

**COURSE PROFILE- (2019-2020 B.SC CLINICAL NUTRITION AND DIETETICS**

**SEMESTER I**

<b>Course Code</b>	<b>Title of the Paper</b>	<b>Credits</b>	<b>Hour s/ Week</b>	<b>Total Hour s</b>	<b>L-T- P</b>	<b>CA</b>	<b>SE</b>	<b>Tot al</b>
	<b>Part - I</b> Foundation Course Language	3	5			40	60	100
	<b>Part – II</b> Foundation Course English	3	5			40	60	100
<b>CN18/1C/FSE</b>	<b>Part – III (Core -1)</b> Food Science	5	7	105	4 3 0	40	60	100
<b>CN18/2C/PR1*</b>	<b>Practical 1 (Core -3)</b> Food Science and Physiology Practical	-	3	45	0 0 3	-	-	-
	<b>Part III (Allied-1)</b> Allied Chemistry I	4	4	60		40	60	100
	<b>Allied Practical 1**</b> Allied Chemistry Practical	-	2	30		-	-	-
<b>CN18/1N/ART</b>	<b>Part –IV (Non Major Elective)</b> <b>1a/b/c:</b> Basic Tamil/Advanced Tamil/Art of Interior Decoration	2	2	30		-	50	50
	<b>Soft skill 1</b>	3	2			-	50	50
<b>Total</b>		<b>20</b>						

**\*Practical examination (CN18/2C/PR1) – Food Science and Physiology Practical will be conducted in the second semester.**

**\*\*Allied Practical 1 will be conducted in the second semester**

## SEMESTER II

Course Code	Title of the Paper	Credits	Hours/ Week	Total hours	L-T- P	CA	SE	Total
	<b>Part – I</b> Foundation Course Language	3	5			40	60	100
	<b>Part – II</b> English	3	5			40	60	100
<b>CN18/2C/PHY</b>	<b>Part –III (Core – 2)</b> Physiology	5	7	105	4 3 0	40	60	100
<b>CN18/2C/PR1*</b>	<b>Practical 1 (Core - 3)</b> Food Science and Physiology Practical	3	3	45	0 0 3	40	60	100
	<b>Part –III (Allied -2)</b> Allied Chemistry II	4	4	60		40	60	100
	<b>Allied Practical 1**</b> Allied Chemistry Practical	2	2	30		40	60	100
<b>CN18/2N/BFP</b>	<b>Part –IV (Non Major Elective)1a/b/c:</b> Basic Tamil/Advanced Tamil/Basics of Food Preservation	2	2	30	1 1 0	-	50	50
	<b>Soft skill 2</b>	3	2				50	50
<b>Total</b>		<b>25</b>	<b>30</b>					

**\* Practical examination (CN18/2C/PR1) – Food Science and Physiology practical will be conducted in the second semester**

**\*\*Allied Practical 1 will be conducted in the second semester**

### SEMESTER III

Course Code	Title of the Paper	Credits	Hours/ Week	Total hours	L-T-P	CA	SE	Total
	<b>Part – I</b> Foundation Course Language	3	5			40	60	100
	<b>Part – II</b> Foundation Course English	3	5			40	60	100
CN18/3C/HNU	<b>Part – III (Core - 4)</b> Human Nutrition	5	7	105	4 3 0	40	60	100
CN18/4C/PR2*	<b>Practical 2 (Core-6)</b> Human Nutrition and Nutrition Through Life Cycle Practical*	-	3	45	0 0 3	-	-	-
CN18/3A/MIC	<b>Part –III (Allied-3)</b> Microbiology	4	4	60	3 1 0	40	60	100
CN18/4A/PR1**	<b>Allied Practical**</b> Microbiology and Nutritional Biochemistry Practical	-	2	30	0 0 2	-	-	-
	<b>Part –IV (Skill Based)</b> Environmental studies	2	2	30		-	50	50
	<b>Soft skill 3</b>	3	2			-	50	50
<b>Total</b>		<b>20</b>	<b>30</b>					

**\*Practical examination (CN18/4C/PR2) – Human Nutrition and Nutrition through Lifecycle Practical will be conducted in the fourth semester.**

**\*\*Practical examination (CN18/4A/PR1) – Microbiology and Nutritional Biochemistry Practical will be conducted in the fourth semester.**

**SEMESTER IV**

<b>Course Code</b>	<b>Title of the Paper</b>	<b>Credits</b>	<b>Hours/Week</b>	<b>Total hours</b>	<b>L-T-P</b>	<b>CA</b>	<b>SE</b>	<b>Total</b>
	<b>Part – I</b> Foundation Course Language	3	5	75		40	60	100
	<b>Part – II</b> Foundation Course English	3	5	75		40	60	100
<b>CN18/4C/NLC</b>	<b>Part – III (Core 5)</b> Nutrition Through Lifecycle	5	7	105	4 3 0	40	60	100
<b>CN18/4C/PR2*</b>	<b>Practical 2 (Core-6)*</b> Human Nutrition and Nutrition Through Life Cycle Practical	4	3	45	0 0 3	40	60	100
<b>CN18/4A/NBC</b>	<b>Part- III (Allied - 4)</b> Nutritional Biochemistry	4	4	60	3 1 0	40	60	100
<b>CN18/4A/PR1**</b>	<b>Allied Practical**</b> Microbiology and Nutritional Biochemistry Practical	2	2	30	0 0 2	40	60	100
	<b>Part –IV (Skill Based)</b> Value Education	2	2	30		-	50	50
	<b>Soft skill 4</b>	3	2			-	50	50
<b>Total</b>		<b>26</b>	<b>30</b>					

**\*Practical examination (CN18/4C/PR2) – Human Nutrition and Nutrition through Lifecycle Practical will be conducted in the fourth semester.**

**\*\*Practical examination (CN18/4A/PR1) – Microbiology and Nutritional Biochemistry Practical will be conducted in the fourth semester.**

**SEMESTER V**

<b>Course Code</b>	<b>Title of the Paper</b>	<b>Credits</b>	<b>Hours/Week</b>	<b>Total hours</b>	<b>L-T-P</b>	<b>CA</b>	<b>SE</b>	<b>Total</b>
<b>CN18/5C/FM1</b>	<b>Core -7</b> Food Service Management I	4	4	60	3 1 0	40	60	100
<b>CN18/5C/HFS</b>	<b>Core- 8</b> Human Development and Family Studies	4	5	75	4 1 0	40	60	100
<b>CN18/5C/BCL</b>	<b>Core -9</b> Biomarkers in Clinical Nutrition	4	5	75	4 1 0	40	60	100
<b>CN18/5C/MT1</b>	<b>Core- 10</b> Medical Nutrition Therapy 1	4	5	75	3 2 0	40	60	100
<b>CN18/5E/IDH</b>	<b>Elective -1</b> Interior Decoration and Housekeeping	5	5	75	4 1 0	40	60	100
<b>CN18/6C/PR3*</b>	<b>Practical 3 (Core - 14)*</b> Food Service Management Practical	-	3	45	0 0 3	-	-	-
<b>CN18/6C/PR4**</b>	<b>Practical 4 (Core - 15)**</b> Medical Nutrition Therapy Practical	-	3	45	0 0 3	-	-	-
<b>Total</b>		<b>21</b>	<b>30</b>					
	<b>Self study paper- Health Psychology</b>	2	-	-	-	-	100	100

**\*Practical examination (CN18/6C/PR3) – Food Service Management Practical will be conducted in the sixth semester.**

**\*\*Practical examination (CN18/6C/PR4) – Medical Nutrition Therapy Practical will be conducted in the sixth semester.**

**SEMESTER VI**

<b>Course code</b>	<b>Title of the paper</b>	<b>Credits</b>	<b>Hour s/ week</b>	<b>Total hours</b>	<b>L-T- P</b>	<b>CA</b>	<b>SE</b>	<b>Tota l</b>
<b>CN18/6C/FM2</b>	<b>Core -11</b> Food Service Management II	3	4	60	3 1 0	40	60	100
<b>CN18/6C/MT2</b>	<b>Core -12</b> Medical Nutrition Therapy II	4	5	75	3 2 0	40	60	100
<b>CN18/6C/SPN</b>	<b>Core- 13</b> Sports Nutrition	4	5	75	3 2 0	40	60	100
<b>CN18/6E/PHN</b>	<b>Elective -2</b> Public Health Nutrition	5	5	75	4 1 0	40	60	100
<b>CN18/6E/FPR</b>	<b>Elective-3</b> Food Preservation	5	5	75	4 1 0	40	60	100
<b>CN18/6C/PR3*</b>	<b>Practical 3 (Core - 14)</b> Food Service Management Practical	3	3	45	0 0 3	40	60	100
<b>CN18/6C/PR4**</b>	<b>Practical 4 (Core - 15)</b> Medical Nutrition Therapy Practical	3	3	45	0 0 3	40	60	100
<b>Total</b>		<b>27</b>	<b>30</b>	<b>30</b>				
<b>*Practical examination (CN18/6C/PR3) – Food Service Management Practical will be conducted in the sixth semester.</b>								
<b>**Practical examination (CN18/6C/PR4) – Medical Nutrition Therapy Practical will be conducted in the sixth semester.</b>								
<b>Credits at the end of VI semesters</b>						<b>139</b>		
<b>Part V (Extension activities)</b>						<b>1</b>		
<b>Total credits</b>						<b>140</b>		

## SEMESTER- I

### NON MAJOR ELECTIVE

#### ART OF INTERIOR DECORATION

**TOTAL HOURS: 30 Hours**

**COURSE CODE: CN18/1N/ART**

**CREDITS: 2**

**L-T-P: 1-1-0**

#### COURSE OBJECTIVES

1. To help students understand principles of design, elements of decoration, and to learn to create beautiful surroundings and interiors.
2. To gain skills in using basic principles of art in home and to select the right materials for decoration.

#### COURSE OUTLINE

##### UNIT I:

Introduction to Interior Decoration- Good taste in art, elements of design, types of design, characteristics of good design. Principles of design- harmony, balance, proportion, rhythm and emphasis (10 HOURS)

##### UNIT II:

Colour: qualities of colour, Prang colour chart, colour harmony, applying principles of design in colour and to create different effects and moods. (10 HOURS)

##### UNIT III:

Furniture- Selection and arrangement. Window treatment- types of curtains and draperies. Accessories-Types; Flower arrangement-Types; Floor decorations-Types (10 HOURS)

#### RECOMMENDED TEXT BOOKS

1. Seethraman P and Pannu P, *Interior design and decoration*, CBS publishers & distributors, New Delhi, 2014.
2. Khanna G, *Art of interior design*, Indica Publishers, New Delhi, 2004

#### JOURNALS

1. Journal of interior design
2. International journal of interior design

#### E-LEARNING RESOURCES:

<https://www.thespruce.com/basic-interior-design-principles-1391370>

<http://launchpadacademy.in/elements-of-interior-design->

<2/amp/#aoh=15745888091844&referrer=https%3A%2F%2Fwww.google.com& tf=From%20%251%24s>

## COURSE OUTCOMES

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Define the various principles of design	K1
CO 2	Apply the principles of designs in interiors	K2
CO 3	Identify and select the right type of furniture and furnishings for interior design	K3

## MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO6
CO1	3	1	3	3	3	3
CO2	3	1	3	3	3	3
CO3	3	1	3	3	3	3
AVERAGE	3	1	3	3	3	3

Key: Strongly Corelated-3 Moderately Corelated-2 Weakly Corelated-1 No Corelation-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. Peer Learning

## QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
<b>K1,K2</b>	A-10 X 5 marks	50	50	50



## SEMESTER –II

### NON MAJOR ELECTIVE

#### BASICS OF FOOD PRESERVATION

**TOTAL HOURS: 30 Hours**

**COURSE CODE: CN18/2N/BFP**

**CREDITS: 2**

**L-T-P: 1-1-0**

#### COURSE OBJECTIVES

1. To enable the students to learn the basic principles of food preservation.
2. To help the students to perceive the simple methods of preparing fruit and vegetable based preserves.

#### COURSE OUTLINE

**UNIT I:** **Importance and principles of food preservation**, Methods of food preservation- traditional methods- salting, pickling, drying, jugging and potting. (10 HOURS)

**UNIT II:** **Preservation as sugar concentrate-** basic principles, pectin test and setting tests. Jam, Jelly and Marmalade- ingredients, equipment, preparation (any 2) and storage.  
**Fruit Juice beverage** – fruit juice, syrups, squashes and cordials- ingredients, equipment, preparation (any 2) and storage (10 HOURS)

**UNIT-III:** **Vegetable preserves-** pickles, chutneys, sauces and ketchup- preparation (any 2) and storage.  
**Packaging materials-** types and functions (10 HOURS)

#### RECOMMENDED TEXT BOOKS

1. Jood S and Khetarpaul N, *Food preservation*, Agrotech Publishing, Udaipur, 2002

#### REFERENCE BOOKS

1. Manay S and Swamy M S, *Foods: Facts and Principles*, New Age International (P) Limited, Chennai, 2005
2. Puri R, *Jam Jelly Marmalade*, Sahni Publications, New Delhi, 2004

#### JOURNALS

1. Journal of food processing and preservation
2. The technology of food preservation

## E-LEARNING RESOURCES:

<http://ecoursesonline.iasri.res.in/mod/page/view.php?id=4037>

<https://www.britannica.com/topic/food-preservation>

<https://www.toppr.com/guides/evs/mangoes-round-the-year/food-spoilage/>

[https://en.m.wikipedia.org/wiki/Food\\_additive](https://en.m.wikipedia.org/wiki/Food_additive)

[https://en.m.wikipedia.org/wiki/Food\\_Safety\\_and\\_Standards\\_Authority\\_of\\_India](https://en.m.wikipedia.org/wiki/Food_Safety_and_Standards_Authority_of_India)

## COURSE OUTCOMES

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Define the various methods of food preservation.	K1
CO 2	Identify the different types of packaging materials	K3
CO 3	Explain the simple methods of preparing fruit and vegetable based preserves	K2

## MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO6	AVE
CO1	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3
AVERAGE	3	3	3	3	3	3	3

Key: Strongly Correlated-3 Moderately Correlated-2 Weakly Correlated-1 No Correlation-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. Peer Learning
6. Field Visits
7. Self-Study Papers

## QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K1,K2	A-10 X 5 marks	50	50	50

## SEMESTER IV

### NUTRITION THROUGH LIFE CYCLE

**TOTAL HOURS: 105 Hours**

**COURSE CODE: ND18/4C/NLC// CN18/4C/NLC**

**CREDITS: 5**

**L-T-P: 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. To 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 & mediation. (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. Childhood obesity;  
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 TEXT BOOKS

1. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011
2. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., *Nutritive value of Indian foods*, NIN, Hyderabad, 2001

## REFERENCE BOOKS

1. Sharma M, *Textbook of Nutrition*, 1<sup>st</sup> edition, CBS publishers & distributors PVT Ltd, New Delhi, 2017
2. Longvah T, Ananthan R, Bhaskar K, Venkaiah K, *Indian Food Composition Tables*, National Institute of Nutrition, 2017
3. Abraham S, *Nutrition Through Lifecycle*, 1<sup>st</sup> edition, New age international publishers, New Delhi, 2016
4. Verma P, *Food, Nutrition & Dietetics*, 1<sup>st</sup> edition, CBS publishers & distributors PVT Ltd, New Delhi, 2015
5. Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2<sup>nd</sup> edition, Jones & Bartlett learning publications, 2015,
6. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13<sup>th</sup> Edition, Elsevier Saunders, Missouri, 2012
7. Stump SE, *Nutrition and diagnosis related care*, 7<sup>th</sup> edition, Lippincott, 2012
8. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12<sup>th</sup> edition, Elsevier publications, UK, 2005
9. Whitney EN and Rolfe SR, *Understanding Nutrition*, 9<sup>th</sup> edition, West/Wordsworth, 2002
10. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10<sup>th</sup> edition, Churchill Livingstone, NY, 2000
11. Groff JL, Gropper SS, *Advanced Nutrition and Human Metabolism* 3<sup>rd</sup> edition, West / Wadsworth, UK. 2000
12. Cataldo, DeBruyne and Whitney, *Nutrition and Diet therapy– Principles and Practice* 5<sup>th</sup> edition, West/ Wadsworth, London, 1999
13. Gordon WM, *Perspectives in Nutrition*, 4<sup>th</sup> edition, McGraw Hill, 1999
14. 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

<http://vikaspedia.in/health/nutrition/dietary-guidelines-1/dietary-guideline-1>

<https://www.nhp.gov.in/healthyliving/healthy-diet>

<https://motherchildnutrition.org/india/complementary-feeding-guidelines.html>

<http://vikaspedia.in/health/nutrition/dietary-guidelines-1/diet-for-children-and-adolescents>

<https://motherchildnutrition.org/india/complementary-feeding-guidelines.html>

<https://sol.du.ac.in/mod/book/view.php?id=1422&chapterid=1288>

- <https://www.indi.ie/fact-sheets/fact-sheets-on-nutrition-for-older-people/509-good-nutrition-for-the-older-person.html>

### COURSE OUTCOMES

CO Number	CO STATEMENT	Knowledge level
CO 1	Explain the physiological basis for nutritional needs through the human lifecycle	K1&K2
CO 2	Identify nutrition related concerns and deficiency disorders at every stage of lifecycle	K3
CO 3	Discuss appropriate dietary guidelines for various age groups	K2
CO 4	Construct and interpret diets to meet the nutritional needs across the lifecycle	K2&K3
CO 5	Relate healthy eating behaviours to general well being	K2

### MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
<b>AVERAGE</b>	3	3	3	3	3	3

Key: Strongly Corelated-3 Moderately Corelated-2 Weakly Corelated-1 No Corelation-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. Peer Learning
6. Field Visits
7. Self-Study Papers

### QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	<b>100</b>
K1.K2	B-5/8x8 marks	Not exceeding 300	40	
K2,K3	C-2/3x20 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**

**L-T-P: 0-0-3**

#### **COURSE OBJECTIVES**

1. To enable students to describe selected and relevant biochemical techniques related to nutrition
2. To 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.

#### **COURSE OUTLINE**

##### **HUMAN NUTRITION PRACTICAL**

1. Quantitative Estimation of Reducing Sugar
2. Quantitative estimation of Calcium.
3. Quantitative estimation of Vitamin C.
4. Quantitative estimation of Phosphorous.
5. Quantitative estimation of Iron.
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-
  - a) PEM
  - b) Vitamin A deficiency
  - c) Nutritional anemia

## REFERENCES

1. Nielson S, *Food Analysis Laboratory Manual*, 3<sup>rd</sup> edition, Springer International Publishing, 2017
2. Longvah T, Ananthan R, Bhaskar K, Venkaiah K, *Indian Food Composition Tables*, National Institute of Nutrition, 2017
3. Abraham S, *Nutrition Through Lifecycle*, 1<sup>st</sup> edition, New age international publishers, New Delhi, 2016
4. Cheung PCK and Mehta BM (Eds), *Handbook of Food chemistry*, 1<sup>st</sup> edition, Springer-Verlag Berlin Heidelberg, 2015
5. James CS, *Analytical chemistry of Foods*, 1<sup>st</sup> edition Springer US, 1995

## JOURNALS

1. Journal of Nutrition, health and food sciences.
2. American Journal of clinical nutrition

## COURSE OUTCOME

CO No	CO Statement
<b>Human Nutrition</b>	
CO1	Estimate the amount of specific biological macro and micro molecules
CO2	Assess the energy requirements and evaluate the quality of protein rich recipes by chemical scoring method
<b>Nutrition Through Life cycle</b>	
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-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO6
CO1	3	3	3	3	2	2
CO2	3	3	3	3	2	2
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
<b>AVERAGE</b>	3	3	3	3	2.6	2.6

Key: Strongly Corelated-3 Moderately Corelated-2 Weakly Corelated-1 No Corelation-0

## SEMESTER V

### FOOD SERVICE MANAGEMENT I

**TOTAL HOURS: 60 Hours**

**COURSE CODE: ND18/5C/FM1 // CN18/5C/FM1**

**CREDITS: 4**

**L-T-P: 3-1-0**

#### COURSE OBJECTIVES

- ✓ To help the students to understand the various sectors of food service units
- ✓ To become skilled in planning the design for food service units
- ✓ To develop skills in quantity food purchase production, preparation and service.
- ✓ 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 technique (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. Standardization of recipes: definition, advantages, enlargement of recipes, portion control and effective use of leftovers. (15 HOURS)



**UNIT V: Food Purchase and Storage:**

- a) Food Purchase: Buying and Receiving methods.
- b) Food Storage: Types of storage; Maintenance of store records- Requisition slips, Order form, Stock book, Invoice, Goods received book, Inventories
- c) Computer applications in Food Service Establishments  
( 10 HOURS)

**RECOMMENDED TEXT BOOKS**

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

**REFERENCE BOOKS**

1. Fossett D and Paskins P, *The theory of Hospitality and Catering*, Hodder Education, UK, 2011
2. Jaiswal P, *Food Quality and safety*, CBS Publishers and Distributors 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. Lillcrap DR and Cousins JA, *Food and beverage service*, 4<sup>th</sup> 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 management and research
2. Educational research
3. Journal of food service

**E-LEARNING 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 OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	Identify and differentiate types of food service sectors.	K1 &K4
CO2	Discuss and apply the principles of menu planning and standardisation of recipes.	K2&K3
CO3	Apply the principles and tools of management for effective administration of organisation	K3
CO4	Differentiate and apply the knowledge and skills in planning and designing layout for food service outlets	K3&K4
CO5	Apply the skills for food purchase, storage, preparation, service and maintenance of records	K3

## MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	3	3	3	3
CO2	3	1	3	1	3	3
CO3	3	1	3	3	3	3
CO4	3	2	3	3	3	3
CO5	3	1	3	3	3	3
<b>AVERAGE</b>	3	1.2	3	2.6	3	3

No

Key: Strongly Corelated-3 Moderately Corelated-2 Weakly Corelated-1 Corelation -0

## Teaching Methodology

Lecture method, Power point presentation, Over Head Projector, Group discussion, Assignment, Seminar, Survey, Quiz.

## QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	<b>100</b>
K1.K2	B-5/8x8 marks	Not exceeding 300	40	
K2,K3	C-2/3x20 marks	Not exceeding 1500	40	

## SEMESTER -V

### BIOMARKERS IN CLINICAL NUTRITION

**TOTAL HOURS: 75 Hours**

**COURSE CODE: CN18/5C/BCL**

**CREDITS: 4**

**L-T-P: 4-1-0**

#### COURSE OBJECTIVES

To enable the students

- To understand the basic metabolic processes in the body
- To learn the normal and abnormalities metabolic conditions in body
- To relate normal functioning with diseases conditions
- To diagnose diseases and to learn the diagnostic procedure for the same
- To learn about basic instrumentation used in analysis

#### COURSE OUTLINE

<b>UNIT I:</b>	Basic concepts of instrumentation in nutrient separation and analysis, chromatography, electrophoresis and photo instrumentation-colorimeter, spectrophotometer and flame photometer. (15 HOURS)
<b>UNIT II:</b>	Enzyme assays as a diagnostic tool in acute pancreatitis, liver damages, bone disorder, myocardial infarction and muscle wasting. Inborn Errors of metabolism—Phenylketonuria, Albinism, Galactosemia and Alcaptonuria (15 HOURS)
<b>UNIT III:</b>	Liver function tests- basic concepts, LFT test based on bile pigment levels in blood and urine, plasma protein changes in liver diseases, differential diagnosis for jaundice. (15 HOURS)
<b>UNIT IV:</b>	Basic description of kidney function tests- sugar, urea, creatinine and electrolytes in serum- creatinine clearance tests, phenol red test, serum uric acid, serum total protein, serum albumin, serum globulin, and AG ratio. (15 HOURS)
<b>UNIT V:</b>	Test for Diabetes Mellitus: Fasting glucose, Postprandial glucose, IGT, OGTT, Initial glucose challenge test, HBA1C, Insulin sensitivity test, Fructosamine test (15 HOURS)

## RECOMMENDED TEXT BOOKS

1. Ramasamyier S, *Handbook of Clinical Biochemistry*, 2nd Edition, World Scientific, 2011
2. Deb. A.C, *Fundamentals of Biochemistry*, 7<sup>th</sup> edition, New central book agency, Kolkata, 2001

## REFERENCE BOOKS

1. Chawla R, *Practical Clinical Biochemistry Methods and Interpretations*, 1<sup>st</sup> edition, Jaypee brothers, 2014
2. Crook MA, *Clinical Biochemistry and Metabolic Medicine*, Eighth Edition, CRC Press, 2012
3. Ahmed N, *Clinical Biochemistry*, 1<sup>st</sup> edition, OUP Oxford, 2011
4. Deb. A.C, *Concepts of Biochemistry theory+ Practical*, Books and Allied Pvt Ltd, 2007
5. Talwar G.P, Srivatsa L.N and Moudgil D, *Textbook of biochemistry and human biology*, 3<sup>rd</sup> edition, Prentice hall of India Pvt Ltd, New Delhi, 2003
6. Marshall WJ, Bangert SK, *Clinical Biochemistry: Metabolic and Clinical Aspects*, 1st edition, Churchill Livingstone, 1995

## JOURNALS

1. American journal of clinical nutrition
2. Journal of clinical nutrition and metabolism

## E-LEARNING RESOURCES:

1. <https://www.youtube.com/watch?v=QVoicTVf4DA>
2. <https://www.youtube.com/watch?v=5nnY0aP0Xqg>
3. [https://www.youtube.com/watch?v=GncU\\_PxVX40](https://www.youtube.com/watch?v=GncU_PxVX40)
4. <https://www.youtube.com/watch?v=5zj8JYdtep4>
5. <https://www.youtube.com/watch?v=tXVDY1HvrVU&t=32s>

## Course outcome

S.No.	CO Statement	Knowledge level
CO1	Outline on the basic principles of various instruments used in analysis	K1
CO2	Discuss enzyme assays as diagnostic tools in diseased conditions	K2
CO3	Describe inborn errors of metabolism	K2
CO4	Apply basic concepts of liver and kidney function test in diagnosis and interpretation	K3
CO5	Examine and assess various diagnostic test in diabetes mellitus	K4&K5
CO6	Compose recent biomarkers used as diagnostic tool in nutrition	K6

## MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	2	2
CO2	3	3	3	3	3	3
CO3	2	2	2	2	2	2
CO4	3	3	3	3	3	3
CO5	3	2	2	3	2	2
CO6	3	3	3	3	3	3
<b>AVERAGE</b>	17	16	16	17	15	15

Key: Strongly Corelated-3 Moderately Corelated-2 Weakly Corelated-1 No Corelation-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. Peer Learning
6. Field Visits
7. Self-Study Papers

### QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	<b>100</b>
K1.K2	B-5/8x8 marks	Not exceeding 300	40	
K2,K3	C-2/3x20 marks	Not exceeding 1500	40	





## COURSE OUTCOME

CO.NO	CO Statement	Knowledge
CO1	Recall and list the predisposing factors, symptoms of diseases and the metabolic derangements during various clinical conditions for their effective management	K1
CO2	Interpret and describe the role of specific nutrients and analyse systematically the effect of deficiency in management of diseases	K2 &K3
CO3	Implementation of skills in planning and formulate dietary recommendations appropriate to the clinical condition	K3 &K4
CO4	Analyze the biochemical parameter ,decide appropriate nutritional requirement and recommend dietary treatment	K4 &K5
CO5	Assess the nutritional status and determine effective dietary management to combat malnutrition	K5
CO6	Compile the subjective and objective assessment and administer diets to prevent and control the progression of diseases.	K6

## MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	3	2	2
CO2	3	3	3	2	2
CO3	2	3	3	2	2
CO4	3	3	2	2	2
CO5	3	3	3	2	3
<b>AVERAGE</b>	2.8	3	2.8	2.0	2.2

Key: Strongly Corelated-3 Moderately Corelated-2 Weakly Corelated-1 No Corelation-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. Peer Learning
6. Field Visits
7. Self-Study Papers

## QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	100
K1.K2	B-5/8x8 marks	Not exceeding 300	40	
K2,K3	C-2/3x20 marks	Not exceeding 1500	40	



## SEMESTER V

### INTERIOR DECORATION AND HOUSEKEEPING

**TOTAL HOURS: 75 Hours**

**COURSE CODE: ND18/5E/IDH// CN18/5E/IDH**

**CREDITS: 5**

**L-T-P: 4-1-0**

#### COURSE OBJECTIVES

1. To gain understanding of the basic art principles and to develop aesthetic sense.
2. To 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. (15 HOURS)
- 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; Interdepartmental co-operation (15 HOURS)
- 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 & private areas in establishments;  
Linen room: plan, layout, linen control, receiving, issuing, storage of clean linen, Selection, purchase and linen hire. (15 HOURS)

## RECOMMENDED TEXT BOOKS

1. Seetharaman P, Pannu P, *Interior Design and Decoration*, 1<sup>st</sup> Edition, CBS Publishers and Distributors Pvt Ltd, New Delhi, 2015
2. Andrews S, *Textbook of Hotel Housekeeping Management & Operations*, First edition Reprint, Tata McGraw Hill Education, New Delhi, 2007

## REFERENCE BOOKS

1. Raghubalan G, Raghubalan S, *Hotel Housekeeping: Operations and Management*, 3<sup>rd</sup> edition, Oxford University Press India, 2015
2. Wildhide E, *The Interior Design Directory*, 1<sup>st</sup> Edition, Quardrille Publishing Ltd, 2009
3. Khanna G, *Art of Interior Design*, 1<sup>st</sup> Edition, Indica Publishers, 2005
4. Murphy B, *Flawless Interior Decorating*, 1<sup>st</sup> Edition, McGraw Hill Publications NY, 2005

## JOURNALS

1. Journal of interior design
2. Interior -Designs, architecture and culture

**E-LEARNING RESOURCES** <https://www.thespruce.com/basic-interior-design-principles-1391370>  
<http://launchpadacademy.in/elements-of-interior-design-2/amp/#aoh=15745888091844&referrer=https%3A%2F%2Fwww.google.com& tf=From%20%251%24s>  
<http://59.90.94.166/1Yr/home/402Fashion/paper3/unit2.pdf> <https://www.cityflowers.co.in/blog/9-types-popular-classic-flower-arrangement-styles/> <https://hmhub.me/housekeeping-in-other-institutions/>

## COURSE OUTCOMES

CO No.	CO Statement	Knowledge Level
CO1	Outline the universality of principles and elements of design	K1
CO2	Explain the basic concepts in the selection and types of furniture, furnishings, floor coverings and accessories	K2
CO3	Apply the colour and lighting principles in designing interiors	K3
CO4	Analyse the scope of various styles of flower arrangement	K4
CO5	Discuss the importance of the housekeeping operations	K2
CO6	Manage the public and private areas in various establishments	K6

## MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	1	3	3
CO4	3	1	3	3	3	3
CO5	3	3	3	1	3	3
CO6	3	3	3	1	3	3
<b>AVERAGE</b>	3	2.7	3	2	3	3

Key: Strongly Corelated-3 Moderately Corelated-2 Weakly Corelated-1 No Corelation-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. Peer Learning
6. Field Visits
7. Self-Study Papers

## QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	<b>100</b>
K1.K2	B-5/8x8 marks	Not exceeding 300	40	
K2,K3	C-2/3x20 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**

**L-T-P: 3-1-0**

#### **COURSE OBJECTIVES**

- ✓ To understand the concept and principles of financial management and human
- ✓ resource management.
- ✓

#### **COURSE OUTLINE**

##### **UNIT I:**

##### **Financial Management:**

- a) Elements of cost, Food cost, Labor cost and overhead cost and 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 & collection Equipment- Electric food trolleys & 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*, 3<sup>rd</sup> edition, New age international publishers, New Delhi, 2015
2. Sethi M, *Institutional Food Management*, 3<sup>rd</sup> edition, New age international publishers, New Delhi, 2015
3. Singaravelavan R, *Food and Beverage Service*, 1<sup>st</sup> edition, Oxford university press, 2011

**REFERENCE BOOKS**

1. Fossett D and Paskins P, *The theory of Hospitality and Catering*, Hodder Education, UK, 2011
2. Jaiswal P, *Food Quality and safety*, CBS Publishers and Distributors 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*, 4<sup>th</sup> 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

## E-LEARNING 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 OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	State the various styles of food and beverage services offered in food service sectors	K1
CO2	Discuss the basic technical skills, interpersonal skills and the significance of hygiene and safety in the food premises	K2
CO3	Apply the management concepts to personnel recruitment, selection, training, appraisal, book keeping and pricing methods	K3
CO4	Classify equipments and acquire knowledge on equipment selection	K2&K4
CO5	Apply knowledge and skills to become a entrepreneur in running a food service operations	K3

## MAPPING -COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	3	1	3	3
CO2	3	1	3	3	3	3
CO3	3	1	3	2	3	3
CO4	3	1	3	3	3	3
CO5	1	1	3	3	3	3
AVERAGE	2.6	1	3	2.4	3	3

Key: Strongly Correlated-3 Moderately Correlated-2 Weakly Correlated-1 No Correlation-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. Peer Learning
6. Field Visits
7. Self-Study Papers

## QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10x 2 marks	50	20	100
K1.K2	B-5/8x8 marks	Not exceeding 300	40	
K2,K3	C-2/3x20 marks	Not exceeding 1500	40	

## SEMESTER VI

### MEDICAL NUTRITION THERAPY II

**TOTAL HOURS: 75 Hours**

**COURSE CODE: CN18/6C/MT2**

**CREDITS: 4**

**L-T-P: 3-2-0**

#### COURSE OBJECTIVES

- ✓ To gain knowledge on the various physiological ,metabolic and nutritional changes that
- ✓ occur in various communicable and Non-communicable diseases conditions  
To understand the etiology , classification symptoms and prevention of acute and
- ✓ chronic diseases  
To assess the nutritional status to know the disease prognosis and the ways to combat the
- ✓ abnormality  
To apply nutritional guidelines and principles in administering appropriate dietary
- ✓ recommendations to the subjects and improve their nutritional status  
To demonstrate their professional skill obtained to alleviate the symptoms and
- ✓ nutritional deficiencies arising thereof by appropriate execution of diet.  
To impart diet counseling to alleviate and cure communicable and non communicable diseases.

#### COURSE OUTLINE

##### UNIT I:

##### **Diet in Diabetes Mellitus:**

Diabetes Mellitus- Incidence and predisposing factors, symptoms, types and tests for detection, insulin and its types, Hypoglycemic agent, Dietary management of Pre-diabetes, Type I DM and Type II DM and Complications of diabetes- Acute and Long term. Glycemic Index& Glycemic Load- Definition, Low Glycemic Foods in the treatment of Diabetes (15HOURS)

##### UNIT II:

**Diet in Cardiovascular Disorders:** Incidence, etiology, symptoms, role of specific nutrients, dietary management in hypertension and atherosclerosis.

Hyperlipidemia: Definition, Classification of lipoprotein, Types of hyperlipidemia and dietary management. (15 HOURS)

##### UNIT III:

**Diet in Renal diseases:** Basic renal function - etiology, symptoms, nutritional implications and dietary treatment of Nephritis, Nephrosis and End stage Renal Disease. Dialysis: Types of dialysis, Dietary treatment for dialysis patient. Kidney transplantation: Screening of patient and donor, dietary treatment for kidney transplanted patient. Urolithiasis and Nephrolithiasis: types of stones and dietary management (20 HOURS)

##### UNIT IV:

##### **Nutrition in Critical Conditions:**

Diet in Burns – Definition, Classification of Burns, Metabolic alterations, Rule of nines and Dietary management in Burns  
Diet in Surgery – Pre operative and Post-operative diets

(10 HOURS)

**UNIT V:**

**Nutrition and Cancer:** Etiology, Pathophysiology, Stages in carcinogenesis, Nutrients for Cancer Prevention, Medical Nutrition therapy and Nutritional impact of Cancer Treatment

**Food & drug interaction:** Effect of drugs on food and nutrition-nutrient absorption, nutrient metabolism and nutrient excretion, Modification of drug action by food and nutrients. (15 HOURS)

**RECOMMENDED TEXT BOOKS**

1. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011
2. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12<sup>th</sup> edition, Elsevier publications, UK, 2005.

**REFERENCE BOOKS**

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

**JOURNALS**

1. Journal of clinical nutrition and dietetics
2. Nutrition in clinical practice.



## E-LEARNING RESOURCES

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

## COURSE OUTCOME

CO.NO	CO Statement	Knowledge
CO1	Aquaint and analyse systematically the various metabolic changes in the diseased organs and understand the nutritional implications of the diseases	K1 &K2
CO2	Critically analyse the symptoms and complications of chronic disease conditions and determine the dietary intervention to be employed .	K2
CO3	Apply the knowledge base and professionally demonstrate the skill acquired in assessing the nutritional status of the individuals and evaluate the extent of deficiencies.	K3
C O4	Analyze the symptoms and biochemical parameters to understand the severity of the disease for effective administration of diet therapy	K4 &K5
CO5	Decision to execute and evaluate appropriate dietary modification in the management of the disease and its impact on the nutritional status	K5

## MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	3	3	3	2
CO3	2	3	3	3	2
CO4	3	3	3	2	3
CO5	2	3	3	2	3
AVERAGE	2.4	3	2.8	2.4	2.4

Key: Strongly Corelated-3 Moderately Corelated-2 Weakly Corelated-1 No Corelation-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. Peer Learning
6. Field Visits
7. Self-Study Papers

## QUESTION PAPER PATTERN

<b>Knowledge Level</b>	<b>Section</b>	<b>Word Limit</b>	<b>Marks</b>	<b>Total</b>
K 1	A-10X2 marks	50	20	<b>100</b>
K1.K2	B-5/8x8 marks	Not exceeding 300	40	
K2,K3	C-2/3x20 marks	Not exceeding 1500	40	

## SEMESTER VI

### PUBLIC HEALTH NUTRITION

**TOTAL HOURS: 75 Hours**

**COURSE CODE: ND18/6E/PHN// CN18/6E/PHN**

**CREDITS: 5**

**L-T-P: 4-1-0**

#### 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 & 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 (15 HOURS)

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, – 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 TEXT BOOKS**

1. ChanderVir S, Public Health Nutrition in developing countries, Part I, 1<sup>st</sup> 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, 1<sup>st</sup> 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*, 1<sup>st</sup> 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)*, 1<sup>st</sup> 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), 1<sup>st</sup> edition, Oxfam, 1991

## JOURNALS

1. Journal of community nutrition and health
2. Journal of health, population and nutrition
3. Journal of community nutrition and health.

## E-LEARNING RESOURCES

1. <https://motherchildnutrition.org/india/food-nutrition-board.htm>
2. [www.nin.org](http://www.nin.org)- National Institute of Nutrition, Hyderabad, India
3. [www.icmr.org](http://www.icmr.org) – Indian Council for medical Research.
4. <https://motherchildnutrition.org/resources/pdf/mcn-iasc-toolkit-nutrition-in-emergency-situations.pdf>
5. [http://fscluster.org/sites/default/files/documents/chapter\\_9\\_food\\_and\\_nutrition.pdf](http://fscluster.org/sites/default/files/documents/chapter_9_food_and_nutrition.pdf)
6. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3148629/>

## COURSE OUTCOME

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Define and summarize the nutritional problems facing the country.	K1, K2
CO 2	Classify the causes of malnutrition in India and demonstrate knowledge of various nutrition intervention schemes and assessment techniques for the community.	K2
CO 3	Justify the role of nutrition in national development through various key health indicators and government policies	K5
CO 4	Explain breastfeeding policies of the country and to formulate low cost weaning foods using emerging trends and technologies.	K2, K6
CO 5	Plan nutrition health education programs for vulnerable sections of the community promoting sustainability, gender equity and safe health practices.	K3, K6

## MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
AVERAGE	3	3	3	3	3	3

Key: Strongly Corelated-3 Moderately Corelated-2 Weakly Corelated-1 No Corelation-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. Peer Learning
6. Field Visits
7. Self-Study Papers

## QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
<b>K 1</b>	A-10X2 marks	50	20	<b>100</b>
<b>K1.K2</b>	B-5/8x8 marks	Not exceeding 300	40	
<b>K2,K3</b>	C-2/3x20 marks	Not exceeding 1500	40	

## SEMESTER VI

### FOOD PRESERVATION

**TOTAL HOURS: 75 Hours**  
**CREDITS: 5**

**COURSE CODE: ND18/6E/FPR // CN18/6E/FPR**  
**L-T-P: 4-1-0**

#### COURSE OBJECTIVES

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

#### 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 & 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

### REFERENCES

1. Manay SN, Swamy MS, *Food Facts and Principles*, 3<sup>rd</sup> 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 Distributors 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

### WEBSITES AND 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=uNKq9iIH_oE)  
<https://www.youtube.com/watch?v=ub-XdapCo18>



## COURSE OUTCOMES

CO No.	CO Statement	Knowledge Level
CO 1	Identify the spoilage in fresh and processed foods and describe the physical, chemical and biological quality loss in food.	K1,K2
CO 2	Describe the methods implemented to preserve foods with desirable properties balancing social and cultural norms.	K2
CO 3	Classify and explain food additives, food adulterants and current trends in food standards related to food safety practices.	K3
CO 4	Distinguish various convenience foods processing and preservation techniques; applying emerging technologies maintaining sustainability and ecological balance.	K4
CO 5	Outline the various methods & materials in food packaging with emphasis on current technological advances.	K2

## MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	2	3
CO2	3	3	2	2	3	3
CO3	3	3	3	3	3	3
CO4	3	2	2	3	3	3
CO5	3	2	2	3	3	3
AVERAGE	3	2.6	2.2	2.2	2.8	3

Key: Strongly Corelated-3 Moderately Corelated-2 Weakly Corelated-1 No Corelation-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. Peer Learning
6. Field Visits
7. Self-Study Papers

## QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	100
K1.K2	B-5/8x8 marks	Not exceeding 300	40	
K2,K3	C-2/3x20 marks	Not exceeding 1500	40	

**SEMESTER V & VI**  
**FOOD SERVICE MANAGEMENT PRACTICAL**

**TOTAL HOURS: 45 Hours**  
**CREDITS: 3**

**COURSE CODE: ND18/6C/PR3// CN18/6C/PR3**  
**L-T-P: 0-0-3**

**COURSE OBJECTIVES:**

- To help the students to understand the various sectors of food service units.
- To understand the lay out, organisation structure and the effective functioning of food service industry.
- 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.

**REFERENCES**

1. Sethi M and Malhan S, Catering Management An Integrated Approach, 3<sup>rd</sup> edition, New age international publishers, New Delhi, 2015
2. Andrews S, *Food and Beverage Service*, 2<sup>nd</sup> edition, Tata McGraw hill publishing company limited, 2009
3. George B, *Food and Beverage Service*, 1<sup>st</sup> edition, JAICO Publishing House, 2005
4. Singaravelavan R, *Food and Beverage Service*, 1<sup>st</sup> edition, Oxford university press, 2011

## COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	Identify and classify various sectors of catering industry	K1&k2
CO2	Differentiate equipments, menu, styles of service, lay out, organisation structure and the food production cycle	K4
CO3	Build the skills of interpretation and report writing on industrial visits.	K3
CO4	Assess food handling and sanitary practices in the food service establishments.	K5
CO5	Formulate and Standardization of different cuisines	K6

## MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	2	2	3	3	3	3
CO4	3	2	3	3	3	3
CO5	3	2	3	3	3	3
AVERAGE	2.8	2.4	3	3	3	3

Key: Strongly Corelated-3 Moderately Corelated-2 Weakly Corelated-1 No Corelation-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. Peer Learning
6. Field Visits
7. Self-Study Papers

## SEMESTER V & VI

### MEDICAL NUTRITION THERAPY PRACTICAL

**TOTAL HOURS: 45 Hours**  
**CREDITS: 3**

**COURSE CODE: CN18/6C/PR4**  
**L-T-P: 0-0-3**

#### COURSE OBJECTIVES

- ✓ To assess the nutritional status and decide and choose the appropriate dietary modification
- ✓ To demonstrate their understanding of the facts and ideas in identifying the nutritional implications of various diseases .
- ✓ To apply their knowledge and identify the techniques of planning, preparation and execution of therapeutic diets
- To formulate and administer appropriate dietary modifications and counseling for the patients.

#### MEDICAL NUTRITION THERAPY I

##### Menu planning using ICMR food composition tables and/or ICMR food exchange lists

1. Planning and preparing clear fluid full fluid and soft diet.
2. Planning and preparing diet for fever patient- typhoid and tuberculosis.
3. Planning and preparing diet for obesity and underweight.
4. Planning and preparing diet for diarrhea, constipation and ulcer
5. Planning and preparing diet for hepatitis and cirrhosis of liver.
6. Report on the visit to the dietary department of hospital.

#### MEDICAL NUTRITION THERAPY II

##### Menu planning using ICMR food composition tables and/or ICMR food exchange lists

1. Planning and preparing diet for Hypertension and Atherosclerosis.
2. Planning and preparing diet for Diabetes mellitus with insulin and without insulin
3. Planning and preparing diet for Gout
4. Planning and preparing diet for Nephritis, Nephrosis and ESRD with dialysis
5. Planning and preparing diet for Cancer
6. Planning and preparing diet in Burns
7. Presentation of two case study done in hospital internship (15 days Internship to be done before the completion of II year in a teaching hospital)

#### REFERENCES

1. Stump SE, *Nutrition And Diagnosis Related Care*, 7<sup>th</sup> edition, Lippincott Williams and Wilkins, Canada, 2012

2. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2010
3. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011.
4. Marian M et al., *Clinical Nutrition for surgical patients*, Jones and Bartlett Publishers, Canada, 2008
5. Joshi Y.K, *Basics of Clinical Nutrition*, 2<sup>nd</sup> edition, JP Medical Publishers Pvt Ltd, New Delhi, 2008

## COURSE OUTCOME

CO.NO	CO Statement	Knowledge
CO1	Understand the nutritional implications of the diseases	K1 &K2
CO2	Determine the dietary intervention to be employed	K2
CO3	Apply the knowledge base and professionally demonstrate the skill to evaluate the extent of deficiencies.	K3
C O4	Analyze the symptoms and biochemical parameters for effective administration of diet therapy	K4 &K5
CO5	Decision to execute appropriate dietary modification	K5

## MAPPING COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOMES

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	3	2
CO2	3	3	3	2	3
CO3	2	2	3	3	2
CO4	2	2	3	2	3
CO5	2	3	3	2	3
<b>AVERAGE</b>	2.4	2.6	2.8	2.4	2.6

Key: Strongly Corelated-3 Moderately Corelated-2 Weakly Corelated-1 No Corelation-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. Peer Learning
6. Field Visits
7. Self-Study Papers

**COURSE PROFILE (2019-2020 MSC FOOD AND NUTRITION)**

**SEMESTER I**

<b>COURSE CODE</b>	<b>Title of the paper</b>	<b>Credits</b>	<b>Hours / Week</b>	<b>Total hours</b>	<b>L-T-P</b>	<b>CA</b>	<b>SA</b>	<b>Total</b>
13SP18/1C/NUB	<b>Paper 1-</b> (Core 1) Nutritional Biochemistry	4	6	90	4-2-0	40	60	100
13SP18/1C/MT1	<b>Paper 2-</b> (Core 2) Medical Nutrition Therapy I	4	6	90	4-2-0	40	60	100
13SP18/1E/NTC	<b>Paper 3-</b> (Elective1) Nutraceuticals	3	5	75	3-2-0	40	60	100
13SP18/1E/PHY	<b>Paper 4-</b> (Elective2) Applied Physiology	3	5	75	3-2-0	40	60	100
13SP18/1C/PR1 *	<b>Practical 1-</b> (Core 3) Analytical Techniques in Nutrition	-	6	90	0-0-6	-	-	-
	<b>Soft Skill 1</b> Personality Enrichment for Women	2	2	30		-	50	50
<b>TOTAL</b>		<b>C+E+S</b> <b>8+6+2</b>	<b>28+2</b>					
<p><b>*Practical examination (13SP18/1C/PR1) - Practical will be conducted in the second semester.</b></p>								

**SEMESTER II**

<b>COURSE CODE</b>	<b>Title of the paper</b>	<b>Credits</b>	<b>Hours/Week</b>	<b>Total hours</b>	<b>L-T-P</b>	<b>CA</b>	<b>SA</b>	<b>Total</b>
13SP18/2C/AFS	<b>Paper 1-</b> (Core 4 ) Advanced Food Science	4	5	75	3-2-0	40	60	100
13SP18/2C/SRM	<b>Paper 2-</b> (Core 5) Applied Statistics and Research Methodology	4	5	75	3-2-0	40	60	100
13SP18/2C/MT2	<b>Paper 3-</b> (Core 6) Medical Nutrition Therapy II	4	4	60	3-1-0	40	60	100
13SP18/2E/NSN	<b>Paper 4-</b> (Elective3) Nutrition in Special Needs	3	4	60	3-1-0	40	60	100
13SP18/2E/FPN	<b>Paper 5-</b> (Elective4) (Interdisciplinary) Food Preservation	3	4	60	4-0-0	40	60	100
13SP18/1C/PR1*	<b>Practical 1-</b> (Core 3) Analytical Techniques in Nutrition	4	-			40	60	100
13SP18/2C/PR2	<b>Practical 2-</b> (Core 7) Advanced Food Science Practical	4	6	90	0-0-6	40	60	100
	<b>Soft Skill 2</b> The Communication skills in English/ French for Beginners/ German for Beginners	2	2	30		-	50	50
		<b>C+E+S</b> <b>20+6+2</b>	<b>28+2</b>					

**\*Practical examination (13SP18/1C/PR1) - Practical will be conducted in the second semester.**

### SEMESTER III

<b>COURSE CODE</b>	<b>Title of the paper</b>	<b>Credits</b>	<b>Hours/Week</b>	<b>Total hours</b>	<b>L-T-P</b>	<b>CA</b>	<b>SA</b>	<b>Total</b>
13SP18/3C/CAL	<b>Paper 1-</b> (Core 8) Advanced Studies in Carbohydrates and Lipids	4	5	75	4-1-0	40	60	100
13SP18/3C/MIV	<b>Paper 2-</b> (Core 9) Advanced Studies in Minerals and Vitamins	4	5	75	4-1-0	40	60	100
13SP18/3C/CLB	<b>Paper 3-</b> (Core 10) Clinical Biochemistry	4	4	60	3-1-0	40	60	100
13SP18/3E/FDI	<b>Paper 4-</b> (Elective 5) Food and Drug Interaction	3	4	60	3-1-0	40	60	100
13SP18/3E/NPF	<b>Paper 5-</b> (Elective 6) (Interdisciplinary) Nutrition and Physical Fitness	3	4	60	4-0-0	40	60	100
13SP18/3C/PR3*	<b>Practical 3-</b> (Core 11) Innovative Food Product Development	-	6	75	0-0-6	-	-	-
13SP18/3S/CSS	<b>Soft skill 3</b> Computing skills	2	2	30	2-0-0	-	50	50
		<b>C+E+S</b> <b>12+6+2</b>	<b>28+2</b>					
	<b>Self study-</b> Advanced paper for Registered Dietitian credential and competitive examinations	2	-	-	-	-	100	100
<b>*Practical examination (13SP18/3C/PR3) - Practical will be conducted in the fourth semester.</b>								



### SEMESTER IV

<b>COURSE CODE</b>	<b>Title of the paper</b>	<b>Credits</b>	<b>Hour s/ Week</b>	<b>Total hours</b>	<b>L-T- P</b>	<b>CA</b>	<b>SA</b>	<b>Total</b>
13SP18/4C/EPR	<b>Paper 1-</b> (Core 12) Advanced Studies in Energy and Protein	4	6	90	4-2-0	40	60	100
13SP18/4C/PHN	<b>Paper 2-</b> (Core 13) Public Health Nutrition	4	6	90	4-2-0	40	60	100
13SP18/4C/PRO	<b>Paper 3-</b> (Core 14) Project	4	6	90	0-6-0	40	60	100
13SP18/4E/ FMI	<b>Paper 4-</b> (Elective 7) Food Microbiology	3	4	60	3-1-0	40	60	100
13SP18/3C/PR3*	<b>Practical 3-</b> (Core 11) Innovative Food Product Development	4	-			40	60	100
13SP18/4C/PR4	<b>Practical 4-</b> (Core 15) Public Health Nutrition Practical	4	6	90	0-0-6	40	60	100
13SP18/4S/SWS	<b>Soft skill 4</b> Scientific Writing and Presentation Skills	2	2	30	2-0-0	-	50	50
	<b>Internship (1 month)</b>	2	-			50	-	50
<b>TOTAL</b>		<b>C+E+S +I 20+3+2 +2</b>	<b>28+2</b>					
<b>*Practical examination (13SP18/3C/PR3) - Practical will be conducted in the fourth semester.</b>								

**SEMESTER I**  
**MEDICAL NUTRITION THERAPY - I**

**TOTAL HOURS: 90 hours**

**COURSE CODE: 13SP18/1C/MT1**

**CREDITS: 4**

**L-T-P: 4-2-0**

**COURSE OBJECTIVES**



To impart knowledge on pathophysiology of diseases.



To introduce the current protocol and guidelines of nutrition care process



To study the various feeding methods for patients.



To enable them to learn the evidence based dietary and behavioral therapy for eating disorders, infections, gastrointestinal and liver disorders and pancreas and gall bladder diseases.

**COURSE OUTLINE**

- UNIT I:** Food service in hospitals: Layout and design of dietary kitchen and service. Centralized & decentralized service and Tray service  
Routine diets in hospitals  
Use of RDA and Guidelines for planning balanced diets  
Nutritional support for critically ill patients: Enteral and Parenteral feeds- types, indication and contraindications and calculation of requirements for different therapeutic conditions, Commercial and home formulas (15 HOURS)
- UNIT II:** Pediatric Nutrition- Assessment of infant development through anthropometry. Problems of infants-VLBW, LBW, SGA babies, premature babies, stunting, and wasting;  
Weaning, Commercial baby foods- Types and available infant formulas in market(Assignment)  
Nutrition in eating disorders – etiology, types, diagnostic criteria, nutritional assessment, psychological management, nutritional care and nutrition education (15 HOURS)
- UNIT III:** Nutrition and infection:  
Fever – Etiology, patho-physiology Classification, nutritional implication metabolism, dietary considerations in influenza, typhoid, tuberculosis, Malaria, Dengue, Leptospirosis and swine flu.  
Diet in HIV & AIDS – Etiology, classification, manifestation and stages of HIV infection, opportunistic infections, medical management, medical nutrition therapy, complications and nutritional implications  
Diet in Food intolerance and Allergy –definition, immunological aspects, classification, manifestation, common food allergies, diagnosis and dietetic treatment  
Diet in Respiratory diseases: Etiology, Patho-physiology, nutritional implication and dietary considerations in Pneumonia, COPD and Chronic Bronchitis. (25 HOURS)

**UNIT IV:** Nutrition in Gastro intestinal disorders

Diet in diseases of the esophagus, stomach and duodenum: Etiology, diagnostic tests, symptoms, clinical findings, treatment and dietary modification in esophagitis, GERD, hiatus hernia, gastritis and peptic ulcer.

Diet in diseases of the small intestine and colon: Etiology, types, symptoms, clinical findings, dietary considerations and nutritional consequences of drug therapy in adults and children in diarrhea, constipation, Crohn's disease, diverticulosis, ulcerative colitis and malabsorption syndrome-lactose intolerance, gluten enteropathy, tropical sprue.

Diet in diseases of the Liver, Gall Bladder and Pancreas: Etiology, pathophysiology, types, symptoms, clinical findings, nutritional implications and dietary considerations in Hepatitis, Alcoholic liver disease, Cirrhosis, Hepatic encephalopathy, Cholecystitis – acute and chronic, Cholelithiasis and Pancreatitis- acute and chronic. (25 HOURS)

**UNIT V** Nutrition Care Process (NCP):

NCP: Assessment, Planning, intervention and evaluation; Role of dietitian in health care; Diet Counseling- Importance and steps in diet counseling; Need for Nutrition Education. (10 HOURS)

**RECOMMENDED TEXTBOOKS**

3. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13<sup>th</sup> Edition, Elsevier Saunders, Missouri, 2012
4. Kane K and Prelack K, *Advanced Medical Nutrition Therapy*, First Edition, Jones and Barlett learning, Burlington, 2019

**REFERENCE BOOKS**

3. Verma P, *Food, Nutrition & Dietetics*, 1<sup>st</sup> edition, CBS publishers & distributors PVT Ltd, New Delhi, 2015
4. Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2<sup>nd</sup> edition, Jones & Bartlett learning publications, 2015,
5. Elia M, Ljungqvist O, Stratton RJ, Lanham SA, *Clinical Nutrition (The Nutrition Society Textbook)*, 2<sup>nd</sup> edition, Wiley Blackwell Publishers, 2013
6. Stump SE, *Nutrition and diagnosis related care*, 7<sup>th</sup> edition, Lippincott Williams and Wilkins, Canada, 2012
7. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011.
8. **Skipper A, *Advanced Medical Nutrition Therapy Practice***, Jones and Barlett Learning, MA, 2008
9. Marian M et al., *Clinical Nutrition for surgical patients*, Jones and Bartlett Publishers, Canada, 2008
10. Joshi Y.K, *Basics of Clinical Nutrition*, 2<sup>nd</sup> edition, JP Medical Publishers Pvt Ltd, New Delhi, 2008
11. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12<sup>th</sup> edition, Elsevier publications, UK, 2005

3. Gibney MJ, Elia M, Ljungqvist O, *Clinical Nutrition (The Nutrition Society Textbook)* Wiley Blackwell Publishers, 2005
4. Whitney EN and Rolfes SR, *Understanding Nutrition*, 9<sup>th</sup> edition, West/Wordsworth, 2002
5. Williams SR, *Nutrition & Diet Therapy*, CV. Mosby St. Louis, 2001
6. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10<sup>th</sup> edition, Churchill Livingstone, NY, 2000
7. Shils ME, Olson JA, Shike M, *Modern Nutrition in Health and Disease*, Eighth edition, Volume I and II, Lea and Febiger Philadelphia, A Waverly Company, 2000
8. Cataldo, DeBruyne and Whitney, *Nutrition and Diet therapy– Principles and Practice* 5<sup>th</sup> edition, West/ Wadsworth, London. 1999
9. Antia, F.P. and Abraham P, *Clinical Dietetics and Nutrition*, 4<sup>th</sup> edition, Oxford University Press, Delhi,
10. Carroll AL & Rutherford K, *Nutrition and Diet Therapy* 2<sup>nd</sup> edition, F.A. Davis Company, Philadelphia
11. Ruth A., Townsend CE, *Nutrition and Diet Therapy* 8<sup>th</sup> edition, Thomson Delmar Learning

## **JOURNALS**

8. International journal of Clinical Nutrition and Dietetics
9. International journal of Food, Nutrition and Dietetics
10. Food and nutrition bulletin

## **E- LEARNING RESOURCES:**

5. <https://www.youtube.com/watch?v=8vC7Jro4HRQ>
6. <https://www.youtube.com/watch?v=IxfNM6v3Ef4>
7. [https://www.youtube.com/watch?v=yD6UF3ogn\\_U](https://www.youtube.com/watch?v=yD6UF3ogn_U)
8. <https://www.youtube.com/watch?v=jmF12JYPgoQ>
9. <https://www.youtube.com/watch?v=Haz8k8Rh6UQ>
10. <https://www.youtube.com/watch?v=Rcb6I7gsl-Y>
11. <https://www.youtube.com/watch?v=P9hBjrjMcSw>
12. <https://www.youtube.com/watch?v=y-shOXdsJeA>
13. <https://www.youtube.com/watch?v=iefghc2g91M>
14. <https://www.youtube.com/watch?v=chSyQPKsNk4>
15. <https://www.youtube.com/watch?v=Ueqs7pl5OAY>
16. <https://www.youtube.com/watch?v=XJQn8MXnTWg>
17. <https://www.youtube.com/watch?v=f-Fxlsb2dtQ&t=169s>
18. <https://www.youtube.com/watch?v=Hwi9dsFBuhg>
19. <https://www.youtube.com/watch?v=PGB6dN1KlwQ>
20. <https://www.youtube.com/watch?v=bFdTgty0T0I>
21. <https://www.youtube.com/watch?v=LcNQdo15IF8>
22. <https://www.youtube.com/watch?v=st7G2vyLSiY>
23. [https://www.youtube.com/watch?v=gE5gSU\\_8oHs](https://www.youtube.com/watch?v=gE5gSU_8oHs)

## COURSE OUTCOMES

CO No.	CO Statement	Knowledge Level
CO 1	Identify the role of dietitian and describe the processes involved in delivering quality food and nutrition services for clinical conditions.	K1&K2
CO 2	Demonstrate understanding of physiology, biochemistry, nutrient metabolism, nutrient – nutrient interaction and drug therapy.	K2
CO 3	Interpret, evaluate and use of current protocols and guidelines to make practical decisions in the treatment of critically ill patients.	K2&K5
CO 4	Apply the knowledge of nutrition assessment and evidence-based nutrition intervention for diseases and conditions.	K3
CO 5	Analyze the pathophysiology of nutrition-related clinical conditions and evaluate the role of diet therapy	K4&K5
CO6	Discuss and develop disease specific prevention and treatment strategies of various communicable diseases, gastrointestinal, liver, pancreas and gallbladder diseases based on the current nutrition research.	K6

### Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	1	3	2
CO2	3	3	2	2	3	2
CO3	3	3	3	3	3	3
CO4	3	3	2	3	3	3
CO5	3	3	2	2	3	2
CO6	3	3	3	3	3	3
AVERAGE	2.83	3.00	2.33	2.33	3.00	2.50

### TEACHING METHODOLOGY

3. Lecture (Chalk and Talk-OHP-LCD)
4. Flipped Learning/Blended Classroom-E Content, Videos
5. Problem Solving-Group Discussion-Role Modeling
6. Quiz-Seminar
7. Peer Learning

## SEMESTER I

### NUTRACEUTICALS

**TOTAL HOURS: 75 hours**

**COURSE CODE: 13SP18/1E/NTC**

**CREDITS: 3**

**L-T-P: 3-2-0**

#### COURSE OBJECTIVES

15. Understand the history, concepts of nutraceuticals.
16. Classify the nutraceuticals based on origin, chemical composition and mechanism of action.
3. Learn the health benefits of nutraceuticals from various sources.
4. Learn the various aspects of food as preventive drug or supplement.
5. Discuss the concepts of technologies in functional food industry.

#### COURSE OUTLINE

- UNIT I:** Nutraceuticals - History, Evolution, and Definition, Concept, Classification and General Mechanism of Action. (15 HOURS)
- UNIT II:** Functional foods – Definition, Development of functional foods, bioactive compounds as biomarkers to indicate efficacy of functional ingredients (15 HOURS)
- UNIT III:** Nutraceuticals with potential health benefits from plant phytochemicals, animal products, Novel sources & dietary fiber. Role of Prebiotics & Probiotics as Nutraceuticals and commercial availability (15 HOURS)
- UNIT IV:** Significance of Nutraceuticals and Functional foods in diseases- anticancer agent, anti-inflammatory, antioxidant, anti-diabetic, hypocholesterolemic, and osteogenetic (15 HOURS)
- UNIT V:** Nutrigenomics – Relationship between Nutritional supplementation, gene expression and disease prevention. Application of technologies in Functional food Industry. (15 HOURS)

#### RECOMMENDED TEXTBOOKS

- Wildman, R.E.C, *Handbook of Nutraceuticals and Functional Foods*, Second Edition, CRC Press.
- Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13<sup>th</sup> Edition, Elsevier Saunders, Missouri, 2012

## REFERENCE BOOKS

- 1.Kramer K, Hoppe PP, Packer L, *Nutraceuticals in Health and Disease Prevention*, 1<sup>st</sup> edition, CRC Press, 2001
- 2.Groff JL, Gropper SS, *Advanced Nutrition and Human Metabolism* 3<sup>rd</sup> edition, West Wadsworth, UK. 2000
- 3.Gibson GR & William CM, *Functional foods : Designer Foods*, Pharma Foods, 2004
- 4.Flohe, J & Joost HG, *Nutritional Genomics : Impact on Health and Disease*, Wiley VCH
- 5.Cupp & Tracy TS, *Dietary Supplements: Toxicology and Clinical Pharmacology*, Humana Press

## JOURNALS

8. Journal of nutraceuticals and food science
9. Annual review of Nutrition

## E-LEARNING RESOURCES

5. <https://www.nutraceuticalsworld.com>
6. <https://divisnutraceuticals.com>
7. <https://fssai.gov.in/cms/health-supplements.php>
8. <https://www.nutraceuticalseurope.com>
9. <http://www.chemistryindustry.biz/nutraceuticals.html>
10. <https://www.nutraingredients-asia.com>

## COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	Identify the history, concept of nutraceuticals	K1
CO2	Explain the classification, mechanism of action of nutraceuticals	K2
CO3	Classify the health benefits of nutraceuticals from various sources	K3
CO4	Determine the significance of nutraceuticals in various disease condition	K4
CO5	Assess the relationship between nutrient supplementation, gene expression and disease prevention	K5
CO6	Compile the concepts of technologies in functional food industry	K6

### Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	2	2
CO2	3	3	2	2	2	2
CO3	3	3	2	2	3	2
CO4	3	3	3	2	3	2
CO5	3	3	3	2	2	2
CO6	3	2	2	3	2	3
<b>AVERAGE</b>	3	2.6	2.5	2.2	2.3	2.2

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-  
2WEAKLY CORELATED-1 NO CORELATION-0

### TEACHING METHODOLOGY

8. Lecture (Chalk and Talk-OHP-LCD)
9. Flipped Learning/Blended Classroom-E Content, Videos
10. Problem Solving-Group Discussion-Role Modelling
11. Quiz-Seminar
12. Peer Learning



## SEMESTER I

### ANALYTICAL TECHNIQUES IN NUTRITION

#### Practical – 1

#### CORE -3

**TOTAL HOURS: 90 hours**

**COURSE CODE: 13SP18/1C/PR1**

**CREDITS: 4**

**L-T-P: 0-0-6**

#### COURSE OBJECTIVES

To enable the students to

4. To learn skills in weighing and processing of samples
5. To learn skills in reagent preparation, technique and instrumentation
6. To analyse the nutritive value of food samples
7. To determine the biochemical parameters in blood/ serum & urine sample
8. Quantitative estimation by applying standardized procedures and systematic formula

#### COURSE OUTLINE

##### PRACTICAL:

1. Estimation of proteins using macrokjeldhal method (10 HOURS)
2. Estimation of fat content in egg yolk using soxhlet extraction method  
Estimation of saponification value,  
Estimation of Iodine value in oil/fat  
Estimation of Acid value in oil/fat (14 HOURS)
3. Mineral Estimation in foods:  
Estimation of calcium (titrimetric)  
Estimation of Iron (spectrophotometry)  
Estimation of Phosphorous (colorimetry) (10 HOURS)
4. Vitamin estimation in foods:  
Estimation of Vitamin C (dye method),  
Estimation of Beta carotene (Column Chromatography) (10 HOURS)
5. Estimation of urinary calcium,  
Estimation of urinary creatinine (12 HOURS)
6. Estimation of hemoglobin in blood,  
Estimation of blood glucose using colorimetry and glucometer (8 HOURS)
7. Estimation of protein in serum using Biuret reagent (10 HOURS)
8. Estimation of serum sodium ,  
Estimation of serum potassium (10 HOURS)
9. Demonstration on food analysis using HPLC (6 HOURS)

## RECOMMENDED TEXTBOOKS

4. Nielson S, *Food Analysis Laboratory Manual*, 3<sup>rd</sup> edition, Springer International Publishing, 2017
5. Cheung PCK and Mehta BM (Eds), *Handbook of Food chemistry*, 1<sup>st</sup> edition, Springer-Verlag Berlin Heidelberg, 2015
6. James CS, *Analytical chemistry of Foods*, 1<sup>st</sup> edition Springer US, 1995

## JOURNALS

3. Food analytical methods
4. Journal of food composition and analysis

## E-LEARNING RESOURCES:

7. [https://www.youtube.com/results?search\\_query=analytical+techniques+swayam](https://www.youtube.com/results?search_query=analytical+techniques+swayam)
8. <https://www.youtube.com/watch?v=-GR8Z3UerE0>
9. <https://www.youtube.com/watch?v=tXVDY1HvrVU>
10. <https://www.youtube.com/watch?v=FX-NiPVsYPM>

## COURSE OUTCOME

S.No.	CO Statement	Knowledge level
CO1	Repeat the experimentation for standardisation of procedures	K1
CO2	Estimate the nutritive value of food samples	K2
CO3	Apply standardised procedures and report the results in respective units	K3
CO4	Analyze and compare various biochemical parameters in blood, serum, urine and unknown sample with standard values	K4
CO5	Compare the nutrient composition food samples with Indian food composition table	K5
CO6	Compilation of experimentation with documentation of results	K6

### Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	2	2	2	2	2
CO3	2	2	2	2	2	2
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
CO6	3	2	2	1	1	1
AVERAGE	2.7	2.5	2.5	2.3	2.3	2.3

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY  
CORELATED-1 NO CORELATION-0

### TEACHING METHODOLOGY

Lecture (Chalk and Talk-OHP-LCD)

Flipped Learning/Blended Classroom-E Content, Videos

Problem Solving-Group Discussion-Role Modelling

Quiz-Seminar

Peer Learning

## SEMESTER II

### ADVANCED FOOD SCIENCE

#### CORE - 4

**TOTAL HOURS: 75 hours**

**COURSE CODE: 13SP18/2C/AFS**

**CREDITS: 4**

**L-T-P: 3-2-0**

#### COURSE OBJECTIVES

To enable students to

3. understand the composition, nutritive value and the effect of cooking on various food components
4. Gain knowledge on food labelling , food quality and standards
5. Develop skills on subjective and objective evaluation
6. Learn the emerging trends in food science.
7. Acquire knowledge on post harvest technology and food processing techniques

#### COURSE OUTLINE

##### UNIT I:Cereals and Pulses:

Cereals: Structure, composition and processing of rice, wheat, maize, sorghum and barley. Composition and nutritive value of Ragi, Bajra, foxtail millet and kodo millet; Cereal Cookery: Gelatinization, factors affecting gelatinization, gel formation, Retrogradation, Syneresis and Dextrinisation; Gluten formation. Cereal products: Products of rice, wheat, maize and other cereal products and baked products; Modified starch

Pulses:Composition, nutritive value, processing, toxic constituents, effect of cooking on pulses. (15 HOURS)

**UNIT II: Vegetables and Fruits:** Composition, nutritive value, effect of cooking on pigments and polyphenols and vegetables and fruit preserves.

##### **Fats and Sugars:**

Fat: Types, composition, processing and changes during cooking and storage; Rancidity of fats; Modified Fats; Functions of fats and oils in food, Emulsion – Types.

Sugar and Jaggery: Types, nutritive value, manufacture, sugar cookery- crystallization and stages.

Browning of foods: Enzymatic and Non-enzymatic browning of foods (15 HOURS)

##### UNIT III: Milk and Meat:

Milk: Composition, nutritive value, processing, physical and functional properties of milk. Milk Cookery, Milk products-types and processing. Egg: Structure, composition, nutritive value of egg; Egg quality; Egg Foams and Egg cookery.

Meat: Composition and nutritive value of meat, classes, cuts and grades of meat, post mortem changes in meat, tenderizing meat and meat cookery. Gelatin

Poultry: Classification, composition, nutritive value and processing

Fish: Classification, composition, nutritive value, selection, preservation and processing and fish cookery. (25 HOURS)

**UNIT IV: Food Quality and Food Labeling:**

Evaluation of Food Quality: Sensory evaluation and Objective evaluation

Adulteration- definition, types and methods of detection;

Food Labeling: Definition, requirements and use of food labeling.

Food standards – National and international standards – FSSAI, HACCP, ISO series (10 HOURS)

**UNIT V: Emerging trends in Food Science:**

Recent trends in post-harvest technology in foods- cereals, pulses, vegetables and fruits; Food Composition Databases, Organic foods, processed and convenience foods; GM foods; Food fortification and Food Enrichment;

Enzymes in food Industry: Classification, properties, Enzyme applications and new developments. (10 HOURS)

**RECOMMENDED TEXTBOOKS**

6. Manay S and Swamy S, *Food Facts and Principles*, New Age International (P) Ltd Publishers, New Delhi, 2001
7. Potter NM and Hotchkiss JH, *Food Science*, C.B.S. Publishers, New Delhi, 1995

**REFERENCE BOOKS**

8. Reddy SM, *Basic Food science and Technology*, New Age Publishers, New Delhi, 2015
9. Lowe B, *Experimental cookery from chemical and physical stand point*, Forgotten books, UK, 2015
10. Srilakshmi B, *Food Science*, Sixth Edition, New Age International Ltd Publishers, New Delhi, 2015
11. Roday S, *Food science and Nutrition*, Oxford university press, New Delhi, 2007
12. KhetarPaul N; Grewal, R and Jood, S, *Bakery Science and Cereal Technology*, Dia publishing house, Delhi. 2005
13. McCance and Widdowson, *Composition of food*, 6<sup>th</sup> Edition, Food Standards Agency, 2004
14. Swaminathan .N, *Food Science and Experimental Foods*, Ganesh Publications, Madras, 2004
15. Vaclavik, V, *Dimensions of Food*, 5<sup>th</sup> Edition CRC press USA, 2002
16. Aylward, F, *Food technology Processing and laboratory control*, Agrobios Publishing, Jodhpur, 2001
17. Subramani A, *Concise Food Science*, Soundarya Publications, 1998
18. Meyers, L.M., *Food Chemistry*; Van Nonstrand Reinhold Co., New York,

## JOURNALS

7. Journal of food science
8. Journal of food science and technology
9. Journal of nutrition and food science
10. International journal of food science and nutrition

## E-LEARNING RESOURCES

3. [https://en.wikipedia.org/wiki/Food\\_quality](https://en.wikipedia.org/wiki/Food_quality)
4. [https://www.science\\_direct.com](https://www.science_direct.com)
5. [https://www.eufic.org/food\\_production/processed-food](https://www.eufic.org/food_production/processed-food)

## COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	Outline and explain the structure, composition and the nutritive value of food groups	K1 &K2
CO2	Discuss the processing techniques and the effect of cooking on various food components	K2
CO3	Apply the principles of subjective and in objective methods and evaluate the quality of foods.	K3 &K5
CO4	Analyse the emerging trends in food science and gain detail insight on food quality and standards	K4&K1
CO5	Develop skills to undertake research in the field of food science and career in food industry	K6

## Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	3	1
CO2	3	3	3	1	3	3
CO3	3	3	3	3	3	3
CO4	3	3	2	3	3	3
CO5	3	3	3	3	3	3
AVERAGE	3.0	3.0	2.6	2.6	3	2.6

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY CORELATED-1 NO CORELATION-0

## TEACHING METHODOLOGY

Lecture method, Power point presentation, Over Head Projector, Group discussion, Assignment, Seminar, Survey, Quiz.

**SEMESTER II**  
**APPLIED STATISTICS AND RESEARCH METHODOLOGY**  
**CORE - 5**

**TOTAL HOURS: 75 hours**

**COURSE CODE: 13SP18/2C/SRM**

**CREDITS: 4**

**L-T-P: 3-2-0**

**COURSE OBJECTIVES**



To define the principles of research and recall the methodologies in conducting a research



To demonstrate their understanding of facts and principles to formulate research designs



To identify the basic theories and techniques of research methodology



To analyze and examine numerical data applying statistical procedures appropriate to the area of research



To evaluate and discuss the results obtained and draw inferences to provide solutions to problems related to the field of nutrition

- ✓ To compile the data and discover new facts and theories from the research undertaken

**COURSE OUTLINE**

**UNIT I:** Meaning of research, Purposes of research, Types of research; Selecting a research problem and preparing a research proposal-The academic research problem, using the library, sending related literature, Note taking; Preparation of a research proposal for getting funds for the research; Ethical Issues- Ethical importance of consent in research, Regulations and Guidelines for research on human subjects; Intellectual Property Rights Experimental and quasi experimental research- Principles of experimental research experimental and control groups, variables, controlling extraneous variables, experimental validity, experimental designs, pre, post, true and quasi experimental design, Factorial design, Theory and hypothesis, experimental control (10 HOURS)

**UNIT II:** Sampling and Sample Designs-Census and sample methods-Theoretical basis of sampling, law of statistical regularity, law of inertia of large numbers, essentials of sampling. Sampling from infinite population-concept of sampling distribution and standard error, relationship between sample size and standard error; Standard errors of sample mean. Sample variance, sample standard deviation and sample mean, sample standard deviation and sample proportion and the differences in these values Methods of sampling Non-probability sampling methods, advantages, Limitation of probability sampling; Probability sampling methods –Types, Selection of appropriate method of sampling, size of sample, merits and limitations of sampling, sampling and non-sampling errors. (10 HOURS)

**UNIT III:** Collection of Data-Primary and secondary data, sources, published and unpublished sources, Editing primary and secondary data, and precautions in the use of secondary data.  
Organization of data collection –Limitations and sources of error, Tools of research- Quantitative and Qualitative studies.Observation, Questionnaire, Opinionnaire- various methods and techniques; Reliability and validity of research tools  
Classification and tabulation of Data-Meaning and objectives of classification, objects of classification, Types of classification, formation of frequency distribution, typesymmetric and asymmetric distribution considerations in the construction of frequency distribution  
Tabulation of data-Difference between classification and tabulation of data, Role of tabulation Parts of the table, general rules of tabulation Review of a table types of tables, machine tabulation. Editing and coding of data records. Diagrammatic and graphicalrepresentation Significance of diagrams and graphs, comparison of tabular and diagrammatic presentation types of diagrams. Graphs-Techniques of constructing graphs, graphs of time series or line graphs Rules for constructing the line graph or natural scale, types of graphs, graphs of frequency distribution-Histogram, frequency polygon, smoothed frequency curve, cumulative frequency curves or gives, limitations of diagrams and graphs. (10 HOURS)

**UNIT IV:** Meaning of statistics, scope and limitations of statistic as a tool for decision making under uncertainty  
Measures of central tendency –mean, median, mode and their relative merits finding combined mean, weighted mean, finding median and mode graphically.  
Measures of variation-absolute and relative measures-range standard deviation of mean, combined standard deviation given the SD's of two distribution, coefficient of variation, percentiles and their applications  
Correlationmethods-meaning, product moment, coefficient of correlation, rank correlation, scatter diagram and regression lines and their uses. Concepts of partial and multiple correlations  
Test of significance-hypothesis testing, tests involving normal distribution, tests for large and small samplest tests-A tests to compare means of population and sample means of two independent samples c means of two dependent samples ,F tests-comparison of SD's of two samples ,analysis of variance , non-parametric tests-chi square test. (35 HOURS)

**UNIT V:** Report Writing -style manual, format of the research report ,The thesis or dissertation- style of writing, typing a report, reference form (Bibliography)- Pagination, tables, figures-Evaluating a research report-Foot notes plagiarism, Technical and popular reports (10 HOURS)



### RECOMMENDED TEXTBOOKS

3. Gupta. S.P, *Statistical Methods*, S Chand & Sons,, New Delhi, 2008
4. Kothari, C. and Garg, G, *Research methodology Methods and Techniques* 3<sup>rd</sup> edition, New Delhi: New Age International (P) Ltd, 2014

### REFERENCE BOOKS

5. Singh, Y.K, *Fundamental of Research Methodology and Statistic*. New Age International (P) Ltd., Publishers. New Delhi, 2015
6. Saravanavel, P, *Research Methodology*, KitabMahal Agencies, New Delhi, 2005
7. Elhance .D.N, Veenaand and Agarwal .B.M, *Fundamental of statistics*,48<sup>th</sup>Edition, KitabMahal, Allahabad, 2005
8. Best JW and Kahn JV, *Research in Education*, Prentice Hall of India Pvt. Ltd., New Delhi, 1996
9. Koul L, *Methodology of Educational Research*,3<sup>rd</sup> edition Vikas publishing House Pvt.Ltd,New Delhi
10. William Giles Campbell, *Form and style in Thesis writing*, Houghton Mifflin Company, Boston.
11. Sadhu A.N andSingh A,*Research Methodology in Social Sciences*, Himalaya Publishing House, Mumbai,

### JOURNALS

8. International journal of social research methodology
9. Journal of research practice

### COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	To recall the definitions , theories and statistical procedures and gain critical thinking skills to effectively undertake research	K1& k2
CO2	To demonstrate understanding of the concept of research and acquire the necessary skills to formulate research outline.	K2&K1
CO3	To implement the skills in employing appropriate tools and techniques in structuring the research designs and solving the research problem.	K3 &K2
CO4	To analyze and classify the data collected using the principles of research methodology and draw conclusions by subjecting it to various statistical treatments	K4
CO5	To interpret and make valid judgements determining the statistical significance obtained	K5
CO6	To compile the information, develop new theories and propose alternative solutions based on the outcomes of the research.	K6

### Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	2
CO2	3	3	2	3	3	3
CO3	3	3	3	2	2	2
CO4	2	3	3	2	2	3
CO5	2	2	3	3	2	3
CO6	2	2	3	3	3	3
AVERAGE	<b>2.5</b>	<b>2.6</b>	<b>2.8</b>	<b>2.5</b>	<b>2.5</b>	<b>2.5</b>

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY  
CORELATED-1 NO CORELATION-0

### TEACHING METHODOLOGY

Lecture (Chalk and Talk-OHP-LCD)

Flipped Learning/Blended Classroom-E Content, Videos

Problem Solving-Group Discussion-Role Modelling

Quiz-Seminar

Peer Learning

## SEMESTER II

### MEDICAL NUTRITION THERAPY – II CORE - 6

**TOTAL HOURS: 60 hours**

**COURSE CODE: 13SP18/2C/MT2**

**CREDITS: 3**

**L-T-P: 3-1-0**

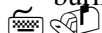
#### COURSE OBJECTIVES



To impart knowledge on weight management.



To introduce the current protocol for nutrition care process in renal diseases, trauma, burns and surgery



To enable the students to learn the evidence-based diet therapy and lifestyle modification for non-communicable diseases like obesity, diabetes mellitus, cardiovascular disorders and cancer

#### COURSE OUTLINE

##### UNIT I:

Nutrition for weight management:

Etiology, Regulation of body weight, factors regulating energy intake and body weight, assessment, and health risks, management of obesity in adults and children- lifestyle modification, dietary modification, pharmaceutical management, Role of Leptin, Ghrelin and Glycemic load, surgical procedures.

Nutrition for Leanness:

Etiology, assessment, management, high energy diets for weight gain (10HOURS)

##### UNIT II:

Diet in Cardiovascular diseases:

Etiology, symptoms, role of specific nutrients in cardiac efficiency, clinical findings related to nutritional care and medical nutrition therapy of Atherosclerosis, Hyperlipidemia, hypertension, myocardial infarction and congestive heart failure. (10 HOURS)

##### UNIT III:

Diet in Diabetes Mellitus:

Incidence and predisposing factors, types, symptoms and tests for detection, metabolism and treatment – oral hypoglycemic drugs, insulin, & exercise, dietary guidelines and rationale for dietary modifications. Acute and chronic complications, age related issues – children and adolescents, pregnancy.

Hypoglycemia: types, diagnostic criteria and management.

Diet in Cancer: Etiology, types, metabolic effects, nutritional implications in different types of cancers and alternative nutritional therapies. (15 HOURS)

**UNIT IV:** Diet in Renal disorders:  
Basic renal function, Etiology, symptoms, metabolic and nutritional implications and dietary treatment of Acute and chronic glomerulonephritis, Nephrotic syndrome, Acute kidney disease and End stage renal disease in adults and children.  
Nephrolithiasis: Risk factors, composition of renal stones, diagnosis, medical nutrition therapy. (10 HOURS)

**UNIT V:** Diet in Burns: Types, Metabolic alterations, Rule of nine and Medical nutritional therapy.  
Diet in Surgery: Pre-operative nutritional assessment.  
Pre and post nutritional care in gastro intestinal surgery and Bariatric Surgery  
Pre and post nutritional care in Liver transplantation, Cardiac transplantation and Kidney transplantation (15 HOURS)

#### RECOMMENDED TEXTBOOKS

- c) Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13<sup>th</sup> Edition, Elsevier Saunders, Missouri, 2012
- d) Kane K and Prelack K, *Advanced Medical Nutrition Therapy*, First Edition, Jones and Barlett learning, Burlington, 2019.

#### REFERENCES

3. Verma P, *Food, Nutrition & Dietetics*, 1<sup>st</sup> edition, CBS publishers & distributors PVT Ltd, New Delhi, 2015
4. Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2<sup>nd</sup> edition, Jones & Bartlett learning publications, 2015,
5. Elia M, Ljungqvist O, Stratton RJ, Lanham SA, *Clinical Nutrition (The Nutrition Society Textbook)*, 2<sup>nd</sup> edition, Wiley Blackwell Publishers, 2013
6. Stump SE, *Nutrition and diagnosis related care*, 7<sup>th</sup> edition, Lippincott Williams and Wilkins, Canada, 2012
7. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011.
8. **Skipper A, *Advanced Medical Nutrition Therapy Practice***, Jones and Barlett Learning, MA, 2008
9. Marian M et al., *Clinical Nutrition for surgical patients*, Jones and Bartlett Publishers, Canada, 2008
10. Joshi Y.K, *Basics of Clinical Nutrition*, 2<sup>nd</sup> edition, JP Medical Publishers Pvt Ltd, New Delhi, 2008
11. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12<sup>th</sup> edition, Elsevier publications, UK, 2005
12. Gibney MJ, Elia M, Ljungqvist O, *Clinical Nutrition (The Nutrition Society Textbook)* Wiley Blackwell Publishers, 2005
13. Whitney EN and Rolfes SR, *Understanding Nutrition*, 9<sup>th</sup> edition, West/Wordsworth, 2002

5. Williams SR, *Nutrition & Diet Therapy*, CV. Mosby St. Louis, 2001
6. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10<sup>th</sup> edition, Churchill Livingstone, NY, 2000
7. Shils ME, Olson JA, Shike M, *Modern Nutrition in Health and Disease*, Eighth edition, Volume I and II, Lea and Febiger Philadelphia, A Waverly Company, 2000
8. Cataldo, DeBruyne and Whitney, *Nutrition and Diet therapy– Principles and Practice* 5<sup>th</sup> edition, West/ Wadsworth, London. 1999
9. Antia, F.P. and Abraham P, *Clinical Dietetics and Nutrition*, 4<sup>th</sup> edition, Oxford University Press, Delhi,
10. Carroll AL & Rutherford K, *Nutrition and Diet Therapy* 2<sup>nd</sup> edition, F.A. Davis Company, Philadelphia
11. Ruth A., Townsend CE, *Nutrition and Diet Therapy* 8<sup>th</sup> edition, Thomson Delmar Learning

## JOURNALS

3. International journal of Clinical Nutrition
4. International journal of Food and Nutrition

## E-LEARNING RESOURCES

8. <https://www.youtube.com/watch?v=2dbCmdCccGk>
9. <https://www.youtube.com/watch?v=1nuSSsAnRVM>
10. [https://www.youtube.com/watch?v=ZGPa\\_4FN9M4](https://www.youtube.com/watch?v=ZGPa_4FN9M4)
11. <https://www.youtube.com/watch?v=Lf5R9yqpun8>
12. <https://www.youtube.com/watch?v=MOe1Svj3Tg8>
13. <https://www.youtube.com/watch?v=v67BwDQcFOM>
14. [https://www.youtube.com/watch?v=fQwar\\_-QdiQ](https://www.youtube.com/watch?v=fQwar_-QdiQ)
15. <https://www.youtube.com/watch?v=vKIRWY-LMYc>
16. <https://www.youtube.com/watch?v=7m2WG91HZy8>
17. <https://www.youtube.com/watch?v=1mo80kTZgW4>

## COURSE OUTCOME:

CO No.	CO Statement	Knowledge Level
CO 1	Recall and describe the work of dietary department with whom the dietitian collaborates in the delivery of food and nutrition services.	K1, K2
CO 2	Demonstrate the Nutrition Care Process in complex clinical conditions like trauma, renal disorders, diabetes mellitus and cancer	K2
CO 3	Explain the mechanisms by which different foods, food constituents and unhealthy life style progresses the risk of Non-Communicable diseases.	K5
CO 4	Evaluate and apply scientific knowledge into clinical practice.	K3, K4
CO 5	Plan, analyze, assess and develop disease specific dietary modification for the patient.	K3, K4, K5, K6

### Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	2	2	2
CO2	3	3	3	3	2	3
CO3	3	3	3	2	3	2
CO4	3	3	3	3	3	2
CO5	2	2	2	3	3	2
AVERAGE	2.6	2.6	2.6	2.6	2.6	2.2

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY  
CORELATED-1 NO CORELATION-0

### TEACHING METHODOLOGY

- b) Lecture (Chalk and Talk-OHP-LCD)
- c) Flipped Learning/Blended Classroom-E Content, Videos
- d) Problem Solving-Group Discussion-Role Modelling
- e) Quiz-Seminar
- f) Peer Learning

## SEMESTER II

### NUTRITION IN SPECIAL NEEDS

Elective - 3

TOTAL HOURS: 60 hours

COURSE CODE: 13SP18/2E/NSN

CREDITS: 3

L-T-P: 3-1-0

#### COURSE OBJECTIVES

To understand the importance of nutrients for special children, astronauts, soldiers, high altitude, arctic and Antarctic travelers and during disaster

- e) To learn the dietary modification for children with special conditions
- f) To study the nutritional requirements for age related problems

#### COURSE OUTLINE

- UNIT I:** Nutrition in children with feeding problems – cleft lip, cleft palate, Underweight, failure to thrive, overweight and swallowing problems  
Nutrition for Special children: ADHD, Autism, Cerebral Palsy, Epilepsy or Seizure Disorder, Muscular Dystrophy, Mental Retardation, Down Syndrome, PraderWilli (PW) Syndrome, Spina Bifida, Cystic Fibrosis, Rett Syndrome (15 HOURS)
- UNIT II:** Space nutrition – Classification, Types of foods, selection of food, microgravity, planning, food preparation and serving (10 HOURS)
- UNIT III:** Nutrition during emergency situations like Tsunami, earthquake, draught, famine and cyclone. Role of National and international agencies in emergency feeding (10 HOURS)
- UNIT IV:** Nutrition in high Altitudes, Nutrition in Arctic and Antarctic regions & Military foods (10 HOURS)
- UNIT V:** Nutrition in Geriatrics:  
Nutritional requirements in age related problems- Alzheimer's disease, Parkinson's disease, changes in the gastrointestinal tract, age-related renal impairment, reduced immunity, weight loss, cognitive impairment and vascular risk factors and hospitalized elderly patient. (15 HOURS)

#### RECOMMENDED TEXTBOOKS

- b) Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13<sup>th</sup> Edition, Elsevier Saunders, Missouri, 2012.

4. Lane HW and Smith SM., 'Nutrition in Space", In: *Modern Nutrition in Health and Disease*, 9th edition, eds. Shils ME, Olson JA, Shike M, and A. C. Ross. Baltimore: Williams & Wilkins

## REFERENCE BOOKS

11. Abraham S, *Nutrition Through Lifecycle*, 1<sup>st</sup> edition, New age international publishers, New Delhi, 2016
12. Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2<sup>nd</sup> edition, Jones & Bartlett learning publications, 2015,
13. Stump SE, *Nutrition and diagnosis related care*, 7<sup>th</sup> edition, Lippincott, 2012
14. A Report on Toolkit for Addressing Nutrition in Emergency Situations, June 2008, [www.motherchild.org](http://www.motherchild.org)
15. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12<sup>th</sup> edition, Elsevier publications, UK, 2005
16. Whitney EN and Rolfes SR, *Understanding Nutrition*, 9<sup>th</sup> edition, West/Wordsworth, 2002
17. Wildman RE, *Handbook of Nutraceuticals and Functional foods*, Culinary and Hospitality industry publication services, 2001
18. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10<sup>th</sup> edition, Churchill Livingstone, NY, 2000
19. Cataldo, DeBruyne and Whitney, *Nutrition and Diet therapy– Principles and Practice* 5<sup>th</sup> edition, West/ Wadsworth, London, 1999
20. Swaminathan M, *Principles of Nutrition and Dietetics*, Bappeo, Bangalore, 1995
21. Space Food and Nutrition – An Educators guide with activities in Science and Mathematics, NASA, <http://spacelink.nasa.gov/products>
22. Public Health Guide for Emergencies, [www.jshsh.edu](http://www.jshsh.edu)

## JOURNALS

3. International journal of Clinical Nutrition and Dietetics
4. International journal of Food, Nutrition and Dietetics

## E-LEARNING RESOURCES:

### Course Outcome

CO No	CO statement	Knowledge level
CO1	Identify and define the children and elderly persons with special needs and emergency situations	K1
CO2	Infer the role of nutrition for special children, elderly people, astronauts, soldiers, high altitude, arctic and Antarctic travelers and during disaster	K2
CO3	Explain the importance of nutrition during special condition and emergency situations	K3
CO4	Plan, develop and prioritize the diet for children with special needs, geriatric conditions.	K4, K5, K6



### Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	1	2	2	2
CO2	3	3	3	2	2	1
CO3	3	3	3	3	2	1
CO4	3	3	3	3	3	3
AVERAGE	3	3	2.5	2.5	2.25	1.75

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY  
CORELATED-1 NO CORELATION-0

### TEACHING METHODOLOGY

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

## SEMESTER II

### FOOD PRESERVATION (INTERDISCIPLINARY) ELECTIVE -4

**TOTAL HOURS: 60 hours**

**COURSE CODE: 13SP18/2E/FPN**

**CREDITS: 3**

**L-T-P: 4-0-0**

#### **COURSE OBJECTIVES**

To enable students :

3. To understand the role of biological agents (microorganisms) in preservation of foods
4. To learn science behind the various preservation/ processing technologies.
5. To impart knowledge on the need, importance of food preservation.
6. To obtain knowledge on current trends in food packaging.
7. To familiarize with food safety management systems and food regulations.

#### **COURSE OUTLINE**

- UNIT I: Importance, Principles of preservation & Spoilage:**  
Importance and principles of preservation; Preservation of various foods cereals, pulses, fruits & vegetables, milk & milk products, flesh foods; Food spoilage – causes of spoilage, spoilage of various foods & food product (15 HOURS)
- UNIT II: Methods of food preservation:**  
Traditional methods of preservation; Preservation as sugar concentrates- Jams, Jelly, Marmalades and Preserves; Fruit Juice Beverages– Preparation and preservation; Chemical preservation - advantages and disadvantages (15 HOURS)
- UNIT III: Role of Temperature in Food Preservation:**  
Use of High temperatures – Drying, sterilizations, canning, pasteurization, Blanching, Irradiation  
Use of low temperatures – Refrigeration & freezing. (15 HOURS)
- UNIT IV: Packaging:**  
Functions of Packaging, packing materials and forms, special packaging– military & space foods, safety & package tests (15 HOURS)
- UNIT V: Food additives and food standards:**  
Food Additives and Food Standards (15 HOURS)

#### **RECOMMENDED TEXTBOOKS**

14. Khetarpaul N, *Food Processing & Preservation*, 2<sup>nd</sup> Edition, Daya Publishing House, 2012.
15. Jood S and Khetarpaul N, *Food Preservation*, Agro Tech Publishing Academy, Udaipur, 2002

## REFERENCE BOOKS

3. Sivasankar B, *Food Processing and Preservation*, Prentice Hall of India (P) Ltd, New Delhi, 2008
4. Manay SN, Swamy MS, *Food Facts and Principles*, 3<sup>rd</sup> edition, New Age International Ltd, New Delhi, 2008
5. Khetarpaul N, *Food Processing and Preservation*, Daya Publishing House, New Delhi, 2005
6. Hausner A, *Preserved Foods and Sweetmeats*, Biotech Books, New Delhi, 2005
7. Subbulakshmi G, Udipi SA, *Food Processing and Preservation*, New Age International Ltd, Publishers, New Delhi, 2001
8. NIIR BOARD, *Manual of Modern Technology on Food Preservation*, Asia Pacific Business Press Inc, New Delhi.
9. *Desroisier, Technology of Food Preservation, 1<sup>st</sup> Edition, CBS Publishers, 1998*

## JOURNALS

5. Food Science Research Journal
6. Current Research in Nutrition & Food Science Journal
7. Journal of Experimental food chemistry

## E-LEARNING RESOURCES

8. [www.nchfp.uga.edu](http://www.nchfp.uga.edu)
9. <https://preservingfoodathome.com>
10. <https://www.buecher.de>
11. <https://www.barnesandnoble.com>
12. <https://www.crcpress.com>

## COURSE OUTCOMES

CO Number	CO STATEMENT	Knowledge scale
CO 1	Explain the importance of microorganisms in food preservation	K5
CO 2	Identify the concept of different methods of food preservation	K4
CO 3	Elaborate on the principles of food preservation including high and low temperature	K6
CO 4	Develop knowledge on different types of food packaging materials, requirements of effective packaging	K3
CO 5	Interpret food safety management systems and food regulations	K5
CO6	Classify the various types of food additives	K4

### Mapping of CO with PSO

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
AVERAGE	3	3	3	3	3	3

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY  
CORELATED-1 NO CORELATION-0

### TEACHING METHODOLOGY

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

**SEMESTER II**  
**ADVANCED FOOD SCIENCE PRACTICAL**

**Practical -2**

**CORE – 7**

**TOTAL HOURS: 90 hours**  
**CREDITS: 4**

**COURSE CODE: 13SP18/2C/PR2**  
**L-T-P: 0-0-6**

**COURSE OBJECTIVES**

**To enable the students to**



Acquire in depth-knowledge of food science to analyse, discriminate and interpret the results



Evaluate the sensory and objective quality of food products



Assess the effect of cooking and processing on various food components



Estimate pectin strength ,smoking temperature and discuss the factors affecting foam formation and crystallization of sugar



Equip with skills of preparation of various recipes

**COURSE OUTLINE**

1. Evaluation of Food quality:  
Sensory methods: Threshold, Aroma recognition and difference tests.  
(5 HOURS)  
Objective Methods: Ink print, line spread, specific gravity, seed displacement and percent sag  
(5 HOURS)
2. Convenience & Traditional Foods and Fermented Foods: (20 HOURS)
3. Gelatin, Pectin and Browning: (15 HOURS)
  1. Factors affecting gelatin
  2. Testing pectin strength in fruit and vegetable extract
  3. Enzymatic Browning and its prevention in fruits and vegetables
  4. Vegetable and fruit preserve preparation – Jam , Jelly and Marmalade
  5. Marshmallows, Lemon chiffon pie, Coffee panacotte
4. Fats, Oils, Emulsions and Foams: (15 HOURS)
  - a) Determination of smoking temperature of fats and oils
  - b) Types of Emulsions: Permanent emulsions – preparation of mayonnaise using different variations; Temporary emulsions
  - c) Egg Foaming: Factors affecting foam formation.
5. Sugar cookery: (10 HOURS)
  - Crystallization of sugar
  - Factors affecting crystallization of sugar
  - Recipes
  1. Estimation of gluten content
  2. Recipes: Breads, Buns, Biscuits and Cakes

7. Adulteration: (10 HOURS)  
 a) Easy methods of detection of adulterants

**RECOMMENDED TEXTBOOKS**

4. Lowe B, *Experimental cookery from chemical and physical stand point*, Forgotten books, UK, 2015
5. Swaminathan .N, *Food Science and Experimental Foods*, Ganesh Publications, Madras, 2004

**REFERENCE BOOKS**

1. KhetarPaul N; Grewal, R and Jood, S, *Bakery Science and Cereal Technology*, Dia publishing house, Delhi. 2005
2. McCance and Widdowson, *Composition of food*, 6<sup>th</sup> Edition, Food Standards Agency, 2004

**JOURNALS**

4. Food Science Research Journal
5. Current Research in Nutrition & Food Science Journal
6. Journal of Experimental food chemistry
7. International journal of Food Science & Technology
8. International journal of Food Properties
9. International Journal of Agriculture & food Science technology
10. Journal Of Food Science & Technology
11. Asian Journal of dairy and Food research
12. Rice Research
13. Research & Review; Journal of Food Science & Technology
14. Journal of applied research in Food Science & Nutrition

**COURSE OUTCOME:**

CO No.	CO Statement	Knowledge Level
CO1	Apply the principles of subjective and objective methods for evaluating the quality of food products	K3&K5
CO2	Demonstrate the crystallisation of sugar and assess the factors affecting crystallisation and egg foam formation	K2 &K5
CO3	Acquire knowledge on enzymatic browning reactions and illustrate preventive methods	K2
CO4	Estimate pectin strength, gluten content, and determine the smoking temperature of fats and oils.	K4
CO5	Compare and differentiate traditional and convenience foods	K4
CO6	Apply the principles of food science ,develop skills and gain hands on practical experience on an individual basis that motivate them to undertake research in the field of food science and career in food industry	K6

### Mapping of CO with PSO

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	2	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
CO6	3	3	3	3	3	3
<b>AVE RAGE</b>	3	3	3	3	3	3

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY  
CORELATED-1 NO CORELATION-0

### TEACHING METHODOLOGY

11. Lecture (Chalk and Talk-OHP-LCD)
12. Flipped Learning/Blended Classroom-E Content, Videos
13. Problem Solving-Group Discussion-Role Modelling
14. Quiz-Seminar
15. Peer Learning

## SEMESTER III

### FOOD AND DRUG INTERACTION ELECTIVE - 5

**TOTAL HOURS: 60 hours**

**COURSE CODE: 13SP18/3E/FDI**

**CREDITS: 3**

**L-T-P: 3-1-0**

#### **COURSE OBJECTIVES**

- To enable students to gain an insight on basic concepts in pharmacology.
- Learn the mechanism of pharmacokinetics and pharmacodynamics.
- To help students understand the drug therapy.
- To assess the dietary modification during drug therapy for various disease condition
- To analyse the effect of drug on nutrient intake
- To assess the impact of food on drug absorption

#### **COURSE OUTLINE**

##### **UNIT I:**

General Pharmacology:

- a) Drug – Definition, Sources of drugs, Routes of drug administration- Enteral (Oral ingestion), Parenteral (Injections, Inhalation, Transdermal, Transmucosal) and special drug delivery system.
- b) Pharmacokinetics and drug dosage – Definition, drug passage through the biological membranes: Passive & Active transfer, Absorption of drug, Factors influencing absorption, Bioavailability, Distribution, Metabolism of drugs, Inhibition of drug metabolism and Excretion of drugs – routes of excretion.
- c) Drug Dosage: Definition of Minimum dose, Maximum dose, Toxic dose, Lethal dose, Fixed dose, individualizing dose and Loading dose  
(10 HOURS)

##### **UNIT II:**

Pharmacodynamics:

- a) Definition, Principles and mechanism of drug action (physical, chemical, through enzymes), stimulation and inhibition of drug action. Receptors- Definition and functions of receptors.
- b) Antagonism (physical, chemical, physiological and receptor mediated), Factors modifying drug action – body size, age, sex, route of administration, diet & environment, psychological factors, pathological state, genetic factors and dose (10 HOURS)

##### **UNIT III:**

Drug therapy & Dietary modifications

- a) Drugs acting on Gastro intestinal system: Drugs used in peptic ulcer, Drugs used for Constipation and Drugs used for the treatment of Diarrhea. Dietary modifications during ingestion of drugs



- b) Drugs in Renal diseases: Diuretics and Anti diuretics: Examples, adverse effects, Precautions taken by dietitian
- c) Cardiovascular drugs: Drugs used in Congestive cardiac failure, Angina pectoris, Myocardial infarction, Lipid lowering drugs, and hypertension. Dietary modifications during ingestion of drugs
- d) Coagulants & Anti-coagulants: definition, classification – Coumarin derivatives, warfarin and heparin, Dietary modifications during ingestion of drugs. (15 HOURS)

**UNIT IV:** Drug Therapy& Dietary modifications

- a) Hypoglycemic drugs: definition, classification – insulin, oral hypoglycemic drugs (Sulphonyl urea derivative and Biguanides), plant source, mechanism of action. Dietary modification during ingestion of drugs.
- b) Chemotherapy in Cancer: General principles in the treatment of cancer. Common adverse effects to anticancer drugs, Dietary modifications during ingestion of drugs
- c) Drugs in Asthma, Allergies and infections:Drugs used in bronchial asthma, NSAIDs- mechanism of action, adverse effects, Dietary modifications
- d) Drugs in Gout and Rheumatism: Anti gout drugs and Anti rheumatics, Dietary modifications.
- e) Drugs in Seizures, Mood disorders and Sleep disorders: definition of hypnotics, sedatives, Anticonvulsants, Antipsychotics, antianxiety drugs, antidepressants and tranquillizers. Dietary modifications. (15 HOURS)

**UNIT V:** Food and drug interactions:

- a) Effect of drugs on food and nutrition- nutrient absorption, nutrient metabolism, and nutrient excretion
- b) Effect of food on drug therapy- drug absorption, drug distribution, drug Metabolism, drug excretion.
- c) Modification of drug action
- d) Effects of drugs on nutritional status – alterations in oral taste and smell perceptions, gastro intestinal system, appetite, glucose levels, organ system toxicity. (10 HOURS)

**RECOMMENDED TEXTBOOKS**

1. Ashutoshkar, SC, Mehta, *Essentials of Pharmacology, 1<sup>st</sup> Edition, New Age International Publications, New Delhi, 2013*
2. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process, 13<sup>th</sup> Edition, Elsevier Saunders, Missouri, 2012*

**REFERENCE BOOKS**

1. Murugesh N, *A Concise Text Book of Pharmacology*, 6th publishers, edition, Sathya Madurai, 2011

2. Udaykumar P, *Pharmacology for Nurses*, 2nd edition reprint, Jaypee Brothers Medical Publishers, New Delhi, 2010

3. Raje VN, *Pharmacology and toxicology*, 1st New edition reprint, CBS publishers, Delhi, 2011.

4. Grover JK, Malik M, *Drug Interaction*, 1<sup>st</sup> Edition, Pee Pee Publication, 2005  
5. Katzung B, Masters S, Trevor A, *Basic and Clinical Pharmacology*, 13<sup>th</sup> edition, Mcgraw hill education, 2015

## JOURNALS

1. The Journal of Nutrition
2. British Journal of Nutrition
3. Advances in Nutrition
4. Nutrition Reviews
5. Journal of Human Nutrition & Dietetics

## E-LEARNING RESOURCES

- <http://evolve.elsevier.com>
- [www.foodmedinteractions.com](http://www.foodmedinteractions.com)
- [www.nih.gov/cc/patient\\_education](http://www.nih.gov/cc/patient_education)
- <https://www.fda.gov>
- <https://www.food.actapol.net>

## COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	List the sources of drugs, routes of drug administration	K1
CO2	Explain the drug pharmacokinetics and pharmacodynamics mechanism	K2
CO3	Classify the drug therapy for various diseases condition	K3
CO4	To determine the dietary modification during drug therapy	K4
CO5	Assess the effect of drug on nutrient intake	K5
CO6	To compile the impact of food on drug absorption	K6

### Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	2	2
CO2	3	3	2	3	2	2
CO3	3	3	3	2	2	2
CO4	2	3	2	3	2	3
CO5	2	3	3	3	2	2
CO6	3	3	2	3	2	2
AVERAGE	2.6	3	2.5	2.8	2	2.2

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY  
CORELATED-1 NO CORELATION-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. Peer Learning

**SEMESTER III**  
**NUTRITION AND PHYSICAL FITNESS**  
**(INTERDISCIPLINARY)**

**ELECTIVE – 6**

**TOTAL HOURS: 60 hours**

**COURSE CODE: 13SP18/3E/NPF**

**CREDITS: 3**

**L-T-P: 4-0-0**

1. To impart knowledge on the balanced diet, menu planning and classification of food.
2. To understand the need of consuming nutritionally balanced diet
3. To introduce the sources, functions and deficiencies of macronutrients and micronutrients
4. To learn the importance of fitness in daily life
5. To study the nutritional requirements for athletes

**COURSE OUTLINE**

**UNIT I:**

Introduction to nutrition - Definition of terms - Food, Nutrient and Health.  
Food and our body -RDA - Factors affecting RDA, reference man, reference woman, RDA for adolescents and adults; Basic 5 food group system (ICMR), factors involved in food selection;  
Definition of menu planning; principles of menu planning;  
Planning balanced diet for adults and adolescents.(15 HOURS)

**UNIT II:**

Basic nutrients - Proximate principles - CHO, fats and proteins.  
Carbohydrates - Classification, Functions, Sources, Deficiency;  
Proteins - Classification, Functions, Sources and Deficiency;  
Fats - Classification, Functions and Sources;  
Energy - Definition of energy, Kilo Calories, energy from CHO, proteins and fats,  
Physiological fuel value, gross fuel value, BMR - factors affecting BMR (15 HOURS)

**UNIT III:**

Vitamins: Fat soluble vitamins (A,D,E,K) - sources, functions, deficiency. Water soluble vitamins (Thiamine, Riboflavin, Pyridoxine, Niacin, Vitamin B12) - sources, functions, deficiency.  
Minerals (Calcium, Iron, Phosphorus, Sodium, Potassium, Iodine, Zinc) - sources, functions, deficiency. Water - functions, sources, requirements, water balance, dehydration, water intoxication (10 HOURS)

**UNIT IV:**

Fitness -Definition of fitness, benefits of fitness. Components of fitness, aerobic and anaerobic activities (10 HOURS)

**UNIT V:** Diet for athletes -Requirement for CHO, protein, fat, vitamin, mineral and fluids for an athlete. Pre event and post event meal (10 HOURS)

### RECOMMENDED TEXTBOOKS

1. Srilakshmi B, *Nutritional Science*, 3<sup>rd</sup> edition, New age Publishing Press, New Delhi, 2002
2. Mudambi, S.R. and Rajagopal, M.V., *Fundamentals of food and nutrition*, Wiley Eastern Limited, 2003

### REFERENCE BOOKS

1. Sharma M, *Textbook of Nutrition*, 1<sup>st</sup> edition, CBS publishers & distributors PVT Ltd, New Delhi, 2017
2. Abraham S, *Nutrition Through Lifecycle*, 1<sup>st</sup> edition, New age international publishers, New Delhi, 2016
3. Verma P, *Food, Nutrition & Dietetics*, 1<sup>st</sup> edition, CBS publishers & distributors PVT Ltd, New Delhi, 2015
4. Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2<sup>nd</sup> edition, Jones & Bartlett learning publications, 2015,
5. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13<sup>th</sup> Edition, Elsevier Saunders, Missouri, 2012
6. Stump SE, *Nutrition and diagnosis related care*, 7<sup>th</sup> edition, Lippincott, 2012
7. Mullick P, *Textbook of Home Science*, Kalyani Publishers, India, 2006
8. Joshi S., *Nutrition and Dietetics*, 2<sup>nd</sup> Edition, Tata McGraw Hill Publishing Company, New Delhi. 2002
9. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12<sup>th</sup> edition, Elsevier publications, UK, 2005
10. Whitney EN and Rolfes SR, *Understanding Nutrition*, 9<sup>th</sup> edition, West/Wordsworth, 2002
11. Bean A., *The Complete guide to sports Nutrition*, 3<sup>rd</sup> Edition, A&C Black Publishers Ltd, 2000
12. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10<sup>th</sup> edition, Churchill Livingstone, NY, 2000
13. Cataldo, DeBruyne and Whitney, *Nutrition and Diet therapy- Principles and Practice* 5<sup>th</sup> edition, West/ Wadsworth, London, 1999
14. Gordon WM, *Perspectives in Nutrition*, 4<sup>th</sup> edition, McGraw Hill, 1999
15. Swaminathan M, *Principles of Nutrition and Dietetics*, Bappeo, Bangalore, 1995

### JOURNALS

1. International Journal of Sports Nutrition
2. Journal of nutrition science research

### E-LEARNING RESOURCES

- [www.nal.usda.gov/fnic/food comp](http://www.nal.usda.gov/fnic/food comp)
- [www.niddk.nih.gov/health/nutrit/nutrit.htm](http://www.niddk.nih.gov/health/nutrit/nutrit.htm)

- [www.sportsci.org](http://www.sportsci.org)
- [www.nal.usda.gov/fnic/fpyr/pyramid.html](http://www.nal.usda.gov/fnic/fpyr/pyramid.html)
- <http://evolve.elsevier.com>
- <http://www.choosemyplate.gov>
- <http://www.healthypeople.gov>
- <https://gradireland.com/institution/ulster-university>
- <https://weblink.lakehealth.org/WLP2/#!/classes/info/C10002GC>

### COURSE OUTCOMES

CO No.	CO Statement	Knowledge Level
CO 1	Identify the classification of food by ICMR and Food guide pyramid	K1
CO 2	Identify and describe the role of amino acids, lipids, carbohydrates, and vitamins in our body	K1,K2
CO 3	Explain the functions, food sources, and consequences of deficiencies and toxicities for each of the essential macro and micro nutrients	K3, K4
CO 4	Apply the current understanding of nutrition to aspects of physical fitness	K3
CO 5	Analyze and understand the principles in menu planning and alter food intake to reach the daily recommendation of an individual or an athlete.	K4
CO 6	Discuss and develop nutrition plan for athletes	K5,K6

### Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	2	2	2
CO2	3	2	2	2	2	2
CO3	3	3	3	3	3	2
CO4	3	3	3	3	3	2
CO5	3	3	3	3	3	3
CO6	3	3	3	3	3	3
<b>AVERAGE</b>	3	2.7	2.7	2.7	2.7	2.3

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY CORELATED-1 NO CORELATION-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. Peer Learning

## SEMESTER III

### INNOVATIVE FOOD PRODUCT DEVELOPMENT Practical – 3- CORE -11

**TOTAL HOURS: 90 hours**

**COURSE CODE: 13SP18/3C/PR3**

**CREDITS: 4**

**L-T-P: 0-0-6**

#### COURSE OBJECTIVES

- ✓ Learn to develop an innovative product
- ✓ To enhance their entrepreneurship skills
- ✓ To understand the importance of getting patent for the product
- ✓ To gain knowledge on product life cycle and standardization.
- ✓ To advertise and market the products

#### COURSE OUTLINE

1. Market survey on innovative ingredients and products available(5 HOURS)
2. Consumer oriented product development (5 HOURS)
3. Product life cycle – optimization, Scale up, production (10 HOURS)
4. Theme/ concept based product formulation (6 HOURS)
5. Ingredient combinations (6 HOURS)
6. Processing technique (6 HOURS)
7. Standardization of the product (6 HOURS)
8. Subjective and objective evaluation of the standardized product (6 HOURS)
9. Nutrient analysis (8 HOURS)
10. Packaging and labeling (6 HOURS)
11. Shelf life analysis (6 HOURS)
12. Cost benefit analysis (4 HOURS)
13. Advertising and sale of the developed innovative product (4 HOURS)
14. Documentation (6 HOURS)
15. Report submission (6 HOURS)

#### RECOMMENDED TEXTBOOKS

1. Earle M, Earle R and Anderson A. Food and product development; maximising success, Woodhead publishing ltd, food series, No.64, 2001.
2. Paine FA, Paine HY(Eds) . A handbook of food packaging. Second ed, Blackie Academic and professional. 1992.

#### JOURNALS

1. International journal of Food Engineering
2. Food Marketing and Technology
3. Journal of Agriculture and Food Economics

## COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	Identify and understand the food products and process innovations in the market	K3
CO2	Design and execute product innovation trials to efficiently optimise the product formulation and process	K6
CO3	Learn methods of generating, evaluating and testing product ideas	K5
CO4	Develop good communication and team work skills	K3
CO5	Identify relevant components and plan a product launch	K3
CO6	Learn methods of evaluating and monitoring the success of a launch	K5

## Mapping of CO with PSO

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
CO6	3	3	3	3	3	3
AVERAGE	3	3	3	3	3	3

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY CORELATED-1 NO CORELATION-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. Peer Learning
6. Field Visits



## SEMESTER III

### SOFT SKILL-3

#### COMPUTING SKILLS

**TOTAL HOURS: 30 hours**

**COURSE CODE: 13SP18/3S/CSS**

**CREDITS: 2**

**L-T-P: 2-0-0**

#### COURSE OBJECTIVES

- ✓ To understand the use of Nutrition Care Process Model.
- ✓ To introduce the current nutrition assessment and screening techniques
- ✓ To study the protein quality of different food items
- ✓ To calculate energy expenditure and physical activity level for an individual using different methods

#### COURSE OUTLINE

- UNIT I:** Nutritional Care process  
Nutritional assessment: use of SOAP(Subjective data, Objective data, Assessment and Plan), MNA (Mini Nutritional Assessment), SGA (Subjective Global Assessment) and MUST (Malnutrition Universal Screening Tool) – assessment, diagnosis and intervention
- UNIT II:** Energy requirement:  
Estimation of energy content is using bomb calorimeter, energy requirement of an individual on a working and non-working day using Sathyanarayana and factorial method.  
Software available in the market for calculating the energy requirement and expenditure
- UNIT III:** Development of energy and protein rich recipes by calculating the chemical score and Net Dietary Protein calorie Percentage

#### RECOMMENDED TEXTBOOKS

1. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13<sup>th</sup> Edition, Elsevier Saunders, Missouri, 2012
2. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10<sup>th</sup> edition, Churchill Livingstone, NY, 2000

#### REFERENCE BOOKS

1. Gordon WM, *Perspectives in Nutrition*, 4<sup>th</sup> edition, McGraw Hill, 1999
2. Swaminathan M, *Principles of Nutrition and Dietetics*, Bappeo, Bangalore, 1995

## JOURNALS

1. International Journal of community nutrition
2. Journal of nutrition science research

## COURSE OUTCOMES

CO No.	CO Statement	Knowledge Level
CO 1	Recall and describe the use of nutrition care process model	K1
CO 2	Use the Nutrition Care Process to make decisions and identify nutrition-related problems of different clinical cases	K3
CO 3	Apply principles of nutrition assessment and screening to determine and evaluate nutrition interventions for clinical conditions	K3, K4
CO 4	Gather, analyze, and interpret the amino acid composition of foods	K3,K4, K5
CO 5	Use of different methods to evaluate the energy expenditure and physical activity of an individual	K4, K5

## Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	3	3
CO2	3	3	3	2	3	3
CO3	3	3	3	2	3	3
CO4	3	3	2	2	3	2
CO5	3	3	2	2	3	2
AVERAGE	3	3	2.6	2	3	2.6

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY CORELATED-1 NO CORELATION-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. Peer Learning

## SEMESTER IV

### PUBLIC HEALTH NUTRITION CORE - 13

**TOTAL HOURS: 90 hours**

**COURSE CODE: 13SP18/4C/PHN**

**CREDITS: 4**

**L-T-P: 4-2-0**

#### **COURSE OBJECTIVES**

To enable students

1. To understand the role of nutritional epidemiology in public health.
2. To outline the issues related to maternal and child nutrition.
3. To recognise the solutions to overcome the problems of malnutrition.
4. To create awareness on the interventional strategies for preventing micronutrient deficiencies in India.
5. To understand the concept of food and nutrition security and management of nutrition in emergency situations.

#### **COURSE OUTLINE**

##### **UNIT I:**

Nutritional Epidemiology:

Application of Epidemiological study in Nutrition- cross sectional studies, ecological studies, cohort studies, case control studies, randomized controlled trials: prophylactic, therapeutic and community trials; Sampling and Sample size; From research to programs- Applying knowledge to improve nutrition outcomes. (20 HOURS)

##### **UNIT II:**

Maternal and Child Nutrition:

Nutrition burden in women: Maternal Nutritional status; Factors associated with deterioration of maternal nutritional status; Interventions to improve nutritional status in women. Under nutrition in children: Stunting, underweight and wasting- an overview of the global situation; determinants of under nutrition, Prevention of under nutrition in children-a lifecycle approach; Over nutrition in children: The epidemic of obesity in children, consequences and prevention of overweight and Obesity. Policies and programmes for reducing malnutrition in the Indian context. Integration of breastfeeding and complementary feeding practices into National programme. (20 HOURS)

##### **UNIT III:**

Vitamin A Deficiency (VAD): Consequences of Vitamin A deficiency; Epidemiology of vitamin A deficiency; Vitamin A deficiency status in India; Intervention strategies for preventing VAD; Policies and programmes in the Indian context. Iodine: Importance of iodine for human population; Requirements, Controlling of IDD- a three prong strategy; Elimination of IDD- international focus; Fortification –

Universal Salt Iodization; Policies and programmes in the Indian context. (15 HOURS)

**UNIT IV:** Iron deficiency anemia & Nutritional anemia: Prevalence, causes, Approaches for the prevention and control of anemia; Policies and programmes in the Indian context.  
Zinc: Zinc epidemiology, Requirements, Evidence from Zinc supplementation studies on child health and Zinc intervention strategies. (15 HOURS)

**UNIT V:** Food and Nutrition Security:  
a) Food and Nutrition Security – Basic concepts; Food insecurity and vulnerability; Factors underlying the current state of Food and Nutrition security- food pricing, climate, agriculture, biofuels, agricultural commodities, impact of green revolution, food supply in India, land fragmentation, poverty, hidden hunger and purchasing power; Food and Nutrition Situation in India; Sustainable diets and Sustainable development goals  
b) Food and Nutrition in Natural and Manmade Disasters: Food insecurity and malnutrition- identification and measurement, Nutritional Requirements & intervention, Disaster management in India. (20 HOURS)

### RECOMMENDED TEXTBOOKS

1. ChanderVir S, *Public Health Nutrition In Developing Countries*, Part I, 1<sup>st</sup> edition, Woodhead Publishing, New Delhi, 2011
2. ChanderVir S, *Public Health Nutrition In Developing Countries*, Part II, 1<sup>st</sup> edition, Woodhead Publishing, New Delhi, 2011
3. Park K, Park's Textbook of preventive medicine, 2005

### REFERENCE BOOKS

1. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., *Nutritive value of Indian foods*, NIN, Hyderabad, 2010
2. Bamji M, *Textbook of Human Nutrition*, Oxford publishers, New Delhi, 2010
3. Bhatt VB, *Protein Energy Malnutrition*, PeePee Publishers, New Delhi, 2008
4. Sharma N, *Child Nutrition*, 1<sup>st</sup> 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)*, 1<sup>st</sup> 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), 1<sup>st</sup> edition, Oxfam, 1991
11. Robert H. Fletcher, Suzanne W. Fletcher and Edward H. Wagner, *Clinical Epidemiology- the essentials*, 2<sup>nd</sup> edition, Williams & Wilkins, Baltimore
12. Nutrition foundation of India series, scientific reports
13. Hindu survey of Indian agriculture, latest edition

### JOURNALS

1. International journal of Community Nutrition
2. Indian journal of community health

### E-LEARNING RESOURCES

1. <http://www.hsc.wvu.edu/library/U-links/community- nutrition.htm>
2. [www.asns.rg/njun04a.pdf](http://www.asns.rg/njun04a.pdf)
3. [www.fns.usda.gov/fsec/FILES/safetyNet.pdf](http://www.fns.usda.gov/fsec/FILES/safetyNet.pdf)
4. [www.ext.vt.edu/action\\_for\\_healthykids/assistance/lesson5background.pdf](http://www.ext.vt.edu/action_for_healthykids/assistance/lesson5background.pdf)
5. <https://www.aaas.org/sites/default/files/migrate/uploads/EnvironmentalHealth.pdf>
6. [https://www.rand.org/content/dam/rand/pubs/research\\_reports/.../RAND\\_RR1084.pdf](https://www.rand.org/content/dam/rand/pubs/research_reports/.../RAND_RR1084.pdf)
7. <https://www.nih.gov/health-information>

### COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO 1	Identify and explain the various types of study designs commonly used in nutritional epidemiologic research.	K3&K2
CO 2	Assess the factors associated with maternal and child nutrition	K5
CO 3	Classify the causes of malnutrition in India and perceive the knowledge of various nutrition intervention schemes provided.	K2&K5
CO 4	Discuss on the various intervention programmes and policies concerned with micronutrient deficiency.	K6
CO 5	Analyse the basic concepts of food and nutrition security and summarize the food and nutrition security situation in India.	K4&K2
CO6	Categorise and formulate the various nutritional assessment techniques for the community	K4&K6

### Mapping of CO with PSO

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
CO6	3	3	3	2	2	3
AVERAGE	3	3	3	2.8	2.8	3

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY CORELATED-1 NO CORELATION-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. Peer Learning

## SEMESTER IV

### PROJECT CORE - 14

**TOTAL HOURS: 90 hours**

**COURSE CODE: 13SP18/4C/PRO**

**CREDITS: 4**

**L-T-P: 0-6-0**

#### **COURSE OBJECTIVES**

To enable students

- ✓ To gain knowledge in the area of research
- ✓ To contribute to the community or to the existing research base

#### **COURSE OUTLINE**

The project should be based on individual study and carry the following format:

1. Title page – Title, author's name
2. Certificate of originality by the guide
3. Declaration by the author
4. Table of contents
5. List of tables
6. List of figures
7. Acknowledgement
8. Abstract.
9. Introduction: statement of the problem,significance,need for the study,objectives, and operational definitions.
10. Review of literature
11. Methodology – Sampling and tools for data collection,procedures,hypothesis
12. Results and Discussion–Tables and figures, statistical presentations,hypothesis testing.
13. Summary and Conclusion
14. References.
15. Appendices

#### **RECOMMENDED TEXTBOOKS**

1. Singh, Y.K, *Fundamental of Research Methodology and Statistic*. New Age International (P) Ltd., Publishers. New Delhi, 2015
2. Kothari, C. and Garg, G, *Research methodology Methods and Techniques* 3<sup>rd</sup> edition, New Delhi: New Age International (P) Ltd, 2014
3. Gupta. S.P, *Statistical Methods*, S Chand & Sons,, New Delhi, 2008
4. Saravanavel, P, *Research Methodology*, KitabMahal Agencies, New Delhi, 2005
5. Elhance .D.N, Veenaand and Agarwal .B.M, *Fundamental of statistics*,48<sup>th</sup> Edition, KitabMahal, Allahabad, 2005
6. Best JW and Kahn JV, *Research in Education*, Prentice Hall of India Pvt. Ltd., New Delhi, 1996

7. Koul L, *Methodology of Educational Research*, 3<sup>rd</sup> edition Vikas publishing House Pvt. Ltd ,New Delhi
8. William Giles Campbell, *Form and style in Thesis writing*, Houghton Mifflin Company, Boston.
9. Sadhu A.N and Singh A, *Research Methodology in Social Sciences*, Himalaya Publishing House, Mumbai,

## **JOURNALS**

1. International journal of Nutrition and Dietetics
2. International journal of Clinical Nutrition and Dietetics
3. International journal of Food Microbiology
4. International journal of Food Engineering
5. International journal of Food Properties
6. Food and Nutrition Bulletin
7. Annual review of Nutrition
8. Food Science Research Journal
9. Journal of Agriculture and Food Economics
10. Current Research in Nutrition & Food Science Journal



## SEMESTER IV

### PUBLIC HEALTH NUTRITION PRACTICAL Practical -4 (CORE – 15)

**TOTAL HOURS: 90 hours**

**COURSE CODE: 13SP18/4C/PR4**

**CREDITS: 4**

**L-T-P: 0-0-6**

#### **COURSE OBJECTIVES**

1. To create awareness of various national agencies involved in health and nutrition
2. To learn various health indices and assessment techniques for the community.
3. To plan and conduct nutrition and health education programme for the community balancing the socio-cultural environment.
4. To formulate and prepare low cost recipes for the vulnerable group.
5. To overcome the nutrition and health problems faced by the community.

#### **COURSE OUTLINE**

1. Visit to various organizations concerned with food and nutrition –ICMR, FNB, WVS, ICDS, FCI, PDS, DMS, MSSRF, Agricultural department, Social welfare Board.  
(10 HOURS)
2. Identification of Vulnerable group and Assessment of nutritional Status of vulnerable group  
(20 HOURS)
3. Formulation, and preparation of low cost recipes – weaning, pregnancy, lactation, Vitamin A, Iron and Iodine  
(20 HOURS)
4. Planning and implementation of Nutrition–Health Education (NHE) for a vulnerable group  
(20 HOURS)
5. Preparation of teaching aids for Nutrition- Health Education. (20 HOURS)

#### **REFERENCE BOOKS**

1. ChanderVir S, *Public Health Nutrition In Developing Countries*, Part I, 1<sup>st</sup> edition, Woodhead Publishing, New Delhi, 2011
2. ChanderVir S, *Public Health Nutrition In Developing Countries*, Part II, 1<sup>st</sup> edition, Woodhead Publishing, New Delhi, 2011
3. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., *Nutritive value of Indian foods*, NIN, Hyderabad, 2010
4. Bamji M, *Textbook of Human Nutrition*, Oxford publishers, New Delhi, 2010
5. Bhatt VB, *Protein Energy Malnutrition*, PeePee Publishers, New Delhi, 2008
6. Sharma N, *Child Nutrition*, 1<sup>st</sup> edition, Murarilal& sons, New Delhi, 2006
7. Gupte S, *Textbook of Pediatric Nutrition*, Pawaninder P Vij Publishers, New Delhi, 2006
8. Park K, *Park's Textbook of preventive medicine*, 2005

#### **JOURNALS**

1. International journal of Community Nutrition
2. Journal of community health nursing

## E-LEARNING RESOURCES

- [http://www2.mfa.gr/infocfiles/radC4CD6Health-Nutrition%20Orgs%20\(2008\).pdf](http://www2.mfa.gr/infocfiles/radC4CD6Health-Nutrition%20Orgs%20(2008).pdf)
- <http://www.jmedscindmc.com/article.asp?issn=1011-4564;year=2014;volume=34;issue=5;spage=211;epage=213;aulast=Shrivastava>
- <https://www.indiastudychannel.com/resources/120148-Teaching-Aids-Their-Needs-Types-and-Importance-Of-Teaching-Aids-In-Teaching-Learning-Process.aspx>
- <http://www.yourarticlelibrary.com/nutrition/nutrition-education-of-community-importance-methods-and-other-details/64428>
- <http://vikaspedia.in/health/nutrition/nutritive-value-of-foods/low-cost-nutritious-supplements>

## COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO 1	Identify and explain the broad determinants of dietary and food aspects of health and wellbeing.	K1&K2
CO 2	Analyse the principles of, and approaches to nutritional assessment.	K4
CO 3	Assess and deliver effective nutritional information to the vulnerable group.	K5
CO 4	Develop nutrition and health information to a wide range of audiences through diverse teaching aids.	K6
CO 5	Formulate and prepare low cost recipes for the nutritionally disadvantaged to combat the nutritional deficiencies.	K5

## Mapping of CO with PSO

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO6
CO1	3	3	3	3	3	3
CO2	2	3	3	2	2	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	2	3	3	3	2	3
AVERAGE	2.6	3	3	2.8	2.6	3

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY CORELATED-1 NO CORELATION-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. Peer Learning
6. Field Visits

## SEMESTER IV

### SOFT SKILL-4

#### SCIENTIFIC WRITING AND PRESENTATION SKILLS

**TOTAL HOURS: 30 hours**

**COURSE CODE: 13SP18/4S/SWS**

**CREDITS: 2**

**L-T-P: 2-0-0**

#### COURSE OBJECTIVES

1. To gain knowledge in scientific writing and presentation skill.
2. To understand the principles for oral presentations.
3. To gain in depth knowledge on research paper publication

#### COURSE OUTLINE

**UNIT I:** Scientific writing - abstract, full paper, clinical update, manuscripts. Process of copy editing journals

**UNIT II:** Presentation skills – Thematic, poster, oral, principles to be followed for presentation

**UNIT III:** Computer application for research  
Use of Internet in Research – Websites, search Engines, E-journal and E-Library – INFLIBNET, SHODHGANGA  
Plagiarism – Citation and acknowledgement – reproducibility and accountability, Soft wares available in the market for plagiarism

#### RECOMMENDED TEXTBOOKS

1. Best JW and Kahn JV, *Research in Education*, 7<sup>th</sup> Edition, Prentice Hall of India Pvt.Ltd., New Delhi, 2000.
2. Campbell WG, *Form and style in Thesis writing*, Houghton Mifflin Company, Boston.

#### REFERENCE BOOKS

1. Koul L, *Methodology of Educational Research*, 3<sup>rd</sup> edition, Vikas Publishing House Pvt.Ltd, New Delhi
2. John W. Best and James V.Kahn, *Research in Education*, 7<sup>th</sup> Eed, Prentice Hall of India Pvt. Ltd, New Delhi, 2000.
3. Elhance. D. N Veena and Elhance and Agarwal . B.M, *Fundamentals of Statistics*, 48<sup>th</sup> ed, Kitab mahal, Allahabad, 2005.
4. Sadhu AN, Amarjit Singh, *Research methodology in Social Sciences*. Himalaya Publishing House, gurgoan, Mumbai, 1992.

## JOURNALS

1. Journal of academic writing

## E-LEARNING RESOURCES

### Course Outcome

CO No	CO statement	Knowledge level
CO1	Develop a frame work for scientific writing.	K1
CO2	Describe, Compare and Interpret various means for poster, oral presentation and copy editing.	K2, K4, K5
CO3	Evaluate the use of websites, search engine, E-journals and E-library for research	K5
CO4	Propose the authenticity of the research article using plagiarism checking soft ware.	K6

### Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	1	3	1
CO2	3	3	3	3	1	2
CO3	3	3	3	3	1	1
CO4	3	3	3	3	1	1
AVERAGE	3	3	3	2.5	1.5	1.25

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY CORELATED-1 NO CORELATION-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. Peer Learning

**COURSE PROFILE – (2019-2020 MPHIL FOOD AND NUTRITION)**

<b>Course profile Paper</b>	<b>Course code</b>	<b>Title of the paper</b>	<b>Credits</b>	<b>Hours/week</b>	<b>Total hours</b>	<b>CA</b>	<b>SA</b>	<b>Viva</b>	<b>Total</b>
1	13M19/RML	Research Methodology and Introduction to Teaching/Learning Process	5	5	75	40	60	-	100
2	13M19/APF	Advanced Paper in Foods and Nutrition	5	5	75	40	60	-	100
3	13M19/IE1*  13M19/IE2*	Elective- Internal paper on product development & nutrient analysis OR Elective 2- Internal paper on nutritional survey, assessment, supplementation and counselling	5	5	75	40	60	-	100
4	13M19/PRO	Dissertation	21			50	100	50	200
Total			<b>36</b>						

\*Internal valuation only

## PAPER - 1

### RESEARCH METHODOLOGY AND INTRODUCTION TO TEACHING / LEARNING PROCESS

**TOTAL HOURS: 75 Hours**  
**CREDITS: 5**

**COURSE CODE: 13M19/RML**

#### COURSE OBJECTIVES

- To define the Principles and Techniques in defining and formulation of research problems
- To demonstrate their understanding of facts and ideas on the principles of teaching and learning and infer the best teaching methodology in the classroom.
- To apply the concept of research methodology in constructing research design and their implementation
- To analyse and compare the data collected using appropriate statistical methods
- To deduce and make judgements based on the results obtained and assess the validity using statistical significance and
- To develop best evaluation methods of internal assessment in the classroom and discuss the need to ensure effective student participation in the classroom and teacher student relationship

#### COURSE OUTLINE

- UNIT I:** Formulation of a research problem: Research designs -meaning, principle and components  
Ethical importance of content, privacy and confidentiality in research; Guidelines for research on human subjects; Issue of academic fraud and plagiarisms; copyright, citations and acknowledgement, authorship and publications  
Design of experiments, principles of experimentations  
Sampling methods, different types of sampling designs, sampling errors, sampling bias  
Methods and tools of data collection: Observation, questionnaire, interview, checklist, rating scale, attitude scale, reliability and validity of tools. (15 HOURS)
- UNIT II:** Linear Programming - type of variables, solving problems, interpretation, use in field of Food & Nutrition. Data processing using the computer coding and classification, programming and analysis (15 HOURS)
- UNIT III:** Processing and analysis of data:Editing, coding, classification, tabulation, Parametric or standard tests, chi-square test; Analysis of variance and covariance; Non-parametric or distribution free tests;

Uses of multivariate analysis techniques (concepts only) classification, methods - factor analysis and path analysis, cluster analysis; Handling of qualitative and quantitative data  
Report Writing: Significance, different steps in writing a report,  
Drawing inferences, evaluation. (15 HOURS)

**UNIT IV:** Methods of teaching/learning relevant to higher education: Objectives, advantages, limitations; Methods relating to different levels instructional, self-study, seminar, participatory method; Laboratory and project work, case study, field trips etc., Innovations in nutritional fields. Methods used in non-formal education, vocational training, adult education. (15 HOURS)

**UNIT V:** Organization, Planning and management of the classroom/field: Planning course work, practical work, field trips, seminar etc., Teacher - student relationship, Student interaction and participation.  
Evaluation methods - classroom / field; objectives and functions of evaluation, principles of evaluation; Tool for testing / evaluation: Internal assessment - teacher - made tests, objective type, short answer and essay questions, construction of questions and question bank, performance tests, observation technique, product evaluation, appraising personality traits. The marking and grading systems. (15 HOURS)

### RECOMMENDED TEXT BOOKS

- William Giles Campbell, *Form and style in Thesis writing*, Houghton Mifflin Company, Boston.
- Elhance .D.N, Veenaand and Agarwal .B.M, *Fundamental of statistics*, 48<sup>th</sup> Edition, KitabMahal, Allahabad, 2005

### REFERENCE BOOKS:

1. Singh, Y.K, *Fundamental of Research Methodology and Statistic*. New Age International (P) Ltd., Publishers. New Delhi, 2015
2. Kothari, C. and Garg, G, *Research methodology Methods and Techniques* 3<sup>rd</sup> edition, New Delhi: New Age International (P) Ltd, 2014
3. Gupta. S.P, *Statistical Methods*, S Chand & Sons,, New Delhi, 2008
4. Saravanavel, P, *Research Methodology*, KitabMahal Agencies, New Delhi, 2005

1. Best JW and Kahn JV, *Research in Education*, Prentice Hall of India Pvt. Ltd., New Delhi, 1996
2. Koul L, *Methodology of Educational Research*, 3<sup>rd</sup> edition Vikas publishing House Pvt. Ltd ,New Delhi
3. Sadhu A.N and Singh A, *Research Methodology in Social Sciences*, Himalaya Publishing House, Mumbai,



## JOURNALS

1. International journal of science and research methodology
2. Journal of teaching and learning research

### COURSE OUTCOME:

CO.NO	CO Statement	Knowledge
CO1	Gain knowledge to formulate the research problems based on the methodologies of research and understand the meaning, principles and components of research design	K1
CO2	Demonstrate understanding of ideas and apply skills to outline and determine the usage of appropriate tools of data collection & validity and their suitability in the research setting.	K2
CO3	Apply editing & coding and statistical techniques to process and analyze the data collected and solve the research problem chosen by employing appropriate techniques.	K3
C O4	Examine and analyse the most appropriate method of teaching & learning process and classroom management relevant to higher education to ensure effective student participation	K4
CO5	Determination of the best method of evaluation and testing for internal assessment assessment and student teacher relationship	K5
CO6	Compile the data collected and propose innovative solutions by adopting the necessary steps to complete the research problem selected .	K6

### MAPPING COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOMES

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO6
CO1	3	3	2	2	2	3
CO2	3	3	2	2	3	3
CO3	2	3	3	2	2	2
CO4	2	3	3	3	2	2
CO5	2	3	3	3	3	2
CO6	3	3	3	2	3	2
AVERAGE	2.5	3	2.6	2.3	2.5	2.3

KEY : STRONGLY CORRELATED- 3, MODERATELY CORRELATED 2, WEAKLY

CORRELATED -1, NO CORRELATION -0

### TEACHING METHODOLOGY:

Lecture (Chalk and Talk-OHP-LCD), Flipped Learning/Blended Classroom- E Content, Videos, Problem Solving-Group Discussion-Role Modelling, Quiz-Seminar, Peer Learning. Self-Study Papers.

**PAPER - II**  
**ADVANCED PAPER IN FOODS AND NUTRITION**

**TOTAL HOURS: 75 Hours**  
**CREDITS: 5**

**COURSE CODE: 13M19/APF**

**COURSE OBJECTIVES**

3. To understand the interrelationship between health and nutrition
4. To apply the techniques of nutrition in research
5. To update the latest techniques in food industry
6. To identify the role of proximate principles in combating non-communicable diseases
7. To equip the students in the application of nutrition through research findings

**COURSE OUTLINE**

**UNIT I: Nutrition and Immunity:**

Immunity - Review, Goals of immune modulation - phagocytosis, chemotaxis, antigen recognition, immune cell proliferation, maintenance of mucosal barrier; Modulation of inflammatory response; Nutrients with immuno modulating properties - Arginine, Glutamine, Omega 3 fatty acids, sulphur containing amino acids, nucleotides, ornithine, alpha ketoglutarate and taurine; Supplementation, beneficiary effects-Prebiotics Probiotics and symbiotics. (15 HOURS)

**UNIT II: Nutrition, Health and Disease:**

Assessment of nutritional status - current concepts and methods; National Nutrition Policy - Programmes in combating malnutrition in India; Nutrition and drug interaction; Nutrition and behaviour; Recent concepts of fats, protein, available and unavailable carbohydrate in combating non-communicable diseases; Role of antioxidants and phytochemicals, zoo chemicals & herbs. (15 HOURS)

**UNIT III: Techniques in Nutrition Research:**

Principles, procedure and applications of Electrophoresis, Chromatography, Colorimetry, Spectrophotometry, Fluorimetry, Atomic absorption spectrophotometry, Use of auto analyzer, Flame photometer  
Microbiological assay, in vitro studies, Radio isotope studies, Animal and Human experimentation, epidemiology – Cross sectional double blind studies (20 HOURS)

**UNIT IV: Food Safety, Adequacy and Food allergies:**

Recent developments in food processing and preservation; Post Harvest technology; Novel protein foods - Source, nutritive value and uses; naturally occurring food toxicants and chemical additives in food

Classification of food allergens based on food groups and Nutritional intervention in food allergies. (15 HOURS)

**UNIT V: Macronutrients in Parenteral and Enteral Nutrition**

Parenteral and Enteral nutrition - Review, risk of deficiency, toxicity and adverse effects; Pharmacological use of trace elements - zinc, selenium and copper, chromium, manganese and molybdenum in enteral and parenteral solutions. Drug nutrient interactions (10 HOURS)

**REFERENCES**

3. Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2<sup>nd</sup> edition, Jones & Bartlett learning publications, 2015,
4. Elia M, Ljungqvist O, Stratton RJ, Lanham SA, *Clinical Nutrition (The Nutrition Society Textbook)*, 2<sup>nd</sup> edition, Wiley Blackwell Publishers, 2013
5. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13<sup>th</sup> Edition, Elsevier Saunders, Missouri, 2012
6. Stump SE, *Nutrition and diagnosis related care*, 7<sup>th</sup> edition, Lippincott Williams and Wilkins, Canada, 2012
7. Marian M et al., *Clinical Nutrition for surgical patients*, Jones and Bartlett Publishers, Canada, 2008
8. Joshi Y.K, *Basics of Clinical Nutrition*, 2<sup>nd</sup> edition, JP Medical Publishers Pvt Ltd, New Delhi, 2008
9. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12<sup>th</sup> edition, Elsevier publications, UK, 2005
10. **Gibney MJ, Elia M, Ljungqvist O, *Clinical Nutrition (The Nutrition Society Textbook)* Wiley Blackwell Publishers, 2005**
11. Whitney EN and Rolfes SR, *Understanding Nutrition*, 9<sup>th</sup> edition, West/Wordsworth, 2002
12. Williams SR, *Nutrition & Diet Therapy*, CV. Mosby St. Louis, 2001
13. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10<sup>th</sup> edition, Churchill Livingstone, NY, 2000
14. Shils ME, Olson JA, Shike M, *Modern Nutrition in Health and Disease*, Eighth edition, Volume I and II, Lea and Febiger Philadelphia, A Waverly Company, 2000
15. Ruth A., Townsend CE, *Nutrition and Diet Therapy* 8<sup>th</sup> edition, Thomson Delmar Learning

**JOURNALS**

3. Journal of American Dietetic Association
4. American Journal of Clinical Nutrition
5. British Journal of Clinical Nutrition
6. Indian Journal of Nutrition and Dietetics
7. European Journal of Clinical Nutrition
8. Nutrition Today
9. Journal of Nutrition and Dietetics
10. Journal of enteral and parenteral nutrition

**E-LEARNING SOURCES:**

10. [www.eatright.org](http://www.eatright.org).
11. [www.ifcinfo.health.org](http://www.ifcinfo.health.org).

5. [www.nutrition.gov](http://www.nutrition.gov)
6. [www.diabetes.org](http://www.diabetes.org)
7. [www.americanheart.org](http://www.americanheart.org)

#### Course Outcomes

CO No	CO statement	Knowledge level
CO1	Develop the relation between nutrition and immunity through immune modulating agents	K3
CO2	Utilize the techniques involved in nutrition	K3
CO3	Discuss the recent developments in processing, preservation and post harvest technology	K3
CO4	Analyze the current concepts and methods to overcome nutritional deficiency disorders	K4
CO5	Interpret the role of drug interaction with nutrients and nutrition with behaviour	K5
CO6	Formulate parenteral and enteral nutrition feeds using trace elements	K6

#### MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
CO6	3	3	2	2	2	2
AVERAGE	3	3	2.8	2.8	2.8	2.8

KEY:STRONGLY CORELATED-3 MODERATELY CORELATED-2WEAKLY CORELATED-1

NO CORELATION-0

#### TEACHING METHODOLOGY:

12. Lecture (Chalk and Talk-OHP-LCD)
13. Flipped Learning/Blended Classroom-E Content, Videos
14. Problem Solving-Group Discussion-Role Modelling
15. Quiz-Seminar
16. Peer Learning
17. Self-Study Papers

## **PAPER III**

### **ELECTIVE 1 -INTERNAL PAPER ON PRODUCT DEVELOPMENT & NUTRIENT ANALYSIS**

**Paper Code: 13M19/IE1**

**Credits: 5**

This paper should deal in depth, the contours of the research topic undertaken by the candidate with reference to:

- Background research
- Literature review
- Experimental Design
- Development, standardization and experimentation Parameters and procedures used
- Quantitative and qualitative analysis
- Interpretation of results
- Inferences, conclusions and recommendations

\*Internal Valuation Only

**PAPER III**

**ELECTIVE 2-INTERNAL PAPER ON NUTRITIONAL SURVEY,  
ASSESSMENT, SUPPLEMENTATION AND COUNSELLING**

**Paper Code: 13M19/IE2**

**Credits: 5**

This paper should deal in depth, the contours of the research topic undertaken by the candidate with reference to:

- Defining the problem
- Literature Survey
- Designing the study
- Screening and selection procedures
  - Parameters and tools of data collection
  - Measurement and analysis of data
- Interpretation of results
- Drawing conclusions and recommending suggestions

\*Internal Valuation Only

**PAPER IV  
DISSERTATION**

**Paper Code: 13M19/PRO**

**Credits: 21**

Dissertation assessment is done based on the following criteria: (100 marks)

8. Originality
9. Literature Survey
10. Research Design
11. Data Collection & Methodology
12. Data Interpretation
13. Report Writing
14. Significant Conclusions/ Contribution to Community or existing research base

CA: (50 marks)

Viva voce: (50 marks)

**REFERENCES:**

6. Singh, Y.K, *Fundamental of Research Methodology and Statistic*. New Age International (P) Ltd., Publishers. New Delhi, 2015
7. Kothari, C. and Garg, G, *Research methodology Methods and Techniques* 3<sup>rd</sup> edition, New Delhi: New Age International (P) Ltd, 2014
8. Gupta. S.P, *Statistical Methods*, S Chand & Sons,, New Delhi, 2008
9. Saravanavel, P, *Research Methodology*, KitabMahal Agencies, New Delhi, 2005
10. Elhance .D.N, Veenaand and Agarwal .B.M, *Fundamental of statistics*,48<sup>th</sup>Edition, KitabMahal, Allahabad, 2005
11. Best JW and Kahn JV, *Research in Education*, Prentice Hall of India Pvt. Ltd., New Delhi, 1996
12. Koul L, *Methodology of Educational Research*, 3<sup>rd</sup> edition Vikas publishing House Pvt. Ltd ,New Delhi
13. William Giles Campbell, *Form and style in Thesis writing*, Houghton Mifflin Company, Boston.
14. Sadhu A.N and Singh A, *Research Methodology in Social Sciences*, Himalaya Publishing House, Mumbai,