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BE BOUNDLESS

BENGALURU CITY UNIVERSITY

CHOICE BASED CREDIT SYSTEM

**(Semester Scheme with Multiple Entry and Exit Options for
Under Graduate Course)**

**Syllabus for Home Science
(I & II Semester)**

2021-22 onwards

**Proceedings of the BOS in Home Science (UG & PG) for Bengaluru City University held on
30th September, 2021**

A meeting of the BOS in Home Science (UG & PG) for Bengaluru City University held on 30th September, 2021 between 10:30 am to 5:00 pm in Smt. V.H.D Central Institute of Home Science, Seshadri Road, Bengaluru – 560 001.

The following members were present for the meeting:

Name and Designation

1. Dr Usha Devi. C

Chairperson BOS in Home Science (UG, PG & PhD)
Bengaluru City University (BCU)
HOD, Dept. of Food and Nutrition & Research Centre,
Smt. V.H.D Central Institute of Home Science,
Seshadri Road, Bengaluru – 560 001.

Usha Devi
30/9/21

2. Dr. Vijayalaxmi A.H.M.,

Member
Principal & Associate Professor,
Department of Human Development and Research Centre,
Smt. V.H.D Central Institute of Home Science,
Seshadri Road, Bengaluru – 560 001

Vijayalaxmi
30/09/2021

3. Dr. Madhumathy S.,

Member
HOD & Associate Professor,
Department of Early Childhood Education and Administration,
Smt. V.H.D Central Institute of Home Science,
Seshadri Road, Bengaluru – 560 001

S. Madhumathy

4. Dr. Asha Jyothi U. H.,

Member
HOD & Associate Professor,
Department of Resource Management,
Smt. V.H.D Central Institute of Home Science,
Seshadri Road, Bengaluru – 560 001

Asha Jyothi

5. Dr. Grace Premila Victor.,

Member
Associate Professor,
Bishop Cotton Women's College,
Field Marshal Kariyappa Road,
Bengaluru – 560 025

Grace Premila

Name and Designation

6. **Dr. Marie Kavitha Jayakaran.,**
Member
Associate Professor,
Bishop Cotton Women's College,
Field Marshal Kariyappa Road,
Bengaluru – 560 025
7. **Dr. Shantha Maria B. V.,**
Member
Associate Professor,
Home Science,
Mount Carmel College, Autonomous,
No. 58, Palace Road,
Bengaluru – 560 052
8. **Dr. Sangeeta Pandey.,**
Member
Associate Professor,
Nutrition and Dietetics,
Mount Carmel College, Autonomous,
No. 58, Palace Road,
Bengaluru – 560 052

Marie Kavitha Jayakaran

Shantha Maria B. V.

Sangeeta Pandey

Members Absent

1. **Dr. Komala M**
Member
Professor,
Department of Human Development,
University of Mysore,
Manasa Gangothri, Mysuru – 570 006

The meeting began with Dr Usha Devi C., Chairperson BOS in Home Science, welcoming the members to the meeting and appraising the members of the agenda scheduled for the meeting. She also informed the members that at present three colleges listed below are offering BA/BSc Home Science as one optional and BSc NDCZ courses at UG level and PG in Nutrition and Dietetics in one college.

- a) Bishop Cotton Women's Christian College – BA/BSc Home Science as one optional and NDCZ course; and PG in Nutrition and Dietetics
- b) Faith British Academy - BSc NDCZ course
- c) S B A N M College, Yelahanka - BSc CND

- ✓ The Board reviewed the NEP syllabus and made the necessary minor changes in the matrix and blown up syllabus of first and second semester and approved the same for the academic year 2021-2022 for all the courses.

2. Approval of the Ph.D Research guide ship of Dr Sujata Gupta, Department of Human Development, Mount Carmel College, Autonomous, Bengaluru.
3. The Board included panel of examiners from Smt. V H D Central Institute of Home Science to the Panel of Examiners sent by Bengaluru City University and recommended the same to BCU (Annexure-I) and an additional list of panel from other colleges.
4. The Board also constitutes the BOE (UG/PG) for approval by the BCU (Annexure-II).

The meeting ended with the Chairperson thanking the members for attending the meeting.

Vijayalaxmi
30/09/2021
Dr. Vijayalaxmi A.H.M.

Madhumathy
Dr. Madhumathy S.

Ashjyoti
Dr. Asha Jyothi U. H.

Grace Premila
Dr. Grace Premila Victor.

Marie Kavitha
Dr. Marie Kavitha Jayakaran

Shantha Maria B.V
Dr. Shantha Maria B. V.

Dr. Sangeeta Pandey.

Sangeeta

Usha Devi C

Dr. Usha Devi C,
Chairperson
BOS in Home Science (UG&PG)
Bangalore City University (BCU)
Central College Campus, Bangalore - 01

BENGALURU CITY UNIVERSITY

CURRICULUM FRAMEWORK FOR FOUR-YEAR UNDER GRADUATE PROGRAM (HONOURS) AND MASTERS

[FIRST TWO SEMESTERS]

**IN
HOME SCIENCE
2021**

CONTENTS

Sl. No.	Programmes	Page No.
3.	BA/B.Sc. Home Science	1-27
5.	B.Sc. Nutrition and Dietetics	28-56
6.	B.Sc. Clinical Nutrition	57-98

Structure of B.A/ B.Sc Home Science as one

Discipline Major

(Model II A)

PREAMBLE

Home Science is both science and social science-art related multi-disciplinary field of study. The Learning Outcomes-based Curriculum Framework (LOCF) for B.Sc/B.A (Home Science) degree programme has been designed to integrate the application of sciences and humanities to create a cadre of home scientists to improve the quality of life of individuals, family, community and nation.

Home science program is predominantly practical oriented and therefore helps to develop and polish various skills to empower the cadre required towards innovation, incubation and entrepreneurship along with professional and employable skills. Hands on experience with Project work/internship/fieldwork would help and build capacities for conducting primary research among the students. The curriculum has been structured to prepare the undergraduates to achieve skills to move forward with the development of the society/community/nation and entrepreneurship. The Curriculum incorporates multidimensional fundamental, core and applied aspects of various disciplines with Graduate Attributes (GAs) such as disciplinary knowledge, laboratory/field driven practical's, the art of writing & communication, self-learning, critical thinking, analytical & problem solving abilities, use of ICT, application of knowledge, lifelong learning, research-related skills, team spirit, multicultural competencies, leadership qualities, global vision, professional commitment and sensitizing with Sustainable Development Goals (SDGs) of United Nations. It also aims to build future ready professionals who would be socially responsible global citizens contributing to the overall development of the country. The model curriculum presented has a multidisciplinary approach keeping the New National Education Policy 2020

Model Curriculum

Name of the Degree Program: BA/B.Sc. Honours

Discipline Core: Home Science Total Credits for the Program: 176

Starting year of implementation: 2021-22

Program Outcomes:

By the end of the program the students will be able to:

(Refer to literature on outcome-based education (OBE) for details on Program Outcomes)

1. Deliver quality tertiary education through learning while doing.
2. Reflect universal and domain-specific values in Home Science.
3. Involve, communicate, and engage stakeholders.
4. Preach and practice change as a continuum.
5. Develop the ability to address the complexities and interface among of self, societal and national priorities.
6. Generate multi-skilled leaders with a holistic perspective that cuts across disciplines.
7. Instill both generic and subject-specific skills to succeed in the employment market.
8. Foster a genre of responsible students with a passion for lifelong learning and entrepreneurship.
9. Develop sensitivity, resourcefulness and competence to render service to families, communities, and the nation at large.
10. Promote research, innovation and design (product) development favoring all the disciplines in Home Science.
11. Enhance digital literacy and apply them to engage in real time problem solving and ideation related to all fields of Home Science.
12. Appreciate and benefit from the symbiotic relationship among the five core disciplines of Home Science – Resource Management, Food Science and Nutrition, Textiles and Clothing, Human Development and Family Studies and Extension and Communication

Assessment:

Weightage for assessments (in percentage)

Type of Course	Formative Assessment / IA	Summative Assessment
Theory	60	40
Practical	25	25
Projects	-	-
Experiential Learning (Internships etc.)	-	-

Contents of Courses for Ba/B.Sc. Home Science as Major Subject

Model II A

Semester	Course No.	Course Category	Theory/Practical	Credits	Paper Title	Marks	
						S.A	I.A
1.	HSCT1.1	DSC A 1	Theory	4	Principles of Food and Nutrition	60	40
	HSCP1.1		Practical	2	Principles of Food and Nutrition	25	25
	HSCT1.2	OE- 1	Theory	3	Food Preservation	60	40
2.	HSCT2.1	DSC A2	Theory	4	Fundamentals of Human Development	60	40
	HSCP2.1		Practical	2	Fundamentals of Human Development	25	25
	HSCT2.2	OE- 2	Theory	3	Teaching Materials For Early Childhood Education	60	40
Exit Option with Certificate in Home Science (48 Credits)							
3.	HSCT3.1	DSC A 3	Theory	4	Early Childhood Care and Education	60	40
	HSCP3.1		Practical	2	Early Childhood Care and Education	25	25
	HSCT3.2	OE- 3	Theory	3	Income Generating Skills	60	40
4.	HSCT4.1	DSC A 4	Theory	4	Introduction to Textiles	60	40
	HSCP4.1		Practical	2	Introduction to Textiles	25	25
	HSCT4.2	OE- 4	Theory	3	FashionDesigning	60	40
Exit Option with Diploma in Home Science (96 Credits)							
5	HSCT5.1	DSC A 5	Theory	3	Resource Management and Consumer Economics	60	40
	HSCP5.1		Practical	2	Resource Management and Consumer Economics	25	25
	HSCT5.2	DSC A 6	Theory	3	Communication and Extension Education	60	40

	HSCP5.2		Practical	2	Communication and Extension Education	25	25
	HSCT5.3	VOC- 1	Theory	3	Special Education	60	40
6	HSCT6.1	DSC A 7	Theory	3	Human Development and Family Dynamics	60	40
	HSCP6.1		Practical	2	Human Development and Family Dynamics	25	25
	HSCT6.2		Theory	3	Interior Decoration	60	40
	HSCP6.2		Practic al	2	Interior Decoration	25	25
	HSCT6.3		Theory	3	Designing Interior Spaces	60	40
Exit Option with Bachelor of Science Degree in Home Science (136 Credits)							
7.	HSCT7.1	DSC A 9	Theory	3	Traditional Textiles and Costumes of India	60	40
	HSCP7.1		Practical	2	Traditional Textiles and Costumes of India	25	25
	HSCT7.2	DSC A10	Theory	3	Children with Developmental Challenges	60	40
	HSCP7.2		Practical	2	Children with Developmental Challenges	25	25
	HSCT7.3	DSC A 11	Theory	3	Nutritional Management in Health and Disease	60	40
	HSCP7.3		Practical	2	Nutritional Management in Health and Disease	25	25
	HSCT7.4	DSE 1	Theory	3	Ergonomics in Design	60	40
	HSCT7.5	DSE 2	Theory	3	Public Health Nutrition	60	40
	HSCT7.6		Theory	3	Research Methodology	60	40
	HSCT8.1	DSC A12	Theory	3	Clothing and Fashion Illustration	60	40
	HSCP8.1		Practical	2	Clothing and Fashion Illustration	25	25
	HSCT8.2	DSC A 13	Theory	3	Entrepreneurship Development	60	40

8.	HSCP8.2		Practical	2	Entrepreneurship Development	25	25
	HSCT8.3	DSC A 14	Theory	3	Guidance and Counselling	60	40
	HSCP8.3		Practical	2	Guidance and Counselling	25	25
	HSCT8.4	DSE 3	Theory	3	Food Service Management	60	40
	HSCT8.5		Theory	6	Research Project OR Any two of the following electives / Internship (A) Food Preservationand Safety (B) EnergyConservation (C) ExtensionManagement (D) Gerontology	60	40

Award of Bachelor of Science Degree Honours Degree in Home Science (176credits)

*In lieu of the research Project, two additional elective papers/ Internship may be offered.

Curriculum Structure for the Undergraduate Degree Program Ba/B.Sc.

Home Science

Total Credits for the Program: 176 Credits

Starting year of implementation: 2021-22

Name of the Degree Program: BA/BSc Degree/Honors

Discipline/Subject: Home Science as one Discipline A

Program Articulation Matrix:

This matrix lists only the core courses. Core courses are essential to earn the degree in that discipline/subject. They include courses such as theory, laboratory, project, internships etc. Elective courses may be listed separately.

Sem.	Title /Name of the course	Program outcomes that the course addresses (not more than 3 per course)	Pre-requisite course(s)	Pedagogy	Assessment
1	DSC A 1 Principles of Food and Nutrition	PO –4 PO -5 PO –7	12+/Equivalent Pass	<ul style="list-style-type: none"> • Demonstration • lecture 	Formative and Summative Assessment
	OE- 1 Food Preservation	PO-3 PO-8 PO-9	12+/Equivalent Pass	<ul style="list-style-type: none"> • Demonstration • lecture 	Formative and Summative Assessment
2	DSCA2 Fundamentals of Human Development	PO –4 PO –6 PO –8	12+/Equivalent Pass	<ul style="list-style-type: none"> • Lecture • FieldVisit 	Formative and Summative Assessment
	OE-2 Teaching Materials for Early Childhood Education	PO-1 PO-3 PO-8	12+/Equivalent Pass	<ul style="list-style-type: none"> • Demonstration • lecture 	Formative and Summative Assessment

Syllabus for B.Sc. Home Science as Major Subject & B.Sc. (Hons)

B.SC. HOME SCIENCE SEMESTER 1

Course Title: PRINCIPLES OF FOOD AND NUTRITION (DSC A1)	
Total Contact Hours: 60Hrs	Course Credits: 4
Formative Assessment Marks: 40 marks	Duration of ESA / Exam: 3 Hrs
Model Syllabus Authors:	Summative Assessment Marks: 60 marks

Course Pre-requisite(s): Standard 12 and its equivalence with minimum 35%

Course Outcomes: (COs)

At the end of the course the student should be able to:

1. Understand the role and functions of nutrients, their requirements and the effect of deficiency and excess.
2. Understand the concept of an adequate diet and the importance of meal planning for all age group

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes(POs)	1	2	3	4	5	6	7	8	9	10	11	12
Understand the role and functions of nutrients, their requirements and the effect of deficiency and excess	X		X						X			
Understand the concept of an adequate diet and the importance of meal planning for all age group			X	X							X	

B.SC. HOME SCIENCE
SEMESTER 1

Title of the Course: PRINCIPLES OF FOOD AND NUTRITION

Course : DSC A1	
Number of Theory Credits	Number of lecturehours/semester
4	60

CONTENT	60 Hrs.
Unit–1 Introduction toNutrition	12 Hrs
Chapter No. 1: Definition of nutrition, Malnutrition and Health, Functions of food, Food groups -Types of foodpyramids	6 Hrs
Chapter No. 2: Balanced diet - Meal planning – steps in meal planning	6 Hrs
Unit – 2Nutrients	18 Hrs
Chapter No. 3: Nutrients Macro and Micro nutrients- classification, Sources, functions and deficiency. A) Carbohydrates, B) Proteins C) Fats D) Minerals – Calcium, Iron, Iodine. E) Vitamins – Fat soluble vitamins – A, D, E & K Water soluble vitamins – vitamin C Thiamine, Riboflavin, Niacin	15 Hrs
Chapter No. 4: A) Water – Functions, sources and water balance B) Fibre – Functions and sources, C) Energy – factors affecting BMR	3 Hrs
Unit – 3 Methods of Cooking	15 Hrs
Chapter No. 5. Methods of cooking- Advantages and disadvantages a) Water – Boiling, steaming, pressure cooking b) Oil/Fat – Shallow frying,	

deep frying c) Air – Baking	4 hrs
Chapter No. 6. Nutrition through lifecycle Nutritional requirement, dietary guidelines: Adulthood, Pregnancy, Lactation, Infancy -Complementary feeding, Pre-school, Adolescence, Old age.	11hrs
Unit – 4 Food Preservation	15 Hrs
Chapter No. 7 - Food Preservation- Objectives and principles-Methods: dehydration, temperature regulation ,using preservatives like salt and sugar	8 hrs
Chapter No. 8 - Food Handling and storage - freezing thermal and non-thermal methods, Canning	7hrs
Unit – 4 Food Preservation	15 Hrs
Chapter No. 7 - Food Preservation- Objectives and principles-Methods: dehydration, temperature regulation ,using preservatives like salt and sugar	8 hrs
Chapter No. 8 - Food Handling and storage - freezing thermal and non-thermal methods, Canning	7hrs

Formative Assessment = 100 marks	
Assessment Occasion / type	Weightage in Marks
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Total	60 marks + 40 marks = 100 marks

Practical Course:2Credits

30Hrs

List of Experiments to be conducted

Unit 1: a) Weights and Measures

b) Food pyramids

Unit 2: Methods of cooking

a) Boiling, steaming

b) Pressure cooking, shallow and deep fatFrying

c) Dry heat -baking

Unit 3: Identification of nutrient rich foods and preparation of any three nutrient rich foods

Unit 4: Food preservation – salt, sugar and dehydration.

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2. Srilakshmi B, (2002), Nutrition Science. New Age International publishers. NewDelhi
3. Swaminathan M. (2002), Advanced text book on food and Nutrition. Volume I.Bappco.
4. Gopalan.C.,RamaSastry B.V., and S.C.Balasubramanian (2009), Nutritive value of Indian Foods.NIN.ICMR.Hyderabad.
5. Mudambi S R and Rajagopal M V, (2008), Fundamentals of Foods, Nutrition & diet therapy by New Age International Publishers, NewDelhi

Date

CourseCoordinator

Subject CommitteeChairperson

Ba/ B.Sc. HOME SCIENCE
SEMESTER 1

Course Title: FOOD PRESERVATION (OE1)	
Total Contact Hours: 45 Hrs	Course Credits: 3
Formative Assessment Marks: 40 marks	Duration of ESA/Exam: 3 hrs
Model Syllabus Authors:	Summative Assessment Marks: 60 marks

Course Pre-requisite(s): Standard 12 and its equivalence with minimum 35%

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Know the principles of preservation behind the methods of preservation
2. Understand the stages of sugar cookery, quality of pectin and acidity in the development of preserved food products
3. Acquire skills to formulate food based products
4. Explore the principles of preservation in fruits and vegetables based products
5. Skills to prepare cereals and pulse based preserved products and develop new products with retention of quality course

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12
Know the principles of preservation behind the methods of preservation			X		X							
Understand the stages of sugar cookery, quality of pectin and acidity in the development of preserved food products				X	X							
Acquire skills to formulate food based products							X	X				

Explore the principles of preservation in fruits and vegetables based products							x		x			
Skills to prepare cereals and pulse based preserved products and develop new products with retention of qualitycourse					x		x					

Ba/ B.Sc. HOME SCIENCE
SEMESTER 1

Title of the Course: FOOD PRESERVATION

Course: OE 1	
Number of Theory Credits	Number of lecturehours/semester
3	45

CONTENT	45 Hrs
Unit-I Concept of Food Preservation	10 Hrs
Chapter No.1- Importance of Food Preservation, Types of Food spoilage by Microorganisms and by Enzymes, Basic Principles of Food Preservation Food preservatives- Use of Salt, Acid, Sugar, natural food preservatives and artificialpreservatives	5 Hrs
Chapter No. 2- Starting a food preserving unit, Product Promotion strategies and marketing skills	5 Hrs
Unit-II Preparation of dehydrated products	20 Hrs
Chapter No.3 Methods of drying & dehydration , different types of driers , freeze drying- lyophilization , packing & storage	5 Hrs
Chapter No. 4- Drying methods for the selected products -Rice, Sago, Wheat, Maida, Rice flakes, black gram dhal, green gram dhal, Horse gram dhal Roots and Tubers. Preparation of salted, dehydrated, preserves (Traditional Indian varieties of chips, Papads, Khakharas etc and Masala Powders, onion, garlic, ginger	7 Hrs

powder etc)	8 Hrs
Chapter No. 5- Hands on experience :Drying of vegetables- peas, potato, carrot, French beans, Reconstitution of dried vegetables, Drying & preparation of powders- garlic, ginger, spices mix etc	
Unit -III Preservation by Using Sugar, Chemicals, Salts and Fermentation	15 Hrs
Chapter No. 7 - Role of Pectin in Preserved foods, Stages in Sugar Cookery, Sugar Concentrates – Principles of Gel Formation. Hands on Experience: Preparation of Jam, Jelly, Marmalades, Sauce and Squash, Preserves, Candied, Glazed, Crystallized Fruits, Toffee, Evaluation of pH, Acidity and pectin quality, Preparation and Preservation of Fruit Juices, RTS Visit to Fruits and Vegetable processing industry	8 Hrs
Chapter No. 8 - Pickling – Principles Involved and Types of Pickles, Chemical Preservatives – Definition, Role of Preservation, Permitted Preservatives, FSSAI guidelines, Foods fermented by Yeasts and Bacteria, Wine and Cheese Making	3 Hrs
Chapter No. 9 - Hands on experience: Pickle making, Visit to Commercial Pickle Manufacturing/ Food Industry / Wine industry	4 Hrs

Formative Assessment = 100 marks	
Assessment Occasion / type	Weightage in Marks
Test 1	15
Test 2	15
Assignment + Project	5 + 5
3 Total	60 marks + 40 marks = 100 marks

Reference:

1. Maney S (2008). Foods, Facts and Principles, 3 rd Edition Published by Wiley Eastern, New Delhi.
Usha Chandrasekhar (2002) Food Science and Application in Indian Cookery, Phoenix Publishing House P. Ltd., NewDelhi.
2. Raina U, Kashyap S, Narula V, Thomas S Suvira, VirS, Chopra S (2010) Basic Food Preparation: A Complete Manual, 4th Edition, Orient Black Swan Ltd,Mumbai
3. Srivastava R.P. (2012),Fruit and vegetable preservation – Principles and Practices, International Book Distributing Co., (IBDC), NewDelhi.
4. Maria Parloa (2009), canned fruit, preserves and jellies: Household methods of preparation, US Department of Agriculture, Washington.5
5. Shafiur, Rahman, M. (2007), Handbook of Food Preservation, 2 nd edition, CRC press, NewDelhi

Date

CourseCoordinator

Subject CommitteeChairperson

Ba/B. Sc. HOME SCIENCE
SEMESTER 2

Course Title: Fundamentals of Human Development (DSC A2)	
Total Contact Hours: 60 Hrs.	Course Credits: 4
Formative Assessment Marks: 40 marks	Duration of ESA / Exam: 3 hrs.
Model Syllabus Authors:	Summative Assessment Marks: 60 marks

Course Pre-requisite(s): Standard 12 and its equivalence with minimum 35% Course

Outcomes (COs):

At the end of the course the student should be able to:

1. Explain the need and the importance of studying human growth and development across lifespan.
2. Identify the biological and environmental factors affecting human development.
3. Describe the characteristics, needs and developmental tasks of different stages in the human lifecycle
4. Discuss the special features characteristic of each stage and its impact on the next stage
5. Explain the broad theoretical perspectives of different researchers.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12
Explain the need for and importance of studying human growth and development across life span.		X		X	X						X	

Identify the biological and environmental factors affecting human development.								X	X		X	
Describe the characteristics, needs and developmental tasks of different stages in the human life cycle								X		X		X
Discuss the special features characteristic of each stage and its impact on the next stage			X	X								
Explain the broad theoretical perspectives of different researchers.			X	X					X			

Ba/B.Sc. HOME SCEINCE
SEMESTER 2

Title of the Course: FUNDAMENTALS OF HUMAN DEVELOPMENT

Course : DSC A2	
Number of Theory Credits	Number of lecturehours/semester
4	60

CONTENT	60 Hrs
Unit – 1 Introduction	20 Hrs
Chapter No. 1 Human Development – Definition, needs, and Scope; Domains of Development:	3 Hrs
Chapter No. 2 Concept and principles of Growth and development; Factors influencing growth and development.	5 Hrs
ChapterNo. 3 Methods of studying Human development, Prenatal development	3 Hrs
Chapter No. 4 Fertilization, Pregnancy–Signs, Symptoms, Complications, Discomforts; Stages of Prenatal Development	5 Hrs
Chapter No. 5 Child Birth - Process and types, Birth complications	4 Hrs
Unit – 2 Infancy and Early childhood Years	20 Hrs
Chapter No. 6. Infancy - Definition, Significance, Developmental Tasks, and developmental milestones; Physical growth, reflexes and perceptual	

abilities, Immunization Schedule;	
Chapter No. 7. Early Childhood Years- Definition, Developmental tasks; physical, motor, intellectual, language, emotional, social developmental milestones. importance of preschool education and Significance of play for all-round development	8 Hrs
Chapter No. 8. Piaget's cognitive Theory and Erik Erickson's Personality Theory.	4 Hrs
Unit – 3 Middle Childhood Years	20 Hrs
Chapter No. 9 The Middle Childhood Years - Definition, Developmental tasks. Highlights of Physical, Social, Emotional, Intellectual development. Significance of school and functions; Importance of extra-curricular activities, Peers - Importance and Influence, Interestdevelopment	12 Hrs
Chapter No. 10 Role of Parents and Disciplinary Techniques; Role of siblings, peers and others in the development; Behaviorproblems	8 Hrs

Formative Assessment = 100 marks	
Assessment Occasion / type	Weightage in Marks
Test 1	15
Test 2	15
Assignment + Project	5 + 5
3 Total	60 marks + 40 marks = 100 marks

Practical:2Credits

60Hrs

List of Experiments to be conducted

1. Prepare an album on the stages of prenatal development.
2. Organize a lecture/workshop for parents on importance of the nutrition/ Needs of preschool children.
3. Develop an activity to foster cognitive development in school children

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
Test 1	15
Test 2	15
Assignment /Project	5+5
Total	60 marks + 40 marks = 100 marks

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1. Berk, L.E. (2005). Child development (5th ed.). New Delhi: Prentice Hall.
2. Bhangaokar, R., & Kapadia, S. (in press). Human Development Research in India: A historical overview. In G. Misra (Ed.), Hundred years of Psychology in India. New Delhi: Springer.
3. Feldman, R., & Babu, N. (2009). Discovering the life span. New Delhi: Pearson
4. Kakar, S. (1998). The inner world. Psychoanalytic study of childhood and society in India. Delhi: Oxford University Press.
5. Kapadia, S. (2011). Psychology and human development in India. Country paper. International Society for the Study of Behavioural Development Bulletin Number 2, Serial No. 60, pp.37-42.
6. Keenan, T., Evans, S., & Crowley, K. (2016). An introduction to Child development. Sage.
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TamilNadu.

Date

CourseCo-ordinator

Subject CommitteeChairperson

Ba/B.Sc. HOME SCIENCE
SEMESTER 2

Course Title: TEACHING MATERIALS FOR EARLY CHILDHOOD EDUCATION (OE 2)	
Total Contact Hours: 45 Hrs	Course Credits: 3
Formative Assessment Marks: 60marks	Duration of ESA/Exam: 3 Hrs
Model Syllabus Authors:	Summative Assessment Marks: 40marks

Course Pre-requisite(s): Standard 12 and its equivalence with minimum 35%

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Understand the importance of teaching learning materials.
2. Understand the different teaching methods & materials for early years
3. Understand the different teaching methods & materials developmentally challenged children

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12
Understand the importance of teaching learning materials		X		x			x					
Understand the different teaching methods & materials for early years			x				x		x			
Understand the different teaching methods & materials developmentally challenged children			x				x		x			

B.Sc. HOME SCIENCE
SEMESTER 2

Title of the Course: TEACHING MATERIALS FOR EARLY CHILDHOOD EDUCATION

Course: OE 2	
Number of Theory Credits	Number of lecturehours/semester
3	45

CONTENT	45 Hrs
<p>Chapter No. 1- Objectives of Teaching-Learning Materials, Orientation on different methods and materials used for teaching young children and studying the techniques of different methods.</p> <ul style="list-style-type: none"> • The oral communication methods: (stories, songs, Music, description, explanation, etc.) and conversational methods (conversation, heuristic conversation, questioning on a special subject, etc.). • Exploratory learning methods: direct exploration of objects and phenomena (systematic and independent observation, small experiments, etc.) and indirect exploration (demonstration through pictures, films, etc.). • Methods based on the pupils' direct voluntary action (exercises, practical work, etc.) and simulated action (didactic games, learning through drama, etc.). • Use of natural materials (plants, shells, seeds, insects, rocks, sand, etc.) • Intuitive materials (cast and clay models, Puppets, blocks, puzzles, mazes, etc) • Figurative aids (pictures, photographs, atlas books, maps, albums, table games, etc.) 	15 Hrs

<ul style="list-style-type: none"> Printed teaching aids (children's books, workbooks, etc.). Printed teaching aids Digital material (audio & videos)	
Unit-II – Development of Materials for Early years	13 Hrs
Chapter No. 2- Design and development of developmentally appropriate play materials to foster all round development in children using indigenous materials, Developing stories, songs with music and rhythm appropriate for infancy through early childhood	8 Hrs
Chapter No. 3 - Creative Activities - importance, Types and values promoted, method of giving instructions. Process of scripting for puppet plays and creative drama. a) Painting – free hand, finger, thread, wax resist & spray b) Printing -block, leaf, stencil, thumb c) Pasting – collage, paper mosaic, sand d) Miscellaneous-etching, marbling, dough modelling	5 Hrs
Unit –III- Development of Materials for developmentally challenged children	12 Hrs
Chapter No. 4- Creating teaching learning materials for developmentally challenged children (Blind, Dumb & deaf, Learning disabilities, Speech disorders, Mentally retarded, Gifted children, Slow learners)	8 Hrs
Chapter No. 5 - Designing & developing digital play materials like videos, audio aids or audio- Visual aids	4 Hrs

Formative Assessment = 100 marks	
Assessment Occasion / type	Weightage in Marks
Test 1	15
Test 2	15
Assignment + Project	5 + 5
3 Total	60 marks + 40 marks = 100 marks

Reference:

1. Contractor,M., 1984, Creative drama and puppetry in education, National book trust of India,Delhi
2. Devadas P. Rajammal and N. Jaya (1996), “A Textbook on child development”, Mac Millan India Ltd. NewDelhi.
3. Nasim Siddiqi, Suman Bhatia and Suptika Biswas (2007) Early Childhood Care and Education –Book IV, DOABA HOUSE, NewDelhi.
4. Sen Gupta, M. (2009). Early Childhood Care and Education. New Delhi: PHI Learning Pvt.Ltd.
5. Soni,R., 2015,Theme based early childhood care and education programme- A Resource Book,NCERT

Date CourseCo-ordinator Subject CommitteeChairperson

**Structure of
B.Sc. (Hons.) with
Nutrition and Dietetics as a
Major / Minor Subject & M.Sc.
Nutrition and Dietetics
(Model II A)**

Preamble

The subject wise expert committee to draft model curriculum contents in Nutrition & Dietetics constituted by the Department of Higher Education, Government of Karnataka, Bangalore vide GO No. ED 260 UNE 2019 (PART-1) DATED 13.08.2021 is pleased to submit its partial report on the syllabus for the First Year (First & Second Semesters) B.Sc.(Basic/Honors) Nutrition and Dietetics and detailed Course Structure for B.Sc.(Honors) Nutrition and Dietetics and M.Sc.(OneYear) Nutrition and Dietetics.

The committee discussed various models suggested by the Karnataka State Higher Education Council in its joint meetings with the Chairpersons of Board of Studies of all state universities in Karnataka and resolved to adopt Model IIA (Model Program Structure for the Bachelor of Arts (Basic/Hons.)/ Bachelor of Science (Basic/Hons.) for the subjects with practical with Nutrition and Dietetics as Major/Minor.

The B.Sc (Honors) programme in Nutrition and Dietetics intends to create competent professionals with in-depth understanding of various aspects offered under this programme. The programme offers a broad range of courses spanning across areas of community nutrition, food science, dietetics, and nutrition counseling. The four-year programme aims at conceptual understanding of the key elements of nutrition and dietetics. Students would be trained in areas such as nutritional assessment, diet planning, food product development, health communication, clinical nutrition, nutrition education and behavior modification. The programme would also introduce students to research methodology and statistics which would be pivotal in developing

reasoning, logic, problem solving and scientific temper. The students would be further exposed to continuous hands-on training through regular practical and internship experience. This would enable creative and critical thinking among the students. The comprehensive programme would enable students to keep themselves updated through internship, practical and projects.

The subject expert committee designed the Course Learning Outcome (CO) to help the learners to understand the main objectives of studying the courses by keeping in mind of the Programme outcomes (PO) of the graduate degree with honors in Nutrition and Dietetics or a graduate degree with Nutrition and Dietetics as a major subject.

As the field of Nutrition and Dietetics is vast, dynamic and an evolving area of specialization. This requires students to learn and be abreast with recent advances and evidence- based guidelines in the field of food and nutrition. Hence the subject expert committee suggests introduction of elective papers (for both Discipline electives and Open Electives) along with Discipline Core Courses. The BoS in Nutrition and Dietetics of universities may include additional electives based on the expertise of their staff and needs of the students. Student can select elective paper as per her/his needs and interest. The skills and attributes acquired during the programme would open doors to job opportunities in areas of food science, nutrition, health promotion, and disease management, also paves way for research and higher education for interested students.

Model Curriculum

Name of the Degree Program: M.Sc. Discipline

**Core: Food Science and Nutrition Total Credits for
the Program: 265**

Starting year of implementation: 2021-22

Program Outcomes:

By the end of the program the students will be able to:

PO 1	Disciplinary Knowledge: Understand the role and importance of food and nutrition for the welfare of the community and acquire the skills in planning diet, health and diseases
PO 2	Communication Skills: Learn and apply evidence-based guidelines in the field of dietetics, nutrition counselling, nutrition research laboratory, community
PO 3	Critical thinking: Understand the structure and functions of the different organs systems in relation to nutrition
PO 4	Interpersonal and Problem Solving: Design solutions and novel food products to meet the specified nutrient needs with appropriate consideration for the public health and safety.
PO 5	Critical thinking, Communication and problem solving: Comprehend, communicate effectively, plan, design and implement programs in the field of nutrition and dietetics
PO 6	Decision making, Analytical and Research skills: Understand and demonstrate the knowledge of food science, food science and quality control in societal and environmental contexts

PO 7	Moral and ethical awareness/reasoning and Research skills: Apply ethical principles and commit to professional ethics and responsibilities in the field of nutrition, sports, food industry and health care sectors.
PO 8	Interpersonal and Business skills: Understand the applications of nutraceuticals and functional foods in the product development from conceptualization to evaluation of the quality of the food product
PO 9	Analytical and Research skills: Comprehend the knowledge and role of food additives in food industry in relation to its analytical techniques
PO 10	Critical thinking, Analysis and Research skills: Understand and apply the concept of nutrients and nutritional science in the evaluation of health and disease
PO 11	Goal Setting and Problem-solving skills: Enable students to pursue higher education and research

Assessment:

Weightage for assessments (in percentage)

Type of Course	Formative Assessment / IA	Summative Assessment
Theory	40	60
Practical	25	25
Projects	40	60
Experiential Learning (Internships etc.)	80	20

Content of Courses for B.Sc. Degree/Honours in Nutrition and Dietetics

Model II A

Semester	Course Code.	Category of course	Theory/ Practical	Credits	Paper Titles	Marks	
						S.A	I.A
I	NDT1.1	DSC	Theory	4	Fundamentals of nutrition	60	40
	NDP1.1	DSC	Practical	2	Fundamentals of nutrition	25	25
	NDT1.2	OE	Theory	3	Fundamentals of food and health / Healthy lifestyle and nutrition	60	40
II	NDT2.1	DSC	Theory	4	Principles of Food Science and Preservation	60	40
	NDP2.1	DSC	Practical	2	Principles of Food Science and Preservation	25	25
	NDT2.2	OE	Theory	3	Food safety and Hygiene/ Food Adulteration	60	40
Exit Option with Certificate in Nutrition and Dietetics (52 Credits)							
III	NDT3.1	DSC	Theory	4	Nutrition through life span	60	40
	NDP3.1	DSC	Practical	2	Nutrition through life span	25	25
	NDT3.2	OE	Theory	3	Nutritional Assessment/ Traditional Foods and Health	60	40
IV	NDT4.1	DSC	Theory	4	Human Physiology	60	40
	NDP4.1	DSC	Practical	2	Human Physiology	25	25
	NDT4.2	OE	Theory	3	Nutrition in weight management/ Diet in life style disorder	60	40
Exit Option with Diploma in Nutrition and Dietetics (100 Credits)							
V	NDT5.1	DSC	Theory	3	Clinical Nutrition & Dietetics –1	60	40
	NDP5.1	DSC	Practical	2	Clinical Nutrition & Dietetics –1	25	25

	NDT5.2	DSC	Theory	3	Intermediary metabolism	60	40
	NDP5.2	DSC	Practical	2	Intermediary metabolism	25	25
	NDT5.3	VOC	Theory	2	Food Product Development & Sensory analysis	60	40
	NDP5.3	VOC	Practical	1	Food Service Management	25	25
	NDT5.4	Minor	Theory	3	Nutrition Psychology and Diet Adherence	60	40
	NDP5.4	Minor	Practical	2	Nutrition Psychology and Diet Adherence	25	25
VI	NDT6.1	DSC	Theory	3	Clinical Nutrition & Dietetics –II	60	40
	NDP6.1	DSC	Practical	2	Clinical Nutrition & Dietetics –II	25	25
	NDT6.2	DSC	Theory	3	Community Nutrition & Public Health	60	40
	NDP6.2	DSC	Practical	2	Community Nutrition & Public Health	25	25
	NDP6.3	VOC	Practical	3	Food Analysis	25	25
	NDT6.4			2	Internship	25	25
	NDT6.5	Minor	Theory	3	Assessment of Nutritional Status	60	40
	NDP6.5	Minor	Practical	2	Assessment of Nutritional Status	25	25
Exit Option with Bachelor in Science Degree in Nutrition and Dietetics (144 Credits)							
	NDP5.3	VOC	Practical	1	Food Service Management	25	25
	NDT5.4	Minor	Theory	3	Nutrition Psychology and Diet Adherence	60	40
	NDP5.4	Minor	Practical	2	Nutrition Psychology and Diet Adherence	25	25

VI	NDT6.1	DSC	Theory	3	Clinical Nutrition & Dietetics –II	60	40
	NDP6.1	DSC	Practical	2	Clinical Nutrition & Dietetics –II	25	25
	NDT6.2	DSC	Theory	3	Community Nutrition & Public Health	60	40
	NDP6.2	DSC	Practical	2	Community Nutrition & Public Health	25	25
	NDP6.3	VOC	Practical	3	Food Analysis	25	25
	NDT6.4			2	Internship	25	25
	NDT6.5	Minor	Theory	3	Assessment of Nutritional Status	60	40
	NDP6.5	Minor	Practical	2	Assessment of Nutritional Status	25	25
Exit Option with Bachelor in Science Degree in Nutrition and Dietetics (144 Credits)							
VII	NDT7.1	DSC	Theory	3	Advanced Nutrition –I	60	40
	NDP7.1	DSC	Practical	2	Advanced Nutrition –I	25	25
	NDT7.2	DSC	Theory	3	Advanced Food Science	60	40
	NDP7.2	DSC	Practical	2	Advanced Food Science	25	25
	NDT7.3	DSC	Theory	3	Food Microbiology, Sanitation & Hygiene	60	40
	NDT7.4	DSE	Theory	3	Statistics for Nutrition Research / food and Drug interaction	60	40
	NDT7.5	DSE	Theory	3	Food Processing & Preservation / Functional food quality	60	40
	NDT7.6	DSE	Theory	3	Research Methodology	60	40
VIII	NDT8.1	DSC	Theory	3	Advances in Medical Nutrition Therapy	70	40
	NDP8.1	DSC	Practical	2	Advances in Medical Nutrition Therapy	25	25

	NDT8.2	DSC	Theory	3	Advanced Nutrition-II	60	40
	NDT8.3	DSC	Theory	3	Exercise physiology and nutrition	60	40
	NDT8.4	DSE	Theory	3	Nutrition counselling / Nutrition care process	60	40
	NDT8.5		Research Project/	6	Research Project	140	60
Exit Option with Bachelor in Science Honours in Nutrition and Dietetics (185 Credits)							
IX	NDT9.1	DSC	Theory	3	Nutraceuticals and Functional Foods	60	40
	NDP9.1	DSC	Practical	2	Nutraceuticals and Functional Foods	25	25
	NDT9.2	DSC	Theory	3	Nutrition in critical care	60	40
	NDP9.2	DSC	Practical	2	Nutrition in critical care	25	25
	NDT9.3	DSC	Theory	3	Food safety & quality assurance	60	40
	NDT9.4	DSE	Theory	3	Nutrition in emergencies / Food sanitation & hygiene	60	40
	NDT9.5	VOC	Theory	3	Maternal & child nutrition / Precision nutrition and Nutrigenomics	60	40
	NDT9.6	DSE	Theory	3	Food Additives/ Nutritional Biochemistry	60	40
X	NDT10.1	DSC	Theory	3	Sports Nutrition	60	40
	NDT10.1	DSC	Practical	2	Sports Nutrition	25	25
	NDT10.2	DSC	Theory	3	Program Planning and Nutrition	60	40
	NDT10.3	DSC	Theory	3	Nutrition Education in Community	60	40
	NDT10.4	DSE	Theory	3	Geriatric Nutrition / Pediatric Nutrition	60	40
	NDT10.5		Dissertation	6	Dissertation/ Research project	140	60

Award with Master in Science in Nutrition and Dietetics (265 Credits)

*In lieu of the research Project, two additional elective papers/ Internship may be offered

Abbreviation ND – Nutrition and Dietetics; DSC – Discipline Core; DSE –Discipline Specific Elective; T – Theory/ P – Practical; VOC-Vocational; OE- Open Elective; E-Elective ; MIN -minor

CURRICULUM STRUCTURE FOR UNDERGRADUATE DEGREE PROGRAM

Name of the Degree Program: B.Sc. (Honors)

Discipline / Subject: Nutrition and Dietetics

Starting Year of Implementation: 2021-22

PROGRAM ARTICULATION MATRIX

Semester	Course No	Program outcomes that the course addresses	Pre Requisite Course (s)	Pedagogy	Assessment
I	DSC 1 Fundamentals of nutrition	PO1 PO2	PUC/12 th Science students	➤ MOOC ➤ Seminar ➤ Assignments	Formative and Summative Assessment
	OE 1 Fundamentals of food and health / Health lifestyle and nutrition	PO1 PO2	PUC/12 th Science students	➤ Group ➤ Discussion ➤ Case Studies ➤ Lecture	Formative and Summative Assessment
II	DSC- 2 Principles of Food Science and Preservation	PO1 PO4 PO6	PUC/12 th Science students	➤ ICT ➤ Content Review ➤ Audio -VideoMaterials	Formative and Summative Assessment
	OE- 1 Food safety and Hygiene/ Food Adulteration	PO1 PO4 PO6	PUC/12 th Science students	➤ Demonstration ➤ Field Visits ➤ Hands OnTraining ➤ Observation ➤ On The FieldTraining ➤ Review ➤ Research ➤ Article ➤ Presentations ➤ Nutrition Education Tools And Module Development	Formative and Summative Assessment

Syllabus for B.Sc. with Nutrition and Dietetics as Major Subject & B.Sc. (Hons) Nutrition and Dietetics

B.Sc NUTRITION AND DIETETICS SEMESTER 1

Title of the Course: FUNDAMENTALS OF NUTRITION

Course Title: Fundamentals of Nutrition (DSC 1)	
Total Contact Hours: 45 Hours	Course Credits:3
Formative Assessment Marks: 40	Duration of ESA/Exam: 3 hours
Model Syllabus Authors:	Summative Assessment Marks: 60

Course Pre-requisite(s): PUC Science students

Course Outcomes (COs):

1. Gain knowledge in basic terminology, aspects of nutrition & functions of food in healthy lifesustenance
2. Understand function of nutrients, dietary sources, consequences of deficiency and excess
3. Understand the food composition and concept of energy balance
4. Equip with knowledge and understanding on importance of water

Course Articulation Matrix:

Course Outcomes (COs) / Program Outcomes(POs)	1	2	3	4	5	6	7	8	9	10	11	12
Gain knowledge in basic terminology, aspects of nutrition & functions of food in healthy life sustenance	X											
Understand function of nutrients, dietary sources, consequences of deficiency and excess	X									x		
Understand the food composition and concept of energy balance	X											

Equip with knowledge and understanding on importance of water	X												
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B.Sc NUTRITION AND DIETETICS SEMESTER 1

Title of the Course: FUNDAMENTALS OF NUTRITION

Course: DSC- 1	
Number of Theory Credits	Number of lectureHours/semester
3	45

Content	45 Hrs
Unit – 1 Introduction to Nutrition	14 hours
Understanding concept of nutrition, nutrients, nutritional status, malnutrition Functions of food, food groups, concept of balanced diet Methods of cooking and preservation of Nutrients Water: Functions, sources and water balance	
Unit - 2 Macronutrients	14 hours
Classification, Sources, Functions and Deficiency of Carbohydrates, Dietary Fibre Proteins and fats	
Unit - 3 Energy Metabolism	14 hours
Significance, components, factors influencing body composition, energy metabolism, BMR Measurement methods – Direct and Indirect Energy expenditure in activities, the use of doubly labeled water Influence of energy excess & deficit on body composition – obesity and under nutrition. Current methodology, Recommendations	

Unit – 4 Micro Nutrients - Sources, Functions and Deficiency	14 hours
Minerals: Calcium, Phosphorous, Iron, Iodine, Zinc Fat soluble vitamins (Vitamin A, D, E, K) Water soluble vitamins (B complex vitamins: Thiamine, Riboflavin, Niacin, Folic acid and Vitamin C)	

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
CIA	15+ 15
Presentation / Assignment	10
Total	30

Practical:2Credits

60Hrs

List of Experiments to be conducted

1. Weights and measures
2. Methods of cooking
 - a. Water – boiling, steaming, pressure cooking
 - b. Oil- Shallow frying, deep frying
3. Identification of nutrient rich food
4. Planning and preparation of macro nutrient rich recipes
 - a. Energy
 - b. Protein
5. Planning and preparation of micro nutrient recipes
 - a. Iron
 - b. Vitamin A

REFERENCES

1. Raheena Begum., (2009), A Text book of Food, Nutrition & Dietetics, Sterling Publications, New Delhi.
2. Mudambi S R and Rajagopal M V., (2008), Fundamentals of Food, Nutrition and Diet Therapy by New Age International Publishers, New Delhi
3. Srilakshmi. B., (2009), Human Nutrition, New Age International Publishers

Date

Course Co-ordinator

Subject Committee Chairperson

B.Sc NUTRITION AND DIETETICS SEMESTER 1

Title of the Course: FUNDAMENTALS OF FOOD & HEALTH -OE

Course Title: FUNDAMENTALS OF FOOD AND HEALTH (OE-1)	
Total Contact Hours: 45	Course Credits: 3
Formative Assessment Marks: 40	Duration of ESA/Exam: 3 hours
Model Syllabus Authors:	Summative Assessment Marks: 60

Course Outcomes (COs):

1. Gain knowledge on key nutrients and their implications on health
2. Familiarize with the concept of health and issues of public health concern
3. Understand the effect of novel and processed foods on general health and wellbeing

Course Articulation Matrix:

Course Outcomes (COs) / Program Outcomes(POs)	1	2	3	4	5	6	7	8	9	10	11	12
Gain knowledge on key nutrients and their implications on health	X											
Understand the effect of novel and processed foods on general health and well being	X											

B.Sc NUTRITION AND DIETETICS SEMESTER 1

Title of the Course: FUNDAMENTALS OF FOOD & HEALTH

Course: OE-1	
Number of Theory Credits	Number of lectureHours/semester
3	45

Content	45 Hours
Unit–1 Overview of Food &Macronutrients	12 hours
Overview of Food & Nutrients, Food choice and factors influencing food choice Classification of nutrients – macronutrients and micronutrients. Energy, Carbohydrates, Protein and Fats Classification, Functions and Sources Impact of macronutrients on health – Deficiency and Excess	
Unit - 2 Micronutrients & Water	11 hours
Micronutrients - Classification, Functions and Sources Impact of micronutrients on health – Deficiency and Excess Water – Role, Body fluids and electrolytes	
Unit – 3 Components of health	11 hours

<p>Health – Definition, Components, Factors influencing health, Dietary guidelines</p> <p>Issues of public concern</p> <p>Malnutrition, Anemia, Vitamin A deficiency, Obesity, Diabetes and Hypertension</p>	
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Unit - 4 Foods for health and well being	11 hours
<p>Functional foods – Probiotics, prebiotics and phytochemicals</p> <p>Health supplements, processed foods, organic foods</p> <p>Nutrition label – understanding and importance</p>	
Unit - 4 Foods for health and well being	11 hours
<p>Functional foods – Probiotics, prebiotics and phytochemicals</p> <p>Health supplements, processed foods, organic foods</p> <p>Nutrition label – understanding and importance</p>	

Formative Assessment = 100 marks	
Assessment Occasion / type	Weightage in Marks
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Total	60 marks + 40 marks = 100 marks

References

1. Antia F.P., Philip Abraham, Clinical Dietetics and Nutrition, Oxford University Press; 4th edition.
2. Kathleen Mahan L., Sylvia Escott-Stump, Krause's food, nutrition and diet therapy (11th edition). Saunders company, London.
3. Passmore R. and Davidson S. (1986) Human nutrition and Dietetics. Liming stone publishers.
4. Robinson C.H. Careme, Chenometh W.L., Garmick A.E. (1986) 16th edition Normal Therapeutic nutrient. Publish by Mc Millan Company NewYork.
5. Shil's M.E., Alfon J.A., Shike M (1994), Modern nutrition in health and diseases eighth edition.
6. William S.R., Nutrition and Diet Therapy fourth edition C.V. Mos Company.

Date

Course Co-ordinator

Subject Committee Chairperson

B.Sc. NUTRITION AND DIETETICS SEMESTER 2

Title of the Course: PRINCIPLES OF FOOD SCIENCE & PRESERVATION

Course Title: Principles of Food Science & Preservation (DSC- 2)	
Total Contact Hours: 45	Course Credits: 3
Formative Assessment Marks:40	Duration of ESA/Exam: 3 hrs
Model Syllabus Authors:	Summative Assessment Marks: 60

Course Pre-requisite(s): 12 std / PUC SCIENCE

Course Outcomes (COs):

1. Apply basic nutrition knowledge in making foods choices and obtaining an adequatediet
2. Learn to distinguish and relate the characteristics and properties offoods
3. Apply the knowledge gained on characteristics and properties of foods during cooking
4. Develop appropriate food preparation and processing methods to ensurequality standards

Course Articulation Matrix:

Course Outcomes (COs) / Program Outcomes(POs)	1	2	3	4	5	6	7	8	9	10	11	12
Learn to distinguish and relate the characteristics and properties of foods	X					X						
Apply the knowledge gained on characteristics and properties of foods during cooking.				X								
Develop appropriate food preparation and processing methods to ensure quality standards				X		X						

B.Sc NUTRITION AND DIETETICS SEMESTER 2

Title of the Course: Principles of Food Science & Preservation

Course: DSC- 2	
Number of Theory Credits	Number of lectureHours/semester
3	45

CONTENT	56 Hours
Unit – 1	14 hours
Introduction to Food Science Properties of food (a) Colloids, sols, gels, foam- (b) Emulsion formation- (c) Bound and free water -(d) pH Value, osmosis and osmotic pressure- (e) Boiling, melting and freezing points Sensory Evaluation- Subjective and objective. Cereals & Millets-Production, importance & composition- Cereal Products. Wheat, rice maize, ragi and sorghum. Malting and cooking of cereals, non-enzymatic reactions, Leavening agents. Fermented products, Milling of wheat, Parboiling of Rice, Pulses- composition, toxic constituents and cooking of pulses, variety and processing	

Unit – 2	14 hours
<p>Fruits and vegetables – Production composition, pigments, flavors and variety- changes during cooking-enzymatic browning, non-enzymatic browning.</p> <p>Milk and milk products- composition, storage- Processing of milk- Coagulation- Milk products available in India.</p> <p>Egg- structure, composition, storage, grade, quality, selection, Role of egg in food preparation, coagulation.</p>	16hrs
Unit – 3	14 hours
<p>Sugar, Jaggery and honey - Composition, different forms of sugar, storage- Behaviors of syrups at different temperatures- Crystallization and caramelization</p> <p>Oil and Fats- Composition, types, storage, plasticity, Hydrogenation and processing .Changes during heating- Fats as shortening agents, smoking point, Rancidity, specific fat (Lard, Butter,Margarine)</p> <p>Meat, Fish poultry-structure, composition, storage, Post mortem changes in meat, Curing of meat, Tenderization, Aging of meat, selection, Meat cookery.</p>	
Unit – 4	14 hours
<p>Methods of cooking, nutrient loss during cooking</p> <p>Concepts of food safety and standards</p> <p>Food Preservation, food spoilage, method of preservation by low temperature, high temperature, dehydration, food irradiation</p>	

Formative Assessment = 100 marks	
Assessment Occasion / type	Weightage in Marks
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Total	60 marks + 40 marks = 100 marks

Practical:2Credits

60Hrs

List of Experiments to be conducted

1. Weights & measures, standardization of common food preparation.
2. Sensory evaluation
3. Starch cookery I-microscopic observation of different starches gel formation and gelatinization.
4. Starch cookery II- Rice and Wheat preparation, factors influencing dough development and gluten formation. Leavened products, milk cookery-casein formation, curd setting.
5. Fermented products and pulse cookery.
6. Vegetable cookery- Effect on pigments and enzymatic browning in fruits and vegetables
7. Egg cookery and fat and oil cookery.
8. Sugar and Jaggery- Syrup formation, crystallization and caramelization.

9. Leavened products, milk cookery-casein formation, curd setting.
10. Fermented products and pulse cookery.
11. Vegetable cookery- Effect on pigments and enzymatic browning in fruits and vegetables
12. Egg cookery and fat and oil cookery.
13. Sugar and Jaggery- Syrup formation, crystallization and caramelization.

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
CIA	15+15
Presentation / Assignment	10
Total	40

References

1. Arora K., Gupta K.V., Theory of cooking
2. Bennen Marion. Introductory foods
3. Lavies. (1998) Food commodities. Heinemann Ltd, London
4. Lowe Bella Experimental cookery
5. Norman N Potter, Joseph H Hotchkiss (1999) Food science Technology
6. Peckham. Foundation of food preparation
7. Srilakshmi. Food Science. New Age International Publishers, New Delhi.

Sari Edelstein, 2014, Food Science-An ecological approach, Jones & Bartlett Learning, MA

Date

Course Co-ordinator

Subject Committee Chairperson

B.Sc NUTRITION AND DIETETICS SEMESTER 2

Course Title: FOOD SAFETY AND HYGIENE (OE- 2)	
Total Contact Hours: 45	Course Credits: 3
Formative Assessment Marks: 40	Duration of ESA/Exam: 3 hours
Model Syllabus Authors:	Summative Assessment Marks: 60

Course Outcomes (COs):

1. Gain knowledge on food safety and their implications on health
2. Familiarize with the concept of food safety issues on public health
3. Understand the standards, laws and regulations regarding food safety

Course Articulation Matrix:

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12
Gain knowledge on food safety and their implications on health	X											
Familiarize with the concept of food safety issues on public health	X					X						
Understand the standards, laws and regulations regarding food safety						X						

B.Sc NUTRITION AND DIETETICS SEMESTER 2

Title of the Course: FUNDAMENTALS OF FOOD SAFETY AND HYGIENE (OE-2)

Number of Theory Credits	Number of lecture hours/semester
3	45

Content	45 Hours
Unit–1 Introduction to FoodSafety	11hours
Concept and meaning of Food Safety, food adulteration, food hazards Food laws and regulations – National (FSSAI) and international (FAO) food laws, Governingbodies Exposure, estimation, toxicological requirements and risk analysis Safety aspects of water and beverages Safety assessment of food contaminants and pesticide residues	
Unit – 2 Food Safety: Principles of prevention	11 hours
Reduce microbial contamination and control growth Eliminate source of contaminants Sanitation: principle and purposes	
Unit – 3 Food Protection	11 hours

Food protection by: Thermal transfer methods, Chemical methods, Biocontrol methods and biotechnology, Irradiation methods Foodborne Illness Risk Factors Food worker Education and training	
Unit - 4 Food Hygiene	12 hours
Food hygiene law and the importance of food safety. Food Safety Hazards. Temperature control, food deliveries, refrigeration, low and high-risk foods,	

use by dates and best before dates, and stock rotation (FIFO). Cross-Contamination Hand hygiene, further hygiene considerations, protective clothing, reporting illness and first aid.	
use by dates and best before dates, and stock rotation (FIFO). Cross-Contamination Hand hygiene, further hygiene considerations, protective clothing, reporting illness and first aid.	

Formative Assessment = 100 marks	
Assessment Occasion / type	Weightage in Marks
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Total	60 marks + 40 marks = 100 marks

References

1. Food Safety-Theory and Practice:Paul L. Knechtges, Jones & BartlettLearning,2012
2. Food Hygiene and Sanitation With case studies, Sunetra Roday, 2nd Edition, Tata McGraw Hill Education PvtLtd.,2011
3. Kirk, R.S and Sawyer , R.: Pearson's composition and analysis of foods, Longman Scientific and technical. 9th Edition, England.1991
4. Bryan,F.L: Hazardous Analysis Critical Control Point Evaluation. A guide to identifying Hazards and assessing risks associated with food preparation and storage. WHO,Geneva.1992
5. Bureau of Indian Standards: Specifications and Standardmethods.

Date

CourseCo-ordinator

Subject CommitteeChairperson

**Structure of B.Sc
Honours in
Clinical Nutrition and Dietetics and
M.Sc. in
Clinical Nutrition and Dietetics
(Model I C)**

Model Curriculum

Name of the Degree Program: B.Sc. Honours and M.Sc.

Discipline Core: Clinical Nutrition and Dietetics

Total Credits for the Program: 224 Starting

year of implementation: 2021-22 Program

Outcomes:

By the end of the program the students will be able to: -

PO	Program Outcomes
PO1	Understand the basic concepts of food science and nutrition and role of food and nutrients in growth, development, disease prevention and management.
PO2	Explain functions of macro and micronutrients, deficiencies, disorders and identify foods rich in specific nutrients.
PO3	Understand the complex processes of human physiology, metabolism, and human biochemistry with reference to energy and nutrition requirements.
PO4	Competent to implement food safety regulations and create awareness about sanitation, safety, hygiene for individuals, families, and communities.
PO5	Understand food and nutrition security and create awareness to public and communities.
PO6	Evaluate and assess the nutrient requirements of infants, children, and adults.
PO7	Critically analyze nutritional status of different age groups, and design diet plan as per the nutritional requirements.
PO8	Understand the importance of nutrition in lifestyle disorders and derive plan accordingly.

PO9	Apply technical skills, knowledge of nutrition, and decision-making skills, assessing capabilities in evaluating the nutritional status of individuals and communities and their response to nutrition intervention
PO10	Provide nutrition awareness and counseling to individuals, groups, and communities.

PO11	Competence in the skills of Nutritional assessment, Diet planning and Food service management in health-care systems, communities, and institutions
PO12	Shall be able to understand the principles of fitness and nutrition, during various stages of life cycle such as childhood, adolescence and old age and assess and evaluate their dietary and exercise habits.
PO13	Data collection and interpretation in nutrition surveys and critical analysis to resolve complex societal problems
PO14	Maintain ethical, legal, and professional practice standards during nutritional counselling or consultancy and to take leadership roles in fields of health, food research laboratories, dietetics, special nutritional needs, and nutritional counseling.
PO15	Practice and implement state of art nutrition care or consultancy in health food industry, critical care nutrition segments, clinical setups, nutraceutical industry, sports and fitness centers, therapeutic nutrition product manufacturing set ups, geriatric care units, meal/food distribution centers, women and child development organizations, Food auditing set ups, Food testing labs and Foodcorporations.
PO11	Competence in the skills of Nutritional assessment, Diet planning and Food service management in health-care systems, communities, and institutions
PO12	Shall be able to understand the principles of fitness and nutrition, during various stages of life cycle such as childhood, adolescence and old age and assess and evaluate their dietary and exercise habits.
PO13	Data collection and interpretation in nutrition surveys and critical analysis to resolve complex societal problems

PO14	Maintain ethical, legal, and professional practice standards during nutritional counselling or consultancy and to take leadership roles in fields of health, food research laboratories, dietetics, special nutritional needs, and nutritional counseling.
PO15	Practice and implement state of art nutrition care or consultancy in health food industry, critical care nutrition segments, clinical setups, nutraceutical industry, sports and fitness centers, therapeutic nutrition product manufacturing set ups, geriatric care units, meal/food distribution centers, women and child development organizations, Food auditing set ups, Food testing labs and Foodcorporations.

Assessment:

Weightage for assessments (in percentage)

Type of Course	Formative Assessment / IA	Summative Assessment
Theory	40	60
Practical	25	25
Projects	40	60
Experiential Learning (Internships etc.)	80	20

Contents of Courses for B.Sc. Clinical Nutrition and Dietetics as Major Subject

Model I C

Semester	Course code.	Course Category	Theory/Practical	Credits	Paper Title	Marks	
						S. A	I.A
1.	CNDT 1.1	DSC- 1	Theory	3	Fundamentals of Nutrition	60	40
	CNDP 1.1		Practical	2	Fundamentals of Nutrition	25	25
	CNDT 1.2	DSC- 2	Theory	3	Essentials of Macronutrients	60	40
	CNDP 1.2		Practical	2	Essentials of Macronutrients	35	15
	CNDT 1.3	DSC- 3	Theory	3	Food Sanitation and Hygiene	60	40
	CNDT 1.4	OE - 1	Theory	3	Fundamentals of Food and Health/Health lifestyle and Nutrition	60	40
2.	CNDT 2.1	DSC - 4	Theory	3	Human Physiology	60	40
	CNDP 2.1		Practical	2	Human Physiology	25	25
	CNDT 2.2	DSC- 5	Theory	3	Essentials of Micronutrients	60	40
	CNDP 2.2		Practical	2	Essentials of Micronutrients	25	25
	CNDT 2.3	DSC- 6	Theory	3	Food Safety and Security	60	40
	CNDT 2.4	OE- 2	Theory	3	Food safety and Hygiene /Food Adulteration	60	40
Exit option with Certificate							
	CNDP 3.1	DSC- 8	Practical	2	Life Cycle Nutrition	25	25
	CNDT 3.2		Theory	3	Dietetics I	60	40
	CNDT 3.2		Practical	2	Dietetics I	25	25

	CNDT 3.3	DSC- 9	Theory	3	Nutritional Biochemistry	60	40
	CNDT 3.4	OE- 3	Theory	3	Nutritional Assessment/Traditional Foods in Health	60	40
4.	CNDT 4.1	DSC- 10	Theory	3	Dietetics II	60	40
	CNDP 4.1		Practical	2	Dietetics II	25	25
	CNDT 4.2	DSC- 11	Theory	3	Community Nutrition	60	40
	CNDP 4.2		Practical	2	Community Nutrition	25	25
	CNDT 4.3	DSC- 12	Theory	3	Nutrition in Physical Fitness	60	40
	CNDT 4.4	OE- 4	Theory	3	Nutrition in Weight Management / Diet in Lifestyle Disorders	60	40
Exit Option with Diploma							
5	CNDT 5.1	DSC- 13	Theory	3	Dietetics III	60	40
	CNDP 5.1		Practical	2	Dietetics III	25	25
	CNDT 5.2	DSC- 14	Theory	3	Food Science	60	40
	CNDP 5.2		Practical	2	Food Science	25	25
	CNDT 5.3	DSC- 15	Theory	3	Functional Foods	60	40
	CNDT 5.5	DSE- 1	Theory	3	Food Microbiology	60	40
	CNDT 5.4	VOC - 1	Theory	3	Food Entrepreneurship	60	40
6.	CNDT 6.1	DSC- 16	Theory	3	Dietetics IV	60	40
	CNDP 6.1		Practical	2	Dietetics IV	25	25
	CNDT 6.2	DSC- 17	Theory	3	Institutional Food Service Management	60	40
	CNDP 6.2		Practical	2	Institutional Food Service Management	25	25
	CNDT 6.3	DSC- 18	Theory	3	Nutrition Education and Counselling	60	40

	CNDT 6.4	DSE- 2	Theory	3	Diabetes Management	60	40
	CNDT 6.5	VOC - 2	Theory	3	Clinical Case Studies	60	40
Exit Option with Bachelor of Science in Clinical Nutrition and Dietetics							
7.	CNDT 7.1	DSC- 19	Theory	3	Human Nutrition I	60	40
	CNDP 7.1		Practical	2	Human Nutrition I	25	25
	CNDT 7.2	DSC- 20	Theory	3	Medical Nutrition Therapy I	60	40
	CNDP 7.2		Practical	2	Medical Nutrition Therapy I	25	25
	CNDT 7.3		Internship	3	Internship	60	40
	CNDT 7.4	DSE- 3	Theory	3	Foods in Indian Tradition	60	40
	CNDT 7.5	VOC - 3	Theory	3	Nutritional Communication	60	40
	CNDT 7.6		Theory	3	Research Methodology	60	40
8.	CNDT 8.1	DSC- 21	Theory	3	Human Nutrition- II	60	40
	CNDT 8.2	DSC- 22	Theory	3	Nutrition in Critical Care	60	40
	CNDT 8.3	DSE- 4	Theory	3	Food Additives and Adulterants	60	40
	CNDT 8.4	VOC- 4	Theory	3	Therapeutic Food Product Development	60	40
	CNDT 8.5		Research Project/ Theory – 2	6	Research Project	140	60
					Advanced Dietetics	60	40
					Advanced Food Science	60	40
Award of Bachelor of Science Honours in Clinical Nutrition and Dietetics							
9.	CNDT 9.1	DSC- 23	Theory	3	Medical Nutrition Therapy II	60	40
	CNDP 9.1		Practical	2	Medical Nutrition Therapy II	60	40
	CNDT 9.2	DSC- 24	Theory	3	Public Health Nutrition	60	40

	CNDP 9.2		Practical	2	Public Health Nutrition	25	25
	CNDT 9.3	Field Study	Field study	2	Field Study	25	25
	CNDT 9.4	DSE- 5	Theory	3	Nutritional Psychology	60	40
	CNDT 9.5	VOC - 5	Vocational	3	Nutrition for Women	60	40
	CNDT 9.6		Theory	3	Nutraceuticals and Dietary Supplements	60	40
10.	CNDT 10.1	DSC -25	Theory	4	Sports Nutrition	60	40
	CNDT 10.2	DSC- 26	Theory	3	Nutrition in major Emergencies	60	40
	CNDT 10.3	DSE- 6	Theory	3	Paediatric and Geriatric Nutrition	60	40
	CNDP 10.4	VOC- 6	Practical	2	Nutritional Management in Lifestyle Disorders	25	25
	CND 10.5	Dissertation /Research Project	Dissertation/Research Project	6	Dissertation/Research Project	140	60
Award of Master of Science in Clinical Nutrition and Dietetics							

Curriculum Structure for the Undergraduate Degree Program

B.Sc. Clinical Nutrition and Dietetics

Total Credits for the Program: 265 credits

Starting year of implementation: 2021-2022

Name of the Degree Program: B. Sc Degree / Honours and M.Sc

Discipline/Subject: Clinical Nutrition and Dietetics

Program Articulation Matrix:

This matrix lists only the core courses. Core courses are essential to earn the degree in that discipline/subject. They include courses such as theory, laboratory, project, internships etc. Elective courses may be listed separately.

Sem.	Title /Name of the course	Program outcomes that the course addresses (not more than 3 per course)	Pre-requisite course(s)	Pedagogy	Assessment
1	Fundamentals of Nutrition	PO1	PUC / 10+2 with Chemistry or Biology as one optional	<ul style="list-style-type: none"> Seminar Presentation Quiz 	Formative and Summative Assessment
	Essentials of Macronutrients	PO1, PO2	PUC / 10+2 with Chemistry or Biology as one optional	<ul style="list-style-type: none"> Seminar presentation Planning innovative recipes, Low-cost innovative recipes 	Formative and Summative Assessment
	Food Sanitation, Hygiene	PO4	PUC / 10+2 with Chemistry or Biology as one optional	<ul style="list-style-type: none"> Field study in community Visits Awareness programs 	Formative and Summative Assessment
	Human Physiology	PO3	PUC / 10+2 with Chemistry or Biology as one optional	<ul style="list-style-type: none"> Seminar and Poster presentation Model making 	Formative and Summative Assessment

2	Essentials of Micronutrients	PO2	PUC / 10+2 with Chemistry or Biology as one optional	<ul style="list-style-type: none"> • Seminar presentation, Quiz • Low-cost innovative recipes 	Formative and Summative Assessment
	Food Safety and Security	PO4, PO5	PUC / 10+2 with Chemistry or Biology as one optional	<ul style="list-style-type: none"> • Visits to fair price shops • Visits to institutes, Debate • Awareness programs 	Formative and Summative Assessment

SYLLABUS FOR B.SC. (HONOURS) IN CLINICAL NUTRITION AND DIETETICS

B.SC. CLINICAL NUTRITION AND DIETETICS SEMESTER 1

Course Title: FUNDAMENTALS OF NUTRITION (DSE1)	
Total Contact Hours: 45	Course Credits: 3
Formative Assessment Marks: 40	Duration of ESA/Exam: 3 hours
Model Syllabus Authors:	Summative Assessment Marks: 60

Course Pre-requisite(s): PUC/ 10+2 (with chemistry or biology as one optional) Course

Outcomes (COs): At the end of the course the student should be able to:

1. To understand the guidelines of diet requirements
2. To learn about different methods and principle of cooking
3. To understand the role of macro nutrients in human nutrition
4. To understand their physiological functions, requirements, and sources of macronutrients
5. To acquire knowledge on food sanitation and hygiene
6. To understand food laws and food regulations

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
To understand food laws and food regulations	✓														
To understand the guidelines of diet requirements	✓														
To learn about different methods and principle of cooking	✓														
To understand the role of macro nutrients in human nutrition	✓	✓													
To understand their physiological functions, requirements, and sources of macro nutrients	✓	✓													
To acquire knowledge on food sanitation and hygiene				✓											

Course Title: FUNDAMENTALS OF NUTRITION

Course : DSC 1	
Number of Theory Credits	Number of lecture hours/semester
3	45

CONTENT	45 Hrs
Unit–1INTRODUCTION	14 Hrs
<p>Understanding terminologies:</p> <p>Food, nutrition, health, nutrients, nutritional status, malnutrition-under nutrition over nutrition and optimum nutrition, diet, diet therapy, therapeutic nutrition, kilocalorie, joule, diet diversity, body mass index, daily values, nutrient density. Methods of determining human nutrient need</p> <p>Food and nutrient requirements:</p> <p>Guidelines and Recommendations, development of National Nutritional Requirements, translation of nutritional requirements into Dietary Guidelines. food group system, functions of food Physiological, Psychological and Social factors affecting food intake and food habits, Recommended Dietary allowance (RDA), General Principles of Deriving RDA, Use of Recommended Dietary Allowances (RDAs), Limitations of RDAs, Balanced diet, use of Food exchange list. Food pyramid, my plate, basic of menu planning for family.</p>	

Unit – 2ENERGY	14 Hrs
<p>Definition, units of energy, energy value of food. Components of energy requirement, factors affecting energy requirements, methods of measuring energy expenditure. RMR, Physical Activity Level (PAL),BMR, factors affecting B.M.R, determination of BMR by calculation (Harris Benedict). Energy needs of the body (reference man and reference woman), Energy requirement during work, thermic effect of food, SDA.</p> <p>Human body composition – Methods of assessment (direct and indirect), Changes in body composition during life cycle. Factors affecting body composition: body weight and physical activity</p>	
Unit – 3 FOOD PREPARATION AND HEALTH	14 Hrs
<p>Selection of foods, preliminary preparation of food, principles of cooking, methods of cooking - Boiling, Steaming, Pressure cooking, Microwave oven, Frying (shallow, deep fat), Smoking point of oil, Combination method, methods of cooking: advantages and disadvantages. Effect of cooking on nutritive value, methods of enhancing nutritive value</p> <p>Nutrition and Health- Inter-relationship between food, nutrition, and health. Food choices – nutrients and nourishment, cognitive and environmental influences. Nutrient and food guides for health promotion. Balanced diet-definitions and its importance</p>	

Formative Assessment = 100 marks	
Assessment Occasion / type	Weightage in Marks
Test 1	15

Test 2	15
Assignment + Project	5 + 5
Total	60 marks + 40 marks = 100 marks

Practical –2Credits

60hours

1. Identification of foods under foodgroups.
2. Study of My plate and FoodPyramid
3. Weights and measures of common food (Raw and cookedweight)
4. Cooking methods – Planning and Preparing of recipesby
 - a. Boiling,
 - b. Steaming,
 - c. Pressure cooking,
 - d. Microwave cooking
 - e. Frying (shallow, deep fat), Smoking point ofoil
 - f. Combinationmethod
5. Identifying food composition table and Usage food exchangelist
6. Calculation of energy requirement and energy expenditure for an adultman
7. Calculation of energy requirement and energy expenditure for an adult awoman

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
CIA	15 +15
Presentation / Assignment	10
Total	40

REFERENCES

1. Mudambi S R and Rajagopal M V, (2008), Fundamentals of Foods, nutrition & Diet therapy by new age international publishers, NewDelhi
2. Srilakshmi B, (2002), nutrition science. New Age International publishers. New Delhi.
3. Shubhangaini A Joshi, (2010), Nutrition and Dietetics, with Indian case studies, Tata McGraw-Hill, NewDelhi
4. Bamji, M.S, Reddy, V. (1998), Textbook of Human Nutrition, Oxford & IBH Publishing Co, NewDelhi. Gibney M.J, Elia M Ljinguist. O (2005), Clinical Nutrition, Blackwell Science PublishingCo.
5. Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy, Macmillan Pub. Co. NewYork.
6. Swaminathan, M. (2002) Food and Nutrition, Volume I, The Bangalore Printing and Publishing CompanyLtd.
7. Guthrie, H.A & Picciano, M.F (1995), Morby Publishing Co, NewYork.
8. Srilakshmi, B. (2005). Dietetics, New Age International Publishers, NewDelhi
9. Williams- Basic nutrition and Diet therapy, Elsevier 12thedition

Date

CourseCo-Ordinator

Subject CommitteeChairperson

B.SC. CLINICAL NUTRITION AND DIETETICS SEMESTER 1

Course Title: ESSENTIALS OF MACRO NUTRIENTS (DSC- 2)	
Total Contact Hours: 45	Course Credits: 3+2
Formative Assessment Marks:40	Duration of ESA/Exam: 3 hours
Model Syllabus Authors:	Summative Assessment Marks: 60

Course Pre-requisite(s): PUC/ 10+2 (with chemistry or biology as one optional)

Course Outcomes (COs): At the end of the course the student should be able to:

1. Understand significance of Macro nutrients in the diet
2. Understand their physiological functions, requirements, and sources of macro nutrients

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes(POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Understand significance of Macro nutrients in the diet	✓														
Understand their physiological functions, requirements, and sources of macro nutrients	✓														

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 1

Title of the Course: ESSENTIALS OF MACRO NUTRIENTS

Course: DSC 2	
Number of Theory Credits	Number of lectureHours/semester
3	45

CONTENT	45 Hrs
Unit-1 CARBOHYDRATES	15 Hrs
Chapter No.1: Carbohydrates: Composition, classification, digestion, absorption and metabolism, Functions, Sources and Requirements, excess and deficiencies.	8 Hrs
Chapter No.2: Dietary fiber – definition, classification, sources, role of fiber in Nutrition. Resistant starch, fructo-oligosaccharides, other oligosaccharides: Chemical composition and physiological significance. Glycemic Index and glycemic load. Review of nutritional significance of carbohydrates and changing trends in dietary intake of different types of carbohydrates and their implications.	7 Hrs
Unit – 2PROTEINS	15 Hrs
Chapter No.3: Proteins: Composition, classification of proteins and amino-acids, functions, digestion, absorption and metabolism, Requirements and Sources, Effect of deficiency. Assessment of Protein quality. BV, PER, NPU and	

chemical score.	
Unit-3 LIPIDS	15 Hrs
Chapter No.4: Lipids: Classification, functions, digestion, absorption and metabolism, Sources and Requirements - SFA, MUFA, PUFA: functions and deficiency, Role of n-3 and n-6 fatty acids, Trans Fatty Acids, dietary guidelines (International and National) for visible and invisible fats in diets.	

Formative Assessment = 100 marks	
Assessment Occasion / type	Weightage in Marks
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Total	60 marks + 40 marks = 100 marks

Practical –2Credits**60Hours**

1. Planning and preparation of energy dense recipes
2. Planning and preparation of low energy recipes
3. Planning and Preparation of low Glycaemic index recipes. load

Calculation of Glycaemic index and Glycaemic

4. Planning and preparation of high & low fiber recipes
5. Planning and preparation of protein dense recipes
6. Planning and preparation of low protein recipes
7. Planning and preparation of n-3 and n-6 rich recipes

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
Seminar presentation	10
Planning innovative recipes	15
Low-cost innovative recipes	15
Total	40

References:

1. Shubhangaini A Joshi, (2010), Nutrition and Dietetics, with Indian case studies, Tata McGraw-Hill, NewDelhi
2. Srilakshmi B. (2013) human Nutrition for B.Sc. Nursing students, New Age international publications, NewDelhi.
3. Mudambi S.R and Rajagopal M.V (2008) Fundamentals of foods, Nutrition and Diet therapy, 6th revised edition, new age international publications, NewDelhi
4. Swaminathan M S (2012) Fundamentals of food nutrition BappccoPublication
5. Longvah T Anathan R, Bhaskarachary K, and Venkaiah k (2017) Indian food composition table, NIN.ICMRHyderabad
6. Bamji, M.S, Reddy, V. (1998), Textbook of Human Nutrition, Oxford & IBH Publishing Co, NewDelhi.
7. Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Blackwell Science PublishingCo.
8. Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy, Macmillan Pub. Co. NewYork.
9. Swaminathan, M. (2002) Food and Nutrition, Volume I, The Bangalore Printing and Publishing CompanyLtd.
10. Guthrie, H.A & Picciano, M.F (1995), Morby Publishing Co, NewYork.
11. Srilakshmi, B. (2005). Dietetics, New Age International Publishers, NewDelhi.

Date:**CourseCo-Ordinator****Subject Committee Chairperson**

B.SC. CLINICAL NUTRITION AND DIETETICS SEMESTER 1

Course Title: FOOD SANITATION AND HYGYEINE (OE- 1)	
Total Contact Hours: 45	Course Credits: 3
Formative Assessment Marks:40	Duration of ESA/Exam: 3 hours
Model Syllabus Authors:	Summative Assessment Marks: 60

Course Pre-requisite(s): PUC/ 10+2 (with chemistry or biology as one optional)

Course Outcomes (COs): At the end of the course the student should be able to:

1. Understand importance of foodhygiene
2. Understand the procedure for cleaning andsanitation

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes(POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Understand importance of food hygiene	✓														
Understand the procedure for cleaning and sanitation	✓														

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 1

Title of the Course: FOOD SANITATION & HYGIENE

Number of Theory Credits	Number of lecture hours/semester
3	42

CONTENT	45 Hrs
Unit-1 INTRODUCTION	15 Hrs
Chapter No.1: Terminologies – Sanitation, hygiene, food safety, food sanitation, contamination, food spoilage, danger zone. Significance of sanitation in food catering units, hospital kitchens, food handlers. FSSAI: Safe food handling and hygiene practices -guidelines.	8 Hrs
Chapter No.2: Introduction - Serving safe food, food borne illnesses, preventing food borne illnesses, key practices for ensuring food sanitation. Personal hygiene - importance, sanitary habits, and practices, use of protective clothing during food preparation in large establishments.	7 Hrs
Unit-2 PURCHASE ANDHYGIENE	15 Hrs
Chapter No.3: Purchasing and Storage - Choosing a supplier, Inspection Procedures, Receiving and Inspecting Specific Food, Storage - General Storage Guidelines, Types of Storage, storing specific food, storage techniques - dry	7 Hrs

food storage, refrigerated storage, freezer storage.	8 Hrs
Chapter No.4: Hygiene in Service - Hygiene procedures in food preparation, holding and display food for service, serving food safely, off-site services, hot holding of foods, Safe use of left - over food, hygiene in food service, protective display of food. Storage and disposal of waste – Classification of waste, methods of disposal.	
Unit – 3 CLEANING AND SANITATION	15 Hrs
Chapter No.4: Cleaning and Sanitation - Sanitation Standards for Equipment, installing and maintaining kitchen equipment, Cleaning and Sanitizing - Cleaning vs. Sanitizing, machine dishwashing, manual dishwashing, sanitizing food contact surfaces, cleaning the Premises, storing utensils, tableware, and equipment, using cleaning agents, developing a cleaning Program. Pest control methods and its importance.	15 Hrs

Formative Assessment = 100 marks	
Assessment Occasion / type	Weightage in Marks
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Total	60 marks + 40 marks = 100 marks

References

1. De Vries. (1997) Food Safety and Toxicity, CRC, NewYork.
2. Lawley, R., Curtis L. and Davis, J. (2004) The Food Safety Hazard Guidebook, RSCpublishing.
3. Mario Stanga, Sanitation: Cleaning and Disinfection in the Food Industry, Wiley, 2010.
4. Marriott, Norman G. (1985). Principles of Food Sanitation, AVI, New YorkUSA.
5. Norman G. Marriott, Principles of sanitation, Van Nostrand Reinhold Company, New York.1985.
6. Roday. S. (1999) Food Hygiene and Sanitation, Tata McGraw-Hill Company Limited, NewDelhi.
7. Y. H. Hui, L. Bernard Bruinsma, J. Richard Gorham, Wai-Kit Nip, Phillip S. Tong, Phil Ventresca, Food plant sanitation, CRC Press,2002.
8. Y. H. Hui, Plant sanitation for food processing and food service, CRC Press,2014.

Date

CourseCo-ordinator

Subject CommitteeChairperson

B.SC. CLINICAL NUTRITION AND DIETETICS
SEMESTER 2

Course Title: HUMAN PHYSIOLOGY (DSC – 3)	
Total Contact Hours: 45	Course Credits: 3
Formative Assessment Marks:40	Duration of ESA/Exam: 3 hours
Model Syllabus Authors:	Summative Assessment Marks: 60

Course Pre-requisite(s): PUC/ 10+2 (with chemistry or biology as one optional)

Course Outcomes (COs):

At the end of the course the student should be able to:

- 1 To gain elementary knowledge of functions of organ systems in the human body.
2. To learn about the physiological functions, sources, requirements, micronutrients and its deficiencies
3. To understand the concept of water balance and the function of electrolytes in human nutrition
4. To understand the major nutritional problems in populations
5. To study the different programs and interventions for improving nutritional status.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
To gain elementary knowledge of functions of organ systems in the human body			✓												
To learn about the physiological functions, sources, requirements, micronutrients and its deficiencies		✓													
To understand the concept of water balance and the function of electrolytes in human nutrition		✓													
To understand the major nutritional problems in populations				✓	✓										
To study the different programs and interventions for improving nutritional status				✓	✓										

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 2

Title of the Course: HUMAN PHYSIOLOGY

Number of Theory Credits	Number of lecture hours/semester
3	45

CONTENT	45 HRS
<p>UNIT 1- Basic Cells and Tissues</p> <p>Structure and Function of Cell, Physiological properties of protoplasm. Levels of cellular organization and function – cell organelles and tissues - Structure and functions of epithelial, connective, muscular and nervous tissue, organs and systems – Brief review, Cell membrane transport across cell, membrane and intercellular communication, cell multiplication</p> <p>Introduction of biological membranes to understand molecular transport, transport of large molecules, receptor mediated endocytosis, exocytosis. Molecular aspects of transport; Passive diffusion, facilitated diffusion, active transport. active transport - sodium potassium pump.</p>	15 Hrs

<p>Unit – 2 - Organ system</p> <p>Digestive System - Digestive system: Review of structure (Physiology) and function - Secretory, Digestive and Absorptive functions. Functions of mouth pharynx, oesophagus, stomach, intestine and intestinal villi. Liver, pancreas and gall bladder and their dysfunction Digestive glands: salivary, gastric, liver, pancreas. Digestion of nutrients- Proteins, fats, carbohydrates. Hunger and thirst mechanism. Motility and hormones of</p>	15 Hrs
<p>GIT. Regulation of food intake – role of hunger and satiety centers, effect of nutrients.</p> <p>Circulatory System - Blood: Properties, formation, composition and functions and homeostasis. Formation and function of plasma proteins, erythropoiesis. Blood groups & histocompatibility. Composition & functions of CSF and Lymph. Structure & functions of heart, blood vessels- physiological aspects, ECG, Blood pressure.</p> <p>Respiratory system - Outlined structure of respiratory system, Primary function of respiratory system, Mechanism of respiration, Transport of gases and artificial respiration. Role of lungs in the exchange of gases, Transport of oxygen and CO₂. Cardiorespiratory changes during exercise and training</p> <p>Excretory System - Structure and functions of nephron, glomerular filtration, tubular absorption and secretion. Urine formation - Role of kidney in maintaining pH of blood - Water, electrolyte and acid base balance – diuretics</p> <p>Nervous System: Review of structure and function of neuron - conduction of nerve impulse, synapses, and role of neurotransmitters, Organization of central and Peripheral nervous system, Hypothalamus and its role in various body functions</p>	

Unit – 3	15 Hrs
<p>Skeletal & Muscular System - Ultra structure of skeletal muscle and bone, role of collagen and elastin in bone composition, growth and remodeling, factors affecting long bone growth. Muscular system: Muscle type, structure: Muscle proteins – contractile and non-contractile. Energetics of muscle contraction, Muscular dystrophies.</p> <p>Reproductive System and Endocrine System -Male reproductive system – Structure and functions. Spermatogenesis. Female reproductive system – Structure and functions. Oogenesis.Menstrual cycle, Puberty, Menopause. Fertilization, Development of fertilized ovum (Brief account) Placenta and its functions – Parturition. Endocrinology- Functions of hormones of the pituitary,</p> <p>Immune System - Organs and cells of Immune system, Primary and secondary Lymphoid organs. Immunity– Definition, Types, Innate immunity, Adaptive immunity, cell mediated and humoral immunity. Complement system. Antigens - Chemical nature of antigens, hapten, antigenicity, immunogenicity, epitope. Immunoglobulins -Isotypes, structures and functions IgG, IgM, IgE. Adjuvants. Monoclonal antibodies – definition and production. Major histocompatibility complex proteins (MHC): Definition. Types, physiological role. Vaccines- Definition, significance of vaccines. Hypersensitivity reactions- definition, types, and examples thyroid, parathyroid, adrenal, pancreas, and gonads. Steroid hormones their functions and mechanism of action.</p>	

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Formative Assessment = 100 marks	
Assessment Occasion / type	Weightage in Marks
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Total	60 marks + 40 marks = 100 marks

PRACTICAL:2Credits

60Hrs

1. Microscopic study of tissues- Epithelial, connective, and muscular tissues
2. Smear preparation of human blood for RBC and WBC count
3. Estimation of hemoglobin by Sahli- Hellige (Calorimetric) hematin method
4. Determination of blood groups and Rh factor
5. Determination of bleeding time by Duke's method
6. Determination of Blood clotting time by Wright's method
7. Clinical examination of urine

a) Physical examination: volume colour, odour, appearance, pH.

b) Test for abnormal constituents of urine: Sugar, blood, albumin, Bile salts and ketone bodies.

8. Pulse, B.P and respiratory rate at rest and after exercises

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
Seminar presentation	10
Planning innovative recipes	15

Low-cost innovative recipes	15
Total	40

References

1. Human Physiology by CC. Chatterjee, 11th edition(1985)
2. Essentials of Medical physiology by K Sambulingam, 3rd edition,2005
3. The Cell, Copper, Geoffery, M., Oxford University Press,(2001)
4. Textbook of Biochemistry with Clinical correlations; Thomas Devlin [Ed.] (1997), Wiley –Liss.
5. Lehninger- Principles of Biochemistry; DL Nelson and MM Cox [Eds], 6th Edn. Macmillan Publications(2012).
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8. Principles of Biochemistry: General Aspects, Smith et al., [Ed.] (1986) McGrawHill.
9. Human Biochemistry, Orten and Neuhans, 10th Edn. Mosbey International,(1983).
10. Review of Medical Physiology, Gannong, W.F.15th Edn., Maruzen Asial,(1991).
11. Human Physiology: The mechanisms of Body functions. A.J. Vander, et. Al., (1985) McGraw-Hill.
12. Molecular Cell Biology, Baltimore et. al. (1995) Scientific AmericanPublication.
13. Cellular Physiology of Nerve and Muscle. Gary G Mathew (1998) Balckwell Scientific Inc

Date

CourseCo-ordinator

Subject Commit

B.SC. CLINICAL NUTRITION AND DIETETICS SEMESTER 2

Course Title: ESSENTIALS OF MICRO NUTRIENTS (DSC – 4)	
Total Contact Hours: 45	Course Credits: 3
Formative Assessment Marks:40	Duration of ESA/Exam: 3 hours
Model Syllabus Authors:	Summative Assessment Marks: 60

Course Pre-requisite(s): PUC/ 10+2 (with chemistry or biology as one optional)

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Understand the significance of micronutrients
2. Know the role of water and electrolytes in the body

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes(POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Understand the significance of micronutrients			✓												
Know the role of water and electrolytes in the body		✓													

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 2

Title of the Course: ESSENTIALS OF MICRONUTRIENTS

Number of Theory Credits	Number of lecture hours/semester
3	45

CONTENT	45 Hrs
Unit –1 - Vitamins	15 Hrs
<p>– Definition and classification</p> <p>Fat soluble vitamins - Physiological functions, Sources, Requirements, Deficiency and Hypervitaminosis of Vitamin A, D, E and K</p> <p>Water Soluble vitamins – Physiological functions, Sources, Requirements and Deficiency of B Complex Vitamins- Thiamine, Riboflavin, Niacin, Pyridoxine, Folic Acid, Pantothenic Acid, Cyanocobalamin and VitaminC.</p> <p>Interaction with other nutrients and its effects.</p>	
Unit – 2 - Minerals	15 Hrs
<p>Definition, Classification, Distribution in the body, Functions, Sources and requirement and Effects of Deficiency of Calcium, Phosphorus, Magnesium, Sodium, Potassium, Manganese, Selenium, Iron, Zinc, Iodine, Molybdenum, Cobalt and Fluorine</p> <p>Trace Elements - Distribution in the body, Functions, Sources and requirement and Effects of Deficiency of Vanadium, Silicon, Boron, Nickel, Lithium, Lead, Cadmium, Sulphur.</p>	

Unit – 3 – Water and Electrolytes	15 Hrs
Water – Importance, distribution in the body, functions of water and sources, water intake and loss. Dehydration, edema. Electrolytes - Types, sources, composition of body fluids, maintenance of fluid and electrolyte balance and imbalance	

Formative Assessment = 100 marks	
Assessment Occasion / type	Weightage in Marks
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Total	60 marks + 40 marks = 100 marks

Practical:2Credits

60Hrs

1. Planning and preparation of Vitamin A rich recipes
2. Planning and preparation of Vitamin C rich recipes
3. Planning and preparation of Vitamin B complex rich recipes
4. Planning and preparation of Calcium rich recipes
5. Planning and preparation of iron rich recipes
6. Planning and preparation of Folate rich recipes
7. Estimation of iron in food sources
8. Estimation of calcium in milk
9. Estimation of vitamin C in food sources
10. Estimation of vitamin A by calorimetric method
11. Estimation of total mineral content in a food sample using muffle furnace

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
Seminar presentation	15
Quiz, Assignment	15
Low-cost innovative recipes	10
Total	40

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1. Shubhangaini A Joshi, (2010), Nutrition and Dietetics, with Indian case studies, Tata McGraw-Hill, NewDelhi
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4. Swaminathan MS (2012) Fundamentals of food nutrition BappccoPublication
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6. Bamji, M.S, Reddy, V. (1998), Textbook of Human Nutrition, Oxford & IBH Publishing Co, NewDelhi.
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10. Guthrie, H.A & Picciano, M.F (1995), Morby Publishing Co, NewYork.
11. Srilakshmi, B. (2005). Dietetics, New Age International Publishers, NewDelhi

Date:

CourseCo-Ordinator

Subject-CommitteeChairperson

B.SC. CLINICAL NUTRITION AND DIETETICS
SEMESTER 2

Course Title: FOOD SAFETY AND SECURITY (OE-2)	
Total Contact Hours: 45	Course Credits: 3
Formative Assessment Marks:40	Duration of ESA/Exam: 3 hours
Model Syllabus Authors:	Summative Assessment Marks: 60

Course Pre-requisite(s): PUC/ 10+2 (with chemistry or biology as one optional)

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Understand food laws, regulations and policies
2. Know about food safety and food adulteration

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes(POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Understand food laws, regulations and policies			✓												
Know about food safety and food adulteration		✓													

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 2

Title of the Course: FOOD SAFETY AND SECURITY0E

Number of Theory Credits	Number of lecture hours/semester
3	45

CONTENT	45 Hrs
<p>Unit –1</p> <p>Food Safety - definition of food safety and food spoilage, factors affecting food safety and food spoilage: GMP, GAP, SSOP, GHP, food adulteration - definition, types adulteration in various foods- intentional, incidental, and metallic contaminants</p> <p>Food Laws and Regulations National Legislation - Essential Commodities Act, Standard of Weight and Measures Act, ISI, Mark of BIS, Agmark, BIS. GRAS and permissible limits for chemical preservatives and legal aspects for γ -irradiations. Recent concerns in food safety: New and Emerging Pathogens. Genetically modified foods / Transgenics / Organic foods. Newer approaches to food safety. PFA, FPO, Food Safety and Standards Bill 2005, International Laws and Agreements - FAO, WHO, Codex Alimentarius, WTO, JECFA, APEDA, ISO 22000 series, Hazard Analysis Critical Control Point (HACCP): principles of HACCP, applications of HACCP Current Food Safety Standards in India, Current Food Safety regulations 2001, Food Safety and Standards Authority of India, objectives of developing food safety standards, enforcement of structure and procedure, role of food analyst, safety analysis, action by designated officer and report of foodanalyst</p>	15 Hrs

Unit - 2	15 Hrs
<p>Food and Nutrition Security – Definition, Food production, access, distribution, availability, losses, consumption, Food distribution strategies and storage of food. Socio-cultural aspects and Dietary Patterns: Their implications for Nutrition and Health. Nutritional Status - Determinants of nutritional status of individual and populations, Nutrition and Non-nutritional indicators -Socio-cultural, Biologic, Environmental, Economic.</p> <p>Major Nutritional Problems – An overview etiology, prevalence, clinical manifestations, preventive and therapeutic measures for: Macro and micronutrient deficiencies.</p>	
Unit - 3	15 Hrs
<p>National Food, Nutrition and Health Policies- Plan of action and programs, Approaches and Strategies for improving nutritional status and health, Programmatic options- their advantages and demerits. feasibility, political support, available resources (human, financial, infrastructural). Case studies of selected strategies and programs: their rationale and context. How to select interventions from a range of possible options: Health-based interventions, Food-based interventions including fortification and genetic improvement of foods, supplementary feeding, nutrition education for behavior change.</p> <p>Health economics and economics of malnutrition- Its impact on productivity and national development, Cost-Benefit, Cost effectiveness, Cost efficiency</p>	

Formative Assessment = 100 marks	
Assessment Occasion / type	Weightage in Marks
Test 1	15

Test 2	15
Assignment + Project	5 + 5
Total	60 marks + 40 marks = 100 marks

References

1. Bamji, M.S., Rao, P.N., Reddy, V. (Eds) (1996): Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., NewDelhi.
2. Gopalan, C. and Kaur, S. (Eds) (1989): Women and Nutrition in India, Nutrition Foundation ofIndia.
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Date CourseCo-Ordinator Chairperson

