ETHIRAJ COLLEGE FOR WOMEN
AUTONOMOUS
AIDED
CHENNAI-8

DEPARTMENT OF
NUTRITION, FOOD SERVICE MANAGEMENT AND DIETETICS

SYLLABUS FOR
B.Sc NUTRITION, FOOD SERVICE MANAGEMENT AND DIETETICS
2018 – 2021 batch onwards

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

On obtaining an undergraduate degree the student will be able to:

PEO1: Apply and advance the knowledge and skills acquired, to become a creative professional in their chosen field.

PEO2: Engage in self-directed continuous learning, aimed at global competency, which will promote professional and personal growth

PEO3: Develop management skills and entrepreneurial skills, by harnessing core competencies tempered by values and ethics

PEO4: Work towards achieving economic and social equity for women through application of relevant knowledge PEO5: Contribute to promoting environmental sustainability and social inclusivity

PROGRAMME OUTCOMES (POs)

1. To promote and apply scientific knowledge for finding sustainable solution to solve the issues pertaining to the society/Industry
2. Identify, analyse and formulate novel ideas to yield, substantial results in the fields of research utilizing the principles of Physical and Biological Science
3. Relate key concepts and scientific principles to various scientific phenomenon and their applications in day-to-day life
4. Cultivate unparalled comprehension of fundamental concepts relevant to basic sciences leading to an individual progress and career advancement at the National and Global levels
5. To communicate effectively their views and ideas orally/ written in English and in other related languages
6. Design solutions for complex problems and design system components or processes that meet the specific needs with appropriate consideration for public health and safety, cultural, societal and environmental conditions

PROGRAMME SPECIFIC OUTCOMES (PSOs)

On completion of the specific programme (B.Sc Nutrition, Food Service Management and Dietetics) the student will be able to:

1. Develop effective communication and foster positive health enhancing practices extending to the community to support sustainable living.

2. Analyze, interpret, evaluate and use professional literature to make ethical, evidence based decisions facilitating professional collaborations in the field of Nutrition and Dietetics.

3. Develop core competency skills to support actions that promote social, cultural, economic ecological and gender equity.

4. Evaluate, adopt and apply the best practices relating to health, safety, quality and clients satisfaction in the field of Nutrition and Dietetics.

5. To develop critical thinking, decision making attributes and aesthetic skills to enhance professional competency by updating and applying emerging trends and technologies.

6. To foster entrepreneurial skills, enable pursuit of higher education, research and career in Nutrition, Food Service Management and Dietetics and health education causing meaningful societal impact.

PROGRAMME PROFILE -B.Sc NUTRITION, FOOD SERVICE MANAGEMENT AND DIETETICS (AIDED)

Sem	Paper code	Paper	Hrs/wk	Credits	CA	End Sem	Total
I		Foundation Course Language	5	3	40	60	100
I		English	5	3	40	60	100
I	**ND18/1C/FSE**	Food Science	7	5	40	60	100
I	**ND18/2C/PR1***	Food Science & Physiology practical	3	-	40	60	100
I		Allied Chemistry I	4	4	40	60	100
I		Allied Chemistry I Practical	2	-	40	60*	100
I	**ND18/1N/HEN**	Health and Nutrition	2	2	-	50	50
I		Soft skill 1	2	3	-	50	50
II		Foundation Course Language	5	3	40	60	100
II		English	5	3	40	60	100
II	**ND18/2C/PHY**	Physiology	7	5	40	60	100
II	**ND18/2C/PR1***	Food Science & Physiology practical	3	3	40	60	100
II		Allied Chemistry II	4	4	40	60	100
II		Allied Chemistry II Practical	2	2	40	60*	100
II	**ND18/2N/FLA**	Flower Arrangement	2	2	-	50	50
II		Soft skill 2	2	3	-	50	50
III		Foundation Course Language	5	3	40	60	100
III		English	5	3	40	60	100
III	**ND18/3C/HNU**	Human Nutrition	7	5	40	60	100
III	**ND18/4C/PR2***	Human Nutrition & Nutrition Through Lifecycle practical	3	-	40	60	100
III	**ND18/3A/MIC**	Microbiology	4	4	40	60	100
III	**ND18/4A/PR1***	Microbiology & Nutritional Biochemistry Practical	2	-	40	60*	100
III		Environmental Studies	2	2	-	50	50
III		Soft Skill 3	2	3	-	50	50

IV		Foundation Course Language	5	3	40	60	100
IV		English	5	3	40	60	100
IV	**ND18/4C/NLC**	Nutrition Through Lifecycle	7	5	40	60	100
IV	**ND18/4C/PR2***	Human Nutrition & Nutrition Through Lifecycle practical	3	4	40	60*	100
IV	**ND18/4A/NBC**	Nutritional Biochemistry	4	4	40	60	100
IV	**ND18/4A/PR1***	Microbiology & Nutritional Biochemistry Practical	2	2	40	60*	100
IV		Value Education	2	2	-	50	50
IV		Soft Skill 4	2	3	-	50	50
V	**ND18/5C/FM1**	Food Service Management I	4	4	40	60	100
V	**ND18/5C/HFS**	Human Development and Family Studies	5	4	40	60	100
V	**ND18/5C/BAK**	Baking and Confectionery	5	4	40	60	50
V	**ND18/5C/TD1**	Therapeutic Dietetics I	5	4	40	60	50
V	**ND18/5E/IDH**	Interior Decoration & Housekeeping	5	5	40	60	100
		Self study course Health Psychology		**2 (extra)**	-	**100**	**100**
VI	**ND18/6C/FM2**	Food Service Management II	4	3	40	60	100
VI	**ND18/6C/TD2**	Therapeutic Dietetics II	5	4	40	60	100
VI	**ND18/6C/SPN**	Sports Nutrition	5	4	40	60	100
VI	**ND18/6E/PHN**	Public Health Nutrition	5	5	40	60	100
VI	**ND18/6E/FPR**	Food Preservation	5	5	40	60	100
VI	**ND18/6C/PR3***	Food Service Management Practical	3	3	40	60*	100
VI	**ND18/6C/PR4***	Therapeutic Dietetic Practical	3	3	40	60*	100
		Extension activity		1			
		TOTAL		**140**			

*Practical examination is conducted internally in the even semester (II, IV, VI).

Internship for a period of 15 days in a teaching hospital during 6th semester will be awarded one extra credit.

CREDIT ALLOTMENT FOR CORE, ALLIED AND PART IV SUBJECTS

Semester	Part I	Part II	Part III		Elective	Part IV			
			Core credits (Theory + Practical)	Allied credits (Theory + Practical)		1a/b/c	Soft skill	EVS	VE
I	3	3	5	4		2	3		
II	3	3	5+3	4+2		2	3		
III	3	3	5	4			3	2	
IV	3	3	5+4	4+2			3		2
V			16		5				
VI			11+6		10				
Total	**12**	**12**	**60**	**20**	**15**	**4**	**12**	**2**	**2**

Total credits: 139+1 (Extension activities) = 140 credits**
EVS – Environmental Studies
VE – Value Education
1a/b/c – 1a – Basic Tamil, 1b – Advanced Tamil, 1c – Non – Major Elective

***** Extension activities – Compulsory – NSS/CSS/ Sports/YRC/RRC/Rotaract/NCC**
Extra credits: Women Studies/E-Cell/SIFE/Consumer Club/Certificate Course/ internship/self study

EVALUATION PATTERN FOR CONTINOUS ASSESSMENT

INTERNAL EVALUATION BY COURSE TEACHERS

PART I, II, AND III THEORY PAPERS

S.no	Components	Time	Maximum marks	CA marks
1	Test I	2 hours	50 to be converted to 10	10
2	Test II	2 hours	50 to be converted to 10	10
3	Assignment/ Seminar/Field visit			10
4	Participatory learning			10
			Total	**40**

Sem	Course Code	Course Title	Continuous Assessment				
			Test I	Test II	Quiz/Assignment Seminar/ Field Visit	Participatory Learning	Total
I	**ND18/1C/FSE**	Food Science	10	10	10	10	40
II	**ND18/2C/PHY**	Physiology	10	10	10	10	40
III	**ND18/3C/HNU**	Human Nutrition	10	10	10	10	40
III	**ND18/3A/MIC**	Microbiology	10	10	10	10	40
IV	**ND18/4C/NLC**	Nutrition Through Lifecycle	10	10	10	10	40
IV	**ND18/4A/NBC**	Nutritional Biochemistry	10	10	10	10	40
V	**ND18/5C/FM1**	Food Service Management I	10	10	10	10	40
V	**ND18/5C/HFS**	Human development and Family Studies	10	10	10	10	40
V	**ND18/5C/BAK**	Baking and Confectionery	10	10	10	10	40
V	**ND18/5C/TD1**	Therapeutic Dietetics I	10	10	10	10	40
V	**ND18/5E/IDH**	Interior Decoration & Housekeeping	10	10	10	10	40
VI	**ND18/6C/FM2**	Food Service Management II	10	10	10	10	40
VI	**ND18/6C/TD2**	Therapeutic Dietetics II	10	10	10	10	40
VI	**ND18/6C/SPN**	Sports Nutrition	10	10	10	10	40
VI	**ND18/6E/PHN**	Public Health Nutrition	10	10	10	10	40
VI	**ND18/6E/FPR**	Food Preservation	10	10	10	10	40

CA – Question paper pattern for theory - UG

Knowledge level	Section	Word limit	Marks	Total
K1	A – 6x2 marks	50	12	50
K1, K2	B – 3/5x6 marks	Not exceeding 500	18	
K2, K3	C – 1/2 x20 marks	Not exceeding 1500	20	

CA – Question paper pattern – Part IV - NME

Knowledge level	Section	Word limit	Marks	Total
K1, K2	A – 5x10	350	50	50

Practical papers

Part III Semester I/II/III/IV/V/VI

Practical examination will be conducted internally. **NO EXTERNAL EXAMINER**

EVALUATION PATTERN- PRACTICALS

Sem	Course Code	Course Title	Continuous Assessment		End Semester	Total
			Participation	Record	60	100
II	**ND18/2C/PR1**	Food Science and Physiology Practical	20	20	60	100
IV	**ND18/4C/PR2***	Human Nutrition and Nutrition Through Lifecycle practical	20	20	60	100
IV	**ND18/4A/PR1***	Microbiology and Nutritional Biochemistry Practical	20	20	60	100
VI	**ND18/6C/PR3***	Food Service Management Practical	20	20	60	100
VI	**ND18/6C/PR4***	Therapeutic Dietetics Practical	20	20	60	100

END SEMESTER EVALAUTION PATTERN – UG

Theory papers

Part III – Major Semester I/II/III/IV/V/VI
Double valuation by course teacher and external examiner
Maximum marks: 100 to be converted to 60
Passing marks: 40/100; 24/60

Part IV

Single valuation – written examination
Maximum marks: 50
Passing marks: 20

Structure of Part- IV papers (Non-Major Elective)

Semester	Code	Course Title	Maximum Marks
I	ND18/1N/HEN	Health and Nutrition	50
II	ND18/2N/FLA	Flower Arrangement	50

SEMESTER I COURSE PROFILE- NUTRITION, FOOD SERVICE MANAGEMENT AND DIETETICS

Semester	Course Code	Course Title	Hrs./ Week	Credits	CA	End Semester	Total
I		**Part - I** Foundation Course Language	5	3	40	60	100
I		**Part - II** English	5	3	40	60	100
I	**ND18/1C/FSE**	**Part – III** **Core 1-** Food Science	7	5	40	60	100
I	**ND18/2C/PR1***	**Core 3-** Food Science and Physiology Practical	3	-	-	-	100
I		**Part III** Allied 1- Allied Chemistry I	4	4	40	60	100
I		Allied Chemistry Practical	2	-	40	60	100
I	**UG18/1N/BTA** **UG18/1N/ATA** **ND18/1N/HEN****	**Part IV** **1a/b/c** **1a- Basic Tamil** **1b- Advanced Tamil** **1c- Health and Nutrition (NME)**	2	2	-	50	50
I		**Soft skill 1**	2	3	-	50	50
Total			**30**	**20**			

***Practical examination (ND18/2C/PR1) – Food science and Physiology Practical will be conducted in the second semester.**

SEMESTER II COURSE PROFILE- NUTRITION, FOOD SERVICE MANAGEMENT AND DIETETICS

Semester	Course Code	Course Title	Hrs./ Week	Credits	CA	End Semester	Total
II		**Part – I** Foundation Course Language	5	3	40	60	100
II		**Part – II** English	5	3	40	60	100
II	**ND18/2C/PHY**	**Part – III Core 2-** Physiology	7	5	40	60	100
II	**ND18/2C/PR1***	**Core 3-** Food Science and Physiology Practical	3	3	40	60	100
II		**Part III Allied 2-** Allied Chemistry II	4	4	40	60	100
II		Allied Chemistry Practical	2	2	40	60	100
II	**UG18/2N/BTA UG18/2N/ATA ND18/2N/FLA* ***	**Part IV 1A/B/C – 1a- Basic Tamil 1b- Advanced Tamil 1c-Flower Arrangement**	2	2	-	50	50
II		**Soft skill 2**	2	3			
Total			**30**	**25**			

*** Practical examination (ND18/2C/PR1) – Food science and Physiology practical will be conducted in the second semester**

SEMESTER III COURSE PROFILE- NUTRITION, FOOD SERVICE MANAGEMENT AND DIETETICS

Semester	Course Code	Course Title	Hrs./ Week	Credits	CA	End Semester	Total
III		**Part – I** Foundation Course Language	5	3	40	60	100
III		**Part – II** English	5	3	40	60	100
III	**ND18/3C/HNU**	**Part – III Core 4-** Human Nutrition	7	5	40	60	100
III	**ND18/4C/PR2***	**Core 6-** Human Nutrition and Nutrition Through Life Cycle Practical *	3	-	-	-	-
III	**ND18/3A/MIC**	**Part III Allied 3-** Microbiology	4	4	40	60	100
III	**ND18/4A/PR1****	Allied- Microbiology and Nutritional Biochemistry Practical	2	-	-	-	-
III		**Part IV Environmental studies**	2	2	-	50	50
III		**Soft skill 3**	2	3			
Total			**30**	**20**			

***Practical examination (ND18/4C/PR2) – Human Nutrition and Nutrition through Lifecycle Practical will be conducted in the fourth semester.**

****Practical examination (ND18/4A/PR1) – Microbiology and Nutritional Biochemistry Practical will be conducted in the fourth semester**

SEMESTER IV COURSE PROFILE- NUTRITION, FOOD SERVICE MANAGEMENT AND DIETETICS

Course Code	Course Title	Hrs./ Week	Credits	CA	End Semester	Total
	Part – I Foundation Course Language	5	3	40	60	100
	Part – II English	5	3	40	60	100
ND18/4C/NLC	**Part – III** **Core 5-** Nutrition Through Lifecycle	7	5	40	60	100
ND18/4C/PR2*	**Core 6-** Human Nutrition and Nutrition Through Life Cycle Practical	3	4	40	60	100
ND18/4A/NBC	**Part III** **Allied 4-** Nutritional Biochemistry	4	4	40	60	100
ND18/4A/PR1**	**Allied-** Microbiology and Nutritional Biochemistry practical	2	2	40	60	100
	Part IV **Value Education**	2	2	-	50	50
	Soft skill 4	2	3			
Total		**30**	**26**			

***Practical examination (ND18/4C/PR2) – Human Nutrition and Nutrition through Lifecycle Practical will be conducted in the fourth semester.**

****Practical examination (ND18/4A/PR1) – Microbiology and Nutritional Biochemistry Practical will be conducted in the fourth semester.**

SEMESTER V COURSE PROFILE- NUTRITION, FOOD SERVICE MANAGEMENT AND DIETETICS

Course Code	Course Title	Hrs./ Week	Credits	CA	End Semester	Total
ND18/5C/FM1	**Core 7-** Food Service Management I	4	4	40	60	100
ND18/5C/HFS	**Core 8-** Human Development and Family Studies	5	4	40	60	100
ND18/5C/BAK	**Core 9-** Baking and Confectionery	5	4	40	60	100
ND18/5C/TD1	**Core 10-** Therapeutic Dietetics I	5	4	40	60	100
ND18/5E/IDH	**Elective 1** Interior Decoration & Housekeeping	5	5	40	60	100
ND18/6C/PR3*	**Core 14-** Food Service Management Practical	3	-	-	-	-
ND18/6C/PR4*	**Core 15-** Therapeutic Dietetic Practical	3	-	-	-	-
Total		**30**	**21**			

***Practical examination (ND18/6C/PR3) – Food Service Management Practical will be conducted in the sixth semester.**
***Practical examination (ND18/6C/PR4) – Therapeutic Dietetics Practical will be conducted in the sixth semester.**

SELF STUDY COURSE
Health Psychology - 2 credits (extra)
End Semester examination marks - 100

SEMESTER VI COURSE PROFILE- NUTRITION, FOOD SERVICE MANAGEMENT AND DIETETICS

Course Code	Course Title	Hrs./ Week	Credits	CA	End Semester	Total
ND18/6C/FM2	Core 11- Food Service Management II	4	3	40	60	100
ND18/6C/TD2	Core 12- Therapeutic Dietetics II	5	4	40	60	100
ND18/6C/SPN	Core 13- Sports Nutrition	5	4	40	60	100
ND18/6E/PHN	Elective 2- Public Health Nutrition	5	5	40	60	100
ND18/6E/FPR	Elective 3- Food Preservation	5	5	40	60	100
ND18/6C/PR3*	Core 14- Food Service Management Practical	3	3	40	60	100
ND18/6C/PR4*	Core 15- Therapeutic Dietetic Practical	3	3	40	60	100
Total		**30**	**27**			
Credits at the end of VI semesters			**139**			
Part V (Extension activities)			**1**			
Total credits			**140**			

***Practical examination (ND18/6C/PR3) – Food Service Management Practical will be conducted in the sixth semester.**

***Practical examination (ND18/6C/PR4) – Therapeutic Dietetics Practical will be conducted in the sixth semester.**

FOOD SCIENCE

Total hours: 105 hours
Credits: 5

Course Code: ND18/1C/FSE // CN18/1C/FSE
LTP: 4 3 0

COURSE OBJECTIVES

1. To impart knowledge on the classification of food groups, composition and nutritive value of different food ingredients.
2. To understand the role of each food group in cookery
3. To introduce different preliminary preparation and cooking methods to enhance conservation of nutrients
4. To learn the importance of sensory and objective evaluation of foods
5. To study the effect of cooking on food and nutrients.

COURSE OUTLINE

UNIT I: Basics of Food and Cooking

Methods: Food Groups - Basic Five, Food guide pyramid (ICMR) and Food plate (USDA). Classification of food based on nutrients.
Introduction to Food science: Preliminary preparation of food prior to cooking with special reference to conservation of nutrients and palatability.
Study of cooking methods: Dry heat method - broiling, grilling, frying and baking- its advantages and disadvantages; Moist method- boiling steaming, poaching, pressure cooking and stewing; Microwave cooking and solar cooking- merits and demerits.
Evaluation of food quality: Sensory characteristics of food, Food evaluation - Subjective method, Objective methods: chemical physical, physicochemical, and microscopic examination.

(25 HOURS)

UNIT II: Cereal and Grains

Rice and wheat- structure, composition, nutritive value and processing; locally available millets Ragi, Bajra, Foxtail, Kodo, Barnyard- composition and nutritive value.
Fermented products, dough and batter; Cooking of starch – moist heat method (gelatinization dry heat method (dextrinisation); Maillard's reaction.
Pulses and legumes: Composition and nutritive value, processing– decortication, germination, parching & puffing, soya products, TVP. Toxic constituents in pulses; lathyrism and favism. Role of cereals and pulses in cookery.
Nuts and oilseeds: Composition and nutritive value of some common nuts and oilseeds.

(20 HOURS)

UNIT III: Vegetables and Fruits

Classification, composition, nutritive value, and storage of some common vegetables
Pigments: Classification, effect of cooking on pigments, factors affecting pigments.
Role of vegetables in cookery.
Fruits: Classification, composition and nutritive value. Browning of fruits
Milk: Composition, nutritive value and types. Milk products-Types and processing of fermented and non-fermented. Milk cookery: Effect of heat, acid, enzymes, phenolic compounds, and salts; Role in cookery.
Beverages: Classification and uses in cookery. (20 HOURS)

UNIT IV: Flesh Foods and Egg

Meat - composition, nutritive value, post mortem changes in meat, ageing, tenderization of meat. Changes during cooking of meat.
Fish- Classification, composition, nutritive value, selection, changes during cooking and spoilage of fish.
Egg- structure, composition, nutritive value, storage, deterioration during storage-Physical and Chemical changes. Egg cookery- effect of heat, sugar, salt, acid, and starch on egg protein; Evaluation of egg quality; Role of egg in cookery. (20 HOURS)

UNIT V: Fats and Sugars

Fat and oils: Sources, shortening, emulsification, flavour component, hydrogenation, rancidity, smoking point and factors affecting absorption of fat. Role of fat in cookery
Sugar and Jaggery: Types, stages of sugar cookery and crystallization of sugar
Common condiments and spices: Composition and uses in cookery

(20 HOURS)

RECOMMENDED TEXTBOOKS

1. Manay S and Swamy S, *Food Facts and Principles*, New Age International (P) Ltd Publishers, New Delhi, 2001.
2. Roday S, *Food science and Nutrition*, Oxford university press, New Delhi, 2007.

REFERENCE BOOKS

3. Srilakshmi B, *Food Science*, Sixth Edition, New Age International Ltd Publishers, New Delhi, 2015.
4. Potter NM andHotchkiss JH, *Food Science*, C.B.S. Publishers, New Delhi, 1995.
5. Reddy SM, *Basic Food science and Technology*, New Age Publishers, New Delhi, 2015.
6. Lowe B, *Experimental cookery from chemical and physical stand point*, Forgotten books, UK, 2015
7. McCance and Widdowson, *Composition of food*, 6th Edition, Food Standards Agency, 2004
8. Subramani A, *Concise Food Science*, Soundarya Publications, 1998.

9. Peckham G.C., Foundations of Food Preparation, The Macmillan Publishing Co., N.Y, 1979
10. Paul. C.C. and Palmer. R.H, Food Theory and Application John Wiley and Sons, N.Y, 1972
11. Griswold R.M., The Experimental study of Foods, Houghton Miffin Co., Boston, 1979
12. Helen Charley, Food Science, John Wiley and Sons, N.Y, 1970.

JOURNALS

1. Journal of Food Science and Technology
2. International Journal of Food Science

E- LEARNING SOURCES

www.fao.org
www.wfp.org

Course Outcomes

CO No	Course outcomes
CO 1	Identify, Define and classify different food groups, nutrients, and different pre-preparation and cooking methods adopting best practices of health and safety.
CO 2	Describe the composition and nutritive value of different food groups and their role in cookery from current literature.
CO 3	Define and explain the physical and chemical changes occurring in the nutritive and non-nutritive constituents of different foods during various cooking processes.
CO 4	Apply the current understanding of food science to describe the various sustainable food practices like energy and nutrient conservation methods
CO 5	Analyze and understand the principles in cooking and its effect on sensory attributes and nutrients.

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	3	3	3	3
CO2	3	2	3	3	3	3
CO3	3	2	1	2	3	3
CO4	3	2	3	3	3	3
CO5	2	3	3	3	3	3
Average	2.6	2.4	2.6	2.5	3	3

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Problem Solving- Group Discussion- Role Modelling
Quiz- Seminar

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

PHYSIOLOGY

Total hours: 105 hours **Course Code: ND18/2C/PHY // CN18/2C/PHY**
Credits: 5 **LTP: 4 3 0**

COURSE OBJECTIVES

1. To impart knowledge on structure and functions of different organs
2. To understand the physiological functioning of various system of the body
3. To introduce the interrelationship between nutritional science and physiological functions

COURSE OUTLINE

Unit I

Cell: Structure and functions (Review). **Tissues** – classification, structure and functions of – epithelial, connective, muscular and nervous tissue (Review)

Blood – composition, RBC, WBC, Platelets; structure and function; Blood Groups –Blood coagulation – Body defense against diseases.

Bones: Classification, structure, function and chemical composition of bone. Bone mineral density. (20 HOURS)

Unit II

Nervous system: Physiology of nerve and muscle – Conduction of nerve impulses along nerve and muscle fibres, physiology of muscle contraction, Synapse.

Central and Peripheral Nervous System – General Anatomy – Functions of cerebrum, cerebellum, medulla oblongata, pons, Spinal cord.

Autonomic nervous system – Sympathetic, parasympathetic – functions. (20 HOURS)

Unit III

Heart and circulation – Anatomy of Heart, Properties of cardiac muscle, Origin and conduction of heart beat – cardiac cycle, cardiac output and heart sounds; Blood pressure, Factors affecting blood pressure, ECG.

Respiratory system – Anatomy of respiratory organs, Gaseous exchange in lungs and tissues, Transport of oxygen and carbon dioxide, Muscles of inspiration and expiration. (25HOURS)

Unit IV

Digestive system – Anatomy of Gastrointestinal Tract, digestion and absorption of Carbohydrates, fats and proteins.

Excretory system – Structure of kidney, Urine Formation, Acid – base balance.

Skin – structure and function. Body temperature regulation. (20 HOURS)

Unit V

Endocrine system – Pituitary, Thyroid, Parathyroid, Adrenal Gland and pancreas – List of Hormones with its functions.

Reproductive system – Anatomy of Reproductive Organs (Review). Spermatogenesis and Oogenesis: menstrual cycle and ovarian cycle. Influence of hormones on fertilization, conception and lactation. (20 HOURS)

RECOMMENDED TEXTBOOKS

1. Guyton AC & Hall JE, *Textbook of Medical Physiology*,10th Edition, Harcourt Asia P.Ltd Singapore, 2001.
2. Sembulingam K, *Essentials of Medical Physiology*, 6th edition, Jaypee Medical Publishers, New Delhi, 2013

REFERENCE BOOKS

1. Chatterjee CC, *Human Physiology*, Volume I, 11th Edition, CBS Publishers, New Delhi, 2016
2. Chatterjee CC, *Human Physiology*, Volume II, 11th Edition, CBS Publishers, New Delhi, 2016
3. Waugh A &Grant A, *Ross & Wilson Anatomy and Physiology in Health and Illness*, 12thEdition,Churchill Livingstone Elsevier evolve, 2014
4. Sathya P and Devanand V, *Textbook of Physiology*, First edition, CBS Publishers and Distributers Pvt Ltd, New Delhi, 2013
5. Boron WF and Boulpaep EL, *Medical Physiology*, II edition, Saunders Elseivier, 2009
6. MariebEN,*Human Anatomy and Physiology*, VI edition, Pearson edition, 2004
7. Tortora. G&Grabowski, S.R. *Principles of Anatomy & Physiology*,10thEdition, John Wiley & Sons, USA,2003
8. Ganong, WF, *Review of Medical Physiology*,21st Edition, McGraw Hill Publishers, 2003
9. Joshi, VD, *Physiology – Preparation Manual for Undergraduates*, Churchill Livingstone. New Delhi, 1995
10. Chakrabarti et al., *Human Physiology*, The New Book Stall, Calcutta, 1994

JOURNALS

1. Indian Heart Journal
2. Journal of Physiology and Biochemistry

E- LEARNING SOURCES

1. http://ib.bioninja.com.au/standard-level/topic-6-human-physiology/
2. https://www.drnajeeblectures.com/cardiac-cycle/
3. www.cvphysiology.com/Heart%20Disease/HD002
4. https://study.com/academy/lesson/what-is-respiration-definition-process-equation.html
5. https://www.bbc.com/education/guides/zq349j6/revision
6. https://books.google.co.in/books/about/Guyton_and_Hall_Textbook_of_Medical_Phys.html?id=Po0zyO0BFzwC
7. http://jpkc.hactcm.edu.cn/2012yxslx/file/Textbook%20of%20Medical%20Physiology.pdf
8. https://books.google.co.in/books?isbn=070205321X

9. https://www.us.elsevierhealth.com/medicine/physiology
10. www.ebooks-for-all.com/bookmarks/detail/Human-Physiology/onecat/0.html

Course Outcomes

CO No	Course outcomes
CO1	Identify the major levels of organization, major components of each organ and define the relationship between anatomy and physiology
CO2	Explain the concept of homeostasis, negative and positive feedback mechanisms and usage of anatomical terms to describe the body
CO3	Illustrate the functions of important physiological systems including digestive, cardio respiratory, renal, reproductive, endocrine and nervous.
CO4	Distinguish the interaction between separate systems to yield the integrated physiological responses in the body
CO5	Develop competency to analyze relationship between health, disease and physiology

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	1	1	1	1	2	3
CO 2	2	3	2	3	2	3
CO 3	1	3	1	2	2	3
CO 4	1	3	2	2	3	3
CO 5	3	3	2	3	3	3
Average	2	2.6	1.6	2.2	2.4	3

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Problem Solving- Group Discussion
Quiz- Seminar

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER I & II

FOOD SCIENCE AND PHYSIOLOGY PRACTICAL

Total hours: 45 hours
Credits: 3

Course Code: ND18/2C/PR1 // CN18/2C/PR1
LTP: 0 0 3

COURSE OBJECTIVES

FOOD SCIENCE

1. To impart knowledge on sensory analysis of food.
2. To introduce the skills of different cooking techniques and use of cooking equipment for food preparation.
3. To study the physical and chemical changes that happens during cooking.

PHYSIOLOGY

1. To identify the different vital organs, glands and tissues under a microscope.
2. To study the factors affecting the pulse and respiration rate of an individual
3. To estimate the blood parameters like bleeding time, clotting time, Serum hemoglobin, RBC and WBC

FOOD SCIENCE PRACTICAL

1. Techniques in measurements of food stuffs, uses of standard measuring cups and spoons. Experimental foods and cookery practical.
2. Cereals :
   a. Microscopic study of different starches.
   b. Method of combining starch and boiling water
   c. Study of effects of moist and dry heat on starch
   d. Preparation of white sauces
   e. Gluten formation

   Different methods of cooking rice - straining, absorption, pressure cooking.
   Preparation of phulka, lime rice, vegetable fried rice, ragiadai, uppuma, string hoppers, puttu, idli and dosai,.
3. Pulses: Effect of hard, soft water, alkali, papaya, on the texture and the cooking time of grams and dhals.
   Preparation: sambhar, sundal, cereal and pulse combination - adai, dhokla, poli, sprouted gram salad.
4. Eggs: Coagulation of egg protein - egg white foam, effect of beating, addition of sugar, acid and effect of temperature on egg foam.
   Preparation – poached egg, omelette, scrambled egg, custard, steamed vanilla pudding.
5. Vegetables: Effect of shredding, dicing, addition of acid, alkali, covering, steaming and pressure cooking on different pigments and acceptability on vegetables.

Preparation- Carrot cucumber, cauliflower manchurian, avial, vegetable kofta, stuffed capsicum, baked vegetables.

6. Fruits: Enzymatic browning and prevention. Preparation of banana fritters, fruit jelly, date pudding, fruit salad, pine apple payasam.
7. Milk: Coagulation of milk proteins, preparation of paneer, curd.
   Preparation- paneer masala, firni, rice payasam, sweet lassi, shrikand,
8. Beverage:Preparation of stimulating and nourishing beverages - coffee, tea, cocoa, milk shake, lassi, fruit punch, panagam.
9. Fats and oils: Comparison of smoking temperature of some fats and oils.
   Preparation- shallow fry- vegetable cutlet and deep fry; banana chips, vadai, diamond cuts.
10. Sugar cookery: Different stages of crystallisation of sugar Preparation of recipes at different stages of sugar crystallisation - gulabjamun, chocolate fudge, badhushah, coconut burfi, peanuts chikkis, caramel custard.

REFERENCE BOOKS

1. Griswold R.M., The Experimental study of Foods, Houghton Miffin Co., Boston, 1979
2. Helen Charley Food Science, John Wiley and Sons, N.Y, 1970.
3. Srilakshmi B. Food Science, New Age International Ltd., Publishers. 2014
4. Srilakshmi B, *Food Science*, Sixth Edition, New Age International Ltd Publishers, New Delhi, 2015
5. Norman. M. Potter and Joseph. H. Hotchkiss, Food Science, C.B.S. Publishers. 1995.

PHYSIOLOGY PRACTICAL

1. Microscopic study of different tissues – epithelial, Connective, Muscular and Nervous.
2. Anatomy of Sheep's Brain.
3. Hemoglobin Estimation, WBC Count, RBC Count, Coagulation time, bleeding time, blood grouping., Anatomy of Sheep's Heart, Estimation of Blood Pressure, effect of exercise on respiratory rate, arterial blood pressure and pulse rate.
4. Microscopic structure of lung and trachea.
5. Microscopic structure of pancreas, stomach, small intestine, liver.
6. Microscopic structure of nephron.
7. Microscopic structure of thyroid, pituitary, adrenal, ovary, uterus, mammary gland and testis.

RECOMMENDED TEXTBOOKS

1. Guyton AC & Hall JE, *Textbook of Medical Physiology*, 10th Edition, Harcourt Asia P.Ltd Singapore, 2001.
2. Sembulingam K, *Essentials of Medical Physiology*, 6th edition, Jaypee Medical Publishers, New Delhi, 2013.
3. Waugh A &Grant A, *Ross & Wilson Anatomy and Physiology in Health and Illness*, 12thEdition,Churchill Livingstone Elsevier evolve, 2014

REFERENCE BOOKS

1. Chaudhuri, A.R. (2000). Textbook of Practical Physiology. Paras Publishing, Hyderabad.
2. Jain, A.K. (2003). Textbook of Practical Physiology. Paras Publishing, Hyderabad.
3. Bloom W & Fawcett, D.W.A. "Text book of Histology". W.B.Souders & co. latest Edition.
4. Gunasegaran JP, *Textbook of Histology and A Practical guide*, 3rd edition, Elsevier, 2016
5. Kote N, *Practical Manual of Histology for Medical Students,* Jaypee brothers, 2014.
6. Chaudhuri, A.R, *Textbook of Practical Physiology,* Paras Publishing, Hyderabad, 2000

Course outcomes

CO No	Course outcomes
CO 1	Identify the different food ingredients and incorporate traditional and sustainable cooking techniques
CO 2	Describe and conduct appropriate sensory analysis of recipes
CO 3	Demonstrate skills while using cooking utensils and equipment during food preparation
CO4	Recognize and identify the principle tissue structures
CO5	Perform, analyze and interpret the experiments of blood parameters

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	3	3	3
CO 2	3	3	2	3	3	3
CO 3	2	3	3	3	3	3
CO 4	2	3	1	2	3	3
CO 5	1	3	1	2	3	3
Average	2.2	3	1.8	2.6	3	3

SEMESTER I

PART IV NME- 1 HEALTH AND NUTRITION

Total hours: 30 hours
Credits: 2

Course Code: ND18/1N/HEN
LTP: 1 1 0

COURSE OBJECTIVES

1. To inculcate the concept of good nutrition and health.
2. To improve the standard of health and nutritional status of college students.

COURSE OUTLINE

UNIT I

Definition of health – components of healthy life style – Diet, physical fitness- benefits of fitness and stress management.

UNIT II

Definition of nutrition – The Nutrients, Diet planning principles, Food guide pyramid and Food Plate. Food safety- Processed foods, making wise choices, food safety in the kitchen, environmental contaminants in food.

UNIT III

Nutrition for teenagers and young adults- nutritional needs food choices and health habits. Special situations- eating disorders, obesity, nutritional anemia, premenstrual syndrome. Recommended daily eating guide for adolescents, Adults - during pregnancy, lactation and peri menopause. Nutrition for Elderly.

RECOMMENDED TEXTBOOKS

1. Wardlaw M Gordon 1999. Perspectives in nutrition 4th edition, McGraw Hill
2. Eleanor Noss Whitney and Sharon RadyRolfes, 2002. Understanding Nutrition 9th edition, West Wordsworth.

REFERENCE BOOKS

1. Kathleen Mahan and Marian Arlin 2004 Krause's Food Ntrition& Diet therapy 8th edition, W.B.Saunderscompany.
2. Guthrie H. Andrews – Introductory Nutrition C.V.Mosby Co., St. Lours.
3. M.Swaminathan "Principles of Nutrition and Dietetics", 1993, Bappeo 88, Mysore Road, Bangalore – 560 018.
4. Cataldo, DeBruyne and Whitney 1999. Nutrition and Diet therapy – Principles and Practice 5th edition, West/ Wadsworth, London.
5. Garrow JS, James WPT, Ralph A 2000. Human Nutrition and Dietetics 10th edition, Churchill Livingstone, NY.
6. Groff L James, Gropper S Sareen 2000. Advanced Nutrition and Human Metabolism 3rd edition, West / Wadsworth, UK.

E – LEARNING SOURCES

1. www.nutrition.gov - Service of National agricultural library, USDA
2. www.nal.usda.gov/fnic - Food and Nutrition information centre.

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Problem Solving- Group Discussion- Role Modelling
Quiz- Seminar

SEMESTER II

PART IV - NME – 2 FLOWER ARRANGEMENT

Total hours: 30 hours
Credits: 2

Course Code: ND18/2N/FLA
LTP: 1 1 0

COURSE OBJECTIVES

To enable students

1. To gain understanding of the basic principles of flower arrangement
2. To develop skills in arranging flowers for different occasions

COURSE OUTLINE

UNIT I: Importance of flower arrangement- types of flowers, foliages and weeds used for flower arrangements. Choosing flowers for arrangement. Conditioning and keeping flowers fresh. Accessories and tools used for arranging flowers.

UNIT II: Basic types of flower arrangements- crescent, diagonal ,circle, horizontal, open half circle, oval, hogarth, perpendicular, side triangle, spiral, swirl and triangle .Japanese style- Moribana and Ikkebana. Dry and floating arrangement.

UNIT III: Flower arrangements for different occasions- party-bouquet, festive occasion-floating arrangement, front office- triangular/ all around arrangement.

RECOMMENDED TEXTBOOKS

1. Seetharaman P, Pannu P, Interior Design and Decoration, 1st Edition, CBS Publishers and Distributors Pvt Ltd, New Delhi, 2015.

REFERENCE BOOKS

1. Dorothy S.and Darlene .M. Introduction to Interior Design Macmillan publishing company, New York,1979.
2. Gold Stein.H.& Gold Stein.V. Art in every day life- Mac Millian and company , New York,1966.

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Problem Solving- Group Discussion- Role Modelling
Quiz- Seminar
Field Visits

SEMESTER III

HUMAN NUTRITION

Total hours: 105 hours **Course Code: ND18/3C/HNU //CN18/3C/HNU**
Credits: 4 **LTP: 4 3 0**

COURSE OBJECTIVES

1. Provide an integrated overview of dietary sources, physiological role, requirements of macro and micro nutrients and water.
2. To gain information and knowledge regarding metabolism of major nutrients.
3. Comprehend the principles of nutrition.

COURSE OUTLINE

UNIT I

Importance of nutrition, History of nutrition. Energy: Definition - Calories, Joule, Calorimetry direct and indirect calorimetry, respiratory quotient, Energy value of foods, physiological fuel values.

Energy needs of the body BMR, RMR, definition, factors influencing BMR, the energy cost of physical activities and method of determination, calculation of total caloric requirements, factorial method for determining total energy needs.

Carbohydrates: definition, classification, functions, utilization and storage, Unavailable carbohydrate or dietary fibre, food sources, requirements. Role of fibre in human nutrition.Glycemic index and Glycemic load. (25 HOURS)

UNIT II

Protein : Definition, classification, functions, essential and non essential amino acids, requirements, evaluation of protein quality- PER, BV, NPU, chemical score and PDCAAS; supplementary value; nitrogen balance; food sources & requirement. Protein energy malnutrition.

Lipids: definition, classification, functions, essential fatty acids - sources and effects of deficiency; saturated fatty acids, cholesterol and its relation to CHD. Food sources andrequirements. (20 HOURS)

UNIT III

Minerals : (I) **Macro-minerals** – calcium and phosphorus : (a) Distribution in the body, functions, absorption and storage, excretion, blood level, role of parathyroid hormone, vitamin D and calcium (b) Ca : P ratio (c) food sources, RDA, effects of deficiency.

(II) **Micro minerals**- Iron - distribution in the body, functions, absorption, transport, storage, excretion, food sources, nutritional anaemia, nutritional siderosis. Zinc, Copper, Iodine: distribution, function, RDA, food sources, deficiency and toxicity. Selenium-Vitamin E relationship, Chromium and glucose tolerance factor. (20 HOURS)

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UNIT IV

Vitamins: Fat Soluble Vitamins: Vitamin A & D –Measurements, function, absorption and transport, storage, RDA, food source, effects of deficiency, treatment of Vitamin A deficiency and prevention, hypervitaminosis, Vitamin E & K- functions, sources, effects of deficiency. (20 HOURS)

UNIT V

Water: Water balance, dehydration, water intoxication. Potassium, Sodium and Chloride: effects of imbalance (Deficiency and excess), distribution in the body, function, food sources, requirements.

Water soluble vitamins: Vitamin C, B1, B2, niacin, vitamin B6, B12, Folic acid, Biotin and pantothenic acid - function, RDA, food sources, loss during processing and preparation of food, effects of deficiency. (20 HOURS)

RECOMMENDED TEXTBOOKS

1. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012
2. Mann and Truswell, *Essential of Human Nutrition*, 3rd edition, Oxford University Press, 2007

REFERENCE BOOKS

1. Longvah T, Ananthan R, Bhaskar K, Venkaiah K, *Indian Food Composition Tables*, National Institute of Nutrition, 2017
2. Whitney EN and Rolfes SR, *Understanding Nutrition*, 10th edition, Thomson/Wordsworth, 2005
3. Insel P, Turner E & Ross D, *Nutrition*, ADA, Jones & Bartlett, Canada, 2nd edition, 2004
4. Sumathi R. Mudambi and Rajagopal MV, *Foods and Nutrition*, 4th edition, New Age International Ltd. Publishers, New Delhi, 2001
5. Groff JL, Gropper SS, *Advanced Nutrition and Human Metabolism*,3rd edition, West/ Wadsworth, UK, 2000
6. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., *Nutritive value of Indian Foods*, NIN, Hyderabad, 2001
7. Cataldo, DeBruyne and Whitney EN, *Nutrition and Diet therapy, Principle and Practice*, 5th edition, West Wordsworth, London, , 1999
8. Gordon WM, 4th edition, *Perspectives in Nutrition*, McGraw Hill, 1999
9. Brown JE, *Nutrition now*, West Publishing Company, 1995
10. Swaminathan .M, *Principles of Nutrition and Dietetics*, Bappco, Bangalore, 1993

JOURNALS

1. Journal of Human Nutrition and Dietetics
2. Food and Nutrition Journal

E- LEARNING SOURCES

1. www.nutrition.gov- Service of National agricultural library, USD
2. www.nal.usda.gov/fnic- Food and Nutrition information centre.
3. www.nutrition.gov- Service of National agricultural library, USD

COURSE OUTCOMES

CO No.	Course outcomes
CO 1	List/ define key terms related to macro nutrients, micronutrients, water, electrolyte as in sources, losses during processing, deficiency and RDA
CO 2	Classify micronutrients and examine/ discuss their functions, metabolism and deficiencies.
CO 3	Define and explain the relationship between nutrients and nutrient metabolism
CO4	Identify and analyze the distribution, functions, metabolism, deficiency of micronutrients
CO5	Explain and analyze the role of water and electrolytes in human health

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	2	3	2	3	2	3
CO 2	2	3	3	3	3	3
CO 3	3	3	3	3	3	3
CO 4	2	3	2	3	2	3
CO 5	2	3	2	3	2	3
Average	2.6	3	2.6	3	2.4	3

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Problem Solving- Group Discussion- Role Modelling
Quiz- Seminar
Field Visits

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 5200	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER III

MICROBIOLOGY

Total hours: 60 hours **Course Code: ND18/3A/MIC// CN18/3A/MIC**
Credits: 4 **LTP: 3 1 0**

COURSE OBJECTIVE

1. To enable the students to gain knowledge of general characteristics of micro-organisms.
2. Understand the role of microorganisms in food spoilage and in food borne diseases.
3. Gain knowledge on environmental microbiology.
4. To impart the knowledge on the methods of sterilization and disinfection.

COURSE OUTLINE

UNIT I

Classification of microorganisms: Morphology, Motility, Nutrition, Respiration and Reproduction of Bacteria, Viruses, Yeast & Moulds. (10 HOURS)

UNIT II

Spoilage and contamination of common foods

a) Factors affecting growth of microorganisms-temperature, water activity, pH, redox potential.
b) Sources of contamination and spoilage of common foods -Cereal and cereal products, fruits and vegetables, egg, Meat and fish, milk and milk products (two each) (15 HOURS)

UNIT III

Microorganisms in infection, resistance and immunity

a) Infection-modes of spread of Infection; Body Defense- Chemical and cellular;
b)Immunity: types- Active and Passive, Artificial and natural; Vaccines- live, dead and toxoids. (10 HOURS)

UNIT IV

Food poisoning and Food borne diseases

a)Food poisoning/ intoxication and food infection- definition. Bacterial food poisoning- Staphylococcus aureus, Clostridium botulinum, Clostridium perfringes, Bacillus cereus.
b) Food Infection- Salmonellosis, Shigellosis, Cholera, Gastroenteritis; Measures to prevent food poisoning and food borne infections. (15 HOURS)

UNIT V

Environmental Microbiology

a) Micro organisms found in water, soil, air and sewage- List of microorganisms and diseases caused; Test for sanitary quality of water: Total Bacterial count, Test for E-coli- MPN and Faecal Streptococci; Purification of water

b) Destruction of Microorganism: Sterilization and Disinfection – Methods (10 HOURS)

RECOMMENDED TEXT BOOKS

1. Arora DR, *Textbook of Microbiology*, 4th edition, CBS Publishers and distribution Pvt Ltd, New Delhi, 2012.
2. Adam MR, Moses MO, *Food Microbiology*, 2nd edition, Panima publishing corporation, 2003

REFERENCE BOOKS

1. Parija SC, Textbook of Microbiology & Immunology, 2nd Edition, Elsevier India, 2012
2. Anandanarayanan,R and Panicker CK, *Textbook of Microbiology*, Seventh edition, University Press, Hyderabad, 2009
3. Ramesh VK, *Food Microbiology*, MJP Publishers, 2007
4. Dubey RC, Maheswar DK, *A Textbook of Microbiology*, 1st edition, S. Chand & Co Ltd Publications, 2005
5. Jay JM, Loessner MJ, Golden DA, *Modern Food Microbiology*, 7th Edition, Springer, New york, 2005
6. Purohit, S.S *Microbiology – Fundamentals & applications*, 6th Edition, Agro bices Indiana, 2002
7. Heritage J, Evans EGV, Killington RA, *Introductory Microbiology*, Cambridge University press, 2002
8. Pelczar, J.*Microbiology*, 7th edition, Tata McGraw Hill publishing, 1998
9. Garbutt J, *Essentials of Food microbiology*, 2nd edition, Arnold publication, New York,1997
10. Patel A.H, *Industrial Microbiology*, Macmillan India Limited. New Delhi, 1996

JOURNALS

1. Journal of Food and Industrial Microbiology
2. International Journal of Food Microbiology

E- LEARNING SOURCES

- https://www.us.elsevierhealth.com/medicine/microbiology
- https://www.journals.elsevier.com/international-journal-of-food-microbiology
- https://www.journals.elsevier.com/food-microbiology
- www.cfsan.fda.gov/
- http://www.microbiol.org/
- http://mic.sgmjournals.org/
- http://media.axon.es/pdf/86637.pdf
- http://www.grsmu.by/files/file/university/cafedry/microbiologii-virysologii-immynologii/files/essential_microbiology.pdf
- http://www.fim.edu.my/FSC110.pdf
- https://booksite.elsevier.com/samplechapters/9780123705198/Sample_Chapters/02~Chapter_1.pdf

- http://microbiologyonline.org/file/7926d7789d8a2f7b2075109f68c3175e.pdf
- http://themodern.farm/studies/Microbiology-Laboratory-Manual.pdf/

COURSE OUTCOMES

CO Number	Course outcomes
CO 1	Outline the fundamental knowledge on the microorganisms and classify them
CO 2	Explain the sources of contamination and spoilage of foods
CO 3	Classify the different types of immunity and describe the vaccines
CO 4	Categorize the microorganisms in soil, water, air and sewage and assess the quality of water
CO 5	Explain the causes and prevention of food poisoning and food borne infections.
CO6	Distinguish between sterilization and disinfection and outline the appropriate methods to be used in different settings.

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	1	2	3	3	3
CO 2	3	1	3	3	3	3
CO 3	1	2	3	3	3	3
CO 4	2	2	3	3	3	3
CO 5	1	3	3	3	3	3
CO6	3	2	3	3	3	3
Average	2.1	1.8	2.8	3	3	3

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Problem Solving- Group Discussion- Role Modelling
Quiz- Seminar
Field Visits

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER IV
NUTRITION THROUGH LIFE CYCLE

Total hours: 105 hours
Credits: 5

Course Code: ND18/4C/NLC// CN18/4C/NLC
LTP: 4 3 0

COURSE OBJECTIVES

1. To understand the role of nutrition in the growth and development through the lifestyle.
2. To gain insight into the principles of effective meal planning.
3. To understand the nutritional needs of individuals at every stage of lifecycle.
4. Plan diets for various age groups across the lifecycle.

COURSE OUTLINE

UNIT I: Introduction to meal planning: Balanced diet, RDA - Food Guide Pyramid (ICMR); Food plate (USDA); Principles of meal planning – steps involved in planning a diet. Adult:- nutritional requirements, planning balanced diets for adult men and women, promoting healthy lifestyle through holistic approach - Diet, physical activity, stress management, yoga and meditation. (25 HOURS)

UNIT II: Pregnancy: Effect of nutrition on outcome of pregnancy, physiological demands of gestation, weight gain, nutrition needs, dietary plans and dietary problems, complication of pregnancy . Lactation: Physiology of lactation, nutritional requirements during lactation, concerns of breast feeding mother. Lactogogues. (20 HOURS)

UNIT III: Infancy: Breast feeding, complementary feeding, advantages and disadvantages, low cost complementary foods- Artificial feeding - Infant milk Substitutes. low birth weight infants Preschool: Growth and nutritional needs, problems in feeding patterns and food acceptance, PEM , Vitamin A. (20 HOURS)

UNIT IV: School Children: Physical development, factors affecting food needs, RDA, packed lunch. Childhoodobesity. Adolescence: Growth and development, Food Habits, nutritional requirements, Eating disorders, Nutritional Anaemia, (20 HOURS)

UNIT V: Old Age: Biologic & Physiologic aspects of aging, nutritional disorders in the aged, factors affecting food selection, nutritional requirements. (20 HOURS)

RECOMMENDED TEXTBOOKS

1. Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2nd edition, Jones & Bartlett learning publications, 2015,
2. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012

REFERENCE BOOKS

3. Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott, 2012
4. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011
5. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elseivier publications, UK, 2005
6. Whitney EN and Rolfes SR, *Understanding Nutrition,* 9th edition, West/Wordsworth, 2002
7. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2001
8. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10th edition, Churchill Livingstone, NY, 2000
9. Groff JL, Gropper SS, *Advanced Nutrition and Human Metabolism* 3rd edition, West / Wadsworth, UK. 2000
10. Cataldo, DeBruyne and Whitney, *Nutrition and Diet therapy– Principles and Practice* 5th edition, West/ Wadsworth, London. 1999
11. Gordon WM, *Perspectives in Nutrition*, 4th edition, McGraw Hill, 1999
12. Swaminathan M, *Principles of Nutrition and Dietetics*, Bappeo, Bangalore,1995

JOURNALS

1. International Journal of Food, Nutrition and Public Health
2. Indian Journal of Nutrition and Dietetics

E- LEARNING RESOURCES

1. https://2012books.lardbucket.org/pdfs/an-introduction-to-nutrition/s17-nutrition-through-the-life-cyc.pdf
2. http://scitechconnect.elsevier.com/wp-content/uploads/2014/08/main-47.pdf
3. http://gerlings.faculty.mjc.edu/Lifecycle%20Nutrition%20Part%201.pdf
4. http://fod.infobase.com/HTTP/40400/40445_worksheet.pdf
5. https://www.health.gov.bc.ca/library/publications/year/2008/Meals_and_More_Manual.pdf
6. https://dpi.wi.gov/sites/default/files/imce/community-nutrition/pdf/menu-planning-guide-web.pdf/

COURSE OUTCOMES

CO No	Course outcomes
CO 1	Explain the physiological basis for nutritional needs through the human lifecycle
CO 2	Identify nutrition related concerns and deficiency disorders at every stage of lifecycle
CO 3	Discuss appropriate dietary guidelines for various age groups
CO 4	Construct and interpret diets to meet the nutritional needs across the lifecycle
CO 5	Relate healthy eating behaviours to general well being

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	1	3	2	3	3	3
CO 2	2	2	2	2	3	3
CO 3	3	3	3	3	3	3
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3
Average	2.4	2.8	2.6	2.8	3	3

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Problem Solving- Group Discussion- Role Modelling
Quiz- Seminar
Field Visits

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER IV

NUTRITIONAL BIOCHEMISTRY

Total hours: 60 hours **Course Code: ND18/4A/NBC// CN18/4A/NBC**
Credits: 4 **LTP: 3 1 0**

COURSE OBJECTIVES

To introduce the students to

1. The principles and viewpoints of biochemistry.
2. A basic understanding of the functions of biological systems in relation to nutritional biochemistry.
3. To understand the chemical nature of biological macromolecules.
4. To relate the role of nutrients and enzymes in biochemical processes and pathways.
5. To understand principles of bioenergetics and inborn errors of metabolism.

COURSE OUTLINE

UNIT I: Introduction to biochemistry and its relation to nutrition.

Carbohydrates– Classification, glucose oxidation via glycolysis-aerobic, anaerobic (with structure), TCA (with structure), HMP (No Structure) Gluconeogenesis, glycogenolysis and biosynthesis of glycogen, blood glucose homeostasis, Cori Cycle. (15 HOURS)

UNIT II: **Proteins and Amino acids**.

Amino acids – Classification, chemical properties, chromatography separation techniques.Peptides- structure & nomenclature.

Protein-Classification, structure-primary, secondary, tertiary and quaternary, transamination, deamination-oxidative and non-oxidative, decarboxylation, urea cycle, fate of ammonia, glutamine synthesis. (10 HOURS)

UNIT III: **Lipids**- Classification, Chemical composition and properties of fat, beta-oxidation of fatty acids of oleic, linoleic and palmitic acid, desaturation of fatty acids, ketone bodies, ketogenesis. Dietary cholesterol- cholesterol bio-synthesis (No Structure), regulation of cholesterol synthesis.
Lipoproteins – Classification, their role and normal values. (15 HOURS)
Interrelationship between carbohydrates, fat and protein metabolism –hormonal regulation.

UNIT IV: **Enzymes** – Classification, factors affecting enzyme activity, role of B-vitamins as coenzymes - TPP, FAD, FMN, NAD, NADP, Tetrahydrofolic acid, Biotin, Coenzyme A, B12, Pyridoxine. Enzymes of clinical importance- LDH, AST, ALT, creatine kinase etc.

Biological oxidation-electron transport chain. (10 HOURS)

UNIT V: **Inborn errors of metabolism**
Carbohydrate- fructose intolerance, galactosemia, glycogen-Type I Von Gierke's Disease.
Disorders of aromatic amino acids – Phenyl ketonuria, alkaptonuria, tyrosinosis. Disorders of **sulphur-containing amino acids**-Homocystinuria
Nucleic acids- Nucleoside, Nucleotide, DNA and RNA – Structure and Functions (10 HOURS)

RECOMMENDED TEXTBOOKS

1. Shanmugam, Ambika, Fundamentals of biochemistry to medical students. NAV Bharat Printers & traders 56, Peters Road, Chennai 86. 1985.
2. Ramadevi K, Ed: *AmbikaShanmugam's Fundamentals of biochemistry for medical students*, 8th edition, Wolters Kluwer Health, India, 2016

REFERENCE BOOKS

1. Rodwell V, Bender D, Botham KM, Kennelly PJ, Weil PA, *Harper's Illustrated Biochemistry*, 30th Edition, McGraw hill Education, 2015
2. Sulochana H, *Principles of Biochemistry*, PBS enterprises, Chennai, 2010
3. Cox MM and Nelson DL, *Lehninger Principles of biochemistry*, 5th edition, EH Freman&Company, New york, 2008
4. Vasudevan DM, Sreekumari S, *Textbook of Biochemistry*, 5th edition, Jaypee Publishers, New Delhi, 2007
5. Veerakumari L, *Biochemistry*, 1st edition, MJP Publishers, 2005
6. Murray RK, Granner DK, Mayes PA, Rodwell VW, Harper's Illustrated*Biochemistry*,26th edition, Mcgraw hill publishing house,., 2003
7. Montgomery R, Conway TW, Spector AA, *Biochemistry-A care oriented Approach*. Mosby Company, 1990

JOURNALS

1. International Journal of Clinical Nutrition
2. Indian Journal of Medical Biochemistry

E- LEARNING RESOURCES

1. https://ia801208.us.archive.org/0/items/HARPERSILLUSTRATEDBIOCHEMISTRY30th/HARPER%27S%20ILLUSTRATED%20BIOCHEMISTRY%2030th.pdf
2. https://www.journals.elsevier.com/clinical-biochemistry
3. https://www.journals.elsevier.com/the-international-journal-of-biochemistry-and-cell-biology
4. http://www.ijmb.in
5. http://jpkc.gmu.cn/swhx/book/Biochemistry.pdf
6. http://www.jaypeedigital.com/Book/BookDetail?isbn=9788180615382&AspxAutoDetectCookieSupport=1

7. https://www.saddleback.edu/faculty/jzoval/mypptlectures/ch15_metabolism/lecture_notes_ch15_metabolism_current-v2.0.pdf
8. http://www.inf.ed.ac.uk/teaching/courses/csb/CSB_lecture_metabolic_pathways.pdf
9. http//www.gwu.edu/~mpb-metabolic pathways of biochemistry
10. http//www.indstate.edu/theme/mwking/inborn.html-inborn errors of metabolism
11. http//www.worthington-biochem/introBiochem/introEnzymes.html-enzymes
12. http//en.wikipedia.org/wiki/Biochemistry-biochemistryencyclopedia

COURSE OUTCOMES

CO No.	Course Outcomes
CO1	Define various inborn errors of metabolism
CO2	Outline the structure and classification of major biological macromolecules, specific micro molecules and enzymes
CO3	Illustrate the major metabolic pathways and its interrelationship
CO4	Outline the process of biological oxidation and metabolic release of energy
CO5	Apply and relate the knowledge of biochemistry to nutrition, health and diseases

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	2	3	1	3	3	3
CO 2	2	2	2	1	2	3
CO 3	2	2	1	2	2	3
CO 4	2	3	2	2	2	3
CO 5	3	3	3	3	3	3
Average	2.2	2.6	2	2	2.4	3

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Problem Solving- Group Discussion- Role Modelling
Quiz- Seminar

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER III & IV

HUMAN NUTRITION AND NUTRITION THROUGH LIFE CYCLE PRACTICAL

Total hours: 45 hours **Course Code: ND18/4C/PR2//CN18/4C/PR2**
Credits: 4 **LTP: 0 0 3**

COURSE OBJECTIVES

1. Enable students to describe selected and relevant biochemical techniques related to nutrition
2. Demonstrate practical skills necessary to conduct laboratory based tests
3. To gain knowledge in planning diets for individuals-based on physical activity levels and income group- across the life cycle.
4. To enable students to plan diets for specific deficiency states.

HUMAN NUTRITION PRACTICAL

1. Quantitative estimation of calcium.
2. Quantitative estimation of Vitamin C.
3. Quantitative estimation of phosphorous.
4. Quantitative estimation of iron.
5. Quantitative estimation of reducing sugar.
6. Assessment of BMR and Calorie requirement by factorial approach.
7. Determination of Chemical Score for protein rich recipes.

NUTRITION THROUGH LIFE CYCLE PRACTICAL

1. Preparation of Complementary feed.
2. Planning and preparation of diets for different activity levels and income group.
    a) pre-school child
    b) school going children
    c) adolescents
    d) adult
    e) expectant mother
    f) Nursing mother.
    g) old age
3. Planning and preparation of diets (low and medium cost) for deficiency diseases-
    1. PEM
    2. Vitamin A deficiency
    3. Nutritional anemia

RECOMMENDED TEXTBOOKS

1. Nielson S, *Food Analysis Laboratory Manual*, 3rd edition, Springer International Publishing, 2017
2. Longvah T, Ananthan R, Bhaskar K, Venkaiah K, *Indian Food Composition Tables*, National Institute of Nutrition, 2017.

REFERENCE BOOKS

1. Abraham S, *Nutrition Through Lifecycle*, 1st edition, New age international publishers, New Delhi, 2016
2. Cheung PCK and Mehta BM (Eds), Handbook of Food chemistry, 1st edition, Springer-Verlag Berlin Heidelberg, 2015
3. James CS, *Analytical chemistry of Foods*, 1st edition Springer US, 1995.

COURSE OUTCOMES

CO No	CO Statement
CO1	Estimate the amount of specific biological macro and micro nutrients
CO2	Assess the energy requirements and evaluate the quality of protein rich recipes by chemical scoring method
CO3	Planning and Preparing diets for individuals across the life span
CO4	Developing indigenous, value added and low cost complementary feeds
CO5	Planning and Preparing suitable and sustainable diets for deficiency diseases

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	1	3	1	3	3	3
CO 2	1	3	1	3	3	3
CO 3	3	3	3	3	3	3
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3
Average	2.2	3	2.2	3	3	3

SEMESTER – III & IV

MICROBIOLOGY AND NUTRITIONAL BIOCHEMISTRY PRACTICAL

Total hours: 30 hours **Course Code: ND18/4A/PR1//CN18/4A/PR1**
Credits: 2 **LTP: 0 0 2**

COURSE OBJECTIVES

1. To examine the microorganisms under the microscope.
2. To perform simple tests to identify the micro-organism
3. Identify appropriate techniques for sterilization and disinfection
4. To enable students to describe selected and relevant biochemical techniques
5. To demonstrate practical skills necessary to conduct laboratory based tests

COURSE OUTLINE

MICROBIOLOGY PRACTICAL

1. Examination of yeast, moulds and bacteria
2. Examination of organisms using Gram staining technique
3. Examination of organisms using simple staining technique
4. Motility of bacteria using hanging drop technique
5. Demonstration of sterilization of glassware using hot air oven, auto clave

NUTRITIONAL BIOCHEMISTRY PRACTICAL

1. Qualitative test for carbohydrates - glucose, fructose, lactose, maltose
2. Qualitative test for proteins - albumin, casein and gelatin
3. Qualitative test for individual amino acids-Tyrosine, Cysteine, Methionine,Tryptophan.
4. Qualitative test for minerals

RECOMMENDED TEXTBOOKS

1. Nielson S, *Food Analysis Laboratory Manual*, 3rd edition, Springer International Publishing, 2017
2. Cheung PCK and Mehta BM (Eds), Handbook of Food chemistry, 1st edition, Springer-Verlag Berlin Heidelberg, 2015

REFERENCE BOOKS

1. Cappuccino J, Sherman, N, *Microbiology: A Laboratory Manual,* 10th edition, Pearson, 2013
2. Garg N and Garg KL, *Laboratory Manual of Food Microbiology*, 1st edition, KG Mukerji Publishers, 2010
3. James CS, *Analytical chemistry of Foods*, 1st edition Springer US, 1995

COURSE OUTCOMES

CO No.	Course outcomes
CO1	Learn techniques to identify and differentiate micro organisms
CO2	Demonstrate and identify the best practices relating to sterilization and disinfection appropriate to various settings to promote healthy, safe and eco friendly environment
CO3	Recall relevant principles and practical procedure for various analytical techniques
CO4	Demonstrate analytical techniques
CO5	Identify macro and micro nutrients based on qualitative analysis

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	1	2	3	2	3	3
CO2	3	3	3	3	3	3
CO3	1	3	1	2	3	3
CO4	1	3	1	3	3	3
CO5	2	3	1	3	3	3
Average	1.6	2.8	1.8	2.6	3	3

SEMESTER V

FOOD SERVICE MANAGEMENT I

Total hours: 60 hours **Course Code: ND18/5C/FM1 // CN18/5C/FM1**
Credits: 4 **LTP: 3 1 0**

COURSE OBJECTIVES

1. To help the students to understand the various sectors of food service units
2. To become skilled in planning the design for food service units
3. To develop skills in quantity food purchase production, preparation and service.
4. To understand the concept and principles of organization management.

COURSE OUTLINE

UNIT I

Food Service Industry

a) **Sectors of Food Service Industry**: Commercial- hotels, restaurants, Popular catering- fast food, take away, franchising, leisure attractions, Transport catering, Outdoor catering. Non-Commercial-Industrial catering, welfare catering-old age homes, prisons, religious institutions and Institutional catering.

b) **Food service systems**: Conventional, Cook chill/ Cook Freeze, Commissary and Assembly Service. (15 HOURS)

UNIT II

Organization management

Types of organization, Principles, Functions and Tools of management – Organization chart, Job description, Job specification, Job analysis, Work schedule, Budget and Leadership styles. (10 HOURS)

UNIT III

Planning and Layout of physical plant

Planning and organizing of spaces: Kitchen area, storage area, service area, receiving, pre-preparation, dishwashing and garbage disposal area.
Concepts of work flow and work simplification techniques (10 HOURS)

UNIT IV

Menu Planning and Standardization

a) Menu: Definition, Functions of menu, Types of menu, French classic menu sequence, writing menu, and menu display, Factors considered in menu planning.

b) Standardization of recipes- Definition, Advantages, Enlargement of recipes, Portion control and Effective use of leftovers (15 HOURS)

UNIT V

Food Purchase and Storage

Food Purchase: Buying and Receiving methods.

a) Food Storage: Types of storage; Maintenance of store records- Requisition slips, Order form, Stock book, Invoice, Goods received book, Inventories

b) Computer applications in Food Service Establishments (10 HOURS)

RECOMMENDED TEXTBOOKS

1. Sethi M and Malhan S, *Catering Management An integrated approach*, 3rd edition, New age international publishers, New Delhi, 2015
2. Sethi M,*Institutional Food Management*, 3rd edition, New age international publishers, New Delhi, 2015
3. Singaravelavan R, *Food and Beverage Service,* 1st edition, Oxford university press, 2011

REFERENCE BOOKS

1. Fospett D and Paskins P, *The theory of Hospitality and Catering*, Hodder Education, UK, 2011
2. Jaiswal P, *Food Quality and safety*, CBS Publishers and Distributers Pvt Ltd, New Delhi, 2011
3. Bali PS, *Quantity food Production operations & Indian Cuisine,* Oxford University Press, New Delhi, 2011
4. George B and Chatterjee S, *Food and beverage Service and Management*, JAICO, 2010
5. Kalsigsis C and Thomas C, *Design and equipment for food service -A management view*, John Wiley and sons limited, 1999
6. Lillicrap DR and Cousins JA, *Food and beverage service*, 4th edition, ELBS, 1996
7. Jones, P, *Introduction to hospitality operations (An Indispensable guide to the industry),*Cassell publications, London, 1996
8. West B, and Wood, *Food service in institutions*, New York, 1995
9. Nathaniel BS, *Catering management for hotels, restaurants, Institutions,* Sujeet publications, New Delhi, 1991
10. JonesP, *Food service operations*, Cassell publications, London, 1990

JOURNALS

1. Journal of Food Service Management and Education
2. Journal of Food Service
3. Journal of Food Service Business Research

EARNING RESOURCES

1. http//www.ccohs.ca/oshanswers/hsprograms/house.html
2. https://en.wikipedia.org/wiki/Foodservice
3. http://www.nfsmi.org/documentlibraryfiles/PDF/20080228031334.pdf

COURSE OUTCOMES

CO No.	Course outcomes
CO1	Identify and differentiate types of food service sectors.
CO2	Discuss and apply the principles of menu planning and standardisation of recipes.
CO3	Apply the principles and tools of management for effective administration of organisation
CO4	Differentiate and apply the knowledge and skills in planning and designing layout for food service outlets.
CO5	Apply the skills for food purchase, storage, preparation, service and maintenance of records

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	1	2	3	3	3	3
CO 2	3	3	3	3	3	3
CO 3	3	2	2	3	3	3
CO 4	3	2	1	2	3	3
CO 5	3	2	2	3	3	3
Average	2.6	2.2	2.2	2.8	3	3

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Problem Solving- Group Discussion- Role Modelling
Quiz- Seminar

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER V
HUMAN DEVELOPMENT AND FAMILY STUDIES

Teaching hours: 75 hours **Course Code: ND18/5C/HFS// CN18/5C/HFS**
Credits: 4 **LTP: 4 1 0**

COURSE OBJECTIVES

To enable students to

1. Understand the major concepts in human development
2. Know about the birth process and lactation
3. Gain insight into the problems of old age.
4. Develop a scientific attitude towards behaviour pattern in individual, family and community life.

COURSE OUTLINE

UNIT I

Prenatal development- Conception- test tube baby, signs of pregnancy, stages of prenatal development - Prenatal care, management of normal pregnancy, hygiene, diet and medical supervision, multiple pregnancy Labor-signs and stages of labor, types of birth, post-natal care of mother, adjustments of new born to temperature, breathing, feeding and elimination.

(15 HOURS)

UNIT II

Infancy-[birth to 2yrs] - Development- physical, motor, social, emotional, cognitive and language, Effects of stimulation- care of infants - feeding, bathing, clothing, sleeping, toilet training and immunization. Maternal deprivation.

Early Childhood - [2-6 yrs] -Development- physical, motor, social, emotional, cognitive and language.Importance of play and play activities, behaviour problems- causes and treatment. Paternal deprivation

(15 HOURS)

UNIT III

Late Childhood [6-12 yrs] - Development- physical, motor, social, emotional, cognitive, moral and language, styles of parenting.

Adolescence [12-18 yrs]: Development - physical, motor, social, emotional, moral andcognitive; adjustment problems; sex education.

(15 HOURS)

UNIT IV

Adulthood- [18-60 yrs]- characteristics and developmental tasks, marriage and family as basic institution, functions of marriage, adjustments in marriage —sex, finance, career, society and in-laws. family life cycle-adjustment in different stages, critical family situations and its effect on children.

(15 HOURS)

UNIT V

Old age [60 yrs and above]: Physical and psychological changes, problems of the aged, family attitude towards the aged, place of the aged in Indian society. (15 HOURS)

Related experience

- Visit to a nursery school.
- A survey on adjustment problems between husband and wife
- Survey on in-law relationships
- Survey on problems of old age

RECOMMENDED TEXTBOOKS

1. Walsh BA, Weiser DA, DeFlorio L, and Burnham MM, 1st edition, *Introduction to Human Development and Family Studies*, Psychology Press, 2017
2. Beckett C, Taylor H, *Human Growth and Development*, 3rdedition, SAGE, 2016

REFERENCE BOOKS:

1. Peterson GW, Bush KR, *Handbook of Marriage and the Family*, 3rd edition, Springer US, 2016
2. Sigelman CK and Rider EA, *Life-span Human development*, 8th edition, Cengage Learning, USA, 2015
3. McCarthy JR, EdwardsR, *Key Concepts in family studies*, 1st edition reprint, SAGE publications, 2010
4. Santrock WJ, *Adolescence*, 11th edition, Tata Mcgraw hill education, New Delhi, 2007
5. Berk LE,*Child Development*, 6thEdition, Prentice Hall of India Pvt Ltd, New Delhi, 2003
6. Berk LE, *Child Development*, 3rd Edition, Prentice Hall of India Pvt Ltd, New Delhi, 2001
7. Menon KMK, Palaniappan, *Mudaliar and Menon's Clinical Obstetrics*, 9thEdition, Orient Longman, Chennai, 2000
8. Devadas RP, Jaya N, *A Textbook on Child Development*, MacMillan India Ltd, New Delhi, 2003
9. Hurrlock EB, *Child development*, 6th edition, Tat Mcgraw hill education, New york, 1997
10. Park K,*Textbook of Preventive and Social Medicine*, 14thEdition, Banarasidas Bharat Publishers, Jabalpur, 1995
11. Boss P, Doherty WJ, LaRossa R, Schumm WR, Steinmet SK, *Source book of Family Theories and Methods: A Contextual Approach,* Springer Science & Business Media, 1993

JOURNALS

1. Indian Journal of Human Development
2. Indian Journal of Social Development

E- LEARNING SOURCES

1. www.mhschool.com/benziger/online/family/parent/children.html
2. www.unt.edu/cpe/module/blk.2sty.html
3. www.uky.edu/subject/family.html
4. www.aifs.gov.au/institute/pubs/fm2003/fm64/booknotes.pdf
5. www.aifs.gov.au/istitute/pubs/fm/fm53cj.p

COURSE OUTCOMES

CO No.	Course outcomes
CO1	Identify the major developmental milestones of individual across the lifespan in the areas of physical, social, emotional, cognitive and language development
CO2	Interpret inputs and insights regarding family – adjustments, critical situations
CO3	Explain the psychosocial, economic and health issues of the aged in the current scenario.
CO4	Examine the prenatal and postnatal care of mother and child.
CO5	Develop the skills in handling real life situations in order to face challenges and opportunities in life

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	2	3	3
CO 2	2	3	3	1	3	3
CO 3	3	3	3	1	3	3
CO 4	3	3	3	2	3	3
CO 5	3	3	3	3	3	3
CO6	3	1	3	3	3	2
Average	2.8	2.7	2.8	2	3	2.8

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Problem Solving- Group Discussion- Role Modelling
Quiz- Seminar

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER V

BAKING AND CONFECTIONERY

Teaching hours: 75 hours
Credits: 4

Course Code: ND18/5C/BAK
LTP: 3 1 0

COURSE OUTLINE

UNIT-1

Introduction to baking- History -principles of baking -baking process, terminologies. Equipment and tools in baking-Hand tools, measuring & portioning devices, cookware &bakeware, processing equipment, heavy equipment. (10 HOURS)

UNIT-2

Baking ingredients-role of each ingredient in baking, Flour-composition and type of flour in baking, Sugar-types, Shortening, Egg, Leavening agents-yeast, baking soda, baking powder etc, Other ingredients- salt, milk and milk derivatives, malt, products, dough improver, oxidizing agents, spices. (20 HOURS)

Baking for special dietary needs – use of alternative ingredients & substitutes.

UNIT-3

Bread making- ingredients, types of processing, types of breads – leavened and unleavened.

Cakes – ingredients, types of cakes – shortened &unshortened.

Related experience

Preparation of shortened &unshortened cakes – angel food cake, butter cake, sponge cake, chocolate cake, pound cake, muffins. (15HOURS)

UNIT-4

Pastries- history, types of pastries- puff pastry, short crust, Phyllo pastry, flaky pastry, choux pastry- Pies and tarts- quiches, pastry fillings.

Cookies & biscuits – ingredients, types and processing.

Related experience

Preparation of pastries- Short crust pastry, flaky pastry, puff pastry, choux pastry, sweet dough pastry. (15 HOURS)

UNIT-5

Confectionery – chocolate and sugar based confectionery.

Chocolates- production, types, chocolate decorations

Sugar based confectionery – fudge, fondant, sugar candies, marzipan, pastillage, nougatine.

Decoration - preparation of icing- butter cream, foam, fudge, fondant, glaze, royal icing and ganache.

Piping – steps involved in piping, piping patterns. (15HOURS)

RECOMMENED TEXTBOOKS

1. Yogambal Ashokkumar, Textbook of Bakery and Confectionery, PHI Learning Private limted, New Delhi.2012.
2. Sarah R.Lebensky, Pricilla et al., Textbook of Baking and Pastry Fundamentals, third edition, Pearson Education Ltd, 2004

REFERENCE BOOKS

1. The Culinary Institute of America, Baking & Pastry: Mastering the Art and Craft, John Wiley &Sons,Inc New Jersy. 2009
2. Paul. C.C. and Palmer. R.H. Food Theory and Application John Wiley and Sons, N.Y, 1972
3. Griswold R.M. The Experimental study of Foods, Houghton Miffin Co., Boston, 1979
4. Helen Charley, Food Science, John Wiley and Sons, N.Y, 1970.
5. Srilakshmi B. Food Science, New Age International Ltd., Publishers. 2001
6. N. ShakunthalaManay and N. ShadaksharaSwamy, Food Facts And Principle. New age International (P) Ltd., Publishers, 2001.
7. Uttam, KS . Theory of Bakery and Confectionery – An Operational Approach, Kanishka Publishers, New Delhi, 2011.
8. John kingslee, A Professional Text to Bakery and Confectionery, New Age International (P) Limited,Publishers. 2014

Journals

Journal of Confectionaries
Journal of Culinary Science and Technology

COURSE OUTCOMES

CO No.	Course outcomes
CO1	Define and explain the concept of baking theory and practice communicating using relevant professional literature in relation to cultural and socially acceptable norms with aspects of quality and aesthetics.
CO2	Illustrate and classify professional equipments used in baking following current trends adopting safety and quality aspects.
CO3	Identify and explain various types of breads, cakes, pastries, cookies and confectionery with ingredients used in professional practices within socially and culturally acceptable norms fostering best practices in health and quality.
CO4	Experiment with ingredients for special dietary needs to support sustainable living, applying health, safety and aesthetic aspects.
CO5	Apply the concept of baking to prepare selected recipes with decorations in keeping with cultural norms fostering entrepreneurial skills.

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	2	3	3	3
CO3	2	3	3	3	3	3
CO4	3	2	3	3	3	3
CO5	3	2	3	3	3	3

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Survey
Practical lab work
Quiz- Seminar

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	200	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER V
THERAPEUTIC DIETETICS I

Total hours : 75 hours **Course Code: ND18/5C/TD1**
Credits: 4 **LTP: 4 1 0**

COURSE OBJECTIVES

1. To bring an understanding on the pathogenesis of certain specific disease conditions affecting the gastro intestinal tract, liver and life style disorders
2. To learn the role of diet in managing various health conditions; from prevention to palliation
3. To plan and prepare customised diets for various conditions
4. Explain the role of a dietician as a part of health care team

COURSE OUTLINE

UNIT I:Diet Therapy: Purposes & principles of therapeutic diets, modifications to be adopted.

a. Modification of diet consistency, nutritive value, type of feed in
   i. Clear Fluid Diet
   ii. Full fluid diet
   iii. Soft diet – Self study
b. Special feeding methods – Parenteral and Enteral nutrition.

(15 HOURS)

UNIT II: Nutrition and diet counseling - nutritional assessment of patients, psychology of feeding the patient, dietary counseling, follow up and patient education.
Role of Dietitian - In the hospital and community.

(15 HOURS)

UNIT III: Etiology, Prevalence, pathophysiology, principles of diet management & lifestyle modification, special foods/dietetic supplements

a. Obesity
b. Diabetes mellitus – Prediabetes, GDM, Type I & Type II.
c. Cardiovascular diseases- atherosclerosis, hypertension, myocardial Infarction, Metabolic Syndrome.

(15 HOURS)

UNIT IV: Etiology, symptoms & dietary management of

a. Persistent Diarrhoea & Constipation
b. IBD, IBS, Celiac disease.

(15 HOURS)

UNIT V: Etiology, symptoms, pathophysiology and dietary management of
a. Liver diseases – hepatitis, cirrhosis, hepatic encephalopathy.
b. Peptic ulcer – gastric & duodenal ulcer, GERD.

(15 HOURS)

RECOMMENDED TEXTBOOKS

1. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012.
2. Joshi Y.K, Basics of Clinical Nutrition, 2nd edition, JP Medical Publishers Pvt Ltd, New Delhi, 2008

REFERENCE BOOKS

1. Mitch, W. and Ikizler, Alp. Handbook of Nutrition and the Kidney, 6th Ed. Lippincott Williams and Wilkins, New Delhi, 2010.
2. Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott Williams and Wilkins, Canada, 2012
3. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2010
4. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011.
5. Vimla, V. Advances in Diet Therapy, New Age International Publishers, 2009.
6. Marian M et al., Clinical Nutrition for surgical patients, Jones and Bartlett Publishers, Canada, 2008
7. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elseivier publications, UK, 2005
8. Gibney MJ, Elia M, Ljunggvist O, Clinical Nutrition (The Nutrition Society Textbook) Wiley Blackwell Publishers, 2005
9. Whitney EN and Rolfes SR, *Understanding Nutrition,* 9th edition, West/Wordsworth, 2002
10. Guthrie H, Introductory Nutrition, CV Mosby Co.St. Louis, 2002
11. Williams SR, Nutrition & Diet Therapy, CV. Mosby St. Louis, 2001
12. Garrow et al, Human Nutrition & Dietetics, 10th Edition, Churchill Livingston, 2001
13. Width, M & Reinhardt, T.The Essential Pocket Guide for Clinical Nutrition, 2nd Ed. Wolters Kluwer, 2018.
14. Elia M, Ljunggvist O, Stratton RJ, Lanham SA, Clinical Nutrition (The Nutrition Society Textbook), 2nd edition, Wiley Blackwell Publishers, 2013

JOURNALS

1. American Journal of Clinical Nutrition
2. Journal of Physicians Association of India

E- LEARNING RESOURCES

1. www.nal.usda.gov – Food & Nutrition Information Centre.
2. www.eatright.org – American Dietetic Organisation.
3. www.nin.org- National Institute of Nutrition, Hyderabad, India
4. www.icmr.org – Indian Council for medical Research.

Course outcomes

CO No	CO Statement
CO1	Critical thinking and problem solving while designing diets
CO2	Appraise the role of dietitian in community, hospital
CO3	Make use of Nutrition care process to assess and provide treatment plan and evaluate professional literature to make ethical evidence based practical decisions
CO4	Demonstrate knowledge on the pathophysiology, symptoms, principles of diet therapy and diet adjuncts for specific disease conditions
CO5	Demonstrate counselling technique to facilitate behaviour change

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	3	3
CO 3	3	3	3	3	3	3
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3
Average	3	3	3	3	3	3

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Problem Solving- Group Discussion- Role Modelling
Quiz- Seminar

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER V
INTERIOR DECORATION AND HOUSEKEEPING

Teaching hours: 75 hours **Course Code: ND18/5E/IDH// CN18/5E/IDH**
Credits: 5 **LTP: 3 2 0**

COURSE OBJECTIVES

1. Gain understanding of the basic art principles and to develop aesthetic sense.
2. Learn to make good colour combinations in the interiors
3. To understand the basic principles in making effective flower arrangement.
4. To understand common housekeeping procedures and practices.

COURSE OUTLINE

UNIT I

Art in daily living: Importance of good taste, Objectives of Interior design,
a) **Elements of design:** line, shape, size, colour, texture, pattern and light; Types and characteristics of design
b) **Principles of design:** harmony, balance, rhythm, proportion and emphasis (15 HOURS)

UNIT II

a) Colour: Qualities of colour-hue, value, intensity; colour harmony.
b) Flower arrangement: Flowers for different arrangements, types of flower arrangement.
c) Lighting: principles, types of lighting. (15 HOURS)

UNIT III

a) Furniture: Selection and arrangement of furniture for different rooms
b) Furnishing materials: types; factors considered in their selection.
c) Floor coverings: Selection & types- hard and soft,
d) Window treatment: curtains and draperies.
e) Accessories: Selection, types, use and care. (15HOURS)

UNIT IV

Organization of the housekeeping department: Importance of the housekeeping department, Layout and Organization of Housekeeping Department, qualification and personal qualities of a housekeeper. Inter departmental co-operation

(15HOURS)

UNIT V:

Cleaning tools and equipment: cleaning agents, cleaning methods, stain removal, types of cleaning- daily, weekly and annual. Bed making Procedure. Care of public and private area establishments.

Linen room: plan, layout, linen control, receiving, issuing, storage of clean linen, Selection, purchase and linen hire (15 HOURS)

RECOMMENDED TEXTBOOKS

1. Seetharaman P, Pannu P, Interior Design and Decoration, 1st Edition, CBS Publishers and DistributorsPvt Ltd, New Delhi, 2015
2. Raghubalan G, Raghubalan S, Hotel Housekeeping: Operations and Management, 3rdedition, Oxford University Press India, 2015

.REFERENCE BOOKS:

1. Wildhide E, The Interior Design Directory, 1st Edition, Quardrille Publishing Ltd, 2009
2. Andrews S, Textbook of Hotel Housekeeping Management & Operations, First edition Reprint, Tata McGraw Hill Education, New Delhi, 2007
3. Khanna G, Art of Interior Design, 1st Edition, Indica Publishers, 2005
4. Murphy B, Flawless Interior Decorating,1st Edition, McGraw Hill Publications NY, 2005.
5. Dorothy S.and Darlene .M. Introduction to Interior Design Macmillan publishing company, New York,1979.
6. Goldstein H. and Goldstein V. Art in Everyday Life, Oxford and IBH pub co., ND

JOURNALS

Journal of Interior Design
Fundamentals of Interior Design

E – LEARNING SOURCES

1. www.mydesignagenda.com
2. www.bestinteriordesigners.eu
3. www.interiordezine.com
4. www.bestdesignbooks.eu
5. www.homedesignideas.eu
6. http//housekeeping.about.com

COURSE OUTCOMES

CO No.	Course outcomes
CO1	Outline the universality of principles and elements of design
CO2	Explain the basic concepts in the selection and types of furniture, furnishings, floor coverings and accessories
CO3	Apply the colour and lighting principles in designing interiors
CO4	Analyse the scope of various styles of flower arrangement
CO5	Discuss the importance of the housekeeping operations
CO6	Manage the public and private areas in various establishments

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	2	2	3	3	3	3
CO 2	2	2	3	3	3	3
CO 3	2	2	3	3	3	3
CO 4	2	2	3	3	3	3
CO 5	2	2	3	3	3	3
Average	2	2	3	3	3	3

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Problem Solving- Group Discussion- Role Modelling
Quiz- Seminar

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER VI

FOOD SERVICE MANAGEMENT II

Total hours: 60 hours **Course Code: ND18/6C/FM2/ CN18/6C/FM2**
Credits: 3 **LTP: 3 1 0**

COURSE OBJECTIVES

1. To understand the concept and principles of financial management and human resource management.
2. To be knowledgeable about service areas and equipment used in food service areas.
3. To understand the basic principles of sanitation and safety.

COURSE OUTLINE

UNIT I

Financial Management

a) Elements of cost, Food cost, Labor cost and overhead cost, Break even analysis.
b) Basic concept of Book Keeping: Transactions, Types- Single entry and Double entry system of book keeping, Book of Accounts – Journal, Ledger, subsidiary books, difference between Journal and Ledger; trial balance and balance sheet
c) Food cost pricing: Methods of pricing and factors affecting pricing. (10 HOURS)

UNIT II

Human Resource Management

a) Recruitment, Selection, Induction, Training, Supervision, Performance appraisal, Promotion, Demotion, Transfer, Retirement, Termination and Dismissal of employees.
b) Laws Governing Food Service Establishment pertaining to employees –Labor laws (15 HOURS)

UNIT III

Food and Beverage Service

a) Styles of Service: Table service/ Waiter service, Self-service, Specialized service, Assisted service and Single point service.
b) Rules for laying a table, waiting at table, Attributes of food and beverage personnel, Inter-personal skills of food and beverage personnel. (10 HOURS)

UNIT IV

Equipment

a) Definition, classification- based on weight or size, order of use and mode of operation and factors considered in the selection of equipment
b) Pre-preparation Equipment- Dough making machine, bread slicer, vegetable cutting machine. Cooking Equipment – Gas ranges with ovens, Fryer, Rotisserie.
c) Holding Equipment – Bain-marie and Chafing dishes. Service equipment- Flatware, Cutlery and Hollow ware.

d) Clearing and collection Equipment- Electric food trolleys and clearing trolleys. Washing Equipment – electric dishwasher and Glassware washing. (15 HOURS)

UNIT V:

Hygiene and safety

a) Definition of hygiene, Personal hygiene, food hygiene, and environmental hygiene; Types of Pests and Pest control - Methods; Garbage disposal – Methods, HACCP.
b) Accidents -Causes and Prevention (10 HOURS)

RECOMMENDED TEXT BOOKS

1. Sethi M and Malhan S, *Catering Management An integrated approach*, 3rd edition, New age international publishers, New Delhi, 2015
2. Sethi M, *Institutional Food Management*, 3rd edition, New age international publishers, New Delhi, 2015
3. Singaravelavan R, *Food and Beverage Service,* 1st edition, Oxford university press, 2011

REFERENCE BOOKS

1. Foskett D and Paskins P, *The theory of Hospitality and Catering*, Hodder Education, UK, 2011
2. Jaiswal P, *Food Quality and safety*, CBS Publishers and Distributers Pvt Ltd, New Delhi, 2011
3. Bali PS, *Quantity food Production operations & Indian Cuisine,* Oxford University Press, New Delhi, 2011
4. George B and Chatterjee S, *Food and beverage Service and Management*, JAICO, 2010
5. Kalsigsis C and Thomas C, *Design and equipment for food service -A management view*, John Wiley and sons limited, 1999
6. Lillicrap DR and Cousins JA, *Food and beverage service*, 4th edition, ELBS, 1996
7. Jones, P, *Introduction to hospitality operations (An Indispensable guide to the industry),*Cassell publications, London, 1996
8. West B, and Wood, *Food service in institutions*, New York, 1995
9. Nathaniel BS, *Catering management for hotels, restaurants, Institutions,* Sujeet publications, New Delhi, 1991
10. Jones P, *Food service operations*, Cassell publications, London, 1990

JOURNALS

1. Journal of food service
2. Journal of food service business research
3. Journal of food service management and education

EARNING SOURCES

1. http//www.ccohs.ca/oshanswers/hsprograms/house.html
2. https://en.wikipedia.org/wiki/Foodservice
3. http://www.nfsmi.org/documentlibraryfiles/PDF/20080228031334.pdf

COURSE OUTCOMES

CO No.	Course outcomes
CO1	State the various styles of food and beverage services offered in food service sectors
CO2	Discuss the basic technical skills, interpersonal skills and the significance of hygiene and safety in the food premises
CO3	Apply the management concepts to personnel recruitment, selection, training, appraisal, book keeping and pricing methods
CO4	Classify equipments and acquire knowledge on equipment selection
CO5	Apply knowledge and skills to become a entrepreneur in running a food service operations

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	1	2	1	3	3	3
CO 2	2	2	2	3	3	3
CO 3	2	2	2	3	3	3
CO 4	1	2	2	3	3	3
CO 5	3	2	3	3	3	3
AVERAGE	1.8	2.0	2.0	3	3	3

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning
6. Field Visits
7. Self-Study Papers

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER VI
THERAPEUTIC DIETETICS II

Teaching hours: 75 hours
Credits: 4

Course Code: ND18/6C/TD2
LTP: 4 1 0

OBJECTIVES

1. To bring an understanding on the pathogenesis of certain specific disease conditions such as cancer, AIDS, specific fevers, food allergies and kidney diseases
2. To learn the role of diet in managing various health conditions from prevention to palliation
3. To plan and prepare customised diets for various conditions

COURSE OUTLINE

UNIT I Nutrition and cancer - Nutrition in the etiology of cancer, Effect of cancer therapy on nutritional status and nutrients in prevention of cancer. Nutritional assessment of cancer patients.
(10 HOURS)

UNIT II

a. **AIDS** – Prevalence, Etiology, pathophysiology, complications, medical & nutritional management.
b. **Diet in fevers** – acute – typhoid and chronic- TB, intermittent fevers - malaria .

(15 HOURS)

UNIT III

Diet in allergy and lactose intolerance- definition, classification, manifestation, common food allergens, tests and dietary treatment.

(10HOURS)

UNIT IV - Nutrition in Stress

a) Diet in Sepsis and trauma
b) Diet in burns – definition, types and dietary management in burns.
a) Diet in surgery – pre operative and post operative diets. (20 HOURS)

UNIT V

Diseases of the excretory system – etiology, symptoms, diagnosis, nutritional therapy.

a. Kidney – Acute Kidney disease, Chronic Kidney disease, Dialysis – types.
b. Renal calculi – types, diet management. (20 HOURS)

RECOMMENDED TEXT BOOKS

1. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012.
2. Joshi Y.K, Basics of Clinical Nutrition, 2nd edition, JP Medical Publishers Pvt Ltd, New Delhi, 2008

REFERENCE BOOKS

1. Whitney EN and Rolfes SR, *Understanding Nutrition,* 9th edition, West/Wordsworth, 2002
2. Guthrie H, Introductory Nutrition, CV Mosby Co.St. Louis, 2002
3. Width, M & Reinhardt, T. The Essential Pocket Guide for Clinical Nutrition, 2nd Ed. Wolters Kluwer, 2018.
4. Elia M, Ljunggvist O, Stratton RJ, Lanham SA, Clinical Nutrition (The Nutrition Society Textbook), 2nd edition, Wiley Blackwell Publishers, 2013
5. Mitch, W. and Ikizler, Alp. Handbook of Nutrition and the Kidney, 6th Ed. Lippincott Williams and Wilkins, New Delhi, 2010.
6. Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott Williams and Wilkins, Canada, 2012
7. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2010
8. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011.
9. Vimla, V. Advances in Diet Therapy, New Age International Publishers, 2009.
10. Marian M et al., Clinical Nutrition for surgical patients, Jones and Bartlett Publishers, Canada, 2008
11. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elseivier publications, UK, 2005
12. Gibney MJ, Elia M, Ljunggvist O, Clinical Nutrition (The Nutrition Society Textbook) Wiley Blackwell Publishers, 2005
13. Williams SR, Nutrition & Diet Therapy, CV. Mosby St. Louis, 2001
14. Garrow et al, Human Nutrition & Dietetics, 10th Edition, Churchill Livingston, 2001

JOURNALS

1. American Journal of Clinical Nutrition
2. Journal of Physicians Association of India

E-LEARNING RESOURCES

5. www.nal.usda.gov – Food & Nutrition Information Centre.
6. www.eatright.org – American Dietetic Organisation.
7. www.nin.org- National Institute of Nutrition, Hyderabad, India
8. www.icmr.org – Indian Council for medical Research.

CO No	CO Statement
CO1	Define and Explain the pathophysiology, symptoms, principles of diet therapy and diet adjuncts for specific disease conditions.
CO2	Explain the Nutrition care process for individual cases applying the principles of diet therapy and current nutrient recommendations as per social, cultural, and ethical norms.
CO3	Demonstrate skills in designing menu for specific disease conditions using emerging trends and current health and safety norms.
CO4	Justify the various dietary modifications critically with evidence based knowledge.
CO5	Evaluate cases with detailed history and suggest appropriate dietetic measures for prevention with sustainable lifestyle modification.

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	2	3	3	3	3	3
CO 2	3	3	3	3	3	3
CO 3	3	3	3	3	3	3
CO 4	3	3	3	3	3	3
CO 5	3	3	2	3	3	3
Average	2.8	3	2.8	3	3	3

TEACHING METHODOLOGY

Lecture (Chalk and talk- OHP- LCD)
Videos
Problem Solving- Group Discussion- Role Modelling
Quiz- Seminar
Case studies – discussion and planning
Internships and guest lectures

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER VI

SPORTS NUTRITION

Total hours: 75 hours **Course code: ND18/6C/SPN // CN18/6C/SPN**
Credits: 4 **LTP: 3 2 0**

COURSE OBJECTIVES

1. To understand the role of nutrients in athletic performance.
2. To provide an overview of dietary supplements to enhance performance.
3. Gain insight into female specific issues relating to athletes.
4. Study the nutritional requirements of athletes with special needs.

COURSE OUTLINE

UNIT 1

Introduction and energy requirements

Fitness- definition, benefits, components, conditioning by training, aerobic and anaerobic activities. Energy and Performance -Energy definition, role of ATP and its inter conversion, storage of carbohydrate, protein and fat in the body, important fuels for exercise, human energy systems. Fatigue during aerobic and anaerobic activities and prevention

(15 HOURS)

UNIT II

Role of Carbohydrates in sports

Relationship between muscle glycogen and performance, importance of glycemic index in athletes, high GI and low GI foods , pre and post exercise carbohydrate meals, glycogen replenishment, carbohydrate loading.

(10 HOURS)

UNIT III

a) Role of protein, fat, vitamins minerals and antioxidants in exercise.
b) Protein requirements during endurance and strength training, meeting protein needs, bioavailability of proteins, protein requirement in vegetarian athletes, effect of excess protein intake on athlete's health.
c) Body fat and performance, its advantages, assessment of body composition, desirable body fat percentage for athletes. Role of dietary fat in performance, Fat loading.
d) Effect of exercise on vitamins and mineral requirements, recommendation for vitamins and minerals in athletes. Antioxidants and the role in exercise. (20 HOURS)

UNIT IV

a) Fluid requirements & Ergogenic aids.-
b) Fluid requirements of exercise, dangers of dehydration and overhydration, hyponatremia, sports drinks -types, fluid concentration, weather and fluid intake, role of non alcoholic drinks, diet drinks, carbonated beverages in athletes.
c) Ergogenic aids: Classification, commonly used ergogenic aids- protein supplements, vitamin and mineral supplements, imbalances due to supplements, natural versus synthetic vitamin supplements.

(15 HOURS)

UNIT V

a) Nutritional issues and recommendations for athletes
b) Female athlete triad - Performance in athletes with eating disorders-anorexia nervosa and continuance of training, amenorrhea in athletes, causes , risk factors, amenorrhea and bone loss , iron deficiency anemia and sports anemia, causes, symptoms, latent iron deficiency, role of iron supplements, special recommendations for pregnancy, body fat level and fertility, weight gain during pregnancy, nutritional guidelines.
c) Nutritional needs of athletes with special needs- Diabetic athlete, young and elderly, travelling athlete.

(15 HOURS)

Activity

a) Preparation of sports drinks
b) Planning diets for different performance events – foot ball, sprinting, swimming and weight lifting

Visits

a) Visit to YMCA
b) Visit to a National stadium to observe the performance of athletes.

RECOMMENDED TEXTBOOKS

1. Bean A, *The Complete Guide To Sports Nutrition,* 7th edition, Bloomsbury, London, 2013.
2. Srilakshmi B, Suganthi V, Ashok CK. Exercise physiology, fitness and Sports Nutrition. New age international publishers, 2018

REFERENCE BOOKS

1. Dunford M, *Fundamentals Of Sports And Exercise Nutrition,* Human Kinetics, Illinois, 2010
2. Jeukendrup A and Gleeson M, *Sports Nutrition: An introduction to energy production and performance,* Human Kinetics publishers, 2004
3. Maughan RJ, Burke LM, Handbook of Sports Medicine & Science- Sports Nutrition, Blackwell Science publications, 2002

4. Williams MH, *Nutrition For Health, Fitness And Sport*, 5th edition, McGraw Hill, Boston, 1999
5. William D, McArdle, Frank I, Katch and Katch VL, *Sports and Exercise Nutrition,* 4thedition, Lippincott Williams and Wilkins, 1999

JOURNALS

1. Journal of International Society of Sports Nutrition
2. International Journal of Sports Nutrition and Exercise Metabolism

E- LEARNING SOURCES:

1. www.acsm.org
2. www.ausport.govt.au
3. www.sportsci.org
4. www.gssiweb.com
5. www.acefitness.org
6. https://www.ucd.ie/t4cms/Sports%20Nutrition%20Talk%20UCD%20seminar.pdf
7. https://www.dcms.uscg.mil/Portals/10/CG-1/cg111/docs/HPM/Nutrition-for-Sports-Performance.pdf?ver=2017-04-04-152011-810
8. http://samples.jbpub.com/9781284036695/9781449690045_CH01_pass03.pdf
9. https://www.albertahealthservices.ca/assets/info/nutrition/if-nfs-sports-nutrition-for-youth.pdf
10. http://ommolketab.ir/aaf-lib/5g2s72u8j4qfbi9p4x56zhsjxru8rf.pdf
11. https://www.researchgate.net/profile/Lisa_Mcanulty/publication/229071049_Eating_Before_During_and_After_the_Event/links/56d4899c08aefd177b0f5a9c/Eating-Before-During-and-After-the-Event.pdf
12. http://www.aco.org.nz/pdf/nutrition-for-sports.pdf

COURSE OUTCOMES

CO No	Course outcome
CO 1	Outline the nutritional guidelines for optimal health and performance enhancement
CO 2	Discuss the different types of assessment of body composition.
CO 3	Plan diets for various sports events
CO 4	Assess, evaluate and analyse appropriate use of nutritional supplements and ergogenic aids
CO 5	Explain the nutritional concerns of female athletes
CO6	Develop and justify the preparation of sports drinks

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	2	3	2	3	3	3
CO 3	3	3	3	3	3	3
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3
CO6	3	3	3	3	3	3
AVERAGE	2.8	3.0	2.8	3.0	3.0	3.0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Field Visits

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER VI
PUBLIC HEALTH NUTRITION

Total hours: 75 hours
Credits: 5

Course Code: ND18/6E/PHN// CN18/6E/PHN
LTP: 3 2 0

COURSE OBJECTIVES

1. To sensitize students to public health inequities of the country in terms of nutrition and its role in national development, focusing on maternal and child nutrition in keeping with sustainable development goals.
2. To create awareness of various national and international agencies involved in health and nutrition and nutritional intervention programs concerned with public health in India.
3. To learn various health indices and assessment techniques for the community and plan nutrition health education programs balancing the socio-cultural milieu.

COURSE OUTLINE

UNIT I

Nutrition and Health in National Development: Nutritional problems confronting our country, Sustainable Development Goals, Causes of malnutrition in India, Food and Nutrition Security, Sustainable diets, Balance between food and population growth. (15 HOURS)

UNIT II:

Nutritional Assessment: Sampling techniques, Identification of risk groups, Methods of Assessment of Nutritional Status: Direct assessment –Anthropometry, Biochemical estimations, Clinical and Dietary assessment; Indirect Assessment- Food balance sheets and Agricultural data, Ecological parameters and Vital Health Statistics (10 HOURS)

UNIT III

a) **National Nutrition Programmes to combat malnutrition:** Prophylactic programs – Vitamin A, Iron and Folic acid, Iodine; Pulse Polio, Revised National Tuberculosis Control Programme- DOTS, National AIDS control Programme; ICDS, School feeding Programmes, Nutrition Intervention during Emergencies. Immunization and its importance

b) **National and International agencies in Community Nutrition:** FAO, WHO, UNICEF, ICMR, ICAR, NIN, CFTRI, MSSRF, Food & Nutrition Board, Social Welfare Boards – Central & State. (15 HOURS)

UNIT IV

a) **Importance of Breast feeding:** Promotion of successful breastfeeding, Government policies, Exclusive Breastfeeding, Wet nursing, Breast milk banks, IMS Act; Weaning foods: Planning, formulating and preparation; Importance of correct and timely weaning, low cost complementary foods.

b) **Nutrition and Infection:** Relationship (10 HOURS)

UNIT V

a) **Nutrition Education Program:** Objectives, Planning, Implementation and Evaluation; Communication Strategies – Role of Audio visual aids

b) **Recent advances in community Nutrition**; Fortification and enrichment of foods

(10 HOURS)

Related Experiences

A) Assessment of Nutritional status of vulnerable groups

B) Nutrition Education Programme for vulnerable groups

RECOMMENDED TEXTBOOKS

1. ChanderVir S, Public Health Nutrition in developing countries, Part I, 1st edition, Woodhead Publishing, New Delhi, 2011.
2. Park K, Park's Textbook of preventive medicine, 2005.
3. Bamji, Textbook of Human Nutrition, Oxford publishers, New Delhi, 2010

REFERENCE BOOKS

1. ChanderVir S, Public Health Nutrition in developing countries, Part II, 1st edition, Woodhead Publishing, New Delhi, 2011
2. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2010
3. Bhatt VB, *Protein Energy Malnutrition*, PeePee Publishers, New Delhi, 2008
4. Sharma N, *Child Nutrition*, 1st edition, Murarilal& sons, New Delhi, 2006
5. Gupte S, Textbook of Pediatric Nutrition, Pawaninder P Vij Publishers, New Delhi, 2006
6. Gibney MJ, Margetts BM, Kearney JM, Arab L (Ed), *Public Health Nutrition (The Nutrition Society Textbook),* 1st edition, Wiley black well, 2004
7. WHO, The Management of Nutrition in Major Emergencies, AITBS Publishers, New Delhi, 2000
8. Sachdev HPS, Choudhary P, *Nutrition In Children – Developing Country Concerns*, BI publications, New Delhi, 1994
9. Swaminathan M, Principles of Nutrition and Dietetics, Bappeo, Bangalore, 1993
10. Young H, Nutrition in Emergencies (Practical Health Guides), 1st edition, Oxfam, 1991

JOURNALS

1. Journal of Community Nutrition and Health
2. Journal of Health, Population and Nutrition

E- LEARNING RESOURCES

1. www.nin.org- National Institute of Nutrition, Hyderabad, India
2. www.icmr.org – Indian Council for medical Research.
3. https://motherchildnutrition.org/resources/pdf/mcn-iasc-toolkit-nutrition-in-emergency-situations.pdf
4. http://fscluster.org/sites/default/files/documents/chapter_9_food_and_nutrition.pdf
5. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3148629/

COURSE OUTCOME:

CO No	Course outcome
CO 1	Define and summarize the nutritional problems facing the country.
CO 2	Classify the causes of malnutrition in India and demonstrate knowledge of various nutrition intervention schemes and assessment techniques for the community.
CO 3	Justify the role of nutrition in national development through various key health indicators and government policies
CO 4	Explain breastfeeding policies of the country and to formulate low cost weaning foods using emerging trends and technologies.
CO 5	Plan nutrition health education programs for vulnerable sections of the community promoting sustainability, gender equity and safe health practices.

Mapping of CO with PSO

CO No	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	3	2	3
CO2	3	3	3	3	1	3
CO3	3	2	3	3	2	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	2	3
Average	3	2.6	3	3	2	3

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Field Visits – community extension activity
6. Anthropometric assessment of various age groups

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER VI
FOOD PRESERVATION

Total hours: 75 hours
Credits: 5

Course Code: ND18/6E/FPR // CN18/6E/FPR
LTP: 3 2 0

COURSE OBJECTIVES

1. To impart knowledge on food spoilage and the common causes of food spoilage
2. To understand the principles of food preservation.
3. To introduce the novel food processing and preservation techniques
4. To study the current trends in food packaging
5. To create awareness about the food safety laws pertaining to processing and packaging techniques.

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COURSE OUTLINE

UNIT I

Introduction-Importance and principles of preservation, food spoilage - causes of spoilage, spoilage of various foods and food products. (15 HOURS)

UNIT II

Methods of food preservation: Traditional methods-salting, pickling and drying. Preservation as sugar concentrates - Jams, Jelly, Marmalades and Preserves. Fruit Juice Beverages - Preparation and preservation. Preparation of candied fruits (15 HOURS)

UNIT III

Methods of food preservation

Use of high temperatures- Drying and sterilization, canning, pasteurization, Blanching
Use of Low temperatures - Refrigeration and freezing, Irradiation (15 HOURS)

UNIT IV

Food additives – definition, uses of additives, characteristics of chemical additives, intentional food additives, permitted amounts; Food standards –BIS,AGMARK, FSSAI 2006.
Food adulteration – types of adulterants, intentional adulterants, incidental adulterants. (15 HOURS)

UNIT V

Convenience foods – processing and preservation techniques - ready-to-cook, ready-to-use, ready-to serve and ready-to-eat.
Packaging: Functions of Packaging, packing materials and forms, special packaging - military and space foods and intelligent packaging. (15 HOURS)

RECOMMENDED TEXTBOOKS

1. Sivasankar B, *Food Processing and Preservation*, Prentice Hall of India (P) Ltd, New Delhi, 2008
2. Jood S and Khetarpaul N, *Food Preservation*, Agro Tech Publishing Academy, Udaipur, 2002

REFERENCE BOOKS

1. Manay SN, Swamy MS, *Food Facts and Principles*, 3rd edition, New Age International (P) Ltd, New Delhi, 2008
2. Khetarpaul N, *Food Processing and Preservation*, Daya Publishing House, New Delhi, 2005
3. Hausner A, *Preserved Foods and Sweetmeats*, Biotech Books, New Delhi, 2005
4. Puri R, *Jam Jelly Marmalade*, Sahni Publications, New Delhi, 2004
5. Srivatsava RP and Sanjeevkumar, Fruit and vegetable preservation: Principles and Practices, Revised third edition, CBS Publishers and Distributers Pvt Ltd, New Delhi, 2002
6. Subbulakshmi G, Udipi SA, *Food Processing and Preservation*, New Age International (P) Ltd, Publishers, New Delhi, 2001
7. NIIR BOARD, *Manual of Modern Technology on Food Preservation*, Asia Pacific Business Press Inc, New Delhi.

JOURNALS

1. Journal of Food Processing and Preservation
2. Food Preservation Science

E- LEARNING RESOURCES

- https://www.youtube.com/watch?v=WWGRTSbvef0
- https://www.youtube.com/watch?v=8va4id8BA0o
- https://www.youtube.com/watch?v=osqfOuOs81s
- https://www.youtube.com/watch?v=MIT5EU4U4sQ
- https://www.youtube.com/watch?v=uNKq9iIH_oE
- https://www.youtube.com/watch?v=ub-XdapCo18

COURSE OUTCOMES

CO No	Course outcomes
CO 1	Identify the spoilage in fresh and processed foods and describe the physical, chemical and biological quality loss in food.
CO 2	Describe the methods implemented to preserve foods with desirable properties balancing social and cultural norms.
CO 3	Classify and explain food additives, food adulterants and current trends in food standards related to food safety practices.
CO 4	Distinguish various convenience foods processing and preservation techniques; applying emerging technologies maintaining sustainability and ecological balance.
CO 5	Outline the various methods & materials in food packaging with emphasis on current technological advances.

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	2	3	3	3	3
CO5	3	2	3	3	3	3
Average	3	2.4	3	3	3	3

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Quiz-Seminar
3. Peer Learning
4. Field Visits
5. Practical lab experience

QUESTION PAPER PATTERN – UG

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	Not exceeding 500	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		

SEMESTER V & VI

FOOD SERVICE MANAGEMENT PRACTICAL

Total hours: 45 hours **Course Code: ND18/6C/PR3// CN18/6C/PR3**
Credits: 3 **LTP: 0 0 3**

COURSE OBJECTIVES

1. To help the students to understand the various sectors of food service units
2. To understand the lay out, organisation structure and the effective functioning of food service industry
3. To develop skills in quantity food purchase production, preparation and service

COURSE OUTLINE

FOOD SERVICE MANAGEMENT I

1. Visit to sectors of food industry – any 2 commercial and non-commercial sectors.
2. Standardization of two portions of North Indian, South Indian and Chinese Cuisine.

FOOD SERVICE MANAGEMENT II

1. Quantity production of standardized North Indian, South Indian and Chinese Cuisine.

RECOMMENDED TEXTBOOKS

1. Sethi M and Malhan S, Catering Management An Integrated Approach, 3rd edition, New age international publishers, New Delhi, 2015
2. Andrews S,*Food and Beverage Service,* 2nd edition, Tata McGraw hill publishing company limited, 2009

REFERENCE BOOKS

1. George B,*Food and Beverage Service*, 1stedition, JAICO Publishing House, 2005
2. Singaravelavan R, Food and Beverage Service, 1st edition, Oxford university press, 2011

COURSE OUTCOMES

CO No.	Course outcomes
CO1	Identify and classify various sectors of catering industry
CO2	Differentiate equipments, menu, styles of service, lay out, organisation structure and the food production cycle
CO3	Build the skills of interpretation and report writing on industrial visits
CO4	Assess food handling and sanitary practices in the food service establishments
CO5	Formulate and Standardization of different cuisines

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	1	2	3	3	3	3
CO 2	2	2	1	3	3	3
CO 3	3	3	1	3	1	3
CO 4	3	2	2	3	3	3
CO 5	3	2	3	3	3	3
Average	2.4	1.8	2.0	3	2.6	3.0

SEMESTER V & VI
THERAPEUTIC DIETETIC PRACTICAL

Total hours: 45 hours **Course Code: ND18/6C/PR4**
Credits: 3 **LTP: 0 0 3**

Course objectives

1. To apply emerging trends in the medical nutrition therapy of diseases
2. To gain preliminary experience in diet counselling techniques and nutrition care by way of internships
3. To obtain knowledge of applying principles of diet therapy in critically ill patients

THERAPEUTIC DIETETICS I

1. Therapeutic diets for the following:
   a. Parenteral feed, enteral feed – evaluation of case study.
   b. Peptic ulcer
   c. Planning and preparing diet in IBD, IBS, Celiac disease
   d. Liver disorders- Hepatitis & Cirrhosis
   e. Obesity
   f. Diabetes mellitus – Type 1 and Type 2, GDM.
   g. Cardiovascular diseases – Hypertension, Atherosclerosis, Myocardial Infarction.
2. Dietetic internship in a teaching hospital for 2 weeks to be completed before the completion of the degree at the end of fifth semester.

THERAPEUTIC DIETETICS II

1. Planning and preparing diet in cancer.
2. Planning and preparing diet in AIDS.
3. Planning and preparing pre & postoperative diets.
4. Planning and preparing diet in trauma, burns.
5. Kidney – acute kidney disease, chronic kidney disease, urinary calculi.
6. Survey on oral nutritional supplements.

RECOMMENDED TEXTBOOKS

1. Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott Williams and Wilkins, Canada, 2012.
2. Width, M & Reinhardt, T. The Essential Pocket Guide for Clinical Nutrition, 2nd Ed. Wolters Kluwer, 2018.

REFERENCE BOOKS

1. Whitney EN and Rolfes SR, *Understanding Nutrition,* 9th edition, West/Wordsworth, 2002
2. Guthrie H, Introductory Nutrition, CV Mosby Co.St. Louis, 2002
3. Elia M, Ljunggvist O, Stratton RJ, Lanham SA, Clinical Nutrition. The Nutrition Society Textbook, 2nd edition, Wiley Blackwell Publishers, 2013
4. Mitch, W. and Ikizler, Alp. Handbook of Nutrition and the Kidney, 6th Ed. Lippincott Williams and Wilkins, New Delhi, 2010.
5. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012
6. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2010
7. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011.
8. Vimla, V. Advances in Diet Therapy, New Age International Publishers, 2009.
9. Marian M et al., Clinical Nutrition for surgical patients, Jones and Bartlett Publishers, Canada, 2008
10. Joshi Y.K, Basics of Clinical Nutrition, 2nd edition, JP Medical Publishers Pvt Ltd, New Delhi, 2008
11. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elseivier publications, UK, 2005
12. Gibney MJ, Elia M, Ljunggvist O, Clinical Nutrition (The Nutrition Society Textbook) Wiley Blackwell Publishers, 2005
13. Williams SR, Nutrition & Diet Therapy, CV. Mosby St. Louis, 2001
14. Garrow et al, Human Nutrition & Dietetics, 10th Edition, Churchill Livingston, 2001

COURSE OUTCOMES

CO No	Course outcomes
CO1	Analyse, interpret and evaluate case studies pertaining to Enteral and Parentral feeding
CO2	Assess, design, formulate and prepare diets for various disease conditions
CO3	Market survey of various nutritional supplements and to create awareness regarding relevance to its usage in disease condition and economic viabilities
CO4	Take part in supervised dietetic internship for two weeks in a tertiary hospital for a hands on experience

Mapping of CO with PSO

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	2	3	3	3
CO 2	3	3	3	3	3	3
CO 3	3	3	3	3	3	3
CO 4	3	3	3	3	3	3
Average	3	3	2.8	3	3	3

SELF STUDY COURSE/ADVANCED LEARNER COURSE
HEALTH PSYCHOLOGY *

Objectives

1. To understand the basic concepts of human behavior and health psychology
2. To gain insight into the psychological and psycho-social factors that affect health
3. To understand the psychological approaches to illness
4. Overview of health interventions relating to diseases

UNIT I: Foundation of Health psychology – Definition – Health and Health Psychology, Mind Body Relationships, Need for Health Psychology, Bio psycho social model in health psychology.
UNIT II: Health behavior- Health Enhancing Behaviors- Exercise, Healthy Eating Practices, Sleep, Weight Management and Health Screening. Health Compromising Behaviors – Alcoholism, Eating Disorders, Smoking.
UNIT III: Stress - Physiology of stress, sources of stress, coping with stress, factors affecting stress and Stress Management.
UNIT IV: Management of chronic illness- Quality of Life, Emotional responses to chronic illness- CVD, Diabetes mellitus and Cancer, coping with chronic illness, patient education, social support interventions and family support.
UNIT V: Intervention strategies- Rational Emotive Behavioral therapy, Cognitive Behavioral Therapy –Trans theoretical Model of behavior change.

COURSE OUTCOMES

1. Identify the importance of health psychology in enhancing well being.
2. Learn strategies to foster positivity and wellness.
3. Outline the relevance of various intervention strategies in the current health scenario.

REFERENCES

1. Taylor ES. Health Psychology (2006) 6th Edition, Tata Mc Graw Hill Publishers New Delhi.
2. Capuzzi D, Gross DR. Counseling and Psychotherapy – Theories and Interventions (2007) 4th Edition, Pearson Prentics Hall Publishers.
3. Brannon L, Feist J. Introduction to Health Psychology (2007) Akash Press, New Delhi.
4. Richard.O. Straub. Health Psychology: a biophysical Approach (2016) 5th edition,Worth Publishers.

JOURNAL

1. Journal of Indian Health Psychology
2. Journal of Health Psychology
3. International Journal of Clinical and Health Psychology

***Criteria for Advanced Learner** - Student with overall distinction in the four semesters of study (without any arrears)
Optional course with 2 credits (extra).

Single valuation/No continuous assessment

Question paper pattern

Knowledge level	Section	Word limit	Marks	Total	Special instructions if any
K1	A – 10x2 marks	50	20	100	
K1, K2	B – 5/8x8 marks	200	40		
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40		
K1	A – 10x2 marks	50	20		