DEPARTMENT OF FOODS AND NUTRITION

FIRST YEAR (NEP)

ACADEMIC YEAR 2023-2024

SEMESTER I

Program Specific Outcome (PSO) : Level 4.5

At the end of level 5 i.e. at the completion of first year (2 semesters) of the undergraduate program the following are the Program Specific outcome

1. **Disciplinary Knowledge:** The students would be able to demonstrate the acquisition of knowledge of facts, concepts, principles, theories, and processes in the broad multidisciplinary learning context of the domain of family and community sciences

2. **Critical Thinking**: The students would be able to understand the linkages between the learning areas within and across the chosen fields of study

3. **Decision making, Analytical and Communication Skills**: The students should be able to acquire the cognitive skills required to identify, analyse and synthesize information from a range of sources

4. **Critical Thinking and Problem Solving, Moral and Professional Ethics:** The students would be able to apply the knowledge and essential skills required to perform effectively in a defined job (summer internship) or different settings/programs (practicals) relating to the chosen field of study

5. **Multicultural competence:** Ability to learn about different Indian cultures by way of practicing traditions, Food Anthropology, History of Indian Costumes, Traditional Household Practices, developing itineraries, Indic studies and making traditional arts and crafts

6. **Digital Literacy**: Competency in accessing relevant and authentic information and data from Electronic media with the ability to learn, synthesize, integrate to make presentations on the given topics in various disciplines for academic and extension/community work.

- **Bloom's Taxonomy (BT) Levels:** 1.Remember 2.Understand 3.Application 4.Analysis 5.Evaluation 6. Creation Programme
- **Elements of** Employability (Emp)/ Entrepreneurship (Ent)/ Skill Development (SD)
- **Relevance to** Local (L)/ National (N)/ Regional(R)/Global (G)
- **Relation to** Gender (G), Environment and Sustainability (ES), Human Values (HV)and Professional Ethics (PE)

NEP STRUCTURE FOR FOODS AND NUTRITION UNDERGRADUATE COURSE			
SEMESTER	**COURSE NAME**	**CREDIT**	**COURSE TYPE**
I	Introduction to Foods & Nutrition	4(3+1)	MAJOR
	Introduction to Public Health Nutrition	4(3+1)	MAJOR
	Sustainable Development Goals	4(4+0)	MDC
	Fundamentals of Communication Skills in English	2(2+0)	AEC
	Computer Literacy I	2(1+1)	SEC
	Indian Knowledge Systems from the Family & Community Science Perspectives	2(2+0)	IKS
	COURSE OFFERED TO STUDENTS OTHER THAN FOODS & NUTRITION SPECIALIZATION		
	Science of Foods	4(4+0)	MINOR
	TOTAL	**22**	

NAAC Accredited "A+" Grade Faculty Of Family and Community Sciences The Maharaja Sayajirao University of Baroda		**Academic Year**	**2023 – 24**
B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5			
Year	**I**	**Introduction to Foods and Nutrition (Major course)**	**Credits Hours**	**4 (3 + 1) Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**I**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2023-2024	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations, videos		

Course Outcome (CO)
Course Outcome:
CO1: To impart knowledge pertaining to different food groups and nutrients and its importance in daily life.
CO2: To understand the functions of food and the role of various nutrients.
CO3 To familiarise students with different methods of cooking- their advantages and disadvantages

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I.	**Nutrition and health related concepts:** **a) Definitions** i. Nutrition ii. Food	4 hrs	10%	1,2	1,2	1	Emp	R, G	ES, G

	iii. Food security iv. Nutrition status **v.** Balanced diet **vi.** Food and nutrition supplements **b) Concept of**: i. Food pyramid a) My plate								
II	**Introduction to food groups- Farm foods and animal foods** **a) Cereals and Products** **i.** Types of cereals: wheat, rice, millets, maize, oats ii. Cereal Products: Flaked rice, puffed rice, wheat flour and types iii. Composition and nutritive value b) **Pulses and Legumes** i. Classification of legumes ii. Composition and nutritive value iii. Methods of cooking: Germination, Fermentation, Boiling c) **Fruits and Vegetables** i. Classification: Botanical and Nutritional classification ii. Composition, Nutritive value and Role in cookery iii. Conservation of nutrients in fruits and vegetables d) **Salt, Sugar and Jaggery** i. culinary role	20h	44%	1,2	1,2	1	Emp	R, G	ES, G

	ii. Nutritive value- WHO Guidelines for using Salt and Sugars in diet **e) Nuts and Oil seeds** i. Composition and Nutritive value ii. Importance in the daily diet iii. Role of Nuts and oilseeds in Cookery f) **Fats and Oils** **i.** Classification of fats and oils based on origin ii. Main difference between fats and oils iii. Listing different edible oils: animal and vegetable iv. Nutritional Significance v. Role of Fats and Oils in cookery g) **Milk and Milk Products:** i. Composition and Nutritive value of milk from various sources and importance in daily diets ii. Fortified milk iii. Role of milk and its products in cookery h) **Eggs** i. Basic structure of an egg ii. Composition and Nutritive value and Importance in daily diet- biological value iii. culinary role of eggs i) **Meat** i. Definition								

	ii. Sources and classification ii. Nutritive value and importance in the daily diet biological value j) **Fish** i. Sources and classification ii. Nutritive value and importance in the daily diet - biological value								
III	**Introduction to Macronutrients and Micronutrients-** **a) Carbohydrates** i. Definition and classification of carbohydrates ii. Functions of carbohydrates iii. RDA, sources and concept of glycaemic index iv. Excess of carbohydrates in diet (overweight, obesity and diabetes) **b) Proteins** i. Definition and classification of proteins ii. Functions of proteins iii. Concept of Biological value/ complete protein iv. RDA and sources of proteins v. Deficiency disorders of protein (Protein Energy Malnutrition) **c) Lipids** i. Definition and classification of lipids ii. Functions of lipids iii. RDA and sources of lipids iv. Excess of lipids in diet- heart diseases d) **Digestion, absorption, storage and excretion of Carbohydrates, proteins and fats** e) **Fat soluble vitamins: Vitamin A, D, E, K** i. Properties and Functions	15h	33%	1,2	1,2	1	Emp	R, G	ES, G

	ii. Dietary sources and RDA iii. Deficiency Disorders of fat-soluble vitamins f) **Water soluble vitamins: Vitamin B complex (B1, B2, B3, B6, B12) and Vitamin C** i. Properties and Functions ii. Dietary sources and RDA iii. Deficiency Disorders of water-soluble vitamins **g) Minerals: Calcium, Phosphorus, Iron, Iodine** i. Properties and Functions ii. Dietary sources and RDA iii. Deficiency Disorders of water-soluble vitamins **h) Absorption, transport, storage and excretion of Vitamins and Minerals** **i) Water** i. Functions of water in the body ii. Water balance- Body's major water sources and routes of water loss								
IV	**Culinary terms and Methods cooking:** a) Introduction to different culinary terms b) Modes of heat transfer: Radiation, Conduction and Convection c) Moist heat methods: Boiling, Simmering, Poaching, Steaming, Pressure cooking d) Dry heat methods: i. Air as medium of cooking: Grilling, broiling, roasting, baking ii. Fat as medium of cooking: Sautéing, Shallow fat frying, Deep fat frying e) Combined (Moist and dry) Methods: Braising, Stewing f) Other cooking methods: Germination, Fermentation, Braising, Microwave cooking, Solar cooking.	6h	13%	1,2	3	1	Emp	R, G	ES, G

	g) Advantages and Disadvantages (Nutrient Losses) of Cooking and methods to prevent nutrient loss								

Reference Books	
1	Sunetra Roday (2017). Food Science and Nutrition, Oxford University Press, ISBN-13: 978-0-19-807886-9/ ISBN-10: 0-19-807886-2
2	T. Longvah R. Ananthan K. Bhaskarachary K. Venkaiah (2017). Indian Food Composition Tables (IFCT),, Indian Council of Medical Research, National Institute of Nutrition, ASIN: B076NMYR4P
3	Srilakshmi B (2019) Dietetics (8th ed.). New Age International Limited, New Delhi.
4	Srilakshmi B (2019) Nutrition Science (7th ed). New Age International Limited, New Delhi.
5	Sethi Mohini, Eram Rao (2013). Food Science Experiments and Applications. Second edition. CBS Publishers, New Delhi, ISBN 978-81-239-1693-4
6	Indian food Composition Tables (2017) 1st edition , National Institute of Nutrition, T Longvah, ISBN: 978-93-5267-677-4
7	Swaminathan M (2018). Handbook of Foods and Nutrition. Published by: Ganesh and Co. Pvt. Ltd. Madras, ISBN-10: 812041795X / ISBN-13: 978-8120417953
8	Tejmeet Rekhi & Heena Yadav (2020). Fundamentals of Food & Nutrition. Elite Publishing House.

PRACTICALS

NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**		**Academic Year**	**2023 – 24**
B.Sc. F.C.Sc (Regular) - First Year – Level 4.5			
Year	**I**	**Introduction to Foods and Nutrition (Major Course)**	**Credits/Hours per week**	**01/ 30 hours**
Semester	**I**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations		

Unit No.	Course Content : Practical	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Commonly Consumed Foods, their Cost and classification based on nutrients** a) Market survey of locally available food items viz. cereals, pulses, fruits and vegetables, milk and milk products, fats and oils, nuts and oilseeds, sugar and jaggery, meat, fish, and poultry and miscellaneous food items like biscuits, jams, jellies, ketchup etc. and their cost along with their local names b) Food group- Grouping of foods, discussion on nutritive value	20h	50%	2,3,4	1,2	1,5,6	SD	L,N,RG	-

	c) Calculation of various nutrients for various food group by using IFCT data base d) Calculate the amount of food required for providing a given amount of nutrient e) To calculate the amount of food required for obtaining a given amount of nutrient.								
II	**Categorization of food groups according to its nutritive values** • Protein, CHO, Calcium, Iron, Vitamin A & Vitamin C	5h	25%	2,3,4	1,2	6	SD	N	-
III	**General concepts of weights and measures** a) Measuring ingredients Methods of measuring different types of foods – grains, flours & liquids b) Edible portion: Determination of edible portion percentage of different foods	5h	25%	2,3,4,5	1,2	1,6	SD	N	-

Syllabus of Courses

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023-24**

B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5				
Year	**I**	**Introduction to Public Health Nutrition (Major Course)**	**Credits / Hours per week**	**4 (3+1) / 5 hours/week** **Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**I**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentations		

Course Outcome (CO)

CO1: To orient students regarding basics of public health nutrition
CO2: To explain to the students need of prioritizing nutrition issues
CO3: To help students gain an understanding regarding global nutrition problems
CO4: To sensitize students to the principles and methods for assessment of nutritional status
CO5: To equip students to use and interpret various indicators for assessing nutrition and health status of an individual

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**An Overview of Public Health Nutrition** a) Concept of Public Health Nutrition (PHN), Prevention as the major concern in PHN	10 h	13%	1,2	1,2,3	1,2	SD	L,N,R,G	G,ES

	b) Determinants of health and nutrition c) Health system in India d) Definitions used in PHN- public health approaches, epidemiology, health promotion, vulnerable groups, dual burden of malnutrition, poverty enumeration, food security e) Nutrition status & health related indicators (Maternal and Child nutrition related indicators, morbidity rates, mortality rates, definitions (IMR, NMR, U5MR, MMR etc)								
II	**Introduction of Nutritional Status Assessment Methods and Anthropometric Measurements** a) Overview of nutritional status assessment methods: Direct methods - ABCD (anthropometry, biochemical parameters, clinical signs and symptoms, and dietary assessment); and Indirect methods b) Anthropometric measurements, indicators and cut-offs for children, adolescents and adults – weight, height, MUAC, skin fold thickness, waist circumference, hip circumference, BMI, weight for age, weight for height, height for age & BMI for age, waist/ hip ratio, waist-stature ratio) c) The new WHO growth standards / reference standards for children &	15 h	20%	1,2,3,4,5	1,2	1,4	EMP,SD	L,N,R,G	G,ES,HV

	adolescents, its use and implications and classification to define mild, moderate & severe forms of malnutrition. d) Growth monitoring - use of WHO growth charts								
III	**Biochemical and Clinical Assessment** a) An overview of assessment of biochemical parameters: i. Lipids, Carbohydrates, Protein ii. Iron, Iodine iii. Vitamin A, Vitamin D, Vitamin B12 b) Understanding the clinical signs and symptoms for various nutritional deficiencies like: severe acute malnutrition, anemia, vitamin A deficiency, iodine deficiency disorders, vitamin B-complex, ascorbic acid and other micronutrients	05 h	7%	1,2,3,4,5	1,2	1	SD	L,N,R,G	G,ES
IV	**Dietary Assessment Methods** a) Methods of dietary intake assessment: 24-hour diet recall method; food frequency method; weighed food inventory; food diary method, chemical food analysis method, etc. b) Rapid assessment methods for dietary intake: Dietary Diversity Score for household, individual, women and young children	12 h	16%	1,2,3,4,5	1,2	1,4	EMP,SD	L,N,R,G	G,ES,HV

V	**International & National Organizations Working in the Field of Nutrition**	03 h	4%	2,4,5	1,2	1,3,4	EMP,SD	L,N,R,G	G,ES,HV

Reference Books

1.	K. Park (2011).Text Book of Preventive and Social Medicine, 21 EDITION. Banarsidas Bhanot Publishers.Jabalpur. ISBN13: 9788190607995. 868 pages.
2.	Vir Sheila (2011). Public Health Nutrition in Developing Countries published by Wood head Publishing India. ISBN-13: 9780857090041, ISBN-10: 0857090046
3.	Kristen Cashin and Lesley Oot. 2018. Guide to Anthropometry: A Practical Tool for Program Planners, Managers, and Implementers. Washington, DC: Food and Nutrition Technical Assistance III Project (FANTA)/ FHI 360.
4.	WHO: Child growth standards 2007, www.who.int/childgrowth/standards/WHO child growth standards and the identification of severe acute malnutrition in infants and children A joint statement. WHO UNICEF 2009
5.	The Training Course on Child Growth Assessment, Module http://www.who.int/childgrowth/training/modules
6.	King, F. S., Burgess, A., Quinn, V. J., & Osei, A. K. (Eds.). (2015). Nutrition for developing countries. Oxford University Press
7.	https://inddex.nutrition.tufts.edu/why-dietary-data
8.	Guidelines for Measuring Household and Individual Dietary Diversity Score. FAO. 2013.

PRACTICALS

	NAAC Accredited "A+"Grade Faculty of Family and Community Sciences The Maharaja Sayajirao University of Baroda		**Academic Year**	**2023-24**
B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5				
Year	**I**	**Introduction to Public Health Nutrition (Major Course)**	**Credits/ Hours per week**	**01/ 30 hours**
Semester	**I**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Presentations, Hands On Training, fieldwork, use of relevant statistical package		

No	**Course Content : Practical**	**Contact Hours**	**Weightage (%)**	**BT level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**Anthropometric Assessment** a) Various anthropometric measurements for children and adults - weight, height, waist/hip circumference etc. b) Use of WHO child growth charts, WHO Anthro and Anthroplus software	10 h	13%	1,2,3,4,5	1,2	1,2,4	Emp, SD	L,N,R,G	G,ES,HV
II	**Dietary Assessment** a) Development of tools for collection of dietary data using dietary intake: 24h dietary recall and food frequency questionnaire (FFQ) methods. b) Analysis, comparisons with RDA, and interpretation c) Computing dietary diversity score	14 h	19%	1,2,3,4,5	1,2	1,2,4	Emp, SD	L,N,R,G	G,ES,HV

III	**Indirect parameters for assessing nutritional status –** Socio-Economic Status survey for different income groups	6 h	8%	1,2,3, 4,5	1,2	1,2	SD	L,N,R,G	ES,HV

Syllabus of Courses

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**		**Academic Year**	**2023-24**
B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5				
Year	**I**	**Sustainable Development Goals** **(Multidisciplinary Course)**	**Credits/Hours per week**	**4(4+0)/4hrs/Week** **Theory: 60 Hours**
Semester	**II**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Marks /Grade**	**O**
Modeof Transaction		Lectures, Case Studies, Videos,		

Course Outcome (CO)

CO1. To understand concept of SDGs & integrate the SDGs with Nutrition Science & Dietetics
CO2. To develop an insight for achieving SDGs through core areas of Family and Community Resource Management discipline.
CO3. To integrate SDGs in the curriculum of Extension and communication.
CO4. To understand SDGs in context of Human Development & Family Studies
CO5. To apply sustainable practices as per SDGs in Apparel Industries.

Unit No.	**Topic**	**Contact Hours**	**Weightag (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**Introduction to SDG from the Family and Community Science Perspective** • Understanding SDG • Goals and Targets • SDG India Index • Achieving sustainable living	12h	20%	1,2,3,4,5	CO1	1,2,3	Emp, SD	L, R, G	G, ES, HV, PE

Page

	• Contributions to a sustainable future **Nutrition in the Context of SDGs** • Understanding diet quality related 11 Sustainable Development Goals • Number of Indicators relevant to nutrition in SDGs • Diet quality and delivery of the SDGs • Healthy diets & progress on SDGs: Country Examples								
II	**Family and Community Resource Management and SDGs** • Understanding importance of SDGs with relevance to the field of Family and Community Resource Management • Achieving SDGs with Family and Community Resource Management through: • Role of Consumer Education • Skill development & Entrepreneurship • Sustainable Interiors • Sustainable Practices in Hospitality Industry • Research, Extension &	12h	20%	1,2,3,4,5	CO2	1,2,3	Emp, SD	L, R, G	G, ES, HV, PE

	Environment Management								
III	**Integrating SDGs in Extension and Communication Curriculum** • Objectives of Extension and Communication Curriculum • Understanding importance of SDGs with reference to EC curriculum ○ Extension and Communication as a field towards achieving SDGs through teaching, Research and Extension : SDG3:Good Health and Well-being , SDG 4; Quality of Education , SDG 5; Gender Equality , SDG6 : Clean water and Sanitation , SDG 8: Decent work and Economic Growth , SDG11: Sustainable Cities and Communities, SDG 17: Partnership for Goals	12h	20%	1,2,3,4,5	CO3	1,2,3	Emp, SD	L, R, G	G, ES, HV, PE
IV	**Understanding Human Development in the Context of SDGs** • Sustainability and Sustainable Development-	12h	20%	1,2,3,4,5	CO4	1,2,3	Emp, SD	L, R, G	G, ES, HV, PE

	Interaction of various factors social, political, economic, cultural, ecological at local and global level (Integrative approach) • Role human beings have played and can play in ensuring balance in nature and sustainable future. • Curriculum Framework for Sustainable Development Goals – Focus on holistic life course approach, centrality of education • SDG -4 Quality education - emphasizing: knowledge and understanding b) skills and applications c) values and attitudes • SDG policy to practice: effective multi sectoral interventions/ programs/case studies at state/national and global levels (values linked to sustainable development: self-awareness, interconnectedness, compassion, peace, justice, value for life and other life forms, equality and equity)								
V	**Sustainable Practices of the**	12h	20%	1,2,3,4,5	CO5	1,2,3	Emp, SD, Ent	L, R, G	G, ES, HV, PE

	Apparel Industries • **:** Responsible Production- manufacturing goods and services in an ethical and sustainable way that minimizes waste and pollution and supports long-term sustainability of surrounding communities and their natural environments. (SDG 12) • Responsible consumption- beyond buying better, greener products and being more aware of their end-of-life destination. Also consideration of the environmental, social, health and economic impacts of a product and its services included. (SDG 12) • Circular economy- sustainable economic models, in which products and materials are designed in such a way that they can be reused, remanufactured, recycled or recovered. (SDG 12) • Best practices for sustainability- to build resilient infrastructure, promote sustainable industrialization and foster innovation. (SDG 9)								

References	
1.	Wade.R. Education for sustainability: Challenges and opportunities.Policyand Practice: Education for Sustainable Development Review, 6, 30 48. https://www.developmenteducationreview.com/issue/issue 6/education sustainability challenges and opportunities
2.	Osman.A, Ladhani. S, Findlater. E and McKay. V (Curriculum framework for Sustainable Development Goals.Commonwealth Secretariat. Retrieved from https://www.thecommonwealtheducationhub.net/wpcontent/uploads/2017/01/Curriculum_Framework_for_SDGs_July_2017.pdf
3.	WHO UNICEF: Nurturing Care Framework for Early Childhood Developmenthttp://www.portal.pmnch.org/maternal_child_adolescent/child/nurturing care frame work/en/
4.	Humanity at the Crossroads: https://www.youtube.com/watch?v=ZVls3wbTRu0
5.	Alison Gwilt (2020) A Practical Guide to Sustainable Fashion, Publisher : Bloomsbury Visual Arts; 2nd edition (9 July 2020), ISBN- : 10 : ISBN-13 ,1350067040 978-1350067042
6.	Dana Thomas (2019), Fashionopolis: The price of fast fashion and the future of clothes, Publisher : Penguin Press (3 September : ISBN-10 ,(2019 0735224013, ISBN-13 : 978-0735224018
7.	Elizabeth L. Cline (2019) The conscious closet: The revolutionary guide to looking good while doing good, Publisher : Plume; Illustrated edition(August 20, 2019) , ISBN-10 : : 1524744301, ISBN-131524744304-978
8.	Kirsi Niinimäki (2019) Sustainable Fashion in a circular economy, Publisher : : Aalto-yliopisto (1 January 2019) , ISBN-10 9526000897, ISBN-13 : 978-9526000893
9.	Milburn Jane (2017) Slow Clothing: Finding Meaning in What We Wear, Published by Brisbane, Queensland : Textile Beat, 2017, ISBN 9780648181705, 0648181707
10.	Rebecca Burgess (2019), Fibershed, Publisher : Chelsea Green Publishing Co; Illustrated edition (19 November 2019) , ISBN-10 : : ISBN-13 ,160358663616035866 34-978
11.	Subramanian Senthilkannan Muthu, Miguel Angel Gardetti, Sustainability in the Textile and Apparel Industries-Sourcing Synthetic and Novel Alternative Raw Materials, Publisher : : Springer; 1st ed. 2020 edition (20 March 2020), ISBN-10 3030385310, ISBN-13 : 3030385316-978
12.	Goel, S.(2016).Management of resources for sustainable development. New Delhi: Orient Blackswan Pvt. Ltd.
13.	Somayaji, G., & Somayaji , S. (2009). Environmental concerns and sustainable development: some perspectives from India. New Delhi: TERI Publication.
14.	Sundar, I. (2006). Environment and Sustainable Development. New Delhi: APH Publishing Corporation.
15.	http://www.un.org>sustainable development goals

16.	http://www.semanticscholar.org
17.	https://direct.mit.edu
18.	http://www.sdgfund.org
19.	http://SDGresources.relax.com
20.	http://assets.kpmg.com
21.	http:// http://www.devalt.org
22.	http://www.frontierin.org

Syllabus of Courses

	NAAC Accredited "A+" Grade. **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year 2023-2024**	**2023-24**

B.Sc. F.C. Sc (REGULAR) - First Year – Level 4.5				
Year	**I**	**Fundamentals of Communication Skills in English (AEC Course)**	**Credits / Hours per week**	**Credits 2(2+0)** **2 Hours per week** **Theory: 30 Hrs**
Semester	**I**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	
Mode of Transaction		Lectures and Presentations		

Course Outcome (CO)

CO1: To analyze and evaluate different forms of communication, including verbal and nonverbal, and apply this knowledge to improve personal and professional communication skills.

CO2: To develop effective communication skills by applying knowledge of the components and process of communication to analyze and overcome communication barriers in diverse contexts.

CO3: To enhance learning in language and communication by developing effective study skills, including notetaking, summarizing, and referencing, and applying these skills to complete research assignments and deliver effective presentations.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Language and Communication** • English Language and Biological Perspective • Functions of Language • Varieties of English • Pre-requisites of Communication • Communication: Definitions and Importance	10h	33.33%	1,2, 3,4	1	2.3,4,	EMP, SD	L, N, R, G	ES, PE

II	**Fundamentals of Communication** • Components of Communication • Process of Communication • Barriers to Process of Communication • Types of Communication • Multiplicities in Communication	10h	33.33%	1,2, 3,4	2	1,2,3, 4,	EMP, SD	L, N, R, G	ES, PE
III	**Introducing Study Skills** • Study Skills: Learn How to Learn • Note-taking, Note-making and Summarizing Skills • Library and Referencing Skills. • Improving Public Speaking Skills	10h	33.34%	1,2,3,4,5	3	1,2,4, 5	EMP, ENT SD	L, N, R, G	ES, PE
Reference Books									
1.	Khanna, Pooja, English Communication (For AECC Course, Delhi University). Vikas Publishing House. New Delhi.								
2.	Castells, M. Communication Power. Oxford University Press, New Delhi.								
3.	Hargie, O. The Handbook on Communication Skills. Routledge Publication, New York.								
4.	Thomas, Lizy, et al. Fundamentals of language and Communication								
5.	Raviya, Hitesh, et al. Developing Communication Skills in English. MacMillan Publishers India Private Limited, 2020, Chennai, India.								
6.	Surve, Anshu, et al. Developing Communication Skills in English. MacMillan Publishers India Private Limited, 2023, Chennai, India.								
7	Roloft, M. F. Interpersonal Communication. Sage Publication., USA.								

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023-24**

B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5

Year	**I**	**Computer Literacy-I** **(Skill Enhancement Course)**	**Credits / Hours per week**	**2(1+1)** **3 hours/week** **Total: 45 Hrs.**
Semester	**I**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentations		

Course Outcome (CO)

CO1: To Acquire the fundamental concepts of computer with the present level of knowledge of the students.
CO2: To identify the basic components of computer and Operating System.
CO3: To Understand Computer Networks, and browse the internet, content, and collaborate with peers.

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/R/G	**Relation to** G/ES/HV/PE
I	**Introduction to Computer** a) Computer and Latest IT gadgets i. Evolution of Computers & its applications ii. IT gadgets and their applications iii. Basics of Software and Hardware	3h	12%	1,2,3,4,5,6	1,2,3	1,2,3,4,5,6	Emp, SD	L,N,R,G	PE

	iv. Central Processing Unit and its function v. Computer Memory & storage vi. Application, Systems & Utility Software vii. Mobile Apps b) Operating System i. Basics of Operating system ii. Types & Functions of Operating System								
II	**Network and Communication** a) Introduction to basic Networking Terminology i. Network and its types ii. Network Topology iii. OSI Model iv. ISP and Role of ISP v. Network Protocols b) Introduction to Internet i. Concept of Internet & WWW ii. Website Address and URL iii. Modes of Connecting Internet iv. Introduction to IP Address v. Identifying and uses of IP/MAC vi. Popular Web Browsers c) Using E-mails i. Creating and sending a new E-mail	4h	13%	1,2,3,4,5,6	1,2,3	1,2,3,4,5,6	Emp, SD	L,N,R,G	PE

	ii. Replying to an E-mail message iii. Forwarding an E-mail message iv. Attaching files with email v. Email Signature vi. Social Networking & e-Commerce								
III	**Word Processor** a) Word Processing Basics i. Opening Word Processing Package ii. Title Bar, Menu Bar, Toolbars & Sidebar iii. Creating, opening & closing a new document iv. Page Setup & Printing of Documents v. PDF file and Saving a Document as PDF file vi. AutoCorrect, Spelling & Grammar vii. Find and Replace viii. Formatting the Text ix. Paragraph Indentation x. Header & Footer xi. Footnote & Endnote b) Table Manipulation i. Insert & Draw Table ii. Changing cell width and height	8h	25%	1,2,3	CO1 CO2 CO4	PSO1 PSO5	EMP, SD	L, N, R, G	PE

	iii. Alignment of Text in cell iv. Delete / Insertion of Row, Column and Merging & Splitting of Cells b) Function of Mail Merge c) Function of Macro d) Shortcut								

References	
1.	Fundamentals of computers, E balagurusamy Publisher: McGraw Hill Education; 1st edition (24 June 2009)
2.	Computer Fundamentals by Anita Goel Publisher: Pearson India Release Date: April 2010
3.	Practical Computer Literacy 3rd edition Paperback – January 1, 2011 by June Jamrich Parsons and Dan Oja (Author)
4.	A Gateway to Computer Literacy, RS Salaria, Khanna publication
5.	Fundamentals of computer, V Rajaraman Publisher: Niharika adabala ; 6Th edition (24 June 2009)
6.	Computer Fundamentals - 6Th Revised Edition by Pradeep K. Sinha Priti Sinha, BPB Publications
7.	Computer Skill (Paperback, Surender Kumar Jain) Publisher: Hans Consultancy Bureau.

PRACTICALS

	NAAC Accredited "A+"Grade Faculty of Family and Community Sciences The Maharaja Sayajirao University of Baroda	**Academic Year**	**2023-24**
B.Sc. F.C.Sc. (REGULAR) - First Year – Level 4.5			
Year	**I**	**Computer Literacy-I (Skill Enhancement Course)**	**Credits/ Hours per week**	**01/ 30 hours**
Semester	**I**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Presentations, Hands On Training, fieldwork, use of relevant statistical package		

No.	**Course Content : Practical**	**Contact Hours**	**Weightage (%)**	**BT level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	Creating, opening & closing a new document i. Page Setup & Printing of Documents ii. PDF file and Saving a Document as PDF file iii. AutoCorrect, Spelling & Grammar iv. Find and Replace v. Formatting the Text vi. Paragraph Indentation vii. Header & Footer Macro	30h	50%	1,2,3,4,5,6	1,2,3	1,2,3,4,5,6	Emp,SD	L,N,R,G	PE

Syllabus of Courses

	NAAC Accredited "A+ "Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023-24**

B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5

Year	**I**	**Indian Knowledge Systems from Family & Community Perspective** **(Value Added Course)**	**Credits / Hours per week**	**2(2+0) Credits / 2 hrs/week** **Theory: 30 Hours**
Semester	**I**	Year of Introduction: 2023-24 Year of Syllabus Revision: -2023-24	**Maximum Marks / Grade**	**O**
Mode of Transaction		Lecture		

Course Outcome (CO)

CO1. To get acquainted with Traditional Home Management Practices in India.
CO2. To understand Indian Civilization and Historical concepts of Human development in Indian Ancient writings
CO3. To gain an insight about Indian Traditional Forms of Communication
CO4. To develop an insight on sustaining Indian Traditional knowledge through textile and craft education
CO5: To understand the Indian food culture and food preferences and to enlighten the students about the Role of Traditional Foods in Health and Diseases

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Home Management Practices in India** a) Indian Hospitality Practices i. Concept of "Atithi Devo Bhava" in India ii. Role of a "Gruhini" in managing home. iii. Traditional Meal Services b) Traditional Home Decoration i. Floor Decoration ii. Wall Decoration iii. Traditional/ Culture Theme Decoration	06h	20%	1,2,3	CO1	1,2,3	EMP,ENT,SD	N	G, HV

II	**Human Development and Family Studies: Indic Perspectives** a) Brief introduction to Indian civilization and history understanding the nature of diversity in India; (cultural, regional, linguistic etc); social stratification and the underlying oneness, unity, similarity across India b) Concept of Human Development in India: 'Individual in the social world' (psychological, metaphysical, spiritual, yogic), *Purushartha* framework and human development, key terms c) (i) Childhood and child socialization, influence of gender; Ayurveda stages of childhood; importance of prenatal development, healthy children, samskara *Ashramadharma* (4 stages) and 16 *samskara;* cultural variations and rites of passage. Influence of cultural continuity and social change on Human Development, families	06h	20%	1,2,3	CO2	1,2,3	EMP, ENT	L,N,R	G, ES, HV
III	**Indian Traditional Forms of Communication** a) Importance and relevance of studying Traditional Form of Communication b) Historical Evolution of Indian forms of Communication c) Cultural Diversity in Indian Traditional Forms Communication d) Types of Indian Traditional Forms of Communication	06h	20%	1,2,3	CO3	1,2,3	EMP, ENT	L,N,R	HV

	i Folk Music, Dance, Drama ii. Culture and Rituals, Proverbs and Sayings iii Fairs and Festival Folk iv. Art and Paintings								
IV	**Sustaining Traditional Knowledge through Textile Craft Education** a) Classification of the traditional textile crafts of India (Embroidered, Woven and Painted and Printed) b) Understanding the Textile Craft landscape of Gujarat State. c) Introduction to GO's and NGO's promoting traditional crafts.	06h	20%	1,2,3	CO4	1,2,3	EMP, ENT	L,N,R	HV
V	**Introduction to Food Anthropology** a) Understanding Food culture (anthropology) b) Introduction to Food Anthropology c) History of Indian Foods d) Food Preferences & Taboos in different cultures e) Role of Traditional Foods in Health and Diseases	06h	20%	1,2	CO5	1,2,3	EMP, ENT	L,N,R	G, ES, HV

References

1.	Bhatt, P. and Goenka, S. (1990). *The Foundation of Art and Design.* Bombay: Lakhani book Depot.
2.	Das, B., Mangai, A.*, (2017) Communication and Culture in India: Insights form the Margins*
3.	Gandotra, V.; Shukul, M. and Jaiswal, N. (2010). *Introduction to Interior Design and Decoration*. Delhi: Dominant Publishers and Distributors
4.	Kakar, S. & Kakar, K. (2007). *The Indians: Portrait of a people.* New Delhi: Penguin books.
5.	Kansal ,A and Rayaprol ,A.,(2019) *Communication and Society India : Continuity and Change*
6.	Kaur, R. (2022). *Constructions of childhood in India: Exploring the personal and sociocultural contours*. New Delhi: Routledge.
7.	Khanna, A., (2016) *Traditional Media and Development in India*
8.	Malhotra, R. & Viswanathan, V. (2023). *Varna, jati, caste: A primer on Indian social structures.* New Delhi: Occam.

9.	Pandit, S. (2022). *An introduction to Psychology.* New Delhi: Sage.
10.	Sanyal, S. (2012). *Land of the seven rivers: A brief history of India's geography*. New Delhi: Pearson.
11.	Saraswathi, T. S., Menon, S., & Madan, A. (2023). *Childhoods in India: Traditions, trends and transformation.* New Delhi: Routledge.
12.	Seetharaman P. and Pannu, P. (2005). *Interior Design & Decoration*. New Delhi: CBS Publishers & Distribution
13.	Sharma, S., Agrawal B., (2015) *Communication in India Historical perspectives.*
14.	Shukul, Maneesha and GandotraVeena, (2006) Home Management and Family Finance, Dominant Publishers and Distribution, Delhi.
15.	Singh, R. K. (2009). *Atithi Devo bhavah guest management*. Chandni Chowk, Delhi: Global Media.
16.	https://www.indica.today/long-reads/sixteen-samskaras/
17.	https://www.indica.today/quick-reads/understanding-hinduism-vii-glossary-of-terms-in-hinduism/
18.	https://yoga.ayush.gov.in/Yoga-History/
19.	https://www.indica.today/long-reads/sixteen-samskaras/
20.	https://www.indica.today/quick-reads/understanding-hinduism-vii-glossary-of-terms-in-hinduism/

COURSE OFFERED TO STUDENTS OTHER THAN FOODS & NUTRITION SPECIALIZATION

SEMESTER I

NAAC Accredited "A+" Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**		**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc (FOODS & NUTRITION) - First Year – Level 5

Year	**I**	**Science of Foods (Minor Course)**	**Credits/Hours**	**4 (4 + 0) / 4 hours/week Theory:60hrs**
Semester	**I**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2023-2024	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations, videos		

Course Outcome (CO)
Course Outcome:
CO1: To impart knowledge pertaining to different food groups and nutrients and its importance in daily life.
CO2: To understand the functions of food and the role of various nutrients.
CO3 To familiarise students with different methods of cooking- their advantages and disadvantages
CO4: To understand basics of maternal and child health

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
II.	**Nutrition and health related terms:** b) Health c) Nutrition d) Food e) Balanced diet f) Nutraceuticals	4 h	7%	1,2	1,2	1	Emp	R, G	ES, G

	g) Food pyramid h) My plate i) BMR								
II	**Introduction to Farm foods** **a) Cereals and Products** i. Types of cereals: wheat, rice, millets, maize, oats ii. Cereal Products: Flaked rice, puffed rice, wheat flour and types iii. Composition and nutritive value iv. Anti-nutritional factors present in cereals and methods to eliminate them **b) Pulses and Legumes** i. Classification of legumes ii. Composition and nutritive value iii. Anti-Nutritional factors present in pulses and methods to eliminate them **c) Fruits** i. Classification of fruits ii. Composition Nutritive value and Role in cookery iii. Conservation of nutrients in fruits iv. Post-harvest changes and storage **d) Vegetables** v. Classification of vegetables vi. Composition and Nutritive value vii. Flavor compounds viii. Changes during cooking and loss of nutrients during cooking ix. Storage of vegetables **e) Salt, Sugar and Jaggery** i. Culinary role ii. Nutritive value- WHO Guidelines for using Salt and Sugars in diet **f) Nuts and Oil seeds**	25 h	42%	1,2	1,2	1	Emp	R, G	ES, G

	i. Composition and Nutritive value ii. Importance in the daily diet iii. Role of Nuts and oilseeds in Cookery								
III	**Introduction to animal foods** **a) Milk and Milk Products**: i. Composition and Nutritive value of milk from various sources and importance in daily diets ii. Fortified milk iii. Role of milk and its products in cookery **b) Eggs** i. Basic structure of an egg ii. Composition and Nutritive value and Importance in daily diet- biological value iii. Quality evaluation and grading of eggs iv. Culinary role of eggs **c) Fish** i. Classification ii. Composition and nutritive value iii. Fish cookery **d) Meat** i. Definition ii. Sources and classification iii. Nutritive value and importance in the daily diet - biological value iv. Post mortem changes in Meat: Rigor mortis, ageing **e) Fats and Oils** i. Classification of fats and oils based on origin ii. Main difference between fats and oils iii. Nutritional Significance iv. Role of Fats and Oils in cookery	25 h	42%	1,2	1,2	1	Emp	R, G	ES, G

IV	**Culinary terms and Methods cooking:** h) Introduction to different culinary terms i) Modes of heat transfer: Radiation, Conduction and Convection j) Moist heat methods: Boiling, Simmering, Poaching, Steaming, Pressure cooking k) Dry heat methods: iii. Air as medium of cooking: Grilling, broiling, roasting, baking iv. Fat as medium of cooking: Sautéing, Shallow fat frying, Deep fat frying l) Combined (Moist and dry) Methods: Braising, Stewing m) Other cooking methods: Germination, Fermentation, Braising, Microwave cooking, Solar cooking. n) Advantages and Disadvantages (Nutrient Losses) of Cooking and methods to prevent nutrient loss	6 h	9%	1,2	3	1	Emp	R, G	ES, G

Reference Books	
1	Sunetra Roday (2017). Food Science and Nutrition, Oxford University Press, ISBN-13: 978-0-19-807886-9/ ISBN-10: 0-19-807886-2
2	T. Longvah R. Ananthan K. Bhaskarachary K. Venkaiah (2017). Indian Food Composition Tables (IFCT),, Indian Council of Medical Research, National Institute of Nutrition, ASIN: B076NMYR4P
3	Srilakshmi B (2015). Food Science. Sixth edition, New Age International, New Delhi, ISBN 10: 8122438091 ISBN 13: 9788122438093
4	Srilakshmi B.(2014). Dietetics, 7th Edition, New Age International Publishers. Delhi
5	Sethi Mohini, Eram Rao (2013). Food Science Experiments and Applications. Second edition. CBS Publishers, New Delhi, ISBN 978-81-239-1693-4
6	Tejmeet Rekhi & Heena Yadav (2020). Fundamentals of Food & Nutrition. Elite Publishing House.

SEMESTER II

NEP STRUCTURE FOR FOODS AND NUTRITION UNDERGRADUATE COURSE (MAJOR: DIETETICS - GRANT IN AID PROGRAMME)			
SEMESTER	**COURSE NAME**	**CREDIT**	**COURSE TYPE**
II	Introduction to Food Science	4(3+1)	MAJOR
	Food Preservation	4(2+2)	MAJOR
	Food Microbiology & Food Safety	4(3+1)	MDC
	COURSE OFFERED TO STUDENTS OTHER THAN FOODS & NUTRITION SPECIALIZATION		
	Health and Fitness for Youth	4(4+0)	MINOR
	TOTAL	**16**	

	NAAC Accredited "A+ " Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5

Year	**I**	**Introduction to Food Science (Major Course)**	**Credits/ Hours per week**	**4 (3+1) / 5 hours/week** **Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**II**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentation		

Course Outcome (CO)

CO1: Students will acquaint with knowledge of various nutrients and their advantages.
CO2: Students will relate the role of each nutrient up in a balanced diet
CO3: Students will be able to identify the best food sources for each nutrient

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Basic Concepts in Chemistry and Moisture in Foods** a) Matter and Classification of matter: i. Physical classification: Solid, Liquid and Gases, ii. Chemical Classification: elements, compounds & mixture b) Chemical Shorthand: symbols, formulae and equations	20	30	1,2,3	1	1, 4	EMP, SD	L,N,R,G	PE

	c) Calculation of molecular mass, Equivalent weight d) Concept of atomic structure, theory of valency e) Fundamental particles of atom: electron, proton and neutron, charge and mass of electron, proton and neutron. f) Atomic number (Z), mass number (A), calculation of protons, electrons and neutrons. Isotopes, isobars and isotones (definition with examples). g) Electronic configuration of atoms h) Periodic classification of elements i) Electrolytes - Sodium (Na+), Chloride (Cl-), Potassium (K+), Magnesium (Mg++), Calcium (Ca++), Phosphate (HPO4-), Bicarbonate (HCO3-) j) Chemical Bonding: Valence electrons, Lewis symbol. Octet rule. Chemical bond (definition) and its type. k) Solution: i. Definition of solution, solute, solvent, pH ii. Acids, bases and salts iii. Concentration of solution Molarity (M), Normality (N) l) Basic aspects of organic chemistry – i. Nature and characteristics of organic compounds ii. Classification, nomenclature and general properties of organic compounds iii. General reactions of aliphatic and aromatic organic compounds m) Moisture in Foods: i. Structure of water and ice								

	ii. Properties of water – Melting point, Boiling point, Surface tension, Specific Heat, Dielectric constant, Latent heat of fusion, Vaporization and Sublimation iii. Concept of free water, entrapped water & bound water and their implications. iv. Water activity, Relative humidity v. Determination of moisture and water activity in foods - Perishable, semi-perishable and non-perishable foods.								
II	**Chemistry of Food Macronutrients** **a) Carbohydrates** i. Introduction and Classification of carbohydrates ii. Structure and Properties of monosaccharides a. Glycoside formation b. Oxidation of sugars c. Reduction d. Osazone formation e. Furfural formation iii. Structure and Properties of disaccharide iv. Structure and Properties of polysachhraides (starch, cellulose, hemicelluloses, pectin substances.) v. Functionality of carbohydrates- Gelatinization, retrogradation, dextrinization, Modified starch, Resistant starches, Inversions, glycosides vi. Browning reactions in food vii. Edible Gums: Classification & Sources viii. Properties and applications: Gum Arabic, Locust bean Gum, Seaweed polysaccharides (agar-agar,	20	30	1,2,3	2	1	EMP	L,N,R,G	PE

	alginates, carrageenan), dextran, chitin, inulin and ··glucan ix. Pectic substances and changes on cooking and processing. **b) Proteins** i. Classification, composition and structure of protein ii. Chemical Properties of proteins: Amphoterism, Binding of ions, Hydration of proteins, Precipitation with antibodies, denaturation. iii. Physical properties of proteins- Molecular weight, Solubility, Electrophoresis, iv. Functionality of proteins- hydration and solubility, gelation, denaturation, surface active properties (emulsion, colloidal system, foaming, dough texturization [gluten formation] flavour binding) **c) Lipids** i. Structure & Classification ii. Occurrence and composition of fats and oils iii. Physical properties: emulsion, shortening, crystallinity, reversion, rendering, hydrogenation, polymorphism, smoke point, flash point and fire point, rancidity and prevention of rancidity, peroxidation iv. Chemical properties: hydrolysis (Saponification value, Reichert Meissl value and Polenske value), Unsaturation (halogenation- Iodine Value, hydrogenation), Oxidation, Acid value,								

	interestification, Rancidity and Methods to prevent Rancidity								
III	Basics of Functional Foods and Food Additives i. Functional Foods a. Definition b. Types c. Health Benefits ii. Food Additives a. Definition b. Types c. Classification	5	10	1,2,3	2	1	EMP	L,N,R,G	PE
Reference Books									
1.	Sunetra Roday (2017). Food Science and Nutrition, Oxford University Press, ISBN-13: 978-0-19-807886-9/ ISBN-10: 0-19-807886-2								
2.	T. Longvah R. Ananthan K. Bhaskarachary K. Venkaiah (2017). Indian Food Composition Tables (IFCT),, Indian Council of Medical Research, National Institute of Nutrition, ASIN: B076NMYR4P								
3.	Srilakshmi B (2015). Food Science. Sixth edition, New Age International, New Delhi, ISBN 10: 8122438091 ISBN 13: 9788122438093								
4.	Sethi Mohini, Eram Rao (2011). Food Science Experiments and Applications. Second edition. CBS Publishers, New Delhi								
5.	Chopra and Panesar (2010), Food Chemistry, Narosa Publishing House								
6.	Fennema, Owen R (2008), Food Chemistry, 4rd Ed., Marcell Dekker, New York, ISBN13: 978-0-8493-6 / ISBN-10: 0-8493-9272-1								
7.	L H Meyer (2004). Food Chemistry, CBS Publishers and Distributorss Pvt. Ltd. ISBN 9788123911496								
8.	Vaclavik. (2003). Essentials of Food Science. CBS Publishers, New Delhi. ISBN: 9788181283498								
9.	Maney S (2008). Foods, Facts and Principles, 3RD Edition Published by Wiley Eastern, New Delhi. ISBN- 9788122422153 / ISBN 8122422152								
10.	Potter,N.N.and Hotchkiss,J.H (1995), Food Science, 5th Ed., Chapman & Hall, ISBN 978-1-4615-4985-7								

PRACTICALS

	NAAC Accredited "A+" Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023-24**

B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5

Year	**I**	**Introduction to Food Science (Major Course)**	**Credits/ Hours per week**	**4 (3+1) / 5 hours/week** **Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**II**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentation		

Unit No.	**Course Content : Practical**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	a) Introduction of glassware and basic equipment used in laboratory. b) Preparation of normal solution of acids and alkali (NaOH, HCl, HNO_3, H_2SO_4) c) Preparation of molar solution of acids and alkali (NaOH, HCl, HNO_3, H_2SO_4) d) Determination of strength of acids by titrimetry HCl-Na_2CO_3 e) Determination of strength of bases by titrimetry NaOH-$C_2H_2O_4$, f) Measurement of titratable acidity of fruits and Vegetable juices.	15	15	2,3,4,5	1, 2	1,4	EMP, SD	N,G	PE

II	a) Determination of gluten content and water absorption property of various flours b) Gelatinization of starch and factors affecting gelatinization. c) Effect of heat, acid, alkali on Milk protein d) Effect of heat, acid, alkali on Egg protein e) Effect of heat, acid, alkali on Plant protein f) Effect of pH and Temperature on Milk – Paneer and Kalakand g) Determination of smoke point of various oils and plasticity of fats. h) Browning in foods- i. Enzymic browning and factors affecting it. ii. Non enzymic browning (dextrinization, caramelization, Maillard reaction)	15	15	2,3,4,5	1,2	1,4	EMP, SD	N,G	PE

	NAAC Accredited "A+" Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc (FOODS & NUTRITION) - First Year – Level 4.5

Year	**I**	**Food Preservation** **(Major Course)**	**Credits/Hours**	**4 (2+2) / 6 hours/week** **Theory:30hrs; Practical:60hrs**
Semester	**II**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2023-2024	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations, videos		

Course Outcome (CO)

1. To understand the basic concepts of Food Preservation
2. To acquire knowledge regarding the developments in Food Preservation
3. To develop ability in preparing and preserving various food products by using Preservation Techniques

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
III.	**Principles of Food Preservation** i. Importance of Food Preservation ii. Prevention or delay of microbial decomposition iii. Prevention or delay of self decomposition of food iv. Prevention of damage by insects , animals, mechanical causes	3h	5%	1,2	1	1	Emp	L, N, R, G	ES, G

	v. Factors affecting Food Spoilage – temperature, moisture, oxygen, light, time vi. Intermediate – Moisture Foods vii. Edible films								
IV.	**Preservation by Heat (High temperature)** i. Effect of heat on microorganisms, Thermal Death Time curve (TDT) ii. Sterilization, Pasteurization- Batch, High Temperature- Short Time, Blanching- Fruits and vegetables, Canning- Meat and Fish iii. Advantages of drying, drying rate, changes during drying iv. Methods of drying- Sun drying (solar drying), shade drying, dehydration- air convection driers, drum or roller dryers, vacuum dryers, smoking- meat and fish, spray drying- Dried whole milk, fruit powders, drying eggs v. Irradiation – Types of ionising radiations, factors affecting radiation, effect of radiation on food	6h	10%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G
V.	**Preservation by Cold (Low temperature)** v. Effect of cold on microorganisms vi. Types of Cold Preservation – Chill storage- eggs, Cold storage, refrigeration; Freezing methods- air freezing, immersion freezing, indirect contact	6h	10%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G

	freezing; Deep freezing; Lyophilisation (Freeze-drying); Freezing of eggs, meat and fish, fruits								
VI.	**Preservation by Food Additives** i. Sugaring- Fruits; Salting- Vegetables and Fish; Pickling- control of pH, types of pickles, spoilage in pickles; Chemical preservatives- Potassium metabisulphite, Sodium benzoate, Sulphur dioxide ii. Carbonation	5h	8.4%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G
VII.	**Fermented Foods** i. Benefits of fermentation, microbial activities, control of fermentation in foods; Biopreservation and Hurdle technology ii. Breads; Traditional Indian fermented foods; Malt beverages; Vinegar, wine, alcohol	4h	6.6%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G
VIII	**Preservation of different foods** i. Cereals, pulses, spices, perishables and semi-perishables	6h	10%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G
	Reference Books								
1.	G.L. Robertson (2005); Food Packaging 'Principles and Practice' Second Edn.								
2.	RamaswamyHosahalli, MechelleMarcotte (2006); Food Processing: Principles and Applications; CRC Press								
3.	P.J Fellows (2009); Food Processing Technology; 3rd Edition; CRC WP								
4.	M. Shaffiur Rahman, (2007); Handbook of Food Preservation; Edited by, CRC Press Pvt. Ltd.								
5.	Singh A K (2015), Food Preparation and Preservation; Random Publication (New Delhi).								
6.	Shrivastava RP and Kumar S. (2015); Fruit and Vegetable Preservation- Principles and Practices; CBS Publishers and Distributors Education (India)								

7.	Potter.N.N and Hotchkiss J.H (2007); Food Science; CBS Publishers and Distributors Pvt. Ltd.
8.	Manay.N.S and Shadaksharaswamy (2014); Foods- Facts and Principles; New Age International (P) Ltd, Publishers
9.	Frazier.W.C and Westhoff.D.S (2014); Food Microbiology; McGraw Hill Education (India) Pvt Ltd
10.	Subbhulakshmi. G and Udipi. S. A (2006); Food Processing and Preservation; New Age International (P) Ltd, Publishers

	NAAC Accredited "A+" Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc (FOODS & NUTRITION) - First Year – Level 4.5

Year	**I**	**Food Preservation Practical (Major Course)**	**Credits/Hours**	**4 (2+2) / 6 hours/week Practical:60hrs**
Semester	**II**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2023-2024	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations, videos		

Course Outcome (CO)

1. Students will understand the basics of Food Preservation
2. Students will learn about the latest developments in Food Preservation

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	i. Market survey of commonly consumed preserved foods- fruit beverages, jams, tomato products, pickles, sauces, ketchups, chutneys; frozen- peas, corn, mushrooms; dehydrated powders ii. Make a list of products prepared from fruits and vegetables	4h	3.3%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G

II	**Fruit Beverages** i. Fruit juice, fruit drink, fruit squash fruit cordial, fruit punch, fruit juice concentrate, sherbets ii. Wines (Fruit)- grapes, pineapple, ginger iii. Fruit jam; apple, pineapple, guava, mix fruit iv. Wood apple jelly, orange marmalade	12h	10%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
III	**Tomato Products** Tomato juice, Tomato paste, Tomato puree, Tomato ketchup, Tomato sauce, Tomato chutney, Tomato pickle	16h	13.3 %	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
IV	**Pickles** Lemon dates pickle, carrot pickle, mix veg pickle	4h	3.3%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
V	**Sauces and Chutneys** i. Sauce- White, schezwan, pesto, chilli, chocolate, mayonnaise, plum, apple, papaya ii. Chutney- Sweet mango, apple, plum, wood apple, papaya	4h	3.3%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
VI	i. Blanching and Freezing -carrot, peas, cauliflower and corn ii. Blanching and Drying - peas, potato, carrot, French beans, mint, fenugreek leaves iii. Reconstitution of dried vegetables iv. Drying & making powders- garlic, ginger, onion, spices, orange peel, pomegranate seeds etc.	12h	10%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
VII	**Visits to Food Industries** Factory visits- pickle, jam, pulses, freeze drying, papad industries, small-scale entrepreneurs in food preservation industry	8h	6.8%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G

	NAAC Accredited "A+ " Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.S.C. (Foods and Nutrition)- First year- Level 4.5

Year	**I**	**Food Microbiology and Food Safety (Multidisciplinary Course)**	**Credits/ Hours per week**	**4 (3+1) 5 Hours/week Theory : 45 Hrs; practical : 30 Hrs**
Semester	**II**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2023-2024	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials, Presentation, Class discussions.		

Course Outcome (CO)

CO1: Students will understand the history of microbiology, basic characteristics of micro-organisms, their role in food spoilage and food borne illnesses

CO2: Students will gain knowledge on microbiology of water and its treatment

CO3: Knowledge will be gained with respect to culture its types and preservation techniques

CO4: students will learn about the role of prebiotics and prebiotics in health and disease.

CO5: Students will be able to enumerate and identify different types of microorganisms-and study basic laboratory techniques

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**Discovery of Microbiology** a. Scope of microbiology b. Contribution of various scientists in establishment of different theories: i. Discovery of Theory of spontaneous generation of life ii. Germ theory of fermentation and decay iii. Germ theory of disease	10	10%	1,2,3	1	1,2,3,4	EMP	G	ES HV

II	**Classification and reproduction of Bacteria, Yeast, Mould and Virus** a. Morphological details b. Classification and nomenclature c. Requirement for their growth d. Reproduction e. Definition & different types of culture media f. Use of good bacteria in fermentation	11	15%	1,2,3,4	1	1,2,3, 4	EMP	G	ES HV
III	**Introduction to Food Toxicology** a. Importance of Food toxicology b. Determining Toxicity c. Dose Effect and Dose Response **Biological Toxins and chemical toxin** a. Naturally occurring toxins in foods b. Toxins from processed foods c. Seafood toxins d. Chemicals used for pest management during farming, storage and transportation (Pesticides) – Organo Chlorines, Organophosphates, carbamates heavy metals – Cd, Pb, Ni, Hg, Tin	10	15%	1,2,3,4	2	1,2,3, 4	EMP	G	ES HV
IV	**Microbial contamination of Food** a. Contamination of Cereals, pulses, fish, milk and milk products, meat and meat product, fats, spices and condiments, fruits and vegetables b. Disease microbiology	9	15 %	1,2,3,4,5	2	1,2,3, 4	EMP	G	ES HV
V	**Probiotics and Prebiotics** a. Definition and types b. Sources c. Role of prebiotics and probiotics & its mechanism in health and diseases	5	15%	1,2,3,4	4	1,2,3, 4	EMP	G	ES HV
Reference Books									
1	Pelczar MJ, Chan ECS and Krieg NR (2008). Microbiology (5th ed.). Tata McGraw Hill Publishing Co Ltd, New Delhi								
2	Jay JM (2004). Modern Food Microbiology (7th ed.) CBS Publishers and Distributors, Springer Publications, Delhi								

3	Sheth M and Sukul S (2009). Food Safety Training Manual for food service
4	Frazier (2017). Food Microbiology. McGraw Hill Education
5	Garg (2010). Laboratory Manual of Food Microbiology. I. K. International Publishing House Pvt. Ltd.

NEP STRUCTURE FOR FOODS AND NUTRITION UNDERGRADUATE COURSE (MAJOR: FOOD SCIENCE & QUALITY CONTOL - GRANT IN AID PROGRAMME)			
SEMESTER	**COURSE NAME**	**CREDIT**	**COURSE TYPE**
II	Basics of Food Science	4(3+1)	MAJOR
	Fundamentals of Food Preservation	4(2+2)	MAJOR
	Food Microbiology and Toxicology	4(3+1)	MDC
	TOTAL	**12**	

	NAAC Accredited "A+ " Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5

Year	**I**	**Basics of Food Science (Major Course)**	**Credits/ Hours per week**	**4 (3+1) / 5 hours/week Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**II**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentation		

Course Outcome (CO)

CO1: Students will acquaint with knowledge of various nutrients and their advantages.
CO2: Students will relate the role of each nutrient up in a balanced diet
CO3: Students will be able to identify the best food sources for each nutrient

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent /SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Basic Concepts in Chemistry and Moisture in Foods** n) Matter and Classification of matter: iii. Physical classification: Solid, Liquid and Gases, iv. Chemical Classification: elements, compounds & mixture o) Chemical Shorthand: symbols, formulae and equations	20	30	1,2,3	1	1, 4	EMP, SD	L,N,R,G	PE

	p) Calculation of molecular mass, Equivalent weight q) Concept of atomic structure, theory of valency r) Fundamental particles of atom: electron, proton and neutron, charge and mass of electron, proton and neutron. s) Atomic number (Z), mass number (A), calculation of protons, electrons and neutrons. Isotopes, isobars and isotones (definition with examples). t) Electronic configuration of atoms u) Periodic classification of elements v) Electrolytes - Sodium (Na+), Chloride (Cl-), Potassium (K+), Magnesium (Mg++), Calcium (Ca++), Phosphate (HPO4-), Bicarbonate (HCO3-) w) Chemical Bonding: Valence electrons, Lewis symbol. Octet rule. Chemical bond (definition) and its type. x) Solution: iv. Definition of solution, solute, solvent, pH v. Acids, bases and salts vi. Concentration of solution Molarity (M), Normality (N) y) Basic aspects of organic chemistry – iv. Nature and characteristics of organic compounds v. Classification, nomenclature and general properties of organic compounds vi. General reactions of aliphatic and aromatic organic compounds z) Moisture in Foods: vi. Structure of water and ice								

	vii. Properties of water – Melting point, Boiling point, Surface tension, Specific Heat, Dielectric constant, Latent heat of fusion, Vaporization and Sublimation viii. Concept of free water, entrapped water & bound water and their implications. ix. Water activity, Relative humidity x. Determination of moisture and water activity in foods - Perishable, semi-perishable and non-perishable foods.								
II	**Chemistry of Food Macronutrients** **d) Carbohydrates** x. Introduction and Classification of carbohydrates xi. Structure and Properties of monosaccharides f. Glycoside formation g. Oxidation of sugars h. Reduction i. Osazone formation j. Furfural formation xii. Structure and Properties of disaccharide xiii. Structure and Properties of polysachhraides (starch, cellulose, hemicelluloses, pectin substances.) xiv. Functionality of carbohydrates- Gelatinization, retrogradation, dextrinization, Modified starch, Resistant starches, Inversions, glycosides xv. Browning reactions in food xvi. Edible Gums: Classification & Sources xvii. Properties and applications: Gum Arabic, Locust bean Gum, Seaweed polysaccharides (agar-agar,	20	30	1,2,3	2	1	EMP	L,N,R,G	PE

	alginates, carrageenan), dextran, chitin, inulin and ··glucan xviii. Pectic substances and changes on cooking and processing. **e) Proteins** v. Classification, composition and structure of protein vi. Chemical Properties of proteins: Amphoterism, Binding of ions, Hydration of proteins, Precipitation with antibodies, denaturation. vii. Physical properties of proteins- Molecular weight, Solubility, Electrophoresis, viii. Functionality of proteins- hydration and solubility, gelation, denaturation, surface active properties (emulsion, colloidal system, foaming, dough texturization [gluten formation] flavour binding) **f) Lipids** v. Structure & Classification vi. Occurrence and composition of fats and oils vii. Physical properties: emulsion, shortening, crystallinity, reversion, rendering, hydrogenation, polymorphism, smoke point, flash point and fire point, rancidity and prevention of rancidity, peroxidation viii. Chemical properties: hydrolysis (Saponification value, Reichert Meissl value and Polenske value), Unsaturation (halogenation- Iodine Value, hydrogenation), Oxidation, Acid value,								

	interestification, Rancidity and Methods to prevent Rancidity								
III	Basics of Functional Foods and Food Additives i. Functional Foods a. Definition b. Types c. Health Benefits ii. Food Additives a. Definition b. Types c. Classification	5	10	1,2,3	2	1	EMP	L,N,R,G	PE
Reference Books									
1.	Sunetra Roday (2017). Food Science and Nutrition, Oxford University Press, ISBN-13: 978-0-19-807886-9/ ISBN-10: 0-19-807886-2								
2.	T. Longvah R. Ananthan K. Bhaskarachary K. Venkaiah (2017). Indian Food Composition Tables (IFCT),, Indian Council of Medical Research, National Institute of Nutrition, ASIN: B076NMYR4P								
3.	Srilakshmi B (2015). Food Science. Sixth edition, New Age International, New Delhi, ISBN 10: 8122438091 ISBN 13: 9788122438093								
4.	Sethi Mohini, Eram Rao (2011). Food Science Experiments and Applications. Second edition. CBS Publishers, New Delhi								
5.	Chopra and Panesar (2010), Food Chemistry, Narosa Publishing House								
6.	Fennema, Owen R (2008), Food Chemistry, 4rd Ed., Marcell Dekker, New York, ISBN13: 978-0-8493-6 / ISBN-10: 0-8493-9272-1								
7.	L H Meyer (2004). Food Chemistry, CBS Publishers and Distributorss Pvt. Ltd. ISBN 9788123911496								
8.	Vaclavik. (2003). Essentials of Food Science. CBS Publishers, New Delhi. ISBN: 9788181283498								
9.	Maney S (2008). Foods, Facts and Principles, 3RD Edition Published by Wiley Eastern, New Delhi. ISBN- 9788122422153 / ISBN 8122422152								
10.	Potter,N.N.and Hotchkiss,J.H (1995), Food Science, 5th Ed., Chapman & Hall, ISBN 978-1-4615-4985-7								

PRACTICALS

NAAC Accredited "A+" Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**		**Academic Year**	**2023-24**
B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5			
Year	**I**	**Basics of Food Science (Major Course)**	**Credits/ Hours per week**	**4 (3+1) / 5 hours/week** **Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**II**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentation		

Unit No.	**Course Content : Practical**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	g) Introduction of glassware and basic equipment used in laboratory. h) Preparation of normal solution of acids and alkali (NaOH, HCl, HNO_3, H_2SO_4) i) Preparation of molar solution of acids and alkali (NaOH, HCl, HNO_3, H_2SO_4) j) Determination of strength of acids by titrimetry HCl-Na_2CO_3 k) Determination of strength of bases by titrimetry NaOH-$C_2H_2O_4$, l) Measurement of titratable acidity of fruits and Vegetable juices.	15	15	2,3,4,5	1, 2	1,4	EMP, SD	N,G	PE

II	i) Determination of gluten content and water absorption property of various flours j) Gelatinization of starch and factors affecting gelatinization. k) Effect of heat, acid, alkali on Milk protein l) Effect of heat, acid, alkali on Egg protein m) Effect of heat, acid, alkali on Plant protein n) Effect of pH and Temperature on Milk – Paneer and Kalakand o) Determination of smoke point of various oils and plasticity of fats. p) Browning in foods- iii. Enzymic browning and factors affecting it. iv. Non enzymic browning (dextrinization, caramelization, Maillard reaction)	15	15	2,3,4,5	1,2	1,4	EMP, SD	N,G	PE

	NAAC Accredited "A+" Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc (FOODS & NUTRITION) - First Year – Level 4.5

Year	**I**	**Fundamentals of Food Preservation** **(Major Course)**	**Credits/Hours**	**4 (2+2) / 6 hours/week** **Theory:30hrs; Practical:60hrs**
Semester	**II**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2023-2024	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations, videos		

Course Outcome (CO)

1. To understand the basic concepts of Food Preservation
2. To acquire knowledge regarding the developments in Food Preservation
3. To develop ability in preparing and preserving various food products by using Preservation Techniques

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
IX.	**Principles of Food Preservation** i. Importance of Food Preservation ii. Prevention or delay of microbial decomposition iii. Prevention or delay of self decomposition of food iv. Prevention of damage by insects , animals, mechanical causes v. Factors affecting Food Spoilage – temperature, moisture, oxygen, light, time	3h	5%	1,2	1	1	Emp	L, N, R, G	ES, G

	vi. Intermediate – Moisture Foods vii. Edible films								
X.	**Preservation by Heat (High temperature)** i. Effect of heat on microorganisms, Thermal Death Time curve (TDT) ii. Sterilization, Pasteurization- Batch, High Temperature- Short Time, Blanching- Fruits and vegetables, Canning- Meat and Fish iii. Advantages of drying, drying rate, changes during drying iv. Methods of drying- Sun drying (solar drying), shade drying, dehydration- air convection driers, drum or roller dryers, vacuum dryers, smoking- meat and fish, spray drying- Dried whole milk, fruit powders, drying eggs v. Irradiation – Types of ionising radiations, factors affecting radiation, effect of radiation on food	6h	10%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G
XI.	**Preservation by Cold (Low temperature)** i. Effect of cold on microorganisms ii. Types of Cold Preservation – Chill storage- eggs, Cold storage, refrigeration; Freezing methods- air freezing, immersion freezing, indirect contact freezing; Deep freezing; Lyophilisation (Freeze-drying); Freezing of eggs, meat and fish, fruits	6h	10%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G
XII.	**Preservation by Food Additives**	5h	8.4%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G

	i. Sugaring- Fruits; Salting- Vegetables and Fish; Pickling- control of pH, types of pickles, spoilage in pickles; Chemical preservatives- Potassium metabisulphite, Sodium benzoate, Sulphur dioxide ii. Carbonation								
XIII	**Fermented Foods** i. Benefits of fermentation, microbial activities, control of fermentation in foods; Biopreservation and Hurdle technology ii. Breads; Traditional Indian fermented foods; Malt beverages; Vinegar, wine, alcohol	4h	6.6%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G
XIV	**Preservation of different foods** i. Cereals, pulses, spices, perishables and semi- perishables	6h	10%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G
	Reference Books								
1.	G.L. Robertson (2005); Food Packaging 'Principles and Practice' Second Edn.								
2.	RamaswamyHosahalli, MechelleMarcotte (2006); Food Processing: Principles and Applications; CRC Press								
3.	P.J Fellows (2009); Food Processing Technology; 3rd Edition; CRC WP								
4.	M. Shaffiur Rahman, (2007); Handbook of Food Preservation; Edited by, CRC Press Pvt. Ltd.								
5.	Singh A K (2015), Food Preparation and Preservation; Random Publication (New Delhi).								
6.	Shrivastava RP and Kumar S. (2015); Fruit and Vegetable Preservation- Principles and Practices; CBS Publishers and Distributors Education (India)								
7.	Potter.N.N and Hotchkiss J.H (2007); Food Science; CBS Publishers and Distributors Pvt. Ltd.								
8.	Manay.N.S and Shadaksharaswamy (2014); Foods- Facts and Principles; New Age International (P) Ltd, Publishers								
9.	Frazier.W.C and Westhoff.D.S (2014); Food Microbiology; McGraw Hill Education (India) Pvt Ltd								
10.	Subbhulakshmi. G and Udipi. S. A (2006); Food Processing and Preservation; New Age International (P) Ltd, Publishers								

	NAAC Accredited "A+" Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc (FOODS & NUTRITION) - First Year – Level 4.5

Year	**I**	**Fundamentals of Food Preservation Practical** **(Major Course)**	**Credits/Hours**	**4 (2+2) / 6 hours/week** **Practical:60hrs**
Semester	**II**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2023-2024	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations, videos		

Course Outcome (CO)

1. Students will understand the basics of Food Preservation
2. Students will learn about the latest developments in Food Preservation

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	i. Market survey of commonly consumed preserved foods- fruit beverages, jams, tomato products, pickles, sauces, ketchups, chutneys; frozen- peas, corn, mushrooms; dehydrated powders ii. Make a list of products prepared from fruits and vegetables	4h	3.3%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G

II	**Fruit Beverages** i. Fruit juice, fruit drink, fruit squash fruit cordial, fruit punch, fruit juice concentrate, sherbets ii. Wines (Fruit)- grapes, pineapple, ginger iii. Fruit jam; apple, pineapple, guava, mix fruit iv. Wood apple jelly, orange marmalade	12h	10%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
III	**Tomato Products** Tomato juice, Tomato paste, Tomato puree, Tomato ketchup, Tomato sauce, Tomato chutney, Tomato pickle	16h	13.3 %	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
IV	**Pickles** Lemon dates pickle, carrot pickle, mix veg pickle	4h	3.3%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
V	**Sauces and Chutneys** i. Sauce- White, schezwan, pesto, chilli, chocolate, mayonnaise, plum, apple, papaya ii. Chutney- Sweet mango, apple, plum, wood apple, papaya	4h	3.3%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
VI	i. Blanching and Freezing -carrot, peas, cauliflower and corn ii. Blanching and Drying - peas, potato, carrot, French beans, mint, fenugreek leaves iii. Reconstitution of dried vegetables iv. Drying & making powders- garlic, ginger, onion, spices, orange peel, pomegranate seeds etc.	12h	10%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
VII	**Visits to Food Industries** Factory visits- pickle, jam, pulses, freeze drying, papad industries, small-scale entrepreneurs in food preservation industry	8h	6.8%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G

	NAAC Accredited "A+ " Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.S.C. (Foods and Nutrition)- First year- Level 4.5

Year	**I**	**Food Microbiology and Toxicology (Multidisciplinary Course)**	**Credits/ Hours per week**	**4 (3+1) 5 Hours/week Theory : 45 Hrs; practical : 30 Hrs**
Semester	**II**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2023-2024	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials, Presentation, Class discussions.		

Course Outcome (CO)

CO1: Students will understand the history of microbiology, basic characteristics of micro-organisms, their role in food spoilage and food borne illnesses

CO2: Students will gain knowledge on microbiology of water and its treatment

CO3: Knowledge will be gained with respect to culture its types and preservation techniques

CO4: students will learn about the role of prebiotics and prebiotics in health and disease.

CO5: Students will be able to enumerate and identify different types of microorganisms-and study basic laboratory techniques

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**Discovery of Microbiology** a. Scope of microbiology b. Contribution of various scientists in establishment of different theories: i. Discovery of Theory of spontaneous generation of life ii. Germ theory of fermentation and decay iii. Germ theory of disease	10	10%	1,2,3	1	1,2,3,4	EMP	G	ES HV

II	**Classification and reproduction of Bacteria, Yeast, Mould and Virus** a. Morphological details b. Classification and nomenclature c. Requirement for their growth d. Reproduction e. Definition & different types of culture media f. Use of good bacteria in fermentation	11	15%	1,2,3,4	1	1,2,3, 4	EMP	G	ES HV
III	**Introduction to Food Toxicology** a. Importance of Food toxicology b. Determining Toxicity c. Dose Effect and Dose Response **Biological Toxins and chemical toxin** a. Naturally occurring toxins in foods b. Toxins from processed foods c. Seafood toxins d. Chemicals used for pest management during farming, storage and transportation (Pesticides) – Organo Chlorines, Organophosphates, carbamates heavy metals – Cd, Pb, Ni, Hg, Tin	10	15%	1,2,3,4	2	1,2,3, 4	EMP	G	ES HV
IV	**Microbial contamination of Food** a. Contamination of Cereals, pulses, fish, milk and milk products, meat and meat product, fats, spices and condiments, fruits and vegetables b. Disease microbiology	9	15 %	1,2,3,4,5	2	1,2,3, 4	EMP	G	ES HV
V	**Probiotics and Prebiotics** a. Definition and types b. Sources c. Role of prebiotics and probiotics & its mechanism in health and diseases	5	15%	1,2,3,4	4	1,2,3, 4	EMP	G	ES HV
Reference Books									
1	Pelczar MJ, Chan ECS and Krieg NR (2008). Microbiology (5th ed.). Tata McGraw Hill Publishing Co Ltd, New Delhi								
2	Jay JM (2004). Modern Food Microbiology (7th ed.) CBS Publishers and Distributors, Springer Publications, Delhi								

3	Sheth M and Sukul S (2009). Food Safety Training Manual for food service
4	Frazier (2017). Food Microbiology. McGraw Hill Education
5	Garg (2010). Laboratory Manual of Food Microbiology. I. K. International Publishing House Pvt. Ltd.

PRACTICALS

	NAAC Accredited "A+" Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**		**Academic Year**	**2023 -24**
B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5				
Year	**I**	**Food Microbiology and Toxicology (Multidisciplinary Course)**	**Credits /Hours per week**	**4 (3 + 1)/ 5 hrs per week**
Semester	**II**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Labs, demonstrations		

Course Outcome (CO)
Course Outcome:
CO1: Students will understand the history of microbiology, basic characteristics of micro-organisms, their role in food spoilage and food borne illnesses
CO2: Students will gain knowledge on microbiology of water and its treatment
CO3: Knowledge will be gained with respect to culture its types and preservation techniques
CO4: students will learn about the role of prebiotics and prebiotics in health and disease.
CO5: Students will be able to enumerate and identify different types of microorganisms-and study basic laboratory techniques

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**Glassware Sterilization** Types of Sterilization and their principles a. Dry heat sterilization b. Hot air Oven c. Moist heat sterilization d. Autoclave	10	5%	1,2,3	1	1,2,3, 4	SD	G	ES, HV

II	**Basic microbiological techniques** **Understanding different types of microscopy and their principles** a. Simple microscopy b. Compound microscopy c. Electron microscopy d. Media e. Preparation of media, storage and sterilization	5	10%	1,2,3,4	1	1,2,3, 4	SD	G	ES, HV
III	**Determination of Bacteria in air, food and water** a. Preparation of nutrient agar and dilution b. Preparation of dilution blank c. Most probable number technique for water d. To determine the safety of water using rapid methods e. To determine microorganisms in air samples of different places f. To determination of yeast, molds and Coliforms in food samples using different technique	10	10%	1,2,3,4	2	1,2,3, 4	SD	G	ES HV
IV	**Importance of Grams staining technique** a. Principle of grams staining technique b. To perform Grams staining technique and observe under the microscope to determine it gram positive bacteria or gram negative.	5	5 %	1,2,3,4,5	2	1,2,3, 4	SD	G	ES HV

NEP STRUCTURE FOR FOODS AND NUTRITION UNDERGRADUATE COURSE (MAJOR: PUBLIC HEALTH NUTRITION - GRANT IN AID PROGRAMME)			
SEMESTER	**COURSE NAME**	**CREDIT**	**COURSE TYPE**
II	Fundamentals of Food Science	4(3+1)	MAJOR
	Basics of Food Preservation	4(2+2)	MAJOR
	Basic Microbiology & Food Safety	4(3+1)	MDC
	TOTAL	**12**	

	NAAC Accredited "A+" Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5				
Year	**I**	**Fundamentals of Food Science (Major Course)**	**Credits/ Hours per week**	**4 (3+1) / 5 hours/week** **Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**II**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentation		

Course Outcome (CO)

CO1: Students will acquaint with knowledge of various nutrients and their advantages.
CO2: Students will relate the role of each nutrient up in a balanced diet
CO3: Students will be able to identify the best food sources for each nutrient

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent /SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Basic Concepts in Chemistry and Moisture in Foods** aa) Matter and Classification of matter: v. Physical classification: Solid, Liquid and Gases, vi. Chemical Classification: elements, compounds & mixture	20	30	1,2,3	1	1, 4	EMP, SD	L,N,R,G	PE

	bb) Chemical Shorthand: symbols, formulae and equations cc) Calculation of molecular mass, Equivalent weight dd) Concept of atomic structure, theory of valency ee) Fundamental particles of atom: electron, proton and neutron, charge and mass of electron, proton and neutron. ff) Atomic number (Z), mass number (A), calculation of protons, electrons and neutrons. Isotopes, isobars and isotones (definition with examples). gg) Electronic configuration of atoms hh) Periodic classification of elements ii) Electrolytes - Sodium (Na+), Chloride (Cl-), Potassium (K+), Magnesium (Mg++), Calcium (Ca++), Phosphate (HPO4-), Bicarbonate (HCO3-) jj) Chemical Bonding: Valence electrons, Lewis symbol. Octet rule. Chemical bond (definition) and its type. kk) Solution: vii. Definition of solution, solute, solvent, pH viii. Acids, bases and salts ix. Concentration of solution Molarity (M), Normality (N) ll) Basic aspects of organic chemistry – vii. Nature and characteristics of organic compounds viii. Classification, nomenclature and general properties of organic compounds ix. General reactions of aliphatic and aromatic organic compounds								

	mm) Moisture in Foods: xi. Structure of water and ice xii. Properties of water – Melting point, Boiling point, Surface tension, Specific Heat, Dielectric constant, Latent heat of fusion, Vaporization and Sublimation xiii. Concept of free water, entrapped water & bound water and their implications. xiv. Water activity, Relative humidity xv. Determination of moisture and water activity in foods - Perishable, semi-perishable and non-perishable foods.								
II	**Chemistry of Food Macronutrients** **g) Carbohydrates** xix. Introduction and Classification of carbohydrates xx. Structure and Properties of monosaccharides k. Glycoside formation l. Oxidation of sugars m. Reduction n. Osazone formation o. Furfural formation xxi. Structure and Properties of disaccharide xxii. Structure and Properties of polysachhraides (starch, cellulose, hemicelluloses, pectin substances.) xxiii. Functionality of carbohydrates- Gelatinization, retrogradation, dextrinization, Modified starch, Resistant starches, Inversions, glycosides xxiv. Browning reactions in food xxv. Edible Gums: Classification & Sources	20	30	1,2,3	2	1	EMP	L,N,R,G	PE

	xxvi. Properties and applications: Gum Arabic, Locust bean Gum, Seaweed polysaccharides (agar-agar, alginates, carrageenan), dextran, chitin, inulin and ‥glucan xxvii. Pectic substances and changes on cooking and processing. **h) Proteins** ix. Classification, composition and structure of protein x. Chemical Properties of proteins: Amphoterism, Binding of ions, Hydration of proteins, Precipitation with antibodies, denaturation. xi. Physical properties of proteins- Molecular weight, Solubility, Electrophoresis, xii. Functionality of proteins- hydration and solubility, gelation, denaturation, surface active properties (emulsion, colloidal system, foaming, dough texturization [gluten formation] flavour binding) **i) Lipids** ix. Structure & Classification x. Occurrence and composition of fats and oils xi. Physical properties: emulsion, shortening, crystallinity, reversion, rendering, hydrogenation, polymorphism, smoke point, flash point and fire point, rancidity and prevention of rancidity, peroxidation xii. Chemical properties: hydrolysis (Saponification value, Reichert Meissl value and Polenske value), Unsaturation (halogenation- Iodine								

	Value, hydrogenation), Oxidation, Acid value, interestification, Rancidity and Methods to prevent Rancidity								
III	Basics of Functional Foods and Food Additives i. Functional Foods a. Definition b. Types c. Health Benefits ii. Food Additives a. Definition b. Types c. Classification	5	10	1,2,3	2	1	EMP	L,N,R,G	PE

Reference Books	
1.	Sunetra Roday (2017). Food Science and Nutrition, Oxford University Press, ISBN-13: 978-0-19-807886-9/ ISBN-10: 0-19-807886-2
2.	T. Longvah R. Ananthan K. Bhaskarachary K. Venkaiah (2017). Indian Food Composition Tables (IFCT),, Indian Council of Medical Research, National Institute of Nutrition, ASIN: B076NMYR4P
3.	Srilakshmi B (2015). Food Science. Sixth edition, New Age International, New Delhi, ISBN 10: 8122438091 ISBN 13: 9788122438093
4.	Sethi Mohini, Eram Rao (2011). Food Science Experiments and Applications. Second edition. CBS Publishers, New Delhi
5.	Chopra and Panesar (2010), Food Chemistry, Narosa Publishing House
6.	Fennema, Owen R (2008), Food Chemistry, 4rd Ed., Marcell Dekker, New York, ISBN13: 978-0-8493-6 / ISBN-10: 0-8493-9272-1
7.	L H Meyer (2004). Food Chemistry, CBS Publishers and Distributorss Pvt. Ltd. ISBN 9788123911496
8.	Vaclavik. (2003). Essentials of Food Science. CBS Publishers, New Delhi. ISBN: 9788181283498
9.	Maney S (2008). Foods, Facts and Principles, 3RD Edition Published by Wiley Eastern, New Delhi. ISBN- 9788122422153 / ISBN 8122422152
10.	Potter,N.N.and Hotchkiss,J.H (1995), Food Science, 5th Ed., Chapman & Hall, ISBN 978-1-4615-4985-7

PRACTICALS

	NAAC Accredited "A+" Grade Faculty Of Family and Community Sciences The Maharaja Sayajirao University of Baroda		**Academic Year**	**2023-24**
B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5				
Year	**I**	**Fundamentals of Food Science (Major Course)**	**Credits/ Hours per week**	**4 (3+1) / 5 hours/week Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**II**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentation		

Unit No.	**Course Content : Practical**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	a) Introduction of glassware and basic equipment used in laboratory. b) Preparation of normal solution of acids and alkali (NaOH, HCl, HNO_3, H_2SO_4) c) Preparation of molar solution of acids and alkali (NaOH, HCl, HNO_3, H_2SO_4) d) Determination of strength of acids by titrimetry HCl-Na_2CO_3 e) Determination of strength of bases by titrimetry NaOH-$C_2H_2O_4$, f) Measurement of titratable acidity of fruits and Vegetable juices.	15	15	2,3,4,5	1, 2	1,4	EMP, SD	N,G	PE

II	q) Determination of gluten content and water absorption property of various flours r) Gelatinization of starch and factors affecting gelatinization. s) Effect of heat, acid, alkali on Milk protein t) Effect of heat, acid, alkali on Egg protein u) Effect of heat, acid, alkali on Plant protein v) Effect of pH and Temperature on Milk – Paneer and Kalakand w) Determination of smoke point of various oils and plasticity of fats. x) Browning in foods- v. Enzymic browning and factors affecting it. vi. Non enzymic browning (dextrinization, caramelization, Maillard reaction)	15	15	2,3,4,5	1,2	1,4	EMP, SD	N,G	PE

NAAC Accredited "A+" Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**		**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc (FOODS & NUTRITION) - First Year – Level 4.5

Year	**I**	**Basics of Food Preservation** **(Major Course)**	**Credits/Hours**	**4 (2+2) / 6 hours/week** **Theory:30hrs; Practical:60hrs**
Semester	**II**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2023-2024	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations, videos		

Course Outcome (CO)

1. To understand the basic concepts of Food Preservation
2. To acquire knowledge regarding the developments in Food Preservation
3. To develop ability in preparing and preserving various food products by using Preservation Techniques

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
XV.	**Principles of Food Preservation** i. Importance of Food Preservation ii. Prevention or delay of microbial decomposition iii. Prevention or delay of self decomposition of food iv. Prevention of damage by insects , animals, mechanical causes	3h	5%	1,2	1	1	Emp	L, N, R, G	ES, G

	v. Factors affecting Food Spoilage – temperature, moisture, oxygen, light, time vi. Intermediate – Moisture Foods vii. Edible films								
XVI	**Preservation by Heat (High temperature)** i. Effect of heat on microorganisms, Thermal Death Time curve (TDT) ii. Sterilization, Pasteurization- Batch, High Temperature- Short Time, Blanching- Fruits and vegetables, Canning- Meat and Fish iii. Advantages of drying, drying rate, changes during drying iv. Methods of drying- Sun drying (solar drying), shade drying, dehydration- air convection driers, drum or roller dryers, vacuum dryers, smoking- meat and fish, spray drying- Dried whole milk, fruit powders, drying eggs v. Irradiation – Types of ionising radiations, factors affecting radiation, effect of radiation on food	6h	10%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G
XVI	**Preservation by Cold (Low temperature)** i. Effect of cold on microorganisms ii. Types of Cold Preservation – Chill storage- eggs, Cold storage, refrigeration; Freezing methods- air freezing, immersion freezing, indirect contact	6h	10%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G

	freezing; Deep freezing; Lyophilisation (Freeze-drying); Freezing of eggs, meat and fish, fruits								
XVI	**Preservation by Food Additives** i. Sugaring- Fruits; Salting- Vegetables and Fish; Pickling- control of pH, types of pickles, spoilage in pickles; Chemical preservatives- Potassium metabisulphite, Sodium benzoate, Sulphur dioxide ii. Carbonation	5h	8.4%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G
XIX	**Fermented Foods** i. Benefits of fermentation, microbial activities, control of fermentation in foods; Biopreservation and Hurdle technology ii. Breads; Traditional Indian fermented foods; Malt beverages; Vinegar, wine, alcohol	4h	6.6%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G
XX.	**Preservation of different foods** i. Cereals, pulses, spices, perishables and semi- perishables	6h	10%	1,2	1,2	1,2	Emp	L, N, R, G	ES, G
	Reference Books								
1.	G.L. Robertson (2005); Food Packaging 'Principles and Practice' Second Edn.								
2.	RamaswamyHosahalli, MechelleMarcotte (2006); Food Processing: Principles and Applications; CRC Press								
3.	P.J Fellows (2009); Food Processing Technology; 3rd Edition; CRC WP								
4.	M. Shaffiur Rahman, (2007); Handbook of Food Preservation; Edited by, CRC Press Pvt. Ltd.								
5.	Singh A K (2015), Food Preparation and Preservation; Random Publication (New Delhi).								

6.	Shrivastava RP and Kumar S. (2015); Fruit and Vegetable Preservation- Principles and Practices; CBS Publishers and Distributors Education (India)
7.	Potter.N.N and Hotchkiss J.H (2007); Food Science; CBS Publishers and Distributors Pvt. Ltd.
8.	Manay.N.S and Shadaksharaswamy (2014); Foods- Facts and Principles; New Age International (P) Ltd, Publishers
9.	Frazier.W.C and Westhoff.D.S (2014); Food Microbiology; McGraw Hill Education (India) Pvt Ltd
10.	Subbhulakshmi. G and Udipi. S. A (2006); Food Processing and Preservation; New Age International (P) Ltd, Publishers

	NAAC Accredited "A+" Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc (FOODS & NUTRITION) - First Year – Level 4.5

Year	**I**	**Basics of Food Preservation Practical** **(Major Course)**	**Credits/Hours**	**4 (2+2) / 6 hours/week** **Practical:60hrs**
Semester	**II**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2023-2024	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations, videos		

Course Outcome (CO)

1. Students will understand the basics of Food Preservation
2. Students will learn about the latest developments in Food Preservation

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	i. Market survey of commonly consumed preserved foods- fruit beverages, jams, tomato products, pickles, sauces, ketchups, chutneys; frozen- peas, corn, mushrooms; dehydrated powders ii. Make a list of products prepared from fruits and vegetables	4h	3.3%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G

II	**Fruit Beverages** i. Fruit juice, fruit drink, fruit squash fruit cordial, fruit punch, fruit juice concentrate, sherbets ii. Wines (Fruit)- grapes, pineapple, ginger iii. Fruit jam; apple, pineapple, guava, mix fruit iv. Wood apple jelly, orange marmalade	12h	10%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
III	**Tomato Products** Tomato juice, Tomato paste, Tomato puree, Tomato ketchup, Tomato sauce, Tomato chutney, Tomato pickle	16h	13.3 %	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
IV	**Pickles** Lemon dates pickle, carrot pickle, mix veg pickle	4h	3.3%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
V	**Sauces and Chutneys** i. Sauce- White, schezwan, pesto, chilli, chocolate, mayonnaise, plum, apple, papaya ii. Chutney- Sweet mango, apple, plum, wood apple, papaya	4h	3.3%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
VI	i. Blanching and Freezing -carrot, peas, cauliflower and corn ii. Blanching and Drying - peas, potato, carrot, French beans, mint, fenugreek leaves iii. Reconstitution of dried vegetables iv. Drying & making powders- garlic, ginger, onion, spices, orange peel, pomegranate seeds etc.	12h	10%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G
VII	**Visits to Food Industries** Factory visits- pickle, jam, pulses, freeze drying, papad industries, small-scale entrepreneurs in food preservation industry	8h	6.8%	1,2,3	1,2	1,2	Emp	L, N, R, G	ES, G

	NAAC Accredited "A+ " Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.S.C. (Foods and Nutrition)- First year- Level 4.5

Year	**I**	**Basic Microbiology and Food Safety (Multidisciplinary Course)**	**Credits/ Hours per week**	**4 (3+1) 5 Hours/week Theory : 45 Hrs; practical : 30 Hrs**
Semester	**II**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2023-2024	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials, Presentation, Class discussions.		

Course Outcome (CO)

CO1: Students will understand the history of microbiology, basic characteristics of micro-organisms, their role in food spoilage and food borne illnesses

CO2: Students will gain knowledge on microbiology of water and its treatment

CO3: Knowledge will be gained with respect to culture its types and preservation techniques

CO4: students will learn about the role of prebiotics and prebiotics in health and disease.

CO5: Students will be able to enumerate and identify different types of microorganisms-and study basic laboratory techniques

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**Discovery of Microbiology** a. Scope of microbiology b. Contribution of various scientists in establishment of different theories: i. Discovery of Theory of spontaneous generation of life ii. Germ theory of fermentation and decay iii. Germ theory of disease	10	10%	1,2,3	1	1,2,3, 4	EMP	G	ES HV

II	**Classification and reproduction of Bacteria, Yeast, Mould and Virus** a. Morphological details b. Classification and nomenclature c. Requirement for their growth d. Reproduction e. Definition & different types of culture media f. Use of good bacteria in fermentation	11	15%	1,2,3,4	1	1,2,3, 4	EMP	G	ES HV
III	**Introduction to Food Toxicology** a. Importance of Food toxicology b. Determining Toxicity c. Dose Effect and Dose Response **Biological Toxins and chemical toxin** a. Naturally occurring toxins in foods b. Toxins from processed foods c. Seafood toxins d. Chemicals used for pest management during farming, storage and transportation (Pesticides) – Organo Chlorines, Organophosphates, carbamates heavy metals – Cd, Pb, Ni, Hg, Tin	10	15%	1,2,3,4	2	1,2,3, 4	EMP	G	ES HV
IV	**Microbial contamination of Food** a. Contamination of Cereals, pulses, fish, milk and milk products, meat and meat product, fats, spices and condiments, fruits and vegetables b. Disease microbiology	9	15 %	1,2,3,4,5	2	1,2,3, 4	EMP	G	ES HV
V	**Probiotics and Prebiotics** a. Definition and types b. Sources c. Role of prebiotics and probiotics & its mechanism in health and diseases	5	15%	1,2,3,4	4	1,2,3, 4	EMP	G	ES HV
Reference Books									
1	Pelczar MJ, Chan ECS and Krieg NR (2008). Microbiology (5th ed.). Tata McGraw Hill Publishing Co Ltd, New Delhi								
2	Jay JM (2004). Modern Food Microbiology (7th ed.) CBS Publishers and Distributors, Springer Publications, Delhi								

3	Sheth M and Sukul S (2009). Food Safety Training Manual for food service
4	Frazier (2017). Food Microbiology. McGraw Hill Education
5	Garg (2010). Laboratory Manual of Food Microbiology. I. K. International Publishing House Pvt. Ltd.

PRACTICALS

NAAC Accredited "A+" Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**		**Academic Year**	**2023 -24**
B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5			
Year	**I**	**Basic Microbiology and Food Safety (Multidisciplinary Course)**	**Credits /Hours per week**	**4 (3 + 1)/ 5 hrs per week**
Semester	**II**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Labs, demonstrations		

Course Outcome (CO)
Course Outcome:
CO1: Students will understand the history of microbiology, basic characteristics of micro-organisms, their role in food spoilage and food borne illnesses
CO2: Students will gain knowledge on microbiology of water and its treatment
CO3: Knowledge will be gained with respect to culture its types and preservation techniques
CO4: students will learn about the role of prebiotics and prebiotics in health and disease.
CO5: Students will be able to enumerate and identify different types of microorganisms-and study basic laboratory techniques

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE

I	**Glassware Sterilization** Types of Sterilization and their principles a. Dry heat sterilization b. Hot air Oven c. Moist heat sterilization d. Autoclave	10	5%	1,2,3	1	1,2,3, 4	SD	G	ES, HV
II	**Basic microbiological techniques** **Understanding different types of microscopy and their principles** a. Simple microscopy b. Compound microscopy c. Electron microscopy d. Media e. Preparation of media, storage and sterilization	5	10%	1,2,3,4	1	1,2,3, 4	SD	G	ES, HV
III	**Determination of Bacteria in air, food and water** a. Preparation of nutrient agar and dilution b. Preparation of dilution blank c. Most probable number technique for water d. To determine the safety of water using rapid methods e. To determine microorganisms in air samples of different places f. To determination of yeast, molds and Coliforms in food samples using different technique	10	10%	1,2,3,4	2	1,2,3, 4	SD	G	ES HV
IV	**Importance of Grams staining technique** a. Principle of grams staining technique b. To perform Grams staining technique and observe under the microscope to determine it gram positive bacteria or gram negative.	5	5 %	1,2,3,4,5	2	1,2,3, 4	SD	G	ES HV

FIRST YEAR

SEMESTER-II (COMMON COURSES FOR ALL THE STUDENTS)

NEP STRUCTURE FOR UNDERGRADUATE COURSE			
SEMESTER	**COURSE NAME**	**CREDIT**	COURSE TYPE
	Developing Communication Skills in English	2(2+0)	AEC
	Computer Literacy II	2(1+1)	SEC
	Environment Science	2(2+0)	VAC
	TOTAL	**6**	

Syllabus of courses

	NAAC Accredited "A+" Grade. **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year 2023-2024**	**2023-24**

B.Sc. F.C. Sc - First Year – Level 4.5

Year	**I**	**Developing Communication Skills in English** **(AEC Course)**	**Credits / Hours per week**	**2(2+0) /2 Hours/ week** **Theory: 30 Hrs**
Semester	**II**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Lectures and Presentations		

Course Outcome (CO)

CO1: To Identify the important aspects of communication Skills and understanding listening and speaking skills.
CO2: To explore techniques for improving reading skills and to understand types and styles of reading skills.
CO3: To understand the significance of the concept of critical thinking skills and to understand the nuances of writing different types of paragraphs and to employ various strategies to create slogans.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Oral Communication Skills** i. Listening Skills: An Introduction ii. Types of Listening Skills iii. Improving Listening Skills iv. Articulating Speaking Skills	10	33.33%	1,2, 3,4	1	2.3,4,	EMP, SD	L, N, R, G	ES, PE

II	**Comprehending Reading Skills** i. Reading Skills: A Lifelong Skill ii. Types of Reading iii. Techniques of Reading iv. Styles of Reading and Effective Reading	10	33.33%	1,2, 3,4	2	1,2,3, 4,	EMP, SD	L, N, R, G	ES, PE
III	**Critical Thinking and Writing Skills** i. Critical Thinking Skills: Concept and Definition ii. Rhetoric / Logic / Concerting Ideas into Expression and Developing Arguments iii. Paragraph Writing iv. Writing Slogans and Interpreting Information	10	33.34%	1,2,3,4 ,5	3	1,2,4, 5	EMP, ENT SD	L, N, R, G	ES, PE

Reference Books

1.	Khanna, Pooja, English Communication (For AECC Course, Delhi University). Vikas Publishing House. New Delhi.
2.	Castells, M. Communication Power. Oxford University Press, New Delhi.
3.	Hargie, O. The Handbook on Communication Skills. Routledge Publication, New York.
4.	Thomas, Lizy, et al. Fundamentals of language and Communication
5.	Raviya, Hitesh, et al. Developing Communication Skills in English. MacMillan Publishers India Private Limited, 2020, Chennai, India.
6.	Surve, Anshu, et al. Developing Communication Skills in English. MacMillan Publishers India Private Limited, 2023, Chennai, India.
7	Roloft, M. F. Interpersonal Communication. Sage Publication., USA.

Syllabus of courses

NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**		**Academic Year**	**2023-24**
B.Sc. F.C.Sc (REGULAR) - First Year – Level 4.5			
Year	**I**	**Computer Literacy-II** **(SEC Course)**	**Credits / Hours per week**	**2(1+1) / 3 hours/week** **Theory: 15 Hrs.;** **Practical's: 30 Hrs**
Semester	**II**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Presentations		

Course Outcome (CO)

CO1: To learn the fundamental concepts of MS Office.
CO2: To learn development of documents/presentations using MS Word Processor, Spreadsheet & Presentation software.
CO3: To acquire confidence in using computer in professional and personal life.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/R/G	Relation to G/ES/HV/PE
I	**Spreadsheet** a) Elements of Spread Sheet i.Creating of Spread Sheet ii.Manipulation of Cells & Sheet iii.Modifying / Editing Cell Content iv.Formatting Cell (Font, Alignment, Style) v.Freezing panes	8h	25%	2,4,6	1,2,3	2,4,6	SD, Emp	L, N, R, G	PE

	b) Formulas, Functions and Charts i. Using Formulas for Numbers ii. Functions in MS Excel iii. Creating Charts iv. Pivot Table and its uses								
II	**PowerPoint Presentation** a) Introduction to PowerPoint Presentation i. Creating a Presentation Using a Template ii. Inserting & Editing Text on Slides iii. Inserting pictures and clip art iv. Creating & using Master Slide v. Presentation of Slides b) Use transitions and animation c) Printing Slides and Handouts	3h	12%	2,6	1,2,3	2,6	SD,Emp	L, N, R, G	PE
III	**Emerging Trends in Technology** a) Introduction to Cloud Computing i. Uses and features of Cloud Computing ii. Applications of cloud Computing b) Internet of Things and their Applications used in our daily life. c) Introduction to Artificial	4h	13%	1,2,3	1,2,3	1,2,3	Emp, SD	L, N, R, G	PE

	Intelligences and their applications. d) Introduction to Cyber security. i. Cyber security goal ii. Types of cyber attacks iii. Types of cyber attackers iv. Cyber Security Tools v. Email Security vi. Digital Signature								

Reference	
1.	Fundamentals of computers, E balagurusamy Publisher: McGraw Hill Education; 1st edition (24 June 2009)
2.	Computer Fundamentals by Anita Goel Publisher: Pearson India Release Date: April 2010
3.	Practical Computer Literacy 3rd edition Paperback – January 1, 2011 by June Jamrich Parsons and Dan Oja (Author)
4.	A Gateway to Computer Literacy, RS Salaria, Khanna publication
5.	Fundamentals of computer, V Rajaraman Publisher: Niharika adabala ; 6Th edition (24 June 2009)
6.	Computer Fundamentals - 6Th Revised Edition by Pradeep K. Sinha Priti Sinha, BPB Publications
7.	Computer Skill (Paperback, Surender Kumar Jain) Publisher: Hans Consultancy Bureau.

Syllabus of courses

NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**		**Academic Year**	**2023-24**
B.Sc. F.C.Sc. (REGULAR) - First Year – Level 4.5			
Year **I**	**Computer Literacy-II (Skill Enhancement Course)**	**Credits/ Hours per week**	**01/ 30 hours**
Semester **II**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction	Presentations, Hands On Training, fieldwork, use of relevant statistical package		

No	**Course Content: Practical**	**Contact Hours**	**Weightage (%)**	**BT level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	i. Creating, Modifying, Formatting cell ii. Using formulas and Functions iii. Average, IF, Sum, Sum if, Sum ifs, Min, Max, TRIM, Count, Count A, count if, Count ifs, V lookup, H lookup, Match, Index iv. Creating Charts v. Uses of Pivot Table vi. Protect Workbook and Worksheet	20 h	35%	2,4,6	1,2,3	2,4,6	SD, Emp	L, N, R, G	PE
II	i. Creating Presentation Using Templates ii. Creating & using Master Slide iii. Use transitions and animation iv. Printing Slides and Handouts	10 h	15%	2,6	1,2,3	2,6	SD,Emp	L, N, R, G	PE

Syllabus of courses

NAAC Accredited "A+"Grade Faculty of Family and Community Sciences The Maharaja Sayajirao University of Baroda		**Academic Year**	**2023-24**
B.Sc. F.C.Sc (HPP) - First Year – Level 4.5			
Year	I	**Environment Science (VAC)**	**Credits / Hours per week**	**02 (2+0) /2 Hrs/ week Theory: 30 Hrs**
Semester	II	Year of Introduction:2023-24 Year of Syllabus Revision:2023-24	**Maximum Marks / Grade**	O
Mode of Transaction		Lectures and Tutorials		

Course Outcome (CO)

CO1: To appreciate the historical context of human interactions with the environment.
CO2: To gain insights into the international efforts to safeguard the Earth's environment and resources.
CO3: To understand the concept of natural resources; identify types of natural resources, their distribution and use with special reference to India.
CO4: To develop a critical understanding of the environmental issues of concern.
CO5: To Understand the concepts of ecosystems, biodiversity and conservation.
CO6: To Learn about Pollution, types and sources of different kinds of pollution.
CO7: To have an overview of national and global efforts to address climate change adaptation and mitigation.

Unit No.	**Topic**	**Contact Hours**	**Weightag (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE

I	**Humans and the Environment** ▪ **The man-environment interaction:** Humans as hunter-gatherers; Mastery of fire; Origin of agriculture; Emergence of city-states; Great ancient civilizations and the environment, Indic Knowledge and Culture of sustainability; Middle Ages and Renaissance; Industrial revolution and its impact on the environment; Population growth and natural resource exploitation; Global environmental change. ▪ **Environmental Ethics**	04h	13%	1,2	CO1, CO2	1,2,3	EMP, ENT	L,N,R,G	ES, HV
II	**Natural Resources and Sustainable Development** ▪ **Overview of natural resources:** Definition of resource; Classification of natural resources- biotic and abiotic, renewable and non-renewable. ▪ **Biotic resources** ▪ **Water resources** ▪ **Soil and mineral resources**. ▪ **Energy resources:** Sources of energy and their classification, ▪ **SDGs related to environment, targets**	06h	20%	1,2,3	CO3	1,2,3	EMP, ENT	L,N,R,G	ES, HV
III	**Environmental Issues: Local, Regional and Global** ▪ **Environmental issues and scales:** Concepts of micro-, meso-, synoptic and planetary scales; Temporal and spatial extents of local, regional, and global phenomena. ▪ Pollution: Impact of sectoral processes on Environment; Types of Pollution- air, noise, water, soil, thermal, radioactive ;municipal solid waste, hazardous waste; trans boundary air pollution; acid rain; smog. ▪ **Land use and Land cover change:** land degradation, deforestation, desertification,	06h	20%	1,2,3	CO4	1,2,3	EMP, ENT	L,N,R,G	ES, HV

	urbanization. Biodiversity loss: past and current trends, impact. ▪ **Global change:** Ozone layer depletion; Climate change. Disasters – Natural and Man-made (Anthropogenic)								
IV	**Conservation of Biodiversity and Ecosystems** ▪ Biodiversity and its distribution: ▪ Ecosystems and ecosystem services: ▪ Threats to biodiversity and ecosystems: ▪ Major conservation policies:. ▪ Discussion on one national and one international case study related to the environment and sustainable development.	06h	20%	1,2,3	CO5	1,2,3	EMP, ENT	L,N,R,G	ES, HV
V	**Environmental Pollution and Health** ▪ Understanding pollution: ▪ Air pollution: ▪ Water pollution: ▪ Soil pollution and solid waste ▪ Noise pollution ▪ Thermal and radioactive pollution: ▪ Participation in plantation drive and nature camps**.**	04h	13.5%	1,2,3	CO6	1,2,3	EMP, ENT	L,N,R,G	ES, HV
VI	**Climate Change: Impacts, Adaptation and Mitigation** • Understanding climate change: • Impacts, vulnerability and adaptation to climate change	04h	13.5%	1,2,3	CO7	1,2,3	EMP, ENT	L,N,R,G	ES, HV
References									
1.	Fisher, Michael H. (2018) An Environmental History of India- From Earliest Times to the Twenty-First Century, Cambridge University Press.								
2.	Headrick, Daniel R. (2020) Humans versus Nature- A Global Environmental History, Oxford University Press.								
3.	Chiras, D. D and Reganold, J. P. (2010). Natural Resource Conservation: Management for a Sustainable Future.10th edition, Upper Saddle River, N. J. Benjamin/Cummins/Pearson.								

4.	Gilbert M. Masters and W. P. (2008). An Introduction to Environmental Engineering and Science, Ela Publisher (Pearson)
5.	Harper, Charles L. (2017) Environment and Society, Human Perspectives on Environmental Issues 6th Edition. Routledge.
6.	Harris, Frances (2012) Global Environmental Issues, 2nd Edition. Wiley- Blackwell
7.	Bawa, K.S., Oomen, M.A. and Primack, R. (2011) Conservation Biology: A Primer for South Asia. Universities Press.
8.	Sinha, N. (2020) Wild and Wilful. Harper Collins, India.
9.	Jackson, A. R., & Jackson, J. M. (2000). Environmental Science: The Natural Environment and Human Impact. Pearson Education.
10.	Masters, G. M., & Ela, W. P. (2008). Introduction to environmental engineering and science (No. 60457). Englewood Cliffs, NJ: Prentice Hall.
11.	Adenle A., Azadi H., Arbiol J. (2015). Global assessment of technological innovation for climate change adaptation and mitigation in developing world, Journal of Environmental Management, 161 (15): 261-275.
12.	Barnett, J. & S. O'Neill (2010). Maladaptation. Global Environmental Change—Human and Policy Dimensions 20: 211–213.
13.	Jørgensen, Sven Marques, Erik João Carlos and Nielsen, Søren Nors (2016) Integrated Environmental Management, A transdisciplinary Approach. CRC Press.
14.	Theodore, M. K. and Theodore, Louis (2021) Introduction to Environmental Management, 2nd Edition. CRC Press.
15.	UNEP (2007) Multilateral Environmental Agreement Negotiator's Handbook, University of Joensuu, ISBN 978-952-458-992-5
16.	Ministry of Environment, Forest and Climate Change (2019) A Handbook on International Environment Conventions & Programmes. https://moef.gov.in/wp- content/uploads/2020/02/ convention-V-16-CURVE-web.pdf
17.	Sharma B.K., 2001, "Environmental Chemistry". Geol Publ. House, Meerut
18.	Townsend C., Harper J, and Michael B., 2014, "Essentials of Ecology", Blackwell Science
19.	Trivedi R.K., 2010, Handbook of "Environmental Laws, Rules Guidelines, Compliances and Stadards", Vol I and II, Enviro Media
20.	Trivedi R. K. and P.K. Goel, 2003, "Introduction to Air Pollution", Techno-Science Publication
21.	Wanger K.D., 1998, "Environmental Management", W.B. Saunders Co. Philadelphia, USA

Adapted from the curriculum of Environment Science as recommended by UGC, 2023

SUMMER INTERNSHIP : 4 Credits

(For Students who Exit at 1st Year)

Syllabus of courses

	NAAC Accredited "A+" Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023-24**

B.Sc. F.C.Sc. (REGULAR) - First Year – Level 4.5

Year	**I**	**Summer Internship/Apprenticeship**	**Credits / Hours per week**	**4 (0+4) Credits / 8 hrs/week Practical: 32Hrs**
Semester	**II**	Year of Introduction: 2023-2024 Year of Syllabus Revision: -2023-2024	**Maximum Marks / Grade**	**O Grade**
Mode of Transaction		Summer Internship/Apprenticeship		

Course Outcome (CO)

CO1. To get On Site Experiential Learning from recognized Institutions/Agency.

Unit No.		**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements of** Emp/Ent/SD	**Relevance to** L,N,R,G	**Relation to** G, ES, HV, PE
1.	Internship/ Apprenticeship of 30 days (8 hours per week) under any **One** of the following: a. NGOs, Schools, Anganwadis, Childcare Centre, ICDS b. CSR based Industry c. Food Industry, Hotels, Restaurants, Cafes d. Fitness Centre, Gymnasium, Boutique e. Museum and Exhibits	30	90%	1,2,3,4,5 & 6	1	4	EMP, ENT, SD	L	HV, PE

	f. Firm of Architects, Interior Designer, Fashion Designer, Graphic Designer g. Aviation, Tourism Industry h. Textile industry,Fashion industry and Media Industry i. Retail outlets j. Student Internship Programmes offered by Universities k. Event Management Firms								
2.	To prepare the report and make presentation for final evaluation (Certificate to be provided by the Institution/Agency)	2	10%	1,2,3,4,5 & 6	CO1	PSO4	EMP, ENT, SD	L	HV, PE

UG Certificate: Students who opt to exit after completion of the first year and have secured 44 credits will be awarded a UG certificate if, in addition they complete one internship course of 4 credits during the summer vacation of the first year. These students are allowed to re-enter the degree programme within three years and complete the degree programme within the stipulated maximum period of 7 years

Note: The course will be evaluated by the agency/Institution under whom the student is doing the internship

COURSE OFFERED TO STUDENTS OTHER THAN FOODS & NUTRITION SPECIALIZATION

SEMESTER II

NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**		**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc (Regular) - First Year – Level 4.5

Year	**I**	**Health & Fitness for Youth (Minor Course)**	**Credits/Hours per week**	**4(4+0)Credits /4hrs/Week**
Semester	**II**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2023-24	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations, videos, case studies		

Course Outcome (CO):

CO1 Basic understanding about physical fitness and factors affecting health and fitness.
CO2 Application and Translation of scientific knowledge into practice.
CO3 Correlating principles of healthy diet with physical fitness
CO4 Understanding and update on Alternative health systems and its impact on health and fitness
CO5 Comprehensive knowledge on role of sleep, physical activity and stress management in physical fitness
CO6 Basic knowledge on first aid for emergencies

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Introduction to Health and fitness** f) Basic definitions and spectrum of health g) Physical health, mental health, social health, spiritual health h) Components of physical fitness	15 h	20%	1,2	1	1	EMP	G	G,HV

	(Health related physical fitness, performance related physical fitness, skill related fitness) i) Fitness balance j) Cosmetic fitness k) Factors affecting health and fitness l) Aetiology and consequences of unhealthy lifestyle								
II	**Assessment of body composition and mental health** c) Types of body d) Body composition, Height, Weight e) Types of fat distribution f) Health related physical fitness tests and their interpretation (Pulse rate, Blood pressure, BMI, WHR, WC, MUAC, Weight, SFT, Karada scan, fat analyser, fitness monitoring devices, home scale monitoring g) Activities for developing fitness h) Use of different tools for mental health screening and their interpretation i) Visit to university sports complex	10 h	20%	1,2,3,4	2	4	SD	L,N,G,R	G
III	**Diet for Health & wellbeing** a) Indian dietary guidelines b) Myplate concept c) Balanced diet d) Food pyramid e) Classification of food f) Life style changes (Dietary changes, physical activity, sleep pattern, screen time reduction , Role of hydration, Stress management and relaxation techniques)	15 h	20%	1,2	3	1, 2	EMP,ENT	L,N,G,R	G,ES
IV	**Role of fitness in health** a) Best exercise for weight loss b) Best exercise to build lean muscles c) Workout for body building	15 h	20%	1,2	4, 5	4,5	EMP,ENT,SD	L,N,G,R	G,ES

	d) Alternative health systems (AYUSH) and its impact on health and fitness e) (Naturopathy, Chinese herb medicine, Ayurveda, Homeopathy) f) Yoga and meditation								
V	**Basic first aid** a) Definition and purpose of first aid Principles and Ethics of First Aid b) First Aid – General Procedure -first aid kit. c) Wounds (types and its management) d) First aid for –burns, snake bite, drowning, unconsciousness, electric shock, chocking,sun stroke, bleeding. e) Demonstration of CPR	05 h	20%	1,2,3	6	4	EMP,ENT,SD	L	G,ES,PE

Reference Books	
1	Sunetra Roday (2017). Food Science and Nutrition, Oxford University Press, ISBN-13: 978-0-19-807886-9/ ISBN-10: 0-19-807886-2
2	Inara Hasanali. (2022, June 06). Nutrition Facts - References. Medindia. Retrieved on Apr 08, 2023 from https://www.medindia.net/patients/patientinfo/nutrition-facts-food-functions-references.htm.
3	Endocrinology of Physical Activity and Sport (2020) by Anthony C. Hackney (Editor); Naama Constantini (Editor
4	Swaminathan M (2018). Handbook of Foods and Nutrition. Published by: Ganesh and Co. Pvt. Ltd. Madras, ISBN-10: 812041795X / ISBN-13: 978-8120417953
5	Srilakshmi B (2019) Dietetics (8th ed.). New Age International Limited, New Delhi.
6	Srilakshmi B (2019) Nutrition Science (7th ed). New Age International Limited, New Delhi.
7	Growth Monitoring Training Modules- NIPCCD, New Delhi
8	Mahan, L.K. and Stump, S. E. (2020). Krause's Food, Nutrition and Diet Therapy (15th Edition). Saunders, An Imprint of Elsevier, Pennsylvania, USA
9	Sen Ray K, Subbulakshmi G and Subhadra M (2011). Methodologies for fitness Assessment Ane Books Pvt. Ltd., New Delhi
10	Geetanjali bhide, Subhadra Mandalika (2018) Nutritional Guidelines for Sportspersons, jaypee publishers
11	https://www.indianredcross.org/publications/FA-manual.pdf

SECOND YEAR (NEP)

PUBLIC HEALTH NUTRITION

SEMESTER III

Program Specific Outcome (PSO): Level 5 (Public Health Nutrition)

At the end of level 5 i.e. at the completion of second year (4 semesters) of the undergraduate program the following are the Program Specific outcome

1. **Conceptual understanding**: students acquire a comprehensive understanding of concepts, principles, theories, processes of human nutrition, including macronutrients, micronutrients, dietary guidelines, and nutritional needs across the lifespan in the community.

2. **Foundational Knowledge**: comprehend the principles of nutritional biochemistry, human anatomy and physiology, biophysics as they relate to health and illness for individuals and populations.

3. **Decision making, Analytical and Communication Skills**: students should be able to acquire the cognitive skills required to identify, analyse, evaluate and able to effectively communicate nutrition information for the benefit of the community.

4. **Multicultural competence**: ability to learn about different Indian cultures by way of practicing traditions, Food Anthropology, food beliefs, cultural practices during different stages of lifecycle and sensory attributes of food to enhance overall health and nutritional status of the communities.

5. **Digital Literacy**: Competency in accessing relevant and authentic information, data from electronic media and learn new nutrition software with the ability to learn, assimilate, integrate to make presentations on the given topics for academic and extension/community work or advocacy to the Government –a step towards "VIKASIT BHARAT".

- **Bloom's Taxonomy (BT) Levels:** 1. Remember 2. Understand 3. Application 4. Analysis 5. Evaluation 6. Creation Programme
- **Elements of** Employability (Emp)/ Entrepreneurship (Ent)/ Skill Development (SD)
- **Relevance to** Local (L)/ National (N)/ Regional(R)/Global (G)
- **Relation to** Gender (G), Environment and Sustainability (ES), Human Values (HV)and Professional Ethics (PE)

NEP STRUCTURE FOR FOODS AND NUTRITION UNDERGRADUATE COURSE (MAJOR:PUBLIC HEALTH NUTRITION -GRANT IN AID PROGRAMME)			
SEMESTER	**COURSENAME**	**CREDIT**	**COURSETYPE**
III	Basics of Biophysics	4 (3+1)	MAJOR
	Sensory Evaluation Techniques	4 (2+2)	MAJOR
	Biochemistry	4 (4+0)	MAJOR
	Fundamentals of Anatomy & physiology	4 (3+1)	MDC
	English for Enterpreneurship	2 (2+0)	AEC
	Nutritional Assessment	2 (1+1)	SEC
	Standardization of Conventional Indian Foods	2 (0+2)	IKS II
	TOTAL	**22**	

Note: English for Enterpreneurship – Course outline will be taken care at faculty level.

Syllabus of Courses

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023-24**

B.Sc. F.C.Sc (Public Health Nutrition) –Second Year – Level 5				
Year	**II**	**Basics of Biophysics (Major Course)**	**Credits / Hours per week**	**4 (3+1) / 5 hours/week** **Theory: 45 Hrs.; Practical: 30 Hrs.**
Semester	**III**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentations		

Course Outcome (CO)

The student will be able to

CO1: Gain knowledge of basic principles of science and its applications in nutrition.

CO2: Acquire knowledge of different instrumentation techniques used in food and nutrition research.

CO3: Develop critical & analytical thinking with respect to physical concepts in biological system.

CO4: Develop problem-solving skills supporting life system.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/ SD	Relevance to L/N/R/G	Relation to G/ES/HV/ PE
I	**Measurements & Units** a) Systems of unit- MKS, CGS, FPS systems & its inter Conversions. Introduction of smaller units of length, mass & time- milli, micro, nano, pico, Angstrom, carats, quintal, tonnes, conversions of length & weight from MKS to FPS & vice-versa. To calculate BMI etc.	15 h	25%	1,2,3,4	1,3,4	2,3	SD	L, N, R, G	G, ES, HV, PE

	b) Fundamental and Derived units-area, volume, density, pressure, velocity, acceleration. Relating it to practical application- Checking purity of a gold ring, volume of tea in different cups, milk in different glasses, capacity of commonly used vessels, spoons, katori etc., area of a study-room. Volume of air in a bedroom, volume of water in a water-tank c) Mass and Weight—milligrams, carats, micrograms, theory of weightlessness. Different types of balances used in the community bathroom scales, infantometer, stadiometer, microbalances, single-pan balances, digital balances- least count, standardization etc. d) Density – study of purity of substances, comparison of different densities related to food. Lactometer, salinometer, saccharimeter, alcoholometer e) Pressure- of liquids, gases, Blood pressure, principles of sphygmomanometer, underwater exercises, air and water mattresses, precautions to be taken.								
II	**Heat and Light** a) Solid, liquid, gas- boiling, evaporation, sublimation, condensation, freezing, frosting, defrosting, vaporization, fusion. b) Heat and temperature- expansion, contraction. Applications-examples of expansion- mercury in thermometer, opening lids of glass containers, freezing of water- explain expansion & breaking of bottles in freezer etc. c) Thermometer and Scales- Centigrade, Fahrenheit and inter conversions. Body temperature, measurement, clinical & laboratory thermometers. d) Specific heat- of different substances and its applications- water as a remedy for small burns, copper bottomed vessels for cooking.	12 h	20%	1,2,3,4, 5	1,2,4	2,3	SD	L, N, R, G	G, ES, HV, PE

	e) Latent heat- of fusion, vaporization. Burns due to boiling, steam & its remedies. f) Modes of transfer of heat- conduction, convection, radiation. Heating pads, steam inhalers, Insulators in cooking utensils, ovens, refrigerators. Room heater, thermos flask, cooling of food in refrigerator etc. g) Electromagnetic radiations- radio & TV waves, micro waves, UV- radiations x- rays, gamma rays etc- and their uses. Practical applications- micro-wave cooking, ultraviolet sterilisation, h) ultra-violet radiation therapy (rickets, tuberculosis, fibrositis, neuritis, lumbago, psoriasis, acne vulgaris) i) radiotherapy using gamma rays, teletherapy, operation of remote-control, infra-red heat therapy, thermography for detection of breast cancer and ocular diseases, detection of tumours & TB using X-rays. j) Light- incandescence, fluorescence, phosphorescence- its applications-bulbs, fluorescent lamps (FL), CFLs, LEDs, LCDs. Fluorescent lights in the treatment of jaundice of newborns, fluoroscopy.								
III	**Biophysical Phenomena** a) Diffusion, Filtration, Ultra-filtration, Osmosis, Reverse Osmosis, Dialysis, Precipitation, Coagulation- applications of all these phenomena. b) Colloids- properties, examples, uses-colloidal medicines, applications of colloidal chemistry. c) Absorption & Adsorption-applications in purification of water, tablet formulations, charcoal in masks, water filters, removal of bacteria, toxins, irritants using adsorbents, enzymatic reactions etc. d) pH and buffer- effect in humans with examples of phosphate, bicarbonate buffers, acidosis, alkalosis. Acidic & alkaline foods.	12 h	20%	1,2,3,4, 5	1,2,3,4	2,3	SD	L, N, R, G	G, ES, HV, PE

	e) Surface tension- applications in food, medication (oral tablets to reduce surface tension of the fecal contents in the rectum, soap solution for enemas) laundry, other applications. f) Viscosity- curd, milk, oil, food gruels etc. Factors affecting viscosity. Viscosity of blood in different disease conditions, use of Dextran to maintain viscosity of blood during hemorrhage& shock, effect of exercises on blood flow, other applications.								
IV	**Instruments** a) Principles, operation and uses of: i) Colorimetry ii) Fluorimetry iii) Flame Photometry iv) Small instruments like: pH Meter, Muffle Furnace, Hot Air Oven, Pressure Cooker, Autoclave, Centrifuge, Hot Water Bath, Microwave oven	6 h	10%	1,2,3,4, 5	1,2,3,4	2,3	EMP, SD	L, N, R, G	G, ES, HV, PE

Reference Books

1.	Kuruvilla. Annie (2022). An Elementary Guide to Biophysics and Instrumentation. Notion Press, Chennai, Tamil Nadu.
2.	Wilson K and Walker J (2018).Principles& Techniques of Biochemistry & Molecular Biology.(8th edition). Foundation Books, New Delhi.
3.	Pomeranz Y and MeLoan CE (2004). Food Analysis: Theory and Practice (3 rd edition.). CBS Publishers and Distributors, New Delhi
4.	Raghuramulu N, Nair M and K Kalyanasundaram S (2003). A Manual of Laboratory Techniques (2nd edition). NIN, ICMR.
5.	Srivastava AK and Jain PC (2008). Instrumental Approach to Chemical Analysis (4th edition.). S. Chand Company Ltd., New Delhi.
6.	Peet LJ (1979). Household Equipment (6 th edition.). John Wiley & Sons, New York
7.	Van Zante J (1970). Household Equipment Principles. Prentice Hall, New York
8.	David T Plummer (2017)- Introduction to Practical Biochemistry (3rd edition), Tata McGraw Hill Publishing Co., New Delhi
9.	Tuli G D, Bahl Arun&Bahl B S (2020)-Essentials of Physical Chemistry (28th edition), S Chand & Co. Pvt. Ltd. New Delhi
10.	Soni P.L., Dharmarha OP, Dash UN (2022)-Textbook of Physical Chemistry (24th edition), S Chand & Co. Pvt. Ltd. New Delhi

For Practical

	NAAC Accredited "A+"Grade Faculty of Family and Community Sciences The Maharaja Sayajirao University of Baroda		**Academic Year**	**2023-24**
B.Sc. F.C.Sc (Public Health Nutrition) –Second Year – Level 5				
Year	**II**	**Basics of Biophysics (Major Course)**	**Credits/ Hours per week**	**4 (3+1) / 5 hours/week Theory: 45 Hrs.; Practical: 30 Hrs.**
Semester	**III**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction		Laboratory work, Presentations, Hands On Training		

Course Outcome (CO)
The student will be able to
CO1: Acquire skills for good laboratory practices.
CO2: Verify the knowledge acquired in the theory classes through experiments.
CO3: Understand the working of various instruments used in food and nutrition research.
CO4: Use modern equipment and techniques to acquire data.

No.	**Course Content: Practical**	**Contact Hours**	**Weightage (%)**	**BT level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/R/G	**Relation to** G/ES/HV/PE
I	a) Precautions to be taken in laboratories- fuses, circuit breakers, electric shocks, fire-hazards, fire extinguishers, first-aid. b) Getting acquainted with different laboratory tools/apparatus: pipette, burette, measuring cylinders, volumetric flasks etc.	2 h	1.66%	1,2,3,4,5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE

II	a) Study about different types of balances: ordinary common balance, spring balance, analytical (micro-balances), bathroom scales, kitchen scales- digital & non-digital. b) Understanding least count, minimum & maximum capacity, purpose of weighing (in relation to what stuff and how much quantity). c) Draw & label each in the journal with description & precautions while operating.	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE
III	a) Determine the mass of objects using different balances. Record readings in tables (minimum 5 tables). b) Conversion from kilograms to pounds & vice-versa.	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE
IV	a) Determine the volumes of different utensils used in everyday life using standard measuring cylinders/cups – different types of tea-cups, glasses, coffee-mugs, soup bowls, bowls, bottles, table-spoons, teaspoons, buckets, mugs. b) Learn about standard measuring cups & spoons- demonstration of standards available in the market.	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE
V	a) Study about different types of Thermometers- clinical, digital, laboratory, infra-red etc. b) Draw & label each in the journal with description, working, uses & precautions. c) Measuring 5 different temperatures using lab thermometer	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE

	d) Learn inter-conversion from Centigrade to Fahrenheit & vice versa. e) Make tables of conversion from ^{0}F to ^{0}C, and vice versa of different types of thermometers- clinical, candy, incubator, meat, deep-freezer, oven etc								
VI	a) Study about Lactometer- draw, label & description in the journal. b) Find the purity of milk using different milk samples, systematically diluting with water. Minimum 5 readings	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE
VII	a) Study the working, calibration & precaution while using a Colorimeter. b) Draw & label the parts in the journal with description, principle & theory of operation c) Table showing different filters with wavelength & colour	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE
VIII	a) Determine the absorption spectra of 2 coloured solutions using Colorimeter. b) Draw graphs to show the absorption spectrum.	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE
IX	Demonstration of pH Meter- a) Principle, working, uses & precautions b) Draw label and write in journal	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE
X	Demonstration of Muffle Furnace, Hot Air Oven, OTG & Microwave ovens- a) Principle, working, uses & precautions b) Draw label and write in journal	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE

XI	Demonstration of Pressure Cooker and Autoclave- a) Principle, working, uses & precautions b) Draw label and write in journal	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE
XII	Demonstration of Centrifuge- a) Principle, working, uses & precautions. b) Draw label and write in journal	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE
XIII	Demonstration of water bath- a) Principle, working, uses & precautions. b) Draw label and write in journal	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE
XIV	Demonstration of Moisturemeter, Polarimeter, & Viscometer a) Principle, working, uses & precautions. b) Draw label and write in journal	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE
XV	Demonstration of Refractometer, Shortometer &Tenderometer- a) Principle, working, uses & precautions. b) Draw label and write in journal	2 h	1.66%	1,2,3,4, 5	1,2,3,4	2,3	Emp, SD	L, N, R, G	G, ES, HV, PE

MODE OF EVALUATION:

50% IA : 50% UA
50% IA = Mid term evaluation as class test + home assignment/ class assignment/ quiz/ active learning/ Practical class performance / presentation/ journal / written applicatory test / viva + attendance
50% UA = University examination

Syllabus of Courses

	NAAC Accredited "A "Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023-24**

B.Sc. F.C.Sc (Public Health Nutrition) - Second Year – Level 5				
Year	**II**	**Sensory Evaluation Techniques (Major Course)**	**Credits / Hours per week**	**4 (2+2) / 6 hours/week** **Theory: 30 Hrs.; Practical: 60 Hrs.**
Semester	**III**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentations		

Course Outcome (CO)
Students will be able to
CO1: Explain the concept of sensory thresholds.
CO2: Apply sensory evaluation methods for food formulations to assess the acceptability and quality of food.
CO3: Demonstrate an ability to identify solutions to problems related to the sensory analysis of food.
CO4: Draw sound conclusions and make recommendations following appropriate sensory experimentation and statistical analysis.

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**Introduction to sensory evaluation** a) The role of sensory evaluation in the food industry b) The five human senses c) Factors affecting acceptance – sensory, psychosocial, physiological d) Sensory characteristics of food – classification, taste qualities, taste thresholds, interaction of constituents, effect of temperature, chemical configuration	9 h	15 %	1,2	1	1,2	SD	L, N, R, G	G, ES

	e) Olfaction: Odor classification, chemical specificity, testing techniques, threshold and interaction f) Test individual sensitivities to odour and taste								
II	**Food sample presentation and selection of panel** a) Presenting food samples for evaluation (Colour, Texture, Consistency, Taste & Odour) b) Sample size for different evaluation tests c) Order of presentation d) Method of presentation e) Effect of temperature, sleep, hunger, age, sex on sensory characteristics of foods f) Preparing a panel for sensory evaluation by threshold tests using sweet, sour, salty and bitter solutions (sucrose, citric acid, NaCl and caffeine) g) Sensory Evaluation panel i) Types of panels ii) Training the panel members iii) Number of panel members for different tests h) Sensory Booths / laboratories /requirements for sensory Evaluation	12 h	20 %	1,2	2,3	1,2	SD	L, N, R, G	G, ES, HV
III	**Sensory evaluation tests and its application** a) Classification of tests, score card preparation and its uses in terms of laboratory testing b) Discriminative / Difference Test i) Single sample test / Monodic test ii) Paired comparison test iii) Simple triangle test iv) Directional triangle test v) Due-Trio test vi) Multiple sample test c) Quality Test i) Scoring test ii) Descriptive test iii) Flavour profile method iv) Texture profile method d) Rating Test	9 h	15 %	1,2	2,3	1,2	SD	L, N, R, G	G, ES

	i) Hedonic scale test ii) Preference ranks iii) Visual representation e) Limitations of sensory evaluation								
Reference Books									
1.	Meilgaard MC, Civille GV, Carr BT. 2015. Sensory Evaluation Techniques, 5th edition. Boca Raton, FL: CRC Press. ISBN 9781482216905								
2.	Lawless HT and Heymann H. 2010. Sensory Evaluation of Food: Principles and Practices, 2nd edition. New York, NY: Springer. ISBN 978-1-4419-6488-5								
3.	Howard R. Moskowitz, Jacqueline H. Beckley, and Anna V.A. 2006. Sensory and consumer research in food product design and development. Blackwell Pub, Iowa. 358 p. ISBN:9781119945949								
4.	Lawless H T, 2013, Laboratory Exercises for Sensory Evaluation, Series volume 2, Springer, US ISBN 978-1-4614-5713-8								
5.	Shrilakshmi B, 2018, Food Science, 7th edition, New Age International (P) Ltd Publishers, New Delhi, ISBN 10: 9386418894 ISBN 13: 9789386418890								
6.	Joshi VK (2009), Sensory Science: Principles and Application in Food Evaluation, Agrotech Publishing								
7.	Manual for Recognition of Food Testing Laboratories, 2015, FSSAI, New Delhi								
8.	Indian Standard Guide for Sensory Evaluation of Foods, 2012, Bureau of Indian Standards, (BIS), New Delhi								
9.	Faculty of Food Safety and Quality, 2022. https://www.igmpiindia.org/sensory-analysis-in-quality-control.html								
10.	Sensory evaluation of food. https://egyankosh.ac.in/bitstream/123456789/33856/1/Practical-6.pdf								
11.	Sensory evaluation A Practical Handbook (2009). John Wiley and Sons. Ltd. Publication.								
12.	Mason. R & Nottingham.S (2002). Sensory Evaluation Manual. Food 3007 And Food 7012.								
13.	Eram. S. Rao (2014). Food Quality Evaluation. Variety Books Publisher's Distributors.								

For Practical

	NAAC Accredited "A+"Grade Faculty of Family and Community Sciences The Maharaja Sayajirao University of Baroda	**Academic Year**	**2023-24**
B.Sc. F.C.Sc (Public Health Nutrition)- Second Year – Level 5			
Year	**II**	**Sensory Evaluation Techniques (Major Course)**	**Credits/ Hours per week**	**4 (2+2) / 6 hours/week Theory: 30 Hrs.; Practical: 60 Hrs.**
Semester	**III**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction		Labs, Presentations, Hands on Training		

No.	**Course Content : Practical**	**Contact Hours**	**Weightage (%)**	**BT level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**Basics of sensory evaluation tests** a) Preparation of solutions for sensory evaluation of basic taste: sweet, sour, bitter, salty, umami b) Molar solutions to learn dilutions: w/v and v/v	2h	2%	3,4,5	1,2	3	Emp, SD	L, N, R, G	G, ES, HV
II	**Preparation of sensory evaluation cards (Score cards) for** a) Difference Tests - The Triangle Test, The Duo-Trio Test, Paired Comparison Tests b) Descriptive Tests- Flavour Profile Test, Texture Profile Test, The Spectrum Descriptive Analysis. c) Qualitative Tests d) Free Choice Profiling	12h	10%	3,4,5	2,3	3	Emp, SD	L, N, R, G	G, ES, HV
III	**Conducting Sensory Testing** a) Setting the place and coding of samples for the tests	12h	10%	3,4,5	2,3	3	Emp, SD	L, N, R, G	G, ES, HV

	b) Conduct Difference Tests - The Triangle Test, The Duo-Trio Test, Paired Comparison Tests c) Descriptive Tests- Flavour Profile Test, Texture Profile Test, The Spectrum Descriptive Analysis. d) Qualitative Tests e) Free Choice Profiling								
IV	**Statistics in sensory evaluation** a) Need of statistics b) Generation of Raw data c) Describing data: measures of central tendency, Measures of variability etc.	12h	10%	3,4,5	2,3	3,5	Emp, SD	L, N, R, G	G, ES, HV
V	**Holistic approaches to understand colour, flavour, texture profiles of:** a) Fruits b) Vegetables c) Confectionary a) Baked goods	10h	8%	3,4,5	2,3	3,5	Emp, SD	L, N, R, G	G, ES, HV
VI	**Application of Sensory Evaluation** a) New product development viz Nutraceuticals, Pharmaceuticals – Food Pharma Convergence (examples) b) Quality Control c) Product specifications	12h	10%	3,4,5 ,6	4	3 ,5	Emp, SD	L, N, R, G	G, ES, HV

MODE OF EVALUATION:

50% IA: 50% UA

50% IA = Mid term evaluation as class test + home assignment/ class assignment/ quiz/ active learning/ Practical class performance / presentation/ journal /written applicatory test/ viva + attendance
50% UA = University examination

Syllabus of Courses

	NAAC Accredited "A+" Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc (Public Health Nutrition) - Second Year – Level 5

Year	**II**	**Biochemistry (Major Course)**	**Credits/ Hours per week**	**4 (4 + 0) / 4 hours/week Theory:60 Hrs.; Practical: 0 Hrs.**
Semester	**III**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2024-2025	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations, videos		

Course Outcome (CO)
Students will be able to
CO1: Understand the principles of biochemistry.
CO2: Gain knowledge and understanding of the delivery and function of cellular nutrients and metabolism in human body.
CO3: Apply the knowledge of biochemistry and clinical biochemistry to human nutrition and dietetics.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I.	**Enzymes, Biological membranes and Biological Oxidation** a) **Enzymes** i. Definition, importance, nomenclature, properties, specificity of enzymes ii. Classification of enzymes iii. Coenzymes, isoenzymes iv. Catalytic site of enzyme v. Mechanism of enzyme action vi. Factors influencing enzyme action	12 h	20%	1,2,5	1,2,3	1,2	Emp	L, N, R,G	G

	vii. Enzyme inhibition viii. Clinical enzymology: Diagnostic value of serum enzymes and isoenzymes b) **Biological membranes** i. Membrane structure and functions ii. Transport of metabolites across membranes c) **Biological Oxidation** i. Enzymes and Coenzymes involved in oxidation and reduction ii. High energy phosphates iii. Importance of biological oxidation iv. Components of electron transport chain/respiratory chain v. Oxidative phosphorylation and ATP generation								
II	**Chemistry and Metabolism of Carbohydrates and Fats** **a) Carbohydrates** i. Structure, isomers, epimers, anomers ii. Reactions of monosaccharides iii. Glycosides iv. Derivatives of monosaccharides v. Classification- Monosaccharides, Disaccharides, Polysaccharides vi. Glycolysis vii. TCA/citric acid cycle viii. Glycogenesis ix. Glycogenolysis x. Gluconeogenesis xi. HMP shunt xii. Regulation of blood glucose levels xiii. Renal threshold for glucose **b) Fats** i. Classification of lipids	15 h	25%	1,2,5	1,2,3	1,2	Emp	L, N, R,G	G

	ii. Fatty acids-nomenclature, saturated and unsaturated, essential fatty acids iii. Triacylglycerols- properties of triacylglycerols iv. Beta oxidation of Fatty acids v. Fatty acid synthesis vi. Chain elongation and Desaturation vii. Synthesis of triacylglycerols viii. Lipolysis of Triacylglycerols ix. Ketone bodies x. Types of lipoproteins and their functions								
III	**Chemistry and Metabolism of Amino Acids and Proteins** a) Classification of amino acids: Based on their structure polarity, metabolic fate and nutritional classification b) Common physical and chemical properties of amino acids c) Metabolic pool d) Classification of proteins e) Structure (Primary, Secondary and Tertiary) and properties of proteins f) Peptides and biologically active peptides g) Importance of non- protein amino acids h) Denaturation of proteins i) Nitrogen balance j) Decarboxylation k) Transamination and Deamination l) Urea Cycle m) Plasma proteins and their importance – Albumin, Globulin, C-reactive protein and Immunoglobulin n) Proteinuria	12 h	20%	1,2,5	1,2,3	1,2	Emp	L, N, R,G	G
IV	**Nucleotide Metabolism, Nucleic Acids and Protein Synthesis** a) Overview on structure and nomenclature of nucleotides b) Biological importance of nucleic acids	12 h	20%	1,2,5	1,2,3	1,2	Emp	L, N, R,G	

	c) Chemistry of DNA and structural organization of RNA d) DNA & gene e) Overview on synthesis (denovo synthesis and salvage pathway) and degradation of purines and pyrimidines f) Disorders of Purine and Pyrimidine metabolism – Hyperuricemia, Gout, Hypouricemia, Orotic aciduria g) The process of protein synthesis h) Overview of transcription in eukaryotes and post transcriptional modification **i)** Overview of translation in eukaryotes and post translational modification								
V	**Fluid, Electrolyte and Acid-Base Balance** a) Distribution of fluids in the body b) Physiological functions of water c) Factors influencing the distribution of body water d) Water balance in the body –Regulation of water intake and output e) Dehydration f) Electrolyte composition and regulation in body fluids g) Maintenance of blood pH h) Buffer systems (Bicarbonate, Phosphate, Protein) i) Renal mechanism j) Respiratory mechanism k) Disorders of acid-base balance – Causes and treatment	9 h	15%	1,2,5	1,2,3	1,2	Emp	L, N, R,G	G

Reference Books	
1	Satyanarayana U and Chakrapani U. Biochemistry. 6th edition, 2021. Published by Elsevier
2	Botham K, McGuinness O, Weil PA, Kennelly P, Rodwell V. Harper's Biochemistry Illustrated Biochemistry. 32nd Edition, 2022. Published by McGraw Hill Education.
3	Stryer L, Berg J, John LT. Biochemistry, 8th Edition, 2015. Published by WH Freeman and Co.
4	Abali EE, Cline SD, Franklin DS, Viselli SM. Lippincott's Illustrated Reviews: Biochemistry. 8th edition, 2021.Published by Wolters Kluwer
5	Jain J L, Jain S, Jain N. Fundamentals of Biochemistry, 2022.Published by S. Chand & company, New Delhi
6	Moran L, Horton R, Scrimgeour G, Perry M. Principles of Biochemistry, 5th Edition, 2011. Pearson Publication, US.

7	Ralston GB and Kuchel PW. Schaum's Easy Outline of Biochemistry: Revised Edition. 1st edition, 2019. Published by McGraw Hill Education.
8	Deb A C. Fundamentals of Biochemistry, 10th edition, 2019. Published by New Central Book Agency

MODE OF EVALUATION:

50% IA: 50% UA

50% IA = Mid term evaluation as class test + home assignment/ class assignment/ quiz/ active learning/ Practical class performance / presentation + attendance

50% UA = University examination

Syllabus of Courses

NAAC Accredited "A+ " Grade Faculty Of Family and Community Sciences The Maharaja Sayajirao University of Baroda		**Academic Year**	**2023 – 24**
B.Sc. F.C.Sc. (Public Health Nutrition)- Second Year – Level 5			
Year **II**	**Fundamentals of Anatomy & physiology (Multi-Disciplinary Course)**	**Credits/ Hours per week**	**4 (3 + 1) /5 hours/week Theory: 45 Hrs. ; Practical : 30 Hrs**
Semester **III**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2024-2025	**Maximum Grade**	**O**
Mode of Transaction	Lectures, Tutorials, Presentation, Class discussions.		

Course Outcome (CO) :
Students will be able to
CO1: Define basic concepts in human anatomy and physiology
CO2: Apply knowledge of human physiology to clinical conditions
CO3: Interpret and Interrelate the concepts of nutrition and physiology to outcomes of metabolic syndromes and derangements

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Principles of Anatomy and Physiology and** Integrate the concepts of nutrition and physiology a) Anatomical aspects of the body i. Anatomical terms & Orientation of the body ii. Surface anatomy of Cell- basic unit of life b) Cell organelles- structure and function c) Cell growth and division- phases and importance	6	20%	1,2,3	1	1,2	Emp	L,N,RG	G

	d) Tissues-types, structure and functions.								
II	**Digestive and Respiratory Systems and** Integrate the concepts of nutrition and physiology a) **Digestive System** i. Principal organs of the digestive system – Mouth, tongue, Teeth, Esophagus, Stomach, Small Intestine, Large Intestine, Rectum, Anus- structure & function ii. Principal accessory organs- salivary glands, liver, gall bladder, pancreas- structure & function (Interrelate with glucagon and insulin) iii. Anatomy of the alimentary canal and accessory organs iv. Physiology of digestion v. Mechanism of assimilation and absorption–- Importance of Na+/Cl- ; Na+ glucose transporter vi. Removal of unabsorbed food materials and waste products. vii. Role of enzymes and gut hormones in Digestion and absorption of food **b) Respiratory System** i. Structure of major organs of the respiratory system ii. Basic functions of the organs of respiratory system iii. Physiology of exchange of gases-O2 and CO2Role of tidal volume and vital volumes in muscular exercise iv. Role in maintaining homeostasis	9	15%	1,2,3	1,2,3	1,2	Emp	L,N,RG	G
III	**Circulatory, Musculoskeletal system and Immunology** (at this level only structure and Function) **a) Circulatory system**	12	15%	1,2,3	1,2,3	1,2	Emp	L,N,RG	G

	i. Blood – constituents, blood grouping, blood coagulation ii. Heart- Structure and function iii. Arterial system, Venous system-afferent efferent vessels iv. Importance of Blood circulation v. Heart rate, Pulse rate, Cardiac output, blood pressure- systolic & diastolic and its regulation vi. Cardiac cycle **b) Musculoskeletal System** i. Muscle- Types, structure & functions ii. Skeletal system – formation of bone and teeth -Concept of bone formation and its types. **c) Immunology** i. Basic principles of Immunology- concept of immunity and types ii. Immunoglobulin- Types, general structure & function iii. T-Cells, B-Cells structure & function **iv.** Humoral and Cell mediated Immunity								
IV	**Uro-Genital Systems** **a) Excretory System** i. Kidney, Urinary bladder- structure and function ii. Mechanism of urine formation – Glomerular Filtration rate (eGFR), urine output, urine composition- Normal & abnormal constituents iii. Counter-current mechanisms in blood pressure regulation iv. Hormonal control **b) Reproductive System** i. Sex glands, organs including hormones- structure and function ii. Mechanism of Menstruation - estrogen verses progesterone iii. Testosterone- single hormone impact	8	10%	1,2,3	1,2,3	1,2	Emp	L,N,RG	G

	iv. Overview of Physiology of conception-intra uterine layers-importance of B6/B12 vitamins in neuronal development v. Parturition, Lactation and Menopause vi. Life long-Nutrition based current approaches for a healthy life for women **vii.** HIV– cause, Risk factors								
V	**Neuro and Endocrine system** **a) Endocrine glands – Name & hormone associated, location and general functions** i. Pituitary ii. Thyroid iii. Parathyroid iv. Pancreas v. Adrenal vi. Sex glands (male and female) **b) Nervous System** i. Neuron- structure and function ii. Brain-Major division and sensory motor neurons iii. Central nervous system, Autonomic Nervous System, Parasympathetic Nervous System (Inter relate with examples of role of adrenalin and role of insulin and glucagon)	10	10%	1,2,3	1,2,3	1,2	Emp	L,N,RG	G
Reference Books (to edit and write in APA style, mention the latest edition)									
1	Chatterjee CC. Human Physiology. 11th Edition, Volume 1& 2, 2016.CBS Publishers & Distributors Pvt. Ltd. ISBN: 9788123928722								
2	Kathleen J. W. Wilson, Anne Waugh, Allison Grant. Ross and Wilson Anatomy and Physiology in Health and Illness. 12th Edition, 2014. Elsevier Publication								
3	Nora Hebert, Ruth Heisler, Olga Malakhova, Jett Chinn, Karen Krabbenhoft. A photographic Atlas for Anatomy and Physiology. 8th Edition, 2014. Pearson Publication								
4	Roger Watson. Anatomy and Physiology for Nurses. 13th Edition, 2012. Elsevier Publication								
5	Pearce E. Anatomy and Physiology for Nurses. 16th edition, 1997. Published by Jaypee Brothers Medical Publishers (P) Ltd.								

For Practical

NAAC Accredited "A+ " Grade Faculty Of Family and Community Sciences The Maharaja Sayajirao University of Baroda		**Academic Year**	**2023 – 24**
B.Sc. F.C.Sc. (Public Health Nutrition)- Second Year – Level 5			
Year	**II**	**Fundamentals of Anatomy & Physiology (Multi-Disciplinary Course)**	**Credits/ Hours per week**	**4 (3+1) /5 hours/week Theory: 45 Hrs ; Practical : 30 Hrs**
Semester	**III**	Year of Introduction: 2023-2024 Year of Syllabus Revision: 2024-2025	**Maximum Grade**	**O**
Mode of Transaction		Lab , Demonstrations		

Course Outcome (CO)
Students will be able to
CO1: Acquire basic skills in laboratory techniques.
CO2: Conduct basic biophysical techniques and corelate them with various physiological condition.

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/ SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**Microscopy & Cytology** a) Demonstration of microscope and cheek cells and onion peel (single cell) b) Histology of Permanent slides - various tissues and organs	12	10%	1,2,4	2	2,5	SD	L,N,RG	G

II	**Hematological Assay** a) Preparation of blood smear (Temporary slide)- (understanding of morphology of RBC and WBC) b) Determination & Interpretation of Complete Blood Cell (CBC) Count- (Only demonstration) c) Demonstration of haemin crystals d) Haemoglobin estimation using Sahli's method e) Blood Group determination (Using Antisera)	12	10%	1,2,4	1,2	2,5	SD	L,N,RG	G
III	**Biophysical Methods** a) Measurement of pulse rate and oxygen saturation before and after exercise- Manual & automated b) Measurement of blood pressure (Manual & automated), oxygen saturation at rest and after exercise c) Measurement of grip strength d) Use of Pedometer for measuring the rate of physical activity e) Body composition/ bodyfat analysis	6	10%	1,2,4	2	2,5	SD	L,N,RG	G

MODE OF EVALUATION:

50% IA : 50% UA
50% IA = Mid term evaluation as class test + home assignment/ class assignment/ quiz/ active learning/ Practical class performance / presentation/ journal /written applicatory test / viva + attendance
50% UA = University examination

Syllabus of Courses

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023-24**

B.Sc. F.C.Sc (Public Health Nutrition) – Second Year – Level 5				
Year	**II**	**Nutritional Assessment (Skill Enhancement Course)**	**Credits/ Hours per week**	**2 (1+1) / 3 hours/week** **Theory: 15 Hrs** **Practical: 30 Hrs**
Semester	**III**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentations		

Course Outcomes (CO):
Students will be able to
CO1: Learn about the principles and methods for assessment of nutritional status, and their applications in free living and hospital settings
CO2: Understand strengths and drawbacks of various invasive and noninvasive methods for assessing nutrition and health status of an individual and communities.

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/R/G	**Relation to** G/ES/HV/PE
I	**Overview and Critique of Nutritional Status Assessment Methods (advantages, disadvantages, errors)** Indirect Methods – Socioeconomic status (various other classification – Kuppuswami, Uday Pareek, Prasad, Agarwal and others), mortality (IMR, NMR, U5MR, MMR) & morbidity rates (common illnesses – NFHS data), etc. Introduction to ICD-11	7 h	25%	1,2,3, 4	1,2	1,2,3, 4,5	Emp/SD	L/N/R/G	G/HV/PE

	Direct Method - Anthropometry (BMI- WHO and Asia Pacific classifications, WHR, WSR, and Introduction to WHO Growth charts, Anthro and Anthroplus software) Direct Method - Dietary assessment (Dietary Diversity Score, HDDS, IDDS, MDD-W, MDD- Children)								
II	**Overview and Critique of Nutritional Status Assessment Methods (advantages, disadvantages, errors)** a) Direct Method - Biochemical parameters (Lipids, Carbohydrates, Protein, Iron, Iodine, Vitamin A, Vitamin D, Vitamin B12, Bone disorders – Calcium, Vitamin D, Serum ferritin, Gout – Uric acid other parameters from blood/ urine/ saliva. Breathe – CBC, Liver & Kidney function test, ESR, hsCRP) b) Direct Method - Clinical signs and symptoms for all nutritional defiencies, and	4 h	13%	1,2,3, 4,5	1,2	1,2,3, 4	Emp/SD	L/N/R/G	G/HV/PE
III	**Various scales used for nutritional status assessment for free living population and in hospital setup** a) Patient assessment in a hospital setup– Subjective Global Assessment (SGA), Malnutrition Universal Screening Tool (MUST), Mini Nutritional Assessment (MNA), Mini Mental State Examination (MMSE) and calculating the Risk Score, Edinburgh Postnatal Depression Scale (EPDS)	4 h	12%	1,2,3, 4,5	1,2	1,2,3, 4	Emp/SD	L/N/R/G	G/HV/PE

	b) Healthy eating index, Diabetes Risk Score, Community Based Assessment Checklist for NCDs (CBAC), c) Physical activity (IPAQ) **Biophysical Methods to assess Nutritional Status** a) Understanding pulse and oxygen saturation, cut offs for Hypertension (Indian/Global) b) Body Composition using Bioelectrical impedence method understanding the fat %, LBM, SM, c) Introduction to Imaging Methods - DEXA, CT, MRI, Sonography, BMD for understanding body composition changes Use of AI for measuring nutritional status								

	References:
1.	Kristen Cashin and Lesley Oot. 2018. Guide to Anthropometry: A Practical Tool for Program Planners, Managers, and Implementers. Washington, DC: Food and Nutrition Technical Assistance III Project (FANTA)/ FHI 360.
2.	WHO: Child growth standards 2007, www.who.int/childgrowth/standards/WHO child growth standards and the identification of severe acute malnutrition in infants and children A joint statement. WHO UNICEF 2009
3.	The Training Course on Child Growth Assessment, Module http://www.who.int/childgrowth/training/modules
4.	King, F. S., Burgess, A., Quinn, V. J., & Osei, A. K. (Eds.). (2015). *Nutrition for developing countries*. Oxford University Press
5.	https://inddex.nutrition.tufts.edu/why-dietary-data
6.	Guidelines for Measuring Household and Individual Dietary Diversity Score. FAO. 2013.
7.	India - SAMPLE REGISTRATION SYSTEM (SRS)-STATISTICAL REPORT 2020 (censusindia.gov.in)
8.	EDPS_text_added.pdf (stanford.edu)
9.	Best Nutrition Software for dietitian India (ntuitive.in)
10.	NutriCal - A Recipe Management Software for Food Industry
11.	MCP_Guide_Book.pdf (nhm.gov.in)/ MCP_card.pdf (swach.org)

For Practical

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023-24**
B.Sc. F.C.Sc (Public Health Nutrition)– Second Year – Level 5			
Year	**II**	**Nutritional Assessment (Skill Enhancement Course)**	**Credits/ Hours per week**	**2 (1+1) / 3 hours/week** **Theory: 15 Hrs** **Practical: 30 Hrs**
Semester	**III**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction		Presentations, Hands on Training, Fieldwork		

Unit No.	**Course Content: Practical**	**Contact Hours**	**Weightage (%)**	**BT level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/R/G	**Relation to** G/ES/HV/PE
I	**a) SES** i. Development of SES survey questionnaire ii. Assessment of SES of households using different classifications (mentioned in theory) **b) Anthropometric Assessment** i. Assessment of nutritional status using measurements like - weight / height / MUAC, etc. in different settings – Community / School / Hospital (different vulnerable groups) and understanding calibrations, validity and reliability of tools.	12 h	20%	1,3,4	1,2	1,2,3 ,4,5	Emp/Ent/SD	L/N/R/G	G/HV/PE

	ii. Demonstration of the growth charts, MCP card and Poshan tracker application in the Anganwadi center iii. Use of Anthro and Anthroplus software using original/available datasets								
II	**a) Dietary assessment (different settings) and analysis** i. 24-hour dietary recall method (3 day) ii. Food frequency method iii. Dietary diversity score for women & children (HDDS, IDDS, MDDW, for infants: MDD, MMF, MAD) iv. Software for dietary recall (Dietcal, Ntutive calculator, etc.) **b) Clinical Signs and Symptoms** Demonstration of clinical signs and symptoms of all nutritional deficiencies and disorders **c) Case Studies** Case study using and highlighting the screening tools, anthropometric measurements, and dietary assessments methods learnt (5/student)	12 h	20 %	1,3,4, 5	1,2	1,2,3 ,4,5,	Emp/Ent/SD	L/N/R/G	G/HV/PE
III	Patient assessment in a hospital setup– Subjective Global Assessment (SGA), Malnutrition Universal Screening Tool (MUST), Mini Nutritional Assessment (MNA), Mini Mental State Examination (MMSE) and calculating the Risk Score (1 case for each scale)	6 h	10%	1,2,3, 4,5	1,2	1,2,3 ,4,5	Emp/Ent/SD	L/N/R/G	G/HV/PE

MODE OF EVALUATION:

50 % IA: 50% UA

50% IA = Mid Term evaluation as class test/ Practical class performance / journal/ applicatory written test/ viva + attendance

50% UA = University examination

Syllabus of Courses

NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**		**Academic Year**	**2023-24**
B.Sc. F.C.Sc (Public Health Nutrition)- Second Year – Level 5			
Year	**II**	**Standardization of Conventional Indian Foods (Indian Knowledge System-II)**	**Credits/ Hours per week**	**2 (0+2) /4 hours/week Practical: 60 Hrs**
Semester	**III**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction		Lab work, Hands on Training, Presentations, use of relevant software's		

Course Outcome (CO)
The students will be able to
CO1: Understand weights and volumes needed for food preparations
CO2: Enhanced skills/ practical knowledge in planning of meals
CO3: Learn about traditional regional specific foods consumed in the community

Unit No.	Course Content: Practical	Contact Hours	Weightage (%)	BT level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Standardization of Beverages, Wheat, Rice and Millet based recipes** a) Beverages: Tea/coffee, Milk shake/ lassi, chhaas, raab, fruit/vegetable smoothies (n=6-8) b) Wheat based/ millet based: roti, paratha, bhakri, puri, stuffed paratha, , , mamra, (n=6-8) c) Rice/millet/wheat based: Boiled rice, jeera rice, veg pulao, khichdi, masala khichdi (rice/wheat/millet), dosa (rice/millet), uttapa, idli (rice/millet),etc (n=6-9).	24 h	40%	1,2,3	1,2	1,2,3	Ent, SD	L,R,N,G	ES

	d) Pulses: thin/medium/thick dal, hole, desi chana, rajma, kadhi, sambhar, moong sabji, sevusal,sprouts, punamissaetc (n=6-8).								
II	**Standardization of Vegetables, Soup, Egg, Milk based recipes** a) Vegetables: fresh greens, other vegetables- dry and curries (n= 6-8). b) Milk and milk products: curd, paneer, shrikhand, Kheer, custard, Raita, payasam,etc (n=6-8) c) Soups: Broth, vegetable soup, shorba, Dal soup tomato--plain and cream soups etc. (n=6-8). d) Salads: cucumber, tomato, onion, beetroot (n=6-8) e) Chutneys: green, coconut, khajur, tomato etc f) Egg based: Boiled, half fried, scrambled, omelettes, egg pudding etc (n=6-8)	18 h	30%	1,2,3	1,2	1,2,3	Ent, SD	L,R,N,G	ES
III	**Standardization of Breakfast, Snacks, Traditional Indian Sweets** a) Breakfast viz upma, poha, moong chila, besanchila, etc (n=6—8) b) Snacks- pakoda, muthiya, handwo, dhokla, sabudanavada, meduvada, patra (n=6-9). c) Traditional Indian sweets—sukhadi, sheera, besanladdo, gajar/dudhi halwa, chikki (peanut/til) (n=6-9).	18 h	30%	1,2,3	1,2	1,2,3	Ent, SD	L,R,N,G	ES
	References								
1.	Chadha R and Mathur P (eds)(2015). Nutrition: A Lifecycle Approach. Hyderabad: Orient BlackSwan,								
2.	Longvah T, Ananthan R, Bhaskarachary K, Vankiah k (2017). Indian Food Composition Tables. Hyderabad: National Institute of Nutrition, Indian council of Medical Research								
3.	Rekhi T and Yadav H (2014). Fundamentals of Food and Nutrition. New Delhi: Elite Publishing House Pvt Ltd.								

MODE OF EVALUATION:

50% IA: 50% UA

50% IA = Practical class performance / journal/ written test/ viva + attendance

50% UA = Applicatory written test as per University rule

SEMESTER – IV

PUBLIC HEALTH NUTRITION

NEP STRUCTURE FOR FOODS AND NUTRITION UNDERGRADUATE COURSE (MAJOR:PUBLIC HEALTH NUTRITION -GRANT IN AID PROGRAMME)			
SEMESTER	**COURSENAME**	**CREDIT**	**COURSETYPE**
IV	Food Science & Chemistry	4 (3+1)	MAJOR
	Principles of Normal Nutrition	4 (4+0)	MAJOR
	Meal Planning	4 (2+2)	MAJOR
	English for Digital and Virtual Communications	2 (2+0)	AEC
	Basics of Data Management	2 (0+2)	SEC
	Labeling of Foods	2 (2+0)	VAC
	TOTAL	**18**	
	COURSE OFFERED TO STUDENTS OTHER THAN FOODS & NUTRITION SPECIALIZATION		
	Nutrition indicators for Health	4 (4 + 0)	MINOR
	GRAND TOTAL	**22**	

Note: English for Digital and Virtual Communications – Course outline will be taken care at faculty level.

Syllabus of Courses

	NAAC Accredited "A+ " Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc. (Public Health Nutrition) Second Year – Level 5

Year	**II**	**Food Science & Chemistry (Major Course)**	**Credits/ Hours per week**	**4 (3+1) / 5 hours/week** **Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**IV**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentation		

Course Outcome (CO)

The students will be able to

CO1: Explain the properties of foods.

CO2: Explain the relation between chemistry of food components and their role in processing of foods.

CO3: Explain the relation between chemistry of food components and their physiological functions.

CO4: Recognize functions, classification and role of food components in food preparation.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Properties of Foods** a) **Physical Properties** i. Solutions ii. Vapour Pressure iii. Osmotic Pressure iv. Viscosity v. Surface and Interfacial Tension vi. Specific Gravity b) **Acids, Bases and Buffers**	10	22	1,2,3	1	2	EMP, SD	L,N,R,G	PE

	i. Acids and Bases in Foods ii. Buffers and buffering capacity of Various Foods c) **Colloidal Systems in Food –** i. Types and Functions of colloidal systems in food products ii. Sols and Gels – formation and stability in food products iii. Emulsion – formation, factors affecting stability, emulsifiers and their types, role in food products iv. Foam - formation, factors affecting stability, emulsifiers and their types, role in food products								
II	**Enzymes and bioactive compounds in food** **a) Enzymes** i. General characteristics of Enzymes in foods ii. Exogenous and endogenous enzymes in foods and their uses iii. Enzymes affecting the sensorial characteristics of foods - Phenol Oxidases, Peroxidases, Lipoxygenase, Hydroperoxide Lyase and Related Enzyme Transformations, Biogenesis of Other Lipid-Derived Flavors, Origin and Control of Pungent Flavors and Other Bioactive Effects **b) Bioactive Compounds** i. Carotenoids ii. Choline iii. Carnitine iv. Coenzyme Q v. Dithiolthiones vi. Glucosinolates vii. Flavonoids viii. Phytosterols	15	33	1,2,3	2	2	EMP	L,N,R,G	PE

	ix. Phytoestrogens x. Polyphenols xi. Resveratrol								
III	**Pigments/Colour in Foods- Food Applications and Functional Properties** i. Betalains – betanin, ii. Quinones – cochineal, iii. Flavonoids – anthocyan-ins, iv. Isoprenoids – carotene, v. Annatto (bixin, norbixin), vi. Paprika extract, vii. Lutein, canthaxanthin, viii. Porphyrins – chlorophylls and chlorophyllins and copper complexes of these compounds ix. Others - caramels, curcumin, or plant coal.	5	12	1,2,3	2	2	EMP	L,N,R,G	PE
IV	**Flavour in Foods –** a) **Natural, Flavours –** i. Found in nature – Citrus fruits, Sulfur containing compounds in vegetables, ii. Extracted from nature- plant extracts – vanilla, rose , lavender iii. Extracted using natural techniques – flavours produced by microbial and enzymatic fermentation – lactic acid fermentation, Alcoholic fermentation, acetic acid fermentation, butyric acid fermentation. b) **Artificial Flavours –** Nature identical and synthetic flavours, FSSAI guidelines and regulations on permissible limits and usage c) Herbs, Spices and condiments Essential oils and their Culinary Role i. Asafoetida ii. Bay Leaves	15	33	1,2,3	2	2	EMP	L,N,R,G	PE

	iii. Black Pepper iv. Cardamom v. Carom Seeds vi. Cinnamon vii. Cloves viii. Coriander ix. Cumin x. Fennel xi. Fenugreek xii. Mace xiii. Mustard xiv. Nutmeg xv. Saffron xvi. Star Anise xvii. Condiments - acid(vinegar, lemon juice), bitter (garlic, shallot, onion, leeks, pepper, paprika), fat (oi, butter, fat), readymade condiments (sauces and ketchups) salt condiments (sea salt, black salt) sweet condiments (sugar honey) **d) Flavour profiles –** i. Mexican Cuisine: chilli, tomato, avocado, black beans, pepper, corn, coriander leaf and lime. ii. Indian Cuisine: cinnamon, ginger, garlic, cumin, lentils, turmeric, fenugreek and nutmeg. iii. Mediterranean Cuisine: oregano, parsley, basil, dill, rosemary, mint, cucumber, lemon, dill and coriander. iv. Southeast Asian Cuisine: fish sauce, lemongrass, ginger, five-spice (clove, white								

	pepper, liquorice, fennel, Sichuan pepper) and coconut milk. e) **Food pairing – Indian and continental**								
Reference Books									
1.	SunetraRoday (2017). Food Science and Nutrition, Oxford University Press, ISBN-13: 978-0-19-807886-9/ ISBN-10: 0-19-807886-2								
2.	T. Longvah R. Ananthan K. Bhaskarachary K. Venkaiah (2017). Indian Food Composition Tables (IFCT),, Indian Council of Medical Research, National Institute of Nutrition, ASIN: B076NMYR4P								
3.	Srilakshmi B (2015). Food Science. Sixth edition, New Age International, New Delhi, ISBN 10: 8122438091 ISBN 13: 9788122438093								
4.	Sethi Mohini, Eram Rao (2011). Food Science Experiments and Applications. Second edition. CBS Publishers, New Delhi								
5.	Chopra and Panesar (2010), Food Chemistry, Narosa Publishing House								
6.	Fennema, Owen R (2008), Food Chemistry, 4rd Ed., Marcell Dekker, New York, ISBN13: 978-0-8493-6 / ISBN-10: 0-8493-9272-1								
7.	L H Meyer (2004). Food Chemistry, CBS Publishers and Distributorss Pvt. Ltd. ISBN 9788123911496								
8.	Vaclavik. (2003). Essentials of Food Science. CBS Publishers, New Delhi. ISBN: 9788181283498								
9.	Maney S (2008). Foods, Facts and Principles, 3RD Edition Published by Wiley Eastern, New Delhi. ISBN- 9788122422153 / ISBN 8122422152								
10.	Potter,N.N.and Hotchkiss,J.H (1995), Food Science, 5th Ed., Chapman & Hall, ISBN 978-1-4615-4985-7								
11.	Vedpal Yadav, Food Chemistry and Nutrition Practical Manual, Government Polytechnic, Mandi Adampur, Hisar, Haryana, India-125052, 2024								
12.	Basic Scientific Food Preparation Lab Manual, Iowa State University Department of Food Science and Human Nutrition, 701 Morrill Rd, Ames, IA 50011 https://www.iastatedigitalpress.com digipress@iastate.edu, 2023								
13.	Manual Of Methods of Analysis Of Foods – Cereal & Cereal Products- Food Safety and Standards Authority of India Ministry of Health and Family Welfare Government of India New Delhi 20162023								
14.	Manual for Analysis of Oils and Fats, Food Safety and Standards Authority of India Ministry of Health and Family Welfare Government of India New Delhi 2016								

For Practical

NAAC Accredited "A+ " Grade Faculty Of Family and Community Sciences The Maharaja Sayajirao University of Baroda		**Academic Year**	**2023 – 24**
B.Sc. F.C.Sc. (Public Health Nutrition) - Second Year – Level 5			
Year	**II**	**Food Science & Chemistry (Major Course)**	**Credits / Hours per week**	**4 (3+1) / 5 hours/week Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**IV**	Year of Introduction: 2023 -2024 Year of Syllabus Revision: 2024 - 25	**Maximum Marks / Grade**	**O**
Mode of Transaction		Demonstration, food preparation, application		

Course Outcome (CO)
Students will be able to
CO1: Students will be able to understand principles of Food Science through practical applications and role in cooking.
CO2: Students will be able to understand the physical characteristics of plant and animal foods and their role in cooking.
CO3: Students will learn science behind various ingredients and their role in food preparation.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**a) Measuring the viscosity of various liquid foods using falling ball method and/or viscometer** i. Starch gels from various sources ii. Egg white iii. Honey iv. Sauces v. Oils **b) Measuring surface tension of various liquid foods using capillary rise method** i. Mayonnaise	20	66	1,2,3	1,2,3	1,2	SD	L,N,R,G	PE

	ii. Egg white iii. Honey iv. Sauces v. Oils **c) Measuring and comparing the specific gravity of various liquid foods** i. Refined and unrefined oils ii. Honey iii. Milk d) **Measuring the acidity and alkalinity of various liquid foods using indicator paper and pH meter** i. Lemon juice ii. Carbonated beverages iii. Tomato juice iv. Vinegar v. Distilled water vi. Tap water vii. Baking soda solution e) **Measuring the buffering capacity of foods** i. Milk ii. Gelatin sol iii. Egg white f) **Study the colloidal system in foods and factors affecting their formation and stability** i. Sols – gravy ii. Emulsions – Temporary and Permanent - Salad dressings and Mayonnaise iii. Gels – Alginate gels g) Foam- Whipped cream, egg foam								

II	**a) Estimation of α amylase activity** i. α amylase activity in samples of ungerminated and germinated wheat and barley by falling number technique and its implications in food preparation ii. α amylase activity in new and aged rice samples by falling number technique and its implications in food preparation **b) Effect heat on enzymes** i. α amylase from wheat and barley ii. Papain from raw papaya iii. Bromelain from pineapple	5	17	1,2,3	1,2, 3	1,2	SD	L,N,R,G	PE
III	**a) Effect of heat acid and alkali on food pigments** i. Water soluble pigments – Anthocyanins, anthoxanthins, betalins, polyphenols and tannins ii. Fat soluble pigments – Carotenoids, lutein, chlorophyll and xanthophyll	5	17	1,2,3	1,2, 3	1,2	SD	L,N,R,G	PE

MODE OF EVALUATION:

50% IA: 50% UA

50% IA = Mid term evaluation as class test + home assignment/ class assignment/ quiz/ active learning/ Practical class performance / presentation/ journal / written applicatory test / viva + attendance

50% UA = University examination

Syllabus of Courses

	NAAC Accredited "A+ " Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc. (Public Health Nutrition) - Second Year – Level 5

Year	**II**	**Principles of Normal Nutrition (Major Course)**	**Credits/ Hours per week**	**4 (4+0) /4 hours/week** **Theory: 60 Hrs; Practical: 0 Hrs**
Semester	**IV**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentation		

Course Outcome (CO)

The students will be able to

CO1: State basic concepts in human nutrition.

CO2: Comprehend the role of various nutrients in maintaining good health.

CO3: Associate the synergistic and inhibitory properties of nutrients with nutritional and health outcomes.

CO4: Understand the outcomes of nutritional deficiencies and excess.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/R/G	Relation to G/ES/HV/PE
I	Orientation to Human Nutrition **a) Brief history of nutrition in India** i. Origin and development of nutrition science globally and in India ii. Major landmarks in the history of nutrition **b) Basic concepts in human nutrition** i. Introduction to Food based Dietary Guidelines and its applications- Food Based Dietary Guidelines from	7	12	1,2	1	1,2	Emp	N,R	PE

	developed and developing countries and their visual representation								
II	**a) Energy Requirements, Body Composition and Body Weight** i. Energy Metabolism ii. Energy intake iii. Calculating Energy requirements iv. Factors affecting energy expenditure v. Energy balance in various conditions vi. Regulation of body weight - Control of food intake and energy balance - Role of hormones – leptin, ghrelin and insulin **b) Body Composition** – i. Introduction ii. Five levels of body composition –relationship between different levels of body composition iii. Body composition techniques – direct and indirect methods iv. Factors affecting body composition **c) Water as a nutrient** i. Water in our body ii. Importance of water iii. Water requirement and actors affecting the same iv. Maintaining water balance	12	20	1,2	1,2, 4	1,2	EMP	N,R	PE
III	**Macronutrients in Human Nutrition** **a) Carbohydrates** i. Carbohydrates in food ii. Digestive fate of various carbohydrates from food and effect of various factors- processing, storage, interaction with other food ingredients iii. Glycemic carbohydrates iv. Non-glycemic carbohydrates	16	27	1,2	1,2, 3,4	1,2	EMP	N,R	PE

	v. Regulation of blood glucose levels – role of carbohydrates and hormones vi. Role of dietary fibre in human nutrition – role of prebiotics vii. Disorders of carbohydrate metabolism - Lactose intolerance, type 2 diabetes mellitus, inborn errors of carbohydrate metabolism viii. RDA for carbohydrates ix. Advanced Glycation End Products (AGEs) **b) Proteins their classification** i. Food sources of protein ii. Functions of amino acids and proteins iii. Digestive fate of various proteins from food iv. Evaluation of protein quality v. Protein homeostasis vi. Protein deficiency causes and consequences vii. Calculating RDA and EAR of proteins for Indians **c) Lipids and fatty acids** i. Lipids in foods – Visible and invisible fat from Vegetable and animal sources (Saturated, Unsaturated and Trans fats) and blending of fats ii. Nomenclature and Functions of lipids iii. Digestive fate of fats from food iv. Lipid peroxidation – formation of Advanced Lipid Peroxidation end products (ALEs) v. Calculating RDA and EAR for fats and oils (visible) for Indians vi. Consequences of inadequate fat intake vii. Consequences of excess fat intake								
IV	**a) Vitamins in Human Nutrition** i. Fat Soluble Vitamins–Vitamins A, D, E and K- General properties	16	27	1,2	1,2, 3,4	1,2	EMP	N,R	PE

	ii. Absorption, transport, storage, excretion iii. Functions iv. Deficiencies v. Toxicity vi. Synergic and inhibitory relationship between water soluble vitamins vii. RDA and EAR viii. Measurement of status **b) Water Soluble Vitamins–Thiamin, Riboflavin, Niacin, Pyridoxine, Ascorbic Acid, Folic Acid, Cyanocobalamine - General properties** i. Absorption, transport, storage, excretion ii. Functions iii. Synergic and inhibitory relationship between water soluble vitamins iv. Deficiencies v. Toxicity vi. RDA and EAR vii. Measurement of status								
V	**Macro and Micro Minerals–Sodium, Potassium, Magnesium, Calcium, Phosphorous, Iron, Iodine, Selenium and Zinc – Introduction** a) Absorption, transport, storage, excretion b) Factors affecting bioavailability c) Functions d) Deficiencies e) Requirements f) Recommended Daily Allowance	7	11	1,2	1,2, 3,4	1,2	Emp	N,R	PE
VI	**Oxidative Stress** a) Introduction b) Dietary factors associated with etiology of oxidative stress	2	3	1,2,3	2,4	1,2	Emp	N,R,G	PE

	c) Oxidative stress and metabolic disorders d) Role of nutrients in addressing oxidative stress								
Reference Books									
1.	Anjana Agarwal and Shobha Udipi. (2022) Textbook of human Nutrition, Second Edition, Jaypee Medical Publishers, New Delhi. ISBN-13 978-9389587869								
2.	Dietary guidelines for Indians – A Manual by National Institute of Nutrition. (2011) ICMR National Institute of Nutrition, Indian Council of Medical Research, Department of Health Research, Ministry of Health and Family Welfare, Government of India.								
3.	Nutrient Requirements for Indians. A Report of the Expert Group 2020. ICMR National Institute of Nutrition, Indian Council of Medical Research, Department of Health Research, Ministry of Health and Family Welfare, Government of India.								
4.	Susan A. Lanham-New , Ian A. Macdonald, Helen M. Roche . (2010) Nutrition and Metabolism (2nd ed.), Wiley-Blackwell, ISBN: 978-1-4051-6808-3								

MODE OF EVALUATION:

50% IA: 50% UA

50% IA = Mid term evaluation as class test + home assignment/ class assignment/ quiz/ active learning/ Practical class performance / presentation + attendance

50% UA = University examination

Syllabus of Courses

	NAAC Accredited "A⁺"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023-24**

B.Sc. F.C.Sc (Public Health Nutrition) - Second Year – Level 5				
Year	**II**	**Meal Planning (Major Course)**	**Credits / Hours per week**	**4 (2+2) / 6 hours/week Theory: 30 Hrs; Practical: 60 Hrs**
Semester	**IV**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentations		

Course Outcome (CO)
Students will be able to
CO1: Understand the basic principles of meal planning
CO2: Understand nutritional requirements during different stages of life
CO3: Apply principles of meal planning using food exchange system through life cycle

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/R/G	**Relation to** G/ES/HV/PE
I	**Concept of meal planning and food exchange system** a) Basic definitions: Adequate intake, functional foods, Phytochemicals, Neutraceuticals, Dietary supplements and balanced diet b) Introduction to ten food groups, sources and nutrients from each food group c) Exchanges of various food groups and their basis, standard weights and measures.	8 h	13%	1,2	1	1,4,5	SD	L,N,R,G	ES

	d) Importance of meal planning, principles of meal planning and factors affecting meal planning. e) Food Pyramid, My pyramid, My plate, food based dietary guidelines for Indians, Dietary goals for healthy life. f) Concept of DRI, RDA, EAR, RDI, Upper Tolerable Limits, ESADDI (Estimated Safe and Adequate Daily Dietary Intake), MDR (Minimum Daily Requirement), Latest RDA and EAR for Indians g) Types of menus and food services								
II	**Nutrition for adults** a) Definition of Reference adult man and woman b) Nutrient requirements for men & women c) Overview of Nutritional deficiencies d) Dietary guidelines for healthy living	4 h	7%	1,2	1,2	1,2,3	SD	N,G	G,PE
III	**Nutrition during pregnancy and lactation** a) Physiological changes during pregnancy & lactation b) Factors affecting outcome of pregnancy c) Complications during pregnancy d) Weight gain during pregnancy according to pre-pregnancy weight e) Nutrient requirement during pregnancy & lactation f) Dietary guidelines for eating during pregnancy & lactation g) Food taboos & myths	8 h	13%	1,2	2,3	1,2,3, 4	SD	L,R,N,G	G,PE
IV	**Nutrition during infancy** a) Growth & development (including growth milestones) during infancy b) Nutrient requirement during infancy c) Comparison of Human milk with artificial milk d) Breastfeeding and planning of safe & indigenous complementary feeds during infancy e) Feeding in difficult situations	4 h	7%	1,2	2,3	1,2,3	SD	L,R,N,G	G,PE
V	**Nutrition during childhood** a) Growth and development b) Nutrient requirement during childhood	2 h	4%	1,2	1,2	1,2,3	SD	N,G	G,PE

	c) Healthy eating habits d) Nutrition concern – Undernutrition, over nutrition, and micronutrient deficiencies								
VI	**Nutrition during adolescence** a) Growth and development b) Nutrient requirement during childhood c) Nutrition concern – Undernutrition, over nutrition, and micronutrient deficiencies d) Eating disorders	2 h	3%	1,2	1,2	1,2,3	SD	N,G	G,PE
VII	**Nutrition for Geriatrics** a) Physiological and psychological changes occurring during old age b) Nutrient requirement during ageing c) Diet and feeding pattern for the elderly d) Nutritional concerns and their management e) Factors affecting longevity and health	2 h	3%	1,2	1,2	1,2,3	SD	N,G	G,PE

Reference Books

1.	Chadha R and Mathur P (eds)(2015). *Nutrition: A Lifecycle Approach*. Orient Blackswan, Hyderabad.
2.	Bamji MS, Krishnaswamy K, Brahmam GNV (2016). *Textbook of Human Nutrition,4th edition*. Oxford and IBH Publishing Co. Pvt. Ltd.
3.	Bernstein, M. (2010). Nutrition for the older Adult(2nd edition). Jones publishers. ISBN-10:1284048934
4.	Brown, J. (2011). Nutrition Now (6th ed). Wadsworth publishers. ISBN:13-978-1133936534
5.	Dietary guidelines for Indians – A Manual by National Institute of Nutrition.(2011)
6.	Longvah T, Ananthan R, Bhaskarachary K, Vankiah k (2017). Indian Food Composition Tables. Hyderabad: National Institute of Nutrition, Indiancouncil of Medical Research
7.	Revised Short Summary Report 2024. ICMR – NIN Expert Group on Nutrient Requirements for Indians, Recommended Dietary Allowance (RDA) and Estimated Average Requirements (EAR) 2020

For Practical

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023-24**

B.Sc. F.C.Sc (Public Health Nutrition) - Second Year – Level 5

Year	**II**	**Meal Planning (Major Course)**	**Credits/ Hours per week**	**4 (2+2) / 6 hours/week** **Theory: 30 Hrs; Practical: 60 Hrs**
Semester	**IV**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction		Lab work, Hands on Training, Presentations, use of relevant softwares		

No.	**Course Content: Practical**	**Contact Hours**	**Weightage (%)**	**BT level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**Introduction to Meal Planning** a) Conversion of raw weights to volumes b) Assessment of edible portion of foods viz. fruits and vegetables c) Calculation of nutrients using IFCT book i. Macronutrients: Energy, Protein, Fat, CHO ii. Micronutrients: Iron, Calcium, Vitamin A, Vitamin C iii. Ranking of food groups based on nutrients eg. Foods rich in protein, carbohydrates, fiber, iron calcium, Vit. C, Vit. A	10 h	%	1,2,3	1	1	SD	L,R,N,G	ES

II	**Planning and preparation of diets for:** a) Adults b) Pregnancy c) Lactation d) Geriatrics	20 h	17%	3,4, 5,6	3,4	1,2,3 ,4,5	Emp ,Ent, SD	L,R,N,G	ES
III	**a) Planning and preparation of diets of:** i. Infants ii. Preschoolers iii. School Children iv. Adolescents **b) Planning and preparation of** i. Complementary foods ii. Healthy Tiffin recipes	30 h	25%	3,4, 5,6	3,4	1,2,3 ,4,5	Emp ,Ent, SD	L,R,N,G	ES

MODE OF EVALUATION:

50% IA: 50% UA

50% IA = Mid term evaluation as class test + home assignment/ class assignment/ quiz/ active learning/ Practical class performance / presentation/ journal /written applicatory test/ viva + attendance
50% UA = University examination

Syllabus of Courses

	NAAC Accredited "A⁺"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023 – 24**

B.Sc. F.C.Sc (Public Health Nutrition) – Second Year – Level 5

Year	**II**	**Basics of Data Management (Skill Enhancement Course)**	**Credits/Hours per week**	**2(0+2) /4 hours /week** **Practical: 60 Hrs**
Semester	**IV**	Year of Introduction: 2024-25 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations		

Course Outcomes

The students will be able to

CO1: Understand the importance of data management in the field of foods and nutrition.

CO2: Develop skills in data collection methods, including surveys, interviews, and dietary assessments.

CO3: Learn techniques for organizing data and gain proficiency in data analysis using statistical tools and software.

CO4: Interpret and represent the data effectively and use softwares and applications for nutrition analysis

Unit No.	**Course Content : Practical**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**a) Introduction to data management in Foods and Nutrition** **Overview of data management concepts:** Data collection, data organisation, data processing, data presentation and representation **Types of data:** Qualitative, Quantitative, Categorical, Numerical, Normal, Ordinal, Discrete and continuous	24h	40%	2,3,4	1,2	5	SD	L,N,RG	-

	b) Data collection Techniques- Practical exercises on designing tools as well as using **i. Primary data collection** Focus group discussion; Case studies; Observations; Body mapping; Pile sorting; Free listing; Narrations; In-depth interview (Key Informant interview); Drawing as dialogue, Exit interviews, questionnaires etc. **ii. Secondary data collection**- published and unpublished data **iii. Using softwares for data collection**								
II	**a) Data organisation** i. **Steps of data organization:** Data coding, cleaning, sorting, tabulation etc. **b) Data processing/ analysis** i. Descriptive data analysis (textual and numerical data) • Mean • Median • Mode • Standard Deviation ii. Using softwares/ applications for nutritional status assessment for eg. WHO Anthro, WHO Anthroplus etc. iii. Using softwares for data analysis	18h	30%	2,3,4, 5	3	5	SD	L,N,RG	-
III	**a) Data presentation and representation** i. Bar Graph ii. Line Graphs iii. Pictographs iv. Histograms v. Stem and Leaf Plot vi. Dot Plots vii. Frequency Distribution **b) Using softwares/ application for nutrition data**	18h	30%	2,3,4, 5	4	5	SD	L,N,RG	-

	i. Softwares/ applications for dietary data calculations ii. Recipe development and nutrient composition calculations								
	References								
1.	Sapford R. and Jupp V. (2006). Data Collection and Analysis, Second Edition, The Open University U.K. 2006								
2.	Puchta C. and Potter J.(2004). Focus group Practice, Sage publications, USA								
3.	rozdova K.and Gaubatz K. (2015) Quantifying the Qualitative- Information Theory for Comparative Case Analysis, Sage publications, USA								
4.	Pandey P. and Mishra M. (2015) Research Methodology: Tools and Techniques. Bridge Center								
5.	Hinton P (2004). Statistics Explained: A Guide for Social Science Students. Routledge Publishing, London								
6.	Kothari C R (2008). Research Methodology: Methods and Techniques (2nd ed.). New Age International Publishers, New Delhi, India								
7.	Lovegrove J., Hodson L., Sharma S. and Lanham S. (2015) Nutrition Research Methodologies. The Nutrition Society. John Wiley and Sons, Ltd., UK								

MODE OF EVALUATION:

50% IA: 50% UA

50% IA = Practical class performance / journal/ written test/ viva + attendance

50% UA = Applicatory written test as per University rule

Syllabus of Courses

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023-24**

B.Sc. F.C.Sc (Public Health Nutrition) - Second Year – Level 5				
Year	**II**	**Labeling of Foods (Value Added Course)**	**Credits / Hours per week**	**2 (2+0) / 2 hours/week Theory: 30 Hrs; Practical: 0 Hrs**
Semester	**IV**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction	Lectures, Tutorials & Presentations			

Course Outcome (CO)
Students will be able to
CO1: Understand the labeling regulations for food safety, public health, and international trade
CO2: Understand the process of developing food labels
CO3: Learn about nutrient profiling systems being used at national and international level

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**An overview of Food Labeling** a) Concept of food labeling b) Importance and utility of food labels for healthy food choices c) Principal display panel d) Front of pack and back of pack labeling Nutrition Panel- Placement and components e) Guidelines for Nutrition and health Claims on Food Labels f) Types of food labels	06 h	20%	1,2	1,2	1,2,3,4	EMP,SD	L,N,R,G	ES

II	**FSSAI Guidelines in India** a) Labeling of Pre-packaged Foods: i. General Labeling Requirements - Name of the product, generic and brand name, Net quantity ii. Symbols Logos on front and back of pack iii. Nutrition information back of pack - Ingredient list, Nutritional Information Declaration of Food Additives, Allergen information iv. Instructions for use v. Name and Address vi. Manufacturing date, Best before/Use by date, vii. Retail Sale Price, viii. Consumer Care details, Lot/Code/Batch Identification b) Labeling of Imported Foods, Labeling of Packaged Food Material not meant for Human Consumption, Mandatory Declarations, Exemptions from certain Labeling Requirements c) Regulations regarding Processing information d) Other Mandatory Declarations e) Display of information in food service establishments f) Exemptions of foods from nutrition labeling	15 h	50%	1,2,3,4,5	1,2,3	1,2,3,	EMP,SD	L,N,R,G	G,ES,HV
III	**Nutrient profiling systems** a) Importance and use of FoPL b) Declaration of nutrients of concern: energy, fat, sugar and salt on FoPL and Health Claims c) WHO Nutrient Profile Models d) Nutri-score System, Health Star Rating System, , Warning lables, Indian Nutrition Rating (INR), GDA, Multiple Traffic Light	09 h	30%	1,2,3	1,2,3	1,2,3, 4	SD	L,N,R,G	G,ES
Reference Books									
1.	FOOD SAFETY AND STANDARDS (LABELING AND DISPLAY) REGULATIONS, 2020, Food Safety and Standards Authority of India, Ministry of Health and Family Welfare, Government of India, 2021 https://www.fssai.gov.in/upload/uploadfiles/files/Compendium_Labeling_Display_23_09_2021.pdf								

2.	Policy Brief- Front-of-pack nutrition labeling of foods and beverages. United Nations Children's Fund (UNICEF). https://www.unicef.org/media/116686/file/Front-of-Pack%20Nutrition%20Labeling%20(FOPNL).pdf
3.	NUTRITION LABELING: POLICY BRIEF (2022). World Health Organisation (WHO) https://iris.who.int/bitstream/handle/10665/355295/9789240051324-eng.pdf?sequence=1
4.	Amendment on Food Safety and Standards Authority of India Notification, Food Safety and Standards (Labeling& Display) Regulations, 2020, https://fssai.gov.in/upload/uploadfiles/files/Draft_Notification_HFSS_20_09_2022.pdf

MODE OF EVALUATION:

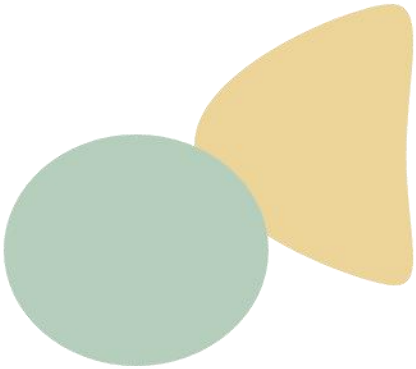
50% IA: 50% UA

50% IA = Mid term evaluation as class test + home assignment/ class assignment/ quiz/ active learning/ Practical class performance / presentation + attendance

50% UA = University examination

SUMMER INTERNSHIP : 4 Credits

(For Students who Exit at 2nd Year)



Syllabus of Courses

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2023-24**

B.Sc. F.C.Sc (Public Health Nutrition) - Second Year – Level 5				
Year	**II**	**Internship in Public Health Nutrition (Internship/Apprenticeship)**	**Credits / Hours per week**	**4 (0+4) / 30 hours/week** **Practical: 120 Hrs**
Semester	**IV**	Year of Introduction: 2023-24 Year of Syllabus Revision: 2024-25	**Maximum Grade**	**O**
Mode of Transaction		Summer Internship/Apprenticeship		

Course Outcome (CO)
Students will be able to
CO1: Get hands on training and get acquainted with day-to-day functioning and objectives of the organisation/institution

Unit No.	Topic	Contact Hours /week	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**a) Summer internship for 30 days under any one of the following:** i. Government organisations offering any health and nutrition program (ICDS, MDM, KVK) ii. Local NGO working in the area of livelihood, health and nutrition with government/ non-government organisations. iii. Food Industries iv. Cafe, Restaurants, Hotels v. Fitness Centres	30	90%	1,2,3,4,5 & 6	1	3	EMP, ENT, SD	L	HV, PE

	b) The internship should cover any one or more of the following domains: i. Food service management (Understanding menus, food safety and hygiene, target group/customer behaviours, accounting, and sales) ii. Functioning of the organisation to understand programs related to agriculture / livelihood / health /nutrition)								
II	Prepare and submit the report to the organization/Institution and the concerned Department of the Faculty	2	10%	1,2,3,4,5 & 6	1	3	EMP, ENT, SD	L	HV, PE

UG Diploma Certificate: Students who opt to exit after completion of the second year and have secured 88 credits will be awarded a Under Graduate Diploma in Public Health Nutrition, Faculty of Family and Community Sciences if, in addition they complete one internship course of 4 credits during the summer vacation of the second year. These students are allowed to re-enter the degree programme within three years and complete the degree programme within the stipulated maximum period of 7 years.

Note: The course will be evaluated by the agency/Institution under whom the student is doing the internship

MODE OF EVALUATION:

- Attendance, report submission and completion certificate.

DEPARTMENT OF FOODS AND NUTRITION

THIRD YEAR (NEP)

PUBLIC HEALTH NUTRITION

(V SEMESTER) – REGULAR

ACADEMIC YEAR 2025 – 2026

PSO

NEP STRUCTURE FOR FOODS AND NUTRITION UNDERGRADUATE COURSE (MAJOR: PUBLIC HEALTH NUTRITION - GRANT IN AID PROGRAMME)			
SEMESTER	**COURSE NAME**	**CREDIT**	**COURSE TYPE**
V	Diet Therapy	4 (3+1)	CORE / MAJOR
	Public Health Nutrition	4 (3+1)	CORE / MAJOR
	Introduction to Research Methods	4 (4+0)	CORE / MAJOR
	Nutrition Lab	2 (0+2)	FOUNDATION / SEC
	COURSE OFFERED TO STUDENTS OTHER THAN FOODS & NUTRITION SPECIALIZATION		
	Health and Nutrition for Mother and Child	4 (4+0)	ELECTIVE / MINOR
	Planning Healthy Diets	4 (4+0)	ELECTIVE / MINOR
	MINOR COURSE IN GRANT IN AID PROGRAMME OFFERED TO ALL HPP STUDENTS OTHER THAN FN HONORS		
	Introduction to Public Health Nutrition	4 (4+0)	ELECTIVE/MINOR
	TOTAL	**22**	

Syllabus of Courses

NAAC Accredited "A+" Grade Faculty of Family and Community Sciences The Maharaja Sayajirao University of Baroda		**Academic Year**	**2025 – 2026**
B.Sc. F.C.Sc. (Public Health Nutrition) - Third Year – Level 5.5			
Year	**III**	**Diet Therapy (Core / Major)**	**Credits / Hours per week**	**4 (3+1) / 5 hours/week Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**V**	Year of Introduction: 2024 - 2025 Year of Syllabus Revision: 2025 - 2026	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentations		

Course Outcome (CO)

1. Comprehensive knowledge in the field of therapeutic nutrition and dietetics.
2. Update & understand the current knowledge about classification, pathogenesis, diagnosis, etiology and dietary management of various diseases.
3. Application and Translation of scientific knowledge into practice.
4. Understanding and update on the newer non-pharmacological therapies to control various diseases conditions based on scientific evidence.
5. Correlating principles of dietary management with laboratory management and human nutrition.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Introduction to Therapeutic Diets and overview of different types of diet** a) Definition of therapeutic nutrition, portion controlled therapeutic nutrition, Recipe fortification, Recipe reduction. b) Categories of Therapeutic Nutrition: Natural food and food products, food supplements, Nutraceuticals	4.5 hr	5%	1,2	CO 1	PSO1, 2	SD	G	ES

	c) Overview of different type of diets viz. low calorie diet, very low calorie diet, Mediterranean diet, DASH diet, MIND diet, Mayo clinic diet, Flexitarian diet, weight watchers, Volumetrics diet, Dr. Weil's anti-inflammatory diet, Dixit diet, South Beach diet, Nutritarian diet, Paleo diet, Nutrisystem diet Keto diet and Atkins diet and meal replacement.								
II	**Medical Nutrition Therapy for weight management** a) Overview of over nutrition, obesity, metabolic syndrome and non- communicable diseases and current scenario. b) Classification of OW/Obesity (WHO and Asia Pacific), type of NCDs: epidemiology, consequences and strategies to combat them (Best buy interventions, lifestyle modification, pharmacological. c) Role of weight management in the management of OW/obesity and NCDs. (WHO and ADA guidelines). d) Principles of dietary management of over-nutrition, obesity, metabolic syndrome and non-communicable diseases.	04 hr	5%	1,2	CO2 CO3 CO4	PSO1, 2	SD	G	ES,PE
III	**Medical Nutrition Therapy for Non – Communicable Diseases** **a) Medical Nutrition Therapy for Diabetes Mellitus** i. Definition of pre - diabetes, diabetes (Type 1, Type 2 & GDM) ii. Symptoms of pre- diabetes and chances of developing Type 2 DM iii. Diet regime for the management of pre- diabetes with emphasis on inclusion and exclusion of foods in their daily diet. iv. Symptoms of Type 1 DM and Type 2 DM, pathology of Fasting blood glucose and OGTT test for diabetes confirmation	16 hr	21%	1,2	CO2 CO3 CO4	PSO1, 2	SD,EMP	G	ES,PE

	v. Diet and physical activity regime for the management of diabetes and continuous monitoring of blood sugars (CGM). vi. Blood glucose targets for women with GDM and Risk factors of GDM vii. Diet and physical activity regime for the management of GDM. **b) Medical Nutrition Therapy for Hypertension & Dyslipidemia** i. Definition of high blood pressure /hypertension and Dyslipidemia. Stages of hypertension and classification of blood lipids. ii. Risk factors of hypertension and pathological assessment and monitoring of blood pressure (Thyroid Function Test, Uric acid levels, urinary albumin- creatinine ratio and urinalysis, sphygmomanometer/ standard digital instrument, ECG). iii. Diet and physical activity regime for hypertension, table salt, food labelling for sodium content iv. Risk factors of dyslipidemia and pathological assessment (Lipid profile) v. Diet and physical activity regime for dyslipidemia, role of functional foods, food labelling for trans-fat and total fat. **c) Medical Nutrition Therapy for Cancer** i. Cancer: Definition, Difference between normal cell and cancer cell, etiology, signs and symptoms, pathophysiology, prevention, Risk factors, diet therapy and its importance. ii. Overview of cancer therapies and its side effects with dietary modifications.								
IV	**Medical Nutrition Therapy for Renal and Hepatic Disorders** **a) Medical Nutrition Therapy for Renal Disorders**	10 hr	14%	1,2	CO2 CO3 CO4	PSO1, 2	SD,EMP	G	ES,PE

	i. Nephrotic syndrome: etiology, symptoms, complications, pathophysiology, Medical treatment and dietary regime ii. Renal Calculi (Kidney stones): etiology, symptoms, complications, pathophysiology, Medical treatment and dietary regime iii. Chronic Kidney Disease (CKD): Overview of it's etiology, symptoms, complications, pathophysiology with medical treatment & dietary regime, overview and types of dialysis iv. Acute Renal Failure (ARF): Overview of it's etiology, symptoms, complications, pathophysiology with medical treatment & dietary regime. v. Kidney Transplant: definition, pathophysiology and diet regime **b) Medical Nutrition Therapy for Liver disorders** i. Cholecystitis (Gall bladder stones): etiology, symptoms, acute and chronic, pathology physiology and dietary management ii. Hepatitis: etiology, forms, symptoms, pathophysiology and dietary management iii. NAFLAD/ MASLD: etiology, causes, symptoms, pathophysiology and dietary management iv. Cirrhosis of liver: etiology, symptoms, pathophysiology and dietary management v. Pancreatitis: etiology, symptoms, pathophysiology, acute and chronic and dietary management								
V	**Medical Nutrition Therapy for Upper and Lower Gastro Intestinal Disorders**	06 hr	8%	1,2	CO2 CO3 CO4	PSO1, 2	SD,EMP	G	ES,PE

	a) Medical Nutrition Therapy for Upper GI disorders i. Gastritis and peptic ulcer: Definition, etiology, symptoms and dietary management ii. Gastroesophageal Reflux Disease (GERD), Esophagitis, Hiatal Hernia: Definition, etiology, symptoms and dietary management **b) Medical Nutrition Therapy for Lower GI disorders** i. Constipation: Definition, etiology, symptoms and dietary management ii. Diarrhoea: Definition, classification (osmotic, secretary, exudative, rapid intestinal transit diarrhea), etiology, symptoms and dietary management, ORS by WHO iii. Inflammatory Bowel Syndrome (Crohn's disease and Ulcerative Colitis): Difference between Crohn's disease and Ulcerative Colitis, etiology, symptoms and dietary management iv. Lactose Intolerance and Gluten Intolerance (Celiac disease): Definition, etiology, symptoms and dietary management v. Gluten Intolerance (Celiac disease): Definition, etiology, symptoms and dietary management								
VI	**Medical Nutrition Therapy for the following Disorders** **Bone Health** i. Definition, etiology, symptoms, pathophysiology, prevention with dietary regime for: a. Osteoporosis b. Rheumatoid Arthritis (RD) c. Osteoarthritis	05 hr	6%	1,2	CO2 CO3 CO4	PSO1, 2	SD,EMP	G	ES,PE

	a) Food Allergy i. Food Allergy: Definition, Difference between food allergy and food intolerance, etiology, symptoms, pathophysiology, prevention and dietary regime ii. Asthma: Definition, etiology, symptoms, pathophysiology and dietary regime. **b) Fever** i. Tuberculosis: etiology, causes, symptoms, pathophysiology and dietary management ii. Typhoid: etiology, causes, symptoms, pathophysiology and dietary management iii. Influenza: etiology, types, causes, symptoms, pathophysiology and dietary management **c) Polycystic Ovarian Disease / Poly Cystic Ovarian Syndrome** i. Overview, Definition and difference between PCOD and PCOS ii. Common signs, symptoms, diagnosis of PCOD iii. Diet and Physical activity regime for PCOD **d) HIV AIDS** i. AIDS: Definition, etiology, signs and symptoms, pathophysiology, prevention, diet therapy and its importance.								

References

1.	L Kathleen Mahan, Janice L Raymond (2022). Krause's Food and the Nutrition Care Process. 16th ed. ISBN 9780323340755. Elsevier Publication.
2.	Srilakshmi B (2014). Dietetics (7th Edition). New Age International Publishers Ltd, New Delhi. ISBN: 9788122435009, 8122435009
3.	Staci Nix, Sue Rodwell Williams (2021). Williams' Basic Nutrition & Diet Therapy. 16th ed. Elsevier - Health Sciences Division, ISBN-100323083471, ISBN- 139780323083478.
4.	Skipper A (2008). Advanced Medical Nutrition Therapy and Practice. 1st edition. Jone & Barlett Publishers
5.	Nelms M, Sucher K (2019). Nutrition Therapy and Pathophysiology. 4th edition. Brooks/Cole Publishers.
6.	Gropper S (2008). Advanced Nutrition and Human Metabolism (5th ed). Wadsworth Publishing Co Inc.

7.	Brown, J (2013). Nutrition Now (7th ed). Wadsworth Publishing Co Inc. ISBN- 13:978-1-133-93653 4, ISBN 10:1-133-93653-9
8.	Peggy Stanfield (2009). Nutrition and Diet Therapy, Self Instructional Approaches (5th ed). Jones and Bartlett Publishers, Inc.
9.	Sylvia Escott – Stump (2015). Nutrition and Diagnosis – Related Care (8th ed). Lippincott Williams and Wilkins. ISBN-13: 978-1451195323, ISBN-10: 145119532X.
10.	American Diabetes Association Professional Practice Committee; 10. Cardiovascular Disease and Risk Management: *Standards of Care in Diabetes—2024*. *Diabetes Care* 1 January 2024; 47 (Supplement_1): S179–S218. https://doi.org/10.2337/dc24-S010\
11.	Longvah T, Ananthan R, Bhaskarachary K, Vankiah k (2017). Indian Food Composition Tables. Hyderabad: National Institute of Nutrition, Indian council of Medical Research.
12.	Malhotra S (2019). Dietetics in Practice - A Handbook. New Era, Chandigarh publishers.
13.	Sheth V and Singh K (2013). Diet Planning Through the Life Cycle Part III: Diet Therapy A Practical Manual. Fifth Edition. Elite Publishing House Pvt Ltd. New Delhi. ISBN 81 88901-51-2
14.	The Purple Book-A Handbook on diets for diseases (2019).1st Edn.FSSAI. 2023
15.	Therapeutic Nutrition : https://ugcmoocs.inflibnet.ac.in

For Practical

	The Maharaja Sayajirao University of Baroda Faculty of Family and Community Sciences Department of Foods and Nutrition	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc. (Public Health Nutrition) - Third Year – Level 5.5				
Year	**III**	**Diet Therapy (Core / Major)**	**Credits / Hours per week**	**4 (3+1) / 5 hours/week Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**V**	Year of Introduction: 2024 - 2025 Year of Syllabus Revision: 2025 - 2026	**Maximum Grade**	**O**
Mode of Transaction				

Course Outcome (CO)

1. Develop an ability to apply principles of nutrition in the treatment of different disease conditions.
2. Provide practical laboratory based training in the preparation of diets for different conditions.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Classification of foods rich in various nutrients for the therapeutic modification of diets** a) Preparation of lists of foods rich in nutrients- Dietary fiber, sodium, magnesium, phosphorous, oxalic acid. b) Preparation of lists of foods rich in cholesterol, PUFA, MUFA, SAFA, Glycemic Index and glycemic load. c) Preparation of hospital diets- clear fluid, full fluid and soft diet.	03 hr	5%	1,3,4,6	CO1	PSO1, 2	Emp.	N,G	ES,PE
II	**Planning and preparation of diets for weight management and febrile disorders** a) Diet for undernutrition (child and adult) b) Diet for overweight/various grades of obesity	06 hr	8%	1,3,4,6	CO2	PSO1, 2	Emp., SD	N,G	ES,PE

	c) Diet during Acute and Chronic fever								
III	**Planning and preparation of diets for the management of diabetes** a) Diet for T1DM b) Diet for T2DM c) Diet for gestational diabetic mother	04 hr	5%	1,3,4,6	CO2	PSO1, 2	Emp. SD	N,G	ES,PE
IV	**Planning and preparation of diets for the management of hypertension, hyperlipidemia, cardiovascular diseases and cancer** a) Diet for Stage I /Stage II hypertension b) Diet for Arthrosclerosis/Dyslipidemia/Hyperlipidemia c) Diet for Improving Heart Health d) Diet for cancer	06 hr	9%	1,3,4,6	CO2	PSO1, 2	Emp., SD	N,G	ES,PE
V	**Planning and preparation of diets for the management of renal and liver disorders** a) Diet for Nephrotic syndrome and patient on dialysis b) Diet for Renal Calculi c) Diet for cirrhosis of liver with/without ascites d) Diet for Fatty Liver	06 hr	8%	1,3,4,6	CO2	PSO1, 2	Emp., SD	N,G	ES,PE
VI	**Planning, Preparing Diets for Gastrointestinal Disorders** a) Diet for a patient suffering from Peptic ulcer/Gastritis b) Diet for a patient suffering from Celiac disease and lactose intolerance c) Diet for IBS	04 hr	5%	1,3,4,6	CO2	PSO1, 2	Emp., SD	N,G	ES,PE

References

1	Longvah T, Ananthan R, Bhaskarachary K, Vankiah k (2017). Indian Food Composition Tables. Hyderabad: National Institute of Nutrition, Indian council of Medical Research.
2	Malhotra S (2012). Dietetics in Practice - A Handbook. Published by New Era International Imprint. ISBN 978-81-290-0050-7 HB, ISBN 978-81-290-0051-4 PB
3	Sheth V and Singh K (2013). Diet Planning Through the Life Cycle Part III: Diet Therapy A Practical Manual. Fifth Edition. Elite Publishing House Pvt Ltd. New Delhi. ISBN 81 88901-51-2

MODE OF EVALUATION:

50% IA : 50% UA

50% IA =

50% UA = University examination

Syllabus of Courses

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc. (Public Health Nutrition) - Third Year – Level 5.5				
Year	**III**	**Public Health Nutrition (Core /Major Course)**	**Credits / Hours per week**	**4 (3+1) / 5 hours/week** **Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**V**	Year of Introduction: 2024-2025 Year of Syllabus Revision: 2025-2026	**Maximum Grade**	**O**
Mode of Transaction	Lectures, Tutorials & Presentations			

Course Outcome (CO)

1. Develop appropriate knowledge and understanding of key concepts of Public health & Public Nutrition among students
2. Acquaint the students with the important nutritional deficiency disorders and non-communicable diseases of Public Health Significance in India
3. Equip students for promotion of good health by applying evidence-based actions to solve nutrition and health problems

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Understanding the field of Public Health Nutrition** a) Defining public health and nutrition and its core competencies b) Differences between Public health and nutrition approach and clinical approach c) Public Health Nutrition Cycle d) Ethics in the Field of Public Health Nutrition e) Introduction and definitions of various fields related to public health nutrition: i. Community Medicine, ii. Epidemiology,	05 hr	7%	1,2,3	1	1,2,5, 6	Emp	L,N,R,G	G, PE

	iii. Anthropology, iv. Health Promotion, v. Health Economics, vi. Advocacy, vii. Food and Nutrition Security, Vulnerability, Hunger, Poverty								
II	**Indicators related to Public Health and Nutrition** a) Nutritional status related indicators from national data sets: Maternal and Child nutrition related indicators) b) Maternal and child malnutrition and dietary risk factors as leading risk factors c) Education, water and sanitation related indicators d) Health-related indicators including HIV and sexual health, NCDs, Diarrhoea, etc. e) Economic Indicators and Criteria used in poverty line and its definitions- Global and National criteria	10 hr	14%	1,2,3	1	1,2,5, 6	Emp	L,N,R,G	G, PE
III	**Health and Nutrition Systems in India** a) Preventive Approach to Address a Public Health Problem- Levels of Disease Prevention b) Short term and long term prevention and management of diet related diseases c) Government health care system d) Nutrition care system in India e) Health Equity f) System Strengthening g) Global Health, One Health, Health Disparities, Acute and Chronic illnesses h) Social and Mental Health Problems	10 hr	14%	1,2,3	1,2,3	1,2	SD	L,N,R,G	G, ES
IV	**Undernutrition** a) Global nutrition targets for undernutrition and over nutrition b) UNICEF conceptual framework of malnutrition c) Indicators used to classify malnutrition as a problem of public health significance (WHO) (Prevalence of underweight, wasting, stunting, and overnutrition)	20 hr	28%	1,2,3	1,2,3	1,2	EMP,SD	L,N,R,G	G,ES

	d) Addressing the problem of undernutrition in children – a life cycle approach, importance of first 1000 days of life e) Undernutrition in adults-weight loss, muscle wasting, frailty, malabsorption and delivery of nutrients, muscle atrophy (sarcopenia) in people ages 60 and older. **Overnutrition** a) National and Global nutrition targets for combating obesity and non-communicable diseases. b) Determinants : nutritional imbalances, food choice, physical inactivity, peer influence, socio-cultural environment and others c) Way forward **Micronutrient Malnutrition** a) Micronutrient Deficiencies- Global Scenario (Vitamin A, Vitamin D, Vitamin B12, Folic Acid, Iron, Iodine, Calcium, Zinc) b) Indicators used to define various deficiency disorders as problems of public health significance with special reference to : c) Vitamin A deficiency (Bitot's spot, night blindness & corneal xerosis prevalence) d) Iron deficiency (Hb levels) e) Iodine deficiency (UIE levels) f) Problem of helminthic infestations in India, burden, consequences & strategies for control (Hygienic environments, Deworming) g) Bundling of deworming with vitamin A supplementation, its advantages h) Role of Zinc in diarrhoea management & prevention, treatment protocols i) Fluorosis: Symptoms, causes and consequences j) Food fortification for addressing the problem of micronutrient malnutrition at population level								

References	
1.	Vir Sheila (2011). Public Health Nutrition in Developing Countries published by Wood head Publishing India. ISBN-13: 9780857090041, ISBN-10: 0857090046
2.	K. Park (2011).Text Book of Preventive and Social Medicine, 21 EDITION. Banarsidas Bhanot Publishers. Jabalpur. ISBN13: 9788190607995. 868 pages.
3.	King, F. S., Burgess, A., Quinn, V. J., & Osei, A. K. (Eds.). (2015). Nutrition for developing countries. Oxford University Press
4.	Gibney, M., Margetts, B., Kearney, J., Arab, L., Gibney, M., Margetts, B., … Arab, L. (2012). Public Health Nutrition (1st ed.). Wiley-Blackwell. Retrieved from https://www.perlego.com/book/2766736 (Original work published 2012)
5.	Census India, www.censusindia.gov.in
6.	Census Gujarat, www.censusgujarat.gov.in
7.	Iron Deficiency Anaemia Assessment, Prevention and Control : A guide for programme managers, WHO, 2001, http://www.who.int/nutrition/publications/en/ida_assessment_prevention_control.pdf
8.	World Health Organisation (1996), Indicators for Assessing Vitamin A Deficiency and their Application in Monitoring and Evaluating Intervention Programmes. https://iris.who.int/bitstream/handle/10665/63064/WHO_NUT_96.10_eng.pdf?sequence=1
9.	World Health Organisation- Vitamin A Deficiency. https://www.who.int/data/nutrition/nlis/info/vitamin-a-deficiency
10.	Assessment of iodine deficiency disorders and monitoring their elimination a guide for programme managers third edition, WHO,2007 http://www.unicef.org/ukraine/2_Guide_for_IDD_managers_eng.pdf
11.	The importance of zinc in human nutrition and estimation of the global prevalence of zinc deficiency, Food & Nutrition Bulletin, Volume 22, Number 2, June 2001, pp. 113-125(13)
12.	World Health Organisation- Soil-transmitted helminth infections, https://www.who.int/news-room/fact-sheets/detail/soil-transmitted-helminth-infections
13.	Ministry of Health and Family Welfare, National Deworming Day Fact Sheet Soil-Transmitted Helminth Infections and, Anganwadi and School-Based Deworming- https://nhm.gov.in/images/pdf/NDD/FAQ/Fact_Sheet_on_Soil_Transmitted_Helminths_Infection_Eng.pdf
14.	https://applications.emro.who.int/dsaf/EMROPUB_2013_EN_1576.pdf
15.	https://applications.emro.who.int/dsaf/EMROPUB_2014_EN_1822.pdf?ua=1

For Practical

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc (Public Health Nutrition) - Third Year – Level 5.5

Year	**III**	**Public Health Nutrition (Core /Major)**	**Credits/ Hours per week**	**4 (3+1) / 5 hours/week** **Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**V**	Year of Introduction: 2024-2025 Year of Syllabus Revision: 2025-2026	**Maximum Grade**	**O**
Mode of Transaction		Presentations, Hands On Training, fieldwork, use of relevant statistical packages		

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**Analytics and critique of health and nutritional data sets (Global, National, Local)** a) Prevalence rate of malnutrition and NCDs b) Prevalence and Incidence rate of Infectious Diseases c) YLLs, YLDs and DALYs for one nutrient deficiency, one infectious disease and one NCD d) Human Development Index e) Global Hunger Index f) Demographics of India i. Demography and Growth Rate	05 hr	7%	1,2,3,4,5	1,2	1,2,3,6	SD	L,N,R,G	G

	ii. Census enumeration and its objectives, Census factsheets, their interpretation & Implications iii. Target population calculations- vulnerable age groups, the projected population in life cycle								
II	**Exposure visits to various Government Programmes set-ups** a) ICDS programme - Anganwadi and Mamta diwas b) PMPoshan Yojana c) Government Health Facility Centre	10 hr	14%	1,2,3,4,5	1,2	1,2,	Emp, SD	L,N,R,G	G,ES,HV
III	**Spot observations and data collection regarding programme service delivery in a Public Health/Nutrition Programmes set-up** (ICDS/PM Poshan Yojana/ PM Jay Yojana/ Maa, NHM, etc) a) Tool building- Observation Check-list b) Data Collection using the Observation Check-list and Questionnaires c) Data entry, analysis, report writing	15 hr	16%	1,2,3,4,5	1,2,3	1,2,3,4,6	SD	L,N,R,G	ES,HV

MODE OF EVALUATION:

50% IA : 50% UA

50% IA =

50% UA = University examination

Syllabus of Courses

NAAC Accredited "A+" Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**		**Academic Year**	**2025 – 2026**
B.Sc. F.C.Sc. (Public Health Nutrition) - Third Year – Level 5.5			
Year	**III**	**Introduction to Research Methods (Core / Major)**	**Credits/ Hours per week**	**4 (4+0)/4 hours/week** **Theory : 60 Hrs**
Semester	**V**	Year of Introduction: 2024 - 2025 Year of Syllabus Revision: 2025 - 2026	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials and Presentations		

Course Outcomes (CO):

1. Understand the basics of research in the field of foods and nutrition.
2. Insight regarding various data collection methods, data processing, analysis and dissemination.

Unit No.	Topic	Contact Hours	Weightage (%)	BT level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/R/G	Relation to G/ES/HV/PE
I	**Introduction to Research** a) Meaning of research, objectives of research, types of research b) Definitions of some key concepts i. Measurement scales – nominal, ordinal, interval, ratio ii. Variables – independent, dependent, confounding, extraneous, continuous, discrete. iii. Identification of a research problem; Formulation of research questions, hypothesis and objectives	12 hr	20%	1,2, 3,4	CO 1	1,2,3 ,4,5	SD	L/N/R/G	HV/PE
II	**Research Design** a) Need for, and features of a good research design	12 hr	20%	1,2, 3,4	CO 1,2	1,2,3 ,4	Emp/SD	L/N/R/G	HV/PE

	b) Important concepts relating to research design c) True experimental designs d) Quasi experimental designs e) Reliability and Validity (internal and external) f) Threats to internal and external validity								
III	**Sampling and Sampling Design** a) Basic concepts: sample, population; characteristics of a good sample design b) Steps in sampling design: type of universe, sampling unit, sampling frame, sample size, parameters of interest, budget, sampling procedure c) Types of sampling, their advantages and disadvantages: probability sampling and non-probability sampling d) Bias and errors in sampling e) Selection of adequate sample size	15 hr	25%	1,2, 3,4	CO 1,2	1,2,3 ,4	Emp/SD	L/N/R/G	HV/PE
IV	**Data Collection and Research Tools** a) Qualitative research tools i. Focus group discussion; ii. Case studies; iii. Interviews: In-depth and key informant interviews; iv. Observations; v. Narrations; vi. Body mapping; vii. Pile sorting; viii. Free listing b) Advantages and disadvantages of qualitative and quantitative research c) Mixed methods research: definition, importance d) Guidelines for constructing questionnaires e) Guidelines for successful interviews	12 hr	20%	1,2, 3,4	CO 1,2	1,2,3 ,4	Emp/SD	L/N/R/G	HV/PE

V	**Data Analysis and Report Writing** a) Coding, tabulation and data analysis (textual and numerical data) i. Mean ii. Median iii. Mode iv. Standard Deviation b) Data Presentation through graphs c) Writing a research report d) Organizing a bibliography e) Dissemination of research findings	09 hr	15%	1,2, 3,4	CO 1,2	1,2,3 ,4	Emp/SD	L/N/R/G	HV/PE

References

1.	Dr. Prabhat Pandey and Dr. Meenu Mishra Pandey (2015) Research Methodology: Tools and Techniques. Bridge Center
2.	Julie A Lovegrove, Leanne Hodson, Sangita Sharma and Susan A Lanham-New (2015) Nutrition Research Methodologies. The Nutrition Society. John Wiley and Sons, Ltd., UK
3.	Ranjit Kumar (2011). Research Methodology: A step-by-step guide for beginners (3rd edition). SAGE Publications Ltd
4.	Kothari C R (2008). Research Methodology: Methods and Techniques (2nd ed.). New Age International Publishers, New Delhi, India
5.	Natasha Mack, Cynthia Woodsong, Kathleen M. Macqueen, Greg Guest, Emily Namey (2005) Qualitative Research Methods: A Data Collector's Field Guide. Family Health International
6.	Hinton P (2004). Statistics Explained: A Guide for Social Science Students. Routledge Publishing, London
7.	Bhattacharya DK (2004). Research Methodology. Published by Anurag Jain for excel books, New Delhi, India
8.	Jennifer Mason (2002). Qualitative Researching (2nd edition). SAGE Publications Ltd
9.	Sproull N (2003). Handbook of Social Research Methods: A Guide for Practitioners and Students in the Social Sciences. The Scarecrow Press, Inc., New Jersey
10.	Fowler FJ (2001). Survey Research Methods (3rd ed.). Sage Publications, Newbury Park
11.	Beaglchole R, Bonita R and Kjellstrom T (1993). Basic Epidemiology. World Health Organization, Geneva

MODE OF EVALUATION:

50% IA : 50% UA

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Syllabus of Courses

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc. (Public Health Nutrition) - Third Year – Level 5.5				
Year	**III**	**Nutrition Lab (Foundation / SEC)**	**Credits / Hours per week**	**2 (0+2) / 4 hours/week Practical: 60 Hrs**
Semester	**V**	Year of Introduction: 2024 - 2025 Year of Syllabus Revision: 2025 - 2026	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentations		

Course Outcome (CO)

1. Acquire skills in hematological and biochemical analysis or biological samples namely blood, serum and urine
2. Learn about various biophysical measurements and simple methods of home-based monitoring

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Theoretical Understanding of Basic Aspects of Nutrition Laboratory** a) Differences in whole blood, serum and plasma b) Changes in blood on keeping c) Venous and capillary samples d) Anti-coagulants e) Preservation of Urine	04 hr	7%	1,2,3	1	1,2,3	Emp, SD	L,N,R,G	G
II	**Biochemical Estimations, Biophysical Measurements, Use of simple techniques for home-based monitoring or side analysis and Estimation of Sufficiency of Fortification**	40 hr	67%	1,2,3	1,2	1,2,3, 4,5	Emp, SD	L,N,R,G	G

	a) Biochemical Estimations in Blood and Serum i. Blood Hemoglobin- Cyanmet Hemoglobin (Direct and Filter Paper Method used in Field settings) ii. Serum Glucose (Kit Method) iii. Serum Total Cholesterol (Kit Method) iv. Serum Triglycerides (Kit Method) v. Serum Total Proteins (Kit Method) vi. Serum Globulins and Serum Albumin (Kit Method) **b) Estimations in Urine** i. Urinary Creatinine Estimation ii. Calculation of GFR **c) Biophysical Measurements and use of simple techniques for home-based monitoring or side analysis** i. Blood pressure measurement (Digital blood pressure monitor, Sphygmomanometers) ii. Oxygen Saturation using Pulse Oxy Meter iii. Use of glucometer iv. Use of diastix & Ketostrips for the presence or absence of sugar or proteins or ketone bodies in urine v. Use of smart gadgets to measure health & fitness status **d) Discussion on various methods and tools available to measure sufficiency of fortification in foods** i. Discussion on Estimation of Iodine and Iron content of salt using Salt Testing Kits (Iodized & Double fortified Salt) vs. iodometric methods (Specificity, sensitivity) ii. Urinary excretion of Iodine and sodium (Discussion of methods and cut offs used for sufficiency)								

III	**Case studies on clinical conditions** a) Preparation and classroom presentations of case studies of different clinical conditions	16 hr	26%	1,2,3	1,2	1,2,3, 4,5	EMP, SD	L,N,R,G	G

References

1.	Chawla R. Practical Clinical Biochemistry Methods and Interpretations, 4th Edition, 2014. Published by Jaypee Brothers Medical Publishers Ltd., India.
2.	Sheel Sharma. Practical Biochemistry, 2007. Published by Classic Publication House
3.	Corabian P, Chojecki D. Exploratory Brief on Glucose Monitoring Technologies [Internet]. Edmonton (AB): Institute of Health Economics; 2017 Jan. Background: Technologies. Available from: https://www.ncbi.nlm.nih.gov/books/NBK549060/
4.	https://saltcomindia.gov.in/SIP_NIDCCP_EstimationContent.aspx
5.	https://www.fssai.gov.in/upload/uploadfiles/files/Methods%20for%20Iodine%20Iron%20and%20Phosphorus%20in%20FS.pdf

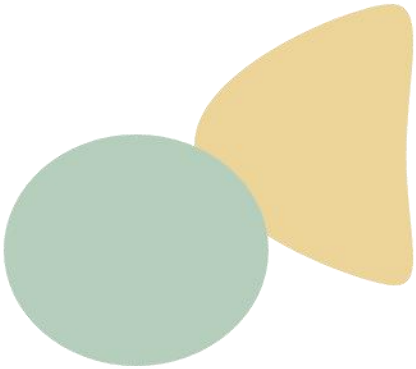
MODE OF EVALUATION:

50% IA : 50% UA

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COURSES OFFERED TO STUDENTS OTHER THAN FOODS AND NUTRITION SPECIALIZATION



Program Specific Outcome (PSO): Level 5.5

At the end of level 5 i.e. at the completion of first year (2 semesters) of the undergraduate program the following are the Program Specific outcome

1. **Disciplinary Knowledge:** The students would be able to demonstrate the acquisition of knowledge of facts, concepts, principles, theories, and processes in the broad multidisciplinary learning context of the domain of family and community sciences

2. **Critical Thinking**: The students would be able to understand the linkages between the learning areas within and across the chosen fields of study

3. **Decision making, Analytical and Communication Skills**: The students should be able to acquire the cognitive skills required to identify, analyse and synthesize information from a range of sources

4. **Critical Thinking and Problem Solving, Moral and Professional Ethics:** The students would be able to apply the knowledge and essential skills required to perform effectively in a defined job (summer internship) or different settings/programs (practicals) relating to the chosen field of study

5. **Multicultural competence:** Ability to learn about different Indian cultures by way of practicing traditions, Food Anthropology, History of Indian Costumes, Traditional Household Practices, developing itineraries, Indic studies and making traditional arts and crafts

6. **Digital Literacy**: Competency in accessing relevant and authentic information and data from electronic media with the ability to learn, synthesize, integrate to make presentations on the given topics in various disciplines for academic and extension/community work.

- **Bloom's Taxonomy (BT) Levels:**1. Remember 2. Understand 3. Application 4. Analysis 5. Evaluation 6. Creation Programme
- **Elements of** Employability (Emp)/ Entrepreneurship (Ent)/ Skill Development (SD)
- **Relevance to** Local (L)/ National (N)/ Regional(R)/Global (G)
- **Relation to** Gender (G), Environment and Sustainability (ES), Human Values (HV)and Professional Ethics (PE)

Syllabus of Courses

	NAAC Accredited "A+ " Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc (REGULAR) - Third Year – Level 5.5

Year	**III**	**Health and Nutrition for Mother and Child (Elective /Minor)**	**Credits/Hours**	**4(4+0)/4 hours/week Theory:60 Hrs**
Semester	**V**	Year of Introduction: 2024-2025 Year of Syllabus Revision: 2025-2026	**Maximum Grade**	**O**
Mode of Transaction		Lectures, class discussions, videos		

Course Outcome (CO)

Understand health concerns and nutritional needs of women throughout the life cycle.

1. Understand common health and nutrition related challenges faced by women.
2. Understand the importance of women health and nutrition for improving child health and nutrition.
3. Understand the importance and key interventions for the first 1000 days of life.
4. Understand the importance of complementary feeding.
5. Develop ability in using and interpreting various methods for assessing nutritional status.
6. Sensitize on the mother child dyad and concept of continuum of care.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Element Emp/Ent/ SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I.	**Health and nutritional needs of women throughout the life cycle.** a) Overview of women's health and nutrition throughout the life cycle (adolescence to old age).	12 hr	20%	1,2,5	1	1,2	Emp, SD	L, N, R, G	ES, HV, G

	b) Health concerns and nutritional needs during the following stages: i. Adolescence ii. Preconception iii. Conception iv. Postpartum and lactation v. Menopausal and old age c) Intergenerational cycle of malnutrition.								
II.	**Common health and nutrition related challenges faced by women** a) PCOD and PCOS b) Infertility c) Endometriosis d) Diabetes e) Hypertension f) Thyroid g) Underweight and obesity h) Anxiety, stress and mood swings	12 hr	20%	1,2,5	2	1,2	Emp, SD	L, N, R, G	ES, HV, G
III.	**Importance of women's health and nutrition on childbirth outcome** a) Importance of optimal nutrition for women during reproductive years and significance of preconception nutritional status on birth outcomes. b) Importance of optimal maternal weight gain during pregnancy. c) Importance of adequate intake of iron, calcium, iodine and folic acid for women during adolescence, pregnancy and lactation. d) Health and nutritional risk factors during pregnancy.	06 hr	14%	1,2,5	3,7	1,2	Emp, SD	L, N, R, G	ES, HV, G

IV.	**First 1000 days of life (Pregnancy -2 years)** a) Optimum health and nutritional growth of women from conception to lactating phase as a building block for healthy 1000 days of life. b) The physiological basis of breastfeeding. c) Feeding Techniques. d) Compositional differences in human milk and animal milk. e) Key interventions and the benefits of practicing exclusive breast feeding and continued breastfeeding, feeding during illnesses and its impact on improving nutritional status of infants. f) Traditional galactagogues, prebiotics and probiotics for health and immunity of women and children. g) Complementary feeding (Minimum dietary diversity for women, minimum dietary diversity for children). h) Key issues of complementary feeding: Timely initiation and why, types of complementary foods (Quality & consistency issues), frequency. i) Importance of hand washing with soap before preparing or feeding complementary foods to children for safety.	15 hr	23%	1,2,5	4,5,7	1,2,3	Emp, SD	L, N, R, G	ES, HV, G
V.	**Growth and Nutritional Requirements of Infants and children** a) Health and social consequences of impaired growth (infections, poor cognition, increased chances of NCDs, poor school performance and poor economic productivity). b) Optimal nutritional care of Low Birth Weight (LBW) babies. c) Nutritional requirements of infants (from birth to 2 year). d) Nutritional requirements for growing children (2-10 years).	15 hr	23%	1,2,4,5	6,7	1,2,3	Emp, SD	L, N, R, G	ES, HV, G

	e) Importance of giving Zinc, ORS for diarrheal episodes, full immunization, Vitamin A and deworming to prevent illnesses and nutritional deficiencies. f) Measuring nutritional status of infants and children by latest WHO growth standards as a tool for growth monitoring, causes and consequences of wasting and stunting. g) Importance of regular growth monitoring to prevent growth faltering. h) Government programs for women and children: ICDS, PM POSHAN, PMMVY, DSY and Poshan Sudha Yojna.								

References

1.	Park K (2007). Park's textbook of Preventive and Social Medicine (19th ed.). M/s Banarsidas Bhanot Publishers, Jabalpur
2.	Tracking the Progress of Maternal and Child Health, UNICEF, 2009
3.	State of World's children (2009) Maternal & Newborn Health, UNICEF
4.	Guyon, AB and QuinnVJ. (2011). Booklet on Key Essential Nutrition Actions Messages. Core Group, Washington, D.C., January 2011
5.	Infant and young child feeding Model Chapter for textbooks for medical students and allied health professionals. WHO Publication, 2009
6.	Essential Interventions, Commodities and Guidelines for Reproductive, Maternal, Newborn and Child Health
7.	Richard D and Martin W (2008) Nutrition and health in developing countries (2nd ed.). Humana Press
8.	Web link: www.thousanddays.org
9.	WHO: Child growth standards 2006, www.who.int/childgrowth/standards/WHO child growth standards and the identification of severe acute malnutrition in infants and children. A joint statement. WHO UNICEF 2009

MODE OF EVALUATION:

50% IA : 50% UA

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50% UA = University examination

Syllabus of Courses

	NAAC Accredited "A+" Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc (REGULAR) - Third Year – Level 5.5

Year	**III**	**Planning Healthy Diets (Elective /Minor)**	**Credits / Hours per week**	**4 (4+0) / 4 hours/week Theory: 60 Hrs**
Semester	**V**	Year of Introduction: 2024-25 Year of Syllabus Revision: 2025-2026	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentations		

Course Outcome (CO)

1. Understand balanced diets and nutrient roles in health.
2. Assess nutritional needs across life stages.
3. Apply dietary guidelines to promote health and prevent disease.
4. Develop practical and effective diet plans.
5. Incorporate cultural diversity and sustainability in diet planning.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Introduction to Food, Nutrition and Health** a) Definition and interrelationship of food, nutrition and health. b) Importance of a balanced diet: Components and their role. c) Food groups and their classification. d) Concept of macronutrients and micronutrients: Sources and functions. e) Methods of Cooking	06 hr	15%	1,2,3,4,6	1		SD	L,N,R,G	ES

II	**Sustainability, Cultural Diversity and Healthy Diets** a) Sustainable and Traditional Diets b) Importance of local, seasonal and culturally appropriate foods, with a focus on traditional Indian diets like Gujarati and Rajasthani cuisines. c) Dietary Diversity and Nutritional Adequacy d) Role of diverse food groups, including millets, pulses, fruits and vegetables in achieving balanced nutrition. e) Environmental Impact of Food Choices f) Understanding food miles, carbon footprint and the environmental benefits of sustainable dietary practices in Indian contexts. g) Processed Foods vs. Traditional Diets h) Health implications of processed foods and the advantages of transitioning to traditional, unprocessed diets. i) Global Guidelines and Future Trends j) Application of WHO Healthy Diet, national dietary guidelines and innovative approaches for food sustainability amidst global challenges.	12 hr	20%	1,2,3,4,5,6	2, 5		SD	L,N,R,G	ES, HV
III	**Tools for Diet Planning** a) Food-based dietary guidelines b) Portion sizes, food guides and food pyramids for healthy eating. c) Critical evaluation of dietary recommendations and fad diets. d) Food exchange list: Concept, use and importance in meal planning. e) Calculation of energy and nutrient requirements.	10 hr	20%	1,2,3,4,5,6	2, 3		Emp, Ent, SD	L,N,R,G	ES
IV	**Food Based Dietary Guidelines for Indians and Its overview** a) Introduction to Recommended Dietary Allowances (RDA) and Estimated Average Requirement (EAR).	16 hr	25 %	1,2,3,4,5,6	4		Emp, Ent, SD	L,N,R,G	G, ES, HV

	b) Energy requirements: Basal Metabolic Rate (BMR), Total Energy Expenditure (TEE), and factors influencing them								
V	**Nutritional Requirements Across Life Stages** a) Factors affecting nutrient needs at different stages of life. b) Nutritional requirements and dietary guidelines for: i. Pregnant and lactating women ii. Infants and preschool children iii. School-age children and adolescents iv. Adults (men and women) v. Elderly population	16 hr	20%	1,2,3,4,5 ,6	4, 5		Emp, Ent, SD	L,N,R,G	G, ES, HV

References

1.	**NIN (2024).** *Dietary Guidelines for Indians - A Manual*. National Institute of Nutrition, Indian Council of Medical Research (ICMR), Hyderabad, India.
2.	**Whitney, E. and Rolfes, S.R. (2022).** *Understanding Nutrition* (16th ed.). Cengage Learning, Boston, USA.
3.	**Mahan, L.K., Escott-Stump, S., and Raymond, J.L. (2020).** *Krause's Food & the Nutrition Care Process* (14th ed.). Elsevier, Missouri, USA.
4.	**FAO (2021).** *Sustainable Healthy Diets: Guiding Principles*. Food and Agriculture Organization of the United Nations, Rome.
5.	**Nambiar, V. (Ed.). (2021). *Indian Food Anthropology and the Eat Right Movement*. Selective & Scientific Books.**
6.	**World Health Organization. (2020). Healthy Diet. Retrieved from WHO website.**
7.	**Srilakshmi, B. (2018).** *Dietetics* (8th ed.). New Age International Pvt. Ltd., New Delhi, India.
8.	**Manay, S. and Shadaksharaswamy, M. (2008).** *Foods: Facts and Principles* (3rd ed.). New Age International Pvt. Ltd., New Delhi, India.
9.	**Mathur, P. (2017).** *Nutrition and Dietetics*. CBS Publishers and Distributors Pvt. Ltd., New Delhi, India.
10.	**National Institute of Nutrition (NIN) (2017).** *Indian Food Composition Tables (IFCT 2017).* ICMR-NIN, Hyderabad, India.
11.	**Sheth, V. and Singh, K. (2007).** *Diet Planning through the Life Cycle, Part II: Diet Therapy - A Practical Manual* (4th ed.). Elite Publishing House Pvt. Ltd., New Delhi, India.

MODE OF EVALUATION:

50% IA : 50% UA

50% IA =

50% UA = University examination

MINOR COURSE IN GRANT IN AID PROGRAMME OFFERED TO ALL HPP STUDENTS OTHER THAN FN HONORS

Syllabus of Courses

	NAAC Accredited "A+" Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2025 – 2026**
B.Sc. F.C.Sc (REGULAR) - Third Year – Level 5.5			
Year	**III**	**Introduction to Public Health Nutrition (Elective /Minor)**	**Credits / Hours per week**	**4 (4+0) / 4 hours/week** **Theory: 60 Hrs**
Semester	**V**	Year of Introduction: 2024-25 Year of Syllabus Revision: 2025-2026	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentations		

Course Outcome (CO)

1. Learn regarding basics of public health nutrition
2. Understand the need of prioritizing nutrition issues
3. Gain an understanding regarding global nutrition problems
4. Equip to use and interpret various indicators for assessing nutrition and health status of an individual

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**An Overview of Public Health Nutrition** a) What is Public Health Nutrition (PHN)? b) Scope of PHN c) Roles and responsibilities of public health nutritionists d) Public health nutrition approaches e) Concept of Public Health Nutrition (PHN), Prevention as the major concern in PHN	08 hr	13%	1,2	1,2,3	1,2	SD	L,N,R,G	G,ES

	f) Determinants of health and nutrition g) Concept of Health for all h) Health system in India								
II	**Understanding Important Concepts in Public Health Nutrition** a) Definitions of important concepts used in PHN– positive health, malnutrition (under nutrition, overweight, obesity, micronutrient malnutrition), nutritional status, health promotion, vulnerable groups, nutrition intervention, food and nutrient supplements, food substitute, nutrition education, poverty, food security, prevalence rates, incidence rates. b) Nutrition status & health related indicators (Maternal and Child nutrition related indicators, morbidity rates, mortality rates, definitions (IMR, NMR, U5MR, MMR etc)	07 hr	12%						
III	**Nutrition – A Global Developmental Priority** 1) Importance of nutrition throughout the life cycle 2) Understanding the dual burden of malnutrition 3) Global burden of death and disease 4) United Nations (UN) Decade of Action on Nutrition (2016 - 2025) 5) Nutrition at centre stage of Sustainable Development Goals (SDGs), 12 of the 17 Goals require good nutrition to be met – an overview	15 hr	25%	1,2,3, 4,5	1,2	1,4	EMP,SD	L,N,R,G	G,ES,HV

IV	**Role of Nutrition in Achieving Global Targets** a) Optimal Infant and Young Child Feeding: Significance of the first 1000 days of life b) Improving maternal, infant and young child nutrition – WHO Global Targets 2025 c) Role of dietary risk factors in achieving global targets related to Non Communicable Diseases (NCDs), maternal and child health d) Addressing micro nutrient deficiencies (brief insight about the national programs for prevention and control of nutritional deficiencies)	16 hr	27%	1,2,3, 4,5	1,2	1	SD	L,N,R,G	G,ES
V	**International & National Organizations Working in the Field of Nutrition**	14 hr	23%	1,2,3, 4,5	1,2	1,4	EMP,SD	L,N,R,G	G,ES,HV

References

1.	K. Park (2011).Text Book of Preventive and Social Medicine, 21 EDITION. Banarsidas Bhanot Publishers.Jabalpur. ISBN13: 9788190607995. 868 pages.
2.	Vir Sheila (2011). Public Health Nutrition in Developing Countries published by Wood head Publishing India. ISBN-13: 9780857090041, ISBN-10: 0857090046
3.	King, F. S., Burgess, A., Quinn, V. J., & Osei, A. K. (Eds.). (2015). *Nutrition for developing countries*. Oxford University Press
4.	World Health Organization. (2014). Global nutrition targets 2025: stunting policy brief (WHO/NMH/NHD/14.3). Geneva: World Health Organization.
5.	World Health Organization. (2014). Global nutrition targets 2025: anaemia policy brief (WHO/NMH/NHD/14.4). Geneva: World Health Organization.
6.	World Health Organization. (2014). Global nutrition targets 2025: low birth weight policy brief (WHO/NMH/NHD/14.5). Geneva: World Health Organisation.
7.	World Health Organization. (2014). Global nutrition targets 2025: breastfeeding policy brief (WHO/NMH/NHD/14.7). Geneva: World Health Organization.
8.	World Health Organization, UNICEF, World Food Programme. (2014). Global nutrition targets 2025: wasting policy brief (WHO/NMH/NHD/14.8). Geneva: World Health Organization.
9.	World Health Organization. (2013). Global action plan for the prevention and control of noncommunicable diseases 2013-2020.
10.	World Health Organization. (2017). The double burden of malnutrition: policy brief (WHO/NMH/NHD/17.3).

THIRD YEAR (NEP)

PUBLIC HEALTH NUTRITION

(VI SEMESTER) – REGULAR

NEP STRUCTURE FOR FOODS AND NUTRITION UNDERGRADUATE COURSE (MAJOR: PUBLIC HEALTH NUTRITION - GRANT IN AID PROGRAMME)			
SEMESTER	**COURSE NAME**	**CREDIT**	**COURSE TYPE**
VI	Maternal and Child Health	4 (3+1)	CORE / MAJOR
	Nutrition Programs and Policies	4 (4+0)	CORE / MAJOR
	Nutrition Program Management	4 (2+2)	CORE / MAJOR
	Social Behaviour Change Communication	2 (1+1)	FOUNDATION/ AEC
	Community Engagement	4 (0+4)	CORE / SI
	COURSE OFFERED TO STUDENTS OTHER THAN FOODS & NUTRITION SPECIALIZATION		
	Preventive Nutrition for Chronic Diseases	4 (4+0)	ELECTIVE / MINOR
	TOTAL	**22**	

Syllabus of Courses

NAAC Accredited "A "Grade Faculty of Family and Community Sciences The Maharaja Sayajirao University of Baroda		**Academic Year**	**2025 – 2026**
B.Sc. F.C.Sc. (Public Health Nutrition) - Third Year – Level 6			
Year	**III**	**Maternal and Child Health (Core / Major)**	**Credits /Hours per week**	**4 (3+1) / 5hrs/week Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**VI**	Year of Introduction: 2024-25 Year of Syllabus Revision: 2025-26	**Maximum Marks /Grade**	**O**
Mode of Transaction	Lectures, Tutorials & Presentations			

Course outcome (CO)

1. Sensitize about the importance of focusing on adolescent health & nutrition
2. Sensitize on the concept of mother child Dyad & Continuum of care
3. Understand on the various aspects of Reproductive Child Health & Nutrition
4. Understand the importance of Maternal nutrition and child health

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/RG	Relation to G/ES/HV/PE
I	**Adolescent Health & Well being (10-19 y)** a) Adolescence: Last window of opportunity to improve health & nutrition status b) Health Implications of nutritional deficiency disorders mainly under nutrition, overnutrition & anemia c) School health programs in India d) PURNA Program – New Initiative of GoG e) Adolescent Sexual Health/ AIDS prevention: Key Issues, use of cervical cancer vaccine (HPV)	05 hr	7%	1,2,3,4,5	1,2	1,2,4	Emp, SD	L,N,R,G	G,ES,HV

	f) Adolescent Pregnancy, Adverse consequences for the child & mother g) Medical Termination of Pregnancy (PCPNDT Act) & its consequences h) Adolescent Friendly Health Centre (AFHC)								
II	**Maternal, Young Child Health & Nutrition (MYCN)** a) Basic understanding of Mother & Child Dyad b) MCH Indicators for health and nutrition c) Continuum of Care d) Ten Essential Nutrition Interventions (WHO) e) Importance of micronutrient supplementation to improve maternal / child health & its economic benefit (Copenhagen Consensus) f) A critique on the Reproductive and Child Health Services (including neonatal care services) in India (RCH 1, 2, NHM, RMNCH+A)	08 hr	11%	1,2,3,4,5	1,2	1,2,4	Emp, SD	L,N,R,G	G,ES,HV
III	**Maternal Health** a) Maternal malnutrition & its adverse pregnancy outcomes b) Components of full Antenatal Care for positive pregnancy outcomes c) Importance of Maternal Nutrition in Pregnancy and Lactation focusing on micronutrient (Iron, Iodine, Calcium, Folate) and promotion of healthy diets through the concept of Dietary Diversity and full utilization of Supplementary Nutrition given in various programs d) Complications in Pregnancy and its management e) Concept of safe delivery & Family Planning for child spacing	10 hr	13%	1,2,3,4,5	1,2	1,2,4	Emp, SD	L,N,R,G	G,ES,HV

	f) LaQshya Programme (Labour room Quality improvement Initiative) g) Role of Delayed cord clamping h) Baby Friendly Health Initiative (BFHI)								
IV	**WHO recommendations on Newborn and Infant Health** a) Causes of NMR, IMR and U5MR b) Care of Newborn and Young Infant c) Danger signs in newborns and Essential Newborn Care (ENBC) & NICU corners d) Delivering ENBC interventions through public health systems – opportunities and challenges eg: Home Based New Born Care (HBNC) e) Management of Low Birth Weight Babies – Kangaroo Mother Care (KMC) f) Universal Immunization Program & introduction of newer vaccines in public health g) Mothers Absolute Affection Program (MAA) h) Integrated Management of Neonatal and Childhood Illness (IMNCI)	10 hr	13%	1,2,3,4,5	1,2	1,2,4	Emp, SD	L,N,R,G	G,ES,HV
V	**Promoting Healthy Growth and Development for Children (0-5y)** a) Optimal Infant and Young Child Feeding Practices b) Nutrition specific & Nutrition Sensitive interventions in management of maternal child nutrition c) Integrated Management of Acute Malnutrition (IMAM) i. Management of SAM at Facility care (F-SAM)	12 hr	16%	1,2,3,4,5	1,2	1,2,4	Emp, SD	L,N,R,G	G,ES,HV

	ii. Management of SAM in Community (CMAM)								

References

1.	K. Park (2011).Text Book of Preventive and Social Medicine, 21 EDITION. Banarsidas Bhanot Publishers. Jabalpur. ISBN13: 9788190607995. 868 pages.
2.	Vir Sheila (2011). Public Health Nutrition in Developing Countries published by Wood head Publishing India. ISBN-13: 9780857090041, ISBN-10: 0857090046
3.	King, F. S., Burgess, A., Quinn, V. J., & Osei, A. K. (Eds.). (2015). Nutrition for developing countries. Oxford University Press.
4.	https://platform.who.int/data/maternal-newborn-child-adolescent-ageing/indicator-explorer-new
5.	Operational Guidelines for Kangaroo Mother Care and Optimal Feeding of Low Birth Weight Infants for Programme Managers and Service Providers (Sept 2014). Ministry of Health and Family Welfare, Government of India
6.	Operational Guidelines on Facility Based Management of Children with Severe Acute Malnutrition. MOHFW, 2011.
7.	A Strategic Approach to Reproductive, Maternal, Newborn, Child And Adolescent Health (Rmnch+A) in India for Health Mother and Child. Ministry of Health and Family Welfare. January 2013
8.	WHO recommendations on antenatal care for a positive pregnancy experience. WHO November 2016
9.	https://wcd.gujarat.gov.in/initiativedetails/Purna
10.	https://mohfw.gov.in/?q=Organisation/departments-health-and-family-welfare/activities-health-and-family-welfare/rch-imnc-training-material-imnci
11.	https://www.unicef.org/rosa/stories/10-proven-nutrition-interventions
12.	https://www.unicef.org/documents/baby-friendly-hospital-initiative
13.	https://www.who.int/teams/maternal-newborn-child-adolescent-health-and-ageing/child-health/integrated-management-of-childhood-illness/care-for-sick-children-at-first-level-health-facilities/training-videos-imci
14.	National Guidelines on Infant and Young Child Feeding. wcd.nic.in
15.	https://www.who.int/tools/essential-newborn-care-course
16.	https://www.who.int/teams/maternal-newborn-child-adolescent-health-and-ageing/newborn-health/essential-newborn-care
17.	https://hbnc-hbyc.mohfw.gov.in/about/hbnc
18.	Sharma S. A conceptual model and framework of nutrition-sensitive and specific interventions across Life stages in India. J Family Med Prim Care. 2021 Nov;10(11):3976-3982. doi: 10.4103/jfmpc.jfmpc_789_21. Epub 2021 Nov 29. PMID: 35136755; PMCID: PMC8797081.

For Practical

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc (PUBLIC HEALTH NUTRITION) - Third Year – Level 6				
Year	**III**	**Maternal and Child Health (Core / Major)**	**Credits/ Hours per week**	**4 (3+1) / 5hrs/week** **Theory: 45 Hrs; Practical: 30 Hrs**
Semester	**VI**	Year of Introduction: 2024-25 Year of Syllabus Revision: 2025-26	**Maximum Grade**	**O**
Mode of Transaction		Presentations, Hands on Training, fieldwork, use of relevant statistical package		

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	a) Visit to AWC to understand MCH programs (ICDS, Mamta Diwas, Annaprashan Diwas, Kishori Diwas, Baal Tula Diwas b) Visit to Adolescent Friendly Health Center (AFHC) c) Visit to RBSK Team d) Visit to Human Milk Bank e) Visit to NRC/CMTC for understanding Treatment Protocol for SAM – F75, F100, EPD	08 hr	10%	1,2,3,4,5	1,2	1,2,4	Emp, SD	L,N,R,G	G,ES,HV
II	a) IMNCI checklist to assess childhood morbidities b) Screening of SAM/MAM/SUW/MUW children at field level c) Two case studies of SAM children at NRC/CMTC d) Monitoring of progress in weight gain pattern at NRC/CMTC	16 hr	22%	1,2,3,4,5	1,2	1,2,4	Emp, SD	L,N,R,G	G,ES,HV

III	a) Interview through question method of Two LBW babies and two under or over nourished children <5 years (urban/rural/tribal) to understand factors affecting b) Interacting with ASHA for understanding HBNC checklist used by them c) Use of Growth charts for identifying growth faltering and its management d) Observation of AWW during Home visits for HNBC	06 hr	8%	1,2,3,4, 5	1,2	1,2	SD	L,N,R,G	ES,HV

MODE OF EVALUATION:

50% IA : 50% UA

50% IA =

50% UA = University examination

Syllabus of Courses

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc (PUBLIC HEALTH NUTRITION) - Third Year – Level 6				
Year	**III**	**Nutrition Programs and Policies (Core / Major)**	**Credits/ Hours per week**	**4 (4+0) / 4 hrs/week** **Theory: 60 Hrs**
Semester	**VI**	Year of Introduction: 2024-2025 Year of Syllabus Revision: 2025-2026	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials and Presentations		

Course Outcomes (CO):

1. Learn and understand the policies concerning health and nutrition.
2. Gain knowledge regarding the ongoing schemes and programs for combating nutrition and health problems in the country and the developing world.

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/R/G	**Relation to** G/ES/HV/PE
I	**Developmental Programs and Policies of the Government Focusing on Nutrition and Health** a) Current policies in India for improving nutrition and health status: Health, Agriculture, Education, Water and Sanitation, Livelihood, Early Childhood Care and Education, Women Empowerment, and Gender policy b) Role of various nodal sectors in delivering nutrition specific and nutrition sensitive interventions; Role of inter-sectoral	12 hr	20%	1,2, 3,4	CO 1,2	1,2,3 ,4	Emp	L/N/R	G/HV

	linkages in improving nutrition outcomes of target population c) Role of NITI Aayog, aspirational districts programme and indicators, aspirational districts of Gujarat d) National Nutrition Policy, National Nutrition Mission (NNM) - Poshan Abhiyan, National Nutrition Strategy: Goals, objectives and indicators for monitoring e) National Guidelines on Infant and Young Child Feeding f) National Rural Livelihood Mission (NRLM), Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Antyodaya Anna Yojana								
II	**National Health Mission, and Schemes Focusing on Health** a) National Health Mission (NHM): Goals and Objectives b) Objectives / Role: Village Health Sanitation and Nutrition Committee (VHSNC), Gram Sanjeevani Samiti, Swachh Bharat Mission c) Role of grass root functionaries: ASHA, ANM, MAS (urban), in delivering essential nutrition actions d) Ayushman Bharat Scheme: Pradhan Mantri Jan Arogya Yojana (PM JAY), Health and Wellness Centres (HWCs) e) Revised National Tuberculosis Control Program (RNTCP)	09 hr	15%	1,2, 3,4	CO 1,2	1,2,3 ,4	Emp/SD	L/N/R	G/HV

	f) National AIDS and STD Control Program (NACP)								
III	**National Nutrition Programs** **a) Undernutrition** i. Integrated Child Development Services (ICDS) scheme (Anganwadi Services – Saksham Anganwadi, Poshan 2.0): Goals, objectives and services ii. Hierarchy and role of functionaries iii. ICDS Mission Mode, ICDS mission in different states iv. Mid-Day Meal (MDM) Scheme (PM-POSHAN): Goals, objectives and services v. PM-POSHAN scheme in districts with centralized kitchen v/s decentralized kitchens vi. Food Fortification in India: Foods fortified and supplied in Government programs – ICDS, PDS, MDM **b) Overnutrition** i. Rising Burden of Non-Communicable Diseases (NCDs) ii. Public health strategies to control NCDs (Best buy interventions of WHO) iii. National Programme for Prevention and Control of Non-Communicable Diseases (NP-NCD), formerly known as National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases	15 hr	25%	1,2, 3,4	CO 1,2	1,2,3 ,4	Emp/SD	L/N/R/G	G/HV

	and Stroke (NPCDCS): Operational strategies, objectives and services								
IV	**National Nutrition Programs for Micronutrient Malnutrition** **Goals / Objectives / Strategies / Guidelines:** a) National Nutritional Anemia Control Program, Nutritional Program for Control of Anemia among Adolescent Girls, National Iron Plus Initiative (NIPI), Intensified NIPI (I-NIPI), Anemia Mukt Bharat (AMB) strategy b) National Vector Borne Disease Control Program (NVBDCP) c) National Prophylaxis Programme against Nutritional Blindness (NPPNB) due to Vitamin A Deficiency (VAD) d) National Iodine Deficiency Disorders Control Program (NIDDCP), Universal Salt Iodization (USI), Double Fortified Salt (DFS) e) Diarrhea Control Program: Role of Zinc, ORS f) National Deworming Campaign g) National Programme for Prevention and Control of Fluorosis (NPPCF)	15 hr	25%	1,2, 3,4	CO 1,2	1,2,3 ,4	Emp/SD	L/N/R/G	G/HV

V	**Other Programs / Schemes / Initiatives Aims and Objectives:** a) Reproductive Maternal Newborn Child Adolescent Health Plus Nutrition (*RMNCAH+N*) b) Janani Suraksha Yojana (JSY) c) Janani Shishu Suraksha Karyakaram (JSSK) d) Indira Gandhi Matritva Sahyog Yojana (IGMSY) - Pradhan Mantri Matritva Vandana Yojana (PMMVY) e) Kasturba Poshan Sahay Yojana (KPSY) f) Pradhan Mantri Surakshit Matritva Yojana (PMSMY) g) Rashtriya Bal Swasthya Karyakram (RBSK), Rashtriya Kishor Swasthya Karyakram (*RKSK*) h) Mission Indradhanush i) Namo Lakshmi Yojana j) Any New Initiatives / Schemes	09 hr	15%	1,2, 3,4	CO 1,2	1,2,3 ,4	Emp	L/N/R	G/HV

References

1.	K. Park (2011). Text Book of Preventive and Social Medicine, 25th Edition. Banarsidas Bhanot Publishers. Jabalpur. ISBN13: 9788190607995
2.	Vir Sheila (2011). Public Health Nutrition in Developing Countries published by Woodhead Publishing India. ISBN-13: 9780857090041, ISBN-10: 0857090046
3.	National Health Mission. Ministry of Health and Family Welfare. Government of India. nhm.gov.in
4.	National Nutrition Mission – ICDS. icds-wcd.nic.in
5.	Ministry of Women & Child development. GOI, www.wcd.nic.in.icds
6.	Ministry of Health & Family Welfare, www.mohfw.nic.in
7.	National Rural Livelihood Mission – nrlm.gov.in
8.	John E hiri (2009). Maternal and Child Health - Global Challenges, Programs, and Policies
9.	http://swachhbharatmission.gov.in/SBMCMS
10.	www.wcd.gujarat.gov.in (Directorate of ICDS, policies & newer initiatives)
11.	Policies: Nutrition Resource platform: Akshay Poshan, www.wcd.nic.in

12.	World Health Organization, Regional Office for South-East Asia. Non-communicable Diseases in the South-East Asia Region: Situation and response 2011
13.	World Health Organization. Non-communicable Diseases Country Profile 2011
14.	WHO "Best Buys" www.who.int/nmh/publications/who_bestbuys_to_prevent_ncds.pdf
15.	Deworming: End the neglect. www.endtheneglect.org
16.	Vitamin A supplementation for infants & children 6-59 months. www.who.int/nutrition/publications/micronutrients/guidelines/vas.../en/
17.	Mother and child Nutrition, Nutrition resources for India. http://motherchildnutrition.org/india/vitamin-a-ifasupplementation.html
18.	National Guidelines on Infant and Young Child Feeding. wcd.nic.in
19.	National AIDS and STD Control Program. https://naco.gov.in/
20.	https://ncvbdc.mohfw.gov.in/
21.	https://tbcindia.mohfw.gov.in/wp-content/uploads/2023/05/4773363959TOG-Chapter-1-Introduction.pdf

MODE OF EVALUATION:

50% IA : 50% UA

50% IA =

50% UA = University examination

Syllabus of Courses

	NAAC Accredited "A+" Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc. (Public Health Nutrition) - Third Year – Level 6

Year	**III**	**Nutrition Program Management (Core / Major)**	**Credits/Hours**	**4 (2+2)/ hour/week** **Theory: 30 Hrs; Practical:60 Hrs**
Semester	**VI**	Year of Introduction: 2024-2025 Year of Syllabus Revision: 2025-2026	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations, videos		

Course Outcomes

1. Gain knowledge and skills to effectively manage and implement health and nutrition programs in developing country contexts.
2. Develop abilities to critically evaluate existing health and nutrition programs.
3. Develop capacity to assess and improve the effectiveness and sustainability of health interventions in resource-limited settings.

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/R/G	**Relation to** G/ES/HV/PE
I	**Nutrition Program Management and Program Planning** a) Fundamental Principles and concepts b) Nutrition Program Management: Definitions, Principles components (Planning, Implementation and Evaluation) c) Program Planning: Definitions and assumptions, Theoretical foundations d) Process of program Planning: planning of goals and objectives, approaches used in planning, type of planning, decision making, SMART objectives	10 hr	11%	1, 2	1,2	1	Emp/SD	N, R	ES, PE

	e) Steps in Planning nutrition program								
II	**Implementation and Monitoring for Nutrition/Health Programs** a) Steps in implementation b) Training, supervision and co-ordination c) Managing space, time and money (cost benefits, cost effectiveness and cost efficiency) d) Coordination and delegation of duties for the team e) Operation research and its contribution to nutrition program f) Management information system at various levels and its applications	05 hr	6%	1, 2	3	2, 3	SD	N, R, G	ES, PE
III	**Evaluation for Nutrition Health Programs and Nutritional Surveillance** **a) Evaluation for Nutrition Health Programs** i. Evaluation: process, impact and outreach. Reporting and dissemination of results- traditional way and recent technology based ii. Critique of the existing nutrition health program: merits, demerits, best practices iii. Optimizing the existing resources for program management **b) Nutritional Surveillance** i. Understanding Nutritional Surveillance system, various tools used in nutrition monitoring and surveillance ii. Types of nutritional surveillance appropriate to different situations iii. Nutritional Surveillance for action-cycle of triple A	10 hr	12%	2, 3	3,4	2, 3 ,4	Emp, Ent	N, R, G	G, ES

IV	**Community Participation, sustainability and convergence** a) Concept, importance and approaches of community participation b) Scaling up of program: sustainability issue c) Centralization and decentralization vertical and horizontal linkage d) Need for convergence of various sectors to maximize coverage and optimize benefits e) Role of partnership to achieve common goals	05 hr	6%	1, 2, 4	1,2	4, 5	Emp, SD	L, N, R,	HV, PE
References									
1.	Sussman S (2001). Handbook of program development for health behaviour research and practice. Sage publications, Inc. Kettner PM, Moroney RM, Martin LL (1990).								
2.	Designing and managing programs: An effectiveness-based approach, Newbury CA, Sage								
3.	Mc Mohan R etal. (1981). On being in charge: A guide for middle level management in primary health care. Geneva: World Health Organization								
4.	Bagchi K (1990). Guidelines for the management of nutrition programs, Geneva : WHO- EMRO Technical Publication No. 15								
5.	Human Development Index Report by UNDP								
6.	https://www.scribd.com/document/517196000/Module-3								
7.	USAID.ENGINE (2013). Nutrition program planning supervision: For health and agriculture Program managers								
8.	Latest NFHS, RSOC, DLHS, UNICEF, CES, FAO and WHO and Government Publications (WCD-ICDS, MDM, PDS)/Operational Guideline of the selected nutritionhealth program								

For Practical

	NAAC Accredited "A+" Grade Faculty of Family and Community Sciences The Maharaja Sayajirao University of Baroda	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc. (Public Health Nutrition) - Third Year – Level 6

Year	**III**	**Nutrition Program Management (Core / Major)**	**Credits/Hours**	**4 (2+2)/ hour/week Theory: 30 Hrs; Practical:60 Hrs**
Semester	**VI**	Year of Introduction: 2024-2025 Year of Syllabus Revision: 2025-2026	**Maximum Grade**	**O**
Mode of Transaction		Practical, Lab Work		

Course Outcome (CO)

1. Provide exposure to the students in field settings about functioning of government programs
2. Understand, evaluate & interpret the functioning of nutrition/ health government programs by studying the nutritional status of target population & delivery of evidence-based interventions for the target population.
3. Conduct operations research in a selected program.

Unit No.	Topic	Contact Hours	Weigh tage (%)	BT Level	CO	PSO	Eleme nts Emp/En t/SD	Releva nce to L/N/R/ G	Relation to G/ES/HV/PE
I	**Desk research on current state and national programs and evidence-based interventions using secondary data sources, and development of tools for assessing needs in selected nutrition/health programs.** a) To conduct desk research to evaluate health and nutrition programs, identifying gaps, and studying	10 hr	10%	2, 3	1,2	2	Emp/S D	N, R	ES, PE

	best practices for effective planning and evaluation. b) Development and standardization of tools, field testing, and employing software such as Epicollect and CS Pro for data gathering.								
II	**To identify and prioritize a health or nutritional issue utilizing HDI and existing secondary data. Strategic project planning should adhere to management principles. Engage stakeholders in the current nutrition and health initiatives.** a) To identify priority of health or nutritional issue utilizing national level secondary data sources b) Prepare a plan of action with stakeholders using principles of management	15 hr	17%	1, 3, 5	3	2, 3	SD	N, R, G	ES, PE
III	**Development of tools for process evaluation and training modules for capacity building, sensitization of field functionaries, supportive supervision, and community outreach activities in a selected program and field setting.** a) Development of tools for process evaluation b) Compiling/developing training modules for capacity building and sensitization of field functionaries and target groups c) To prepare monitoring checklist and format for supportive supervision, and community outreach activities in a selected program and field setting.	20 hr	21%	5, 6	3,4	3 ,4	Emp, Ent	N, R, G	G, ES

IV	**Data Analysis, Interpretations and Recommendations** a) Learn to create and manage Excel spreadsheets for data compilation based on study objectives, and analyze the data using MS Excel or statistical software such as Epi Info or SPSS b) Interpretation of the findings c) Report writing d) To recommend future actions for improving the impact ofinterventions in the program setting.	05 hr	17%	4, 5, 6	1,2	4, 5, 6	Emp, SD	L, N, R,	HV, PE
References									
1.	Latest NFHS, RSOC, DLHS, UNICEF, CES, FAO and WHO and Government Publications (WCD-ICDS, MDM, PDS)/Operational Guideline of the selected nutritionhealth program								

MODE OF EVALUATION:

50% IA : 50% UA

50% IA =

50% UA = University examination

Syllabus of Courses

	NAAC Accredited "A+" Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc. (Public Health Nutrition) - Third Year – Level 6				
Year	**III**	**Community Engagement (Internship)**	**Credits/Hours**	**4 (0+4) /8 hour/week** **Practical: 120 Hrs**
Semester	**VI**	Year of Introduction: 2024-2025 Year of Syllabus Revision: 2025-2026	**Maximum Grade**	**O**
Mode of Transaction		Practical, Lab Work		

Course Outcome (CO)

1. Understand the contribution of social networking as a bridge between the various government schemes and the people of India.
2. Develop Sensitivity towards the environment and education
3. Get the benefits of community engagement through Community based field work
4. Understand the various problems of any community and the possible ways to address the same.
5. Learn to connect with the true spirit of the nation.

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/Ent/SD	Relevance to L/N/R/G	Relation to G/ES/HV/PE
I	**Understanding Community engagement** a) Concept, Ethics and Spectrum of Community engagement b) Stages, Components and Principles of community development, c) Current Programmes of community engagement and their implementation d) Understanding local community and urban, rural and tribal culture	06 hr	5%	1, 2	1,2	1	Emp/SD	N, R	ES, PE

II	**Placement of students in CSR/CBOs/ Urban/Rural development programmes** a) Visit to self-help groups (SHGs) to understand their contributions b) Visit to any two CSR projects to understand their way of working c) Placement of students in any one Urban/rural Development Programs / CSR initiatives / Community based organisations to understand Community Involvement (minimum 2 weeks -once a week)	20 hr	17%	1, 2	3	2, 3	SD	N, R, G	ES, PE
III	**Community Engaged Research /Action project** a) Planning of research/action project b) Identifying nutrition/health/ community engagement problem c) Analyze successful case studies to understand real-world applications of PHN/SBCC strategies d) Development of tools for the activity planned e) Utilize AI tools to enhance engagement efforts, measure impact, and gain community insights. f) Pre testing of the tools g) Planning of how it will be done, sample size (sample size should be reasonably good and doable within the time limit of the course_), plan strategy to implement the activity h) Implementation of community based participatory research or action project (minimum 4 weeks -once a week implementation)	54 hr	45%	2, 3	3,4	2, 3 ,4	Emp, Ent	N, R, G	G, ES
IV	**Preparing report based on evaluation and feedback of the community by** a) Data entry, data cleaning, data analysis, generation of tables and graphic presentation and data interpretation	30 hr	25%	1, 2, 4	1,2	4, 5	Emp, SD	L, N, R,	HV, PE

V	**a) Understand the vital role of Community Engagement within the Public Health Nutrition framework.** i. Develop effective, sustainable community engagement strategies for improving health and nutrition status of populations. ii. Stay informed about emerging Government programs and policies to keep engagement strategies forward-thinking. iii. Apply best practices to foster trust and build positive, lasting relationships with local communities. iv. Address social concerns through targeted community initiatives that support sustainable objectives. **b) Dissemination of the work done** i. PowerPoint presentation at class level ii. Brief description of the issue, justification for carrying out particular activity, findings and your learnings iii. Submission of detailed final report with note on how this work has helped you in learning community engagement	10 hr	8%	1, 2, 4	1,2	4, 5	Emp, SD	L, N, R,	HV, PE

References

1.	Principles of Community Engagement, 2nd Edition, NIH Publication No. 11-7782, Printed June 2011.
2.	https://www.uvm.edu/sites/default/files/community_engagement_handout.pdf (Community Engagement)
3.	https://www.atsdr.cdc.gov/communityengagement/pce_concepts.html (Perspectives of Community)
4.	https://egyankosh.ac.in/bitstream/123456789/59002/1/Unit1.pdf (community concepts
5.	https://sustainingcommunity.wordpress.com/2013/07/09/ethics-and-community-engagement/(Ethics of community engagement

6.	https://www.preservearticles.com/sociology/what-are-the-essential-elements-of-community/4558(Elementsof Community)
7.	https://www.yourarticlelibrary.com/sociology/rural-sociology/rural-community-top-10-characteristics-of-the-rural-community-explained/34968 (features of rural community)
8.	https://www.mapsofindia.com/my-india/government/schemes-for-rural-development-launched-by-government-of-india (government programmes for rural development)
9.	https://www.insightsonindia.com/social-justice/issues-related-to-rural-development/government-schemes-for-rural-development-in-india/ (schemes for rural development)
10.	Book : Modern-Day Strategies for Community Engagement (Link: - https://amzn.to/3XadlXO)
11.	Participatory Rural Appraisal, PRA Application in Rural Development Planning, R Ramesh
12.	Israel BA, Coombe CM, Cheezum RR, Schulz AJ, McGranaghan RJ, Lichtenstein R, Reyes AG, Clement J, Burris A. Community-based participatory research: a capacity-building approach for policy advocacy aimed at eliminating health disparities. Am J Public Health. 2010 Nov;100(11):2094-102. doi: 10.2105/AJPH.2009.170506. Epub 2010 Sep 23. PMID: 20864728; PMCID: PMC2951933.
13.	https://www.cmnty.com/blog/community-engagement-strategies/
14.	de Weger, Esther & Vooren, N. & Luijkx, K. & Baan, Caroline & Drewes, H. (2018). Achieving successful community engagement: A rapid realist review. BMC Health Services Research. 18. 10.1186/s12913-018-3090

MODE OF EVALUATION:

50% IA : 50% UA

50% IA =

50% UA = University examination

Syllabus of Courses

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc (PUBLIC HEALTH NUTRITION) - Third Year – Level 6				
Year	**III**	**Social Behaviour Change Communication (Foundation / AEC)**	**Credits / Hours per week**	**2 (1+1) / 3 hours/week** **Theory: 15 Hrs; Practical: 30 Hrs**
Semester	**VI**	Year of Introduction: 2024-2025 Year of Syllabus Revision: 2025-2026	**Maximum Grade**	**O**
Mode of Transaction		Lectures, Tutorials & Presentations		

Course Outcome (CO)

1. Learn and apply theories and methods of social and behavior change communication
2. Gain skills in planning, conducting and evaluating SBCC programs
3. Get oriented regarding SBCC programs being implemented in Government and NGO systems and to equip them to plan a SBCC program in Government/ NGO sector

Unit No.	Topic	Contact Hours	Weightage (%)	BT Level	CO	PSO	Elements Emp/ Ent/ SD	Relevance to L/N/R/G	Relation to G/ES/HV/PE
I	**Concepts, components and process of communication for nutrition health promotion** a) Definitions of concepts b) Formal – non-formal communication, Participatory communication c) Components of BCC: Sender, Message, Channel, Receiver	08 hr	19%	1,2	1	1,2,	SD	L,N,R,G	ES

	d) Various types of communication – interpersonal, mass media, visual, verbal/ non-verbal. e) History, need and relevance of SBCC in India f) Health behavior theories, models and frameworks including social- cognitive theory, multi theory model and PRECEDE- PROCEED model, Social ecological model and communication for development (C4D) approach								
II	**Concepts and Theories of Social and Behaviour change Communication** a) Definitions of concepts b) Three characteristics of SBCC c) Ten overarching principles for developing SBCC program or campaign d) Steps for developing a successful social and Behaviour change communication program i. Understanding the situation ii. Focusing on designing iii. Creating concept and materials, pretesting and field testing iv. Implementing and monitoring v. Evaluating and replanning	02 hr	4 %	1,2	1,2	1,2,3	SD	N,G	G,PE
III	**Programs and Experiences of Social and Behavioural change communication- A Global and Indian Perspective** a) SBCC in developed and developing nations: some examples – your guide to safe and nutritious food at school. The yellow book. b) Evolution of NHC/ SBCC in India: traditional folk media to modern methods of communication. c) Traditional folk media in Gujarat and its influence on SBCC d) Communication for urban and rural environment; for target specific audience	05 hr	12 %	1,2	2,3	1,2,3	SD	L,R,N,G	G,PE

	Nutrition - Health – Communication in Government Programs and NGOs a) Evolution of SBCC/ IEC in Government nutrition health programs - shift in focus from knowledge gain to change in practices (Creating enabling environments under NNM) b) Overview of SBCC/IEC materials used in ongoing National Nutrition and health programs (Activities, strengths and limitations) – i. SBCC / NHC in ICDS ii. Nutritional counseling in micronutrient deficiency control programs: control of I-NIPI, NIDDCP, NPPNB. c) Strengths and limitations of SBCC/ NHC imparted in NGO programs								

References

1	Kristal AR, Glanz K, Curry SJ, Patterson RE. How can stages of change be best used in dietary interventions? J Am Diet Assoc. 1999;99:679-684.
2	Social and Behavior Change Communication (SBCC) Training for Information, Education, and Communication (IEC) Officers, USAID, 2013
3	Sallis JF, Owen N, Fisher EB. Ecological models of health behavior. In: Glanz K, Rimer BK, Viswanath K (eds). Health Behavior and Health Education: Theory, Research, and Practice. 4th edition. San Francisco, CA: Jossey-Bass. 2008. pp 465-485.
4	Spahn JM, Reeves RS, Keim KS, Laquatra I, Kellogg M, Jortberg B, Clark NA. State of the evidence regarding behavior change theories and strategies in nutrition counseling to facilitate health and food behavior change. J Am Diet Assoc. 2010;110(6):879-91.
5	Boynton PM and Greenhalgh T, Hands-on guide to questionnaire research, Selecting, designing, and developing your questionnaire, BMJ, 328, 2004, 1312- 1315.
6	Green, LW and MW Kreuter. Behavioral and environmental diagnosis. In: Health Promotion Planning: An Educational and Environmental Approach, 2nd ed. Mountain View, CA: Mayfield Publishing Co. 1991:125-149.
7	Lytle LA, Perry CL. Applying research and theory in program planning: An example from a nutrition education intervention. Health Promotion Practice. 2001;2(1):68-80.
8	Simons-Morton BG, Greene WH, Gottlieb NH. (Chpt 8) Evaluation. In: Introduction to Health Education and Health Promotion, 2nd Ed. Prospect Heights, IL: Waveland Press. 1995:218-241.
9	Field guide to designing communication strategy, WHO publication-2007
10	Academy for Educational Development (1988). Communication for Child Survival, AED, USA.
11	Communication for Development (C4D) Capability Development Framework, UNICEF and 3D Change, 2009 FSSAI (2017) your guide to safe & nutritious food at school, Level I & II, The yellow Book.

12	Facts for Life (1990). A Communication Challenge. UNICEF / WHO / UNESCO / UNFPA, UK
13	Health education: theoretical concepts, effective strategies and core competencies: a foundation document to guide capacity development of health educators/World Health Organization. Regional Office for the Eastern Mediterranean, 2012
14	Hubley J (1993) Communicating Health. London: Teaching Aids at Low Cost, London, UK.

For Practical

	NAAC Accredited "A+"Grade **Faculty of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc (PUBLIC HEALTH NUTRITION) - Third Year – Level 6

Year	**III**	**Social Behaviour Change Communication (Foundation / AEC)**	**Social Behaviour Change Communication**	**2 (1+1) / 3 hours/week Theory: 15 Hrs; Practical: 30 Hrs**
Semester	**VI**	Year of Introduction: 2024-2025 Year of Syllabus Revision: 2025-2026	**Maximum Grade**	**O**
Mode of Transaction		Lab work, Hands on Training, Presentations, use of relevant softwares		

No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT level**	**CO**	**PSO**	**Elements** Emp/Ent/ SD	**Relevance to** L/N/RG	**Relation to** G/ES/HV/PE
I	**Tool development for a successful SBCC program** a) Tool development for a successful SBCC program for conducting a need assessment survey and identifying gaps in the existing communications methods being used at the community/Facility Level b) For conducting a need assessment survey regarding the problem issue in focus c) Using various softwares for developing IEC material d) Outcome impact evaluation **Review of the IEC material available under the National programs on Nutrition Specific and**	12 hr	25%	1,2,3	1	1,2,3	SD	L,R,N,G	ES

	Nutrition Sensitive sectors for various groups- Identifying gaps and suggesting improvements								
II	Creating (Developing) and implementing SBCC strategy for any one **Nutrition Specific or Nutrition Sensitive sector** a) Review of various modes of Communication methods available- Identifying gaps b) **To design and plan SBCC program on a specific nutrition topic** taking into account all components of SBCC (Using any one Behaviors change theory) c) **Submit the following:** i. The visual representation ii. Script of the session: Hindi / Gujarati iii. The Communication strategy and iv. The Evaluation plan (Checklist Preparation) d) **To implement two SBCC sessions** in the field and evaluate its effectiveness as per guidelines/ checklist provided. e) **To write a brief report** on outcome impact evaluation of the SBCC sessions conducted.	18 hr	40 %	3,4,5,6	3,4	1,2,3	Emp ,Ent, SD	L,R,N,G	ES

MODE OF EVALUATION:

50% IA : 50% UA

50% IA =

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COURSES OFFERED TO STUDENTS OTHER THAN FOODS AND NUTRITION SPECIALIZATION

Program Specific Outcome (PSO): Level 6

At the end of level 5 i.e. at the completion of first year (2 semesters) of the undergraduate program the following are the Program Specific outcome

1. **Disciplinary Knowledge:** The students would be able to demonstrate the acquisition of knowledge of facts, concepts, principles, theories, and processes in the broad multidisciplinary learning context of the domain of family and community sciences

2. **Critical Thinking**: The students would be able to understand the linkages between the learning areas within and across the chosen fields of study

3. **Decision making, Analytical and Communication Skills**: The students should be able to acquire the cognitive skills required to identify, analyse and synthesize information from a range of sources

4. **Critical Thinking and Problem Solving, Moral and Professional Ethics:** The students would be able to apply the knowledge and essential skills required to perform effectively in a defined job (summer internship) or different settings/programs (practicals) relating to the chosen field of study

5. **Multicultural competence:** Ability to learn about different Indian cultures by way of practicing traditions, Food Anthropology, History of Indian Costumes, Traditional Household Practices, developing itineraries, Indic studies and making traditional arts and crafts

6. **Digital Literacy**: Competency in accessing relevant and authentic information and data from Electronic media with the ability to learn, synthesize, integrate to make presentations on the given topics in various disciplines for academic and extension/community work.

    - **Bloom'sTaxonomy (BT) Levels:**1. Remember 2.Understand 3.Application 4.Analysis 5.Evaluation 6. Creation Programme
    - **Elements of** Employability (Emp)/ Entrepreneurship (Ent)/ Skill Development (SD)
    - **Relevance to** Local (L)/ National (N)/ Regional(R)/Global (G)
    - **Relation to** Gender (G), Environment and Sustainability (ES), Human Values (HV)and Professional Ethics (PE)

Syllabus of Courses

	NAAC Accredited "A+ " Grade **Faculty Of Family and Community Sciences** **The Maharaja Sayajirao University of Baroda**	**Academic Year**	**2025 – 2026**

B.Sc. F.C.Sc (REGULAR) – Third Year – Level 6

Year	**III**	**Preventive Nutrition for Chronic Diseases (Elective / Minor)**	**Credits/Hours**	**4 (4+0)/4 hours/week Theory: 60 Hrs**
Semester	**VI**	Year of Introduction: 2024-2025 Year of Syllabus Revision: 2025-2026	**Maximum Grade**	**O**
Mode of Transaction		Lectures, readings, class discussions, demonstrations, videos		

Course Outcome (CO)

1. Acquire basic knowledge about the emerging public health problems in the population.
2. Understand the basic concept of risk factors associated with Non-Communicable Diseases.
3. Gain understanding of the epidemiology of Non-Communicable Diseases and population-wide approaches to reduce its burden.
4. Orient about the strategies (Best Buy Interventions) for combating Non-Communicable Diseases.

Unit No.	**Topic**	**Contact Hours**	**Weightage (%)**	**BT Level**	**CO**	**PSO**	**Elements** Emp/Ent/SD	**Relevance to** L/N/R/G	**Relation to** G/ES/HV/PE
I	**Introduction to Health Promotion and Disease Prevention** a) Definition and importance of health promotion, target population for health promotion, disease prevention and healthy lifestyle. b) Overview of health communication, health education, policy, systems and environmental change.	05 hr	10%	1,2	1,2	1	Emp/SD	N, R	ES, PE

II	**Introduction to Obesity and Non-Communicable Diseases (NCDs)** a) Obesity: BMI (WHO and Asians); overweight and obese patients (degree of obesity and abdominal obesity). b) Understanding the definition of NCDs and four major NCDs (coronary heart disease, stroke and hypertension; chronic respiratory disease; cancers and diabetes). c) Risk factors of NCDs: Behavioural risk factors, metabolic risk factors, Low birth weight, foetal undernutrition, chronic hunger and chronic stress.	10 hr	15%	1,2	3,4	2, 3 ,4	Emp, Ent	N, R, G	G, ES
III	**Epidemiology and Integrated Approaches for the Management of Non-Communicable Diseases (NCDs)** **a) Epidemiology of NCDs** i. Obesity: Burden (Mortality and morbidity); Risks factors (Diet; Sedentary lifestyle; Genetics) of raised BMI. ii. Hypertension: Classification; burden and rule of halves; risk factors. iii. Coronary Heart Disease (CHD): Burden and its risk factors. iv. Diabetes: Types of Diabetes Mellitus (DM) (Type 1DM, Type 2DM, Gestational diabetes); Burden. v. Cancer: Classification; causes (chemicals, diet and exercise, infection, radiation, heredity). **b) Integrated Approaches for the Management of NCDs** i. Ministry of Health and Family Welfare, Government of India, Operational Guidelines for National Programme for Prevention and Control of Non-Communicable Diseases (2023-2030).	15 hr	25%	1,2	1,2	4, 5	Emp, SD	L, N, R,	HV, PE

	ii. National Programme for the Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS).								
IV	**Prevention and Control of NCDs: Hypertension, Diabetes, Cardiovascular disease, Cancer** a) Hypertension: Classification criteria; Risk assessment (Medical history, physical examination); Management (Lifestyle management and Drug Therapy); Overview of organ wise complications (heart, brain, eye and kidneys). b) Diabetes: High risk individuals for diabetes; Diabetes suspected; Criteria for diagnosis of T2DM; Management of T2DM; Hospitalisation; Educating and diet counselling to diabetes patient; Visits schedule for counselling; Complications of DM (overview of microvascular and macrovascular complications). c) Cardiovascular Diseases: Coronary Heart Disease common symptoms and associated symptoms along with the features not characteristics of myocardial ischemia. d) Overview of signs, symptoms, cause, diagnose, screening and preventive measures of: Cervical cancer, Breast cancer, Oral cancer.	15 hr	25%	1,2	1,3, 4	5, 6	SD	L, N, R, G	ES, HV

V	**Diet Therapy, Physical Activity and Behavioural Therapy for the management of Non-Communicable Diseases (NCDs)** a) Definition of healthy diet and unhealthy diet; Effect of unhealthy diets on individual health and leading cause of NCDs. b) Definition and importance of healthy food choice; Reasons for opting unhealthy food choice in the communities. c) Dietary management of NCDs: overweight, obesity, hypertension, diabetes (Type 2DM), Cardio vascular diseases (CVD). d) Definition of physical activity; Need and benefits of physical activities in individuals; Management of stress with yoga e) Behavioural strategies to enable healthy food habits, physical activities and disease free communities.	15 hr	25%	1,2,3	2,3, 4	1,2,3, 4	SD	L, N, R, G	ES, HV,PE

References

1.	NCD facts and figures (2024). https://www.gacd.org/about/what-we-do/what-are-ncds/key-facts-and-figures
2.	Global Burden of Disease (GBD) (2021). https://www.healthdata.org/research-analysis/gbd
3.	Global Nutrition Report (2022). https://globalnutritionreport.org/
4.	Global status report on non-communicable diseases (2014). https://www.emro.who.int/noncommunicable-diseases/publications/global-status-report-on-ncds.html
5.	Global non communicable disease platform (2024). https://www.who.int/teams/global-noncommunicable-diseases-platform\
6.	Preventing non communicable diseases (2024). https://www.who.int/activities/preventing-noncommunicable-diseases
7.	Module for ASHA on Non-Communicable Diseases (2021). https://nhsrcindia.org/sites/default/files/2021-06/ASHA%20NCD%20Module-English.pdf
8.	Lal S., Dr. (2016). Textbook of Chronic non-communicable Diseases: The Health Challenge of the Twenty-First Century. Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive & Social Medicine, 41(2), 167.
9.	Reducing risk factors of NCDs in primary care (2016). Training Manual for Community Health Workers on Reducing Risk Factors of NCDs. https://mohfw.gov.in/sites/default/files/Traning%20Manual%20for%20Community%20Health%20Workers%20on%20Reducing%20Risk%20Factors%20of%20NCDs_1.pdf
10.	WHO (2024). Non- communicable diseases. https://www.who.int/health-topics/noncommunicable-diseases#tab=tab_2

11.	Operational guidelines for National Programme for Prevention and Control of Non-Communicable Diseases -2023-2030 (2023). https://mohfw.gov.in/sites/default/files/NP-NCD%20Operational%20Guidelines_0.pdf
12.	Non-Communicable Diseases-2 (2018). http://egyankosh.ac.in//handle/123456789/47992
13.	Non-Communicable Diseases-1 (2018). http://egyankosh.ac.in//handle/123456789/47994
14.	Epidemiology of Specific Non-Communicable Diseases (2018). http://egyankosh.ac.in//handle/123456789/47996
15.	Thakur JS (2015). NCD Surveillance. Public health approaches to non- communicable diseases. Wolters Kluwer.
16.	Non-Communicable Diseases and Management Under National Health Programme (2018). http://egyankosh.ac.in//handle/123456789/47998
17.	Module for ASHA on Non-Communicable Diseases (2021). https://nhsrcindia.org/sites/default/files/2021-06/ASHA%20NCD%20Module-English.pdf
18.	Health Promotion and Disease Prevention in Rural Communities (2024). https://www.ruralhealthinfo.org/toolkits/health-promotion/1/introduction
19.	Defining Health Promotion and Disease Prevention (2024). https://www.ruralhealthinfo.org/toolkits/health-promotion/1/definition
20.	Health Communication (2024). https://www.ruralhealthinfo.org/toolkits/health-promotion/2/strategies/health-communication
21.	Health Education (2024). https://www.ruralhealthinfo.org/toolkits/health-promotion/2/strategies/health-education
22.	Policy, Systems, and Environmental Change (2024). https://www.ruralhealthinfo.org/toolkits/health-promotion/2/strategies/policy-systems-environmental

MODE OF EVALUATION:

50% IA : 50% UA

50% IA =

50% UA = University examination

DEPARTMENT OF FOODS AND NUTRITION

FOURTH YEAR (NEP)

PUBLIC HEALTH NUTRITION

(VII SEMESTER) – WITH RESEARCH

REGULAR

NEP STRUCTURE FOR FOODS AND NUTRITION UNDERGRADUATE COURSE (MAJOR: PUBLIC HEALTH NUTRITION - GRANT IN AID ROGRAMME)

	With Research		
SEMESTER	**COURSE NAME**	**CREDIT**	**COURSE TYPE**
VII	Human Nutrition	4 (4+0)	MAJOR
	Advanced Food Science	4 (3+1)	MAJOR
	Food Systems in Public Health	4 (4+0)	MAJOR
	Dissertation I in Public Health Nutrition	6 (0+6)	RESEARCH
	COURSE OFFERED TO STUDENTS OTHER THAN FOODS & NUTRITION SPECIALIZATION		
	Food Labelling	4 (4+0)	MINOR
	TOTAL	**22**	
SEMESTER	**COURSE NAME**	**CREDIT**	**COURSE TYPE**
VIII	Nutrition Epidemiology & Research Methods	4 (3+1)	MAJOR
	Communication for Development	4 (3+1)	MAJOR
	Nutrition in Humanitarian Relief	4 (4+0)	MAJOR
	Dissertation II in Public Health Nutrition	6 (0+6)	RESEARCH
	COURSE OFFERED TO STUDENTS OTHER THAN FOODS & NUTRITION SPECIALIZATION		
	Sanitation and Hygiene	4 (4+0)	MINOR
	TOTAL	**22**	
	TOTAL CREDITS	**176**	

Syllabus of Courses

<table>
<tr><td></td><td colspan="3">The Maharaja Sayajirao University of Baroda
Faculty of Family and Community Sciences
Department of Foods and Nutrition
Fatehgunj, Vadodara 390002</td><td colspan="2">ACADEMIC YEAR
2026-2027</td></tr>
<tr><td colspan="6">B.Sc. F. C. Sc. (Public Health Nutrition) – Fourth Year - LEVEL 6.0</td></tr>
<tr><td>Year</td><td>IV</td><td rowspan="2">Course Type: Major
Course Number:
Course Title: Human Nutrition</td><td>Credit</td><td>4 (4+0)</td></tr>
<tr><td>Semester</td><td>VII</td><td>Hours</td><td>Theory: 60Hrs.</td></tr>
<tr><td>OBJECTIVES</td><td colspan="4">1. To acquire insights into recent advancements on the influence of nutrients on growth, development and health.
2. To gather latest information on the biological functions of macro and micronutrients and how they affect food and nutrition guidelines.
3. To understand the function of nutrients as defined by their chemistry, interrelations among nutrient functions, and mechanistic approaches in the analysis of nutrient disease relationships, and recent advances in the basic sciences related to nutrient function.
4. To gain proficiency with health and nutrition evaluation indicators and comprehend their significance and interpretations.
5. To develop analytical skills by understanding the newer insights available in published, peer reviewed literature, case studies, Position Statements and public policy documents.</td></tr>
<tr><td colspan="6">COURSE CONTENT / SYLLABUS</td></tr>
<tr><td>UNIT-I</td><td colspan="3">Energy
a) Central control of energy: CNS regions involved in the regulation of food intake, neurotransmitters and cells involved in appetite regulation
b) Non Homeostatic control of energy intake: difference between homeostatic and non homeostatic CNS signals, Neurotransmitters involved
c) Energy expenditure: Components of energy expenditure (BMR , TEF & Physical activity)
d) Physical Activity guidelines, tools for data collection – calculations of Energy Expenditure
e) Undernutrition & Overweight/ Obesity: Definition, clinical and Biochemical changes in metabolism and adaptations
f) Recent advances for estimating RDA for energy intake based on ICMR-NIN guidelines for Indians.</td><td colspan="2">08 hrs.</td></tr>
<tr><td>UNIT-II</td><td colspan="3">Macronutrients - Carbohydrates
a) Carbohydrates
i. Review of Structure, classification and food sources of carbohydrates, sugar alcohols, Digestion, absorption transport mechanisms and cellular uptake
ii. Assessment of glucose homeostasis
iii. Fructose metabolism and health effects
iv. Glycemic Index, Glycemic Load
v. RDA for Sugars & Carbohydrates
b) Fibre
i. Definition and Classification of different types of fibre including resistant starch
ii. Physiological effects of dietary fibre on energy metabolism,
iii. CVD, insulin response, Colon Cancer
c) Insulin Resistance (IR)and Diabetes Mellitus (DM)</td><td colspan="2">10 hrs.</td></tr>
</table>

	i. Definition of IR& type 2 DM ii. Action of insulin iii. Understanding the demands of energy by the cell via AMP activated protein kinase and silent information regulator iv. Diagnostic tests to evaluate IR & DM v. Metabolic syndrome & DM vi. Low birth weight and NCD's (Altered programming pathways and their consequences)	
UNIT-III	**Lipids an Overview** a) Review of Digestion, absorption, transport of lipids and delivery to cells b) Different classes of lipids and lipid and apolipoprotein composition of different lipoproteins c) Role of gut in lipid homeostasis d) Endogenous pathway of lipid metabolism e) Pathogenesis of CVD & role of dietary fat on serum lipoproteins f) Diabetic dyslipidemia g) Lipids & Regulation of gene expression h) Essential fatty acids, Eicasanoids, functions, biological significance especially in inflammation i) trans fatty acid & its health implications, transfat free India j) Human requirements, assessment indicators and guidelines for heart health k) Discussion on Review/meta analysis of the papers on omega 3 fatty acids, trans fatty acids, DHA l) Recent advances for estimating RDA for visible fat intake based on ICMR-NIN guidelines for Indians.	10 hrs.
UNIT-IV	**Proteins** a) Review of Basic concepts, digestion, absorption, transport of proteins, Structure of proteins & classification of amino acids b) Fate of absorbed amino acids, synthesis and degradation process c) Calorie restriction, protein metabolism and BCAA d) Protein requirements and quality of proteins: Methods used to determine human protein requirements e) Non protein compounds: their biological importance f) Recent advances for estimating RDA for protein based on ICMR-NIN guidelines for Indians.	10 hrs.
UNIT-V	**Fat Soluble Vitamins** **a) Vitamin A** i. Vitamers and International Units ii. Metabolism and storage of vitamin A and pro vitamin A carotenoids iii. Factors affecting carotenoids bioavailability and role of carotene dioxygenase iv. Plasma retinol binding protein v. Metabolic functions of Vitamin A & Carotenoids vi. The antioxidant function of carotenoids vii. Newer insights in Vitamin A fortification and supplementation viii. Vitamin A, Growth, Infection, morbidity and Immunity ix. Deficiency, Assessment, Indicators & RDA x. Toxicity of Vitamin A & teratogenicity xi. Interactions of vitamin A with drugs and other nutrients **b) Vitamin D** i. Vitamers and International Units ii. Absorption and Metabolism iii. Synthesis of Vitamin D in the skin iv. Metabolism to Calcitriol	08 hrs.

	v. Regulation of Vitamin D metabolism& biological functions vi. Vitamin D deficiency: Rickets and Osteomalacia vii. Strategies to combat Vitamin D deficiency viii. Newer perspectives of Vitamin D in Human Nutrition ix. Interaction with drugs and other nutrients x. Deficiency, assessment, indicators for Vitamin D status xi. Toxicity of Vitamin D xii. Osteoporosis: Causes, consequences & guidelines for management xiii. Discussion: Role of Vitamin D beyond bone health, observations emerging from review and meta analysis **c) Vitamin E** i. Vitamers and units of activity ii. Absorption and metabolism iii. Metabolic functions of vitamin E iv. Vitamin E deficiency, requirements and assessment indicators v. Toxicity vi. Interaction with other nutrients **d) Vitamin K** i. Vitamers ii. Dietary sources, bacterial synthesis and metabolism iii. Metabolic functions of vitamin K iv. Other vitamin K dependent proteins v. Vitamin K deficiency and requirements vi. Vitamin K and neonates vii. Toxicity and drug interactions	
UNIT-VI	**Water Soluble Vitamins: Ascorbic Acid & B Complex vitamins (B1, B2, B3, B6, B12, Folic acid, Biotin, Pantothenic acid)** i. Historical perspective /Landmarks ii. Metabolism: digestion, absorption, transport, utilization, excretion iii. Metabolic functions iv. Fortification and Supplementation v. Deficiency & requirements vi. Toxicity & drug interactions vii. Assessment indicators	06 hrs.
UNIT-VII	**Minerals** **a) Minerals (Calcium, Phosphorous, Iron, Iodine, Copper, Zinc and Fluoride)** i. Sources, digestion, absorption, transport and utilization ii. Factors influencing bioavailability iii. Homeostasis iv. Metabolic functions v. Deficiency & Requirements vi. Toxicity & drug interactions vii. Assessment indicators & RDA viii. Micronutrient interactions ix. Success stories of fortification: Vehicles, form, dose, etc x. Iron, Physical work capacity and cognition xi. Iodine, growth & cognition xii. Zinc, growth & diarrhoea xiii. Deficiency, Assessment, Indicators	08 hrs.

	xiv. Toxicity levels xv. Supplementation, fortification and dietary approaches to combat IDA & IDD xvi. Discussion**:** Observations emerging from Review papers/Meta-analysis, technical report on Micronutrient malnutrition	
	b) Minerals (Sodium and Potassium) i. Role of Sodium and Potassium in electrolyte balance ii. Role of Sodium in hypertension iii. Deficiency, assessment , indicators iv. WHO guidelines on Sodium & Potassium v. Discussion: WHO shake the salt habit vi. Antioxidants: Vitamins, Minerals, Enzyme – mechanism and clinical implications	

REFERENCES

1.	Introduction to Human Nutrition, second edition. Edited by Michael J Gibney, susan A Lanham-New, Aedin Cassidy, Hester H Vorster, Wiley Blackwell, USA,ISBN 978-1-4051-6807-6, 2009
2.	Nutrition in Public Health. Principles, policies and practice. 2nd edition. Arlene spark, Lauren M dinourJanelObenchain. CRC press, Taylor & Francis group, USAISBN 13:978-4987-6661-6, 2015.
3.	Human Energy requirements (2004). Report of a joint FAO/WHO/UNU Expert consultation, Rome,
4.	WHO report on Global action plan for the reduction of non communicable diseases,2013, Geneva
5.	Susan A. Lanham–New, Ian A. MacDonald and Helen M. Roche, Nutrition and Metabolism (The Nutrition Society Textbook), Second Edition- 2011. Wiley-Blackwell.
6.	Martha H. Stipanuk and Marie A. Caudill, Biochemical, Physiological, and Molecular Aspects of Human Nutrition, Third Edition- 2013. Elsevier
7.	Nutrient Requirements & Recommended Dietary Allowances for Indians (1990, Reprinted 2008) 2nd Edition - 2010) By B.S. NarasingaRao, B. Sivakumar)
8.	WHO (2016) SHAKE the Salt habit The SHAKE TECHNICAL PACKAGE for Salt Reduction.
9.	2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease. A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines
10.	Diabetes and Hypertension: A Position Statement by the American Diabetes Association; 2017
11.	Noncommunicable Diseases Progress Monitor 2017. World Health Organization; 2017
12.	Treatment of Diabetes in Older Adults: An Endocrine Society Clinical Practice Guideline; 2019
13.	http://www.framinghamheartstudy.org/
14.	The North Karelia Project: Cardiovascular disease prevention in Finland. Glob Cardiol Sci Pract. 2018(2):13
15.	Global Action Plan for the Prevention and Control of Noncommunicable diseases 2013-2020. World Health Organization; 2013
16.	https://fssai.gov.in/cms/eat-right-india.php
17.	Healthy diets for all: A key to meeting the SDGs. Global Panel on Agriculture and Food Systems for Nutrition. Policy Brief No.10; 2017
18.	Large Scale Food Fortification in India- The Journey So Far and Road Ahead. FSSAI 2017
19.	Cross M and MacDonald B. Nutrition in Institutions. John Wiley & Sons; 2009
20.	Hill N, Fallowfield J, Price S and Wilson D. Military nutrition: maintaining health and rebuilding injured tissue. Philos Trans R Soc Lond B Biol Sci. 2011, 366(1562):231-240
21.	Heer M, Titze J, Smith SM and Baecker N. Nutrition, Physiology and Metabolism in Spaceflight and Analog Studies. Springer; 2015
22.	Space Food and Nutrition. An Educator's Guide with Activities in Science and Mathematics. NASA; 1999
23.	Bhide G and Mandlik S. (2018), Nutritional Guidelines for sportspersons Jaypee Brothers Medical Pub;ishers Pvt. Ltd, New Delhi, India
24.	Dan Benardot. Advanced Sports Nutrition 2nd Edition; 2018
25.	Nutrition for Athletes, A practical guide to eating for health and performance, Prepared by the Nutrition Working Group of the International Olympic Committee based on an International Consensus Conference held at the IOC in Lausanne in October 2010Revised and Updated in April 2012

26.	https://www.unicef.org/nutrition/index_emergencies.html
27.	The management of nutrition in major emergencies. WHO, UNHCR, IFRC, WFP; 2000
28.	Guideline on Sodium intake for adults and children. WHO; 2012
29.	Guideline on Potassium intake for adults and children. WHO; 2012
	Journals
	1. American Journal of Clinical Nutrition 2. British Journal of Nutrition 3. Human Nutrition & Dietetics 4. Journal of Nutrition 5. European Journal of Clinical Nutrition 6. Indian Journal of Medical Research 7. Circulation

Syllabus of Courses

	The Maharaja Sayajirao University of Baroda **Faculty of Family and Community Sciences** **Department of Foods and Nutrition** **Fatehgunj, Vadodara 390002**	**ACADEMIC YEAR 2026-2027**

B.Sc. F.C.Sc. (Public Health Nutrition) - Fourth Year – Level 6.0

Year	**IV**	**Course Type: Major**	**Credit**	**4 (3+1)**
Semester	**VII**	**Course Number:** **Course Title: Advanced Food Science**	**Hours**	**45**

OBJECTIVES:	1. Discuss advanced processing techniques and product development approaches in plant-based foods (cereals, millets, pulses, fruits and vegetables). 2. Explain processing technologies, quality evaluation and functional applications of animal-based foods (milk, meat, poultry, fish and eggs). 3. Examine the nutritional, functional and technological roles of oils, nuts and superseeds in food systems. 4. Evaluate processing, quality and regulatory aspects of alcoholic, non-alcoholic and specialty beverages (tea, coffee, cocoa/chocolate). 5. Critically appraise emerging trends, sustainability issues and future innovations in food science and technology.

COURSE CONTENT / SYLLABUS

UNIT-I	**ADVANCED PROCESSING OF PLANT-BASED FOODS** a) Cereals & Millets: Parboiling, malting; low GI, gluten-free and multigrain formulations; nutritional significance and global perspective b) Pulses & Legumes: Milling, germination, fermentation; functionality (protein isolates, concentrates, hydrolysates); applications in plant-based foods and meat analogues. c) Fruits & Vegetables: Post-harvest physiology; advanced preservation (HPP, irradiation, MAP); nutrient retention; by-product and waste utilization.	09 hrs
UNIT-II	**Milk and Dairy Innovations** a) Structure and composition of milk. b) Processing: pasteurization, homogenization, UHT, membrane processing. c) Innovations: probiotic yogurts, functional dairy beverages, lactose-free products, whey-based foods. d) Casein, whey proteins and bioactive peptides in health promotion.	07 hrs
UNIT-III	**Meat, Poultry, Fish and Eggs** a) Meat & Poultry: Composition; post-mortem changes; processing (chilling, freezing, curing, smoking, canning, irradiation); value-added products (RTE meats, sausages); microbial safety & HACCP. b) Fish: Freshness characteristics; spoilage (microbiological, physiological, biochemical); preservation and processing; functional products (omega-3 enriched oils); cooking methods. c) Eggs: Quality evaluation & grading; deterioration and storage; processing (freezing, drying); effect of heat on proteins; foaming properties (beating, stability, influencing factors).	10 hrs
UNIT-IV	**Oils, Nuts and Seeds** a) Extraction, refining and processing of edible oils. b) Superseeds: Chia, flax, hemp, sunflower, pumpkin, watermelon seeds and basil– composition, bioactive compounds (omega-3 fatty acids, lignans, polyphenols, plant proteins), health benefits and applications in bakery, beverages and nutraceutical products. c) Oleogels: preparation, properties and applications in fat replacement.	06 hrs
UNIT-V	**Beverages**	08 hrs

	a) Alcoholic Beverages: fermentation (beer, wine, spirits), maturation, innovations and health concerns. b) Non-Alcoholic Beverages: fortified, probiotic, sports and energy drinks and plant-based alternatives. c) Processing of Specialty Beverages: i. Tea – types (green, black, oolong, herbal), withering, rolling, fermentation, drying and quality evaluation. ii. Coffee – harvesting, fermentation, roasting, grinding, brewing methods and flavour chemistry. iii. Cocoa & Chocolate – fermentation, drying, roasting, conching, tempering and applications in functional foods. d) Nutraceutical and functional beverage trends. e) Quality, safety and regulatory aspects of beverages.	
	Emerging Trends and Future of Food Science a) Climate-resilient crops and novel food sources (e.g. insects, algae, lab-grown meat). b) Sustainability and circular economy in food systems. c) Future innovations: 3D food printing, smart/intelligent packaging, AI in food systems. d) Global perspectives on functional foods and nutraceuticals.	06 hrs

REFERENCES

1.	Belitz, H. D., Grosch, W., & Schieberle, P. (2019). Food chemistry (5th ed.). Springer.
2.	Cahill, J. P. (2004). Superfoods and superseeds for health and nutrition. Academic Press.
3.	Clarke, R. J., & Vitzthum, O. G. (2018). Coffee: Recent developments. Wiley-Blackwell.
4.	Fellows, P. (2017). Food processing technology: Principles and practice (4th ed.). Woodhead Publishing.
5.	Fennema, O. R. (2010). Fennema's food chemistry (4th ed.). CRC Press.
6.	Fox, P. F., & McSweeney, P. L. H. (2015). Advanced dairy chemistry (4th ed.). Springer.
7.	Gopalakrishnan, A. (2011). Fish processing technology. Indian Council of Agricultural Research.
8.	Graham, H. N. (1992). Tea: The plant and its manufacture. Springer.
9.	Hui, Y. H. (Ed.). (2012). Handbook of meat and meat processing (2nd ed.). CRC Press.
10.	Kader, A. A. (2002). Postharvest technology of horticultural crops. University of California Agriculture & Natural Resources.
11.	Kent, N. L., & Evers, A. D. (2008). Kent's technology of cereals (5th ed.). Woodhead Publishing.
12.	Minifie, B. W. (2012). Chocolate, cocoa and confectionery: Science and technology (3rd ed.). Springer.
13.	Nollet, L. M. L., & Toldrá, F. (2011). Handbook of analysis of edible animal by-products. CRC Press.
14.	Potter, N. N., & Hotchkiss, J. H. (2012). Food science (5th ed.). Springer.
15.	Shahidi, F. (Ed.). (2015). Bailey's industrial oil and fat products (7th ed.). Wiley.
16.	Shahidi, F., & Wanasundara, U. (1998). Omega-3 fatty acid concentrates: Nutritional aspects and production technologies. AOCS Press.
17.	Stadelman, W. J., & Cotterill, O. J. (2001). Egg science and technology (4th ed.). CRC Press.
18.	Walstra, P., Wouters, J. T. M., & Geurts, T. J. (2011). Dairy science and technology (2nd ed.). CRC Press.
19.	WHO & FAO. (2019). Sustainable healthy diets: Guiding principles. World Health Organization.
20.	Yadav, B. S., & Yadav, R. B. (2018). Pulses: Processing and product development. New India Publishing Agency.
Journals	
21.	Food Chemistry *(Elsevier)*
22.	Journal of Food Science and Technology *(Springer / AFSTI, India)*
23.	Comprehensive Reviews in Food Science and Food Safety *(Wiley, Institute of Food Technologists)*
24.	Critical Reviews in Food Science and Nutrition *(Taylor & Francis)*
25.	Journal of Functional Foods *(Elsevier)*
26.	Meat Science *(Elsevier)*
27.	LWT – Food Science and Technology *(Elsevier)*

28.	Trends in Food Science & Technology *(Elsevier)*
29.	Journal of Dairy Science *(Elsevier)*
30.	Food Chemistry *(Elsevier)*
31.	Journal of Food Science and Technology *(Springer / AFSTI, India)*
32.	Comprehensive Reviews in Food Science and Food Safety *(Wiley, Institute of Food Technologists)*
33.	Critical Reviews in Food Science and Nutrition *(Taylor & Francis)*

For Practical

	The Maharaja Sayajirao University of Baroda **Faculty of Family and Community Sciences** **Department of Foods and Nutrition** **Fatehgunj, Vadodara 390002**	**ACADEMIC YEAR 2025-2026**

B.Sc. F.C.Sc. (Public Health Nutrition) - Fourth Year – Level 6.0				
Year	**IV**	**Course Type: Major**	**Credit**	**4 (3+1)**
Semester	**VII**	**Course Number:** **Course Title: Advanced Food Science**	**Hours**	**30**

COURSE CONTENT / SYLLABUS		
UNIT-I	**Fermentation of Foods** a) Preparation of fermented products from different food groups (e.g., idli/dosa batter, curd/yogurt, sauerkraut/pickled vegetables, milk).	04 hrs
UNIT-II	**Milk and Milk Products** a) Effect of heat on milk b) Effect of heat and acid on the proteins of milk c) Effect of added substance on the stability of milk	
UNIT-III	**Egg Quality Evaluation, Egg Foam and Culinary Applications** a) Candling and measurement of yolk index and Haugh unit b) Stages of egg foam formation. c) Preparation of soufflé, meringue, sponge cake, or fluffy omelette. d) Study of factors influencing foam stability (sugar, acid, fat).	12 hrs
UNIT-IV	**Texturized Foods / Meat Alternatives** a) Preparation and sensory evaluation of a dish using texturized vegetable proteins (soy chunks, soy nuggets, meat analogue).	04 hrs
UNIT-V	**Fruits & Vegetables** a) Minimal processing and preparation of a functional product (e.g., fruit leather, dehydrated vegetable chips, candied fruits)	04 hrs

Syllabus of Courses

	The Maharaja Sayajirao University of Baroda Faculty of Family and Community Sciences Department of Foods and Nutrition Fatehgunj, Vadodara 390002		**ACADEMIC YEAR 2026 – 2027**	
B.Sc. F. C. Sc. (Public Health Nutrition) – Fourth Year - Level 6.0				
Year	**IV**	**Course Type: Major**	Credit	4 (4+0)
Semester	**VIII**	**Course Number: Course Title: Food Systems in Public Health**	Hours	Theory: 60 Hrs;

OBJECTIVES:	1. To familiarize students with the structure and functioning of food systems at global, national, and local levels. 2. To build conceptual clarity on evolving paradigms of food security, nutrition security, food sovereignty, and food systems transformation. 3. To equip students with skills to measure and interpret dietary diversity using standard tools. 4. To promote critical understanding of sustainability dimensions within food systems. 5. To provide an overview of policy and governance frameworks in India and intersectoral coordination in advancing food and nutrition security. 6. To develop systems thinking and analytical skills for mapping food system pathways. 7. To encourage evaluation of innovative and transformative approaches for sustainable and planet healthy food system.

COURSE CONTENT / SYLLABUS

UNIT-I	**Introduction to Sustainable Food Systems**	
	a) Conceptual Foundations i. **Definition of Food Systems** – Scope and importance. ii. **Core Components** – Production, processing, distribution, consumption, and waste. iii. **Drivers and Outcomes** – Biophysical, socioeconomic, cultural, and policy drivers shaping outcomes. iv. **The Food System Wheel** – Integrative framework for understanding interactions. **b) Governance and Policy Dimensions** i. **Role and Engagement of Key Ministries in India** – Ensuring availability, access, affordability, diversity, sustainability, and resilience of food systems: ii. **Ministry of Agriculture & Farmers Welfare (MoAFW)** – Production, crop diversification, sustainability. **c) Ministry of Consumer Affairs, Food & Public Distribution A**. **Fundamental concepts and the role of sanitation in food quality and public health.** i. **(MoCAF&PD)** – PDS, procurement, affordability. ii. **Ministry of Health & Family Welfare (MoHFW)** – Nutrition programs, food safety (FSSAI). iii. **Ministry of Women & Child Development (MoWCD)** – ICDS, POSHAN Abhiyaan, women and child nutrition. iv. **Ministry of Food Processing Industries (MoFPI)** – Food transformation, fortification, value addition. v. **Ministry of Rural Development (MoRD)** – Livelihoods, SHGs, wage support for food access. vi. **Ministry of Education (MoE)** – Mid-Day Meals (PM-POSHAN), nutrition education. vii. **Ministry of Environment, Forest & Climate Change (MoEFCC)** – Climate, biodiversity, sustainability of production systems.	15 hrs.

	viii. **NITI Aayog** – Convergence, monitoring, policy think-tank role. **Perspectives, Frameworks, and Transformation of Food Systems** a) **Perspectives on Food Systems** i. **Global and National Food Systems** – Structures, policies, governance, and trade. ii. **Industrial Food Systems –** Characteristics, opportunities (efficiency, reach), risks (ultra-processed foods, health, environmental costs). iii. **Local Food Systems & Nutrition Anthropology –** Cultural traditions, indigenous foods, seasonal diets, community-driven solutions. iv. **Tailoring Food System Investments –** Context-specific approaches for resilience and sustainability.	
UNIT-II	**a) Food Systems Transformation and Sustainability** i. **Evolution of Concepts** – Food Security → Nutrition Security → Food Sovereignty → Food Systems Transformation. ii. **Healthy Diets for All** – Foundation of well-being and sustainable societies. iii. **Measurement Tools** – HDDS, WDDS, MAD for assessing diet quality and adequacy. iv. **Sustainability Challenges** – v. **Environmental**: Climate change, biodiversity, land, water, GHG emissions (food miles) vi. **Economic**: Livelihoods, fair pricing, circular economy, value chains vii. **Social & Equity**: Gender, indigenous knowledge, tribal food systems viii. **Nutrition**: Safe diets, Dietary diversity, sustainable diets, food loss and waste ix. Value added Sustainable Food system Development x. **Global Relevance to SDGs** **b) Indian Examples** i. **National level:** NFSA (2013), POSHAN Abhiyaan, Mid-Day Meal Scheme. ii. **Industrial:** Rise of processed snack foods and FoPNL regulation by FSSAI. iii. **Local:** Tribal diets in Gujarat and Assam; millet revival in Karnataka and Odisha. iv. **Transformation initiatives:** International Year of Millets (2023), Eat Right India movement. **c) Pathways for Transformation** i. Climate-smart agriculture, sustainable intensification ii. Urban agriculture, school gardens, food forests iii. Investment in R&D for climate-resilient crops and systems - Flood- & drought-tolerant rice, Dual-stress rice with efficiency gains, Heat-tolerant, disease-resistant wheat, iv. Education and behavior change among consumers – food purchasing and consumption behaviour, Sustainability-Oriented Choices, food waste reduction v. Integration of food systems in climate and health policies	20 hrs.
UNIT-III	**Key Theories and Frameworks** a) FAO's Framework for Sustainable Food Systems b) HLPE Food Systems Framework c) Doughnut Economics (Kate Raworth) d) Food Systems Thinking, Agroecological approach e) One Health, Planetary Health Diet (EAT–Lancet)	05 hrs.

UNIT-IV	**Developing Sustainable Food Systems** **a) Measuring Food System Sustainability** i. Indicators: Environmental footprint, dietary carbon footprint, land use, water use – Indian food system, regional food system, global food system ii. Food Systems Dashboard iii. Life Cycle Assessment (LCA) methods **b) System Mapping** i. What is food mapping? Mapping food production → processing → distribution → consumption → waste. Example: The journey of rice/wheat through FCI, PDS, and retail. ii. **Stakeholders in Food Systems** - Farmers, cooperatives, processors, traders, consumers, NGOs, policymakers. Example: How stakeholders work together in India's **Mid-Day Meal Scheme**. **c) Policies and Food System Reform** i. How subsidies, procurement, and government schemes shape the system. Example: Subsidy shift from rice/wheat to **millets** under National Food Security Mission. **d) Technology and Innovation** i. Digital tools for farmers (Kisan apps, e-NAM). ii. Climate-smart farming, natural farming (Zero Budget Natural Farming). **e) Capacity Building** i. Why farmer training and extension services matter. ii. Role of SHGs, Krishi Vigyan Kendras, and local innovations.	15 hrs.
UNIT-V	**Future Scenarios and Policy Action** a) Futures thinking: foresight, scenario building, planetary boundaries b) The Food Systems Countdown Initiative (FSCI) c) Role of youth, women, communities d) Building resilience: circular food systems, regenerative agriculture e) Case Study – Indian Context i. India's policy momentum - initiatives like International Year of Millets 2023 ii. National Mission on Sustainable Agriculture (NMSA), iii. Zero Budget Natural Farming (ZBNF) and iv. Eat Right India. v. Local and regional supply chains, millet-based diets and state-led procurement reforms	05 hrs.

REFERENCES

1.	Fanzo, J., Haddad, L., McLaren, R., Marshall, Q., Davis, C., Herforth, A., Jones, A. D., Beal, T., & Tschirley, D. (2021). Viewpoint: The role of food systems in achieving the SDGs. *Global Food Security, 28*, 100519.
2.	Food and Agriculture Organization of the United Nations, International Fund for Agricultural Development, United Nations Children's Fund, World Food Programme, & World Health Organization. (2024). *The state of food security and nutrition in the world 2024* (SOFI report). FAO. https://www.fao.org/publications/sofi
3.	Global Nutrition Report. (n.d.). *Global Nutrition Report*. Development Initiatives. https://globalnutritionreport.org
4.	Global Panel on Agriculture and Food Systems for Nutrition. (2016). *Foresight report: Food systems and diets*. Global Panel on Agriculture and Food Systems for Nutrition. https://www.glopan.org/resources/foresight-report/
5.	High Level Panel of Experts on Food Security and Nutrition. (2014). *Food losses and waste in the context of sustainable food systems* (HLPE Report No. 8). Committee on World Food Security.
6.	High Level Panel of Experts on Food Security and Nutrition. (2017). *Nutrition and food systems*

	(HLPE Report No. 12). Committee on World Food Security. https://www.fao.org/3/i7846e/i7846e.pdf
7.	International Crops Research Institute for the Semi-Arid Tropics. (n.d.). *ICRISAT vision 2030+*. ICRISAT. https://www.icrisat.org/vision-2030/
8.	Meadows, D. H. (2009). *Thinking in systems: A primer*. Chelsea Green Publishing.
9.	Ministry of Agriculture & Farmers Welfare. (n.d.). *Schemes and policy notes*. Government of India.
10.	NITI Aayog. (2021). *Sustainable development of food systems in India*. Government of India. https://www.niti.gov.in/sites/default/files/2021-12/Sustainable-Development-of-Food-Systems-in-India.pdf
11.	United Nations. (2021). *UN Food Systems Summit 2021 outcome documents*. https://www.un.org/en/food-systems-summit
12.	United Nations Environment Programme. (2016). *Food systems and natural resources*. UNEP. A Report of the Working Group on Food Systems of the International Resource Panel. Nairobi, Kenya.
13.	World Health Organization. (n.d.). *Healthy diet: Fact sheet*. WHO. https://www.who.int/news-room/fact-sheets/detail/healthy-diet

Syllabus of Courses

	The Maharaja Sayajirao University of Baroda **Faculty of Family and Community Sciences** **Department of Foods and Nutrition** **Fatehgunj, Vadodara 390002**	**ACADEMIC YEAR 2026-2027**

B.Sc. F.C.Sc (Public Health Nutrition) – Fourth Year - Level 6.0

Year	**IV**	**Course Type: Research**	Credit	6 (0+6)
Semester	**VII**	**Course Number:** **Course Title: Dissertation I in Public Health Nutrition**	Hours	180

OBJECTIVES	1. To learn to formulate a relevant and feasible research problem with a clear statement of need. 2. To execute and conduct an exhaustive literature review to identify and articulate research gaps. 3. To gain proficiency in designing a robust research methodology, including data collection and analysis plans. 4. To develop analytical skills by preparing and presenting a comprehensive research proposal.

COURSE CONTENT / SYLLABUS

UNIT-I	**Introduction to Research in Public Health Nutrition** a) Exploring the spectrum of research within the public health nutrition domain b) The mentor-mentee relationship and its importance	15 hrs.
UNIT-II	**Identifying the Research Problem** a) Select and clearly define the research problem b) Choose the type of research to be conducted c) Formulate the research problem and its rationale d) Formulate a hypothesis or objectives of the study e) Structuring a research proposal: title, introduction, objectives, and scope	15 hrs.
UNIT-III	**Comprehensive Literature Review** a) Advanced search strategies using academic databases and institutional library resources (e.g., PubMed, Google Scholar, Web of Science) b) Consolidate and critically evaluate existing studies c) Identifying and articulating the research gap.	40 hrs.
UNIT-IV	**Research Design and Methodology** a) Select an appropriate research design (Qualitative, Quantitative or mixed methods) b) Design the study with defining study population, sampling techniques, and tools for data collection c) Plan strategies for data analysis d) Address the ethical considerations in research, which may require applying for ethical approval	40 hrs.
UNIT-V	**Preparing the Technical Presentation** a) Prepare a presentation that effectively summarizes your research problem, literature review, and methodology b) Design clear and effective slides for clarity and impact. c) Practice the presentation, focusing on timing, delivery, and a confident tone	05 hrs.
UNIT-VI	**Technical and Ethical Presentation**	

	a) Presenting the research proposal to the dissertation committee. b) Defending the chosen research design and scope. c) Addressing feedback from examiners	05 hrs.
UNIT-VII	**Chapter Writing** a) Write the chapter of Introduction, b) Write Review of Literature and c) Write the Methodology chapter	60 hrs.

REFERENCES

1.	Sproull N (2003). Handbook of Social Research Methods: A Guide for Practitioners and Students in the Social Sciences. The Scarecrow Press, Inc., New Jersey
2.	Beaglchole R, Bonita R and Kjellstrom T (1993). Basic Epidemiology. World Health Organization, Geneva.
3.	Wisker, G. (2001), *The Postgraduate Research Handbook*, Houndmills: Palgrave
4.	Natasha Mack, Cynthia Woodsong, Kathleen M. Macqueen, Greg Guest, Emily Namey (2005) Qualitative Research Methods: A Data Collector's Field Guide Family Health International
5.	Jennifer Mason (2002). Qualitative Researching (2nd edition). SAGE Publications Ltd
6.	Dr. Prabhat Pandey and Dr. Meenu Mishra Pandey (2015) Research Methodology: Tools and Techniques. Bridge Center.
7.	Julie A Lovegrove, Leanne Hodson, Sangita Sharma and Susan A Lanham-New (2015) Nutrition Research Methodologies. The Nutrition Society. John Wiley and Sons, Ltd., UK
8.	The Postgraduate's Guide to Research Ethics (Macmillan Research Skills, 10) [1st ed. 2019]

DEPARTMENT OF FOODS AND NUTRITION

FOURTH YEAR (NEP)

PUBLIC HEALTH NUTRITION

(VIII SEMESTER) – WITH RESEARCH

REGULAR

Syllabus of Courses

	The Maharaja Sayajirao University of Baroda Faculty of Family and Community Sciences Department of Foods and Nutrition Fatehgunj, Vadodara 390002	**ACADEMIC YEAR 2026-2027**

B.Sc. F.C.Sc. (Public Health Nutrition) - Fourth Year – Level 6				
Year	**IV**	**Course Type: Major**	Credit	4 (3+1)
Semester	**VII**	**Course Number: Course Title: Nutrition Epidemiology & Research Methods**	Hours	Theory: 60Hrs.

OBJECTIVES:	1. To understand various methodologies employed in nutrition research 2. To gain full understanding of the use of statistics and epidemiology in nutrition research 3. To learn to critique some recent research studies from the perspectives of – research methodologies, interdisciplinary approaches 4. To develop skills related to use of software for data analysis, interpretation, report writing and presentation

COURSE CONTENT / SYLLABUS

UNIT-I	**Developing the Research Question** a) Selection of research topics – need, relevance, feasibility b) Research ethics-ethical issues, research with human participants, ethics and animal research, ethical committees, informed consent, plagiarism c) Statement of the problem, formulation of the research hypothesis, stating objectives d) Literature search – referencing, abstracting, computer searches, bibliography e) Mono-disciplinary Research f) Multi-disciplinary Research g) Trans-disciplinary Research h) Inter-disciplinary Research	5 hrs.
UNIT-II	**Research Designs and Sampling Designs** a) True Experimental Designs and Quasi Experimental Designs b) Hierarchy of study designs c) Internal & External Validity d) Threats to validity e) Scales and indices f) Epidemiological studies i. Observations and experiments ii. Observational epidemiology – Descriptive studies, ecological studies, cross-sectional studies, case-control studies, Cohort studies –Prospective and retrospective study design, Nested case control studies iii. Experimental epidemiology – field trials, community trials, randomized controlled trials, single and double blind studies, Factorial designs and Cross over studies, Secondary research: systematic reviews and Meta-analysis iv. Potential errors in epidemiological studies – Random error, sampling error, systematic error, selection bias, measurement bias, confounding and control of confounding v. Discussion on various classical studies with respect to research methodology g) Probability and non-probability sampling designs h) Determination of sample size	20 hrs.

UNIT-III	**Qualitative Research Methodology** a) Qualitative research tools and methods i. Ethnography ii. Case Study iii. Phenomenology iv. Grounded Theory b) Data collection methods-Focus group discussions, key informant interviews, Observation method, community mapping, body mapping, free listing, pile sorting and Venn diagrams c) Analyzing qualitative data i. Transcribing and summarizing data ii. Categorizing and Coding (using descriptive codes) iii. Arranging and organizing data with the help of computers (Microsoft Excel) iv. Deciding emerging common themes, patterns and concepts d) Integrating qualitative and quantitative methods e) Critique of recent research studies	10 hrs.
UNIT-IV	**Biostatistics for data analysis and Scientific writing** **a) Parametric and Non Parametric Statistics** i. Mean, Median & Mode ii. Standard Deviation and Standard Errors iii. Confidence Interval iv. Coefficient of variation v. Chi square tests (X2) vi. t – tests for independent samples vii. t – tests for paired samples viii. Analysis of variance ix. Correlation coefficients x. Odds ratio xi. Relative risk xii. Regression analysis **b) Scientific writing** i. Different forms of scientific writing - Articles in journals, reports, review articles, abstracts, dissertations ii. Use of outlines as a starting device- Reasons for preparing outlines, types of outlines (Topic outlines, Conceptual outlines, theme outline), how to formulate outlines iii. Components of scientific writing – Introduction, Review of literature, Methodology, Results and discussion, summary and conclusions, limitations, in-text citation, bibliography and appendices iv. Tables and illustrations as means of presenting data v. Writing a research proposal for grants –rationale and importance of the question being addressed, presenting pilot study/data, time frame, clarity, methods, outcome of the study and its implications, budgeting, available infrastructure and resources, executive summary etc.	10 hrs.

REFERENCES

1.	Hedrik TE, Bickman L and Rog DJ (1993). Applied research design – A practical guide. Sage Publications Inc., California
2.	Kirk J and Miller ML (2011). Reliability and validity in qualitative research. Sage Publications Inc.
3.	Miles MB and Huberman AM (1994). Qualitative data analysis – An expanded sourcebook (2nd ed.). Sage Publications Inc., California
4.	Snecdecor GW and Cochran WG (1991). Statistical methods (8th ed.). Wiley
5.	Beaglehole R, Bonita R and Kjellstrom T (2006). Basic epidemiology (2nd ed.). World Health Organization, Geneva
6.	Sathe PV and Doke PP (2025) Epidemiology and management for health Care (7th ed.). Vora

	Medical Publications, Mumbai
7.	Willett W (2013). Nutritional epidemiology (3rd ed.). Oxford University Press, New York
8.	Bernard HR, Wutich A, and Ryan GW (2016) Analyzing qualitative data: Systematic approaches (2nd ed.). SAGE Publications, Inc., California
9.	Ramamurthy GC (2011). Research methodology. Dreamtech Press
10.	Tan W (2022). Research methods: A practical guide for students and researchers (2nd ed.). World Scientific
11.	Dawson C (2019). Introduction to research methods: A practical guide for anyone undertaking a research project (5th ed.). Hachette, UK
12.	O'Leary Z (2024). The essential guide to doing your research project (2nd ed.). SAGE, South Asia
13.	Mohanty B and Misra S (2025). Statistics for behavioural and social sciences. Atlantic Publishers & Distributors (P) Ltd

For Practical

<table>
<tr><td></td><td colspan="3">The Maharaja Sayajirao University of Baroda
Faculty of Family and Community Sciences
Department of Foods and Nutrition
Fatehgunj, Vadodara 390002</td><td colspan="2">ACADEMIC YEAR
2026-2027</td></tr>
<tr><td colspan="6">B.Sc. F.C.Sc. (Public Health Nutrition) - Fourth Year – Level 6.0</td></tr>
<tr><td>Year</td><td>IV</td><td rowspan="2">Course Type: Major
Course Number:
Course Title: Nutrition Epidemiology & Research Methods</td><td>Credit</td><td>4 (3 + 1)</td></tr>
<tr><td>Semester</td><td>VII</td><td>Hours</td><td>Practical:
30 Hrs</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td colspan="6">COURSE CONTENT / SYLLABUS</td></tr>
<tr><td>UNIT-I</td><td colspan="4">Research Process
a) Review of Literature, Citing Bibliography and Plagiarism check
i. Using search engines on the internet for literature search
ii. Using referencing software
iii. Plagiarism Check
b) Responsible use of Artificial Intelligence- for literature search, graphical representation, making presentations
c) Computer Applications in Research
d) Steps in data analysis: Cleaning and Verifying data, Coding data, Data entry, tabulating data, Data Analysis
e) Practice in calculation of Sample size for various study design by use of relevant formulas
f) Spreadsheet tool (Microsoft Excel): Introduction to features and functions, using formulae, data storing, statistical data analysis, generating charts/graphs
g) Presentation tool (Microsoft Power point): Introduction to features and functions, creating presentations
h) Epi Info for statistical analysis (Chi Square, Odds Ratio, Relative Risk)
i) Use of Epicollect software as tool for data collection
j) Use of Anthroplus software for calculating Z scores</td><td>14 hrs.</td></tr>
<tr><td>UNIT-II</td><td colspan="4">Hands on Experience: Independent Project work
a) Data analysis of given data sets
b) Interpretation & Report writing
c) Presentation</td><td>16 hrs</td></tr>
</table>

Syllabus of Courses

	The Maharaja Sayajirao University of Baroda Faculty of Family and Community Sciences Department of Foods and Nutrition Fatehgunj, Vadodara 390002	**ACADEMIC YEAR 2026 – 2027**

B.Sc. F. C. Sc. (Public Health Nutrition) – Fourth Year - Level 6.0				
Year	**IV**	**Course Type: Major**	Credit	4 (3+1)
Semester	**VIII**	**Course Number: Course Title: Communication For Development**	Hours	Theory: 45 Hrs;

Objectives	1. To gain understanding about the scientific discipline of nutrition and health promotion. 2. To learn about evolution of health promotion and its role in promoting the SDGs 3. To gain skills in planning, conducting and evaluating Health promotion programs in different settings

COURSE CONTENT / SYLLABUS		
UNIT-I	**Health Promotion-Concepts and components of Nutrition and Health Promotion** a) Need for Health Promotion b) Principles of Health Promotion c) The Ottawa Charter for health promotion-1986 d) The Bangkok Charter for Health Promotion in a Globalized World – 2005 e) Promoting health in the SDGs- Shanghai 2016 f) Communication for development (C4D) in Nutrition specific and Nutrition Sensitive sectors- Sectoral review of C4D achievements with special focus on Health, Nutrition and WASH	6 hrs.
UNIT-II	**Introduction to Health Promoting Schools (WHO, FSSAI)** a) Health Promoting schools – WHO, FSSAI b) Advantages of a health promoting school c) Six factors of a health promoting school d) School Health Index e) Best practices in Nutrition and Health Promotion in schools	13 hrs.
UNIT-III	**Introduction to Health promoting hospitals (WHO** a) Evidence-based health promotion in hospitals b) New health promotion services for hospital patients. c) Promoting health of staff d) Overview of the 18 strategies for health promoting hospitals e) Baby friendly hospital initiative/ Mother and baby friendly hospital initiative f) Best practices in Nutrition and Health Promotion in hospitals	13 hrs.
UNIT- IV	**Introduction to Workplace Health promotion (FSSAI)** a) Definition of a healthy workplace b) Healthy workplace core principles, processes and avenues of influence c) Workplace wellness Index d) Workplace health promotion as a strategy for NCD prevention in productive population e) Best practices in Nutrition and Health Promotion at workplaces	13 hrs.

REFERENCES

1. James F MsKenzie, Brad L Neiger Rosemary Thackeray. Planning, implementing and evaluating health promotion programs, 7th Ed, Hoboken USA, 2017

2.	Glanz K, Rimer BK. Theory at a glance: A guide for health promotion practice. NIH, National Cancer Institute. 2nd ed. 2005.
3.	Kristal AR, Glanz K, Curry SJ, Patterson RE. How can stages of change be best used in dietary interventions? J Am Diet Assoc. 1999;99:679-684.
4.	STEPS: A framework for surveillance: The WHO STEPwise approach to Surveillance of noncommunicable diseases (STEPS), NoncommunicableDiseases and Mental Health World Health Organization, Geneva, 2003
5.	Social and Behavior Change Communication (SBCC) Training for Information, Education, and Communication (IEC) Officers, USAID, 2013
6.	Sallis JF, Owen N, Fisher EB. Ecological models of health behavior. In: Glanz K, Rimer BK, Viswanath K (eds). Health Behavior and Health Education:Theory, Research, and Practice. 4th edition. San Francisco, CA: Jossey-Bass. 2008. pp 465-485.
7.	Spahn JM, Reeves RS, Keim KS, Laquatra I, Kellogg M, Jortberg B, Clark NA. State of the evidence regarding behavior change theories and strategiesin nutrition counseling to facilitate health and food behavior change. J Am Diet Assoc. 2010;110(6):879-91.
8.	Boynton PM and Greenhalgh T, Hands-on guide to questionnaire research, Selecting, designing, and developing your questionnaire, BMJ, 328, 2004,1312- 1315.
9.	Health Promoting Schools: A framework for action, ISBN 978 92 9061 447 0 World Health Organization, Geneva, 2009
10.	Lytle LA, Perry CL. Applying research and theory in program planning: An example from a nutrition education intervention. Health Promotion Practice.2001;2(1):68-80.
11.	Healthy workplaces: a model for action For employers, workers, policy-makersand practitioner, WHO, 2010
12.	Simons-Morton BG, Greene WH, Gottlieb NH. (Chpt 8) Evaluation. In: Introduction to Health Education and Health Promotion, 2nd Ed. ProspectHeights, IL: Waveland Press. 1995:218-241.
13.	Field guide to designing communication strategy, WHO publication-2007.
14.	Designing a health communication strategy, John Hopkins University-Centre for Communication programmes.http://ccp.jhu.edu/documents/A%20Field%20Guide%20to%20Designing%20Health%20Comm%20Strategy.pdf
15.	Michael Favin and Marcia Griffiths 1999, Nutrition tool kit-09-Communication for Behaviour change in Nutrition projects. Human DevelopmentNetwork-The World Bank-1999
16.	Hubley J (1993) Communicating Health. London: Teaching Aids at Low Cost, London, UK.
17.	Health education: theoretical concepts, effective strategies and core competencies: a foundation document to guide capacitydevelopment of health educators/World Health Organization. Regional Office for the Eastern Mediterranean, 2012
18.	Health Promotion in Hospitals: Evidence and Quality Management, World Health Organization, Geneva, 2005
19.	Communication for Development (C4D) Capability Development Framework, UNICEF and 3D Change, 2009
20.	Implementation guidance: protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services – the revised Baby-friendly Hospital Initiative. Geneva: World Health Organization; 2018. Licence: CC BY-NC-SA 3.0 IGO.
21.	Jan Andolan Gudielenes- Poshan Abhiyan, Ministry of Women and Child Development, Government of India, 2018

For Practical

	The Maharaja Sayajirao University of Baroda **Faculty of Family and Community Sciences** **Department of Foods and Nutrition**	**ACADEMIC YEAR 2023-24**

B.Sc. F. C. Sc. (Public Health Nutrition) – Fourth Year - Level 6.0

Year	**IV**	**Course Type: Major**	Credit	4 (3+1)
Semester	**VIII**	**Course Number:** **Course Title: Communication For Development**	Hours	Practical: 30 Hrs

Objectives	1. To gain understanding about the scientific discipline of nutrition and health promotion. 2. To learn about evolution of health promotion and its role in promoting the SDGs 3. To gain skills in planning, conducting and evaluating Health promotion programs in different settings

COURSE CONTENT / SYLLABUS

UNIT-I	**Planning and implementing a Nutrition Health education program (Choose any one broad area from a to d)** a) School Health Promotion b) Workplace Health promotion c) Health Promotion in a hospital setting d) Health Promotion in Free living Population This should include (Minimum 30 subjects): i. Conducting Need assessment survey ii. Identifying gaps and planning a Nutrition Health Promotion strategy iii. Developing IEC tools for Nutrition Health Promotion Implementing the NHP program and writing a brief report on outcomes/ impact evaluation	24 hrs.
UNIT-II	**Preparation of project report and final submission** a) Introduction b) Methodology c) Observations d) Results and discussions e) Conclusions f) References	6 hrs.

Syllabus of Courses

	The Maharaja Sayajirao University of Baroda **Faculty of Family and Community Sciences** **Department of Foods and Nutrition** **Fatehgunj, Vadodara 390002**	**ACADEMIC YEAR** **2026 – 2027**

B.Sc. F.C.Sc (Public Health Nutrition) - Fourth Year - Level 6.0

Year	**IV**	**Course Type: Major**	Credit	4 (4+0)
Semester	**VIII**	**Course Number:** **Course Title: Nutrition in Humanitarian Relief**	Hours	Theory: 60 Hrs;

OBJECTIVES:	1. To understand the role of nutrition in humanitarian relief 2. To learn about the rapid nutrition assessment methods for emergency situations 3. To understand the key nutrition interventions to be delivered for humanitarian relief

COURSE CONTENT / SYLLABUS

UNIT-I	**Overview of Disasters Resulting in Emergency Situations and Resultant Nutritional Problems** a) Loud and silent emergencies; nutrition emergency – definition and examples; famine, drought, floods, earthquakes, cyclone, etc. and war, conflicts, civil and political emergencies; its impact on nutrition – health b) Classification; causes and vulnerability to nutrition emergencies; triggers for nutrition emergencies c) Impact of an emergency on nutritional status, types of malnutrition in emergencies d) National Disaster Management Authority (NDMA); national and state disaster management cell – objectives and functions	15 hrs.
UNIT-II	**Applying Core Humanitarian Standards for Nutrition Relief and Assessment** a) International humanitarian system – principles, co-ordination, collaboration, Sphere standards b) Measuring malnutrition in children, adolescents, and adults; individual and population assessment c) Assessment and surveillance of nutritional status in emergency affected populations using rapid assessment methods d) Food security and nutrition assessment; importance; and approaches to food security assessment	12 hrs.
UNIT-III	**Essential Healthcare based on Humanitarian Charter** a) Communicable diseases: i. Prevention ii. Diagnosis and case management iii. Outbreak detection and response iv. Role of Immunization and Sanitation b) Maternal and Child Health and Nutrition: i. Promoting safe motherhood and newborn care ii. Management of childhood illnesses iii. IYCN during emergencies c) Reproductive health care key interventions d) Health and nutritional support for the elderly	12 hrs.
UNIT-IV	**Public health Response for Humanitarian Relief and Rehabilitation** a) Using the decision tree model for humanitarian response (example) b) Provision of water and sanitation, preventing epidemics; providing prompt medical relief	15 hrs.

	c) Targeting food aid, food distribution; assessing food needs; special food rations for nutritional relief; WFP - food basket, and specialized nutritious food d) Mass and supplementary feeding (community kitchens example) e) Blanket and targeted supplementary feeding; management of moderate acute malnutrition and severe acute malnutrition f) Approaches to prevention of micronutrient malnutrition g) HIV/AIDS and nutrition in emergencies h) Livelihood support in emergencies	
UNIT-V	**Monitoring and Evaluation** a) Importance of monitoring and evaluation of nutrition interventions in emergencies b) Areas to be covered in evaluation c) Monitoring and evaluation systems d) Challenges in emergencies	06 hrs.

REFERENCES

1.	Harmonized training Package: Resource material for training & learning on nutrition in emergencies, version 2, 2011. www.ennonline.net
2.	Global Nutrition Cluster. https://www.nutritioncluster.net/gnc-learn
3.	Food and Nutrition Needs in Emergencies. UNHCR, UNICEF, WFP, WHO,2018. https://www.humanitarianlibrary.org/sites/default/files/2018/12/foodnutrition.pdf
4.	Guidelines for Selective Feeding: The Management of Malnutrition in Emergencies. UNHCR. The UN Refugee Agency, 2011. https://www.unhcr.org/in/media/guidelines-selective-feeding-management-malnutrition-emergencies
5.	A Manual: Measuring and Interpreting Malnutrition and Mortality. CDC, WFP, 2005
6.	A toolkit for addressing nutrition in Emergency situations. Inter-Agency Standing Committee (IASC) nutrition cluster report, 2008. www.ennonline.net/pool/files/ife/global-nutrition-cluster-nutritionemergencies-toolkit-june-2008.pdf.
7.	WHO Manual – The Management of Nutrition in Major Emergencies. 2004. Updated -2013. ISBN-92-4-154520-8.
8.	World Food Programme. Saving Lives Changing Lives. WFP Food Basket. https://www.wfp.org/stories/wfp-food-basket
9.	World Food Programme. Saving Lives Changing Lives. Specialized Nutritious Food. https://www.wfp.org/specialized-nutritious-food

Syllabus of Courses

	The Maharaja Sayajirao University of Baroda **Faculty of Family and Community Sciences** **Department of Foods and Nutrition** **Fatehgunj, Vadodara 390002**	**ACADEMIC YEAR 2026-2027**

B.Sc. F.C.Sc (Public Health Nutrition) – Fourth Year - Level 6.0

Year	**IV**	**Course Type: Research**	Credit	6 (0+6)
Semester	**VIII**	**Course Number:** **Course Title: Dissertation II in Public Health Nutrition**	Hours	180

OBJECTIVES	1. To execute the selected research methodology to systematize and categorize raw data, ensuring a structured dataset ready for rigorous examination. 2. To interpret complex datasets using appropriate statistical or thematic techniques to deduce meaningful findings that address the core research questions. 3. To construct a comprehensive, well-structured dissertation that synthesizes original research with existing literature while upholding stringent ethical standards and academic integrity. 4. To defend research outcomes through a professional presentation, communicating complex insights effectively to diverse stakeholde and the broader academic community.

COURSE CONTENT / SYLLABUS

UNIT-I	**Data Collection** a) Gather data by conducting surveys, interviews, or experiments b) Maintaining a research logbook. c) Pilot testing of data collection tools (e.g., surveys, interview questions). d) Entry of the data collected	60 hrs.
UNIT-II	**Data analysis for Quantitative Research** a) Coding the data b) Data cleaning c) Perform descriptive statistics (e.g., means, standard deviations) d) Apply inferential statistical analysis (e.g., t-tests, ANOVA, regression) using software	25 hrs.
UNIT-III	**Data analysis for Qualitative Research** a) Coding the data b) Data cleaning c) Techniques like thematic analysis, content analysis	25 hrs.
UNIT-IV	**Dissertation Writing** a) Write the chapter of Results and Discussion, b) Summary and Conclusion chapter, c) Recommendations from the research, d) Bibliography e) Abstract	60 hrs.
UNIT-V	**Research Dissemination** a) Presenting the research findings in a summary	10 hrs.

REFERENCES

1.	Sproull N (2003). Handbook of Social Research Methods: A Guide for Practitioners and Students in the Social Sciences. The Scarecrow Press, Inc., New Jersey
2.	Beaglchole R, Bonita R and Kjellstrom T (1993). Basic Epidemiology. World Health Organization, Geneva.
3.	Wisker, G. (2001), *The Postgraduate Research Handbook*, Houndmills: Palgrave
4.	Natasha Mack, Cynthia Woodsong, Kathleen M. Macqueen, Greg Guest, Emily Namey (2005) Qualitative Research Methods: A Data Collector's Field Guide Family Health International

5.	Jennifer Mason (2002). Qualitative Researching (2nd edition). SAGE Publications Ltd
6.	Dr. Prabhat Pandey and Dr. Meenu Mishra Pandey (2015) Research Methodology: Tools and Techniques. Bridge Center.
7.	Julie A Lovegrove, Leanne Hodson, Sangita Sharma and Susan A Lanham-New (2015) Nutrition Research Methodologies. The Nutrition Society. John Wiley and Sons, Ltd., UK
8.	The Postgraduate's Guide to Research Ethics (Macmillan Research Skills, 10) [1st ed. 2019]

DEPARTMENT OF FOODS AND NUTRITION

FOURTH YEAR (NEP)

PUBLIC HEALTH NUTRITION

(VII SEMESTER) – WITHOUT RESEARCH

REGULAR

NEP STRUCTURE FOR FOODS AND NUTRITION UNDERGRADUATE COURSE (MAJOR: PUBLIC HEALTH NUTRITION - GRANT IN AID ROGRAMME)

	Without Research		
SEMESTER	**COURSE NAME**	**CREDIT**	**COURSE TYPE**
VII	Human Nutrition	4 (4+0)	MAJOR
	Advanced Food Science	4 (3+1)	MAJOR
	Food Systems in Public Health	4 (4+0)	MAJOR
	OJT I in Public Health Nutrition	6 (0+6)	OJT
	COURSE OFFERED TO STUDENTS OTHER THAN FOODS & NUTRITION SPECIALIZATION		
	Food Labelling	4 (4+0)	MINOR
	TOTAL	**22**	
SEMESTER	**COURSE NAME**	**CREDIT**	**COURSE TYPE**
VIII	Nutrition Epidemiology & Research Methods	4 (3+1)	MAJOR
	Health Promotion and Nutrition Policy	4 (3+1)	MAJOR
	Nutrition in Humanitarian Relief	4 (4+0)	MAJOR
	OJT II in Public Health Nutrition	6 (0+6)	OJT
	COURSE OFFERED TO STUDENTS OTHER THAN FOODS & NUTRITION SPECIALIZATION		
	Sanitation and Hygiene	4 (4+0)	MINOR
	TOTAL	**22**	
	TOTAL CREDITS	**176**	

Syllabus of Courses

	The Maharaja Sayajirao University of Baroda **Faculty of Family and Community Sciences** **Department of Foods and Nutrition** **Fatehgunj, Vadodara 390002**	**ACADEMIC YEAR** **2026-2027**

B.Sc. F. C. Sc. (Public Health Nutrition) – Fourth Year - Level 6.0

Year	**IV**	**Course Type: Major**	Credit	4 (4+0)
Semester	**VII**	**Course Number:** **Course Title: Human Nutrition**	Hours	Theory: 60Hrs.

OBJECTIVES	1. To acquire insights into recent advancements on the influence of nutrients on growth, development and health. 2. To gather latest information on the biological functions of macro and micronutrients and how they affect food and nutrition guidelines. 3. To understand the function of nutrients as defined by their chemistry, interrelations among nutrient functions, and mechanistic approaches in the analysis of nutrient disease relationships, and recent advances in the basic sciences related to nutrient function. 4. To gain proficiency with health and nutrition evaluation indicators and comprehend their significance and interpretations. 5. To develop analytical skills by understanding the newer insights available in published, peer reviewed literature, case studies, Position Statements and public policy documents.

COURSE CONTENT / SYLLABUS

UNIT-I	**Energy** a) Central control of energy: CNS regions involved in the regulation of food intake, neurotransmitters and cells involved in appetite regulation b) Non Homeostatic control of energy intake: difference between homeostatic and non homeostatic CNS signals, Neurotransmitters involved c) Energy expenditure: Components of energy expenditure (BMR , TEF & Physical activity) d) Physical Activity guidelines, tools for data collection – calculations of Energy Expenditure e) Undernutrition & Overweight/ Obesity: Definition, clinical and Biochemical changes in metabolism and adaptations f) Recent advances for estimating RDA for energy intake based on ICMR-NIN guidelines for Indians.	08 hrs.
UNIT-II	**Macronutrients - Carbohydrates** **a) Carbohydrates** i. Review of Structure, classification and food sources of carbohydrates, sugar alcohols, Digestion, absorption transport mechanisms and cellular uptake ii. Assessment of glucose homeostasis iii. Fructose metabolism and health effects iv. Glycemic Index, Glycemic Load v. RDA for Sugars & Carbohydrates **b) Fibre** i. Definition and Classification of different types of fibre including resistant starch ii. Physiological effects of dietary fibre on energy metabolism, iii. CVD, insulin response, Colon Cancer	10 hrs.

	c) Insulin Resistance (IR)and Diabetes Mellitus (DM) i. Definition of IR& type 2 DM ii. Action of insulin iii. Understanding the demands of energy by the cell via AMP activated protein kinase and silent information regulator iv. Diagnostic tests to evaluate IR & DM v. Metabolic syndrome & DM vi. Low birth weight and NCD's (Altered programming pathways and their consequences)	
UNIT-III	**Lipids an Overview** a) Review of Digestion, absorption, transport of lipids and delivery to cells b) Different classes of lipids and lipid and apolipoprotein composition of different lipoproteins c) Role of gut in lipid homeostasis d) Endogenous pathway of lipid metabolism e) Pathogenesis of CVD & role of dietary fat on serum lipoproteins f) Diabetic dyslipidemia g) Lipids & Regulation of gene expression h) Essential fatty acids, Eicasanoids, functions, biological significance especially in inflammation i) trans fatty acid & its health implications, transfat free India j) Human requirements, assessment indicators and guidelines for heart health k) Discussion on Review/meta analysis of the papers on omega 3 fatty acids, trans fatty acids, DHA l) Recent advances for estimating RDA for visible fat intake based on ICMR-NIN guidelines for Indians.	10 hrs.
UNIT-IV	**Proteins** a) Review of Basic concepts, digestion, absorption, transport of proteins, Structure of proteins & classification of amino acids b) Fate of absorbed amino acids, synthesis and degradation process c) Calorie restriction, protein metabolism and BCAA d) Protein requirements and quality of proteins: Methods used to determine human protein requirements e) Non protein compounds: their biological importance f) Recent advances for estimating RDA for protein based on ICMR-NIN guidelines for Indians.	10 hrs.
UNIT-V	**Fat Soluble Vitamins** **a) Vitamin A** i. Vitamers and International Units ii. Metabolism and storage of vitamin A and pro vitamin A carotenoids iii. Factors affecting carotenoids bioavailability and role of carotene dioxygenase iv. Plasma retinol binding protein v. Metabolic functions of Vitamin A & Carotenoids vi. The antioxidant function of carotenoids vii. Newer insights in Vitamin A fortification and supplementation viii. Vitamin A, Growth, Infection, morbidity and Immunity ix. Deficiency, Assessment, Indicators & RDA x. Toxicity of Vitamin A & teratogenicity xi. Interactions of vitamin A with drugs and other nutrients **b) Vitamin D** i. Vitamers and International Units ii. Absorption and Metabolism iii. Synthesis of Vitamin D in the skin	08 hrs.

	iv. Metabolism to Calcitriol v. Regulation of Vitamin D metabolism& biological functions vi. Vitamin D deficiency: Rickets and Osteomalacia vii. Strategies to combat Vitamin D deficiency viii. Newer perspectives of Vitamin D in Human Nutrition ix. Interaction with drugs and other nutrients x. Deficiency, assessment, indicators for Vitamin D status xi. Toxicity of Vitamin D xii. Osteoporosis: Causes, consequences & guidelines for management xiii. Discussion: Role of Vitamin D beyond bone health, observations emerging from review and meta analysis **c) Vitamin E** i. Vitamers and units of activity ii. Absorption and metabolism iii. Metabolic functions of vitamin E iv. Vitamin E deficiency, requirements and assessment indicators v. Toxicity vi. Interaction with other nutrients **d) Vitamin K** i. Vitamers ii. Dietary sources, bacterial synthesis and metabolism iii. Metabolic functions of vitamin K iv. Other vitamin K dependent proteins v. Vitamin K deficiency and requirements vi. Vitamin K and neonates vii. Toxicity and drug interactions	
UNIT-VI	**Water Soluble Vitamins: Ascorbic Acid & B Complex vitamins (B1, B2, B3, B6, B12, Folic acid, Biotin, Pantothenic acid)** i. Historical perspective /Landmarks ii. Metabolism: digestion, absorption, transport, utilization, excretion iii. Metabolic functions iv. Fortification and Supplementation v. Deficiency & requirements vi. Toxicity & drug interactions vii. Assessment indicators	06 hrs.
UNIT-VII	**Minerals** **a) Minerals (Calcium, Phosphorous, Iron, Iodine, Copper, Zinc and Fluoride)** i. Sources, digestion, absorption, transport and utilization ii. Factors influencing bioavailability iii. Homeostasis iv. Metabolic functions v. Deficiency & Requirements vi. Toxicity & drug interactions vii. Assessment indicators & RDA viii. Micronutrient interactions ix. Success stories of fortification: Vehicles, form, dose, etc x. Iron, Physical work capacity and cognition xi. Iodine, growth & cognition xii. Zinc, growth & diarrhoea	08 hrs.

	xiii. Deficiency, Assessment, Indicators xiv. Toxicity levels xv. Supplementation, fortification and dietary approaches to combat IDA & IDD xvi. Discussion**:** Observations emerging from Review papers/Meta-analysis, technical report on Micronutrient malnutrition	
	a) Minerals (Sodium and Potassium) i. Role of Sodium and Potassium in electrolyte balance ii. Role of Sodium in hypertension iii. Deficiency, assessment , indicators iv. WHO guidelines on Sodium & Potassium v. Discussion: WHO shake the salt habit vi. Antioxidants: Vitamins, Minerals, Enzyme – mechanism and clinical implications	

REFERENCES

1.	Introduction to Human Nutrition, second edition. Edited by Michael J Gibney, susan A Lanham-New, Aedin Cassidy, Hester H Vorster, Wiley Blackwell, USA,ISBN 978-1-4051-6807-6, 2009
2.	Nutrition in Public Health. Principles, policies and practice. 2nd edition. Arlene spark, Lauren M dinourJanelObenchain. CRC press, Taylor & Francis group, USAISBN 13:978-4987-6661-6, 2015.
3.	Human Energy requirements (2004). Report of a joint FAO/WHO/UNU Expert consultation, Rome,
4.	WHO report on Global action plan for the reduction of non communicable diseases,2013, Geneva
5.	Susan A. Lanham–New, Ian A. MacDonald and Helen M. Roche, Nutrition and Metabolism (The Nutrition Society Textbook), Second Edition- 2011. Wiley-Blackwell.
6.	Martha H. Stipanuk and Marie A. Caudill, Biochemical, Physiological, and Molecular Aspects of Human Nutrition, Third Edition- 2013. Elsevier
7.	Nutrient Requirements & Recommended Dietary Allowances for Indians (1990, Reprinted 2008) 2nd Edition - 2010) By B.S. NarasingaRao, B. Sivakumar)
8.	WHO (2016) SHAKE the Salt habit The SHAKE TECHNICAL PACKAGE for Salt Reduction.
9.	2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease. A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines
10.	Diabetes and Hypertension: A Position Statement by the American Diabetes Association; 2017
11.	Noncommunicable Diseases Progress Monitor 2017. World Health Organization; 2017
12.	Treatment of Diabetes in Older Adults: An Endocrine Society Clinical Practice Guideline; 2019
13.	http://www.framinghamheartstudy.org/
14.	The North Karelia Project: Cardiovascular disease prevention in Finland. Glob Cardiol Sci Pract. 2018(2):13
15.	Global Action Plan for the Prevention and Control of Noncommunicable diseases 2013-2020. World Health Organization; 2013
16.	https://fssai.gov.in/cms/eat-right-india.php
17.	Healthy diets for all: A key to meeting the SDGs. Global Panel on Agriculture and Food Systems for Nutrition. Policy Brief No.10; 2017
18.	Large Scale Food Fortification in India- The Journey So Far and Road Ahead. FSSAI 2017
19.	Cross M and MacDonald B. Nutrition in Institutions. John Wiley & Sons; 2009
20.	Hill N, Fallowfield J, Price S and Wilson D. Military nutrition: maintaining health and rebuilding injured tissue. Philos Trans R Soc Lond B Biol Sci. 2011, 366(1562):231-240
21.	Heer M, Titze J, Smith SM and Baecker N. Nutrition, Physiology and Metabolism in Spaceflight and Analog Studies. Springer; 2015
22.	Space Food and Nutrition. An Educator's Guide with Activities in Science and Mathematics. NASA; 1999
23.	Bhide G and Mandlik S. (2018), Nutritional Guidelines for sportspersons Jaypee Brothers Medical Publishers Pvt. Ltd, New Delhi, India
24.	Dan Benardot. Advanced Sports Nutrition 2nd Edition; 2018
25.	Nutrition for Athletes, A practical guide to eating for health and performance, Prepared by the

	Nutrition Working Group of the International Olympic Committee based on an International Consensus Conference held at the IOC in Lausanne in October 2010Revised and Updated in April 2012
26.	https://www.unicef.org/nutrition/index_emergencies.html
27.	The management of nutrition in major emergencies. WHO, UNHCR, IFRC, WFP; 2000
28.	Guideline on Sodium intake for adults and children. WHO; 2012
29.	Guideline on Potassium intake for adults and children. WHO; 2012
	Journals
	1. American Journal of Clinical Nutrition 2. British Journal of Nutrition 3. Human Nutrition & Dietetics 4. Journal of Nutrition 5. European Journal of Clinical Nutrition 6. Indian Journal of Medical Research 7. Circulation

Syllabus of Courses

	The Maharaja Sayajirao University of Baroda **Faculty of Family and Community Sciences** **Department of Foods and Nutrition** **Fatehgunj, Vadodara 390002**	**ACADEMIC YEAR 2026-2027**

B.Sc. F.C.Sc. (Public Health Nutrition) - Fourth Year – Level 6.0

Year	**IV**	**Course Type: Major**	**Credit**	**4 (3+1)**
Semester	**VII**	**Course Number:** **Course Title: Advanced Food Science**	**Hours**	**45**

OBJECTIVES:	1. Discuss advanced processing techniques and product development approaches in plant-based foods (cereals, millets, pulses, fruits and vegetables). 2. Explain processing technologies, quality evaluation and functional applications of animal-based foods (milk, meat, poultry, fish and eggs). 3. Examine the nutritional, functional and technological roles of oils, nuts and superseeds in food systems. 4. Evaluate processing, quality and regulatory aspects of alcoholic, non-alcoholic and specialty beverages (tea, coffee, cocoa/chocolate). 5. Critically appraise emerging trends, sustainability issues and future innovations in food science and technology.

COURSE CONTENT / SYLLABUS

UNIT-I	**ADVANCED PROCESSING OF PLANT-BASED FOODS** a) Cereals & Millets: Parboiling, malting; low GI, gluten-free and multigrain formulations; nutritional significance and global perspective b) Pulses & Legumes: Milling, germination, fermentation; functionality (protein isolates, concentrates, hydrolysates); applications in plant-based foods and meat analogues. c) Fruits & Vegetables: Post-harvest physiology; advanced preservation (HPP, irradiation, MAP); nutrient retention; by-product and waste utilization.	09 hrs
UNIT-II	**Milk and Dairy Innovations** a) Structure and composition of milk. b) Processing: pasteurization, homogenization, UHT, membrane processing. c) Innovations: probiotic yogurts, functional dairy beverages, lactose-free products, whey-based foods. d) Casein, whey proteins and bioactive peptides in health promotion.	07 hrs
UNIT-III	**Meat, Poultry, Fish and Eggs** a) Meat & Poultry: Composition; post-mortem changes; processing (chilling, freezing, curing, smoking, canning, irradiation); value-added products (RTE meats, sausages); microbial safety & HACCP. b) Fish: Freshness characteristics; spoilage (microbiological, physiological, biochemical); preservation and processing; functional products (omega-3 enriched oils); cooking methods. c) Eggs: Quality evaluation & grading; deterioration and storage; processing (freezing, drying); effect of heat on proteins; foaming properties (beating, stability, influencing factors).	10 hrs
UNIT-IV	**Oils, Nuts and Seeds** a) Extraction, refining and processing of edible oils. b) Superseeds: Chia, flax, hemp, sunflower, pumpkin, watermelon seeds and basil– composition, bioactive compounds (omega-3 fatty acids, lignans, polyphenols, plant proteins), health benefits and applications in bakery, beverages and nutraceutical products. c) Oleogels: preparation, properties and applications in fat replacement.	06 hrs
UNIT-V	**Beverages**	08 hrs

	a) Alcoholic Beverages: fermentation (beer, wine, spirits), maturation, innovations and health concerns. b) Non-Alcoholic Beverages: fortified, probiotic, sports and energy drinks and plant-based alternatives. c) Processing of Specialty Beverages: i. Tea – types (green, black, oolong, herbal), withering, rolling, fermentation, drying and quality evaluation. ii. Coffee – harvesting, fermentation, roasting, grinding, brewing methods and flavour chemistry. iii. Cocoa & Chocolate – fermentation, drying, roasting, conching, tempering and applications in functional foods. d) Nutraceutical and functional beverage trends. e) Quality, safety and regulatory aspects of beverages.	
	Emerging Trends and Future of Food Science a) Climate-resilient crops and novel food sources (e.g. insects, algae, lab-grown meat). b) Sustainability and circular economy in food systems. c) Future innovations: 3D food printing, smart/intelligent packaging, AI in food systems. d) Global perspectives on functional foods and nutraceuticals.	06 hrs

REFERENCES

1.	Belitz, H. D., Grosch, W., & Schieberle, P. (2019). Food chemistry (5th ed.). Springer.
2.	Cahill, J. P. (2004). Superfoods and superseeds for health and nutrition. Academic Press.
3.	Clarke, R. J., & Vitzthum, O. G. (2018). Coffee: Recent developments. Wiley-Blackwell.
4.	Fellows, P. (2017). Food processing technology: Principles and practice (4th ed.). Woodhead Publishing.
5.	Fennema, O. R. (2010). Fennema's food chemistry (4th ed.). CRC Press.
6.	Fox, P. F., & McSweeney, P. L. H. (2015). Advanced dairy chemistry (4th ed.). Springer.
7.	Gopalakrishnan, A. (2011). Fish processing technology. Indian Council of Agricultural Research.
8.	Graham, H. N. (1992). Tea: The plant and its manufacture. Springer.
9.	Hui, Y. H. (Ed.). (2012). Handbook of meat and meat processing (2nd ed.). CRC Press.
10.	Kader, A. A. (2002). Postharvest technology of horticultural crops. University of California Agriculture & Natural Resources.
11.	Kent, N. L., & Evers, A. D. (2008). Kent's technology of cereals (5th ed.). Woodhead Publishing.
12.	Minifie, B. W. (2012). Chocolate, cocoa and confectionery: Science and technology (3rd ed.). Springer.
13.	Nollet, L. M. L., & Toldrá, F. (2011). Handbook of analysis of edible animal by-products. CRC Press.
14.	Potter, N. N., & Hotchkiss, J. H. (2012). Food science (5th ed.). Springer.
15.	Shahidi, F. (Ed.). (2015). Bailey's industrial oil and fat products (7th ed.). Wiley.
16.	Shahidi, F., & Wanasundara, U. (1998). Omega-3 fatty acid concentrates: Nutritional aspects and production technologies. AOCS Press.
17.	Stadelman, W. J., & Cotterill, O. J. (2001). Egg science and technology (4th ed.). CRC Press.
18.	Walstra, P., Wouters, J. T. M., & Geurts, T. J. (2011). Dairy science and technology (2nd ed.). CRC Press.
19.	WHO & FAO. (2019). Sustainable healthy diets: Guiding principles. World Health Organization.
20.	Yadav, B. S., & Yadav, R. B. (2018). Pulses: Processing and product development. New India Publishing Agency.
Journals	
21.	Food Chemistry *(Elsevier)*
22.	Journal of Food Science and Technology *(Springer / AFSTI, India)*
23.	Comprehensive Reviews in Food Science and Food Safety *(Wiley, Institute of Food Technologists)*
24.	Critical Reviews in Food Science and Nutrition *(Taylor & Francis)*
25.	Journal of Functional Foods *(Elsevier)*
26.	Meat Science *(Elsevier)*
27.	LWT – Food Science and Technology *(Elsevier)*

28.	Trends in Food Science & Technology *(Elsevier)*
29.	Journal of Dairy Science *(Elsevier)*
30.	Food Chemistry *(Elsevier)*
31.	Journal of Food Science and Technology *(Springer / AFSTI, India)*
32.	Comprehensive Reviews in Food Science and Food Safety *(Wiley, Institute of Food Technologists)*
33.	Critical Reviews in Food Science and Nutrition *(Taylor & Francis)*

For Practical

	The Maharaja Sayajirao University of Baroda **Faculty of Family and Community Sciences** **Department of Foods and Nutrition** **Fatehgunj, Vadodara 390002**	**ACADEMIC YEAR 2026-2027**

B.Sc. F.C.Sc. (Public Health Nutrition) - Fourth Year – Level 6.0				
Year	**IV**	**Course Type: Major**	**Credit**	**4 (3+1)**
Semester	**VII**	**Course Number:** **Course Title: Advanced Food Science**	**Hours**	**30**

COURSE CONTENT / SYLLABUS		
UNIT-I	**Fermentation of Foods** a) Preparation of fermented products from different food groups (e.g., idli/dosa batter, curd/yogurt, sauerkraut/pickled vegetables, milk).	04 hrs
UNIT-II	**Milk and Milk Products** a) Effect of heat on milk b) Effect of heat and acid on the proteins of milk c) Effect of added substance on the stability of milk	
UNIT-III	**Egg Quality Evaluation, Egg Foam and Culinary Applications** a) Candling and measurement of yolk index and Haugh unit b) Stages of egg foam formation. c) Preparation of soufflé, meringue, sponge cake, or fluffy omelette. d) Study of factors influencing foam stability (sugar, acid, fat).	12 hrs
UNIT-IV	**Texturized Foods / Meat Alternatives** a) Preparation and sensory evaluation of a dish using texturized vegetable proteins (soy chunks, soy nuggets, meat analogue).	04 hrs
UNIT-V	**Fruits & Vegetables** a) Minimal processing and preparation of a functional product (e.g., fruit leather, dehydrated vegetable chips, candied fruits)	04 hrs

Syllabus of Courses

	The Maharaja Sayajirao University of Baroda Faculty of Family and Community Sciences Department of Foods and Nutrition Fatehgunj, Vadodara 390002		**ACADEMIC YEAR 2026 – 2027**	
B.Sc. F. C. Sc. (Public Health Nutrition) – Fourth Year - Level 6.0				
Year	**IV**	**Course Type: Major**	Credit	4 (4+0)
Semester	**VIII**	**Course Number: Course Title: Food Systems in Public Health**	Hours	Theory: 60 Hrs

OBJECTIVES:	1. To familiarize students with the structure and functioning of food systems at global, national, and local levels. 2. To build conceptual clarity on evolving paradigms of food security, nutrition security, food sovereignty, and food systems transformation. 3. To equip students with skills to measure and interpret dietary diversity using standard tools. 4. To promote critical understanding of sustainability dimensions within food systems. 5. To provide an overview of policy and governance frameworks in India and intersectoral coordination in advancing food and nutrition security. 6. To develop systems thinking and analytical skills for mapping food system pathways. 7. To encourage evaluation of innovative and transformative approaches for sustainable and planet healthy food system.

COURSE CONTENT / SYLLABUS

UNIT-I	**Introduction to Sustainable Food Systems**	
	a) Conceptual Foundations i. **Definition of Food Systems** – Scope and importance. ii. **Core Components** – Production, processing, distribution, consumption, and waste. iii. **Drivers and Outcomes** – Biophysical, socioeconomic, cultural, and policy drivers shaping outcomes. iv. **The Food System Wheel** – Integrative framework for understanding interactions. **b) Governance and Policy Dimensions** i. **Role and Engagement of Key Ministries in India** – Ensuring availability, access, affordability, diversity, sustainability, and resilience of food systems: ii. **Ministry of Agriculture & Farmers Welfare (MoAFW)** – Production, crop diversification, sustainability. **c) Ministry of Consumer Affairs, Food & Public Distribution A**. **Fundamental concepts and the role of sanitation in food quality and public health.** i. **(MoCAF&PD)** – PDS, procurement, affordability. ii. **Ministry of Health & Family Welfare (MoHFW)** – Nutrition programs, food safety (FSSAI). iii. **Ministry of Women & Child Development (MoWCD)** – ICDS, POSHAN Abhiyaan, women and child nutrition. iv. **Ministry of Food Processing Industries (MoFPI)** – Food transformation, fortification, value addition. v. **Ministry of Rural Development (MoRD)** – Livelihoods, SHGs, wage support for food access. vi. **Ministry of Education (MoE)** – Mid-Day Meals (PM-POSHAN), nutrition education. vii. **Ministry of Environment, Forest & Climate Change (MoEFCC)** – Climate, biodiversity, sustainability of production systems.	15 hrs.

	viii. **NITI Aayog** – Convergence, monitoring, policy think-tank role. Perspectives, Frameworks, and Transformation of Food Systems a) **Perspectives on Food Systems** i. **Global and National Food Systems** – Structures, policies, governance, and trade. ii. **Industrial Food Systems –** Characteristics, opportunities (efficiency, reach), risks (ultra-processed foods, health, environmental costs). iii. **Local Food Systems & Nutrition Anthropology –** Cultural traditions, indigenous foods, seasonal diets, community-driven solutions. iv. **Tailoring Food System Investments –** Context-specific approaches for resilience and sustainability.	
UNIT-II	**a) Food Systems Transformation and Sustainability** i. **Evolution of Concepts** – Food Security → Nutrition Security → Food Sovereignty → Food Systems Transformation. ii. **Healthy Diets for All** – Foundation of well-being and sustainable societies. iii. **Measurement Tools** – HDDS, WDDS, MAD for assessing diet quality and adequacy. iv. **Sustainability Challenges** – v. **Environmental**: Climate change, biodiversity, land, water, GHG emissions (food miles) vi. **Economic**: Livelihoods, fair pricing, circular economy, value chains vii. **Social & Equity**: Gender, indigenous knowledge, tribal food systems viii. **Nutrition**: Safe diets, Dietary diversity, sustainable diets, food loss and waste ix. Value added Sustainable Food system Development x. **Global Relevance to SDGs** **b) Indian Examples** i. **National level:** NFSA (2013), POSHAN Abhiyaan, Mid-Day Meal Scheme. ii. **Industrial:** Rise of processed snack foods and FoPNL regulation by FSSAI. iii. **Local:** Tribal diets in Gujarat and Assam; millet revival in Karnataka and Odisha. iv. **Transformation initiatives:** International Year of Millets (2023), Eat Right India movement. **c) Pathways for Transformation** i. Climate-smart agriculture, sustainable intensification ii. Urban agriculture, school gardens, food forests iii. Investment in R&D for climate-resilient crops and systems - Flood- & drought-tolerant rice, Dual-stress rice with efficiency gains, Heat-tolerant, disease-resistant wheat, iv. Education and behavior change among consumers – food purchasing and consumption behaviour, Sustainability-Oriented Choices, food waste reduction v. Integration of food systems in climate and health policies	20 hrs.
UNIT-III	**Key Theories and Frameworks** a) FAO's Framework for Sustainable Food Systems b) HLPE Food Systems Framework c) Doughnut Economics (Kate Raworth) d) Food Systems Thinking, Agroecological approach e) One Health, Planetary Health Diet (EAT–Lancet)	05 hrs.

UNIT-IV	**Developing Sustainable Food Systems** **a) Measuring Food System Sustainability** i. Indicators: Environmental footprint, dietary carbon footprint, land use, water use – Indian food system, regional food system, global food system ii. Food Systems Dashboard iii. Life Cycle Assessment (LCA) methods **b) System Mapping** i. What is food mapping? Mapping food production → processing → distribution → consumption → waste. Example: The journey of rice/wheat through FCI, PDS, and retail. ii. **Stakeholders in Food Systems** - Farmers, cooperatives, processors, traders, consumers, NGOs, policymakers. Example: How stakeholders work together in India's **Mid-Day Meal Scheme**. **c) Policies and Food System Reform** i. How subsidies, procurement, and government schemes shape the system. Example: Subsidy shift from rice/wheat to **millets** under National Food Security Mission. **d) Technology and Innovation** i. Digital tools for farmers (Kisan apps, e-NAM). ii. Climate-smart farming, natural farming (Zero Budget Natural Farming). **e) Capacity Building** iii. Why farmer training and extension services matter. iv. Role of SHGs, Krishi Vigyan Kendras, and local innovations.	16 hrs.
UNIT-V	**Future Scenarios and Policy Action** a) Futures thinking: foresight, scenario building, planetary boundaries b) The Food Systems Countdown Initiative (FSCI) c) Role of youth, women, communities d) Building resilience: circular food systems, regenerative agriculture e) Case Study – Indian Context i. India's policy momentum - initiatives like International Year of Millets 2023 ii. National Mission on Sustainable Agriculture (NMSA), iii. Zero Budget Natural Farming (ZBNF) and iv. Eat Right India. v. Local and regional supply chains, millet-based diets and state-led procurement reforms	05 hrs.

REFERENCES

1.	Fanzo, J., Haddad, L., McLaren, R., Marshall, Q., Davis, C., Herforth, A., Jones, A. D., Beal, T., & Tschirley, D. (2021). Viewpoint: The role of food systems in achieving the SDGs. *Global Food Security, 28*, 100519.
2.	Food and Agriculture Organization of the United Nations, International Fund for Agricultural Development, United Nations Children's Fund, World Food Programme, & World Health Organization. (2024). *The state of food security and nutrition in the world 2024* (SOFI report). FAO. https://www.fao.org/publications/sofi
3.	Global Nutrition Report. (n.d.). *Global Nutrition Report*. Development Initiatives. https://globalnutritionreport.org
4.	Global Panel on Agriculture and Food Systems for Nutrition. (2016). *Foresight report: Food systems and diets*. Global Panel on Agriculture and Food Systems for Nutrition. https://www.glopan.org/resources/foresight-report/
5.	High Level Panel of Experts on Food Security and Nutrition. (2014). *Food losses and waste in the context of sustainable food systems* (HLPE Report No. 8). Committee on World Food Security.
6.	High Level Panel of Experts on Food Security and Nutrition. (2017). *Nutrition and food systems*

	(HLPE Report No. 12). Committee on World Food Security. https://www.fao.org/3/i7846e/i7846e.pdf
7.	International Crops Research Institute for the Semi-Arid Tropics. (n.d.). *ICRISAT vision 2030+*. ICRISAT. https://www.icrisat.org/vision-2030/
8.	Meadows, D. H. (2009). *Thinking in systems: A primer*. Chelsea Green Publishing.
9.	Ministry of Agriculture & Farmers Welfare. (n.d.). *Schemes and policy notes*. Government of India.
10.	NITI Aayog. (2021). *Sustainable development of food systems in India*. Government of India. https://www.niti.gov.in/sites/default/files/2021-12/Sustainable-Development-of-Food-Systems-in-India.pdf
11.	United Nations. (2021). *UN Food Systems Summit 2021 outcome documents*. https://www.un.org/en/food-systems-summit
12.	United Nations Environment Programme. (2016). *Food systems and natural resources*. UNEP. A Report of the Working Group on Food Systems of the International Resource Panel. Nairobi, Kenya.
13.	World Health Organization. (n.d.). *Healthy diet: Fact sheet*. WHO. https://www.who.int/news-room/fact-sheets/detail/healthy-diet

Syllabus of Courses

<table>
<tr><td></td><td colspan="3">The Maharaja Sayajirao University of Baroda
Faculty of Family and Community Sciences
Department of Foods and Nutrition
Fatehgunj, Vadodara 390002</td><td colspan="2">ACADEMIC YEAR
2026-2027</td></tr>
<tr><td colspan="6">B.Sc. F.C.Sc. (Public Health Nutrition) - Fourth Year - Level 6.0</td></tr>
<tr><td>YEAR</td><td>IV</td><td rowspan="2">Course Type: OJT
Course Number:
Course Title: On Job Training I in Public Health Nutrition</td><td>Credit</td><td colspan="2">6 (0+6)</td></tr>
<tr><td>Semester</td><td>VII</td><td>Hours</td><td colspan="2">180</td></tr>
<tr><td>OBJECTIVES</td><td colspan="5">1. To Understand the organizational structure, mandate, and policy framework of public health nutrition institutions
2. To identify public health nutrition terminology, indicators, and service delivery systems
3. To apply basic principles of community nutrition and IEC in field settings
4. To analyze public health nutrition programs through comparative review
5. To demonstrate professional ethics, teamwork, and documentation skills</td></tr>
<tr><td colspan="6">COURSE CONTENT / SYLLABUS</td></tr>
<tr><td>UNIT-I</td><td colspan="4">Orientation to Institution & Policy Framework
a) Orientation to Govt/NGOs/CSR organizations
b) Understanding Organizational structure, hierarchy, and functional roles
c) Orient to Vision, mission, and objectives of public health nutrition programs
d) Overview of national and state nutrition policies and guidelines
e) Learn Professional conduct, ethical behavior, field safety, and Do’s & Don’ts</td><td>20 hrs.</td></tr>
<tr><td>UNIT-II</td><td colspan="4">Mapping, Terminology & Review
a) Mapping of public health nutrition services and delivery systems
b) Understanding terminology related to malnutrition, food security, and health indicators
c) Familiarization with program documents, registers, and reporting formats
d) Review of previous surveys, reports, and baseline data
e) Short presentations based on literature or program review</td><td>20 hrs.</td></tr>
<tr><td>UNIT-III</td><td colspan="4">Information, Education, and Communication (IEC)
a) Principles of nutrition education and behavior change communication
b) Development of IEC material for different population groups
c) Use of culturally appropriate messages and visual aids
d) Participation in nutrition awareness sessions and community meetings
e) Application of health literacy principles in IEC development</td><td>30 hrs.</td></tr>
<tr><td>UNIT-IV</td><td colspan="4">Comparative Analysis of Nutrition Programs
a) Comparison of nutrition interventions at Local, National and International level
b) Analysis of implementation strategies, coverage, and outcomes
c) Preparation of comparative analytical report</td><td>30 hrs.</td></tr>
<tr><td>UNIT-V</td><td colspan="4">Engagement with Ongoing Program of the institution/NGO
a) Engage in the ongoing programs of the institution/NGO
b) Identify research problem, literature review, and methodology
c) Design clear and effective slides for clarity and impact.
d) Practice the presentation, focusing on timing, delivery, and a confident tone</td><td>20 hrs.</td></tr>
<tr><td>UNIT-VI</td><td colspan="4">Skill Development
a) Techniques of Data collection
b) Data Collection
c) Data cleaning, sorting
d) Data analysis</td><td>60 hrs.</td></tr>
</table>

UNIT-VII	**Professional Reporting and Skill Development** a) Maintenance of daily logbook and field diary b) Basic report writing and data summarization c) Teamwork, communication, and time management skills	20 hrs.

REFERENCES

1.	James F MsKenzie, Brad L Neiger Rosemary Thackeray. Planning, implementing and evaluating health promotion programs, 7 th Ed, Hoboken USA, 2017
2.	Glanz K, Rimer BK. Theory at a glance: A guide for health promotion practice. NIH, National Cancer Institute. 2nd ed. 2005.
3.	Social and Behavior Change Communication (SBCC) Training for Information, Education, and Communication (IEC) Officers, USAID, 2013
4.	Field guide to designing communication strategy, WHO publication-2007.
5.	Designing a health communication strategy, John Hopkins University-Centre for Communication programmes.
6.	https://icds.gov.in/en/about-us
7.	https://mohfw.gov.in/
8.	https://data.unicef.org/
9.	https://www.who.int/data
10.	https://www.fao.org/4/w3733e/w3733e04.htm
11.	https://iris.who.int/server/api/core/bitstreams/2e275b23-ad35-4d12-80a2-84174c5a22ae/content

DEPARTMENT OF FOODS AND NUTRITION

FOURTH YEAR (NEP)

PUBLIC HEALTH NUTRITION

(VIII SEMESTER) – WITHOUT RESEARCH

REGULAR

Syllabus of Courses

	The Maharaja Sayajirao University of Baroda Faculty of Family and Community Sciences Department of Foods and Nutrition Fatehgunj, Vadodara 390002	**ACADEMIC YEAR 2026-2027**

B.Sc. F.C.Sc. (Public Health Nutrition) - Fourth Year - Level 6.0

Year	**IV**	**Course Type: Major**	Credit	4 (3+1)
Semester	**VII**	**Course Number: Course Title: Nutrition Epidemiology & Research Methods**	Hours	Theory: 45Hrs

OBJECTIVES:	1. To understand various methodologies employed in nutrition research 2. To gain full understanding of the use of statistics and epidemiology in nutrition research 3. To learn to critique some recent research studies from the perspectives of – research methodologies, interdisciplinary approaches 4. To develop skills related to use of software for data analysis, interpretation, report writing and presentation

COURSE CONTENT / SYLLABUS

UNIT-I	**Developing the Research Question** a) Selection of research topics – need, relevance, feasibility b) Research ethics-ethical issues, research with human participants, ethics and animal research, ethical committees, informed consent, plagiarism c) Statement of the problem, formulation of the research hypothesis, stating objectives d) Literature search – referencing, abstracting, computer searches, bibliography e) Mono-disciplinary Research f) Multi-disciplinary Research g) Trans-disciplinary Research h) Inter-disciplinary Research	5 hrs.
UNIT-II	**Research Designs and Sampling Designs** a) True Experimental Designs and Quasi Experimental Designs b) Hierarchy of study designs c) Internal & External Validity d) Threats to validity e) Scales and indices f) Epidemiological studies i. Observations and experiments ii. Observational epidemiology – Descriptive studies, ecological studies, cross-sectional studies, case-control studies, Cohort studies –Prospective and retrospective study design, Nested case control studies iii. Experimental epidemiology – field trials, community trials, randomized controlled trials, single and double blind studies, Factorial designs and Cross over studies, Secondary research: systematic reviews and Meta-analysis iv. Potential errors in epidemiological studies – Random error, sampling error, systematic error, selection bias, measurement bias, confounding and control of confounding v. Discussion on various classical studies with respect to research methodology g) Probability and non-probability sampling designs h) Determination of sample size	20 hrs.

UNIT-III	**Qualitative Research Methodology** a) Qualitative research tools and methods i. Ethnography ii. Case Study iii. Phenomenology iv. Grounded Theory b) Data collection methods-Focus group discussions, key informant interviews, Observation method, community mapping, body mapping, free listing, pile sorting and Venn diagrams c) Analyzing qualitative data i. Transcribing and summarizing data ii. Categorizing and Coding (using descriptive codes) iii. Arranging and organizing data with the help of computers (Microsoft Excel) iv. Deciding emerging common themes, patterns and concepts d) Integrating qualitative and quantitative methods e) Critique of recent research studies	10 hrs.
UNIT-IV	**Biostatistics for data analysis and Scientific writing** a) **Parametric and Non Parametric Statistics** i. Mean, Median & Mode ii. Standard Deviation and Standard Errors iii. Confidence Interval iv. Coefficient of variation v. Chi square tests (X2) vi. t – tests for independent samples vii. t – tests for paired samples viii. Analysis of variance ix. Correlation coefficients x. Odds ratio xi. Relative risk xii. Regression analysis **b) Scientific writing** i. Different forms of scientific writing - Articles in journals, reports, review articles, abstracts, dissertations ii. Use of outlines as a starting device- Reasons for preparing outlines, types of outlines (Topic outlines, Conceptual outlines, theme outline), how to formulate outlines iii. Components of scientific writing – Introduction, Review of literature, Methodology, Results and discussion, summary and conclusions, limitations, in-text citation, bibliography and appendices iv. Tables and illustrations as means of presenting data v. Writing a research proposal for grants –rationale and importance of the question being addressed, presenting pilot study/data, time frame, clarity, methods, outcome of the study and its implications, budgeting, available infrastructure and resources, executive summary etc.	10 hrs.

REFERENCES

1.	Hedrik TE, Bickman L and Rog DJ (1993). Applied research design – A practical guide. Sage Publications Inc., California
2.	Kirk J and Miller ML (2011). Reliability and validity in qualitative research. Sage Publications Inc.
3.	Miles MB and Huberman AM (1994). Qualitative data analysis – An expanded sourcebook (2nd ed.). Sage Publications Inc., California
4.	Snecdecor GW and Cochran WG (1991). Statistical methods (8th ed.). Wiley
5.	Beaglehole R, Bonita R and Kjellstrom T (2006). Basic epidemiology (2nd ed.). World Health Organization, Geneva
6.	Sathe PV and Doke PP (2025) Epidemiology and management for health Care (7th ed.). Vora

	Medical Publications, Mumbai
7.	Willett W (2013). Nutritional epidemiology (3rd ed.). Oxford University Press, New York
8.	Bernard HR, Wutich A, and Ryan GW (2016) Analyzing qualitative data: Systematic approaches (2nd ed.). SAGE Publications, Inc., California
9.	Ramamurthy GC (2011). Research methodology. Dreamtech Press
10.	Tan W (2022). Research methods: A practical guide for students and researchers (2nd ed.). World Scientific
11.	Dawson C (2019). Introduction to research methods: A practical guide for anyone undertaking a research project (5th ed.). Hachette, UK
12.	O'Leary Z (2024). The essential guide to doing your research project (2nd ed.). SAGE, South Asia
13.	Mohanty B and Misra S (2025). Statistics for behavioural and social sciences. Atlantic Publishers & Distributors (P) Ltd

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<tr><td>Year</td><td>IV</td><td rowspan="2">Course Type: Major
Course Number:
Course Title: Nutrition Epidemiology & Research Methods</td><td>Credit</td><td>4 (3 + 1)</td></tr>
<tr><td>Semester</td><td>VII</td><td>Hours</td><td>Practical: 30 Hrs</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td colspan="5">COURSE CONTENT / SYLLABUS</td></tr>
<tr><td>UNIT-I</td><td colspan="3">Research Process
a) Review of Literature, Citing Bibliography and Plagiarism check
i. Using search engines on the internet for literature search
ii. Using referencing software
iii. Plagiarism Check
b) Responsible use of Artificial Intelligence- for literature search, graphical representation, making presentations
c) Computer Applications in Research
i. Steps in data analysis: Cleaning and Verifying data, Coding data, Data entry, tabulating data, Data Analysis
ii. Practice in calculation of Sample size for various study design by use of relevant formulas
iii. Spreadsheet tool (Microsoft Excel): Introduction to features and functions, using formulae, data storing, statistical data analysis, generating charts/graphs
iv. Presentation tool (Microsoft Power point): Introduction to features and functions, creating presentations
v. Epi Info for statistical analysis (Chi Square, Odds Ratio, Relative Risk)
vi. Use of Epicollect software as tool for data collection
vii. Use of Anthroplus software for calculating Z scores</td><td>14 hrs.</td></tr>
<tr><td>UNIT-II</td><td colspan="3">Hands on Experience: Independent Project work
a) Data analysis of given data sets
b) Interpretation & Report writing
c) Presentation</td><td>16 hrs</td></tr>
</table>

Syllabus of Courses

	The Maharaja Sayajirao University of Baroda Faculty of Family and Community Sciences Department of Foods and Nutrition Fatehgunj, Vadodara 390002			**ACADEMIC YEAR 2026 – 2027**
B.Sc. F. C. Sc. (Public Health Nutrition) – Fourth Year - Level 6.0				
Year	**IV**	**Course Type: Major**	Credit	4 (3+1)
Semester	**VIII**	**Course Number: Course Title: Health Promotion and Nutrition Policy**	Hours	Theory: 45 Hrs;
Objectives	1. To gain understanding about the scientific discipline of nutrition and health promotion. 2. To learn about evolution of health promotion and its role in promoting the SDGs 3. To gain skills in planning, conducting and evaluating Health promotion programs in different settings			
COURSE CONTENT / SYLLABUS				
UNIT-I	**Health Promotion-Concepts and components of Nutrition and Health Promotion** a) Need for Health Promotion b) Principles of Health Promotion c) The Ottawa Charter for health promotion-1986 d) The Bangkok Charter for Health Promotion in a Globalized World – 2005 e) Promoting health in the SDGs- Shanghai 2016 f) Communication for development (C4D) in Nutrition specific and Nutrition Sensitive sectors- Sectoral review of C4D achievements with special focus on Health, Nutrition and WASH			6 hrs.
UNIT-II	**Introduction to Health Promoting Schools (WHO, FSSAI)** a) Health Promoting schools – WHO, FSSAI b) Advantages of a health promoting school c) Six factors of a health promoting school d) School Health Index e) Best practices in Nutrition and Health Promotion in schools			13 hrs.
UNIT-III	**Introduction to Health promoting hospitals (WHO** a) Evidence-based health promotion in hospitals b) New health promotion services for hospital patients. c) Promoting health of staff d) Overview of the 18 strategies for health promoting hospitals e) Baby friendly hospital initiative/ Mother and baby friendly hospital initiative f) Best practices in Nutrition and Health Promotion in hospitals			13 hrs.
UNIT- IV	**Introduction to Workplace Health promotion (FSSAI)** a) Definition of a healthy workplace b) Healthy workplace core principles, processes and avenues of influence c) Workplace wellness Index d) Workplace health promotion as a strategy for NCD prevention in productive population e) Best practices in Nutrition and Health Promotion at workplaces			13 hrs.
REFERENCES				
1.	James F MsKenzie, Brad L Neiger Rosemary Thackeray. Planning, implementing and evaluating health promotion programs, 7th Ed, Hoboken USA, 2017			
2.	Glanz K, Rimer BK. Theory at a glance: A guide for health promotion practice. NIH, National			

	Cancer Institute. 2nd ed. 2005.
3.	Kristal AR, Glanz K, Curry SJ, Patterson RE. How can stages of change be best used in dietary interventions? J Am Diet Assoc. 1999;99:679-684.
4.	STEPS: A framework for surveillance: The WHO STEP wise approach to Surveillance of noncommunicable diseases (STEPS), NoncommunicableDiseases and Mental Health World Health Organization, Geneva, 2003
5.	Social and Behavior Change Communication (SBCC) Training for Information, Education, and Communication (IEC) Officers, USAID, 2013
6.	Sallis JF, Owen N, Fisher EB. Ecological models of health behavior. In: Glanz K, Rimer BK, Viswanath K (eds). Health Behavior and Health Education:Theory, Research, and Practice. 4th edition. San Francisco, CA: Jossey-Bass. 2008. pp 465-485.
7.	Spahn JM, Reeves RS, Keim KS, Laquatra I, Kellogg M, Jortberg B, Clark NA. State of the evidence regarding behavior change theories and strategies in nutrition counseling to facilitate health and food behavior change. J Am Diet Assoc. 2010;110(6):879-91.
8.	Boynton PM and Greenhalgh T, Hands-on guide to questionnaire research, Selecting, designing, and developing your questionnaire, BMJ, 328, 2004,1312- 1315.
9.	Health Promoting Schools: A framework for action, ISBN 978 92 9061 447 0 World Health Organization, Geneva, 2009
10.	Lytle LA, Perry CL. Applying research and theory in program planning: An example from a nutrition education intervention. Health Promotion Practice.2001;2(1):68-80.
11.	Healthy workplaces: a model for action For employers, workers, policy-makers and practitioner, WHO, 2010
12.	Simons-Morton BG, Greene WH, Gottlieb NH. (Chpt 8) Evaluation. In: Introduction to Health Education and Health Promotion, 2nd Ed. ProspectHeights, IL: Waveland Press. 1995:218-241.
13.	Field guide to designing communication strategy, WHO publication-2007.
14.	Designing a health communication strategy, John Hopkins University-Centre for Communication programmes.http://ccp.jhu.edu/documents/A%20Field%20Guide%20to%20Designing%20Health%20Comm%20Strategy.pdf
15.	Michael Favin and Marcia Griffiths 1999, Nutrition tool kit-09-Communication for Behaviour change in Nutrition projects. Human DevelopmentNetwork-The World Bank-1999
16.	Hubley J (1993) Communicating Health. London: Teaching Aids at Low Cost, London, UK.
17.	Health education: theoretical concepts, effective strategies and core competencies: a foundation document to guide capacity development of healtheducators/World Health Organization. Regional Office for the Eastern Mediterranean, 2012
18.	Health Promotion in Hospitals: Evidence and Quality Management, World Health Organization, Geneva, 2005
19.	Communication for Development (C4D) Capability Development Framework, UNICEF and 3D Change, 2009
20.	Implementation guidance: protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services – the revised Baby-friendly Hospital Initiative. Geneva: World Health Organization; 2018. Licence: CC BY-NC-SA 3.0 IGO.
21.	Jan Andolan Gudielenes- Poshan Abhiyan, Ministry of Women and Child Development, Government of India, 2018

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<tr><td>Objectives</td><td colspan="4">1. To gain understanding about the scientific discipline of nutrition and health promotion.
2. To learn about evolution of health promotion and its role in promoting the SDGs
3. To gain skills in planning, conducting and evaluating Health promotion programs in different settings</td></tr>
<tr><td colspan="5">COURSE CONTENT / SYLLABUS</td></tr>
<tr><td rowspan="2">UNIT-I</td><td colspan="3">Planning and implementing a Nutrition Health education program (Choose any one broad area from a to d)</td><td rowspan="2">24 hrs.</td></tr>
<tr><td colspan="3">a) School Health Promotion
b) Workplace Health promotion
c) Health Promotion in a hospital setting
d) Health Promotion in Free living Population

This should include (Minimum 30 subjects):
i. Conducting Need assessment survey
ii. Identifying gaps and planning a Nutrition Health Promotion strategy
iii. Developing IEC tools for Nutrition Health Promotion
Implementing the NHP program and writing a brief report on outcomes/ impact evaluation</td></tr>
<tr><td rowspan="2">UNIT-II</td><td colspan="3">Preparation of project report and final submission</td><td rowspan="2">6 hrs.</td></tr>
<tr><td colspan="3">a) Introduction
b) Methodology
c) Observations
d) Results and discussions
e) Conclusions
f) References</td></tr>
</table>

Syllabus of Courses

	The Maharaja Sayajirao University of Baroda Faculty of Family and Community Sciences Department of Foods and Nutrition Fatehgunj, Vadodara 390002	**ACADEMIC YEAR 2026 – 2027**

B.Sc. F.C.Sc (Public Health Nutrition) - Fourth Year - Level 6.0

Year	IV	**Course Type: Major**	Credit	4 (4+0)
Semester	VIII	**Course Number:** **Course Title: Nutrition in Humanitarian Relief**	Hours	Theory: 60 Hrs;

OBJECTIVES:	1. To understand the role of nutrition in humanitarian relief 2. To learn about the rapid nutrition assessment methods for emergency situations 3. To understand the key nutrition interventions to be delivered for humanitarian relief

COURSE CONTENT / SYLLABUS

UNIT-I	**Overview of Disasters Resulting in Emergency Situations and Resultant Nutritional Problems** a) Loud and silent emergencies; nutrition emergency – definition and examples; famine, drought, floods, earthquakes, cyclone, etc. and war, conflicts, civil and political emergencies; its impact on nutrition – health b) Classification; causes and vulnerability to nutrition emergencies; triggers for nutrition emergencies c) Impact of an emergency on nutritional status, types of malnutrition in emergencies d) National Disaster Management Authority (NDMA); national and state disaster management cell – objectives and functions	15 hrs.
UNIT-II	**Applying Core Humanitarian Standards for Nutrition Relief and Assessment** a) International humanitarian system – principles, co-ordination, collaboration, Sphere standards b) Measuring malnutrition in children, adolescents, and adults; individual and population assessment c) Assessment and surveillance of nutritional status in emergency affected populations using rapid assessment methods d) Food security and nutrition assessment; importance; and approaches to food security assessment	12 hrs.
UNIT-III	**Essential Healthcare based on Humanitarian Charter** a) Communicable diseases: i. Prevention ii. Diagnosis and case management iii. Outbreak detection and response iv. Role of Immunization and Sanitation b) Maternal and Child Health and Nutrition: i. Promoting safe motherhood and newborn care ii. Management of childhood illnesses iii. IYCN during emergencies c) Reproductive health care key interventions d) iv. Health and nutritional support for the elderly	12 hrs.
UNIT-IV	**Public health Response for Humanitarian Relief and Rehabilitation** a) Using the decision tree model for humanitarian response (example) b) Provision of water and sanitation, preventing epidemics; providing prompt medical relief c) Targeting food aid, food distribution; assessing food needs; special food rations for nutritional relief; WFP - food basket, and specialized nutritious food	15 hrs.

	d) Mass and supplementary feeding (community kitchens example) e) Blanket and targeted supplementary feeding; management of moderate acute malnutrition and severe acute malnutrition f) Approaches to prevention of micronutrient malnutrition g) HIV/AIDS and nutrition in emergencies h) Livelihood support in emergencies	
UNIT-V	**Monitoring and Evaluation** a) Importance of monitoring and evaluation of nutrition interventions in emergencies b) Areas to be covered in evaluation c) Monitoring and evaluation systems d) Challenges in emergencies	06 hrs.

REFERENCES

1.	Harmonized training Package: Resource material for training & learning on nutrition in emergencies, version 2, 2011. www.ennonline.net
2.	Global Nutrition Cluster. https://www.nutritioncluster.net/gnc-learn
3.	Food and Nutrition Needs in Emergencies. UNHCR, UNICEF, WFP, WHO,2018. https://www.humanitarianlibrary.org/sites/default/files/2018/12/foodnutrition.pdf
4.	Guidelines for Selective Feeding: The Management of Malnutrition in Emergencies. UNHCR. The UN Refugee Agency, 2011. https://www.unhcr.org/in/media/guidelines-selective-feeding-management-malnutrition-emergencies
5.	A Manual: Measuring and Interpreting Malnutrition and Mortality. CDC, WFP, 2005
6.	A toolkit for addressing nutrition in Emergency situations. Inter-Agency Standing Committee (IASC) nutrition cluster report, 2008. www.ennonline.net/pool/files/ife/global-nutrition-cluster-nutritionemergencies-toolkit-june-2008.pdf.
7.	WHO Manual – The Management of Nutrition in Major Emergencies. 2004. Updated -2013. ISBN-92-4-154520-8.
8.	World Food Programme. Saving Lives Changing Lives. WFP Food Basket. https://www.wfp.org/stories/wfp-food-basket
9.	World Food Programme. Saving Lives Changing Lives. Specialized Nutritious Food. https://www.wfp.org/specialized-nutritious-food

Syllabus of Courses

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B.Sc. F.C.Sc (Public Health Nutrition) - Fourth Year - Level 6.0

YEAR	IV	**Course Type: OJT**	**Credit**	**6 (0+6)**
Semester	VIII	**Course Number: Course Title: On Job Training II in Public Health Nutrition**	**Hours**	**180**

OBJECTIVES	1. To Apply advanced public health nutrition concepts in institutional and community settings 2. To assess nutritional status and program performance using standard tools 3. To evaluate public health nutrition policies and intervention strategies 4. To analyze ongoing programs for effectiveness and gaps 5. To prepare comprehensive field reports and case studies 6. To demonstrate leadership, ethical practice, and professional readiness

COURSE CONTENT / SYLLABUS

UNIT-I	**Advanced Institutional & Program Orientation** a) In-depth understanding of institutional mandates and operational strategies b) Exposure to planning, budgeting, and monitoring mechanisms c) Understanding inter-sectoral coordination in nutrition programs	20 hrs.
UNIT-II	**Nutritional Assessment and Surveillance** a) Advanced anthropometry and dietary assessment methods b) Identification of nutrition risk factors and vulnerable groups c) Use of growth charts, screening tools, and surveillance data d) Data interpretation and reporting	20 hrs.
UNIT-III	**Program Implementation and Monitoring** a) Participation in implementation of nutrition and health programs b) Monitoring service delivery and outreach activities c) Understanding logistics, supply chain, and resource management d) Documentation of field observations	30 hrs.
UNIT-IV	**Policy, Guidelines, and Regulatory Framework** a) Detailed review of national and international nutrition policies b) Program guidelines, operational manuals, and reporting systems c) Ethical considerations and accountability mechanisms	30 hrs.
UNIT-V	**In-depth Engagement with Ongoing Projects** a) Hands-on involvement in selected programs or research activities b) Community engagement, counseling, and follow-up c) Identification of program gaps and recommendations	60 hrs.
UNIT-VI	**Technical Reporting and Professional Development** a) Data Cleaning b) Data analysis, c) Data interpretation, and presentation	20 hrs.
UNIT-VII	**Technical Reporting and Professional Development** a) Preparation of comprehensive OJT report and case studies b) Data analysis, interpretation, and presentation	20 hrs.

	c) Team leadership, problem-solving, and communication skills d) Career readiness and professional ethics	

REFERENCES

1.	James F MsKenzie, Brad L Neiger Rosemary Thackeray. Planning, implementing and evaluating health promotion programs, 7 th Ed, Hoboken USA, 2017
2.	Glanz K, Rimer BK. Theory at a glance: A guide for health promotion practice. NIH, National Cancer Institute. 2nd ed. 2005.
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5.	Designing a health communication strategy, John Hopkins University-Centre for Communication programmes.
6.	https://icds.gov.in/en/about-us
7.	https://mohfw.gov.in/
8.	https://data.unicef.org/
9.	https://www.who.int/data
10.	https://www.fao.org/4/w3733e/w3733e04.htm
11.	https://iris.who.int/server/api/core/bitstreams/2e275b23-ad35-4d12-80a2-84174c5a22ae/content