods of evaluation

Unit III:

8 hrs

Food presentation: Basic elements-Colour, texture, shape, layout and simplicity.
Presentation for food service: choice of plates, serving trays, chafing dishes, portions, sequence of service in buffet style, garnishing and food decoration

Unit IV:

12 hrs

Quantity Food Production:

Standardization of recipes: Benefits of standardized recipes, components, Phases: Recipe verification, product evaluation, quantity adjustment phase.
Introduction to costing of recipes and presentation of foods

Unit V Food Preservation:

10 hrs

Objectives of food preservation. Methods of food preservation: High temperature, Low temperature, Dehydration, use of preservatives-Class I and Class II preservatives, preservation by irradiation, controlled atmosphere storage.

PRACTICAL

Code: CND 502 -P
Number of weeks: 16
Hours/week:03

Total marks: 50
Internal Assessment: 15
Practical exam:35

- Standard vegetable cuts: Julienne, Brunoise, Macedoine, Jardine, Paysanne (1 class)
- Preparation of a dish using the following techniques (2 classes)
 - a) Mixing, blending, binding, beating, whipping, folding
 - b) Coating, blanching, marinating
- Preparation of salads (1 Class)
 - Constituents: Base, Body, Garnish and dressing
 - Preparation of mayonnaise
 - Preparation of salads using foods from different food groups
- Food presentation (1 class)
- Standardization, quantity food production, marketing and costing of (11 classes)
 - a) Beverages
 - b) Snacks
 - c) Salads
 - d) Working lunch

References:

- Srilakshmi B (2010) Fifth Edition Food Science New Age International Publisher
- Mohd. Zulfikar (1995) Food Production an analysis, United Publishers, Mangalore
- Sethi Mohini (2005) Institution Food Management New Age International Publishers

V Semester B.Sc. CND
Optional I Human Nutrition
CND 502 Culinary Science
Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	10	20	1	1	1	2
II	8	16	2	2	-	-
III	8	16	1	2	-	3
IV	12	24	2	1	1	3
V	10	20	1	1	1	2
Total	48	96 (inclusive of choice)	21	35	30	10

V Semester B Sc. CND
Optional II Clinical Nutrition and Dietetics
DIETETICS III

Code: CND 503

Hours:48

Instruction hours/week: 03

Total marks:100

Theory: 70

Internal Assessment:30

Objectives:

1. To understand the role of dietetics in preventive, promotive and curative health care
2. To make appropriate dietary modification in various disease conditions.

Unit I:

12 hrs

Food sensitivity(Food allergy) : Types of reactions, Foods involved in sensitivity, Difference between food allergy and food intolerance, Lactose intolerance, Gluten intolerance, Symptoms, Diagnosis, Dietary management (Elimination)

Unit II:

8 hrs

Diet in genetic disorders (Inborn errors of metabolism): Phenylketonuria, Galactosaemia, Fructosuria

Unit III:

12 hrs

Nutrition and Cancer: Risk factors, prevention and dietary management
HIV/AIDS: Definition, stages, nutritional requirement, Dietary management

Unit IV

8 hrs

Burns: Classification, stages, dietary management in flow phase and anabolic phase

Unit V:

8 hrs

Nutrient and Drug interactions: Effect of drug on food intake, digestion, absorption, transportation and excretion

PRACTICAL

Code: CND503P

No. of classes:16

Instruction hours/week: 03

Total marks:50

Practical exam:35

Internal Assessment:15

- Market survey of Gluten free products, eggless products, peanut free products, lactose free products etc. (1 class)
- Planning and preparation of recipes for the above (6 classes)
- Planning and preparation of day's diet for cancer (3 classes)
- Planning and preparation of day's diet for HIV/AIDS (3 classes)
- Planning a day's diet for different stages of burns (3 classes)

References:

- Srilakshmi, B. (2014) Dietetics, 4th and 7th edition, New Age International Publications, New Delhi
- Shubhangini A Joshi (2011) Nutrition and Dietetics, with Indian Case Studies, 3rd edn Tata McGraw Hill Publication, New Delhi
- Mahan, L.K. & Ecott-Stump, S. (2000): Krause's Food, Nutrition and Diet Therapy, 12th Edition, W.B. Saunders Ltd

**V Semester B. Sc. CND
Optional II Clinical Nutrition and Dietetics
CND 503 Dietetics III
Blue Print**

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	12	24	1	1	2	0
II	8	16	1	2	0	3
III	12	24	1	2	1	2
IV	8	16	2	1	0	2
V	8	16	2	1	0	3
Total	48	96 (inclusive of choice)	21	35	30	10

V Semester B Sc.CND
Optional II Clinical Nutrition and Dietetics
DIET COUNSELING

Code: CND 504

Hours: 48

Instruction hours/week: 03

Objectives:

1. To learn the basic concepts of diet counseling skills
2. To strengthen the ability to interview clients/patients

Total marks:100

Theory: 70

Internal Assessment:30

Unit I - Basic Concepts of Counselling

12 hrs

Definition of counseling, Models for behavioral change, trans theoretical model of behavior change

Motivational interview: Principles, motivational intervention model

Fundamentals of food behavior. Assessment of readiness to change, Client counselor relationship

Unit II – Communication skills

10 hrs

Objectives, Verbal, non verbal communication skills

Skills - Listening, response, action process, sharing response, observing, paraphrasing & reflecting

Behaviour change: Counseling skills for resistance behaviour

Cultural competence in counseling – ABCDE approach

Unit III- Nutrition Care Plan (NCP)

10 hrs

Introduction, Goal setting: Basics, Define goals, Design goals, Design plan of action

Dietary assessment-Food Intake data collection, Data analysis, Interpretation,

Energy determination-Determination of REE, Physical Activity factor (PA),

Determination of Total Energy Expenditure (TEE)

Physical Assessment; Healthy Weight standards, Weight for height tables, BMI and Waist circumference

Documentation – SOAP format

Unit IV: Components of counselling process

10 hrs

Strategies to promote change-Food management tools, Behaviour change strategy, cognitive restructuring, education during counselling

Making behaviour change last-social network, stress management, relapse prevention, counselling evaluation

Unit V:

6 hrs

Counseling sessions: Not ready to change, unsure about change, Ready to change, skill development for OARS (open end questions, affirmations, reflective listening, summary statements, Client rights)

PRACTICAL

Code: CND 504P

Number of classes: 16

Instruction hours/week: 03

Total marks:50

Practical: 35

Internal Assessment:15

- Preparation of counseling aids for the following conditions
Diabetes mellitus (IDDM/NIDDM/GDM), Obesity and underweight,
hypertension, atherosclerosis , renal calculi. 2 classes
- Preparation of Nutrition Care Plan, SOAP format 3 classes
- Motivational techniques 2 classes
- Setting up lifestyle clinic and Conducting counseling sessions for a given
condition using OARS 9 classes

References:

- Bauer Kathleen D, Sokolik Carol, Loiu Doreen., Nutrition Counseling and Education Skill Development , Wadsworth Thomson Learning, 2002
- Bauer Kathleen D, Sokolik Carol., Basic nutrition counseling skill development, Wadsworth Thomson Learning, 2002
- Gail Morrison & Lisa Hark., Medical Nutrition & Disease, Blackwell Science Inc
- Herrin. M., Nutrition Counseling in the Treatment of Eating Disorders. New York, NY, Brunner-Routledge, 2003
- King Kathy, Klawitter Bridget., Nutrition Therapy: Advanced Counseling Skills Lippincott Williams & Wilkin, 2007
- Snetsellar, Linda G., Nutrition counseling skills for the nutrition care process, 4th Edition Jones & Bartlett Publishers, 2009
- Rollnick S, Miller WR, Butler CC. Guilford press, 2008. Motivational Interviewing in Health Care: Helping Patients Change Behavior (Applications of Motivational Interviewing)

V Sem B Sc CND

CND 504 Diet counseling Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	12	24	2	1	1	3
II	10	20	1	1	1	2
III	10	25	1	2	1	2
IV	10	15	1	2	-	2
V	06	12	2	1	-	1
Total	48	96 (inclusive of choice)	21	35	30	10

V Semester B.Sc. CND
Optional III Public Health Nutrition
FOOD SERVICE MANAGEMENT

Code: CND 505

Hours: 48

Instruction hours/week: 03

Total marks:100

Theory:70

Internal Assessment: 30

Objectives

1. To develop knowledge in the areas of Institutional food service management
2. To understand the process of planning, organizing and controlling the management of food and other resources in food service institutions.

UNIT I

04 hrs

Introduction: Evolution of food service industry, types-commercial, non –commercial, Styles of food service (formal, semi formal , informal)

Unit II

12 hrs

Management-Definition, principles, functions

Tools of management – Tangible tools (organization chart, job specification, work schedule, job analysis , budget) . Intangible tools (personality, experience, decision making, and quality of working life)

TQM: Concept of quality assurance

UNIT III

12 hrs

Layout of kitchen space-Layout plan, hotel kitchen, college hostel, food service area of a canteen

Catering equipment-classification based on mode of operation

Foods recommended for

a) canteens (office and college), industrial canteen, and public canteen

b). Food kiosks

c. Institutional feeding-old age homes, hospitals, academic institutional hostels, orphanages

Methods of purchasing- open market buying, formal buying, wholesale buying, contract purchase, auction buying.

Menu planning-Types of menus, factors affecting menu planning

UNIT IV

12 hr

Costing-cost concept; components (material cost, employee cost, overhead cost); behavior of costs (fixed, semi fixed, variable) ;concept of break- even and cost benefit ratio; cost control-Food, labour, overhead and hidden cost; Pricing of dishes.

UNIT V

08 hr

Personnel management-approaches, employee benefits, principles of employee benefits, staff training and development.

PRACTICAL

Code: CND 505-P

No. of weeks: 16

Hours/week: 03

Total Marks: 50

Practical: 35

Internal Assessment: 15

- Visit to a food service institution (Commercial and Non Commercial) 2 classes
- Survey on types of equipment used in food production and service 1 class
- Plan a menu for 6 classes
 - a) Hospital food service for patients, (Waiter service)
 - b) Industrial canteen, (Table de hote Menu)
 - c) Five star hotel, (A la Carte Menu)
 - d) College Hostel (A week's Cyclic Menu)
 - e) Fast Food Outlet (Self service- Tray)
- Preparation of market list, cost and selling price calculation of a given lunch 3 classes
- Serviette folding 2 classes
- Table setting and formal service for 2 classes
 - a) Indian lunch/dinner (North Indian and South Indian service)
 - b) Continental breakfast.

References:

- Mohini Sethi (2016) Institution Food Management, New Age International Publishers .
- Vijay Thakur (2007) Food and Beverage service , 3rd edition ,Dennet and company.
- Jagmohan Negi (2004) management and cost control. Kanishka Publishers and distributon

**V Semester B. Sc. CND
Optional III Public Health Nutrition
CND505 Food Service Management
Blueprint**

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	4	9	1	1	-	1
II	12	28	2	2	1	2
III	12	28	2	2	1	2
IV	12	11	1	1	-	3
V	8	20	1	1	1	2
Total	48	96 (inclusive of choice)	21	35	30	10

V Semester B Sc. CND
Optional III Public Health Nutrition
PUBLIC HEALTH NUTRITION II

Code: CND 506

Hours: 48

Instruction hours/week: 03

Total marks:100

Theory:70

Internal Assessment: 30

Objectives:

1. To know the nutrition programs and policies.
2. To study the various organizations in the field of food and nutrition

Unit I

Food Security

10 hrs

Nutrition security ; Determinants of food security; Different levels of food security (national, household and individual level); Major factors of food access (population, food policies and national economy) ; Role of Government in maintaining food security in India.

Unit II

12 hrs

Nutrition Monitoring: Objectives, Components: Population and Key indicators. Objectives of National Nutrition Monitoring Bureau (NNMB), National Sample Survey Organization (NSSO), National Family Health Survey (NFHS) Food and Nutrition Board
Nutrition Surveillance: Objectives and uses of Nutrition Surveillance System(NSS)

Unit III

6 hrs

National Nutrition Program: Objectives and functions of NNP, ICDS, NIDDCP, NACP, SFP, Vitamin A prophylaxis program.

Unit IV:

Nutrition policy:

8 hrs

Sustainable development goals, National nutrition policy: Aims, Short term and long term intervention, implementation, Vision for the 21st century

Unit V

Organizations to combat malnutrition: Objectives and functions

12 hrs

National organizations concerned with Food and Nutrition---ICMR, NIN, CFTRI, DFRL, NIPCCD

International organizations concerned with Food and Nutrition- FAO, WHO, UNICEF, WORLD BANK

PRACTICAL

Code: CND 506-P

Number of weeks: 16

Hours/week:03

Total marks: 50

Internal Assessment:15

Practical exam:35

- Planning and preparation of indigenous low cost, nutritive recipes (using methods to enhance the nutritive value of foods at home level) suitable for various vulnerable groups (2 class)
- Strategies to combat nutrition problems in a community setting:
School/Anganwadi/ PHC/ orphanage/ old age home
 - 1) Rapport building (1 class)
 - 2) Identification of a vulnerable group and their nutrition related problems (1 class)
 - 3) Assessment of nutrition related problems: Anthropometric and dietary (2 classes)
 - 4) Planning a nutrition intervention for the identified group (2 Classes)
 - 5) Pre- test, implementation and post-test of the intervention program (3 classes)
 - 6) Report writing (2 classes)
- Visit to Food and Nutrition Board and NIPCCD (2 classes)
- Conducting and report writing of a theme based program for National Nutrition Week(September First week) (1 class)

References:

- Shubhangini A Joshi (2011) Nutrition and Dietetics, with Indian Case Studies, 3rdedn Tata McGraw Hill Publication, New Delhi
- Michael J. Gibney , Barrie M. Margetts , John M. Kearney, Lenore Arab (2004), Public Health Nutrition, Wiley-Blackwell publication.
- Salil Sehgal and Rita S Raghuvanshi (Edited) , 2007, Text book of Community nutrition, ICAR New Delhi.
- Mahatab S Bhamji , Kamala Krishnaswamy, GNV Brahman 2011 reprint , Text book of Human nutrition, Third edition, Oxford and IBH publishing, New Delhi.
- Nutritional research by Kamala Krishnaswamy .NIN publication.

V Semester B. Sc. CND

Option III Public Health Nutrition

CND 506 Public Health Nutrition II

Blue Print

Units	No of hours	Marks per unit	Number of questions carrying			
			3 marks	5 marks	10 marks	1 mark
I	10	19	01	01	01	01
II	12	27	02	02	01	01
III	06	09	0	01	0	04
IV	08	14	02	01	0	03
V	12	27	02	02	01	01
Total	48	96 (inclusive of choice)	21	35	30	10

VI Semester B Sc.CND
Optional I Human Nutrition
FUNCTIONAL FOODS

Code: CND 601

Hours: 48

Instruction hours/week: 03

Total marks:100

Theory:70

Internal Assessment: 30

Objectives:

1. To know the various types of functional foods
2. To learn the health benefits of functional foods

UNIT I

Introduction

6 hrs

Definition of functional food and nutraceutical. FOSHU (Foods for specified health use) categories of functional ingredients. Benefits and Active principles of common herbs/plants (containing beneficial ingredients) used in the field of nutraceuticals – Ginseng, Rosemary, Thyme, Oregano, Sage, Basil, wheat grass

UNIT II

12 hrs

Prebiotics :- Definition, sources, Non-digestible/slow digestible carbohydrates: Dietary fibre, Oligosaccharides, sugar alcohols used in food products , resistant starch , Gums . Role of fiber in the diet: Diabetes and Obesity, Constipation and Diverticular disease, Colon cancer, breast cancer.

Health benefits of Oligosaccharides : Anticonstipation, Non-carcinogenic, Reduction of serum cholesterol, improved intestinal flora.

UNIT III

9 hrs

Probiotics:- Definition, sources , Health benefits of Lactic acid bacteria, Bifidobacterium, Saccharomyces Boulardii, Streptococcus thermophiles.

UNIT IV

12 hrs

- Health benefits (in brief)- natural pigments (chlorophyll, chlorophyllin, carotenoids, anthocyanins), Polyunsaturated fatty acids (Omega 3 and Omega 6), peptides and proteins (Glutamine ,L-Arginine), Glycosides, Isoprenoides, Alcohols and Phenols, Lecithin and Choline, Isoflavonoids, phytoestrogens, antioxidants, phytosterols.
- Vitamins and mineral supplements in health

UNIT V

9 hrs

Significance of functional foods and nutraceuticals in the food and pharma industry. Food labels and regulations of nutraceuticals and functional foods.

PRACTICAL

Code: CND 601-P

Number of weeks: 16

Hours/week:03

Total marks: 50

Internal Assessment:15

Practical exam:35

- Preparation of resource file on functional foods (3 Classes)
- Market survey on dietary supplements, probiotics and prebiotics available in the market. (4 classes)
- Study the types of labels and analyze (3 classes)
- Planning of a probiotic product. (2 classes)
- Planning and preparation of recipes rich in Omega 3 and Omega 6. (4 classes)

References:

- Gibson GR & William CM. (2000). Functional Foods - Concept to Products.
- Goldberg I. (1994). Functional Foods: Designer Foods, Pharma Foods.
- Losso JN. (2007). Angi-angiogenic Functional and Medicinal Foods. CRC Press
- Neeser JR & German BJ. (2004). Bioprocesses and Biotechnology for Nutraceuticals. Chapman & Hall.
- Robert EC. (2006). Handbook of Nutraceuticals

V Semester B. Sc. CND Optional I Human Nutrition CND 601 Functional Foods Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	6	09	01	01	—	01
II	12	29	02	02	1	3
III	9	20	01	01	01	02
IV	12	29	02	02	01	03
V	9	09	01	01	---	01
Total	48	96 (inclusive of choice)	21	35	30	10

VI Semester B Sc.CND
Optional I Human Nutrition
INFORMATION AND COMMUNICATION TECHNOLOGY

Code: CND 602

Hours: 48

Instruction hours/week: 03

Objectives:

1. To understand the basics of Information communication technology
2. To know computer tools and applications in the field of health care, food and nutrition

Total marks:100

Theory:70

Internal Assessment: 30

Unit I

08 hrs

ICT-, Meaning, Components of ICT, Applications of ICT
Common Terminologies: Data, Information, Hardware, Software, Introduction to Vital Information Resources Under Seize (VIRUS), ANTIVIRUS, Spam
Components of a computer, Input, CPU and output devices, Memory -units of memory, primary and secondary memory and storage devices

Unit II

12 hrs

Introduction to MS word, Excel and Power point
Data Communication: Meaning, Types and Components
Concept of computer networking: Types, Benefits, Teleconferencing, Videoconferencing, and Computer conferencing.

Unit III

08 hrs

Internet: Advantages and limitations. Internet services (in brief): social networking sites, Twitter and Microblogging, Internet forum, One drive, cloud computing, E-mail
IoT (Internet of Things) and it Impact

Unit IV ICT in Health sector

12 hrs

- E health: Meaning, Benefits of e health, ICT applications in Public health Care in India: E health projects: Birth and death registration, online maternal death review monitoring system, National Identification Number (NIN), Self-monitoring healthcare devices
- Mobile Health: meaning, Difference between e health and m health, health apps, Healthy you card, I mg, mswasthya-CDAC, CycleTel, mDiabetes, Evoz, MAMA, My Fitness Pal, Zoojoo.be. Adverse health consequences of using mobile phones.

Unit V: ICT in Food and Nutrition:

08 hrs

- ICT and food security
- Use of ICT for dietary assessment: 24 hr recall, use of personal digital assistant, digital photography, smart cards
- ICT in counselling

PRACTICAL

Code: CND 602-P

Number of weeks: 16

Hours/week: 03

Total marks: 50

Internal Assessment: 15

Practical exam:35

- Using MS word (basics) (2 classes)
- Excel: Building data base, Simple calculations using excel (2 classes)
- Power point presentation: Preparation of slides, presentation of slides, Simple animation techniques (2 Classes)
- Graphical representation of a given data.(Column, Bar, Line and Pie charts) (3 classes)
- Designing a digital poster (2 classes)
- Create digital story on a given topic by combining text, image, audio and video and submit (3 classes)
- Survey on self monitoring health care devices (1 class)
- Visit to a hospital to learn use of computers in hospitals (1 Class)

References :

- B.Srilakshmi , 2016, Nutrition Science , New age international publishers, New Delhi.
- Santosh Kumar M . Hiremath , 2015, Keonics computer literacy, course material for computer basics, A Government of Karnataka Enterprise,Kinnari publications, Bengaluru.
- <https://mohfw.gov.in/> e-health.(Ministry of Health and Family Welfare, Govt of India Website

V Semester B. Sc. CND Optional I Human Nutrition CND 602 Information and Communication Technology Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	08	16	1	2	NIL	3
II	12	24	1	2	a)5, b) 5	1
III	08	14	2	1	NIL	3
IV	12	24	2	1	(a) 5 b) 5	3
V	08	18	1	1	a) 5, b) 5	0
Total	48	96 (inclusive of choice)	21	35	30	10

VI Semester B Sc. CND
Optional II Clinical Nutrition and Dietetics
DIETETICS IV

Code: CND 603

Hours:48

Instruction hours/week: 03

Total marks:100

Theory: 70

Internal Assessment:30

Objectives:

1. To understand the role of dietetics in preventive, promotive and curative health care
2. To make appropriate dietary modification in various disease conditions.

Unit I

10 hrs

- Nutritional problems during infancy: preterm baby- nutritional requirements, feeding pre term baby, feeding problems
- Weaning: need for weaning, types of supplementary foods, low cost supplementary foods
- Problems in weaning: obesity, underweight, food allergy, refusal to take new food choking, diarrhea

Unit II

9 hrs

- Nutritional problems during pregnancy: Anemia, Constipation, oedema. Pregnancy induced hypertension, hypertension, Gestational Diabetes Mellitus
- Complications during pregnancy: Spinabifida, Intra Uterine Growth Retardation (IUGR)

Unit III

9 hrs

- Nutritional problems during old age: Osteoporosis, neurological problems, obesity, anemia, constipation, immunity
- Degenerative diseases (brief)

Unit IV

12 hrs

- Nutrition support service: Enteral nutrition - Definition, patient screening
- Tube feeding: Nasogastric, Nasoduodenal, Nasojejunal,
- Types of enteral feeds: natural liquid foods, blenderised diets and elemental diets
- Parenteral Nutrition: Definition of Total parenteral nutrition (TPN), composition, patient screening , TPN for children and adults
- Pre and post operative diets; objectives and dietary management

Unit V

8 hrs

- Home care for critically ill and requiring long term nutrition support, complications of nutrition support system- refeeding syndrome, palliative care, rehabilitation diets (stages)

PRACTICAL

Code: CND 603

No. of classes: 16

Instruction hours/week: 03

Total marks: 50

Practical exam: 35

Internal Assessment: 15

- Planning and preparation of a day's diet for anemic pregnant mother 3 classes
- Planning and preparation of a day's diet for gestational diabetic women 2 classes
- Planning and preparation a day's diet for hypertensive pregnant women 2 classes
- Planning and preparation a day's diet for osteoporotic geriatrics 2 classes
- Planning and preparation a day's diet for constipation in geriatrics 2 classes
- Market survey on available commercial enteral formula 2 classes
- Planning and preparation enteral formula- liquid foods and blenderised formula 3 classes

References:

- Srilakshmi B. (2013) Human Nutrition for B.Sc. Nursing students, New Age International Publications, New Delhi.
- Indian Council of Medical Research. Nutritive Value of Indian Foods—Latest publication of NIN, Hyderabad
- Shubhangini A Joshi (2011) Nutrition and Dietetics, with Indian Case Studies, 3rd edn Tata McGraw Hill Publication, New Delhi
- Mahan, L.K. & Ecott-Stump, S. (2000): Krause's Food, Nutrition and Diet Therapy, 12th Edition, W.B. Saunders Ltd

V Semester B. Sc. CND

Optional I Human Nutrition

CND 602 Information and Communication Technology

Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	10	20	1	1	1	2
II	9	17	NIL	1	1	2
III	9	17	2	2	NIL	1
IV	12	30	3	2	1	1
V	8	12	1	1	NIL	4
Total	48	96 (inclusive of choice)	21	35	30	10

VI Semester B Sc.CND
Optional II Clinical Nutrition and Dietetics
NUTRITION COUNSELING

Code: CND 604

Hours:48

Instruction hours/week: 03

Objectives:

1. To demonstrate effective counseling skills for individuals and groups
2. To strengthen the ability to interview clients/patients

Total marks:100

Theory: 70

Internal Assessment:30

Unit I: Components of nutrition counseling **10 hrs**

- Assessment component: Methods of review (verbal and non verbal techniques)
- Dietary Data Analysis: Usage of standard cups and measurement, 24 hr dietary recall method, 3 days dietary recall method, Food Frequency Questionnaire (FFQ), Food log

Unit II **10 hrs**

- Planning component: Designing of counseling plans- goals and objectives, client care plan and designing evaluation instruments
- Implementation component: counseling the patient
- Evaluation component: Measuring the success of performance of client and evaluating the counseling process, counseling strategies for behavior modification, the OARS technique

Unit III **6 hrs**

- Nutrition Counseling for pregnant women with respect to pre pregnancy, prenatal and ante natal care
- Nutrition counseling for mothers on weaning

Unit IV **12 hrs**

- Nutrition counseling for adolescent eating disorder- Anorexia nervosa, Bulimia nervosa, Binge eating disorder
- Nutrition counseling for weight management during adulthood- Lifestyle modification strategies
Dietary modification: Restricted energy diets, Formula diets and meal replacement programs, commercial programs, extreme energy restriction and fasting, very low calorie diets
Weight imbalance: etiology, assessment, management, high energy diets for weight gain

Unit V **10 hrs**

- Nutrition counseling for geriatrics- Definition of agism, geriatrics
- Nutrition and its multiple role in prevention: Nutrition as primary prevention, secondary prevention and tertiary prevention
- Factors influencing quality of life

PRACTICAL

Code: CND 604P

Number of weeks:16

Instruction hours/week: 03

Total marks:50

Practical exam: 35

Internal Assessment:15

- Preparation of counseling aids for a all stages of life (Vulnerable group) (3 classes)
 - a) Complementary feeding
 - b) Child nutrition during preschool and school years
- Preparation of counseling aids for a given condition (4 classes)
 - a) Adolescence-Importance of breakfast, Importance of five food group
 - b) Pregnancy
 - c) Lactation
 - d) Geriatrics
- Preparation of data sheet, questionnaire, client care plan (2 classes)
- Setting up Counseling centre and conducting counseling sessions (7 classes)
Evaluation and report writing

References:

- Herrin. M., Nutrition Counseling in the Treatment of Eating Disorders. New York, NY, Brunner-Routledge, 2003
- King Kathy, Klawitter Bridget., Nutrition Therapy: Advanced Counseling Skills Lippincott Williams & Wilkin,2007
- Snetsellar, Linda G., Nutrition counseling skills for the nutrition care process, 4th Edition Jones & Bartlett Publishers, 2009
- Mahan, L.K. & Ecott-Stump, S. (2000): Krause's Food, Nutrition and Diet Therapy, 12th Edition, W.B. Saunders Ltd

V Semester B Sc CND

Optional II Clinical Nutrition and Dietetics CND 604 Nutritional Counseling Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	10	20	01	01	01	02
II	10	20	02	02	NIL	04
III	6	12	02	01	NIL	01
IV	12	24	02	01	01	03
V	10	20	NIL	02	01	NIL
Total	48	96 (inclusive of choice)	21	35	30	10

VI Semester B Sc.CND
Optional III Public Health Nutrition
FOODS IN INDIAN TRADITION

Code: CND 605

Hours: 48

Instruction hours/week: 04

Total marks:100

Theory:70

Internal Assessment: 30

Objectives:

1. To know the history of Indian Cuisine
2. To learn different regional cuisines of India

Unit I

08 hrs

History of Indian Cuisine: Indus valley civilization, The period of Indo-Aryans, The Buddhist food concepts, The Jainism food concepts, Entry of Europeans

Unit II

08 hrs

Methods of processing of puffed rice, beaten rice, sago, yogurt, Indian Cheese

Unit III

08 hrs

Method of preparation of Traditional Indian sweets-payasam, laddu, shrikhand, gulkand etc, Indian snacks, Pickles, chutneys, papads, jams, jellies, fruit juice.

Unit IV

12 hrs

Regional Cuisine Of India I : Geographical location, historical background, seasonal availability, staple foods, special equipment, speciality cuisines for festivals and occasions Kerala, Tamilnadu With Special Reference To Chettinad Cuisine, Karnataka, Andhra Pradesh And Goa.

Unit V

12 hrs

Regional Cuisine Of India II: Geographical location, historical background, seasonal availability, staple foods, special equipment, speciality cuisines for festivals and occasions of Maharashtra, Punjab, Gujarat, Rajasthan, Awadh, Kashmir And Bengal.

PRACTICAL

Code: CND 604P

Number of weeks:16

Instruction hours/week: 03

Total marks:50

Practical Exam: 35

Internal Assessment:15

- Prepare special dishes of Kerala, Tamil Nadu (with special reference to chettinad cuisine) and Karnataka (3 classes)
- Prepare special dishes of Andhra Pradesh, Goa ,Maharashtra (3 classes)
- Prepare special dishes Punjab (1 class)
- Prepare special dishes Rajasthan (1 class)
- Prepare special dishes Kashmir and Bengal (2 classes)
- Preparation of pickles (2 classes)
- Preparation of Indian sweets and snacks (4 classes)

References:

- M.Shakunthala Manay And Shadaksharaswamy.M. Food Facts And Principles. New Delhi. New Age International Publishers. 2nd Edition.2001.
- Krishna Arora . Theory Of Cookery; New Delhi. Frank Bros. And Co Publishers. 4th Edition.2001.
- Thangam.E.Philip. Modern Cookery For Teaching And Trade (Volume I) New Delhi. Orient Longman Publishers.5th Edition.2003.
- Achaya K T Everyday Indian Processed Foods National Book Trust New Delhi, 1984
- Collen Taylor Sen Feasts and Fasts A History of Food in India Reaktion Books Ltd 2015
- Parvinder Bali Quantity Food Production Operations and Indian Cuisine, Oxford University Press 2013

VI Semester B. Sc. CND Optional III Public Health Nutrition CND 605 Foods In Indian Tradition Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	8	16	1	0	1	3
II	8	16	1	2	0	3
III	8	16	2	2	0	0
IV	12	24	1	2	1	1
V	12	24	2	1	1	3
Total	48	96 (inclusive of choice)	21	35	30	10

VI Semester B Sc. CND
Optional III Public Health Nutrition
ENTREPRENEURSHIP DEVELOPMENT

Code: CND 606

Total marks:100

Hours: 48 Hrs

Theory:70

Instruction hours/week: 03

Internal Assessment: 30

Objectives:

1. To understand the various dimensions of entrepreneurship
2. To enable students to acquire necessary knowledge to be become self employed

Unit I:

10 hrs

Introduction: Meaning of Entrepreneur, entrepreneurship, incubator. Qualities of an entrepreneur. Identification of business opportunities, Sources of ideas, Steps in identification of business opportunities, SWOT Analysis, Business ethics
Case studies of successful food related entrepreneurs: Mumbai Dabbawala, Amul Dairy

Unit II

10 hrs

Women Entrepreneurs: Psycho social barriers. Problems of Women entrepreneurs, Associations promoting women Entrepreneurs —Self Help Groups, Federation of Indian Women Entrepreneurs, Womens' India Trust, Consortium of Women entrepreneurs of India, Central and State Govt. Schemes, Association of Women Entrepreneurs of Karnataka (AWAKE)

Unit III

8 hrs

Marketing Management: The concept of marketing, Components of marketing: Market assessment, segmentation, targeting, developing market mix, features of successful marketing

Unit IV:

10 hrs

- **Financial Management:** Financial institutions providing financial assistance: IFCI, IDBI, SIDBI, NSIC
- **Legal requirements(in brief):** Factories Act 1948, Employees Provident Fund Act 1952, Employees state insurance act, Minimum Wages Act, Indian Partnership Act, Central excise, sales tax, income tax, pollution control act

Unit V Food Product Development:

10 hrs

Basic concepts of new food product development: Market research, consumer dynamics, process of product development, packaging, labelling and marketing of new food products. Guidelines in preparation of a project report

PRACTICAL

Code: CND 606 -P
Number of weeks: 16
Hours/week:03

Total marks: 50
Internal Assessment:15
Practical exam:35

- Evaluation of a working of unit (3 classes)
- Development of sales promotion tools (2classes)
- Study catering management (2 classes)
(any 2 situations) of a) Conference / Workshop b) Food stall
- Visit to AWAKE (1 Class)
- Plan a project proposal for a new food product /Business plan for setting up a food based enterprise and submit a project report. (8 classes)

References:

- Fuller, G.W. (1999) New Food Product Development. From concept to market place. CRC press, New York
- Anil Kumar, S., Poornima, S.C., Abraham, M.K.& Jayashree, K(2004). Entrepreneurship Development. New Age International Publishers
- Appannaiah H R and Gopala Krishna D S (2014) Entrepreneurship Development. Himalaya Publishing House

VI Semester B. Sc. CND
Optional III Public Health Nutrition
CND 606 Entrepreneurship Development
Blueprint

Units	No of hours	Marks per unit	3 marks	5 marks	10 marks	1 mark
I	10	20	01	01	01	02
II	10	20	NIL	02	01	NIL
III	08	16	02	02	NIL	NIL
IV	10	20	02	02	NIL	04
V	10	20	02	NIL	01	04
Total	48	96 (inclusive of choice)	21	35	30	10
